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UNIVERSITÉ PARIS 1
PANTHÉON SORBONNE

Gender, Migration and the Arab Spring: Evidence from Egypt

Nelly El-Mallakh

Thèse pour l'obtention du grade de
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To the beautiful people in my life,
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1 Résumé

1.1 Aperçu sur le Printemps arabe et la révolution égyptienne

Dans les années récentes, plusieurs pays du Moyen Orient et de l'Afrique du Nord (MENA) ont témoigné des vagues de manifestations et de mouvements révolutionnaires, connus sous le nom du « Printemps arabe ». Ces séries de manifestations se sont révélées contagieuses ; elles ont commencé en Tunisie en 2010 et se sont rapidement propagées dans la région. L'Egypte, le Yémen, la Jordanie, le Bahreïn, la Libye, la Syrie, l'Irak, le Liban, le Maroc et l'Arabie Saoudite ont tous témoigné des manifestations avec différents degrés d'intensité. Les causes principales qui ont mené à ces mobilisations populaires dans le monde arabe ont été largement économiques, les taux de chômage élevés, l'extrême pauvreté, les inégalités sociales et le manque d'opportunités économiques. Campante et Chor (2012a) soulignent l'hypothèse que l'expansion de l'éducation dans le monde arabe combinée avec des perspectives d'emploi médiocres est la raison principale pour l'éruption des manifestations du Printemps arabe. D'autre part, Malik et Awadallah (2013) supporte l'hypothèse que l'absence d'un secteur privé compétitif et intégré au niveau mondial est la raison sous-jacente de ces mouvements révolutionnaires. Ces lectures mettent en lumière non seulement l'importance des changements politiques et institutionnels dans le monde arabe mais aussi qu'une meilleure performance économique est essentielle pour la stabilité de long terme dans les pays du MENA.

Inspirées par la révolution tunisienne, les manifestations égyptiennes ont commencé le 25 janvier 2011. La fameuse Place *Tahrir*, Libération, était l'épicentre des manifestations anti-gouvernementales. Après une rébellion de 18 jours, l'ancien Président Hosni Moubarak a démissionné. La chute de Moubarak a été suivie par d'autres manifestations connues sous le nom de « deuxième vague » de révolution. Alors que les dix-huit premiers jours de la révolution égyptienne ont abouti à la chute de Moubarak, les manifestations ont persisté comme les révolutionnaires continuaient à demander des procès contre les figures de l'ancien régime, y compris Moubarak, la restructuration du Ministère de l'Intérieur et la formation d'un nouveau gouvernement.

La révolution égyptienne est un événement de grande importance. Premièrement, la révolution était un processus long, qui a bien dépassé les dix-huit premiers jours de manifestations jusqu'à la chute de Moubarak, comme des deuxième et troisième vagues de révolution ont pris corps. De plus, ces mobilisations de masse ont été très coûteuses ; plus d'un milliers de décès et beaucoup plus de blessés et d'arrêtés. Les révolutionnaires ont non seulement investi leur temps en manifestant mais aussi ont été prêts à sacrifier leur vie en vue d'atteindre leurs objectifs ultimes de liberté et de changement. Deuxièmement, l'Egypte est un des pays les plus importants dans la région MENA en termes de taille de sa population, de son influence politique et de son importance stratégique. Ses trajectoires économique et politique d'après la révolution de 2011 ont potentiellement des impacts sur les pays voisins et sur la région MENA. Finalement, comme ces vagues de manifestations étaient non seulement

spécifiques à l'Egypte mais que d'autres pays du voisinage et de la région ont témoigné des mouvements similaires ; des leçons et des implications peuvent être dérivées de l'expérience égyptienne pour informer des trajectoires similaires dans la région MENA. Toutes ces raisons renforcent l'importance d'étudier les répercussions économiques et institutionnelles de la révolution égyptienne.

1.2 La révolution égyptienne et le marché du travail des femmes

Une des contributions principales de cette thèse est l'étude d'un évènement récent et particulier tel que la révolution égyptienne. Deux questions d'importance cruciale, en termes de contribution à la littérature existante et en termes d'élaboration de politique publique seront examinées dans cette dissertation. En premier, cette thèse examine comment ces vagues récentes et importantes de manifestations égyptiennes ont façonné l'écart de genre sur le marché du travail et en particulier, les différences homme-femme au sein du ménage en termes de participation au marché du travail.

L'autonomisation des femmes est une question de recherche très importante puisque dans beaucoup de pays du monde, les femmes sont à la traîne par rapport aux hommes sur le marché du travail mais aussi en termes d'éducation, de droits et de représentation politique. La question d'autonomisation des femmes est aussi au centre des débats académiques et publics. En effet la relation entre l'autonomisation des femmes et le développement économique est bidirectionnelle. Le développement économique induit potentiellement plus d'autonomisation des femmes par le biais de la réduction des inégalités de genre mais aussi l'autonomisation des femmes peut bénéficier au développement économique (Duflo, 2012).

La recherche académique traitant des questions de genre est en particulier intéressante dans les pays en voie de développement où les inégalités entre les sexes sont les plus prononcées. Concernant le marché du travail égyptien, ceci est particulièrement le cas comme des progrès substantiels sont enregistrés au niveau de l'éducation des femmes tandis que leur participation au marché du travail demeure très faible. Selon le rapport le plus récent sur l'écart entre les sexes publié par le Forum économique mondial en 2016, l'Egypte est classée 132 sur 144 pays sur la base de l'indice global de l'écart entre les sexes. En plus, selon l'enquête sur le marché du travail égyptien (ELMPS12), la participation au marché du travail des femmes mariées est très faible, 30% des femmes mariées participent au marché du travail contre 98% des maris en 2006. Dans ce contexte, étudier les répercussions de la révolution égyptienne sur la participation des femmes au marché du travail se révèle comme une question très pertinente surtout dans la mesure où cette dernière pourrait potentiellement entrainer un changement d'équilibre avec des taux plus élevés de participation des femmes au marché du travail.

Au-delà de l'examen des effets de la révolution de 2011 sur les différences femme-homme au sein du ménage en termes de participation au marché du travail, ce chapitre tente aussi d'offrir

une compréhension plus approfondie des mécanismes potentiels à travers lesquels les manifestations peuvent potentiellement impacter différemment par genre les résultats sur le marché du travail. Quoique ce soit plausible que les manifestations mènent à une révolution de normes sociales et à un changement potentiel de perceptions du rôle des femmes dans la société, c'est improbable que ce mécanisme opère dans un si court terme. Des mécanismes alternatifs incluent l'incertitude élevée, la migration et les transferts de fonds, les changements de fécondité, les changements dans la participation religieuse et les contraintes de temps, toutes ces hypothèses sont examinées et testées dans ce chapitre.

Ce chapitre contribue à la littérature croissante sur l'impact de différents chocs technologique, démographique et économique, sur l'offre du travail des femmes (Goldin et Katz, 2002; Albanesi et Olivetti, 2015; Greenwood, Seshadri et Yorukoglu, 2005; Fogli et Veldkamp, 2011; Ager, Brückner et Herz, 2016; Teso, 2014; Grosjean et Khattar, 2014). La littérature existante sur l'impact des chocs politiques sur le travail des femmes s'est surtout concentrée sur l'impact de la deuxième guerre mondiale sur l'offre de travail des femmes et démontre que l'offre de travail des femmes a augmenté de manière permanente après la guerre à cause de la mobilisation militaire des hommes (Goldin, 1991; Goldin et Olivetti, 2013). En parallèle, Acemoglu, Autor et Lyle (2004) ont examiné l'impact de cette augmentation permanente de l'offre du travail des femmes sur les salaires après la deuxième guerre mondiale. Ce chapitre contribue à la littérature citée ci-dessus en examinant l'impact d'un choc politique de nature différente, tel que la révolution égyptienne, sur la participation des femmes au marché du travail et surtout sur l'écart entre les sexes.

Une des contributions de cette thèse est l'utilisation d'une base de données unique, la base de données statistique de la révolution égyptienne. Cette base de données est administrée par le centre égyptien pour les droits économiques et sociaux et elle enregistre tous les évènements incluant décès, blessés ou arrêtés durant la période de la révolution égyptienne. Ce travail est le premier à exploiter cette base de données en économie et surtout, le premier à géocoder chaque « martyr » - manifestant qui s'est décédé pendant la révolution – en fonction du lieu de décès pour construire une mesure désagrégée de l'intensité de la révolution. La Figure 1.1 montre la géolocalisation des « martyrs ». Chaque cercle représente un lieu de décès, qui peut correspondre à un ou plusieurs incidents de décès. Des lieux de décès ont été identifiés dans chacun des gouvernorats égyptiens ; variant entre un lieu de décès au Louxor à 91 lieux de décès au Caire. Comme j'identifie chaque lieu de décès par ses coordonnées GPS, je construis une mesure désagrégée de l'intensité de la révolution égyptienne, qui est le nombre de « martyrs » reporté à la taille de la population du district correspondant. Géocoder les décès au niveau des districts permet d'isoler les effets des manifestations elles-mêmes d'autres facteurs qui peuvent varier selon le temps ou l'espace.

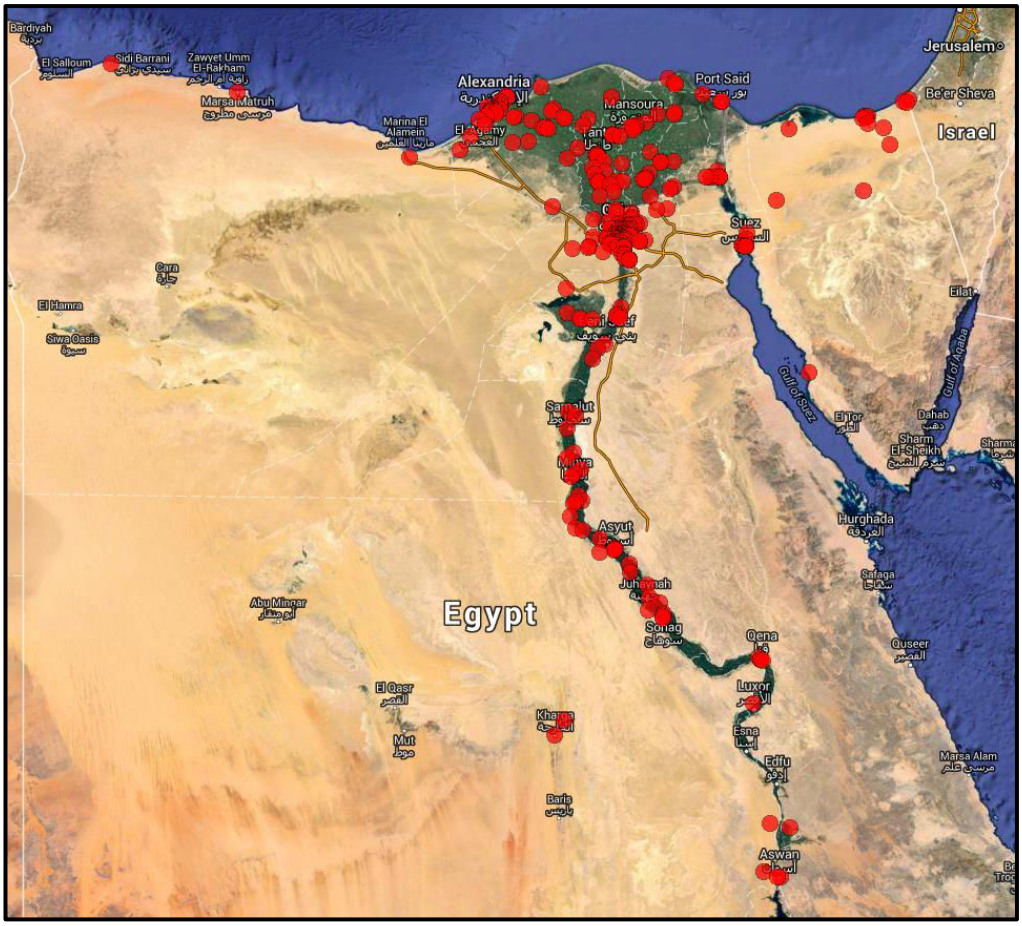

Figure 1.1. Géocoder les « martyrs » de la révolution égyptienne

Notes: Les « martyrs » réfèrent aux décès de la révolution égyptienne du 25 janvier 2011 à fin juin 2012, géocodés en fonction du lieu de décès. Chaque cercle représente un emplacement. Chaque emplacement correspond à un ou plusieurs incidents de décès. Les incidents sont concentrés autour de la Vallée du Nil comme les cinq gouvernorats de frontière : Matrouh, la Mer Rouge, le Nord du Sinaï, le Sud du Sinaï et la Nouvelle-Vallée représentent moins de 2% de la population totale de l'Egypte (Minnesota Population Center, 2015). Sources : les cartes de Google et la base de données statistique de la Révolution égyptienne.

L'analyse empirique combine des données provenant de la base de données statistique de la révolution égyptienne avec des données en panel provenant des enquêtes sur le marché du travail égyptien (ELMPS), d'avant et d'après les manifestations. Les enquêtes ELMPS sont des données représentatives au niveau national. Comme une enquête typique sur le marché du travail, cette base de données incluent des sections relatives à l'emploi, au chômage ainsi qu'aux salaires et revenus. En plus, ces enquêtes fournissent des données riches sur les dynamiques d'emploi, les comportements d'épargne et d'emprunt, les migrations, les transferts de fonds, les caractéristiques socio-économiques des parents, l'éducation, les activités entrepreneuriales, les choix de fécondité, le statut des femmes et les processus décisionnels au sein du ménage (Assaad et Krafft, 2013).

L'enquête ELMPS est effectuée par le Forum de recherche économique (ERF) en coopération avec l'agence centrale égyptienne de mobilisation et de statistiques (CAPMAS) depuis 1998. Ces enquêtes ont été administrées à des échantillons représentatifs en 1998, en 2006 et en 2012. Ce papier met à profit le fait que deux vagues ont été effectuées avant et après les

manifestations égyptiennes de 2011. On utilise la dimension panel et on se focalise en particulier sur les deux vagues de 2006 et de 2012, ce qui permet d'observer les mêmes individus avant et après les manifestations ; le travail de terrain de la vague de 2012 a eu lieu entre le 1er mars 2012 et le 10 juin 2012 (plus d'une année après le déclenchement des manifestations en 2011). Un total de 37,140 individus ont été interrogés en 2006, parmi lesquels 28,679 ont été réinterrogés en 2012. L'analyse se concentre sur l'échantillon de couples mariés en 2006 et en 2012, et qui sont en âge de travailler.

Quant à l'analyse empirique, on utilise la méthode des doubles différences avec intensité de révolution variable au niveau géographique en fonction de l'endroit de résidence des ménages. La méthodologie employée dans ce chapitre repose sur un modèle intra-ménage, où toutes les variables dépendantes d'intérêt sont définies en tant que différence entre femme et homme au sein du ménage. Dans le Tableau 1.1, les résultats principaux de ce chapitre sont reportés. En Panel A, les résultats sont reportés en se basant sur des données au niveau ménage et en Panel B, les résultats sont reportés en se basant sur des données au niveau individu. Ceux-ci mettent en lumière que les manifestations ont réduit les différences intra-ménage entre une femme et son mari, en termes de participation au marché du travail égyptien. Cet accroissement dans la participation des femmes au marché du travail est dû à une augmentation relative du chômage des femmes par rapport aux hommes comme les femmes commencent à chercher activement un emploi après la révolution.

Pour quantifier ces effets, les manifestations du printemps arabe en Egypte ont mené à une augmentation de la participation au marché du travail des femmes par 7%, si on évalue ces effets en utilisant une augmentation par un écart type dans la variable d'intérêt « martyrs » et en reportant ces effets par rapport à la valeur moyenne de participation au marché du travail des femmes avant la révolution. Quant à l'accroissement du chômage et de l'emploi des femmes par rapport aux hommes au sein du ménage, ceci est de l'ordre de 28% et 4% respectivement, aussi évalués par rapport à la valeur moyenne respective de ces deux variables en utilisant une augmentation par un écart type dans la variable d'intérêt « martyrs ».

Les résultats de ce chapitre suggèrent aussi une réduction dans les différences intra-ménage en termes d'emploi entre les femmes et leurs maris, comme l'emploi des femmes augmente par rapport aux hommes après la révolution surtout dans les emplois de « mauvaise qualité », le secteur privé informel. C'est à travers l'effet du travailleur additionnel que les écarts entre sexes au sein du ménage en termes de participation au marché du travail se trouvent réduits après la révolution égyptienne. En effet, les résultats supportent que ce mécanisme soit celui qui mène une augmentation relative de la participation des femmes au marché du travail par rapport aux hommes. Selon un mécanisme de partage des risques, les femmes augmentent leur participation au marché du travail pour faire face à l'incertitude croissante et à l'instabilité des flux de revenus de leurs maris, comme les résultats montrent que le niveau ainsi que la volatilité des revenus des hommes sont affectés négativement par la révolution.

Tableau 1.1: Participation au marché du travail, chômage et emploi. Régression en doubles différences.

Panel A: Des données au niveau ménage, Différences intra-ménage			
	(1)	(2)	(3)
VARIABLES	Participation au marché du travail	Chômage	Emploi
Martyrs × année	0.038***	0.022***	0.016**
	[0.007]	[0.005]	[0.007]
Observations	7,416	7,416	7,416
R-carré	0.727	0.574	0.756
Contrôles ménage	YES	YES	YES
Contrôles × année	YES	YES	YES
Effets fixes ménages	YES	YES	YES
Effet fixe année	YES	YES	YES
Panel B: Données au niveau individuelle			
Martyrs × année× femme	0.036***	0.022***	0.014***
	[0.006]	[0.004]	[0.005]
Martyrs × année	0.002	-0.003	0.005*
	[0.003]	[0.003]	[0.002]
Observations	14,832	14,832	14,832
R-carré	0.849	0.577	0.872
$H_0 : \alpha_1 + \alpha_2 = 0$ (P-value)	0.000	0.000	0.000
Contrôles individu	YES	YES	YES
Contrôles ménage	YES	YES	YES
Contrôles × année	YES	YES	YES
Effets fixes individus	YES	YES	YES
Effet fixe année	YES	YES	YES
Nombre de clusters	213	213	213

*** p<0.01, ** p<0.05, * p<0.1. Les écarts types robustes regroupés au niveau district sont reportés entre parenthèses.

Notes. Chaque cellule représente un coefficient estimé en utilisant la méthode des doubles différences. Le nombre de « martyrs » correspond au nombre de décès entre le 25 janvier 2011 et fin juin 2012, normalisé par la taille de la population du district en milliers habitants. L'année est une variable muette égale à un en 2012 (après les manifestations) et zéro en 2006 (avant les manifestations). La participation au marché du travail, le chômage et l'emploi sont définis en fonction du statut actuel d'emploi. La période de référence pour ces variables est de 3 mois. Dans le Panel A, les résultats sont reportés en utilisant des données au niveau ménage où les variables dépendantes sont définis comme différences intra-ménage entre la femme et son mari et les régressions incluent des variables de contrôle au niveau ménage, variantes dans le temps ainsi que leur interaction avec la variable muette année. Dans le Panel B, les résultats sont reportés en utilisant les données au niveau individuel et les régressions incluent des contrôles au niveau individu et ménage qui varient dans le temps ainsi que leur interaction avec la variable année. Les variables au niveau individu qui varient dans le temps sont les suivantes : trois variables muettes pour les niveaux d'éducation : primaire et préparatoire, secondaire et plus que secondaire. La catégorie de référence est aucune éducation (illettrés ou lettrés mais sans aucun diplôme). Les contrôles au niveau ménage et qui varient dans le temps sont les suivantes : une variable muette pour résidence rurale, des variables muettes pour les districts de résidence, la taille du ménage, le nombre d'adultes entre 15 et 64 ans, une variable muette pour la propriété terrienne et trois variables muettes pour les niveaux d'éducation du chef de ménage. Les régressions incluent aussi des effets fixes ménage/individu (Panel A/Panel B) ainsi que l'effet fixe année et des pondérations panel pour corriger l'attrition entre 2006 et 2012. La P-value du test où l'hypothèse nulle est que $\alpha_1+\alpha_2=0$ est reportée en Panel B pour tester si les manifestations affectent significativement les résultats des femmes.

1.3 La révolution égyptienne et le changement politique

La deuxième question de recherche liée à la révolution, étudiée dans cette thèse est si les manifestations de 2011 ont été efficaces pour induire un changement politique en Egypte et comment les manifestations ont façonné les prévisions économiques des individus, leurs perceptions sur la démocratie et les libertés politiques. En effet, les manifestations de 2011 ont été associées aux élections présidentielles de 2012, qui ont été les premières élections présidentielles libres et compétitives dans l'histoire de l'Egypte. Par contre, on connait peu par rapport à l'efficacité de ces mouvements révolutionnaires pour induire un changement politique et placer l'Egypte sur la bonne voie afin de réussir sa transition démocratique.

Les études empiriques sur les effets des manifestations sur les changements politiques sont presqu'inexistantes. L'unique exception est le travail de Madestam, Shoag, Veuger et Yanagizawa-Drott (2013) qui examinent l'effet du mouvement Tea Party aux Etats-Unis sur l'élaboration de politiques publiques et sur les comportements politiques. Les auteurs utilisent les variations de précipitation en jour de manifestations pour avoir une source exogène de variation en termes de participation aux manifestations et ils trouvent que les manifestations ont eu comme effet une augmentation de support pour les positions du Tea Party ainsi qu'une augmentation des votes accrus par les républicains durant les élections de mi-mandat.

Ce chapitre sur l'impact des manifestations de 2011 sur le changement politique en Egypte est le premier à examiner l'impact des manifestations du printemps arabe sur les résultats politiques qui se sont ensuivis. Ce chapitre examine l'efficacité de ce mode d'action politique en vue de réaliser les objectifs et les demandes des manifestants en termes de changements institutionnel et politique, qui sont cruciaux pour le développement économique. Cette question de recherche est liée à la littérature qui montre que la qualité des institutions est inductive à une meilleure performance économique (Acemoglu, Johnson et Robinson, 2001; Hall et Jones, 1999) et à des travaux parallèles faisant aussi le lien entre démocratisation et performance économique (Rodrik et Wacziarg, 2005; Papaioannou et Siourounis, 2008, Rodrik, 1999; Barro, 1996; Tavares et Wacziarg, 2001). Tandis que ces études se focalisent sur les impacts de la démocratisation et des institutions sur la performance économique, les manifestations et les transitions politiques sont autant importantes pour induire des changements institutionnels qui à leur tour affectent les performances économiques et la croissance de long terme.

Les deux chapitres sur la révolution égyptienne contribuent aussi à la littérature sur les manifestations. Kuran (1989) a développé une théorie des révolutions non-anticipées. Selon l'auteur, des gouvernements peuvent paraitre inébranlables, tandis que leurs peuples respectifs cachent leur volonté de mobilisation anti-gouvernementale jugeant l'opposition politique faible. Par contre, quand l'opposition commence à se renforcer, des révolutions non-anticipées peuvent effectivement se déclencher contre des régimes de longue date. Collins et Margo (2004, 2007) ont examiné l'impact des émeutes des années 1960 qui ont suivi l'assassinat de Martin Luther King Junior sur les résultats au marché du travail des américains africains et sur les valeurs immobilières. Campante et Chor (2014) ont trouvé que l'expansion

en termes d'éducation combinée avec une fragilité macroéconomique est associée avec des pressions populaires pour la démocratisation. Gupte, Justino, et Tranchant (2014) ont étudié les déterminants de la victimisation des émeutes en Inde. Aidt et Franck (2015) ont examiné si la violence politique est un déterminant de démocratisation, en se basant sur le Great Reform Act adopté par le parlement britannique en 1832. Chekir et Diwan (2015) ont comparé la performance et la valeur boursière des firmes connectées et non-connectées politiquement avant et après la révolution égyptienne de 2011. Acemoglu, Hassan et Tahoun (2016) ont examiné l'impact des manifestations égyptiennes de 2011 sur les rendements boursiers des firmes connectées à trois groupes : l'ancien régime de Moubarak (le parti national démocratique), les militaires et les frères musulmans. En plus, la littérature connexe sur les manifestations inclue les travaux d'Aldrich et Reiss (1970), Kent, Phan, et Rabinovich (2016), Fearon (2011) et Chaney (2012), entre autres.

Plusieurs bases de données sont utilisées dans ce chapitre au service de la question de recherche. En se basant sur les données officielles des élections présidentielles de 2012 provenant du Conseil Suprême de la Commission électorale et des données de recensement en Egypte de 2006, j'examine en premier l'impact de l'exposition des districts à différents degrés d'intensité aux manifestations sur les résultats électoraux pendant les deux tours d'élections présidentielles égyptiennes de 2012. Les données de recensement sont utilisées pour dériver des variables de contrôle au niveau des districts qui visent à capturer les différences démographiques ; la taille de la population, la densité de la population, les pourcentages de musulmans et de coptes, les pourcentages d'émigrants et d'immigrants et la structure d'âge de la population. Les variables de contrôle sur les caractéristiques du marché du travail incluent aussi le taux de chômage, la participation des femmes au marché du travail et l'emploi du secteur public. Des proxys pour la pauvreté incluent l'accès à l'électricité et au système d'assainissement. En plus, les régressions incluent des variables de télécommunication telles que l'accès aux ordinateurs et l'accès à internet. Les parts de la population détenant une éducation secondaire et la part des illettrés capturent les différences géographiques en matière d'éducation.

Dans le Tableau 1.2, les résultats principaux de ce chapitre sont reportés. Les candidats du premier tour sont classifiés en tant que candidats de l'ancien régime, candidats islamistes ou candidats indépendants. Les candidates de l'ancien régime sont ceux qui ont servis pendant le mandant de Moubarak ou qui étaient étroitement alignés avec l'ancien régime. Les candidats islamistes sont ceux qui sont affiliés ou appuyés par les partis politiques islamistes. Finalement, les candidats indépendants sont ceux qui n'appartiennent à aucune des deux catégories précédentes. Pendant le deuxième tour des élections, deux candidats étaient en compétition pour les présidentielles, Mohamed Morsi, le candidat des frères musulmans et Ahmed Shafik, une figure de l'ancien régime.

En contrôlant pour des variables, qui peuvent potentiellement affecter l'intensité des manifestations ainsi que les résultats électoraux au niveau des districts, dérivées des données de recensement de 2006, les résultats montrent qu'une exposition à une intensité de manifestations plus élevée mène à une augmentation de la part des votes accrus par les candidats de l'ancien régime durant les deux tours des élections présidentielles de 2012.

Durant le premier tour des élections, cette augmentation de la part des votes accrus par les candidats de l'ancien régime est équivalente à une réduction significative dans la part de votes accrus par les candidats de l'ancien régime, sans affecter significativement la part de votes accrus par les candidats indépendants. Pendant le deuxième tour des élections, les individus étaient confrontés à voter soit pour le candidat islamiste des frères musulmans Mohamed Morsi, soit pour le candidat Ahmed Shafik, une figure de l'ancien régime de Moubarak. On retrouve toujours au deuxième tour que les manifestations de 2011 ont mené à un accroissement de la part des votes accrus par Ahmed Shafik contre une baisse équivalente de la part des votes accrus par Mohamed Morsi. Un résultat intéressant mis avant dans le deuxième tour est l'impact des manifestations sur l'augmentation de la part des votes invalides, qui reflète plus qu'une invalidation non-intentionnelle. Ce résultat montre que les individus exprimaient leur désapprobation par rapport aux deux candidats du deuxième tour en invalidant leurs votes. Dans une vue d'ensemble, ces résultats mettent en avant que les manifestations de 2011 ont eu des répercussions conservatrices entre certains groupes de la société qui avaient potentiellement peur d'un changement politique radical.

L'analyse est complémentée par une étude des mécanismes qui peuvent potentiellement expliquer les résultats soulignés précédemment. Pour se faire, j'utilise deux vagues de données du Baromètre Arabe conduit en Egypte. La première vague a été conduite entre le 16 juin et le 3 juillet 2011 et la deuxième vague entre le 31 mars et le 7 avril 2013. Le baromètre arabe est conduit en Egypte en coopération avec le Centre Ahram pour les études stratégiques. Ces enquêtes sont basées sur les entretiens individuels face à face, conduites en arabe auprès des individus âgés de 18 ans ou plus dans les gouvernorats égyptiens. L'objectif de ces enquêtes conduites en Egypte mais aussi dans d'autres pays arabes est d'évaluer les comportements des citoyens et leurs valeurs vis-à-vis des libertés, de leur confiance à l'égard des institutions publiques, leur identité politique, leurs perceptions en termes de gouvernance et de démocratie, leur engagement civique et leur participation politique.

La première vague a été donc conduite en Egypte après la chute de Moubarak et la deuxième vague a été conduite approximativement deux ans plus tard. En se basant sur ces données transversales regroupées, j'estime l'impact de l'intensité de la révolution sur différentes variables capturant les prévisions économiques individuelles, leurs perceptions de démocratie et de libertés politiques, la confiance vis-à-vis des institutions publiques ainsi l'évaluation de la performance du gouvernement en matière d'économie et de performance en période de transition démocratique.

Les résultats mettent aussi en lumière que les manifestions ont eu des répercussions conservatrices, aux côtés de prévisions économiques négatives, de l'insatisfaction générale à l'égard de la performance du gouvernement, de la réduction des niveaux de confiance envers les institutions publiques et de la reconnaissance croissante des limitations aux libertés civiles et politiques. Ces résultats sont observés sur une période de deux ans suivant la démission de Moubarak et montrent que le peuple égyptien était en particulier insatisfait par rapport à la gestion de la période de transition démocratique. Effectivement, les résultats mettent en avant que les manifestations ont négativement influencé le climat populaire en Egypte en particulier sur la période des deux années suivant la chute de Moubarak.

Tableau 1.2: L'impact des manifestations de 2011 sur les résultats électoraux de 2012

	(1)	(2)	(3)	(4)	(5)
		Premier tour		*Deuxième tour*	
VARIABLES	Indépendant	Ancien	Islamiste	Islamiste	Invalide
Martyrs, % de la population	-1.425	10.593***	-9.167***	-8.588**	0.502***
	[2.915]	[3.590]	[2.126]	[3.926]	[0.169]
Observations	349	349	349	349	349
R-carré	0.895	0.695	0.788	0.744	0.733
Controles au niveau district	YES	YES	YES	YES	YES
Effets fixes gouvernorats	YES	YES	YES	YES	YES
Nombre de clusters	27	27	27	27	27
Moyenne de la variable dépendante	0.203	0.345	0.453	0.537	0.017

Ecarts types robustes regroupés par gouvernorat sont reportés entre parenthèses. *** p<0.01, ** p<0.05, * p<0.1
Notes. L'unité d'analyse est le district. Chaque cellule représente un coefficient estimé par la méthode des MCO. Les variables dépendantes dans les colonnes (1), (2) et (3) représentent la part des votes accrus par les candidats indépendants, de l'ancien régime et islamistes, respectivement, exprimée en % des votes valides durant le premier tour des élections présidentielles de 2012. La variable dépendante en colonne (4) représente la part des votes accrus par le candidat islamiste exprimée en % des votes valides pendant le deuxième tour des élections. La variable dépendante en colonne (5) représente la part des votes invalides durant le deuxième tour des élections présidentielles de 2012 et est égale au nombre total de votes invalides divisé par le nombre total de votants enregistrés par district. La variable d'intérêt principale est le nombre de « martyrs », exprimé en pourcentage de la population du district. Les régressions incluent aussi un vecteur de variables de contrôle au niveau district dérivé des données de recensement de 2006. La valeur moyenne des différentes variables dépendantes est reportée à la dernière ligne.

1.4 La migration de retour et la mobilité professionnelle

Au croisement de l'économie de la migration, du développement et du travail, un autre chapitre de cette thèse examine l'impact de la migration temporaire sur la mobilité professionnelle des migrants de retour vis-à-vis des non-migrants ; qui n'ont eu aucune expérience migratoire. La migration de retour est un phénomène sous-étudié et selon l'étude de Docquier et Rapoport (2012) sur la fuite et le retour des cerveaux, la migration de retour est l'aspect le moins étudié de la migration internationale. Quoique l'immigration internationale et ses impacts sur les pays d'accueil aient eu beaucoup d'intérêt dans la littérature académique, c'est que récemment qu'un nombre croissant d'études a commencé à étudier le phénomène de la migration de retour et ses impacts sur les pays d'origine.

Ce chapitre contribue à la littérature sur la migration de retour et ses impacts en termes de développement économique, qui s'est focalisée sur les choix de fécondité, les primes salariales des migrants de retour par rapport aux non-migrants et les activités entrepreneuriales (Bertoli et Marchetta, 2015; Wahba, 2015; Wahba et Zenou, 2012). Ce papier comble une lacune importante dans la littérature existante en examinant l'impact de la migration de retour sur une autre mesure d'accumulation de capital humain et de compétences, la mobilité professionnelle. Plus précisément ce chapitre étudie si l'expérience migratoire permet aux migrants de retour à grimper l'échelle professionnelle et accéder à de meilleurs emplois, par rapport aux non-migrants.

Examiner si les migrants acquièrent des compétences et accumulent du capital humain au cours de leurs expériences migratoires est une question de premier ordre pour le développement économique des pays d'origine. Ceci est particulièrement le cas pour les pays en voie du développement comme les débats public et académique soulignent surtout l'impact négatif de l'émigration internationale, qui résulte en une fuite des cerveaux. Selon le modèle théorique développé par Stark, Helmenstein, et Prskawetz (1997), la fuite des cerveaux peut être associée au retour des cerveaux par le biais de la migration de retour. En effet dans un contexte d'information imparfaite, les travailleurs à faible productivité peuvent investir en termes d'éducation afin d'émigrer and d'accéder au marché du travail étranger. Une fois que l'information sur la vraie valeur de productivité de ces travailleurs est révélée, ils décident de retourner à leur pays d'origine ayant accumulé du capital humain et des compétences acquises à l'étranger, qu'ils n'auraient pas accumulé autrement. Dans ce cas, la fuite des cerveaux peut effectivement aller de pair avec un retour des cerveaux.

Parallèlement, d'autres travaux ont montré que l'émigration internationale peut mener à un retour de cerveaux si la motivation d'émigration accroît les rendements prévus d'éducation et par suite, mène à un investissement plus important en matière d'éducation pour les migrants eux-mêmes qui souhaitent migrer ou pour le reste des citoyens. Beine, Docquier et Rapoport (2008) trouvent que la possibilité d'émigration des travailleurs qualifiés a un impact positif et significatif sur la formation du capital humain en utilisant des données en coupe transversale au niveau macroéconomique. Batista, Lacuesta et Vincente (2012), en utilisant des données au niveau individuel, trouvent un effet positif de la probabilité d'émigration future des individus sur leur propre éducation au Cap Vert ; un pays avec des taux élevés d'émigration internationale pour les plus éduqués. D'autre part, Chand et Clemens (2008) trouvent que des taux plus élevés d'émigration internationale des plus éduqués mènent non seulement à l'accroissement de l'investissement en éducation mais aussi à l'accroissement du stock d'individus les plus éduqués (net de l'émigration) au Fiji.

Dans ce chapitre, on utilise des données provenant de l'enquête sur marché du travail égyptien de l'année de 2012 (ELMPS12). La migration égyptienne est connue par sa nature temporaire comme la vaste majorité des jeunes égyptiens émigrent temporairement et retournent en Egypte. L'Egypte est donc un pays avec des migrations de retour substantielles. En effet, environ 5% de la population âgée 15 ans ou plus sont des migrants de retour en 2012, selon l'enquête ELMPS12.

Afin de contrôler pour les conditions initiales sur le marché du travail, on emploie une analyse de cohorte en comparant des individus qui sont rentrés sur le marché du travail durant la même décennie. Une des caractéristiques importantes de l'enquête utilisée dans l'analyse empirique est qu'elle permet de suivre les trajectoires professionnelles des individus. Ceci nous permet donc de comparer le premier emploi avec l'emploi actuel pour les individus qui appartiennent à la même cohorte d'entrée sur le marché du travail. L'enquête nous permet aussi d'identifier les migrants de retour non seulement en se basant sur l'information provenant de la section sur la migration de retour mais aussi en suivant les trajectoires professionnelles individuelles qui permettent de détecter les emplois détenus à l'étranger pour les migrants.

En ce qui concerne la méthodologie empirique, on utilise plusieurs méthodes d'estimation. Premièrement, on utilise l'approche de variable instrumentale pour corriger l'endogénéité de la décision de migration. Les cours pétroliers ajustés à l'inflation sont utilisés pour instrumenter la décision de migration temporaire. Le raisonnement sous-jacent est que la migration égyptienne est principalement destinée vers d'autres pays arabes, producteurs de pétrole où les cours pétroliers ont joué un rôle déterminant dans la demande de la main d'œuvre étrangère, directement dans ces pays arabes producteurs du pétrole et indirectement dans les autres pays arabes non-producteurs de pétrole, via le remplacement des travailleurs. Deuxièmement, on utilise la méthode des doubles différences afin de contrôler pour toutes les caractéristiques inobservables qui ne varient pas dans le temps entre les migrants de retour et les non-migrants. Troisièmement, on utilise une méthode de doubles différences combinée avec une approche d'appariement qui permet aussi de contrôler pour les caractéristiques observables ainsi que toutes les caractéristiques inobservables ne variant pas dans le temps. Finalement, on utilise un modèle de sélection qui permet de corriger la double sélection de la décision de migration et de la décision de retour en utilisant un modèle d'équations simultanées (Roodman, 2011) qui permet d'estimer les équations sur la mobilité professionnelle, l'émigration et la migration de retour simultanément. Selon ce modèle, les termes d'erreur des différentes équations peuvent être corrélés suivant une distribution multidimensionnelle. Pour l'identification de l'équation sur l'émigration, on utilise les cours pétroliers ajustés à l'inflation. Pour l'équation sur la migration de retour, on utilise le nombre de conflits armés actifs qui est spécifique par pays de destination et par année, dérivé du Projet de données Uppsala sur les conflits (UCDP). Le raisonnement sous-jacent est que les pays arabes qui constituent principalement les destinations des migrants égyptiens ont témoigné dans les années récentes de nombreux conflits qui ont contribué significativement à la migration de retour des égyptiens.

Le Tableau 1.3 reporte les résultats principaux de ce chapitre par la méthode des doubles différences. Ce tableau est divisé en trois panels qui considèrent respectivement la migration de retour non-conditionnelle du pays de destination des migrants, la migration de retour des pays producteurs de pétrole et la migration de retour des pays non-producteurs de pétrole. Ces trois panels montrent un effet positif et significatif de la migration de retour sur la mobilité professionnelle des individus. Le coefficient de doubles différences montre un effet plus prononcé pour la migration de retour des pays non-producteurs de pétrole par rapport aux pays producteurs de pétrole quoique la taille de l'échantillon soit petite. Les résultats des autres méthodes d'estimation sont robustes et consistants et montrent que la migration de retour a un impact positif et significatif sur la mobilité professionnelle. Autrement dit, les résultats mettent en avant que les migrants de retour ont une probabilité plus élevée à grimper l'échelle professionnelle pour atteindre de meilleurs emplois par rapport aux non-migrants. Non seulement les résultats suggèrent que la migration de retour a un effet positif sur la mobilité professionnelle mais aussi que les migrants de retour ont une probabilité plus importante par rapport aux non-migrants de faire des sauts plus grands à travers l'échelle professionnelle. Finalement, les résultats semblent aussi signaler que seulement les migrants de retour ayant des niveaux élevés d'éducation bénéficient à leur expérience migratoire en termes de mobilité professionnelle positive à leur retour au pays d'origine.

Tableau 1.3: Doubles différences – résultats pour la cohorte des années 1980

Panel A: Traitement de migration de retour

Echantillon de migrants de retour=304, Echantillon de non-migrants=956

	Avant le traitement (t=0)	*Après le traitement (t=1)*	*Différence*
Migrants de retour	3.105	3.895	0.789***
(Groupe de traitement)	(0.079)	(0.082)	(0.113)
Non-migranrts	3.285	3.673	0.388***
(Groupe de contrôle)	(0.050)	(0.047)	(0.068)
Différence	-0.179	0.222**	0.401***
	(0.099)	(0.096)	(0.137)

Panel B: Traitement de migration de retour (pays producteurs de pétrole)

Echantillon de migrants de retour =248, Echantillon de non-migrants =956

	Avant le traitement (t=0)	*Après le traitement (t=1)*	*Différence*
Migrants de retour	3.145	3.895	0.750***
(Groupe de traitement)	(0.086)	(0.090)	(0.124)
Non-migranrts	3.285	3.673	0.388***
(Groupe de contrôle)	(0.050)	(0.047)	(0.068)
Différence	-0.139	0.223**	0.362**
	(0.107)	(0.103)	(0.149)

Panel C: Traitement de migration de retour (pays non producteurs de pétrole)

Echantillon de migrants de retour =42, Echantillon de non-migrants =956

	Avant le traitement (t=0)	*Après le traitement (t=1)*	*Différence*
Migrants de retour	2.833	3.976	1.143***
(Groupe de traitement)	(0.228)	(0.227)	(0.322)
Non-migranrts	3.285	3.673	0.388***
(Groupe de contrôle)	(0.050)	(0.047)	(0.068)
Différence	-0.451*	0.304	0.755**
	(0.241)	(0.230)	(0.333)

*** p<0.01, ** p<0.05, * p<0.1. Ecarts-types robustes sont reportés entre parenthèses.

Notes. Dans le Panel A, le traitement est la migration de retour, non-conditionnelle sur le pays de destination. Dans les Panels B et C, le traitement est considéré comme la migration de retour des pays producteurs de pétrole et la migration de retour des pays non-producteurs de pétrole, en fonction de la dernière destination des migrants. Avant le traitement correspond à la première occupation professionnelle en dans les années 1980 et après le traitement correspond à l'occupation professionnelle actuelle de l'individu en 2010. La variable dépendante est l'occupation professionnelle de l'individu classée de 1 à 5 pour les catégories suivantes : agriculture, col bleu peu qualifié, col bleu très qualifié, col blanc peu qualifié et col blanc très qualifié.

2 Introduction

In recent years, several countries in the Middle East and North Africa (MENA) region have been hit by a wave of protests and revolutionary movements known as the "Arab Spring." These series of protests have proved to be contagious; they first started in Tunisia in late 2010 and rapidly spread throughout the region. Egypt, Yemen, Jordan, Bahrain, Libya, Syria, Iraq, Lebanon, Morocco and Saudi Arabia have all witnessed demonstrations with varying levels of intensity. The driving causes that led to the mass mobilization in the Arab world were largely economic, high levels of unemployment, pervasive poverty and inequality and lack of economic opportunities. Campante and Chor (2012a) argue that expansion of education in the Arab world matched with poor labor market prospects for the educated youth was the major determinant of the Arab Spring upheavals. Malik and Awadallah (2013), on the other hand, argue that one of the main underpinning of the Arab world revolutions is the absence of a competitive private sector, integrated with global markets. Indeed, institutional and political changes are crucial, however economic performance is essential for the long-term stability of the MENA countries.

Inspired by the Tunisian revolution, the Egyptian protests started on the 25th of January 2011, with its famous *Tahrir*, Liberation, Square being the epicenter of antigovernment demonstrations. After an 18-day rebellion, Ex-President Hosni Mubarak stepped down. The toppling of Mubarak has been followed by what has been known as the "second wave" of protests. While the first eighteen days of the revolution succeeded in the fall of Mubarak, the protests persisted as the revolutionaries continued to demand the trials of former regime figures, including Mubarak, the restructuring of the Ministry of Interior and the selection of a new cabinet.

The Egyptian revolution is an event of great importance. First, the protests went well beyond the eighteen days demonstrations until Mubarak's resignation as second and third waves of revolution erupted. These people-led mobilizations were also very costly; with well over a thousand deaths and many more injuries and arrests. Demonstrators did not only invest time but were also willing to sacrifice their lives in pursuit of freedom and change. Second, Egypt is one of the most important countries in the MENA region in terms of population size, political influence and strategic importance. Its political, economic outcomes in the aftermath of the revolution are likely to affect its neighboring countries and the MENA region. Finally, as these waves of revolutions were not only specific to Egypt and several countries in the region have witnessed similar movements, lessons and implications could be driven from Egypt's experience to inform similar trajectories in the MENA region. All these reasons reinforce the importance of studying the economic, institutional repercussions of the Egyptian revolution.

One of the main contributions of this thesis is the study of an important event such as the Arab Spring protests in Egypt. Two questions of extreme importance related to the Arab Spring protests in Egypt, both in terms of contribution to the literature and in terms of policy-making, are examined in this dissertation. First, it examines how the important and recent

waves of protests in Egypt are shaping the gender gap in labor market outcomes and particularly, intra-household differences in labor force participation between husbands and wives.

Women's empowerment is an important research question since in many countries in the world women are lagging behind men in several labor market and educational outcomes but also in terms of rights and political representation. The question of women empowerment lies in the centre of academic and public debates. Not only economic development might be inductive to women's empowerment through a reduction in gender inequalities but also the relationship between women empowerment and economic development is bidirectional. In other words, empowering women might actually be beneficial for economic development (Duflo, 2012).

Gender related research is particularly interesting in developing countries, as gender inequalities tend to be most pronounced in relatively poorer countries. In terms of labor market, this is particularly true in Egypt where advances are made in terms of women's educational attainment, however, their labor force participation remain strikingly low. According to the most recent gender gap report Egypt ranks 132 out of 144 countries on the basis of the Global Gender Gap Index 2016 (World Economic Forum, 2016). As will be presented in the empirical analysis, according to the Egypt Labor Market Panel Survey (ELMPS), married women's labor force participation is dramatically low as it stands at 30% compared to their husbands', the latter being 98% in 2006. Hence, whether the revolution could provide a leeway to increase women's labor force participation in Egypt and lead to a potential shift in labor market equilibrium with higher levels of female labor force participation is a very important research question.

Beyond examining the effects of the 2011 protests on intra-household differences in labor market outcomes, this thesis offers a more comprehensive framework by attempting to disentangle the several potential channels through which the protests could affect labor market outcomes differently by gender. While theoretically plausible, the protests could lead to a revolution in social norms and to changes in perceptions towards the role of women in society, this channel is unlikely to operate in the short term. Alternative channels include increased uncertainty, migration and remittance-recipiency, changes in fertility choices, changes in religious participation and time-constraints; all of which are examined carefully and tested for. This chapter contributes to a growing literature on women's labor supply in response to various technological, demographic and economic shocks (see for instance, Goldin and Katz, 2002; Albanesi and Olivetti, 2015; Greenwood, Seshadri and Yorukoglu, 2005; Fogli and Veldkamp, 2011; Ager, Brückner and Herz, 2016; Teso, 2014; Grosjean and Khattar, 2014). Existing work on the labor market responses to political shocks has mostly focused on the effect of World War II on women's labor supply that was found to have increased permanently after the war as men were mobilized militarily (Goldin, 1991; Goldin and Olivetti, 2013). Parallel work by Acemoglu, Autor and Lyle (2004) has examined the wage effects of such a permanent increase in female's labor supply following World War II. Our paper contributes to the above mentioned literature by examining labor market responses

to a political shock of different nature, such as the one associated with the Egyptian revolution.

One of the main novelties and contributions of this dissertation is the use of a unique dataset, the Statistical Database of the Egyptian revolution. It documents all the events including fatalities, injuries and arrests during the Egyptian uprisings. This work is to the best of my knowledge the first to use the Statistical Database of the Egyptian revolution and the first to geocode each "martyr" - demonstrator who died during the protests - based on their site of death to construct a disaggregated measure of protests' intensity. Geocoding the fatalities at the district level enables to isolate the effect of the protests themselves from other factors that might vary across space and time. Relying on panel data from the Egypt Labor Market Panel Survey (ELMPS), from before and after the Egyptian revolution, we employ a Difference-in-Differences technique that allows for geographical differences in treatment intensities according to the district of residence of the households.

The methodology used in this paper is based on an intra-household framework, where the labor market outcomes of interest are defined as differences between wife and husband. The results suggest that the protests have reduced intra-household differences between the wife and her husband, mainly through an increase in women's unemployment relative to men. Indeed, women were found to start to actively search for employment in the aftermath of the Egyptian protests. We also find suggestive evidence of a reduction in intra-household differences in employment, as women's employment is also found to have increased relative to men in "low quality" jobs, namely the private informal sector. The reduction in intra-household differences in labor force participation is found to be driven by an added worker effect. Through a risk sharing mechanism, women increase their labor force participation in order to face the increased risk and instability of their husband's income flows, as we find that both the levels and the volatility of men's earnings are negatively affected.

The second question related to the Egyptian revolution studied in this dissertation is whether the protests have actually been effective in bringing about political change in Egypt and how they are shaping individuals' economic expectations, perceptions about democracy, political freedoms and liberties. In the context of Egypt, the 2011 Egyptian protests have been associated with the 2012 presidential elections, which are the first free and competitive elections in Egypt's history. However, little is known about how the revolution is actually effective in inducing political change and putting Egypt on the right track to achieve its democratic transition.

On the effects of protests on political change, empirical assessment is almost inexistent. The only exception is the work of Madestam, Shoag, Veuger and Yanagizawa-Drott (2013), who examine the effect of the Tea Party movement in the United-States on policy making and political behavior. The authors exploit variation in rainfall on the day of these rallies as an exogenous source of variation in attendance and find that the protests increased public support for Tea Party positions and led to more Republican votes in the 2010 midterm elections.

The chapter on protests and political change in Egypt is to the best of my knowledge the first paper examining the effects of the Arab Spring on subsequent political outcomes. It examines

the effectiveness of such mode of political action in achieving people's demands in terms of regime and institutional changes, which are key for economic development. This research question is linked to the literature showing how the quality of institutions is inductive to better economic performance (see for instance, Acemoglu, Johnson and Robinson, 2001; Hall and Jones, 1999) and to parallel work on democratization in developing countries and economic performance (Rodrik and Wacziarg, 2005; Papaioannou and Siourounis, 2008, Rodrik, 1999; Barro, 1996; Tavares and Wacziarg, 2001). While these studies focus on the impact of democratization and institutions on economic performance, protests and political transitions are also of great relevance to institutional change, which in turn affects economic performance and long-term growth.

In this chapter, I use several data sources. Using official elections results from the Supreme Council Electoral Commission (SPEC) and Census data from Egypt, I first examine the impact of districts' exposure to varying levels of protests' intensity on voting outcomes during the two rounds of Egypt's first free presidential elections. Candidates are classified in the first round as former regime, Islamist or independent candidates. The former regime candidates are those who served under Mubarak or were closely aligned with his government. Islamist candidates are those affiliated with or endorsed by Islamist political parties. Meanwhile, the independent candidates are those that did not belong to the first two categories. In the second round, two candidates were competing for the elections, Mohamed Morsi, the Muslim Brotherhood candidate, and Ahmed Shafik, the former regime figure. Controlling for potential confounding factors derived from Census data that could potentially affect protest intensity at the district level as well as voting outcomes, I find consistent and robust results suggesting that higher exposure to protest intensity leads to a higher share of votes for former regime figures both during the first and second rounds of the 2012 presidential elections. This finding suggests that the protests have potentially led to a conservative backlash among segments of the population that fear radical political change.

In an attempt to investigate potential mechanisms driving the results, the analysis is complemented using two waves of the Arab Barometer conducted in Egypt. The first one was conducted in 2011 after Mubarak's resignation and the second wave was conducted in 2013, approximately two years later. Relying on pooled cross-sectional data, I find that the protests led to a conservative backlash, alongside negative economic expectations, general dissatisfaction with government performance, decreasing levels of trust towards public institutions, and increasing recognition of limitations on civil and political liberties. These results are observed over the course of the two years following Mubarak's resignation and suggest that the Egyptian people were mostly unsatisfied with the management of the transitional period. Indeed, the results suggest that the protests have soured the popular mood in Egypt, particularly when the nation faced the sobering realities of the democratic transition after Mubarak stepped down.

Both research questions on the Egyptian revolution also contribute to the literature on protests. Kuran (1989) provides a theory of unanticipated revolutions. He argues that governments might appear unshakeable, as people hide their dislike towards their respective government as long as they judge the opposition weak. However, as the opposition starts to

become slightly more powerful, unanticipated revolutions could occur even against longstanding regimes. Collins and Margo (2004, 2007) examined the impact of the 1960s riots following the assassination of Martin Luther King Junior on the labor market outcomes of African Americans and on property values. Campante and Chor (2014) find that expansion in education coupled with macroeconomic weakness is associated with higher incumbent turnover and greater pressures towards democratization. Gupte, Justino, and Tranchant (2014) study the determinants of riots victimization in India. Aidt and Franck (2015) examine whether political violence is driving democratization, providing evidence from the Great Reform Act adopted by the British Parliament in 1832. Chekir and Diwan (2015) compare the performance and stock market valuation of politically connected and unconnected firms before and after the 2011 Egyptian uprisings. Acemoglu, Hassan and Tahoun (2016) investigate the effects of the 2011 Egyptian protests on stock market returns, for firms connected to three groups: elites associated with Mubarak's National Democratic Party (NDP), the military, and the Muslim Brotherhood. Other related literature on protests includes the works of Aldrich and Reiss (1970), Kent, Phan, and Rabinovich (2016), Fearon (2011) and Chaney (2012), among others.

At the intersection of migration, development and labor economics, another chapter in this thesis examines the impact of temporary migration on the occupational mobility of return migrants vis-à-vis stayers, i.e. those who never had any work experience abroad. Return migration is an understudied phenomenon and, as highlighted by Docquier and Rapoport (2012) in their survey on the brain drain and brain gain, "return migration is probably the most understudied aspect of international migration." Indeed, while international migration and its impact on receiving countries have received considerable attention in the academic literature, a growing body of research has only recently started to examine the return phenomenon and its impact on origin countries.

This chapter contributes to the literature on return migration that has primarily focused on fertility choices, the wage premium of return migrants with respect to non-migrants, and entrepreneurial activities (Bertoli and Marchetta, 2015; Wahba, 2015; Wahba and Zenou, 2012). It thus fills a gap in the literature by studying the impact of return migration on human capital accumulation from a new perspective. Another important measure of human capital accumulation and skill upgrading that has not been sufficiently studied is occupational mobility. This chapter thus aims to answer the question of whether temporary migration experience enables return migrants to climb up the occupational ladder compared to non-migrants.

Whether migrants acquire skills and accumulate human capital whilst overseas is an important question for the economic development of the sending countries. This is particularly the case in developing countries since the public debate tends to underscore the negative impact of international migration resulting in a brain drain. From a theoretical point of view as proposed by Stark, Helmenstein, and Prskawetz (1997), a brain drain can be associated with a brain gain through return migration. In a context of imperfect information, low-ability workers could invest in education in order to migrate and be pooled with higher ability workers on the foreign job market. Once information on workers' productivity is revealed, they decide to

return with higher human capital accumulated abroad that they wouldn't have acquired without migrating, hence, this provides the opportunity of a brain gain with a brain drain.

In this chapter, we use data from the 2012 Egypt Labor Market Panel Survey (ELMPS12). Egyptian migration is known to be temporary in nature, as the vast majority of young Egyptian men migrate temporarily and return to Egypt. Hence, Egypt is a country with substantial return migration—indeed, almost 5 percent of the population aged 15 and above were return migrants in 2012 (ELMPS12). In order to control for initial labor market conditions, we rely on cohort analysis, by comparing individuals who entered the labor market in the same decade. One of the main features of the data is that it allows tracking individual job trajectories. Hence, we are able to compare the first and current occupations for individuals who belong to the same cohort of entry in the labor market. We are also able to identify return migrants relying on information from the return migration module but also tracking individual job trajectories to determine whether they had any work experience abroad.

We rely on several estimation techniques. First, we use an instrumental variable approach to correct for the endogeneity of the migration decision. To have an exogenous variation in the probability of temporary migration, inflation adjusted oil-prices are used to instrument for the temporary migration decision. This is because Egyptian migration is predominantly destined towards other Arab countries, where oil prices have played a major role in driving the demand for foreign labor, both directly in oil-producing countries and indirectly in other Arab non-oil producing countries, as replacement workers. We also employ a Difference-in-Differences methodology to account for unobservable time-invariant characteristics between the returnees and stayers, as well as Difference-in-Differences combined with propensity score matching technique that enables us to account for observable characteristics as well as time-invariant unobservables. Finally, we use a selection-model to account for the double selection into migration and into return migration using a conditional mixed process estimator (Roodman, 2011) where we estimate occupational mobility, migration and return migration equations simultaneously, allowing the error terms of the interrelated equations to be correlated through a multidimensional distribution. For identification of the migration equation, we use inflation adjusted oil prices as a predictor of the migration decision. As for the return equation, we use the number of active armed conflicts in a country-year derived from Uppsala Conflict Data Project (UCDP) Monadic Conflict Onset and Incidence Dataset. The rationale behind using this instrument is that other Arab countries constitute the major destinations of Egyptian migrants and several countries in the Middle East have been hit by conflicts in recent years, which have all led to significant return migration.

All the previously described methodologies have led to the same finding: return migration increases the probability of witnessing upward occupational mobility. Return migrants were also found to have consistently higher probabilities of making bigger leaps across the occupational ladder compared to stayers. The results also suggest that only returnees who belong to the upper end of the educational distribution benefit from the migration experience abroad in terms of climbing up the occupational ladder.

3 Arab Spring protests and women's labor market outcomes: Evidence from the Egyptian revolution[1]

3.1 Introduction

Women's empowerment has been central in the policy and academic debates in recent years. There is now a large consensus that empowering women may benefit economic development and is highly desirable for efficiency (see for instance United Nations, 2005; Duflo, 2012; Diebolt and Perrin, 2013). In the academic literature, a growing number of randomized experiments allow to shed light on the effects of programs that aim at improving the status of women in several domains[2].

Still, in many countries in the world, women lag behind men for several education and labor market outcomes. This is particularly true in the Arab world, where several countries are also experiencing in recent years a wave of protests and revolutions - known as the "Arab Spring"- mainly driven by poor labor market prospects for the educated youth (Campante and Chor, 2012a). In this paper, we focus on Egypt, where former presidents Hosni Mubarak and Mohamed Morsi were removed from power in February 2011 and July 2013, respectively. Egypt is also a country with a large segregation by gender. The United Nations (2013) document that it is ranked 77 out of 80 countries on the Gender Empowerment Measure and, according to the World Economic Forum's Global Gender Gap Report (2013), 125 among 136 countries. In the 1990s, following the implementation of the Economic Reform and Structural Adjustment Program, Egypt experienced growing gender gaps, partly because of the contraction of opportunities in the public sector, without an increase in available jobs in the non-governmental sectors (Assaad and Arntz, 2005).

In this paper, we provide an empirical analysis of how the important and recent waves of protests in the Arab world are shaping the gender gap in labor market outcomes. There are several potential mechanisms through which the Egyptian uprisings may affect women's labor market conditions. The most plausible channel - and the one that is supported by our estimates - is that the protests might generate economic uncertainty. Thus through adaptive expectations, individuals residing in those districts were internalizing "past" events to form their expectations about what will happen in the future. If political unrest generates economic uncertainty, then especially for households that are close to the subsistence level, the negative shock would probably undermine the importance of cultural factors and attitudes towards female work: i.e., in periods of recessions, the work of women might be encouraged if the households are close to the subsistence level, even if in normal economic conditions the labor market is highly segregated by gender. This channel is also in line with work of Attanasio,

[1] Joint work with Mathilde Maurel (Université Paris 1 Panthéon-Sorbonne) and Biagio Speciale (Université Paris 1 Panthéon-Sorbonne and Paris School of Economics).

[2] See, among others, Beaman, Duflo, Pande and Topalova (2012), Jensen (2012), Beath, Christia and Enikopolov (2013), Ashraf, Field, and Lee (2014), Bandiera, Buehren, Burgess, Goldstein, Gulesci, Rasul and Sulaiman (2015), and Duflo, Dupas and Kremer (2015).

Low and Sánchez Marcos (2005), who explore the role of female labor supply as an insurance mechanism against idiosyncratic earnings risk within the family.[3]

Were the households close to the subsistence level before the beginning of the political unrest? Campante and Chor (2012a) present the results of a poll conducted by the International Republican Institute in Egypt shortly after the resignation of Hosni Mubarak: 64 percent of the respondents who claimed that they had taken part in the recent protests cited "low living standards/lack of jobs" as their main motivation and 41 percent of the respondents answered that they had "trouble feeding [themselves] and [their] family and buying even the most essential things for survival" (see International Republican Institute, 2011 and Campante and Chor, 2012a for more results on this poll).

To construct a measure of intensity of the Egyptian uprisings, we exploit unique information on the number of demonstrators who died during the protests, denoted as "martyrs" in our data source (Statistical Database of the Egyptian Revolution)[4]. We are able to geocode each "martyr" according to the location of the incident leading to his death. Relying on this unique information, we construct our measure of intensity of the Egyptian protests, the district-level number of "martyrs," normalized by the district's population size. The number of fatalities during a demonstration is a function of both the number of protesters and the type of revolutionary action undertaken by the protesters. For example, storming a government building is more likely to result in a high number of fatalities and this type of action is more likely to happen when a critical mass of protesters is present at the demonstration. Hence, we consider the number of "martyrs" as a proxy for protests' intensity, as it is correlated with the number of protesters and with a number of other indicators of protests' intensity, such as the number of people who were injured or arrested during the uprisings.

To our knowledge, this is the first paper taking advantage of this unique dataset in economic research and the first to geocode each Egyptian "martyr" during the first and second waves of the 2011 uprisings. Computing the intensity of the protests at a very disaggregated level, we are able to isolate the impacts of the protests themselves from other factors that may vary across space. We rely on labor market information from the Egypt Labor Market Panel Survey (ELMPS) related to the period both before and after the political unrest, and we match our unique measure of the intensity of the protests at the district level with the individual's labor market outcomes. Our analysis allows for different treatment intensities according to the geographical location of the individual. Hence, the novelty of this paper relies on the variation over time and in the geographical intensity of the protests, at a very disaggregated level.

Our empirical strategy relies on a Difference-in-Differences specification. The panel structure also allows us to condition on unobserved heterogeneity, through fixed effects estimation. We have information both before and after the uprisings, and exploit geographical differences in protests' intensity. Relying on a sample of couples who are married and living in the same

[3] In related literature, Alesina, Özler, Roubini and Swagel (1996) show that political instability may negatively affect growth and Kent, Phan, and Rabinovich (2016) show that episodes of violent unrest may have a long-lasting effect on economic activity

[4] The term "martyr" has been used as well in the international press, for instance New York Times (2011), BBC News (2012) and Al Jazeera (2013).

household in both the 2006 and 2012 waves of the ELMPS survey, we compare the wife's labor market outcomes in the aftermath of the Egyptian protests to the husband's using intra-household differences in outcomes. Our estimates show that married women's labor force participation has increased relative to their husband in the aftermath of the 2011 Egyptian protests, especially for those who belong to the lowest three quartiles of the pre-revolution distribution of per capita household income. This increase in labor force participation is explained by an increase in both women's employment and unemployment, as women are found to actively start searching for employment. We also find that the increase in employment is mostly in "low quality jobs," mainly in the informal sector. Conditional on being employed, our estimates show that the working women have also increased their labor supply (number of hours of work per week) relative to their husband. Our findings are compatible with a framework of intra-household risk sharing, and suggest that the recent waves of protests have also reduced the wage gap between the wife and her husband as the protests had a negative impact on men's wages and have also increased their volatility. This has occurred because a large share of men is employed in the private sector, which has been the most affected sector during the Arab Spring. Indeed, according to Financial Times (2012), 1,500 factories have shut down in the year 2011 under a range of pressures including insecurity and the number of factories that shut down since the beginning of the revolution to 2013 is estimated to 4,500 factories (Reuters, 2013). Hence, married women increased their labor force participation in the aftermath of the protests in order to face the increased risk and instability of their husband's income flows. Our results therefore add to the literature showing evidence of an "added worker effect" in different contexts (see among others Lundberg, 1985; Cullen and Gruber, 2000; Hyslop, 2001; and Stephens, 2002). Even though, this is a nation-wide shock that likely affected the labor market conditions at the national level, it was more so in districts that were exposed to higher protests' intensity.[5]

We provide several robustness and identification checks. We perform a falsification test in order to ensure that our results are not driven by differential pre-existing trends in labor markets outcomes, using two survey waves that both refer to periods before the eruption of the protests. Additional checks confirm that our results are not driven by the inclusion of central places of assembly, or by the lack of data between 2006 and 2012, the latter check using retrospective information from the 2012 survey to construct individuals' work status in 2010. Our findings are also robust to the use of data that are collapsed at the district level and to different constructions of our "martyrs" variable, considering that an economic shock hitting a district is likely to affect the economic activities of neighboring districts as well. Results are also robust to using geocoding the "martyrs" according to their place of residence instead of the site of death and to correcting for spatial dependence following Conley's (1999).

[5] For instance, Tahrir Square and some its neighboring streets were completely closed during the period of the revolution, streets surrounding Ministries, where protests took place and the Sadat metro station situated beneath Tahrir Square were also closed at times, which very likely affected negatively local economic activity. As for example, the office of Air France situated in Talaat Harb Square, off Tahrir Square shut down in the aftermath of the revolution and never reopened again. See Financial Times (2012) and Reuters (2013) for anecdotal accounts on the state of business in Egypt in the aftermath of the revolution and workers' testimonies in the aftermath of the revolution as workers report loss of income and periods of unemployment.

Our paper contributes to a growing literature on female labor force participation that documents significant persistence over time of women's labor supply. This inertia may depend on the nature of cultural beliefs and on historical determinants of social norms (see for instance, Alesina, Giuliano and Nunn, 2013). Despite this persistence, women's labor supply can react to technological, economic, demographic and political shocks: see Goldin and Katz (2002), Albanesi and Olivetti (2015) and Greenwood, Seshadri and Yorukoglu (2005) for an analysis of the consequences of technological and medical changes on female labor force participation; Fogli and Veldkamp (2011) and Ager, Brückner and Herz (2016) for the role of economic shocks; Teso (2014) and Grosjean and Khattar (2014) for the effects of demographic changes; Goldin (1991) and Acemoglu, Autor and Lyle (2004) for the role of World War II. From a conceptual point of view, in the presence of multiple labor market outcomes equilibria, these shocks may imply a shift from an equilibrium to another with a different level of women's labor supply.

We complement this literature by analyzing the effect of a recent and very relevant political shock, the Arab Spring protests, on the relative position of women in the labor market. In the context of Egypt, this is a relevant and interesting research question as women labor force participation has remained very low, despite a substantial increase in women's education. Whether the Egyptian protests could provide a leeway to break the longstanding social constraints and cause a shift to a labor market equilibrium with lower gender gaps in labor market outcomes and higher female labor force participation rates is a very important research question. While the available data on Egypt allow to analyze the short-term labor market impacts only, the literature we cite above suggests how a relevant shock to the labor division between men and women may have long run consequences, as cultural norms about the appropriate role of women vary. Related to this point, Goldin and Olivetti (2013) show that the shock associated to World War II had a persistent impact on labor market outcomes of higher educated women in the US. These findings are also consistent with a dynamic pattern proposed theoretically by Hazan and Maoz (2002). In their model, a woman's employment outside her home may initially have a direct negative effect on her household's utility, but an increase in women's labor force participation in a certain period decreases the utility loss for women who work outside the household in the following period. This brings a virtuous cycle of increases in women's labor force participation.

Our work also contributes to a growing literature on protests (see, among others, Kuran, 1989; Collins and Margo, 2007; Fearon, 2011; Campante and Chor, 2012a; Chaney, 2012; Madestam, Shoag, Veuger, and Yanagizawa-Drott, 2013; Campante and Chor, 2014; Gupte, Justino, and Tranchant, 2014; Aidt and Franck, 2015; Chekir and Diwan, 2015; Kent, Phan, and Rabinovich, 2016). Some of this previous literature shows how riots can disrupt economic activity, for instance through a decrease in property value due to a decline in perceived amenities in one location relative to others or due to property damage (Collins and Margo, 2007). In addition to destruction of physical capital, protests can raise production costs through higher interest rates on small business loans or higher insurance costs (see Aldrich and Reiss, 1970). Eventually, some residents and firms in districts where the protests take place may decide to move to other areas if relocation costs are not too high, inducing a

downward shift in both labor demand and supply. Collins and Margo (2004) discuss how these channels can imply economically significant labor market consequences, which can be larger in the long run than in the short run[6]. Our work complements this literature on protests confirming that uprisings can affect labor market outcomes and showing a differential effect by gender.

Using data on the Arab Spring in Egypt, Acemoglu, Hassan and Tahoun (2016) investigate the effects of the recent protests on stock market returns, for firms connected to three groups: elites associated with Mubarak's National Democratic Party (NDP), the military, and the Muslim Brotherhood. They construct a daily estimate of the number of protesters in Tahrir Square as measure of revolution intensity, using information from Egyptian and international print and online media. While Acemoglu, Hassan and Tahoun (2016) focus on events in one location (Tahrir Square), exploiting variation at the daily level, our measure of protest intensity varies at the geographical level. The level of disaggregation of the uprisings in our analysis allows to isolate the impacts of the protests themselves from other factors that may vary across geographical areas.

The rest of this paper is organized as follows. Section 3.2 provides background information on the Egyptian protests and the "martyrs." Section 3.3 provides a description of the data. Section 3.4 describes the empirical strategy. Section 3.5 presents the results as well as robustness and identification checks. Section 3.6 discusses the mechanisms. Section 3.7 briefly concludes.

3.2 Background information

3.2.1 The Egyptian revolution and the "martyrs"

The first wave of the Egyptian revolution began on the 25th of January 2011. Youth activists, workers and football fans rallied against Mubarak's government, participating to a protest that represents one of the biggest revolutionary movements in recent years (The Guardian, 2011). The Egyptian revolution was a people-led political mobilization, positioned among a series of Arab Spring uprisings that started in Tunisia and spread rapidly to the Middle East. Protests in Egypt unfolded in the country's two major cities - Cairo and Alexandria - with millions rushing to the streets after few days of the first protest (Beissinger, Jamal, and Mazur, 2015). Crowds filled Tahrir, or Liberation, Square, and spilled into nearby streets. Protesters also came from rural provinces in the Nile Delta (CNN, 2011).

Demonstrators were taking to the streets in several countries in the Arab World, to protest against their respective authoritarian regimes. After few weeks of mass demonstrations, Ben Ali in Tunisia and Mubarak in Egypt were forced to resign, putting an end to two

[6] In line with these results on economic outcomes, Kent, Phan, and Rabinovich (2016) show that episodes of unrest are associated with significant accumulated losses in GDP growth as well as significant increases in macroeconomic uncertainty. Their analysis suggests that it may take a long time for the economy to recover to its pre-unrest output level.

longstanding autocratic regimes in the region. Inspired by the Tunisian and Egyptian uprisings, several Arab countries – Yemen, Jordan, Bahrain, Libya, Syria, Iraq, Lebanon, Morocco and Saudi Arabia - have witnessed similar revolutionary movements with varying levels of intensity (Moaddel, 2012; Beissinger, Jamal, and Mazur, 2015).

Egyptian protests' participants tended to be overwhelming male, middle class, with above average educational levels. They were drawn from middle occupational and income profiles, and heavily networked. More precisely, according to the Arab Barometer survey conducted in Egypt in July 2011, 77% of demonstrators were male, 46% had the highest level of education (university and above) and 45% were internet users as opposed to only 16% for the population as a whole. These revolutionaries were motivated primarily by economic reasons and to a lesser extent by political and civil freedoms (Beissinger, Jamal, and Mazur, 2015).

The spark that ignited the Egyptian revolution was mainly the death of a 28 years old man, called Khalid Said, who died after an encounter with the Egyptian police in Alexandria (New York Times, 2010). Shortly after his death, his story was spread all over blogs, websites and social media, evidencing the major role played by internet as a medium of communication and coordination tool used by protesters during the revolution (Moaddel, 2012; Beissinger, Jamal, and Mazur, 2015). The public protests started in the aftermath of Khalid Said's murder in Egypt's streets, where people were holding posters and banners with his photographs. These events built up to trigger the Egyptian revolution in January 2011 (Buckner and Khatib, 2014).

Many more Egyptian demonstrators died during the protests. These "martyrs" - a term used in the international press (see for instance New York Times, 2011, BBC News, 2012 and Al Jazeera, 2013) and in our data source - played a central role and were an indisputable catalyst in the onset of the Egyptian revolution, creating a self-fulfilling movement of mobilization against the government. This is similar to what happened in Tunisia and Syria, with Mohamed Bouazizi and Hamza Al-Khatib being examples of demonstrators who died during the protests, and whose deaths became a catalyst for the revolution in their countries (Buckner and Khatib, 2014).

This portrayal of the "martyrs" in the Arab Spring uprisings is very different from the standard definition of martyrs who self-sacrifice themselves for their religious beliefs and faith. As Buckner and Khatib (2014) argue, in the context of the Arab Spring the term "martyr" has been attached to those who died at the hands of their own states in pursuit of political change.

In the immediate aftermath of Mubarak's resignation, as the Supreme Council of the Armed Forces (SCAF) took power in Egypt, a constitutional review committee was formed to formulate new amendments to the Constitution. The constitutional declaration of 2011 was approved on March 19 by referendum (Human Rights Watch, 2011). The transitional context dictated these new amendments: a term limit for future presidents, separation of powers and call for judicial oversight of elections, stood as paramount. Under the transitional government, the issue of women's rights was not a priority (Human Rights Watch, 2011; Gómez-Rivas, 2011). Women were officially excluded from the official committee proposing the

amendments to the Constitution, their political representation in the aftermath of the revolution also remained very low (Human Rights Watch, 2011). The Provisional Constitution adopted in March 2011, governed Egypt until the adoption of a new Constitution in December 2012, under Former President Mohamed Morsi's rule.

3.2.2 Stylized facts on the intensity of the protests

Protesters engaging in a revolutionary movement are not only committed in terms of time and resources, but they also acknowledge the probability of occurrence of certain risks, including arrest, injury or even death (Moaddel, 2012). Hence, the number of "martyrs" – *i.e.* demonstrators who died during the protests, using the terminology in our data source - represents a central measure of the intensity of the protests and is quite correlated with a number of other indicators of the revolution.

Figure 3.1 displays the number of "martyrs" and injured from February 2011, after Mubarak stepped down and the Supreme Council of the Armed Forces (SCAF) took power in Egypt in the name of the military on the 11th of February 2011, until June 2013, the end of former president Mohamed Morsi's one year rule. The number of arrested is also displayed during Mohamed Morsi's rule, from July 2012 until June 2013. As shown, these measures of the intensity of the violent protests are closely correlated and follow the same patterns. The first sharp trend shift in November 2011 corresponds to Mohamed Mahmoud Street's deadly clashes, which lasted 5 days from the 19th of November to the 24th of November. It was a street massacre that broke out between protesters and Central Security Forces (CSF), as protests took place in Mohamed Mahmoud Street in response to the CSF's attack on a sit-in in Tahrir Square. The CSF dispersed demonstrators using birdshot, tear gas, rubber and live bullets. A concrete wall was installed in the street to prevent the protesters from reaching the Ministry of Interior building (Le Monde, 2011). The second sharp shift in February 2012 corresponds to a street battle between protesters and the police, near Egypt's Ministry of Interior, triggered by the deaths in Port Said Stadium riot, the country's worst soccer disaster. Demonstrators were condemning the death of soccer fans at the Port Said Stadium and were holding the military-led authorities accountable for the deaths (The Guardian, 2012). The trend shifts in November 2012 and January 2013 correspond to clashes between civilians and the police in the anniversaries of Mohamed Mahmoud Street's massacre and the 25th of January revolution, respectively.

3.3 Data

3.3.1 Geocoding the Statistical Database of the Egyptian Revolution

One of the main novelties of this paper is the use of a unique dataset that to our knowledge has not been exploited in economic research yet: the Statistical Database of the Egyptian Revolution, administered by the Egyptian Center for Economic and Social Rights[7]. This dataset documents all the events, including fatalities, injuries and arrests during the period of the Egyptian revolution as a result of political and social changes. The data are collected during the first eighteen days of the protests (from the 25th of January 2011 to the 11th of February 2011), during the rule of the Supreme Council of the Armed Forces (SCAF) (from the 11th of February 2011 to June 2012), during former president Mohamed Morsi's rule (from July 2012 until June 2013) and, lastly, most recent data cover the period from July 2013 to May 2014.[8] Individual level data on the "martyrs" were collected on a daily basis. They document the names of the "martyrs" *i.e.* demonstrators who died during the protests, the injured and the arrested (from June 2012 to May 2014), their place of residence (for a subset of individuals), occupation, marital status, date of birth, the type and the classification of incident leading to the death, the date of the incident, the governorate where the incident took place, the site and the cause of death, as well as other relevant data for documentation purposes. Figure A1 in the Appendix shows a screenshot of these data. As an example of an observation, the second line reads the following from the right to the left: Political event (classification of the incident), breaking a sit-in by force (type of the incident), 04/09/2011 (date of the incident), Cairo (governorate), breaking the sit-in of the 6th of April movement (description of the event), A. A.[9] (name of the person), Tahrir Square (site of death), gunshot at the bottom of the neck (cause of death).

The Statistical Database of the Egyptian Revolution locates the "martyrs" in each of the 27 governorates. Based on the site of death, we are able to further localize each "martyr" at the *district level*[10]. To give a figure of the disaggregation level of our measure of protests intensity, Cairo is divided into 41 districts, Alexandria into 18, Port-Said into 12 and Suez into 6. The districts can be either urban (*Qism*) or rural (*Markaz*).[11]

[7] The Center for Economic and Social Rights is a non-governmental organization that carries out research and advocacy projects on economic, social and cultural rights in several countries in the world, in collaboration with local human rights advocates and activists. It develops methodologies for measuring and monitoring economic and social rights compliance.
[8] To build our main explanatory variable, we only use the information on the first eighteen days of the protests and the SCAF rule until the end of June 2012, and match this information with the Egyptian labor market data ending in June 2012.
[9] Full names are available in the dataset, initials only are reported in the text for privacy reasons.
[10] In addition to localizing each fatality depending on the site of death, we also geocoded the fatalities using information on their district of residence. This approach would reflect the average level of dissatisfaction or aspirations (economic or political) in a district, rather than measuring a shock for the district where the protests and deaths took place. The Statistical Database of the Egyptian Revolution only provides information on the place of residence of the people who died during the uprisings for about half of the "martyrs." Results were robust to using the two "martyrs" definitions and are reported in Table A6 in the Appendix.
[11] The total number of districts in Egypt is 353. In our main estimation sample, we have 213 districts as the ELMPS does not interview any individuals from the five frontier governorates: Matruh, New Valley, North and South Sinai and the Red Sea. According to Minnesota Population Center (2015), in 2006 no more than 2% of the Egyptian population lived in these border governorates.

Examples of the locations of fatalities we have geocoded in Cairo are episodes near the Supreme Judiciary Council in *Qism Kasr el-Nil,* other episodes near the Ministry of Interior in *Qism Abdeen* and in front of the Al Nour Mosque in *Qism Al-Waili.* Other examples in Giza include episodes near the Israeli Embassy in *Markaz Al-Giza*, on the Cairo University Bridge in *Qism Al-Giza*, and near the Marmina church in *Qism Imbaba*.

In Figure 3.2, we present a map of Egypt, where we pinpoint all locations where fatalities occurred during the protests, using information from the Statistical Database of the Egyptian Revolution. For all governorates, we coded the locations of death using the GPS coordinates. Each circle in Figure 3.2 represents one location of death, which corresponds to one death incidence or many death incidences. In Cairo, we identified 91 different death locations, 37 locations in Giza, 30 locations in Alexandria, 17 locations in each of Qalyubia and Gharbia, 14 in each of Beheira and Asyut, 13 in each of Dakahlia and Sharqia, 10 in Minya, 9 in each of Suez and Ismailia, 7 in Monufia, 6 in each of Beni Suef, Faiyum and Sohag, 5 in Aswan, 4 in each of Port-Said, Kafr el-Sheikh and Qena, 3 in Damietta and 1 in Luxor.[12] Using the GPS coordinates of each death location, we built our proxy of the intensity of the protests, dividing the number of "martyrs" by the district's population size.

In Figure 3.3, we present a street view map of Cairo and its neighboring districts and in Figure 3.4 a closer view of the neighborhood around Cairo's Tahrir Square, which was the main center of mobilization where demonstrators gathered during the protests. Figure 3.3 and Figure 3.4 show how locations across Cairo differ in terms of the number of fatalities during the uprisings. The larger purple dot in Figure 3.3 and Pin A in Figure 3.4 represent Tahrir Square, in *Qism Kasr el-Nil*, where we localized 109 deaths. We also geocoded 52 deaths in Mohamed Mahmoud Street, located in *Qism Abdeen*, corresponding to the green dot in Figure 3.3 and Pin B in Figure 3.4. This episode - denoted "Mohamed Mahmoud clashes" in media coverage - refers to deadly street clashes between protesters and the Central Security Forces (CSF). It lasted 5 days from the 19th of November to the 24th of November 2011. Protests took place in Mohamed Mahmoud Street in response to a Central Security Forces' attack on a sit-in in Tahrir Square (Le Monde, 2011). We localized 30 deaths in front of the Maspero Television Building, located in *Qism Bulaq* (see the light green dot in Figure 3.3). Most of these fatalities occurred in October 2011. This episode is known as the "Maspero massacre." A group of demonstrators mainly composed of Egyptian Copts were protesting against the demolition of a church in Aswan governorate. The demonstrators organized a sit-in in front of the Maspero Television building before the clashes broke out between protesters and security forces (BBC, 2011a). We have also geocoded 25 fatalities in the neighborhood of the Ministers' Cabinet, located in *Qism Sayyidah Zaynab*. In Figure 3.3 the Ministers' Cabinet events are represented by the yellow dot and in Figure 3.4 by Pin C. The protests initially began in Tahrir Square and then reached the headquarters of the Ministers' Cabinet, in response to the appointment by the military of Kamal Ganzouri, who previously served as

[12] We also identified death locations in Matruh, New Valley, North and South Sinai. The Egypt Labor Market Panel Survey we use in the empirical analysis does not interview any individuals from these four border governorates, and from the Red Sea, the fifth border governorate.

Prime Minister under Mubarak. During this episode, deadly clashes occurred for several days between protesters and security forces (BBC, 2011b).

3.3.2 The Egypt Labor Market Panel Survey

The empirical analysis combines information from the Statistical Database of the Egyptian Revolution with data from the Egypt Labor Market Panel Survey (ELMPS), a nationally representative panel survey. The ELMPS, as a typical labor force survey covers topics such as employment, unemployment and earnings. Additionally, it provides very rich information on job dynamics, saving and borrowing behavior, migration, remittance-recipiency, parental background, education, entrepreneurial activities, fertility choices, women's status and decision-making (Assaad and Krafft, 2013).

The ELMPS is carried out by the Economic Research Forum (ERF) in cooperation with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) since 1998. It has been administered to nationally representative samples in 1998, 2006 and 2012[13]. We take advantage of an important feature of the ELMPS, the fact of being carried out before and after the 2011 Egyptian protests. We use the panel dimension and mainly focus on the 2006 and 2012 rounds, allowing us to observe individuals' labor market outcomes before and after the uprisings, as the fieldwork of the 2012 round took place from March 1, 2012 to June 10, 2012, more than a year after the protests[14]. Of the total 37,140 individuals interviewed in 2006, 28,679 individuals were successfully re-interviewed in 2012. We particularly focus on a sample of married couples living in the same household in both waves and of working-age in the two-rounds, aged at least 15 years old in 2006 to less than 64 years old in 2012.[15] Descriptive statistics on individuals' and households' pre and post revolution characteristics are reported in Table 3.1.

Given that we are matching households and individuals across survey rounds, two types of attrition can potentially arise: the first one is linked to the inability to track an entire household interviewed in 2006, while the second one is linked to the inability to track a split household (one or more individuals who left their original household either alone or with additional individuals who may have joined them later) when the original household can be tracked. Type-1 attrition rates are 17.3% at the household level and 14.2% at the individual

[13] See Assaad (2002), Assaad (2009) and Barsoum (2009) for additional information on the survey.
[14] The 2012 survey provides retrospective information on job mobility and changes in job status. It tracks individuals' first, second, third and fourth employment statuses and the employment status in 2011 if any changes occurred after the Egyptian uprisings. Since there are six years between the two waves and several changes might occur in six years, for robustness check we use this retrospective information to construct individuals' work status in 2010, that is the year before the beginning of the uprisings.
[15] Living in the same household in both waves implies that the two individuals forming the couple did not divorce or die. Potentially they can move as a whole household. In our benchmark specification, we account for the latter case by including district of residence dummies. Among the robustness checks, we also consider the full sample of working age individuals, aged at least 15 years in 2006 and less than 64 years old in 2012, rather than focusing on the sample of couples only.

level, while type-2 attrition rate is 30.3%. To correct for the possible biases that could result from these two types of attrition, we use panel weights between 2006 and 2012[16].

Descriptive statistics for all outcome variables are provided for the estimation sample and by gender in Table 3.2, considering the sample of couples married in the two waves and living within the same household. One important aspect is that female labor force participation is low in Egypt, around 30% in 2006 for the women in our sample. This reflects the fact that even though women have become much more educated over the past decades, relatively few engage in any kind of market work. In addition, the descriptive statistics show higher incidence of non-wage work, particularly unpaid family work among females in 2006 compared to males. To a large extent, this segregation of the labor market by gender was due to the decline in government sector employment over the past two decades (Assaad and Barsoum, 2009). The public sector has been the main employer for females, as it provided flexible working hours and other generous benefits, making it possible for women to combine work and domestic chores. In line with the shrinking of the public sector, in 2006 women have started taking up jobs in the private sector, making the incidences of public and private sectors employment about equal in 2006. Additionally, informal sector employment seems to contribute substantially to men's employment. Table 3.2 also shows greater labor supply conditional on being employed, for men compared to women: in 2006, 51 hours compared to 30 hours of work per week, respectively. Interestingly, between the two rounds of the survey employed women increased their labor supply by about 7 hours/week, while men decreased their hours of work per week. In Figure A2 in the Appendix, we also show the distribution of the number of hours of work/week for both men and women conditional on employment, in 2006 and 2012. Indeed, the histograms show how the distribution of the number of hours of work per week for women had changed between the years 2006 and 2012 from very skewed distribution to an almost normally distributed one.

In Table 3.3, we also report descriptive statistics for the time-varying household control variables included in our benchmark specification. The controls include a rural dummy, district of residence dummies (not reported in Table 3.3), household size, the number of adults aged 15 to 64 years old and a dummy variable for land ownership. Household head characteristics include: four dummies for the head of household's educational attainment (the omitted dummy being the reference category). The between variation is greater than the within. However, the within variation of these household controls is not negligible. Household size and the number of adults aged between 15 and 64 years old vary substantially within households, but also the dummy variables for the head's higher level of educational attainment. However, the dummy variable for land ownership is the least varying variable within households.

[16] See Assad and Krafft (2013) for a detailed discussion on sample attrition and the construction of the panel weights. In unreported regressions, we have also considered the full sample of individuals interviewed in 2006 - including as well those individuals for whom the information is missing in 2012 - to check whether the probability of attrition is correlated with the district's subsequent revolutionary activity. We run these additional regressions including the same set of individual and household controls, and clustering standard errors at the district level as in our benchmark specification. We find no correlation between the probability of attrition, on the one hand, and the district's revolutionary activity, other relevant pre-period characteristics or labor force participation interacted with subsequent revolutionary activity, on the other.

3.4 Empirics

3.4.1 Empirical strategy and regression specification

Using household panel data on the Egyptian labor market from the 2006 (before the protests) and 2012 (after the protests) waves of the ELMPS survey, we investigate the impact of the 2011 uprisings on the relative position of women in the labor market by estimating the following Difference-in-Differences specification:

$$Y_{hdt} = \alpha_1 \, martyrs_d \, x \, 2012_t + \boldsymbol{\alpha_2 X_{ht}} + \boldsymbol{\alpha_3 X_{ht} \, x \, 2012_t} + \beta_h + 2012_t + \varepsilon_{hdt} \quad (3.1)$$

$martyrs_d$ - our treatment variable - is a measure of the intensity of the protests: the district level number of "martyrs" from January 2011 to June 2012, per 1000 inhabitants[17]. Equation (3.1) therefore allows for geographical differences in treatment intensity. Each household is exposed to the treatment intensity of his geographical location in 2012 (after the beginning of the protests). *2012* is a dummy variable equal to 1 in 2012 (after the beginning of the protests), 0 in 2006 (before the protests). To answer our research question, all the dependent variables Y_{hdt} are computed as the intra-household differences in labor market outcomes between the wife and the husband.[18] β_h and 2012_t are respectively household and year fixed effects. The household fixed effects absorb the time-invariant variables: the non-interacted term *martyrs*. In all regressions, standard errors are clustered at the district level – see the tables for the number of clusters - and panel weights between 2006 and 2012 are included to correct for attrition.[19]

The vector X_{ht} includes household time-varying variables[20]. Household time-varying controls include a rural dummy, district of residence dummies, a dummy variable for land ownership, household size, number of adults who are 15-64 years old and three dummies for the head of the household's educational attainment[21]. To condition on time-varying effects of potential factors driving the protests, our specification includes the household controls interacted with the year dummy, $X_{ht} \, x \, 2012_t$.

[17] A reason why we consider the number of fatalities as measure of the intensity of the protests, rather than the number of injured or arrested during the uprisings, is that for the injured people, the information is collected at the political incident level rather than individual level. Hence, it is prone to measurement error – for instance if injured people decide to self-medicate rather than going to the hospital. Whereas, the number of arrested during the uprisings is only collected for the period of Mohamed Morsi's (30 June 2012 to 3 July 2013) and Adly Mansour's (4 July 2013 to 8 of June 2014) rules, i.e. after the information of the 2012 wave of the ELMPS was collected. As Figure 3.1 shows, the three variables – number of fatalities, injured and arrested - are highly correlated.

[18] For binary outcomes as labor force participation, the dependent variable is equal to the outcome of the wife minus the outcome of the husband. It is equal -1 if the wife does not participate in the labor market while the husband does. It is equal 0 if both the wife and the husband participate in the labor market or both don't participate and is equal 1 if the wife participates in the labor market while the husband does not.

[19] In Table A8 in the Appendix, we also report Conley's (1999) standard errors correction for spatial dependence instead of the district-clustered standard errors.

[20] See Yang (2008) as an example of work that estimates, among other outcomes, labor supply equations conditioning on a similar set of variables.

[21] The rural dummy and the district of residence dummies capture variation in households' geographical locations between the two years.

The coefficient of interest is the parameter α_1: it allows identifying the effect of the protests on intra-household differences in labor market outcomes between the wife and the husband, *i.e.* how the Arab Spring in Egypt affects the gender gap for several outcomes of interest.[22]

3.4.2 Validity of the parallel trends assumption: A falsification test

The advantage of our Difference-in-Differences specification is that our estimates remain unbiased in case of omission of differences across districts with different levels of protest intensity, provided that such differences remain the same over time. The panel structure of our data allows us to condition on unobserved heterogeneity at the household level, through fixed effects estimation.

A potential threat to our identification strategy is that unobserved time-varying labor market shocks at the district-level may influence simultaneously individual labor market outcomes and the intensity of the uprisings. As a consequence of time-varying and asymmetric economic shocks, districts that are exposed to a higher intensity of the protests may be on different economic trends, and hence would exhibit differential changes in labor market outcomes even in the absence of the 2011 Egyptian uprisings.

To address this potential threat to our identification strategy, we proceed as follows. In this section, we perform placebo estimations of equation (3.1) as falsification test. In Section 3.5.2, we show that our results remain robust to the inclusion of several pre-revolution characteristics interacted with the year dummy. These checks ensure that our findings are not driven by differential pre-existing trends in labor market outcomes before the eruption of the protests.

The estimates in Table 3.4 allow verifying the validity of the parallel trends assumption, which is the main identifying hypothesis for Difference-in-Differences estimation. We run a placebo Difference-in-Differences regression where we use information on labor market outcomes from the 1998 and 2006 ELMPS. Both waves refer to two time periods before the beginning of the protests. In particular, our false experiment tests whether the intra-household differences in labor market outcomes between 1998 and 2006 are associated with the subsequent 2011 protests[23]. The estimates confirm that no outcome was differentially changing before the revolution, in areas that had more protester deaths compared to those areas that had fewer deaths during the Arab Spring protests. We can infer that our results are

[22] We also estimated the same model using individual level instead of household level data using the following specification, $Y_{idt} = \alpha_1 martyrs_d \; x \; 2012_t \; x \; female_i + \alpha_2 martyrs_d \; x \; 2012_t + \alpha_3 2012_t \; x \; female_i + \boldsymbol{\alpha_4 X_{it}} + \boldsymbol{\alpha_5 X_{it} \; x \; 2012_t} + \beta_i + 2012_t + \varepsilon_{idt}$, where the parameter α_1 allows identifying the differential effect of the protests by gender, α_2 quantifies the effect of the protests on men's labor market outcomes, while $\alpha_1 + \alpha_2$ represents the effect on women's outcomes. The vector X_{it} contains individual and household time-varying variables and regression includes both individual and year fixed effects. Results are reported in Table 3.5, Panel B.

[23] We track the same individuals we have in our estimation sample in the 1998 wave of the ELMPS and look at changes in labor market outcomes between 2006 and 1998, instead of changes between 2012 and 2006.

not biased by pre-existing trends in labor market outcomes across households who reside in districts exposed to different degrees of protest intensity. This check provides support to the validity of the parallel trends assumption.

3.5 Results

3.5.1 The impact of the Arab Spring protests on women's labor market outcomes

Table 3.5 presents estimates of the effect of the protests on labor force participation, unemployment and employment, where we consider the market definition of economic activity, including only those engaged in economic activities for the purpose of market exchange and excluding subsistence workers. In Panel A, we report estimates using household level data. The dependent variables of this panel are expressed as intra-household differences in labor market outcomes, i.e. the labor market outcome of the wife minus the labor market outcome of the husband.[24] We condition on the year dummy, household fixed effects, household time-varying controls, and interaction terms between the latter variables and the year fixed effect. The unit of observation being the household, the coefficient of interest is the interaction term between the "martyrs" variable and the year dummy, α_1 in equation (3.1). It quantifies the effect of the protests on intra-household differences in labor market outcomes.

Relying on household-level data, the estimates in Panel A show evidence of the narrowing gap in labor force participation between the wife and the husband, through the narrowing of both employment and unemployment gaps.[25] To quantify the effect of the uprisings on women's labor force participation, we consider a standard deviation (0.590) increase in our measure of the intensity of the protests - the number of "martyrs" per 1000 inhabitants - the revolution increases women's labor force participation by 2.2 percentage points compared to their husband's (0.590*0.038), see column 1 of Table 3.5, Panel A. This is interesting since women's labor force participation in Egypt remains very low despite the substantial increase in their educational attainment (Binzel and Assaad, 2011). As Table 3.2 shows, women's labor force participation is strikingly lower than their male peers'. Focusing on our estimation sample of married men and women, in 2006 women's labor force participation is only 30% as opposed to 98% for men's labor force participation (see descriptive statistics in Table 3.2). Therefore, in percent terms, the impact of the Arab Spring protests on women's labor force participation is large, about 7% (2.2/30) of the 2006 mean value of labor market participation.

[24] The dependent variables of Panel B are equal to -1 if the wife does not participate in the labor market, while the husband participates, are equal to 0 if both the wife and the husband participate in the labor market or do not participate in the labor market, and are equal to 1 if the wife participates in the labor market, while the husband does not participate.

[25] In Table A5 in the Appendix, we focus on the full sample of individuals aged at least 15 years old in 2006 and less than 64 years old in 2012, rather than relying on the couples' sample. We find a reduction in the gender gap in labor force participation, mainly through an increase in women's unemployment. The magnitude of the estimated coefficients for the full sample is smaller in magnitude compared to the couples' sample (see Table 3.5), a finding that is compatible with the main mechanism we describe in Section 3.6.

In Panel B, we report estimates using individual-level data for the couples sample, where we condition on individual and household time-varying characteristics and include the year fixed effect, individual fixed effects, and interaction terms between the control variables and the year dummy.[26] The two estimated coefficients of interest are the interaction term between our measure of protests intensity at the district level ("martyrs"[27]), the year dummy and the female dummy, and the "martyrs" variable interacted with the year dummy. The former coefficient captures the differential effect of the protests on labor market outcomes of women relative to men, *i.e.* how the protests affect the gender gap in labor force participation, employment and unemployment. The latter coefficient provides an estimate of the effect of the protests on men's labor market outcomes. Across all specifications, the estimated coefficient on the interaction term between the "martyrs" variable, the year dummy and the female dummy is always positive and statistically different from zero. This implies that the protests are reducing the gender gap in labor force participation, through an increase in both women's unemployment and employment (see the test with null hypothesis $\alpha_1+\alpha_2=0$ in columns 1, 2 and 3 of Table 3.5, Panel B). These results suggest that the narrowing gap in labor market outcomes evidenced in Panel A is due to an increase in women's labor force participation, unemployment and employment relative to men. Coefficient estimates using individual-level data are very similar in terms of magnitude to those of Panel A and provide further evidence of an increase in women's labor force participation compared to their husbands.[28] With regard to men's labor market outcomes, the estimates show a statistically significant impact of the protests on men's employment, however the magnitude of this effect is negligible.

It is interesting to analyze whether the relative increase in women's labor force participation is due to a rise in employment or unemployment. In Panel A, we find that because of the protests women's unemployment and employment both increased compared to their husband's. Considering a standard deviation change in the "martyrs" variable, in percent terms the increases are about 28% and 4% of the 2006 mean value, for unemployment and employment respectively.[29] Interestingly, we find that the 2011 protests have encouraged women to engage in the Egyptian labor market by actively searching for employment. This is a very important result since the protests seem to provide a leeway to increase married women's labor force participation that has remained very low compared to their husbands. Following Arcand and Fafchamps (2012), in Table 3.6, we also employ Dyadic Difference-in-

[26] Individual controls include three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no-educational degree (either illiterate or literate without any diploma). The education dummy variables may vary over time and therefore are not absorbed by the individual fixed effects.

[27] As we explain in Section 3.3.1, the "martyrs" variable refers to the number of martyrs at the district level normalized by the district population size (per 1000 inhabitants). In Section 3.5.2, we show robustness checks using the absolute number of casualties, without normalizing this measure by the population in the district where the protests took place.

[28] The alternative estimation approach provided in Table 3.5, Panel B provides suggestive evidence to support that the narrowing intra-household gaps is due to increases in women's labor force participation, unemployment and employment compared to men rather than deteriorating men's labor market outcomes. Throughout the paper, our benchmark specification will be that of Panel A, using equation (3.1), where all outcomes are defined as intra-household differences in labor market outcomes. We will only rely on individual-level estimation when focusing on the full-sample of working age individuals since in that case, our households will not only be confined to the wife and the husband.

[29] This is computed as follows: $0.590*\alpha_1$/initial mean of outcome. 0.590 is equivalent to one standard deviation increase in our measure of the intensity of the protests. The 2006 means of women's unemployment and employment in our estimation sample are 0.047 and 0.256, respectively (see Table 3.2).

Differences regression, in which the observations are a pair of household members (wife and husband).[30] In line with the previous findings in Table 3.5, we find that the protests had increased women's labor force participation relative to their husbands', mainly through an increase in employment.

To further investigate the role of the protests in explaining changes in labor market outcomes, in Table 3.7 we look at the effects on private and public sectors employment, as well as on formal and informal sectors employment. This analysis is particularly interesting because a distinctive divide between public and private sector characterizes the Egyptian labor market (El-Haddad, 2009). For many years, the public sector dominated employment in Egypt and was particularly targeted by women because of the shorter working hours and the lower effort requirements, giving the opportunity for women to take care of domestic chores and home responsibilities. Following the public sector downsizing that started in the 1980s and the Economic Reform and Structural Adjustment Program implemented in Egypt in 1991, women witnessed a substantial reduction in the employment opportunities in the Egyptian labor market (Assaad and Arntz, 2005). Whereas, the informal sector in Egypt, like in other MENA countries undergoing structural and economic reforms, has played a major role in employment, especially in periods of economic adjustment and transition (Wahba, 2009). Estimates in Table 3.7 show that the narrowing intra-household gaps between women and men are mainly attributed to an increase in women's employment in the private and informal sectors compared to men. In percent terms, we find that the impact of the Arab Spring protests on women's private sector employment and informal sector employment are about 6% and 8% of the 2006 mean value, respectively. In Table 3.8, we use an alternative estimation technique, a multinomial logit with random effects and a Mundlak procedure[31], using individual-level data. The dependent variable is a categorical variable equal one if the individual is not working (either unemployed or out of labor force), takes the value 2 if the individual is working in the public sector, takes the value 3 if the individual is working in the private formal sector and the value 4 if the individual is working in the private informal sector. In line with the results in Table 3.7, we find that the protests have increased women's employment relative to men mostly in "low quality" jobs, the private informal sector, whereas women's employment in public or private formal sectors didn't differentially change relative to men in the aftermath of the Egyptian protests.

In Table A1 in the Appendix, we investigate the heterogeneity of the effects of the Egyptian uprisings on intra-household differences in labor market outcomes, exploiting information on the pre-revolution distribution of per capita household income. The estimates show that the Egyptian protests have mostly affected the relative labor market outcomes of women in households at the bottom of the distribution. We find that labor force participation has increased only for the women belonging to the three lowest quartiles of the sample distribution of pre-revolution per capita household income, compared to their husband. Interestingly, the households witnessing a narrowing gap in unemployment as women start to actively search for employment are those who belong to the third quartile of pre-revolution

[30] In this framework, control variables could be either defined as differences or averages between pair members.
[31] Regressions also include all the covariates expressed as individual-specific means, to take into account any residual covariance between the random effects and the time-varying covariates.

distribution of per capita household income. By contrast, the households witnessing a reduction in intra-households differences in the women's employment compared to men are those who belong to the two bottom quartiles. A rationale for this finding is that women in the poorest households start to take up low-quality jobs in the informal sector out of necessity, whereas women who belong to richer households start to actively search for employment, but it may take time for them to find a relatively high-quality job.

In Table A2 in the Appendix, we analyze the effects of the protests on intra-household differences in labor market outcomes, by religious group. We find that the Egyptian protests have reduced intra-household differences in labor force participation in favor of women for both Muslim and Christian households, the coefficient estimates for the Christians' sample being greater in magnitude. The estimates also show that the narrowing gap in labor force participation within Muslim households is explained by both a narrowing gap in unemployment and employment, whereas the narrowing gap in labor force participation for Christian households is only explained through a reduction in intra-household differences in unemployment but there is not any statistically significant effect on women's employment compared to their husband's. However, these results should be interpreted with caution, because of the small size of the Christians' sample.[32]

3.5.2 Robustness and identification checks

In Table 3.9, we check the robustness of our results with respect to the exclusion of all central places of assembly, namely the four fully urban governorates: Cairo, Alexandria, Port-Said and Suez.[33] In Panel A, we exclude from the estimation sample households residing in the capital Cairo, which was the main center of mobilization for demonstrators and protesters during the first eighteen days of the protests and in the subsequent period. In Panel B, we exclude households residing in both Cairo and Alexandria. In Panel C, we drop households residing in Cairo, Alexandria and Port-Said. Finally, the estimation sample in Panel D does not include households residing in any of the four fully urban governorates (Cairo, Alexandria, Port-Said and Suez). This robustness check is important because several protests occurred at important sites in urban governorates (see Section 3.3.1) and attracted people from other districts. Also, districts in cities such as Cairo, Alexandria, and Suez are relatively small and the labor market conditions of a certain district are not independent from those in other districts. Finally, the urban governorates represent the core of the Egyptian economy and it is therefore interesting to assess whether the findings of our empirical exercise hold after their exclusion.

[32] The sample size in Table A2 is the Appendix is relatively small because we do not have information on religious affiliation for the full sample of individuals. Based on the information provided in the marriage section - and as interfaith marriage is forbidden in Egypt - a household is labeled Muslim if a member reports her religion as Muslim. Similarly, a household is defined Christian if an individual declares her religion as Christian.

[33] Governorates in Egypt are either fully urban (Cairo, Alexandria, Port-Said and Suez) or a mixture of urban and rural.

Coefficients estimates in Table 3.9 are very stable in terms of magnitude, providing reassurance that our results are not driven by the inclusion of central places of assembly. In line with our estimates in Table 3.5, we find that the Egyptian protests have reduced the intra-household differences in labor force participation through an increase in both women's unemployment and employment compared to their husbands. In percent terms, relying on the coefficient estimates in Panel D, the impact of the Arab Spring protests on the relative increase of women's labor force participation compared to their husbands represents about 8% of the 2006 mean value. The reduction of the intra-household differences in unemployment and employment are about 26% and 4% of the 2006 mean value of these two labor market outcomes, respectively.

We have also checked whether the lack of data between the 2006 and 2012 waves is problematic and – related to this point – whether our results in Section 3.5.1 are driven by differences in pre-revolution trends across districts. In Table 3.10, we use the information on individuals' work status in 2010, which is provided in the job mobility and changes in job status module of the 2012 ELMPS. This section traces changes in job status for individuals aged 15 years old and above and the year of start for each status. It tracks the first, second, third, fourth and the 2011 employment statuses if any changes in status occurred after the 25th of January 2011 uprising. Hence, in this table the outcomes of interest refer to 2010 (before the protests) and 2012 (after the protests)[34]. In Panel A, we use household-level regressions as in our benchmark specification, defining the dependent variables as intra-household differences in labor market outcomes where we rely on the sample of couples for which we were able to track the work status in 2010. Since information on the work status in 2010 is available for only a small subsample, in Panel B, we extend the analysis to all working-age individuals for whom we were able to construct the work status in 2010, regardless of their civil status and we use a Difference-in-Differences specification where we allow for gender to be an important dimension of heterogeneity of our treatment effects as in Table 3.5, Panel B. The two panels of Table 3.10 show that the protests have significantly reduced the intra-household differences in labor force participation, using information on the outcomes of interest for a shorter time span (2010-2012) rather than 2006-2012. These estimates confirm our findings on the effects of the protests on labor market outcomes.

In Section 3.4.2, we have already discussed the placebo Difference-in-Differences regressions, which use information on labor market outcomes from the 1998 and 2006 ELMPS (two waves before the beginning of the protests). The falsification test in Table 3.4 rules out the possibility that our results are driven by pre-existing trends in labor market outcomes. This check is of first-order importance because districts whose labor market outcomes were poor before the revolution could witness more political turmoil and also increase women's labor force participation relative to men. To further address the potential issue of differential pre-trends, in Table 3.11 we condition on interaction terms between the year dummy and several pre-revolution district characteristics. If the Arab Spring deaths are

[34] In the job mobility and changes in job status module of the 2012 ELMPS, there is no information on monthly, hourly wages, and the number of hours of work. Also, the retrospective information on employment status might suffer from recall error. For these two reasons, we consider these regressions in Table 3.10 as a robustness check, while for the benchmark specifications we rely on the information provided in the 2006 and 2012 ELMPS surveys.

not randomly assigned, the inclusion of these interacted time trends absorbs the effect of potential unobservable trends correlated with systematic differences between more and less intensely "treated" districts. In columns (1), (2) and (3) of Table 3.11, we consider a specification similar to our benchmark regression of Table 3.5, while adding the logarithm of the 2005 governorate real GDP per capita interacted with the year dummy. In columns (4), (5) and (6), we include interaction terms between the year fixed effect and a set of pre-revolution district controls derived from the 2006 Egypt Population, Housing and Establishments Census, which is the last Census conducted in Egypt. These additional controls – which are meant to capture the degree of a district's economic development – are the share of households in a district with cell phone availability, the share of households with computer availability, the share of households with electricity access, the share of households with Internet access, and the share of households not connected to sewage disposal system. All these variables are interacted with the year dummy. In columns (7), (8) and (9), we include both the logarithm of the governorate's real GDP per capita and the five district-level controls, interacted with the year dummy. Comparing the estimates from our benchmark specification in Table 3.5 with those from Table 3.11, after the inclusion of differential pre-revolution trends, the coefficients remain stable across all specifications, and the results suggest that the narrowing intra-household gap in labor force participation is mostly explained by the reduction in intra-household differences in unemployment rather than employment.

Related to the robustness checks in Table 3.10, we have estimated in Panel A of Table 3.12 a specification similar to Panel B of Table 3.5, but we have used as main explanatory variable the absolute number of casualties, without normalizing this measure by the population in the district where the protests took place. The rationale for this check is that in case protests occur in popular venues for gathering, residents of a certain district do not necessarily constitute the majority of protesters in that district. After standardizing the variable of interest, the estimates show that an increase in the absolute number of casualties (11 deaths during protests) reduces the intra-household differences in labor market outcomes by 2 percentage points in favor of women, equivalent to an increase by 7% from the 2006 mean value. In Panel B, a district is attributed the absolute standardized number of "martyrs" in that district and in its neighboring districts, sharing a common border. This check aims to provide further reassurance with respect to the rather disaggregated level of our main variable of interest. Since districts are rather small, people are more likely to work in a neighboring district, if their district of residence is heavily treated. In this check, individuals are exposed not only to the number of "martyrs" in their district of residence, but to the "martyrs" in the neighboring districts as well. The estimates show that an standard deviation increase in this alternative measure of protests intensity (37 fatalities) leads to an increase in women's labor force participation and employment relative to men by 4 and 3 percentage points, respectively, equivalent to 14% and 11% of the 2006 mean values of these two labor market outcomes.

In addition to localizing each fatality depending on the site of death, we have also geocoded the fatalities using information on their district of residence. This approach would reflect the average level of dissatisfaction or aspirations (economic or political) in a district, rather than measuring the shock for the district where the protests and deaths took place. The Statistical

Database of the Egyptian Revolution only provides information on the place of residence of the people who died during the uprisings for about half of the "martyrs."[35] Results are robust to using the two "martyrs" definitions and are reported in Table A6 in the Appendix.[36]

Since our measure of protests intensity varies at the district level, in Table A7 in the Appendix we show estimates with data collapsed at the district level. In these regressions, the dependent variables are the intra-household differences in labor market outcomes between wife and husband, collapsed by district. We find the same patterns discussed in Section 3.5.1 and very similar coefficient estimates with respect to our benchmark regressions in Table 3.5.

In all our regressions, standard errors are clustered at the district level to allow for an arbitrary within district correlation. In Table A8 in the Appendix, we use Conley's (1999) standard error correction for spatial dependence. Given the size of the Egyptian territory, we use as different cutoff points 1 degree, 3 degrees, 5 degrees, 7 degrees and 10 degrees.[37] In each spatial dimension (longitude and latitude), spatial dependence declines in distance between districts' centroids and is equal to zero beyond a maximum distance (the different cutoff points). Results are reported using household-level data and a first-difference specification.[38] Our district-level clustered standard errors are comparable to the standard errors corrected for spatial dependence using the different cutoff points. Hence, this robustness check provides reassurance that the statistical significance of our results is not driven by spatial correlation.

3.6 Mechanisms

3.6.1 The added worker effect

To explore the mechanisms through which the protests affect labor market outcomes, in Table 3.13, we investigate the effect of the uprisings on hourly wages, number of weekly working hours (conditional on employment), as well as on commonly used measures of income uncertainty[39]. Following Fuchs-Schündeln and Schündeln (2005), in columns (3), (4) and (5)

[35] We have successfully geocoded 606 "martyrs" using the available information on their location of residence out of the total 1365 "martyrs" that we were able to geocode using the information on their site of death. Our data source for both measures is the Statistical database of the Egyptian Revolution. .

[36] The two measures of protests' intensity – the one constructed using information on the site of death and the other considering the location of residence of the "martyrs" - are highly correlated (the correlation is equal to 0.80).

[37] One degree is approximately 69 miles (111 kilometers). The longest straight-line distance in Egypt from north to south is 1,024 km, while that from east to west measures 1,240 km.

[38] The procedure developed by Conley does not allow for the inclusion of a large number of fixed effects. We opt for a first-difference specification that yields to very similar results to those in Panel A of Table 3.5 when using district-clustered standard errors (see row 1 of Table A8 in the Appendix). The Conley procedure also does not allow for panel weights. In unreported regressions, we rely on our benchmark specification but do not include panel weights. We find that the unweighted district-clustered standard errors are comparable in magnitude to the unweighted regression standard errors corrected for spatial dependence. Hence, there is no obvious reason why one would suspect attrition-weighted standard errors corrected for spatial dependence not to be comparable to attrition weighted district-clustered standard errors as well.

[39] In this section, we present several mechanisms as potential outcomes rather than adding them as control variables in the specification of Table 3.5 to avoid a "bad control" problem, which would generate selection bias. It is important to note that the available aggregate data for Egypt do not allow testing the impact of the protests on the district or governorate economic development. District-level data on GDP per capita are not available. The most recent information on governorate-level GDP per capita – which comes from the 2010 Egypt Human Development report by the UNDP – refers to the period 2007-2008,

we use the logarithm of the variance of the logarithm of monthly wage as risk measure[40]. We construct the income uncertainty variable using three definitions: the first definition is based on occupation, gender and education, the second on occupation, and the third on occupation and gender[41]. Our results show that the Egyptian protests have reduced the intra-household differences in labor supply as expressed by the number of hours of work per week. This is in line with the descriptive statistics in Table 3.2, showing an increase in the number of weekly working hours for employed women by 7 hours/week. We also find a reduction in the hourly wage gap within the household in favor of women. In addition, the regression analysis shows that the protests have a negative effect on the difference between the logarithm of variance of the logarithm of monthly wage between the wife and the husband, according to the definition used in column (3).[42]

In Table A7 in the Appendix, we report estimates using data collapsed at the district level. The dependent variables are the intra-household differences in labor market outcomes (labor force participation, unemployment, employment, logarithm of monthly wage, logarithm of hourly wage and number of hours of work/week) between wife and husband, collapsed at the district level. Results using district-level data confirm our findings in Table 3.13, where we use household-level data. The estimates suggest a reduction in the monthly wage gap in favor of women and an increase in the number of hours of work/week for women relative to men.[43] These findings are in line with the descriptive information of Assaad and Krafft (2013), who show that men have been increasingly employed in riskier and marginal forms of employment – such as irregular wage work – which are closely associated to poverty and vulnerability.

To complement these findings, we have analyzed information from the 2012 wave of the ELMPS survey on whether individuals have witnessed any changes in employment conditions in the past three months due to the revolution. In line with our results, there are striking differences when we compare the answers of men and women in our estimation sample: 43.79% of women report an improvement in working conditions compared to only 20.70% of men. In addition, in line with the findings presented earlier, 8% of men report a decrease in

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i.e. before the beginning of the protests. There is literature using aggregate cross-country data and showing a negative effect of the protests on GDP growth and an increase in macroeconomic uncertainty associated to political unrest (Kent, Phan, and Rabinovich, 2016).

[40] Fuchs-Schündeln and Schündeln (2005) compute this risk measure - the logarithm of the variance of the logarithm of income - for sixteen occupational and educational groups. They use three occupations (civil servants, white-collar workers and blue-collar workers) and five education levels (college, vocational training, intermediate/technical schooling, secondary schooling, secondary schooling not completed). Cappellari and Jenkins (2014) use longitudinal data to construct an alternative measure of earnings' volatility, which is the standard deviation of the arc percentage change in earnings. Their approach is not adaptable in the case of two years panel data.

[41] Occupations are defined according to the ISCO-88 occupation classification (low-skilled blue collar, high-skilled blue collar, low skilled white collar and high-skilled white collar) for the longest job during the past 3 months. Educational levels are the following: no educational degree, primary/preparatory education, secondary education and above secondary education.

[42] In unreported regression, using individual level-data instead of household level data (intra-household differences in labor market outcomes), we find that the protests have a differential effect on wages, labor supply and the variance of monthly wages by gender. These findings complement the picture by providing evidence that the narrowing gap in labor supply within the household is due to an increase in women's labor supply compared to her husband. In addition, the reduction in intra-household differences in wage is due to a negative shock to men's earnings. We also find that the protests have increased the instability of men's earnings as measured by the logarithm of variance of logarithm monthly wage; hence, this explains the negative coefficient on the difference between the wife's variance and that of her husband.

[43] The dependent variables in Table A7 in the Appendix are defined as the outcome of the wife minus the outcome of her husband.

the number of working hours compared to only 2% of women, and 7% of men a decrease in wages compared to 1% of women. 11% of women report increases in pay or incentives as the change they witness in their job, while only 4% of men give a similar answer. As Assaad and Krafft (2013) suggest, workers in the public sector were more likely to report improvements in working conditions, while workers in the private sector reported deterioration in working conditions[44]. The worsening of men's labor market outcomes during the protests also depends on their higher probability of being employed in the private sector, whereas women are relatively more likely to be employed in the public sector.

Overall, all these findings are compatible with a conceptual framework in which women are forced to participate in the labor market to compensate for falling male incomes or increased income uncertainty.[45] This "added worker effect" has been described in different contexts, see among others Lundberg (1985), Cullen and Gruber (2000), Hyslop (2001) and Stephens (2002). It is important to stress that women may react both to the expected and actual deterioration of their husband's earnings. If many men witness a reduction in wages, then women may even adjust their labor market decisions because of a reduction in their husbands' *expected* earnings[46].

3.6.2 Alternative channels

In this section, we discuss other potential mechanisms through which the Egyptian protests may affect women's labor market conditions. While theoretically plausible, the alternative channels we present below are not confirmed by our empirical analysis.

A *first alternative channel* is related to migration. Herbst (1990) highlights how in most areas in Africa, in the beginning of the 20th century, migration was the easiest option to express discontent with deteriorating economic and political conditions. Migration might influence the relative position of women in the labor market, for several reasons: having a household member who resides in another country is associated to changes in the household size (Gibson, McKenzie and Stillman, 2011), in the relative number of women and men within a household, in foregone earnings of the family members who emigrated, and in the amount of remittances received by the members who are left behind (Sjaastad, 1962). There is literature

[44] To check whether people's perception matches the actual consequences of the revolution, the Table A3 in the Appendix shows results from a regression using individual level data instead of household-level data, where the dependent variables are individual outcomes instead of intra-household differences, and the main explanatory variable is an interaction term between the "martyrs" variable, the year dummy and a dummy equal to 1 if the individual was employed in the private sector. These regressions confirm a reduction in the hourly wage for individuals employed in the private sector (see test of statistical significance of the sum $\alpha_1+\alpha_2$).

[45] This channel is also confirmed by the results in Table A1 in the Appendix, showing that the protests reduce intra-household differences in labor force participation in favor of women in households belonging to the three lowest quartiles of the sample distribution of pre-revolution per capita household income.

[46] Table A5 in the Appendix shows that the effect of the protests on women's labor force participation is statistically significant when we consider the full sample of working-age individuals and is smaller in absolute value than the estimates in Panel A of Table 3.5, where we consider a sample of couples only. The latter finding provides additional confirmation of the "added worker effect." Since we do not restrict our analysis to couples in the Table A5 in the Appendix, we do not opt for household-level regression but instead, we use individual-level Difference-in-Differences regression, following the same specification as in Table 3.5, Panel B.

showing a negative effect of male migration on labor force participation of women left behind (see Lokshin and Glinskaya, 2009, among others).

A *second alternative channel* goes through fertility behavior. The Egyptian protests may be an important source of uncertainty. The increase in risk can affect the choice of whether having or not a child (see Adsera, 2004, for a discussion on fertility choices and general uncertainty). Given that labor market and fertility choices are jointly determined, the uprisings could theoretically impact on female labor market conditions through this mechanism.

A third alternative channel through which political unrest might affect women's labor supply is changes in religious participation. For instance, Binzel and Carvalho (2016) theoretically present religion as a coping mechanism for unfulfilled aspirations and show how an unexpected decline in social mobility combined with inequality can produce a religious revival led by the educated middle class. Using data on the 1997 and 1998 Indonesian financial crisis, Chen (2010) demonstrates a causal effect of economic distress on religious intensity, measured using information on Koran study and Islamic school attendance. Chaney (2013) uses centuries of Nile flood data and shows an increase in the political power of religious leaders during periods of economic downturn. These three works thus confirm that political unrest and the business cycle may affect religious participation, which in turn can influence women's labor supply. This is in line with literature showing the relationship between religion and religious rules, on the one hand, and gender inequalities in several outcomes of interest, on the other hand (see Becker and Woessmann (2008) and Noury and Speciale (2016) for evidence on nineteenth-century Prussia and Afghanistan under Taliban rule, respectively). Using data on elections in Turkish municipalities in 1994, Meyersson (2014) shows that the Islamic rule increased female secular high school education. In the longer run, the effect on female education remained persistent and reduced female adolescent marriage rates.

In Table 3.14, we test empirically the relevance of the channels we discuss above. The table presents results from Difference-in-Differences regressions for the following outcomes at the household level: a dummy variable equal to 1 for households that report having a member living or working abroad, log of remittances received, the ratio of pupils enrolled in religious (*azhari*) schools to the total number of individuals currently studying at the time of the survey (at the household level). Furthermore, we have investigated the effect of the protests on the probability of giving birth for a subsample of married women aged 18-49, 9 months after the revolution, compared to the same time interval before the 2006 survey. Estimates in Table 3.14 show no effect of the protests on remittance-recipiency or women's fertility, discarding these channels as potential mechanisms explaining the relative increase in women's labor force participation relative to men in the aftermath of the protests.[47] The only statistically

[47] In Table A4 in the Appendix, we rely on a wide-ranging set of questions asked to currently married women on who has the final say regarding several household decisions and investigate the effect of the protests on decision-making. The dependent variables are defined as the difference between the outcome of the wife and the outcome of the husband. The outcome of the wife/husband is a dummy variable indicator equal one if the wife/husband participates in the decision either alone or jointly with others, and takes the value zero otherwise. We find a reduction in intra-household differences in several decisions in favor of women like visits to family, friends and relatives, buying clothes for her, taking children to the doctor and buying clothes or other needs for the children. We also find an increase in intra-household difference when it comes to making household purchases for daily needs. The answers to these questions are to some extent subjective and they reflect more

significant results are slight reductions in migration and in religious education.[48] The former finding is in line with information from the Arab Barometer Study, which was conducted in Egypt in July 2011: 89% of the Egyptians surveyed reported not considering migration, perhaps because of the optimistic expectations Egyptians had with respect to economic and political conditions. In principle, the reduction in migration we observe in Table 3.14 can increase women's labor force participation, as shown empirically in several studies (see among others Lokshin and Glinskaya, 2009). However, even if the estimates are statistically significant, the magnitude of the coefficient is not large enough to justify the size of the adjustment in women's labor force participation that we observe in Table 3.5.[49]

A *fourth alternative channel* may refer to time constraints. If men are more likely than women to participate to protests, then we expect this participation to negatively affect the time they can allocate to work. This is another mechanism that may increase the labor force participation of women relative to men. As the descriptive statistics in Table 3.15 and Figure 3.5 show, 70% of the "martyrs" died on Friday and Saturday, *i.e.* in demonstrations that occurred during the weekend. This suggests that there was little substitution between protests and labor market activities[50]. To participate in the demonstrations, people tended to reduce their leisure activities more than their labor supply.

A *fifth alternative channel* concerns the possibility that in periods of recession firms prefer to hire workers who are relatively less expensive, for instance women and minority groups (see among others Rubery, 1988). If this positive discrimination towards women was the main channel driving the relationship of interest, then this reason would predict a reduction in the gender gap in employment following a period of uprisings and political instability. Discrimination cannot explain our findings either. In Table 3.16, we report pre-revolution hourly wages for employed men and women in the estimation sample, by educational attainment. Pre-revolution hourly wages of women with secondary or above secondary education are not below those of men with similar levels of schooling: the difference is significant and in favor of women. Only women with no educational degree seem to earn less than their uneducated male peers. This is in line with Said (2007), who analyzes the trends in real hourly and monthly wages, under the period of the Economic Reform and Structural Adjustment Program. She finds that the relative earnings of women have significantly improved between 1998 and 2006, as they witnessed larger wage improvements compared to their male peers (mostly because a larger share of women is employed in the public sector, which witnessed a higher increase in wages compared to the private sector). Even after accounting for differences in characteristics amongst workers, she still finds that the gender pay gap has narrowed down and turned into a wage premium in favor of women employed in

domestic chores rather than women's empowerment. Hence, changes in social norms do not represent the main mechanism explaining the increase in female labor force participation. Moreover the estimated effects are rather small.

[48] Since we rely on panel data from the 2006 and 2012 rounds of the ELMPS, we lose information on the 2012 refresher sample (2,000 households), which over-samples areas with high migration rates. See also Wahba (2014).

[49] A standard deviation increase in our martyrs variable (0.590) results in a negligible reduction in the probability of migration (-0.001*0.590) and a 0.5 percentage-point decrease in religious education (-0.009*0.590).

[50] There was some potential substitution between protests and labor market activities for people working on Fridays and Saturdays, for instance in restaurants, small shops, etc. Also, although the demonstrations may have taken place across the weekend, to some extent preparation (or recuperation) for (from) the protests might have interfered with some labor market activities during the weekdays as well.

the public sector. Therefore the hypothesis of firms preferring to hire workers who are relatively less expensive does not seem to be the mechanism that increases women's private sector employment.

Finally, in Table 3.17 we have estimated the effects of the uprisings on children's education to check whether the 2011 protests are reducing the schooling gender gap. We restrict our sample to children aged 6 to 15 years and study the effect of political unrest on the probability of going to school at the time of the survey, as well as on the probability of going to a religious school (*Azhari*), conditional and unconditional on studying at the time of the survey and estimate the differential effect of the protests by gender on the several educational outcomes. We do not find any evidence of a differential effect of the uprisings on children's education by gender. The protests do not seem to have an impact on the investment in children's human capital or to reduce the schooling gender gap. We only find a slight reduction in religious education for boys as a result of the uprisings. However, the magnitude of the coefficients is very small and there is no significant reduction in the children's education gender gap.

To summarize the results of this section, we do not find statistically significant evidence for the following alternative mechanisms: changes in remittance transfers, fertility decisions and schooling decisions for children. Our analysis also suggests that neither discrimination nor time constraints are driving the relationship of interest. We find a negligible reduction in the probability of migration in the aftermath of the protests and a slight decrease in religious education. However, the magnitude of the estimated coefficients of the latter two variables is not large enough to justify the size of the adjustment in women's labor force participation. The most plausible channel for the increase in women's labor force participation relative to men is a reduction in men's monthly wages, as well as an increase in the uncertainty of their future income flows. This is explained by the fact that a large share of Egyptian men is employed in the private sector, which was the most affected sector during the Arab Spring. Women have increased their labor force participation to compensate for falling male incomes. Since their labor force participation rates were very low, there was ample room for increasing their participation.

3.7 Concluding remarks

Did the Arab Spring protests affect the relative position of women in the labor market? We have answered this research question using data from Egypt and relying on a Difference-in-Differences approach. To estimate different treatment intensities according to the geographical location, we have geocoded "martyrs" data, *i.e.* number of demonstrators who died during the uprisings, to obtain a measure of the intensity of the protests at the district level. This level of disaggregation allows to isolate the effects of the uprisings themselves from other factors that change across space.

Our estimates show that the 2011 Egyptian protests have reduced intra-household differences in force participation, by increasing both women's employment and unemployment relative to men. This labor market adjustment is mainly attributed to an increase in women's private and informal sectors' employment relative to men. The protests have reduced intra-household differences in labor force participation in households belonging to the three lowest quartiles of the pre-revolution income distribution. This is an interesting finding, because it implies that a revolutionary movement mainly led by middle class and highly educated protesters – see Beissinger, Jamal, and Mazur (2015) – had large effects as well on the people who live below the national poverty line, those who belong to the first quartile of the income distribution according to recent statistics of the World Bank.

Our results also show that the protests have also reduced the hourly wage gap between the wife and her husband and reduced the difference in labor supply in favor of women. This is particularly the case as we find that the protests have affected negatively men's wages and have led to an increase in their income volatility. These changes have occurred because a large share of Egyptian men is employed in the private sector, which has been the most affected sector during the Arab Spring protests. Since the most vulnerable households are more likely to bear the burden of men's increased income volatility induced by the revolution, women who belong to these poor households tend to increase their labor force participation as a household risk coping strategy. In our work, the uprisings generate in the short-run a negative income shock that affects female labor market outcomes through an "added worker effect."

Egyptian women's labor force participation has always remained very low compared to their male peers even though women have become much more educated, a structural distortion acquiring the attention of scholars working on Egypt and the Middle East. Our results suggest that – at least in the short run – the 2011 protests have reduced the intra-household gap in labor force participation in the Egyptian labor market. While the estimations show that the change in female labor supply was mainly due to necessity rather than a change in social norms – the latter mechanism being unreasonable to expect in the short term – a relevant shock to the labor division between women and men may well have long run consequences on the role of women in society.

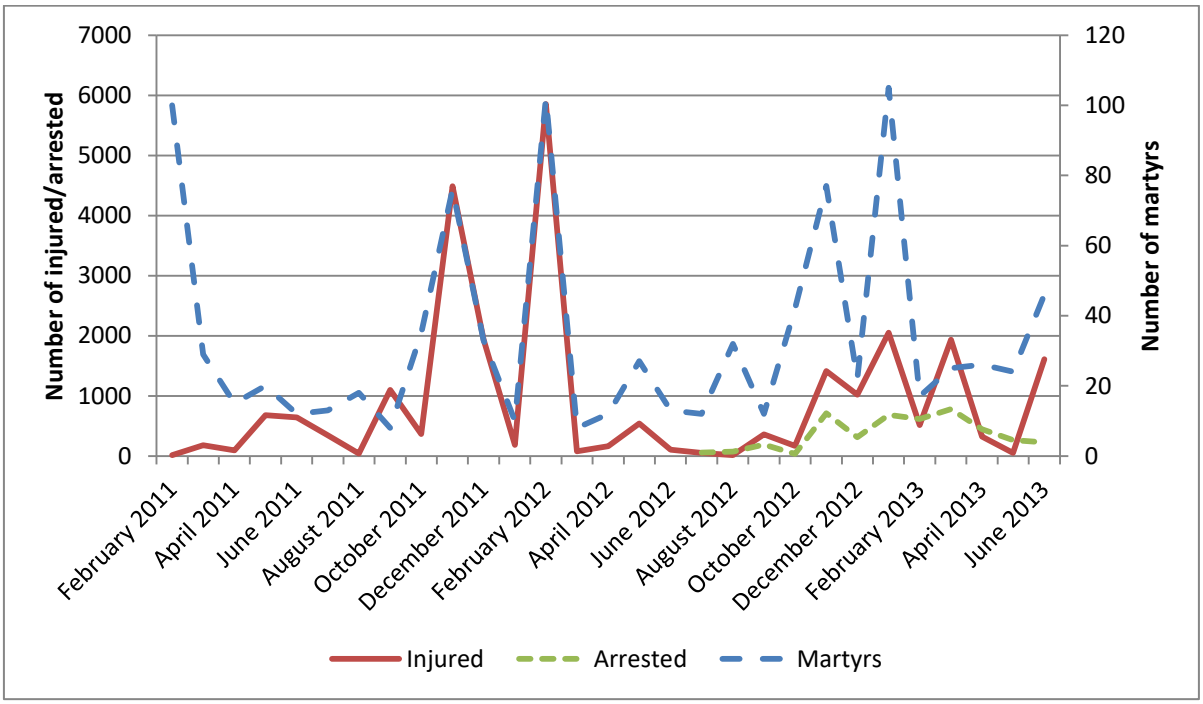


Figure 3.1. The numbers of "martyrs," injured and arrested from February 2011 to June 2013
Notes: The data source is the Statistical Database of the Egyptian Revolution.

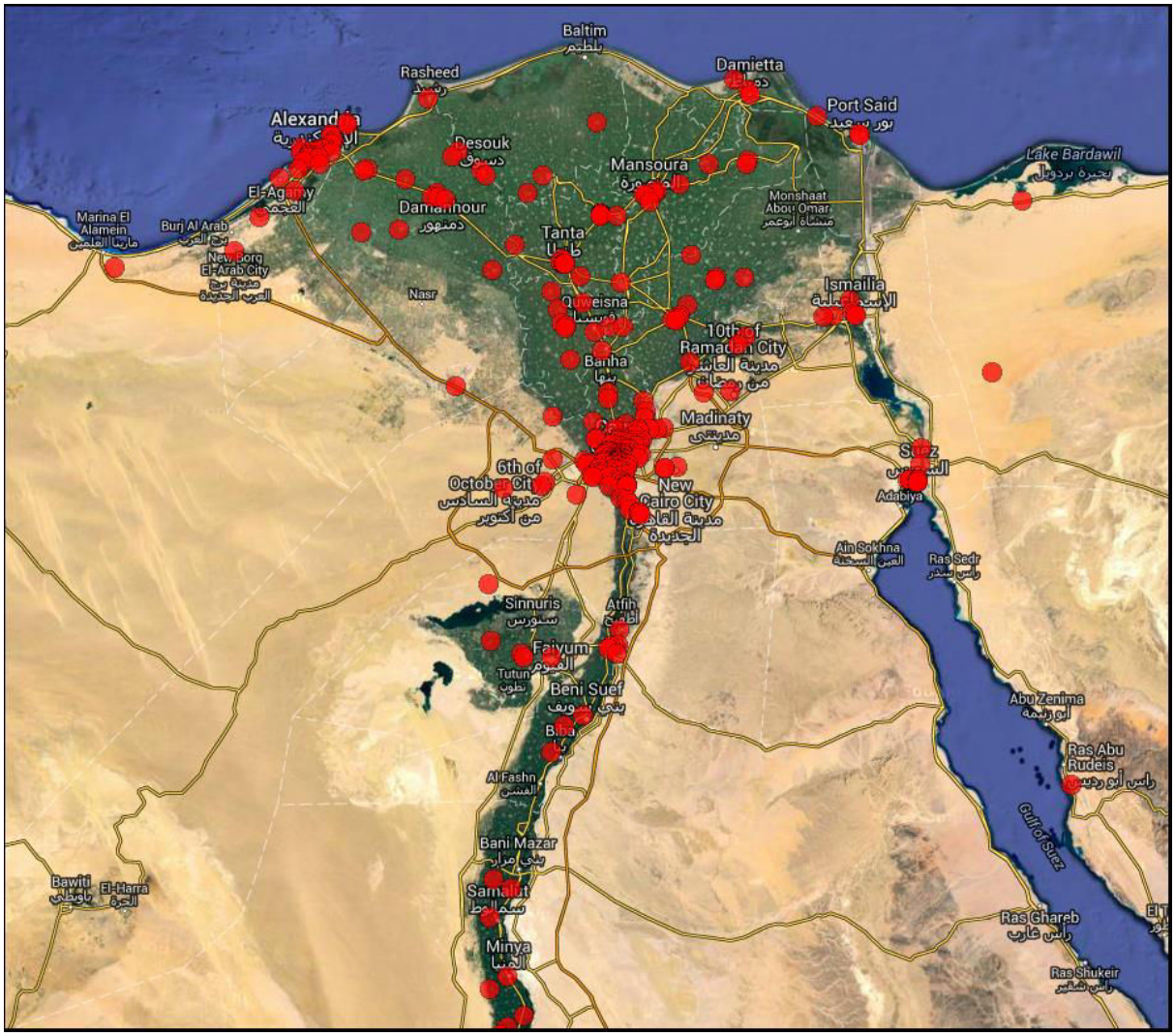


Figure 3.2. Geocoding the location of the "martyrs."

Notes: We geocoded the locations' of death of the "martyrs" from the 25th of January 2011, until the end of June 2012. Each circle represents a location. Each location corresponds to either one incidence of death or several incidences of death. The Southern Upper Egypt governorates (Asyut, Sohag, Qena, Luxor and Aswan) are not presented in this map to zoom on the geographical distribution of "martyrs" in Cairo, Giza, Alexandria, Beheira, the delta region (Qalyubia, Gharbia, Dakahlia, Sharqia, Monufia, Kafr el-Sheikh and Damietta), the Canal cities (Port-Said, Suez and Ismailia) and Northern Upper Egypt (Minya, Beni Suef and Faiyum). Sources: Google maps and Statistical Database of the Egyptian Revolution.

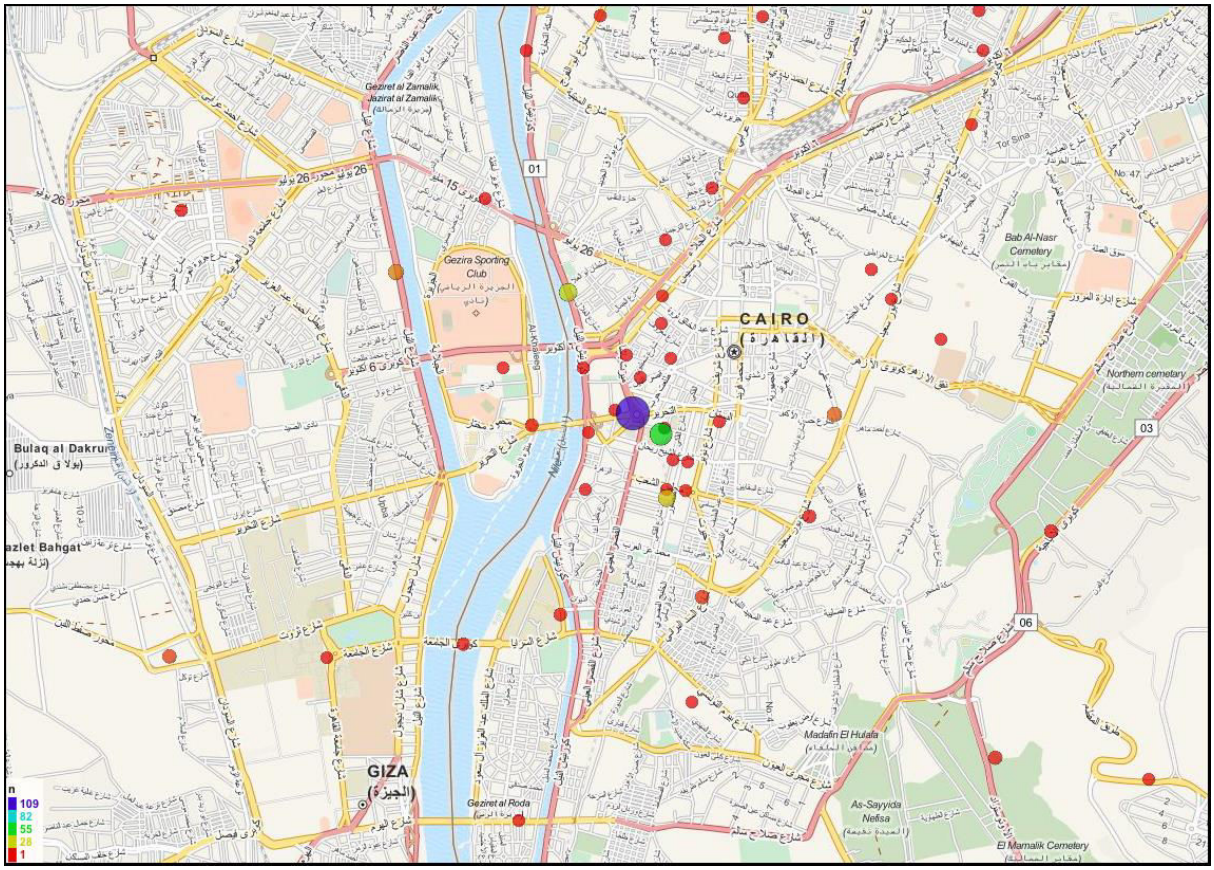


Figure 3.3. Geocoding the location of the "martyrs" in Cairo and its neighborhoods.

Notes: We geocoded the locations' of death of the "martyrs" from the 25th of January 2011, until the end of June 2012. Each circle represents one location. Circles are differentiated by color, according to the number of deaths that occurred in each location. The location with the highest number of death incidences in Cairo is Tahrir Square (the purple dot). Sources: Open Street Map and the Statistical Database of the Egyptian Revolution.

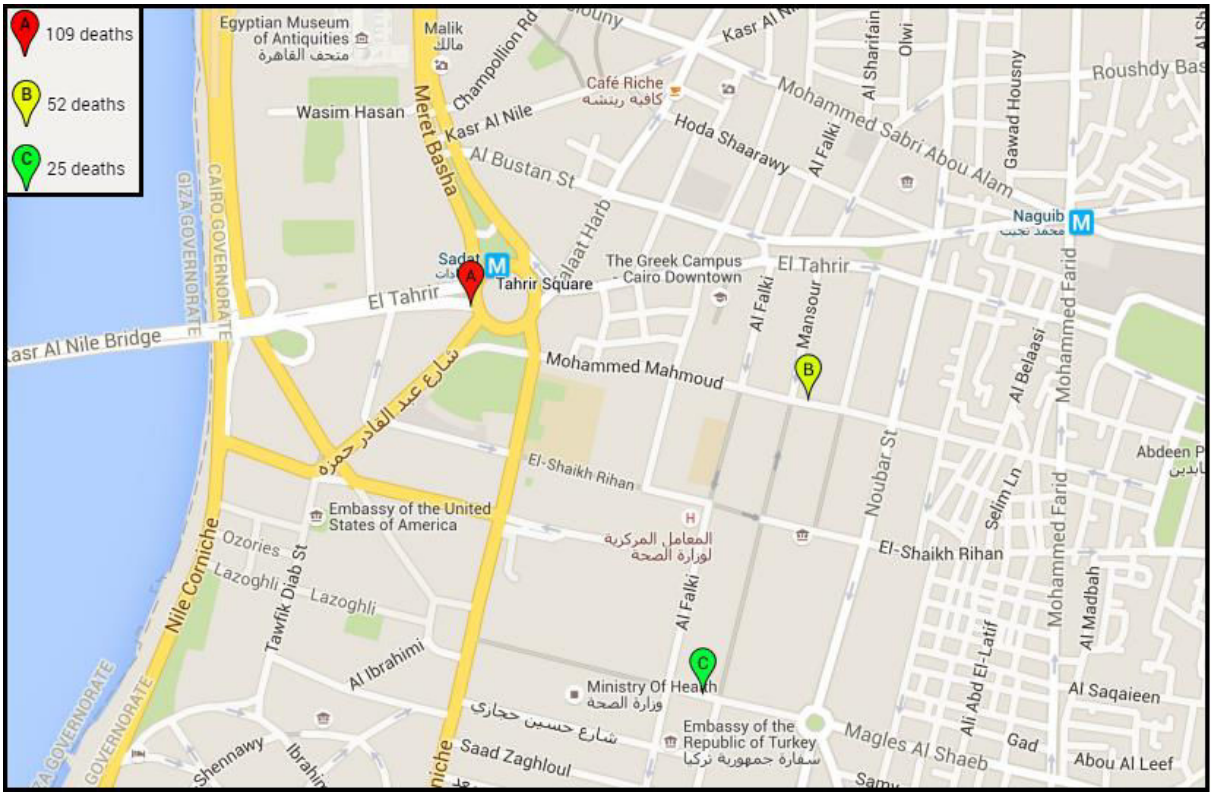


Figure 3.4. Geocoding the location of the "martyrs," Tahrir Square.

Notes: We geocoded the locations' of death of the "martyrs" from the 25th of January 2011, until the end of June 2012. Pin A represents Tahrir Square, Pin B represents Mohamed Mahmoud Street and Pin C represents the Ministers' Cabinet. The pins are differentiated by color, according to the number of deaths that occurred in each location. Sources: Google maps and the Statistical Database of the Egyptian Revolution.

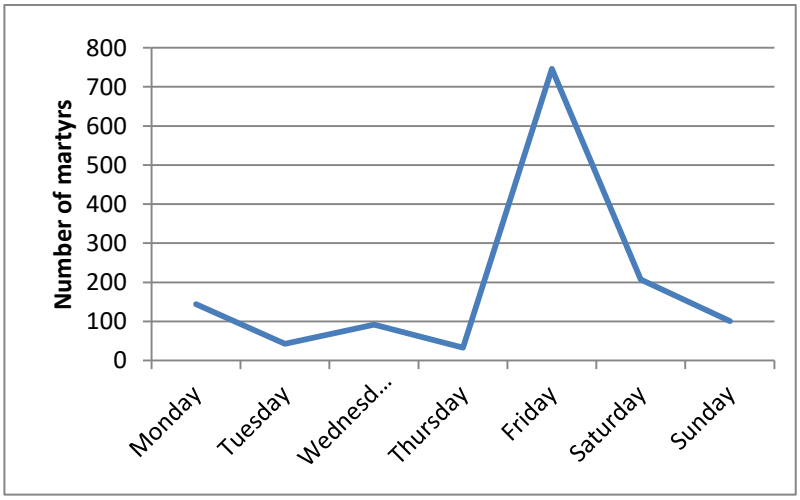


Figure 3.5. The number of "martyrs" per day, from January 2011 until June 2012.

Notes: The data source is the Statistical Database of the Egyptian Revolution.

Table 3.1: Descriptive statistics on individuals' and households' characteristics (estimation sample)

VARIABLES	*Observations*	*2006*		*Observations*	*2012*	
		Mean	*St. Dev.*		*Mean*	*St. Dev.*
Individual level characteristics						
No educational degree	7,416	0.356	0.479	7,416	0.351	0.477
Primary/preparatory education	7,416	0.147	0.355	7,416	0.154	0.361
Secondary education	7,416	0.308	0.462	7,416	0.308	0.462
Above secondary education	7,416	0.189	0.391	7,416	0.186	0.389
Household level characteristics						
Rural	3,708	0.489	0.500	3,708	0.488	0.500
Household size	3,708	4.875	1.947	3,708	5.039	1.668
Number of adults 15-64 years old	3,708	2.861	1.307	3,708	3.067	1.281
Land ownership	3,708	0.166	0.372	3,708	0.131	0.338
Household head characteristics						
No educational degree	3,708	0.320	0.467	3,708	0.313	0.464
Primary/preparatory education	3,708	0.168	0.374	3,708	0.177	0.382
Secondary education	3,708	0.297	0.457	3,708	0.294	0.456
Above secondary education	3,708	0.215	0.411	3,708	0.216	0.412
Measures of the intensity of the protests						
Number of martyrs	229	4.528	11.077			
Number of martyrs per 1000 inhabitants	229	0.100	0.590			

Notes. All reported descriptive statistics refer to sample individuals' and households' characteristics in 2006 and 2012. Individual level controls include four dummies for educational attainment: no education (either illiterate or literate without any diploma), primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). Household level controls include a rural dummy, district of residence dummies (not reported in this table), household size, the number of adults aged 15 to 64 years old and a dummy variable for land ownership. Household head characteristics include: four dummies for the head of household's educational attainment. The number of "martyrs" is summarized at the district level and represents the number of fatalities from the 25th of January 2011 to the end of June 2012. The number of martyrs per 1000 inhabitants is summarized at the district level and represents the number of fatalities from the 25th of January 2011 to the end of June 2012, normalized by the district population size.

Table 3.2: Descriptive statistics on outcome variables (estimation sample)

	All sample				Females				Males			
	2006		2012		2006		2012		2006		2012	
VARIABLES	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*	*Mean*	*St. Dev.*
Labor Force Participation	0.641	0.480	0.606	0.489	0.303	0.460	0.289	0.453	0.980	0.140	0.923	0.266
Unemployment	0.025	0.157	0.029	0.169	0.047	0.212	0.050	0.218	0.004	0.061	0.009	0.093
Employment	0.616	0.486	0.577	0.494	0.256	0.436	0.239	0.426	0.976	0.152	0.915	0.279
Wage work	0.652	0.476	0.396	0.489	0.575	0.495	0.163	0.369	0.672	0.469	0.629	0.483
Employer/Self-employed	0.178	0.382	0.268	0.443	0.040	0.196	0.110	0.313	0.315	0.465	0.309	0.462
Unpaid family work	0.143	0.350	0.093	0.291	0.281	0.450	0.182	0.386	0.005	0.068	0.004	0.067
Formal sector employment	0.310	0.463	0.324	0.468	0.135	0.341	0.153	0.360	0.521	0.500	0.562	0.496
Informal sector employment	0.257	0.437	0.138	0.345	0.097	0.296	0.017	0.127	0.449	0.498	0.308	0.462
Public sector employment	0.253	0.435	0.242	0.429	0.131	0.338	0.141	0.348	0.375	0.484	0.343	0.475
Private sector employment	0.363	0.481	0.334	0.472	0.124	0.330	0.096	0.294	0.601	0.490	0.572	0.495
Log of real hourly wage	0.939	0.790	1.039	0.733	1.120	1.022	1.024	0.724	0.899	0.722	1.043	0.736
Log of real monthly wage	4.007	2.999	6.235	0.705	3.407	3.008	6.100	0.706	4.164	2.977	6.270	0.701
Hours of work/week	46.610	17.810	45.920	16.310	29.930	17.240	36.750	12.780	50.960	15.190	48.280	16.290

Notes. Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Wage work, employer, self-employed and unpaid family work are defined according to the current work status in primary job, reference period 3 months. Formal and informal sectors employment are defined according to the incidence of work contract and social security in primary job, reference period 3 months. Public and private sectors employment are defined according to the economic sector of primary job, reference period 1 week. Monthly and hourly wages are calculated in constant 2006 Egyptian Pounds and refer to the monthly/hourly wage in primary job, conditional on being employed, in log specification. The hours of work refer to the current number of work hours per week, excluding subsistence work (market definition of economic activity) and conditional on being employed. The table reports descriptive statistics that are calculated using the information on the estimation sample for both waves: 2006 and 2012.

Table 3.3: Descriptive statistics on the time-varying household controls

Variable		Mean	Std. Dev.	Observations
Household size	overall	4.957	1.814	N = 7416
	between		1.608	n = 3708
	within		0.841	T = 2
Rural	overall	0.489	0.500	N = 7416
	between		0.497	n = 3708
	within		0.051	T = 2
Number of adults 15-64 years old	overall	2.964	1.298	N = 7416
	between		1.168	n = 3708
	within		0.567	T = 2
Land ownership	overall	0.149	0.356	N = 7416
	between		0.305	n = 3708
	within		0.183	T = 2
Household head characteristics				
No educational degree	overall	0.316	0.465	N = 7416
	between		0.444	n = 3708
	within		0.139	T = 2
Primary/Preparatory education	overall	0.172	0.378	N = 7416
	between		0.344	n = 3708
	within		0.156	T = 2
Secondary education	overall	0.295	0.456	N = 7416
	between		0.440	n = 3708
	within		0.122	T = 2

Notes. All reported descriptive statistics refer to sample households' characteristics. Household time-varying controls include a rural dummy, district of residence dummies (not reported in this table), household size, the number of adults aged 15 to 64 years old and a dummy variable for land ownership. Household head characteristics include: four dummies for the head of household's educational attainment.

Table 3.4: Placebo regressions: The impact of the 2011 revolution on individual's labor market outcomes in 1998-2006

VARIABLES	(1) LFP	(2) Unemploy-ment	(3) Employment	(4) Wage work	(5) Employer/ self-employed	(6) Unpaid	(7) Formal	(8) Informal	(9) Public	(10) Private	(11) Monthly wage	(12) Hourly wage	(13) Hours
Martyrs × year	-0.001	0.001	-0.001	-0.002	0.001	0.002	-0.001	-0.000	-0.001	-0.001	0.000	-0.002	-0.088
	[0.002]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.002]	[0.022]	[0.005]	[0.205]
Observations	2,522	2,522	2,522	2,522	2,522	2,522	1,982	1,982	2,516	2,516	1,093	1,092	1,554
R-squared	0.735	0.539	0.768	0.816	0.785	0.684	0.914	0.814	0.906	0.827	0.950	0.896	0.856
Household Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	144	144	144	144	144	144	143	143	144	144	134	135	139

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level. The year dummy is equal to one for the year 2006 and zero for the year 1998. Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Wage work, employer, self-employed and unpaid family work are defined according to the current work status in primary job, reference period 3 months. Informal sector employment is defined as having neither a legal work contract nor social security in primary job, reference period 3 months, whereas, formal sector employment is defined as having a legal work contract and social security in primary job, reference period 3 months. Private and public sector employment are defined according to the economic sector of primary job, reference period 3 months. Monthly and hourly wages are calculated in constant 1998 Egyptian Pounds and refer to the monthly/hourly wage in primary job, conditional on being employed, in log specification. The hours of work refer to the current number of work hours per week, excluding subsistence work (market definition of economic activity) and conditional on being employed. Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and Regressions include household controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of the household's educational attainment. Regressions also include individual and year fixed effects and panel weights between 1998 and 2006 to correct for attrition.

Table 3.5: Labor Force Participation, Unemployment and Employment. Difference-in-Differences regression.

Panel A: Household level data, Intra-household differences in labor market outcomes			
	(1)	(2)	(3)
VARIABLES	Labor Force Participation	Unemployment	Employment
Martyrs × year	0.038***	0.022***	0.016**
	[0.007]	[0.005]	[0.007]
Observations	7,416	7,416	7,416
R-squared	0.727	0.574	0.756
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Household FE	YES	YES	YES
Year FE	YES	YES	YES
Panel B: Individual level data for couples			
Martyrs × year × female	0.036***	0.022***	0.014***
	[0.006]	[0.004]	[0.005]
Martyrs × year	0.002	-0.003	0.005*
	[0.003]	[0.003]	[0.002]
Observations	14,832	14,832	14,832
R-squared	0.849	0.577	0.872
$H_0 : \alpha_1 + \alpha_2 = 0$ (P-value)	0.000	0.000	0.000
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Individual FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	213	213	213

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). In Panel A, results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. In Panel B, results are reported using individual level data for couples and regressions include individual and household controls as well as their interaction with the year dummy. Individual time-varying controls include the following variables: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household/individual (Panel A/Panel B) and year fixed effects and panel weights between 2006 and 2012 to correct for attrition. The P-value of a test with null hypothesis $\alpha_1+\alpha_2=0$ to check whether the protests significantly affect women's outcomes of interest is also reported in Panel B.

Table 3.6: Dyadic regressions - Labor Force participation, Unemployment and Employment

VARIABLES	(1) Labor Force Participation	(2) Unemployment	(3) Employment
Martyrs × year × female	0.183***	0.012	0.172***
	[0.023]	[0.011]	[0.023]
Martyrs × year	-0.069***	0.003	-0.072***
	[0.010]	[0.002]	[0.010]
Observations	14,832	14,832	14,832
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
Individual FE	YES	YES	YES
Year FE	YES	YES	YES
$H_0 : \alpha_1 + \alpha_2 = 0$ (P-value)	0.000	0.175	0.000

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets.

Notes. Each cell represents a coefficient estimate using Dyadic Difference-in-Differences regression, in which observations is a pair of household members (wife and husband), following (Arcand and Fafchamps, 2012). The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Regressions include individual and household controls. Individual time-varying controls include the following variables: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include individual and year fixed effects. The P-value of a test with null hypothesis $\alpha_1+\alpha_2=0$ to check whether the protests significantly affect women's outcomes of interest is reported in the last row.

Table 3.7: Public and private, formal and informal sectors of employment. Difference-in-Differences regression.

VARIABLES	(1) Public	(2) Private	(3) Formal	(4) Informal
Martyrs × year	0.003	0.013**	0.003	0.013**
	[0.003]	[0.007]	[0.007]	[0.006]
Observations	7,416	7,416	7,416	7,416
R-squared	0.867	0.801	0.805	0.735
Household Controls	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES
Household FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Number of clusters	213	213	213	213

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Private and public sector employment are defined according to the economic sector of primary job, reference period 1 week. Informal sector employment is defined as having neither a legal work contract nor social security in primary job, reference period 3 months, whereas, formal sector employment is defined as having a legal work contract and social security in primary job, reference period 3 months. Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table 3.8: Public, private formal and private informal sector employment. Multinomial logit with random effects model and Mundlak procedure

VARIABLES	(1) Public	(2) Private formal	(3) Private informal
Martyrs × year × female	0.419	7.919	0.785**
	[0.438]	[7.601]	[0.437]
Martyrs × year	0.321**	0.232	0.019
	[0.144]	[0.154]	[0.160]
Observations	14,832	14,832	14,832
Individual controls	YES	YES	YES
Household controls	YES	YES	YES
Controls × year	YES	YES	YES
Individual RE	YES	YES	YES
Year FE	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets.

Notes. Each cell represents a coefficient estimate using a Multinomial logit model with individual random effects and a Mundlak Procedure. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). The dependent variable is a categorical variable that takes the value 1 if the individual is not working either unemployed or out of labor force (omitted category), takes the value 2 if the individual is employed in the public sector, takes the value 3 if the individual is employed in the Private formal sector and the value 4 if the individual is employed in the private informal sector. Private and public sector employment are defined according to the economic sector of primary job, reference period 1 week. Informal sector employment is defined as having neither a legal work contract nor social security in primary job, reference period 3 months, whereas, formal sector employment is defined as having a legal work contract and social security in primary job, reference period 3 months. Regressions include individual and household controls as well as their interaction with the year dummy. Individual time-varying controls include the following variables: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include a year fixed effect and all covariates expressed as individual-specific means.

Table 3.9: Robustness checks, eliminating central places of assembly. Difference-in-Differences regression.

	Panel A: Eliminating Cairo			Panel B: Eliminating Cairo and Alexandria		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Labor Force Participation	Unemployment	Employment	Labor Force Participation	Unemployment	Employment
Martyrs × year	0.040***	0.021***	0.019***	0.041***	0.021***	0.019***
	[0.006]	[0.004]	[0.005]	[0.006]	[0.004]	[0.005]
	6,822	6,822	6,822	6,364	6,364	6,364
	0.709	0.574	0.738	0.701	0.574	0.733
	187	187	187	176	176	176
	Panel C: Eliminating Cairo, Alexandria and Port-Said			**Panel D: Eliminating Cairo, Alexandria, Port-Said and Suez**		
Martyrs × year	0.040***	0.021***	0.019***	0.041***	0.021***	0.019***
	[0.006]	[0.004]	[0.005]	[0.006]	[0.004]	[0.005]
Observations	6,310	6,310	6,310	6,200	6,200	6,200
R-squared	0.699	0.576	0.730	0.699	0.576	0.730
Number of clusters	171	171	171	166	166	166
Household Controls	YES	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. In Panel A, households residing in the Capital Cairo are not included in the estimation sample. In Panel B, households residing in Cairo and Alexandria are not included in the estimation sample. In Panel C, households residing in Cairo, Alexandria and Port-Said are not included in the estimation sample. In Panel D, households residing in Cairo, Alexandria, Port-Said and Suez are not included in the estimation sample. Regressions include household controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table 3.10: Robustness checks, considering individuals' work status in 2010 and 2012. Difference-in-Differences regression.

	(1)	(2)	(3)
VARIABLES	Labor Force Participation	Unemployment	Employment
Panel A: Couples' sample			
Martyrs × year	0.012**	0.004	0.009
	[0.005]	[0.006]	[0.010]
Observations	2,368	2,368	2,368
R-squared	0.898	0.714	0.899
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Household FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	185	185	185
Panel B: Full sample of working age individuals			
Martyrs × year × female	0.021***	0.006**	0.015*
	[0.007]	[0.003]	[0.008]
Martyrs × year	0.004**	-0.002	0.006***
	[0.002]	[0.001]	[0.001]
Observations	23,099	23,099	23,099
R-squared	0.956	0.843	0.943
$H_0 : \alpha_1 + \alpha_2 = 0$ (P-value)	0.000	0.269	0.011
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Individual FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	233	233	233

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2010 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). In Panel A, results are reported for the couples' sample, those for which information on work status in 2010 is available using household level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. In Panel B, results are reported for the full sample of working age women and men for which information on work status in 2010 is available and regressions include individual and household controls as well as their interaction with the year dummy. Individual time-varying controls include the following variables: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include individual and year fixed effects and panel weights between 2006 and 2012 to correct for attrition. The p-value of a test with null hypothesis $\alpha_1+\alpha_2=0$ to check whether the protests significantly affect women's outcomes of interest is reported in Panel B.

Table 3.11: Robustness checks, including additional district level covariates from Census data

VARIABLES	(1) Labor Force Participation	(2) Unemployment	(3) Employment	(4) Labor Force Participation	(5) Unemployment	(6) Employment	(7) Labor Force Participation	(8) Unemployment	(9) Employment
Martyrs × year	0.038***	0.022***	0.016**	0.026***	0.019***	0.008	0.026***	0.018***	0.008
	[0.007]	[0.005]	[0.007]	[0.007]	[0.006]	[0.007]	[0.007]	[0.005]	[0.007]
Log of GDP/capita × year	0.124	-0.057	0.181				-0.071	-0.126*	0.055
	[0.218]	[0.073]	[0.189]				[0.214]	[0.073]	[0.193]
Cell-phone × year				0.771*	0.349*	0.421	0.792*	0.386**	0.405
				[0.440]	[0.199]	[0.398]	[0.431]	[0.193]	[0.387]
Computer × year				1.160	0.336	0.824	1.125	0.274	0.851
				[1.170]	[0.525]	[1.123]	[1.184]	[0.511]	[1.140]
Electricity × year				4.600	0.498	4.101	4.852	0.947	3.904
				[6.745]	[2.514]	[5.152]	[6.852]	[2.484]	[5.234]
Internet × year				-1.116	0.128	-1.243	-1.035	0.271	-1.306
				[1.557]	[0.694]	[1.490]	[1.588]	[0.693]	[1.524]
No sanitation × year				-0.127	-0.046	-0.081	-0.134	-0.059	-0.075
				[0.119]	[0.052]	[0.091]	[0.117]	[0.052]	[0.090]
Observations	7,416	7,416	7,416	7,416	7,416	7,416	7,416	7,416	7,416
R-squared	0.727	0.574	0.756	0.730	0.575	0.757	0.730	0.576	0.757
Household Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	213	213	213	213	213	213	213	213	213

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to 1 for the year 2012 (after the protests) and 0 for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, number of adults aged 15 to 64, a dummy variable for land ownership and three dummies for the head of household's educational attainment. In columns (1), (2) and (3), we include the logarithm of the 2005 real GDP/capita at the governorate level interacted with the year dummy. In columns (4), (5) and (6), additional district level variables from the 2006 Census interacted with the year dummy are included: the share of households with cell phone availability, computer availability, with electricity access, with internet access and the share of households not connected to sewage disposal system. In columns (7), (8) and (9), the logarithm of the governorate level GDP/capita is included along with all the additional district level controls interacted with the year dummy. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table 3.12: Using the absolute number of "martyrs." Difference-in-Differences regression.

Panel A: Using the absolute number of "martyrs" in a district			
	(1)	(2)	(3)
VARIABLES	Labor Force Participation	Unemployment	Employment
Martyrs × year	0.021*	0.009	0.012
	[0.012]	[0.011]	[0.014]
Observations	7,416	7,416	7,416
R-squared	0.727	0.573	0.756
Number of clusters	213	213	213
Panel B: Using the absolute number of "martyrs" in a district and its neighboring districts			
Martyrs × year	0.043**	0.015	0.028*
	[0.017]	[0.009]	[0.015]
Observations	7,416	7,416	7,416
R-squared	0.727	0.573	0.756
Number of clusters	213	213	213
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Household FE	YES	YES	YES
Year FE	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. In Panel A, the number of "martyrs" represents the absolute number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level (normalized by the standard deviation, 11 deaths). In Panel B, each district is attributed the number of "martyrs" in that district and in its neighboring districts, sharing a common border (normalized by the standard deviation, 37 deaths). The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table 3.13: Hourly wages, the number of hours worked per week and the variance of monthly wage. Difference-in-Differences regression.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Log hourly wage	Hours/week	Log variance of log monthly wage (occupation, gender and education)	Log variance of log monthly wage (occupation)	Log variance of log monthly wage (occupation and gender)
Martyrs × year	0.133**	3.614***	-0.090***	-0.003	-0.025
	[0.067]	[0.904]	[0.023]	[0.004]	[0.021]
Observations	927	1,714	1,743	1,743	1,743
R-squared	0.737	0.840	0.933	0.802	0.935
Household Controls	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Number of clusters	159	184	185	185	185

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. In columns (1) hourly wages are calculated in constant 2006 Egyptian Pounds and refer to the hourly wage in primary job, conditional on being employed, in log specification. In column (2), the hours of work refer to the current number of work hours per week, excluding subsistence work (market definition of economic activity) and conditional on being employed. In columns (3), (4) and (5), we use a conventional risk measure: the logarithm of the variance of the logarithm of monthly wage. The monthly wage is expressed in constant 2006 Egyptian Pounds and refers to the monthly wage in primary job. We construct this measure by occupation, gender and education in column (3), by occupation in column (4) and by occupation and gender in column (5). Educational levels are the following: no educational degree, primary/preparatory education, secondary education and above secondary education. The occupational groups are defined according to the ISCO-88 occupation classification: low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar. Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table 3.14: Other potential mechanisms. Difference-in-Differences regression.

VARIABLES	(1) Migration	(2) Remittances	(3) Religious education	(4) Giving birth
Martyrs × year	-0.001*	-0.016	-0.009**	0.002
	[0.001]	[0.012]	[0.004]	[0.005]
Observations	5,564	5,564	3,508	6,346
R-squared	0.516	0.596	0.846	0.548
Household Controls	YES	YES	YES	YES
Household FE	YES	YES	YES	
Year FE	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES
Individual Controls				YES
Individual FE				YES
Number of clusters	210	210	198	212

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regressions. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Regressions in columns (1), (2) and (3) are run at the household level, whereas the regression in column (4) is run on a sample of married women aged 18 to 49 years old. The dependent variable in column (1) corresponds to migration at the household level. It is equal to 1 if household report having a member living or working abroad. The dependent variable in column (2) corresponds to the log of the total value of remittances received by the household, in cash and/or in kind from all listed migrants, during the last 12 months preceding the survey. Remittances are expressed in 2006 constant Egyptian Pounds. The dependent variable in column (3) corresponds to the number of individuals studying at religious schools (*Azhari*) at the time of the survey over the total number of individuals currently studying at the household level. This ratio is calculated on a subsample of individuals who are currently studying at the time of the surveys in 2006 and 2012. The dependent variable in column (4) corresponds to the probability of giving birth after the revolution between the 25th of October 2011 (9 months after the 25th of January 2011 revolution) and the day of visit for the survey interview, and the probability of giving birth for the same time interval prior to the 2006 round, only focusing on married women aged 18 to 49 years old. Regressions in columns (1), (2) and (3) include household controls as well as their interaction with the year dummy. The regression in column (4) includes individual and household controls as well as their interaction with the year dummy. Household time-varying controls include: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Individual time-varying controls include: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Regressions also include individual and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table 3.15: The number of "martyrs" per day

Day	Number of martyrs	Percentage of martyrs
Monday	144	0.105
Tuesday	43	0.031
Wednesday	92	0.067
Thursday	33	0.024
Friday	746	0.546
Saturday	207	0.152
Sunday	101	0.074
Total	1366	1.000

Notes. The data source is the Statistical Database of the Egyptian Revolution. The number of "martyrs" per day is from January 2011 until June 2012.

Table 3.16: Initial mean of hourly wage

	Males	Females	Difference
No educational degree	1.279	0.108	1.171***
Primary/Preparatory education	2.024	0.271	1.754
Secondary education	2.930	8.361	-5.432***
Above secondary education	4.557	6.229	-1.671

Notes. *** p<0.01, ** p<0.05, * p<0.1. Hourly wages are reported in Egyptian Pounds from the ELMPS 2006, for the different levels of educational attainment: no educational degree (either illiterate or literate without any diploma), primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). Hourly wages are reported for males and females, as well as the difference between their hourly wages.

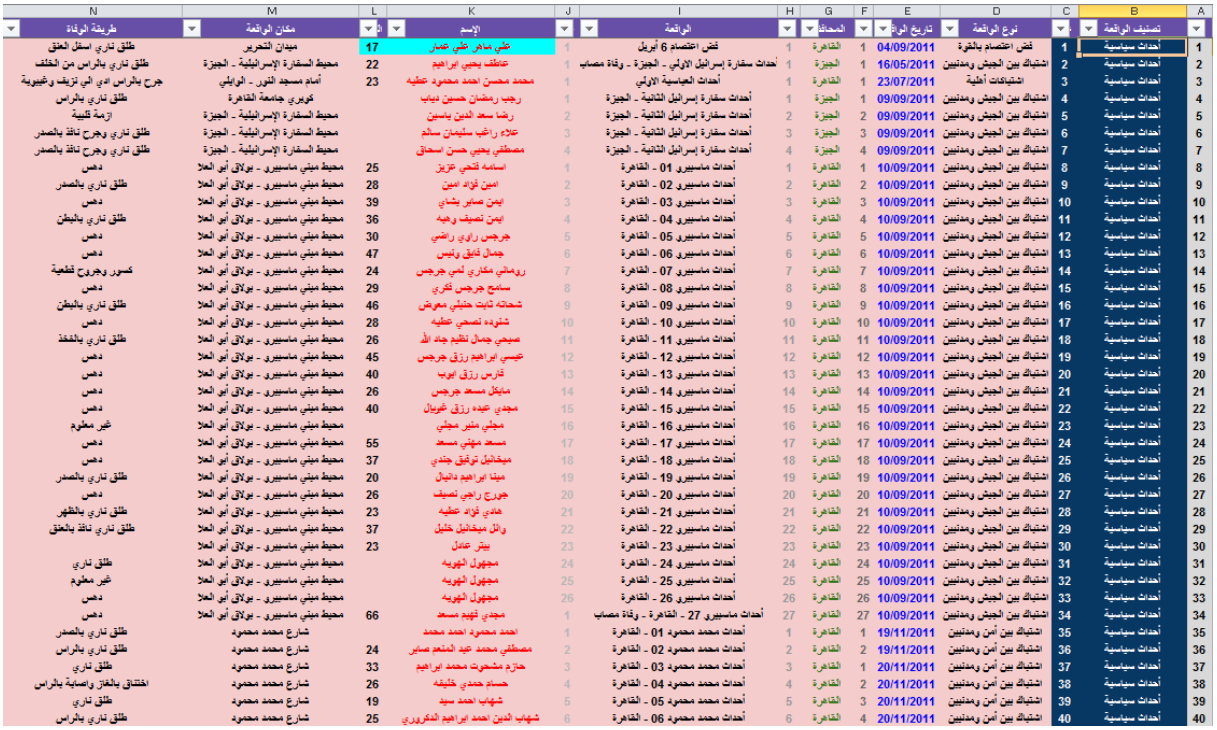
Table 3.17: Gender gap in children's education. Difference-in-Differences regression.

VARIABLES	(1) Going to school	(2) Going to religious school unconditional on studying	(3) Going to religious school conditional on studying
Martyrs × girl × year	-0.007	0.004	0.004
	[0.010]	[0.004]	[0.005]
Martyrs × year	0.011	-0.005*	-0.006*
	[0.010]	[0.003]	[0.003]
Observations	3,962	3,837	3,709
R-squared	0.634	0.813	0.820
$H_0 : \alpha_1 + \alpha_2 = 0$ (P-value)	0.254	0.776	0.663
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Individual FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	182	182	182

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regressions. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012, at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Girl is a dummy variable equal to one for girls. Our estimation sample includes children aged between 6 and 15 years old in the two waves of the panel 2006 and 2012. The dependent variable in column (1) is a dummy variable indicator for going to school at the time of the survey. The dependent variable in column (2) is a dummy variable indicator for going to religious school (*Azhari*) at the time of the survey, unconditional on studying. The dependent variable in column (3) is a dummy variable indicator for going to religious school (*Azhari*) at the time of the survey, conditional on studying. Regressions include household controls as well as their interaction with the year dummy. Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include individual and year fixed effects and panel weights between 2006 and 2012 to correct for attrition. The table also reports the p-value of a test with null hypothesis $\alpha_1+\alpha_2=0$ to check whether the protests significantly affect girls' outcomes of interest.

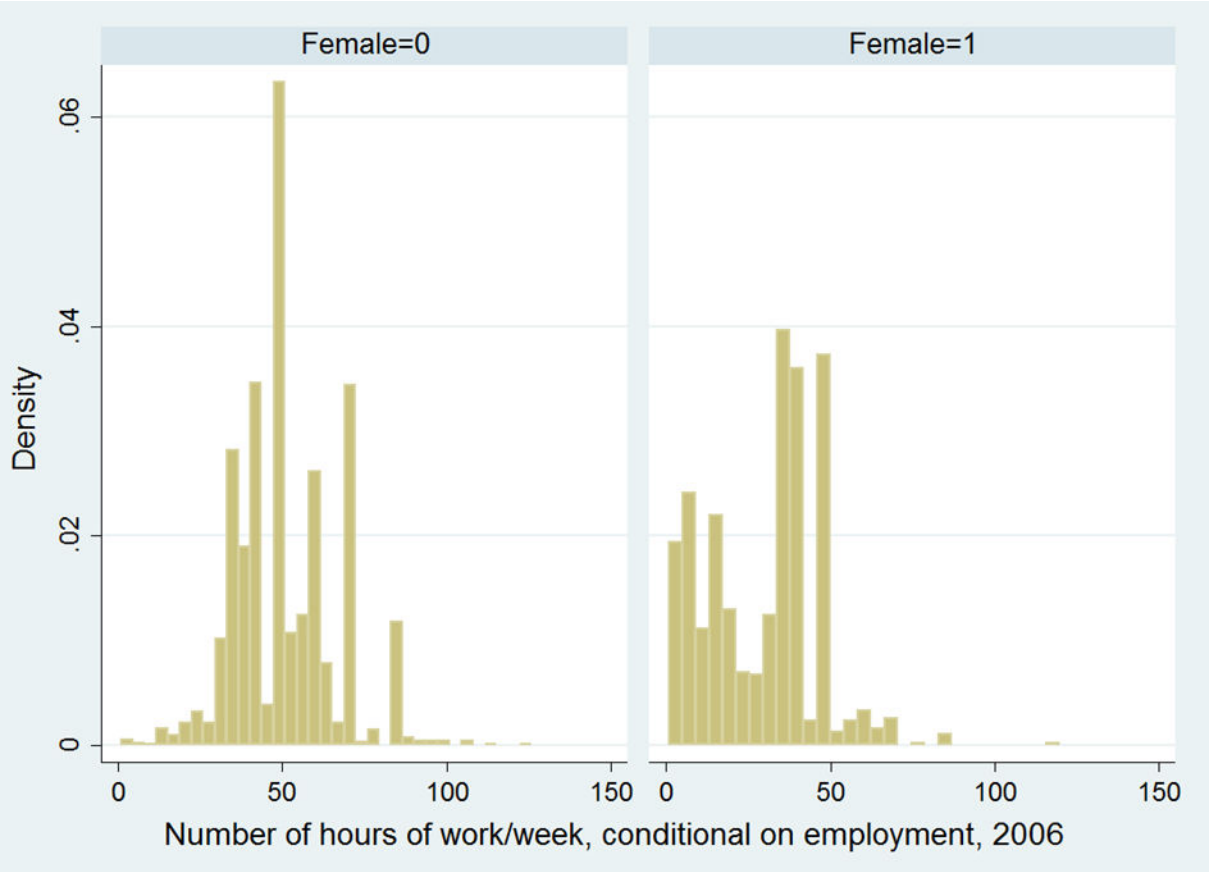
Appendix A



A	B	C	D	E	F	G	H	I	J	K	L	M	N
	تصنيف الواقعة		نوع الواقعة	تاريخ الوا		المحافظ		الواقعة		الإسم	ال	مكان الواقعة	طريقة الوفاة
1	أحداث سياسية	1	فض اعتصام بالقوة	04/09/2011	1	القاهرة	1	فض اعتصام 6 أبريل	1	شابي صابر شابي عصار	17	ميدان التحرير	طلق ناري استقل العنق
2	أحداث سياسية	1	اشتباك بين الجيش ومدنيين	16/05/2011	1	الجيزة	1	أحداث سفارة إسرائيل الاولي - الجيزة - وفاة مصاب	1	عاطف يحيي ابراهيم	22	محيط السفارة الإسرائيلية - الجيزة	طلق ناري بالراس من الخلف
3	أحداث سياسية	1	اشتباكات أهلية	23/07/2011	1	القاهرة	1	أحداث العباسية الاولي	1	محمد محسن احمد محموه عطيه	23	أمام مسجد النور - العباسي	جرح بالراس اي الي تزيف وتقيبوية
4	أحداث سياسية	1	اشتباك بين الجيش ومدنيين	09/09/2011	1	الجيزة	1	أحداث سفارة إسرائيل الثانية - الجيزة	1	رجب رمضان حسين دياب		كوبري جامعة القاهرة	طلق ناري بالراس
5	أحداث سياسية	2	اشتباك بين الجيش ومدنيين	09/09/2011	2	الجيزة	2	أحداث سفارة إسرائيل الثانية - الجيزة	2	رضا سعد الدين ياسين		محيط السفارة الإسرائيلية - الجيزة	ازمة قلبية
6	أحداث سياسية	3	اشتباك بين الجيش ومدنيين	09/09/2011	3	الجيزة	3	أحداث سفارة إسرائيل الثانية - الجيزة	3	علاء راغب سليمان سالم		محيط السفارة الإسرائيلية - الجيزة	طلق ناري وجرح نافذ بالصدر
7	أحداث سياسية	4	اشتباك بين الجيش ومدنيين	09/09/2011	4	الجيزة	4	أحداث سفارة إسرائيل الثانية - الجيزة	4	مصطفي يحيي حسن اسحاق		محيط السفارة الإسرائيلية - الجيزة	طلق ناري وجرح نافذ بالصدر
8	أحداث سياسية	1	اشتباك بين الجيش ومدنيين	10/09/2011	1	القاهرة	1	أحداث ماسبيرو 01 - القاهرة	1	اسامه فتحي عزيز	25	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
9	أحداث سياسية	2	اشتباك بين الجيش ومدنيين	10/09/2011	2	القاهرة	2	أحداث ماسبيرو 02 - القاهرة	2	امين فؤاد امين	28	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري بالصدر
10	أحداث سياسية	3	اشتباك بين الجيش ومدنيين	10/09/2011	3	القاهرة	3	أحداث ماسبيرو 03 - القاهرة	3	ايمن صابر بشاي	39	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
11	أحداث سياسية	4	اشتباك بين الجيش ومدنيين	10/09/2011	4	القاهرة	4	أحداث ماسبيرو 04 - القاهرة	4	ايمن تصيف وهبه	36	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري بالبطن
12	أحداث سياسية	5	اشتباك بين الجيش ومدنيين	10/09/2011	5	القاهرة	5	أحداث ماسبيرو 05 - القاهرة	5	جرجس راي راضي	30	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
13	أحداث سياسية	6	اشتباك بين الجيش ومدنيين	10/09/2011	6	القاهرة	6	أحداث ماسبيرو 06 - القاهرة	6	جمال فايق وليس	47	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
14	أحداث سياسية	7	اشتباك بين الجيش ومدنيين	10/09/2011	7	القاهرة	7	أحداث ماسبيرو 07 - القاهرة	7	روماني مكاري كمي جرجس	24	محيط مبني ماسبيرو - بولاق أبو العلا	كسور وجروح قطعية
15	أحداث سياسية	8	اشتباك بين الجيش ومدنيين	10/09/2011	8	القاهرة	8	أحداث ماسبيرو 08 - القاهرة	8	سامح جرجس فكري	29	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
16	أحداث سياسية	9	اشتباك بين الجيش ومدنيين	10/09/2011	9	القاهرة	9	أحداث ماسبيرو 09 - القاهرة	9	شحاته ثابت حنيني معوض	46	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري بالبطن
17	أحداث سياسية	10	اشتباك بين الجيش ومدنيين	10/09/2011	10	القاهرة	10	أحداث ماسبيرو 10 - القاهرة	10	شنوده نصحي عطيه	28	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
18	أحداث سياسية	11	اشتباك بين الجيش ومدنيين	10/09/2011	11	القاهرة	11	أحداث ماسبيرو 11 - القاهرة	11	صبحي جمال نظيم جاد الله	26	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري بالفخذ
19	أحداث سياسية	12	اشتباك بين الجيش ومدنيين	10/09/2011	12	القاهرة	12	أحداث ماسبيرو 12 - القاهرة	12	عيسي ابراهيم رزق جرجس	45	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
20	أحداث سياسية	13	اشتباك بين الجيش ومدنيين	10/09/2011	13	القاهرة	13	أحداث ماسبيرو 13 - القاهرة	13	فارس رزق ايوب	40	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
21	أحداث سياسية	14	اشتباك بين الجيش ومدنيين	10/09/2011	14	القاهرة	14	أحداث ماسبيرو 14 - القاهرة	14	مايكل مسعد جرجس	26	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
22	أحداث سياسية	15	اشتباك بين الجيش ومدنيين	10/09/2011	15	القاهرة	15	أحداث ماسبيرو 15 - القاهرة	15	مجدي عبده رزق غبوبال	40	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
23	أحداث سياسية	16	اشتباك بين الجيش ومدنيين	10/09/2011	16	القاهرة	16	أحداث ماسبيرو 16 - القاهرة	16	مجلي منير مجلي		محيط مبني ماسبيرو - بولاق أبو العلا	غير معلوم
24	أحداث سياسية	17	اشتباك بين الجيش ومدنيين	10/09/2011	17	القاهرة	17	أحداث ماسبيرو 17 - القاهرة	17	مسعد مهني مسعد	55	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
25	أحداث سياسية	18	اشتباك بين الجيش ومدنيين	10/09/2011	18	القاهرة	18	أحداث ماسبيرو 18 - القاهرة	18	ميخائيل توفيق جندي	37	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
26	أحداث سياسية	19	اشتباك بين الجيش ومدنيين	10/09/2011	19	القاهرة	19	أحداث ماسبيرو 19 - القاهرة	19	مينا ابراهيم دانيال	20	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري بالصدر
27	أحداث سياسية	20	اشتباك بين الجيش ومدنيين	10/09/2011	20	القاهرة	20	أحداث ماسبيرو 20 - القاهرة	20	جورج راجي نصيف	26	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
28	أحداث سياسية	21	اشتباك بين الجيش ومدنيين	10/09/2011	21	القاهرة	21	أحداث ماسبيرو 21 - القاهرة	21	هادي فؤاد عطيه	23	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري بالظهر
29	أحداث سياسية	22	اشتباك بين الجيش ومدنيين	10/09/2011	22	القاهرة	22	أحداث ماسبيرو 22 - القاهرة	22	وائل ميخائيل خليل	37	محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري نافذ بالعنق
30	أحداث سياسية	23	اشتباك بين الجيش ومدنيين	10/09/2011	23	القاهرة	23	أحداث ماسبيرو 23 - القاهرة	23	بيتر عادل	23	محيط مبني ماسبيرو - بولاق أبو العلا	
31	أحداث سياسية	24	اشتباك بين الجيش ومدنيين	10/09/2011	24	القاهرة	24	أحداث ماسبيرو 24 - القاهرة	24	مجهول الهويه		محيط مبني ماسبيرو - بولاق أبو العلا	طلق ناري
32	أحداث سياسية	25	اشتباك بين الجيش ومدنيين	10/09/2011	25	القاهرة	25	أحداث ماسبيرو 25 - القاهرة	25	مجهول الهويه		محيط مبني ماسبيرو - بولاق أبو العلا	غير معلوم
33	أحداث سياسية	26	اشتباك بين الجيش ومدنيين	10/09/2011	26	القاهرة	26	أحداث ماسبيرو 26 - القاهرة	26	مجهول الهويه		محيط مبني ماسبيرو - بولاق أبو العلا	دهس
34	أحداث سياسية	27	اشتباك بين الجيش ومدنيين	10/09/2011	27	القاهرة	27	أحداث ماسبيرو 27 - القاهرة - وفاة مصاب	1	مجدي فهيم مسعد	66	محيط مبني ماسبيرو - بولاق أبو العلا	دهس
35	أحداث سياسية	1	اشتباك بين أمن ومدنيين	19/11/2011	1	القاهرة	1	أحداث محمد محموه 01 - القاهرة	1	احمد محموه احمد محمد		شارع محمد محموه	طلق ناري بالصدر
36	أحداث سياسية	2	اشتباك بين أمن ومدنيين	19/11/2011	2	القاهرة	2	أحداث محمد محموه 02 - القاهرة	2	مصطفي محمد عبد المنعم صابر	24	شارع محمد محموه	طلق ناري بالراس
37	أحداث سياسية	1	اشتباك بين أمن ومدنيين	20/11/2011	1	القاهرة	3	أحداث محمد محموه 03 - القاهرة	3	حازم مشعوت محمد ابراهيم	33	شارع محمد محموه	طلق ناري
38	أحداث سياسية	2	اشتباك بين أمن ومدنيين	20/11/2011	2	القاهرة	4	أحداث محمد محموه 04 - القاهرة	4	حسام حمدي خليفه	26	شارع محمد محموه	اختناق بالغاز واصابة بالراس
39	أحداث سياسية	3	اشتباك بين أمن ومدنيين	20/11/2011	3	القاهرة	5	أحداث محمد محموه 05 - القاهرة	5	شهاب احمد سيد	19	شارع محمد محموه	طلق ناري
40	أحداث سياسية	4	اشتباك بين أمن ومدنيين	20/11/2011	4	القاهرة	6	أحداث محمد محموه 06 - القاهرة	6	شهاب الدين احمد ابراهيم الدكروري	25	شارع محمد محموه	طلق ناري بالراس

Figure A1. Dataset on the "martyrs" of the Egyptian Revolution.

Notes. Data source is the Statistical Database of the Egyptian Revolution. The dataset reads from the right to the left. The columns titles (in the first line) are the following: the classification of the incident, the type of the incident, the date of the incident, the governorate, the description of the incident, the name of the person, the site of death, the cause of death. The second line reads the following from the right to the left: Political event, breaking a sit-in by force, 04/09/2011, Cairo, breaking the sit-in of the 8th of April, Name, Tahrir Square, gunshot at the bottom of the neck. Other variables available in the dataset are the following: individual's occupation, place of residence, marital status, name of the hospital, date of birth, date of death and incident report number.



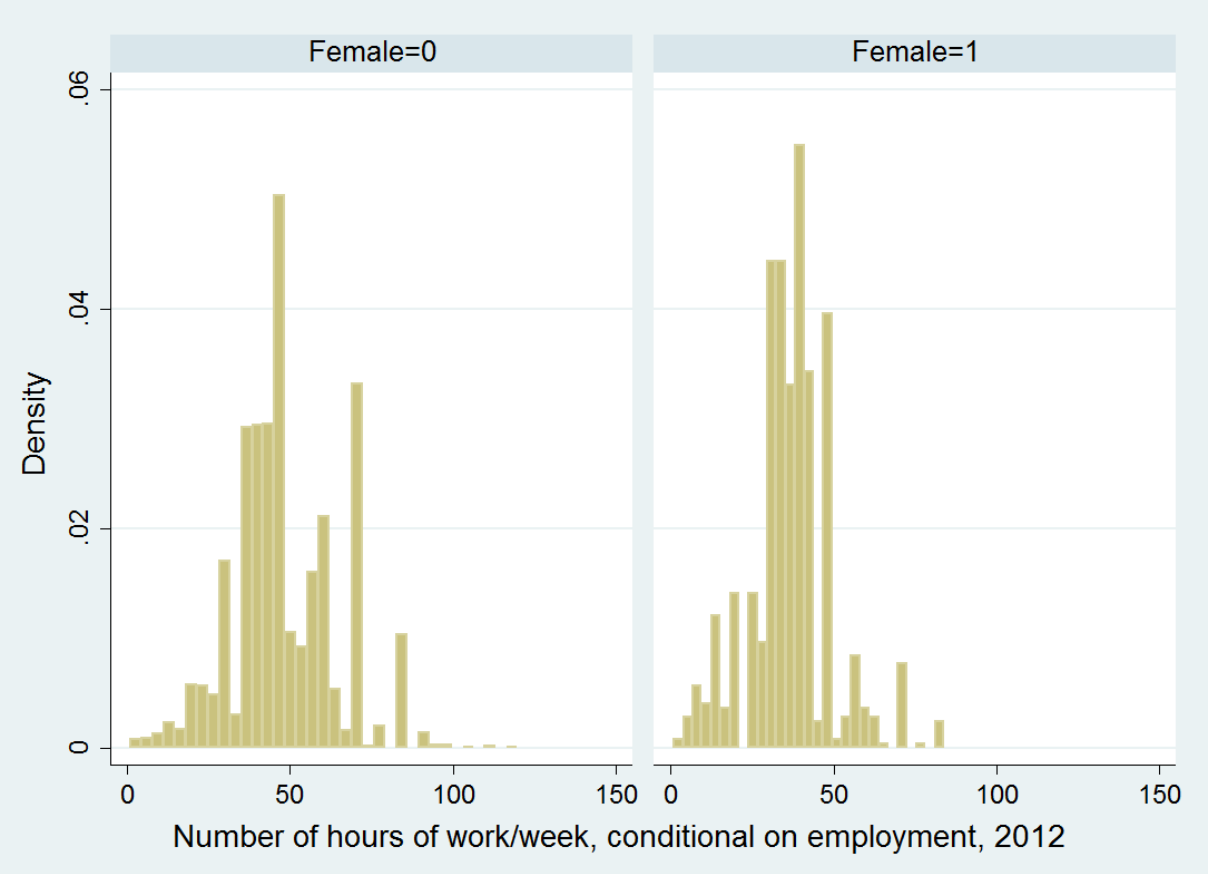


Figure A2. Distribution of the number of hours of work per week conditional on employment, for males and females separately in 2006 and 2012

Table A1: Labor Force Participation, Unemployment and Employment by pre-revolution distribution of per capita household income. Difference-in-Differences regression.

	(1)	(2)	(3)	(4)
VARIABLES	1st quartile	2nd quartile	3rd quartile	4th quartile
Panel A: Labor Force Participation				
Martyrs × year	0.047**	0.026**	0.054***	0.003
	[0.023]	[0.011]	[0.016]	[0.010]
Observations	2,614	1,362	1,656	1,784
R-squared	0.635	0.691	0.710	0.843
Panel B: Unemployment				
Martyrs × year	0.010	0.008	0.041***	0.007
	[0.025]	[0.009]	[0.010]	[0.016]
Observations	2,614	1,362	1,656	1,784
R-squared	0.577	0.636	0.551	0.564
Panel C: Employment				
Martyrs × year	0.037**	0.017*	0.013	-0.004
	[0.017]	[0.009]	[0.009]	[0.013]
Observations	2,614	1,362	1,656	1,784
R-squared	0.653	0.701	0.764	0.860
Household Controls	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES
Household FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Number of clusters	185	151	177	185

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression, by pre-revolution sample distribution of per capita household income. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household time-varying controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table A2: Labor Force Participation, Unemployment and Employment, by religious group. Difference-in-Differences regression.

	Muslims			Christians		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Labor Force Participation	Unemployment	Employment	Labor Force Participation	Unemployment	Employment
Martyrs × year	0.060***	0.033***	0.026**	0.128***	0.121***	0.007
	[0.016]	[0.007]	[0.011]	[0.028]	[0.020]	[0.027]
Observations	3,737	3,737	3,737	289	289	289
R-squared	0.670	0.578	0.699	0.783	0.654	0.789
Household Controls	YES	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Number of clusters	201	201	201	58	58	58

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression, by religious group (Muslims and Christians). The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table A3: Differential effect of the protests on Monthly, Hourly wages and Hours worked/week in Private versus Public sector. Difference-in-Differences regressions.

VARIABLES	(1) Log monthly wage	(2) Log hourly wage	(3) Hours/week
Martyrs × year × private	-0.030	-0.064**	0.608
	[0.057]	[0.031]	[3.220]
Martyrs × year	-0.013	0.001	0.301
	[0.015]	[0.011]	[0.184]
Observations	4,800	4,800	4,800
R-squared	0.663	0.658	0.674
$H_0: \alpha_1 + \alpha_2 = 0$ (P-value)	0.374	0.059	0.772
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Individual FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	204	204	204

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Private is a dummy variable for private sector employment in 2006. Monthly and hourly wages are calculated in constant 2006 Egyptian Pounds and refer to the monthly/hourly wage in primary job, conditional on being employed, in log specification. The hours of work refer to the current number of work hours per week, excluding subsistence work (market definition of economic activity) and conditional on being employed. Regressions include individual and household controls as well as their interaction with the year dummy. Individual time-varying controls include the following variables: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include individual and year fixed effects and panel weights between 2006 and 2012 to correct for attrition. The table also reports the p-value of a test with null hypothesis $\alpha_1+\alpha_2=0$ to check whether the protests significantly affect women's outcomes of interest.

Table A4: Decision-making. Difference-in-Differences regression.

VARIABLES	(1) Decision 1	(2) Decision 2	(3) Decision 3	(4) Decision 4	(5) Decision 5	(6) Decision 6	(7) Decision 7	(8) Decision 8	(9) Decision 9	(10) Decision 10
Martyrs × year	-0.007	-0.026***	0.028**	0.011	0.003	0.026***	0.019***	0.021	0.006	0.063***
	[0.012]	[0.009]	[0.013]	[0.015]	[0.013]	[0.010]	[0.007]	[0.019]	[0.016]	[0.009]
Observations	7,416	7,416	7,416	7,416	7,416	7,416	7,416	7,416	7,416	7,416
R-squared	0.562	0.637	0.539	0.569	0.545	0.555	0.556	0.549	0.552	0.558
Household Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	213	213	213	213	213	213	213	213	213	213

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Decision 1 corresponds to "making large household purchases." Decision 2 corresponds to "making household purchases for daily needs." Decision 3 corresponds to "visits to family, friends and relatives." Decision 4 corresponds to "what food should be cooked each day." Decision 5 corresponds to "getting medical treatment or advice for yourself." Decision 6 corresponds to "buying clothes for yourself." Decision 7 corresponds to "taking child to the doctor." Decision 8 corresponds to "dealing with children's school and teachers." Decision 9 corresponds to "sending child to school on a daily basis." Decision 10 corresponds to "buying clothes or other needs for children." Regressions include individual and household controls as well as their interaction with the year dummy. Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table A5: Labor Force Participation, Unemployment and Employment, full sample of working age individuals. Difference-in-Differences regression.

VARIABLES	(1) Labor Force Participation	(2) Unemployment	(3) Employment
Martyrs × year × female	0.017***	0.024***	-0.006
	[0.006]	[0.003]	[0.006]
Martyrs × year	0.009	-0.003	0.011*
	[0.007]	[0.002]	[0.006]
Observations	28,070	28,070	28,070
R-squared	0.817	0.582	0.825
$H_0 : \alpha_1 + \alpha_2 = 0$ (P-value)	0.000	0.000	0.184
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
Controls × year	YES	YES	YES
Individual FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	233	233	233

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Regressions are conducted on the full sample of working age individuals (aged at least 15 years old in 2006 and less than 65 years old in 2012). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Regressions include individual and household controls as well as their interaction with the year dummy. Individual time-varying controls include the following variables: three dummies for educational attainment: primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The reference category is no educational degree (either illiterate or literate without any diploma). Household time-varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include individual and year fixed effects and panel weights between 2006 and 2012 to correct for attrition. The table also reports the p-value of a test with null hypothesis $\alpha_1+\alpha_2=0$ to check whether the protests significantly affect women's outcomes of interest.

Table A6: Labor Force Participation, Unemployment and Employment using the "martyrs" geocoded by location of residence

VARIABLES	(1) Labor Force Participation	(2) Unemployment	(3) Employment
Martyrs × year	0.035***	0.021***	0.014
	[0.010]	[0.004]	[0.011]
Observations	7,416	7,416	7,416
R-squared	0.727	0.574	0.756
Household Controls	YES	YES	YES
Household FE	YES	YES	YES
Year FE	YES	YES	YES
Number of clusters	213	213	213

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants, geocoded by the martyr's place of residence rather than by the martyr's site of death. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). Results are reported using household-level data where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment. Regressions also include household and year fixed effects and panel weights between 2006 and 2012 to correct for attrition.

Table A7: District-level Difference-in-Differences Regression

VARIABLES	(1) Labor Force Participation	(2) Unemployment	(3) Employment	(4) Log of monthly wage	(5) Log of hourly wage	(6) Hours/week
Martyrs × year	0.035***	0.027***	0.008	0.201**	-0.007	1.048*
	[0.008]	[0.007]	[0.011]	[0.094]	[0.020]	[0.568]
Observations	398	398	398	390	388	396
R-squared	0.823	0.591	0.844	0.835	0.721	0.869
District Controls	YES	YES	YES	YES	YES	YES
Controls × year	YES	YES	YES	YES	YES	YES
District FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets are clustered at the district level.

Notes. Each cell represents a coefficient estimate using Difference-in-Differences regression. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). The unit of observation is the district level. All the dependent variables are computed as the intra-household differences in labor market outcomes between wife and husband (the outcome of the wife minus the outcome of the husband) and averaged by district. Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). In columns (4) and (5), monthly and hourly wages are calculated in constant 2006 Egyptian Pounds and refer to the monthly/hourly wage in primary job, conditional on being employed, in log specification. In column (6), the hours of work refer to the current number of work hours per week, excluding subsistence work (market definition of economic activity) and conditional on being employed. Regressions include district controls as well as their interaction with the year dummy. District time-varying controls include the following variables averaged by district: household size, the number of adults aged 15 to 64 years old, land ownership and three variables for the share of household heads with primary and preparatory education, secondary education (either general or vocational) and above secondary education (either post-secondary institute or university education and above). The specifications also condition on interaction terms between the district time-varying controls and the year dummy. Regressions also include district and year fixed effects.

Table A8: Labor Force Participation, unemployment and employment using Conley's correction for spatial dependence

	(1) Labor Force Participation	(2) Unemployment	(3) Employment
Martyrs × year	0.041	0.022	0.019
District clustered standard errors	[0.005]***	[0.004]***	[0.005]***
Spatial dependence <1 degree	[0.007]***	[0.003]***	[0.006]***
Spatial dependence <3 degrees	[0.009]***	[0.002]***	[0.008]**
Spatial dependence <5 degrees	[0.008]***	[0.002]***	[0.007]***
Spatial dependence <7 degrees	[0.007]***	[0.001]***	[0.006]***
Spatial dependence <10 degrees	[0.006]***	[0.001]***	[0.005]***
Observations	3,708	3,708	3,708
Household controls	YES	YES	YES
Controls × year	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1.

Notes. The number of "martyrs" represents the number of fatalities from the 25th of January 2011 to the end of June 2012 at the district level per 1000 inhabitants, geocoded by the martyr's place of residence rather than by the martyr's site of death. The year dummy is equal to one for the year 2012 (after the protests) and zero for the year 2006 (before the protests). Labor force participation, unemployment and employment are defined according to the current work status. The reference period for the labor market information is 3 months. The labor force includes all those who are engaged in economic activity for purposes of market exchange and excludes subsistence workers, following the market definition of economic activity (see ILO, 1982). In the first row, coefficient estimates are reported. In the second row, district clustered standard errors are reported as in the benchmark specification. In the third to seventh row, standard errors are adjusted for spatial dependence following Conley (1999) using different cutoff points: 1 degree, 3 degrees, 5 degrees, 7 degrees and 10 degrees. In each spatial dimension (longitude and latitude), spatial dependence declines in distance between districts' centroids and is equal zero beyond a maximum distance (the different cutoff points). Results are reported using household-level data, first-difference between the two data points, where the dependent variables are equal to the intra-household differences in labor market outcomes (the outcome of the wife minus the outcome of the husband) and regressions include household controls as well as their interaction with the year dummy. Household time varying controls include the following variables: a rural dummy, district of residence dummies, household size, the number of adults aged 15 to 64 years old, a dummy variable for land ownership and three dummies for the head of household's educational attainment.

4 Upward or Downward: Occupational Mobility and Return Migration [51]

4.1 Introduction

For many poor developing countries, the emigration of the high skilled workers is a source of concern. As such, the brain drain - the loss of highly productive workers- is seen as a negative consequence of international emigration. However, international migration can lead to brain gain when the possibility of emigration increases the expected return to human capital, and lead to more investment in education by both migrants and remaining citizens. Evidence from macro studies, for example, Beine, Docquier and Rapoport (2008)) using cross section data find a positive effect of skilled migration prospects on gross human capital formation. Also, using individual data, Batista, Lacuesta and Vincente (2012) find that a sizable positive effect of the own future probability of emigration on educational attainment in Cape Verde, a country with high educated emigration rates. Similarly, Chand and Clemens (2008) find that high rates of high-educated emigration, not only raised investment in education but also raised the stock of high educated people (net of emigration) in Fiji.

Another channel through which high skilled migration can result in a brain gain is return migration: when migrants return after having accumulated skills overseas, enhancing the average human capital of the origin country.[52] Individuals might migrate temporarily as part of an optimal strategy to maximize lifetime utility. Due to credit constraints, individuals migrate for a period of time where wages are higher so that they can accumulate savings overseas. Alternatively, they migrate temporarily to acquire skills that are highly rewarded in the source country on their return, Dustmann et al. (2011). Within this framework, temporary migration provides an opportunity for workers to acquire physical capital (savings) and human capital (new skills and knowledge). The return of migrants with their financial and human capital investments can be a potential source of economic growth for the origin country through increased productivity and knowledge diffusion (see, for example Dustmann and Gorlach (2015), Djajic (2014) and Dos Santos and Postel-Vinay (2003)).

As pointed out by Docquier and Rapoport (2012) in their survey on the brain drain and brain gain, “return migration is probably the most understudied aspect of international migration.” Largely the literature on the impact of international migration has focused on remittances and savings of migrants and to a lesser extent on the effect of return migration on human capital accumulation; i.e. on the brain gain channel. The later small literature has focused on the wage

[51] Joint work with Jackline Wahba (University of Southampton).
[52] See Docquier and Rapoport (2012) for an excellent survey on the impact of emigration on the brain drain and brain gain in sending countries.

premium earned by return migrants compared to non-migrants.[53] The evidence suggests that there is a positive wage premium associated with overseas work migration for returnees in developing countries, see for example Lacuesta (2010), Reinhold and Thom (2013), and Wahba (2015). Another measure of the acquisition of human capital of temporary migrants, that is under-explored, is their skill upgrading or occupational mobility. Whether migrants acquire human capital whilst overseas is an important question for the economic development of the home developing countries since the public debate tends to underscore the negative impact of high skilled emigration, resulting in a brain drain for origin developing countries.

This paper contributes to this literature by providing evidence on the impact of temporary migration experience on human capital accumulation of returnees by examining occupational mobility, a hardly studied issue, of return migrants vis-à-vis working-age individuals who have never migrated, controlling for the potential endogeneity and selection of migration. Unlike the studies on wage premiums where wages of returnees are only observed at the time of survey, we are able to construct individual occupational mobility based on the first job and the current occupation. Furthermore, we adopt a novel approach in order to identify the impact of overseas migration by constructing cohort groups who entered the labor market in the same decade to control for the initial labor market conditions and examine current occupational mobility relative to the first job.

The existing literature on the impact of return on upward mobility is very sparse- two exceptions. Carletto and Kilic (2011) estimate the impact of international migration experience on the occupational mobility of returnees compared to stayers in Albania. Relying on an instrumental variable approach to control for the non-random nature of international migration and return, they use foreign language knowledge of household members before migration and the number of young children at the time of return, as predictors of past migration and return decisions. They find that past migration experience increases the probability of upward occupational mobility. On the other hand, using the online job search portal of Estonia, Masso, Eamets and Motsmees (2014) also investigate the effect of temporary migration experience on the upward occupational mobility, but using online job search data, which also rely on online self-reported occupations. They find that temporary migration experience does not exhibit any significant effect on upward occupational movement, but this could be due to the very selective nature of their data and the bias arising from using self-reported online information. Unlike those previous studies, we adopt a novel approach by constructing cohort groups who entered the labor market in the same decade to control for the initial labor market conditions as well as using instrumental variable and Difference-in Differences and Difference-in-Differences matching techniques to control for the endogeneity and selection into migration.

We use data from Egypt, a country with substantial temporary international migration where almost 5 percent of the population (above 15 years) were return migrants in 2012. We estimate

[53] See Wahba (2014) for a survey on return migration.

occupational mobility of returnees relative to non-migrants taking into account the selection into temporary emigration as well as selection into return migration, using the Egypt Labor Market Panel Survey (ELMPS), a nationally representative household survey with very rich information on labor market characteristics and dynamics, including retrospective data on international migration and individual experiences before, during and after migration. We rely on cohort analysis by focusing on individuals who had their first job in the same decade and examine occupational mobility between the first job and their job in 2010, before the Egyptian Revolution of the 25th of January 2011, to ensure that our results can be generalized and are not affected by momentous events in the aftermath of the Egyptian Uprising. Estimating the impact of temporary migration on occupational mobility poses the challenge of addressing the non-random selection of who migrates and who returns. To control for the non-randomness nature of migration, we rely on an instrumental variable approach, following Wahba and Zenou (2012) and Bertoli and Marchetta (2015). Hence, to obtain an exogenous source of variation in the probability of migration, we use the historical inflation-adjusted oil prices. We also employ a Difference-in-Differences technique that differences out all unobserved time-invariant differences between the treatment and control groups, as well as Difference-in-Differences matching technique that controls for the observable characteristics as well as the unobserved time-invariant heterogeneity of returnees relative to stayers.

Controlling for the potential non-randomness of migration and return, we find that return migration increases the probability of upward occupational mobility. Our results are robust to different specifications using Difference-in-Differences and Difference-in-Differences matching techniques and also using different cohorts of entry in the labor market. Our results seem to be driven by the most educated returnees, those who have secondary education or above. However, our results are not significant for the less educated individuals, those who have below secondary education. Hence, returnees who are positively selected in terms of education, experience upward occupational mobility upon return in Egypt. In other words, only individuals drawn from the upper end of the educational distribution seem to climb the occupational ladder upon return. This suggests that return migration can lead to a brain gain.

The relevance of this research question is twofold. On the one hand, the answer to this question is not straightforward. Temporary migrants might acquire additional human capital due to their work experience abroad and hence, the human capital accumulated abroad might help those temporary migrants to find occupations higher in the skill and remuneration ladder upon return. Conversely, it might be the case that temporary migration experience is motivated by the shortage of unskilled labor in destination countries and subsequently, the positive effects of temporary migration on human capital and occupational mobility might be contested. Whether temporary emigration and overseas work experience enhance human capital accumulation is an important question. In particular, whether return migration can provide a leeway to promote the economic development of sending countries and compensate for the loss of human capital due to outward migration, through the returnees' higher human capital remain to be an understudied issue.

The rest of this paper is organized as follows. Section 4.2 provides a brief description of Egyptian migration and the data used in our analysis. Section 4.3 describes the empirical strategy. Section 4.4 presents the results. Section 4.5 discusses the possible mechanisms behind the findings, whilst the robustness checks are provided in Section 4.6 and Section 4.7 concludes.

4.2 Background on Egyptian Migration and the Data

4.2.1 Egyptian migration

Egyptian migration went through different phases in the last four decades. Until 1971, Egyptian migration was limited being subject to legal restrictions. The largest boost to outward migration flows occurred when the government lifted all restrictions on labor migration after the adoption of the 1971 constitution that legalized permanent and temporary emigration. One key factor contributing to the boost in outward migration flows was the 1973 War, when oil revenues quadrupled and hence, Gulf countries started implementing major development programs. Massive emigration from Egypt was triggered by the labor shortages in the Gulf oil-producing countries and the increased demand for foreign labor. The majority of Egyptian migrants went to oil exporting Arab countries (the Gulf States, Libya and Iraq).

In the 1980s and in the 1990s, Asian workers started to gradually replace Arab workers; however, Egyptian migration to the Gulf countries did not cease but carried on a lower scale. By the mid 1990s, Saudi Arabia was the main destination of Egyptian migrants where they were the second highest concentration of migrants, only surpassed by Indian nationals. At the same time, Egyptian workers migrated to non-oil exporting Arab Countries (Jordan and Lebanon) to replace nationals of those countries who migrated to the Gulf. In the 2000s, Saudi Arabia continued its importance but Libya hosted a quarter of Egyptian migrants. Iraq was no longer prominent and was replaced by Kuwait and UAE.

A small proportion of Egyptian migration is permanent migrants in Western Countries in particular in North America and Australia. More recently, migration to Europe, namely Greece and Italy, has increased, in particular, undocumented migration driven by high unemployment rates among Egyptian youth, increased competition in the Gulf countries from cheap South East Asian labor and the geographical proximity between Egypt and Europe (MPC Migration Profile, 2013).

On the whole, Egyptian migration is characterized by its temporary nature, with mean migration duration of around four to five years (Lucas, 2008). It is also known to be male dominated, where young men migrate in order to achieve some financial goals and return to Egypt. Hence, Egypt is

a country with a substantial number of returnees with overseas migration experience, which provides us with a good case to study the impact of temporary overseas migration.

A few papers have focused on the impact of temporary migration experience and return migration in Egypt.[54] For example, Wahba and Zenou (2012) have studied the impact of temporary migration on entrepreneurial activities of returnees in Egypt. Bertoli and Marchetta (2015) have examined how the prevailing social norms in the countries of destination of Egyptian migrants affect their fertility choices upon return. More recently, Wahba (2015) has examined the returns to returning by estimating the wage premium incurred by Egyptian returnees. She finds that overseas temporary migration leads to a wage premium on return; the estimates show that return migrants earn on average around 16 per cent more than non-migrants, after controlling for various selection biases. We extend this literature by investigating the extent to which return migrants move up the occupational ladder relative to non-migrants.

4.2.2 Data

The empirical analysis relies on data from the Egypt Labor Market Panel Survey 2012 (ELMPS 12). The ELMPS is a nationally representative panel survey carried out by the Economic Research Forum (ERF) in cooperation with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) since 1998. The ELMPS is a wide-ranging panel survey that covers topics such as employment, unemployment, job dynamics and earnings, as in a typical labor force survey but also provides very rich information on education, residential mobility, migration and socio-economic characteristics (Assaad and Krafft, 2013).

The ELMPS has been administered to nationally representative samples in 1998, 2006 and 2012. We focus particularly on the third round, the ELMPS 2012. The total sample size is 12,060 households and 49,186 individuals. It tracks households and individuals that were previously interviewed in 2006, both those also interviewed in 1998 as well as individuals added in 2006. In 2012, the refresher sample of 2,000 households was selected from an additional 200 PSUs randomly selected from a new master sample prepared by CAPMAS. By design, the 2012 refresher sample over-sampled areas with high migration rates, but is nationally representative once weights are applied (Assaad and Krafft, 2013). We exploit rich information derived from a supplementary module on return migration, surveying individuals aged between 15 and 59 years old who have worked abroad for more than six months. This module features return migrants' characteristics, incidences of migration, reason for migration, and financial situation before migration, year and country of first migration episode, year of final return, savings abroad, remittances, as well as other relevant information. We also rely on retrospective data from the job mobility module. This section traces job trajectories for all individuals aged 15 years old and

[54] For example, Binzel and Assaad (2011) examine the impact of temporary migration on the labor supply of the left behind.

above. Explicitly, it tracks the occupation, economic activity, sector of employment, job stability, incidence of work contract and social security for the first, second, third, fourth jobs and the job in 2011, if any changes in job status occurred after the 25th of January 2011 uprising. [55]

In our analysis, we focus mainly on the 1980s cohort, individuals who had their first job in the 1980s aged at least 15 years old at first job and were less than 65 years old in 2010, but also use different cohorts to check for the robustness of the results.[56] The average age of individuals was 20 years at first job. Throughout the analysis, we consider the year 2010 for the current occupation instead of 2012 (the time of the survey), before the Egyptian Revolution of the 25th of January 2011, to ensure that our results can be generalized and are not affected by momentous events in the aftermath of the Egyptian Uprising. We only focus on males as we only have 3.6% of female returnees among those in the 1980s cohort, as Egyptian migration is mostly male-dominated. Our 1980s cohort is comprised of 956 stayers and 304 returnees. A returnee is defined as a male who had worked abroad but had returned back to Egypt before 2010, whereas, a stayer is defined as a male who never had any overseas migration experience.

Descriptive statistics on the sample of stayers versus returnees in the 1980s cohort are reported in Table 4.1. Returnees were on average about seven months older than stayers at first job. Regarding their educational attainment, returnees were on average more educated compared to stayers. Around 83% of return migrants had at least secondary education compared to 68% of stayers, and hence, the least educated (less than secondary education) category among the stayers was two times greater compared to the returnees and the difference is statistically significant. With respect to their parental background, there is not any significant difference between the two groups in terms of their mother and father's highest level of educational attainment.

Given our focus here on occupational mobility, we compare stayers and returnees who had their first job in the 1980s and were working in 2010. In Table 4.2, we explore their first and current (in 2010) job characteristics. For their first job, returnees were more likely to be employed in the private sector compared to stayers and also less likely to be employed in the Government sector. Returnees were also less likely to work in economic activities, such as construction or professional activities for their first job compared to stayers. The incidence of social security for the first job was 18% lower among returnees compared to stayers. Interestingly, we find contrasted figures when we consider the current job characteristics for the two groups. In 2010, returnees were on average more likely to be employed in the Government sector compared to stayers and less likely to be employed in the private sector. In addition, the incidence of social security for the current job in 2010 was 6% higher among returnees compared to stayers.

[55] In the empirical analysis, we focus on individuals aged 15 to 64 years old, whereas the return migration module is relative to individuals aged 15 to 59 years old. Relying on retrospective information from the job mobility module, we are able to identify returnees among those aged 60 to 64 years old relying on the location of their jobs.

[56] The years considered for the 1980s cohort are from the 1980 to 1989, inclusive. The choice of the 1980s cohort is guided by the desire to capture workers' occupational mobility between their first and possibly last job. We also conducted several robustness checks using 1990s cohort (see Tables 4.22, 4.23 and 4.24), as well examining occupation when the worker was 50 to 55 years of age (see Table B10 in the Appendix). All our results were robust.

However, there is no evidence of returnees being located in different economic sectors compared to stayers.

4.2.3 Occupational Ranking and Mobility

In order to examine occupational mobility, we need to rank occupations. Hence, for each individual, we compare his first occupation in the 1980s to his current occupation in 2010.[57] Occupational categories are split into five distinct categories according to the ISCO-88 one digit classification, and are the following: agriculture, low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar occupations.[58] Agriculture refers to skilled agricultural, forestry and fishery workers, low-skilled blue collar refers to plant and machine operators, assemblers and elementary occupations, high-skilled blue collar refers to craft and related trades workers, low-skilled white collar refers to clerical support workers and service and sales workers and high-skilled white collar refers to managers, professionals, technicians and associate professionals. These five occupational categories are ranked one to five, respectively. We ranked the occupational groups according to the amount of human capital required to be employed in each occupation (see e.g. Sicherman and Galor (1990) and Carletto and Kilic (2011)). Thus, to compute occupational indices in Table 4.3, we regress the hourly wage and its log, the monthly wage and its log, on the number of years of schooling and its squared term, the work experience and its squared term, controlling for marital status, geographical regions and the number of years in the current job and its squared term. Occupational indices are computed as following: first we multiply the estimated coefficients on the number of years of schooling and its squared term and the number of years of work experience and its squared term, obtained from the wage regression, by the levels for each individual. Second, we sum the resulting products and they are averaged at the ISCO88 1-digit occupation to obtain our occupational ranking. Occupational indices and their standard errors are reported in Table 4.3 for the ISCO-88 one digit occupational categories and in Table 4.4, for the five occupational categories (agriculture, low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar).[59] In Table 4.5, we also show the mean hourly and monthly wages by occupation as well as their standard errors, which provides consistent ranking to that in Table 4.4.[60]

[57] Since we rely on the ELMPS 2012, we use current job occupation in 2012 as individual's occupation in 2010 if the individual didn't witness any job status changes with the 25th of January 2011 Egyptian Revolution. Whereas, for those individuals who witnessed job status changes in 2011, we consider their employment status in 2010 and subsequently, we determine their job occupation in 2010.

[58] Armed forces occupations are eliminated. These five occupational categories are ranked one to five, respectively. See Table 4.3 and Table 4.4 for a computation of the occupational rankings.

[59] We also performed two-sample t-test of equality of means, testing if there is significant difference between the index values of a specific category versus all other higher classified categories, using both the ISCO-88 1 digit classification (9 categories) and the five occupational categories (agriculture, low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar). Out of the 12 t-tests, only once we failed to reject the null-hypothesis of equality of means between the two groups, whereas for all the remaining 11 tests, we reject the null-hypothesis (P-value=0). We have also tested if there is significant

Table 4.6 sheds some light on individuals' first and current occupations and their occupational mobility indicators, for the sample of stayers and returnees respectively. For their first occupation, returnees were significantly more likely to have either high-skilled blue collar or low-skilled white collar occupations compared to stayers. In 2010, return migrants are significantly less likely to be employed in high-skilled blue collar occupations and more likely to be employed in high-skilled white collar occupations compared to stayers. We consider several occupational mobility indicators. Degree of mobility is an ordered categorical variable that ranges between -3 and 4 and is computed as the difference between individual's current occupation in 2010 and individual's first occupation in 1980s.[61] Upward mobility is a dummy variable equal to one if the individual's occupation in 2010 is ranked higher compared to his first job occupation in the 1980s, while the opposite is true for downward mobility. Immobility is a dummy variable equal to one if the individual stayed within the same occupational category in the two years considered. Returnees are found to be significantly more mobile compared to stayers and more likely to witness upward mobility, when we compare their first job in the 1980s and their current occupation in 2010. We also find that the difference in means between the two groups is statistically significant.

In order to examine the occupational mobility of the 1980s cohort, in Table 4.7, we construct employment transition matrices for stayers (Panel A) versus returnees (Panel B). Transition rates are row %. Hence, all transition rates are computed for individuals starting within a specific occupational category. As for example, 46.392% of the stayers who had agriculture as their first occupation in the 1980s had also an agricultural occupation in 2010. The diagonal cells represent the percentage of individuals who stayed in the same occupational category between the first job in the 1980s and the current job in 2010. The cells above the diagonal represent the percentage of individuals who witnessed upward mobility, whereas, the cells below the diagonal represent the percentage of individuals who witnessed downward mobility. To compute the share of individuals witnessing upward mobility (out of the total individuals), we consider for each occupational category, the sum of the cells above the diagonal multiplied by the % of total. For example, if the occupational category for the first job is agriculture, the share of individuals witnessing upward occupational mobility would be the sum of the shares of individuals employed in low-skilled blue collar, high-skilled blue collar, low-skilled white collar or high-skilled white collar occupations in 2010, multiplied by 20.293%. Among the sample of returnees in the 1980s cohort, we find that 46% of return migrants witnessed upward occupational mobility when we compare their first job in the 1980s and their current job in 2010. This figure drops to 25% when

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difference between the index values of two consecutive categories or between a specific categories versus all the remaining ones, and results were consistent with the previous tests.

[60] We also performed a Kolmogorov-Smirnov test of first order stochastic dominance to compare the distribution of hourly wages across the different five occupational categories. Indeed, using the KS test to compare the cumulative distribution function of one occupational group versus higher-ranked groups, we reject the null-hypothesis of equality of the cumulative distribution functions and conclude that the cumulative distribution function of hourly wages of one occupational category is always lower to the cumulative distribution function of higher-ranked occupational categories.

[61] The degree of mobility ranges between -3 and 4 as we don't have any individuals who had high-skilled white collar occupations in the 1980s and agricultural occupation in 2010.

we consider the sample of stayers.[62] Interestingly, we also find that 61% of the returnees who witnessed upward mobility had either high-skilled blue collar or low-skilled white collar occupations in 1980s and they moved up the occupational ladder to hold either white collar occupations in general for the former category or high-skilled white collar occupations for the latter. Whereas, 57% of the stayers who witnessed upward occupational mobility, had in the 1980s less qualified occupations to start, namely agricultural or low-skilled blue collar occupations. Although by examining occupational change for the same individual we are able to control for time invariant unobservables, in the next section, we also control for observables and more importantly for the potential endogeneity between migration and occupational choice as well as for the non-randomness of returnees.

4.3 Empirical Methodology

4.3.1 Regression Specification

We estimate the effect of return migration on occupational mobility for the 1980s cohort, focusing on males aged at least 15 years old at first job and 64 years old in 2010. For each individual, we compare his first occupation in the 1980s to his current occupation in 2010.[63] We estimate the following specification, using Probit, Linear Probability and Ordered Probit Models:

$$Y_i = \alpha_0 + \alpha_1 Returnee_i + \alpha_2 X_i + \alpha_3 Z_{i\,t_0} + \varepsilon_i \quad (4.1)$$

Y_i is a dummy variable for upward mobility that takes the value one if the individual's occupation in 2010 is ranked higher compared to his first job occupation in the 1980s and zero otherwise, either for individuals who witnessed downward mobility or stayed within the same occupational category. For the Ordered Probit Model, Y_i is a categorical variable equal 0 if the individual stayed within the same occupational category between the first job in the 1980s and the current occupation in 2010 or downgraded, equal 1 if the individual moved up the occupational ladder one step, equal 2 if the individual moved up the occupational ladder two steps and equal 3, if the individual climbed up the occupational ladder three or four steps. Returnee is a dummy variable equal one for males who had worked abroad and returned to Egypt

[62] Given that the percentage of stayers who had high-skilled white collar occupations in the 1980s is higher than that of returnees, 34% versus 20%, respectively and since there is no potential upgrading for those who had high-skilled white collar occupations at start, in Section 4.6 on the robustness checks we eliminate individuals who had high-skilled white collar occupations in the 1980s and our results remain robust.

[63] To compute occupational indices in Section 4.2.3, we regress the hourly wage and its log, the monthly wage and its log, on the number of years of schooling and its squared term, the work experience and its squared term, controlling for marital status, geographical regions and the number of years in the current job and its squared term. Occupational indices are computed as following: first we multiply the estimated coefficients on the number of years of schooling and its squared term and the number of years of work experience and its squared term, obtained from the wage regression, by the levels for each individuals. Second, we sum the resulting products and they are averaged at the ISCO88 1-digit occupation to obtain our occupational ranking. Occupational indices are reported in Table 4.3.

before 2010 and equal to zero for stayers who never had any migration experience abroad. X_i is a vector of individual and household characteristics. Individual-level characteristics are the following: age in 1980 and its squared term, educational levels and five dummies for individual's geographical regions in 1980. Household level characteristics include mother's and father's level of education. $Z_{i\,t_0}$ is a vector of first job characteristics in the 1980s[64] and includes: sectors of employment, economic activities and the incidence of work contract and social security in the 1980s. We estimate the previous specification using a Probit and Linear Probability model when Y_i is modelled as a dummy variable and an Ordered Probit model model when Y_i is modelled as a categorical variable.

4.3.2 Instrumental Variable approach

When estimating the impact of occupational mobility of returnees versus stayers, unobserved individual characteristics might simultaneously affect the probability of temporary migration, on the one hand and occupational choices, on the other hand. To address the endogeneity problem inherent in this type of analysis, we estimate equation (4.1) using an instrumental variable approach. To obtain an exogenous source of variation in the probability of temporary migration, we use the historical inflation-adjusted oil prices as an instrument, following Wahba and Zenou (2012). Using a two-stage least squares procedure (2SLS), oil prices are matched with the year when the individual was 26 years old, being the mean age at migration for our sample of Egyptian men for the 1980s cohort and 25 years old for the 1990s cohort.[65] When the dependent variable Y_i is modelled as a categorical variable, we use a Conditional Mixed Process estimator, following Roodman (2011). It fits a simultaneous equation model that allows for the correlation between the error terms of the interrelated equations, where in the first equation we estimate the probability of temporary migration experience and in the second equation we estimate the impact of temporary migration on upward occupational mobility using the same set of covariates discussed earlier.

The rationale behind using historic oil prices as a predictor of the migration probability, as argued by Wahba and Zenou (2012), is that other Arab countries constitute the most important destination for Egyptian migrants, where oil prices played a crucial role in driving the demand for foreign labor both directly in the Gulf countries or indirectly, as replacement workers in other non-oil Arab countries.[66] In Figure 4.1, we present the evolution of inflation-adjusted oil prices and migration patterns from the 1960s to 2010. The share of migrants is derived from the ELMPS

[64] In unreported regressions, we have only conditioned on individual and household characteristics, eliminating the vector of first job characteristics $Z_{i\,t_0}$. We are likely to overestimate the effect of return migration on upward occupational mobility if we don't condition on the vector of first job characteristics.
[65] See Wahba and Zenou (2012) and Bertoli and Marchetta (2015) for similar approach.
[66] 98% of Egyptian migrants, in our estimation sample (1980s cohort), migrated to other Arab countries during the last migration episode.

(2012), using information on both current and return migrants and the year of migration. This figure shows how the share of migrants varies over time in response to oil prices' fluctuations and that the two series are closely correlated and follow the same patterns.

The exclusion restriction is that oil prices affect occupational mobility only through temporary migration decision. The identifying assumption is that oil prices when individuals are aged 26 years old are not correlated with occupations in Egypt, as a non-dependent oil economy. In Figure 4.2, we present oil prices against key aggregate economic indicators in Egypt including GDP annual growth rate, male labor force participation rate, male employment in agriculture (% of total male employment), male employment in industry (% of total male employment) and male employment in services (% of total male employment) .[67] This figure shows that key economic labor market indicators in Egypt are irresponsive to oil prices and do not seem to be affected by oil prices' fluctuations, providing support to our exclusion restriction. [68]

In Table 4.8, we report first stage regressions for the 1980s and the 1990s cohorts. As a robustness check, for each cohort, we also matched the inflation-adjusted oil prices to one year below and one year above the mean age at migration.[69] Our results are robust to the different specifications in both the first and the second stages and our instrument is well correlated with the endogenous variable (see the reported Kleibergen-Papp rk Wald F statistics in Table 4.8). On average, we find that one dollar increase in the price of oil increases the probability of return migration by 2 percentage points. We also account for arbitrary within community correlation, by clustering our regressions at the community level. Additionally, we account for common elements to shocks across individuals with same year of birth, and hence, similar values of oil prices by clustering our regressions by year of birth. In Table B14 in the Appendix, we report first stage regression results using community level clustering and in Table B15 in the Appendix, we cluster our regressions using year of birth. Results are consistent with firsts-stage regressions in Table 4.8.

[67] Labor Force participation rate, Employment in agriculture, industry and services are from International Labor Organization, Key indicators of the Labour Market Database. GDP growth rates are from the World Bank National accounts data files. The choice of the time period is dictated by data availability.

[68] In Table B4 in the Appendix, we also present results controlling for initial GDP per capita in Egypt (at first job for stayers and at migration for returnees) to account for the different business cycles hitting Egypt and the oil producing countries where the migrants are locating to, as migrants are responding to a positive shock in the receiving countries as a motive to migrate. Results are robust to this additional check and provide further support to our exclusion restriction.

[69] The mean age at migration for the 1980s cohort is 25.502 with a standard deviation of 5.658, and the mean age at migration for the 1990s cohort is 24.226 with a standard deviation of 4.551. In Table B17 in the Appendix, as a robustness check, we also match oil prices using the year at the last migration episode (age at migration) instead of the average age at migration. Our results are robust to this additional check.

4.3.3 Difference-in-Differences and Matching Difference-in-Differences

We also estimate the following Difference-in-Differences specification to account for unobserved differences between treatment and control groups - returnees and stayers, respectively:

$$Y_{it} = \beta_0 + \beta_1 Returnee_i + \beta_2 2010_t + \beta_3 Returnee_i \times 2010_t + \varepsilon_{it} \quad (4.2)$$

Y_{it} is the individual's occupation at time t, split into five distinct occupational categories according to the one digit ISCO-88 classification, agriculture, low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar. $Returnee_i$ is a dummy variable equal one for the sample of returnees and zero, for the sample of stayers, it captures differences between the treatment and control groups, before the treatment. As we mentioned earlier, the treatment group is the sample of return migrants, all males who had both worked abroad for more than 6 months and had their final return in Egypt before 2010, or males who had a job abroad before 2010 considering retrospective data on job mobility. The control group is the sample of stayers, all males who never had any migration experience abroad. 2010_t is a dummy variable equal one for the second time period and equal zero for the 1980s. The time dummy captures aggregate factors that would cause changes in the individual's occupational choice even in the absence of the treatment. The coefficient of interest is β_3, it multiplies the interaction term between the treatment variable and the time period dummy. The Difference-in-Differences estimator in equation (4.3) is the difference in the average occupational ranking among the returnees between the follow-up and baseline periods, minus the difference in the average occupational ranking among the stayers for the same periods. It differences out all unobserved time-invariant differences between the treatment and control groups.

$$\hat{\beta}_3 = (\bar{Y}^{returnees,t=1} - \bar{Y}^{returnees,t=0}) - (\bar{Y}^{stayers,t=1} - \bar{Y}^{stayers,t=0}) \quad (4.3)$$

We also employ a Difference-in-Differences matching technique that controls for the observable characteristics as well as the unobserved time-invariant heterogeneity.

$$E(\bar{Y}^{returnees,t=1} - \bar{Y}^{returnees,t=0} | X, R = 1) = E(\bar{Y}^{stayers,t=1} - \bar{Y}^{stayers,t=0} | X, R = 0) \quad (4.3a)$$

$$0 < P(R = 1|X) < 1 \quad (4.3b)$$

First, we estimate the propensity score or the individual's probability of receiving the treatment, given the same set of covariates presented earlier, using a Logit model. It enables us to pair return migrants with stayers who have similar values of the propensity score. Hence, the two groups are similar, after the fact, in terms of observable characteristics, apart from the treatment. The key assumption for Propensity score matching, illustrated in equation (4.3), is that the outcome is orthogonal to treatment assignment, conditional on X. Second, we combine the Propensity score

matching technique with a standard Difference-in-Differences specification, based on the matched sample of returnees and stayers.

4.3.4 A selection model: selection into temporary migration and return migration

We account not only for selection into temporary migration but for the double selection into temporary migration and return migration using a Conditional Mixed Process estimator, following Roodman (2011). The Conditional Mixed Process estimator fits a simultaneous equation model using Full information Maximum Likelihood and allows the error terms of the interrelated decisions to be correlated through a multi-dimensional distribution. The interrelated equations are the probabilities of upward occupational mobility (4.4), the probability of migration (4.5) and the probability of return migration (4.6).

In equation (4.4), our dependent variable is a dummy variable indicator for upward occupational mobility between the first occupation in the 1980s and the current occupation in 2010. $Returnee_i$ is our main variable of interest and it is a dummy variable equal one for return migrants and zero, for stayers who never had any migration experience. The vectors X_i and Z_{it_0} are the vectors of individual and household controls and first job characteristics, discussed in Section 4.3.1.

$$Y_i = \delta_0 + \delta_1 Returnee_i + \delta_2 X_i + \delta_3 Z_{it_0} + v_i \quad (4.4)$$

In equation (4.5), we denote the probability of migration as M. An individual decides to migrate when the unobservable latent variable M^* capturing the individual gains from migration is positive. To estimate the probability of migration, our sample includes stayers, return migrants as well as current migrants. We use information on current migrants from the ELMPS (2012). Our sample includes 242 current migrants that could potentially belong to the 1980s cohort.[70] For identification in equation (4.5), as discussed earlier, we include the inflation adjusted oil prices (Oil). Oil prices are matched with the year when each individual was aged 26 years old (the average age at migration during the last migration episode for the 1980s cohort) and with the year of migration for current migrants. W_i is a vector of control variables and it includes educational dummies, a dummy for rural residence, age and its squared term.

$$M_i = \alpha_0 + \alpha_1 W_i + Oil + \varepsilon_i \qquad M_i = \begin{cases} 1 \; if \; M^* > 0 \\ 0 \; if \; M^* \leq 0 \end{cases} \quad (4.5)$$

[70] We have information on current migrants' age, those who could potentially belong to the 1980s. If we compute age at the beginning of the period (*i.e* in 1980), this yields to a sample size of current migrants of 100 current migrants. Based on age at end of period, this yields to a sample of 242 current migrants.

The probability of return migration by R. The sample includes only current and return migrants, since the probability of return is only observed for this subsample. A migrant decides to return if the value of the unobservable latent variable R^* is positive and it captures the perceived gains from return migration. By contrast, a migrant decides to stay abroad if the value of the latent variable R^* is negative. In equation (4.6), we use the number of active armed conflicts ($Conflict$) in a country-year derived from UCDP Monadic Conflict Onset and Incidence Dataset.[71] The rationale behind using this instrument is that countries in the Middle East have been hit by several conflicts in recent years that are significantly driving return migration. Examples include the Iraq's invasion of Kuwait in 1990, the first Gulf War in 1990-1991, 1977 Libyan-Egyptian war, the Israeli invasion of Lebanon in 1982, all of which have led to significant return migration. W_i is a vector of control variables and it includes educational dummies, a dummy for rural residence, age at migration and its squared term.

$$R_i = \beta_0 + \beta_1 W_i + Conflict + \omega_i \qquad R_i = \begin{cases} 1 \; if \; R^* > 0 \\ 0 \; if \; R^* \leq 0 \end{cases} \quad (4.6)$$

v, ε and ω are the errors of our structural model and are allowed to be correlated through a multidimensional distribution.

4.4 Empirical Findings: Estimating the effect of return migration on upward occupational mobility

In Table 4.9, we estimate equation (4.1) using Probit and Linear Probability models, IV-Probit and IV-regression models, while conditioning on individual, household controls, as well as, the first job characteristics. We find a positive and statistically significant effect of return migration on upward occupational mobility for males who first entered the labor market in the 1980s, robust across all specifications. Being a return migrant increases the probability of upward occupational mobility by about 9 percentage points, using probit and linear probability models. Controlling for the endogeneity of the migration decision using historic oil prices as an instrument for return migration, results in coefficient estimates for the IV-Probit model about four times greater than the standard Probit Model. [72]

Relying on the IV-Ordered Probit Model in Panel B of Table 4.10, we find that return migration decreases the probability of downgrading or immobility by 6 percentage points. We also find that return migrants have a consistently higher probability of leaping across occupational categories,

[71] For robustness, in unreported regressions, we used a dummy variable coded as 1 if the country-year contains a new conflict, results where robust to this check.
[72] In Table B16 in the Appendix, we report results using two different clustering techniques: community level clustering or year of birth clustering (since individuals with the same year of birth have the same value of oil prices) and our results are robust and consistent with results in Table 4.8.

by moving up the occupational ladder either one step, two steps, three or four steps. And interestingly, returnees have a higher probability of making bigger leaps across the occupational ladder compared to stayers; 3 percentage points for moving up the occupational ladder 3 or 4 steps compared to 2 percentage points for moving up two steps and one percentage point for moving up 1 step. In Panel C, we use IV-ordered Probit model with bootstrapped standard errors and our results are consistent with those of Panel B and actually bigger in terms of magnitude.

In Table 4.11, we also estimate the effect of return migration on occupational mobility, by disentangling the effect conditional on the country of destination of Egyptian returnees during the last migration episode, namely oil and non-oil countries.[73] As we mentioned earlier, Egyptian migration is mostly towards Arab oil producing countries, hence, the sample size of Egyptians heading to non-oil countries is much smaller. Using a Probit model, return migration from oil countries increases the probability of upward occupational mobility by 9 percentage points, the effect for non-oil countries is 10 percentage points, however imprecisely estimated. Results are also robust to using a standard linear probability model.

In Table 4.12, we estimate a Difference-in-Differences specification, by considering return migration unconditional on the country of destination of Egyptian migrants (Panel A), return migration from oil countries during the last migration episode (Panel B) and return migration from non-oil countries during the last migration episode (Panel C). Difference-in-Differences estimators are positive and statistically significant. Unconditional on the country of destination of Egyptian migrants, return migration increases the probability of upward occupational mobility. Interestingly, conditioning on the destination country during the last migration episode, the magnitude of the estimated coefficient for non-oil countries is about two times greater than the estimated Difference-in-Differences estimator for oil countries. On average, returnees from the 1980s cohort are found to be more likely to climb the occupational ladder in Egypt. Results are qualitatively very similar in Table 4.13, when we use Difference-in-Differences matching estimator.

In Table 4.14, we rely on a Conditional Mixed-Process estimator, where we estimate simultaneously the probabilities of upward occupational mobility, migration and return migration. The number of active conflicts is a strong predictor of the return migration decision; an additional conflict in a country-year increases the probability of return migration by 24%. As for oil prices, they are a strong predictor of temporary migration experience. Indeed, one dollar increase in oil prices increases the probability of migration by 2%. Taking into account the double selection into migration and into return migration, we find that return migration experience increases the probability of upward occupational mobility by 9 percentage points.

[73] For the 1980s cohort, the countries of destination of returnees during the last migration episode are the following oil-producing countries: Libya, Saudi Arabia, Iraq, United Arab Emirates, Qatar and Kuwait. The non-oil producing countries are the following: Morocco, Jordan, Syria, Lebanon, Yemen, Greece, Romania, Germany, France and the Netherlands.

4.5 Mechanisms: Who Climbs the Occupational Ladder?

4.5.1 High versus Low Educated

Our results show that returnees move up the occupational ladder more than non-migrants controlling for the endogeneity of temporary migration, as well as the double selection into migration and return migration. Thus in this section we explore the mechanism behind the observed occupational mobility. First we investigate whether both the high educated and low educated returnees benefit from their overseas work experience and enhance their human capital. Examining the characteristics of the returnees by educational attainment, Table B1 in the Appendix shows that returnees who are less educated (have less than secondary education) are about 3 years older when they had their first job in the 1980s. They are also found to be significantly more likely to come from Rural Upper Egypt compared to returnees with higher levels of educational attainment, namely secondary and above education. In terms of parental background, returnees who are listed as less educated are significantly more likely to have an illiterate father, whereas, in terms of the mother's level of education, there are no significant differences between the two groups of returnees. Regarding their first job characteristics, in Table B2 in the Appendix, the less educated returnees in the 1980s cohort are found to be significantly more likely to work in the private sector compared to the public sector and by contrast, the more educated returnees are found to be significantly more likely to work in the Government sector for their first job in the 1980s. The less educated returnees are also more likely to work in agricultural activities compared to the more educated returnees, who are about 23 percentage points less likely to have an agricultural activity for their first job. Returnees who have either secondary or above secondary education, were also better off in terms of having a work contract and social insurance compared to returnees with lower levels of educational attainment.

Upon return, we find that the more educated returnees are significantly more likely to work in the government/public sector compared to the subsample of returnees who have lower educational levels. By contrast, the latter group is significantly more likely to be employed in the private sector. These patterns were also true for the first job; however, differences are significantly more important in terms of magnitude for the current job upon return. The less educated returnees are also found to be significantly different in terms of current job activity compared to the sample of returnees with higher educational levels. The former group is significantly more likely to work in agricultural and manufacturing activities. Upon return, the incidence of work contract and social security is still significantly greater among the returnees who have either secondary or above secondary education compared to returnees with lower levels of educational attainment and the differences are more pronounced upon return compared to the first job.

According to Table B3 in the Appendix, the more educated returnees are better off both in terms of their first occupation and their current occupation upon return. Regarding their first job, they

are significantly less likely to work in the agricultural sector but more likely to have a high-skilled white collar occupation. Upon return, returnees with lower levels of educational attainment are found to be significantly more likely to held agricultural occupations and blue collar occupations, either low-skilled or high-skilled. Whereas, returnees with higher levels of educational attainment are found to be significantly more likely to held high-skilled white collar occupations. In terms of mobility indicators, the degree of mobility is much greater, the incidence of upward mobility is 23 percentage points greater and the degree of immobility is also significantly less pronounced for the more educated returnees compared to returnees with lower levels of educational attainment.

Table 4.15 presents the transitional matrices for returnees in the 1980s cohort, by educational attainment. In Panel A, we consider the less educated, whereas, in Panel B, we consider the more educated. In Panel A, we find that only 27% of the returnees listed as less educated, witness an upward mobility between the first occupation and the current occupation, whereas about 13% downgrade.[74] By contrast, in Panel B, we find that 50% of the returnees listed as more educated, witness a sort of occupational upgrading between the first and the current job and the incidence of downshifting is also less pronounced, 10%. Interestingly, we also find that most of the returnees with either no educational degree or primary and preparatory education, who witness occupational upgrading have lower occupations to start, namely, 15% of those climbing up the occupational ladder had agricultural occupations. Whereas, 32% of the returnees who either have secondary and above secondary education and witnessing upward mobility had better occupations to start, high-skilled blue collar and low-skilled white collar occupations.

In order to explore the role played by the overseas work experience, we construct transitional matrices for returnees by looking at the occupation abroad. In Table 4.16, we investigate the employment transition for returnees who had their first job in Egypt by looking at the employment transition between the first occupation in the 1980s in Egypt and the occupation in the last migration episode and subsequently, the employment transition between the occupation in the last migration episode and the occupation in Egypt upon return in 2010. We find that 28% of the returnees witness an upward mobility between the first occupation in Egypt and the occupation during the last migration episode, whereas about 16% downgrade while being abroad compared to their first occupation in Egypt. Following the occupational mobility of the same subsample of returnees between the occupation during the last migration episode and the current occupation in Egypt, we find that 36% of the returnees witness an upward mobility upon return, whereas, about 12% witness some sort of downgrading.

By contrast, considering the subsample of returnees who had their first job abroad, we investigate in Table 4.17, the occupational mobility between the first occupation abroad and the current

[74] As presented in Section 4.2.3, the percentage of individuals witnessing upward occupational mobility (out of the total) is computed as the sum of the cells above the diagonal for each starting occupational category multiplied by the % of total. Reciprocally, to compute the percentage of individuals witnessing downward occupational mobility, for each starting occupational category, we sum the cells below the diagonal multiplied each time by the corresponding % of total.

occupation upon return. Interestingly, on the one hand, we find that 65% of those returnees witness an upward mobility compared to their first occupation abroad. On the other hand, only 9% witness some sort of downgrading when we compare the first occupation abroad to the current occupation in Egypt in 2010. Thus, overall the evidence suggests a human capital enhancement story for the highly educated migrants.

In Table 4.18, we examine the occupational mobility of current migrants between the first occupation in Egypt and the current occupation abroad in 2012. [75] It is interesting to contrast the employment transition matrices of current migrants with respect to returnees, to compare their job trajectories. Interestingly, we find very similar figures in Panel A, Table 4.16 which corresponds to employment transition matrices of returnees between the first job in Egypt and the job abroad and Table 4.18 featuring the same for current migrants. Indeed, we find very similar figures when comparing the percentage of returnees/current migrants across occupations in the first job but also in the job held abroad. The distribution of both current migrants and return migrants across occupations is very comparable as well as the incidence of upward mobility between the job in Egypt before migration and the job abroad. For current migrants, we find that the probability of witnessing upward occupational mobility between the job before leaving Egypt and the job abroad is 30% (versus 28% for returnees Panel A of Table 4.16).

To examine the heterogeneity of the impact of return migration on upward occupational mobility, by educational attainment, in Table 4.19, we divide our sample into two educational groups in using a standard linear probability model for upward occupational mobility and IV regression to instrument for return migration. Our results suggest that only males who belong to the upper end of the educational distribution are likely to witness upward occupational mobility. Those individuals have either secondary or above secondary education whereas our results are not significant for the subsample of individuals who have either no educational degree or primary and preparatory education. To sum up our previous findings in Section 4.4 are driven by the high-educated return migrants climbing up the occupational ladder.

4.5.2 Migration Duration

Furthermore, we investigate other potential mechanisms for the observed occupational mobility of returnees, namely, the effect of migration duration, Table 4.20 as well as the effect of the number of years since final return in Egypt Table 4.21 on upward occupational mobility for return migrants. To do so, we split our sample of returnees in four subsamples, according the quartile distribution of migration duration and the number of years since final return, and we estimate the effects of return migration on upward occupation mobility of returnees versus all

[75] Current migrants are included in our analysis when using a Conditional Mixed Process estimator that takes into account the double selection into migration and into return migration.

stayers, separately for each subsample, using linear probability model and IV-regression. In Table 4.20, we find that only individuals who had shorter migration duration benefit from their migration experience in terms of climbing up the occupational ladder. Returnees who have less than 7 years of migration duration witness some sort of occupational upgrading whereas returnees with longer migration spells do not. This finding might suggest that longer migration episodes could result in the loss of information on domestic labor market, ties or networks.

Interestingly, we find that the number of years since final return in Egypt also matters. In Table 4.21, we investigate the effect of return migration on upward occupational mobility by investigating the effect of the number of years since final return in Egypt. We also find that the effect of return migration on upward occupational mobility is significant for returnees who belong to the highest three quartiles of number of years since return's distribution; more than 10 years. Returnees with less than 10 years since final return do experience positive impact though it is not statistically significant. However, returnees, who have been back in Egypt for a longer period, are found to be significantly more likely to climb the occupational ladder in Egypt.

4.5.3 Other mechanisms?

Since returnees accumulate savings whilst overseas, we restrict our sample to waged workers only to check that occupational mobility is driven by human capital accumulation rather than setting-up business/entrepreneurial activities. In Table B5 in the Appendix, we restrict our analysis to wage workers at current occupation in 2010 and to wage workers at both first and current occupations. Our results are robust to these two robustness checks and across the different specifications. Coefficient estimates are also very stable in terms of magnitude, ruling out the possibility that our results might be driven by physical capital accumulation since we are only focusing on wage workers and thus, eliminating entrepreneurs, those who are either employers or self-employed.[76]

Another potential mechanism behind the occupational mobility of returnees could possibly be due to internal migration. In Table B6 in the Appendix, we present internal mobility matrices for stayers and returnees. We look at the geographical mobility of stayers versus returnees in the 1980s cohort between the first geographical region in 1980 and the current geographical region. We do so to ensure that the positive occupational mobility witnessed by the returnees is not driven by their locational choice in Egypt upon return. We find that both stayers and returnees were equally mobile, with around 10% of the stayers and 9.5% of the returnees relocating in a different geographical region compared to the one in 1980. We also find that stayers are more likely to be located in bigger cities like Cairo, Alexandria and Canal Cities, with greater work

[76] Returnees were also asked about the main use of their savings and we find that 77% of the returnees included in our sample used their savings either to build or buy a house or bought shares. Another 15% deposited their savings in banks.

opportunities compared to stayers (22% of stayers compared to 9% of returnees). Thus, this confirms that the returnees' upward occupational mobility compared to the stayers is not driven by their locational choices upon return for two reasons: first, both stayers and returnees were found to be equally mobile within Egypt and second, stayers were found to locate in the capital and bigger cities compared to returnees who are found to be more likely to locate in rural regions in Lower and Upper Egypt.

4.5.4 Perceptions on Benefits from Migration

In order to understand further the potential mechanisms behind the beneficial impact of overseas work experience on the occupational mobility of returnees, we make use of a detailed survey conducted by the European Training Foundation with the aim of studying the impact of migration on skill development in Egypt.[77] The survey was conducted in 2006-2007, and surveyed 812 non-migrants (potential migrants: young adults between 18 and 40) and 1000 returned migrants defined as adults aged 18 and over who had lived and worked abroad for at least 6 months and who had returned within the last 10 years. Although the ETF survey does not enable us to observe the occupational mobility of returnees nor control for any of the empirical challenges, it provides us with useful qualitative information. It asks returnees "Have your experiences abroad helped you find better work opportunities since your return?" About 66% of returned said that their experiences abroad helped them find better work since their return, (61% among less educated and 68% among highly educated returnees). Interestingly, 27% said the skills learned overseas where the most helpful for them, and 37% mentioned that the migration experience in general (and exposure to new ways in particular) have helped them. Also 83% of returnees believed they were better off than before migration, (71% among less educated and 86% among highly educated returnees). Furthermore, the youth who were not planning on migrating were asked about their perceptions on the benefits of migration, in particular "Do you think that people who have lived and worked abroad have experiences abroad that help them find better work opportunities when they return?". Almost 60% replied affirmatively (45% among the less educated and 72% among the highly educated). If anything this descriptive analysis provides suggestive evidence in line with our econometric findings suggesting that occupational mobility is likely to be driven by human capital enhancement overseas.

[77] See Sabadie, et al. (2010) for a description of the survey and questionnaire.

4.6 Robustness checks

4.6.1 Different Cohorts & Sample Selections

To check the robustness of our results, we use the 1990s cohort - those who entered the labor market and had their first job in the 1990s.[78] In this section, we focus on males who had their first job in the 1990s[79], were aged at least 15 years old at first job and were less than 65 years of age in 2010 and had a current job in Egypt in 2010. In Table 4.22, we also estimate the effect of return migration on occupational mobility for the 1990s cohort. We employ a standard Probit, linear probability model, IV-Probit and IV-regression models using historical oil prices. In line with our previous findings, we find the return migration increases the probability of upward occupational mobility by 13 percentage points using a standard Probit Model. Relying on IV-Probit model, the magnitude of the estimated coefficient is more than two times greater. Table 4.23 and Table 4.24 also provide additional robustness checks relying on Difference-in-Differences and Difference-in-Differences matching techniques. Our results are robust to the different specifications and again we find evidence of upward occupational mobility as previously found for the 1980s cohort.

A potential challenge we face by design is that we observe working men in 2010 who entered the labor market in the 1980s. Hence, if returnees are more likely to drop out of the labor market earlier than stayers perhaps since they have accumulated savings to see them through retirement, this might bias our results. So, we also focused on workers aged 50 to 55 years old in 2010 in Table B10 in the Appendix as a robustness check and considered their mobility between the first occupation and their current occupation in 2010. We considered those aged at least 15 years old at first job, using linear probability and IV-regression models. Our results hold and are in line with our previous findings. We find that return migration increases the probability of upward occupational mobility by 10 percentage points.

4.6.2 Robustness of the Occupational Rankings

As additional robustness checks, we also checked the robustness of our findings by eliminating those men who had high skilled white collar occupations at first job for both the 1980s and the 1990s cohorts, since by definition they cannot move up the occupational ladder between the first occupation in the 1980s and in the 1990s respectively and their current occupation in 2010. We use a linear probability, IV-regression and IV-Probit models. Results are reported in Table B11

[78] In Tables B7, B8 and B9 in the Appendix, we provide descriptive statistics for the 1990s cohort regarding individuals' characteristics, first and current job characteristics, occupations and occupational mobility indicators.
[79] The years considered for the 1990s cohort are from the 1990 to 1999, inclusive.

in the Appendix. Our results hold and are robust for both cohorts after eliminating men who started their career with high-skilled white collar occupations. Relying on IV-regression, we find that return migration increases the probability of upward occupational mobility by 10 percentage points for both the 1980s and the 1990s cohorts and by about, 30 percentage points relying on an IV-Probit model.

Our results were also robust to aggregating and disaggregating the occupational categories. In Table B12 in the Appendix, we examine the effect of return migration on upward occupational mobility using a more aggregated definition, where occupations are split into 3 occupational categories: agriculture, blue collar occupations and white collar occupations (ranked 1 to 3, respectively) and to using a more disaggregated definition, where occupations are split into 9 occupational categories: skilled agricultural and fishery workers, elementary occupations, crafts and related trades workers, plant and machine operators and assemblers, service workers and shop and market sales workers, clerks, technicians and associate professionals, legislators, senior officials and managers, and professionals (ranked 1 to 9 respectively). The occupational ranks are computed according to the amount of human capital needed to be employed in each occupation, as presented earlier in Section 4.2.3. [80] Our results are robust to the two levels of aggregation and actually, greater in magnitude when using less aggregated occupations.

4.7 Concluding remarks

Whether migrants acquire human capital while overseas is an important question for the economic development of the home country since it is not uncommon for high skilled migration to be perceived as resulting in brain drain for origin developing countries. This paper studies the extent to which temporary overseas migration enables returnees to climb the occupational ladder. We use Egyptian data to estimate the occupational mobility of returnees relative to non-migrants focusing on cohort groups who entered the labor market in the same decade, to control for initial labor market conditions, and compare individual occupational mobility based on the first job relative to the one in 2010. We rely on instrumental variable approach, Difference-in-Differences, as well as Difference-in-Differences matching techniques to control for the endogeneity and selection into migration.

The findings suggest that return migration increases the probability of upward occupational mobility, in particular for returnees who belong to the upper end of the educational distribution. Hence, our results suggest another mechanism that has not been well studied previously through which the emigration of high skilled workers can lead to brain gain.

[80] Occupational rankings for the ISCO-88 1 digit classification are reported in Table B13 in the Appendix.

Overall, the findings highlight the role played by international migration in human capital accumulation of migrants. In particular, the findings underscore that emigration does not drain human capital accumulation in origin developing countries, as is sometimes perceived, but that temporary migration of highly educated workers enhances their skills and leads to a brain gain. An important policy implication is that high skilled temporary migration should be encouraged, as this would enhance human capital in origin developing countries.

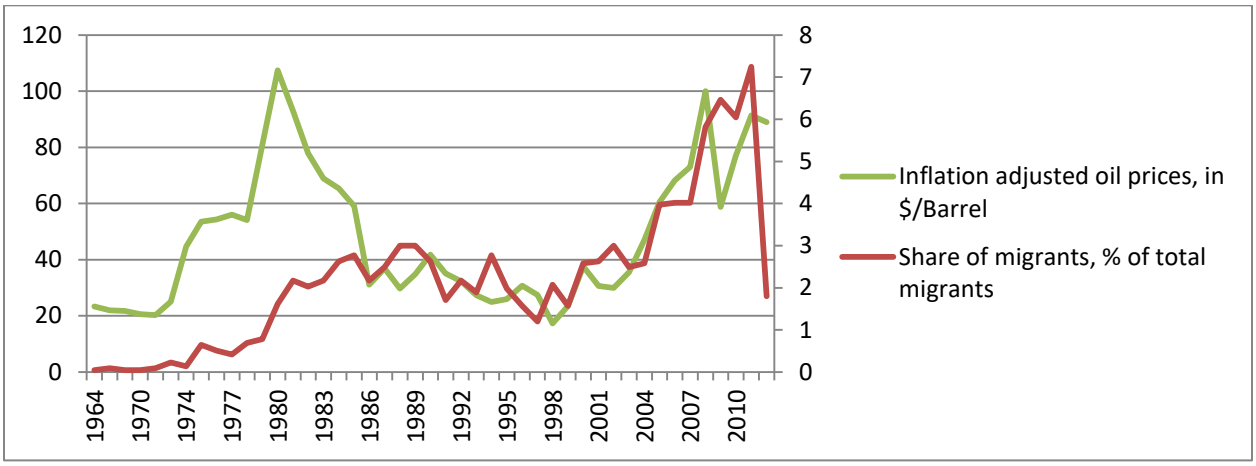

Figure 4.1. Oil prices and migration patterns from the 1960s to 2010.

Notes. Oil prices are inflation adjusted and expressed in $ per Barrel (primary Y-axis). Migration patterns are derived from the ELMPS 2012, using information on current, return migration and the year of migration and are expressed as the share of migrants in a specific year to the total migrants (secondary Y-axis).

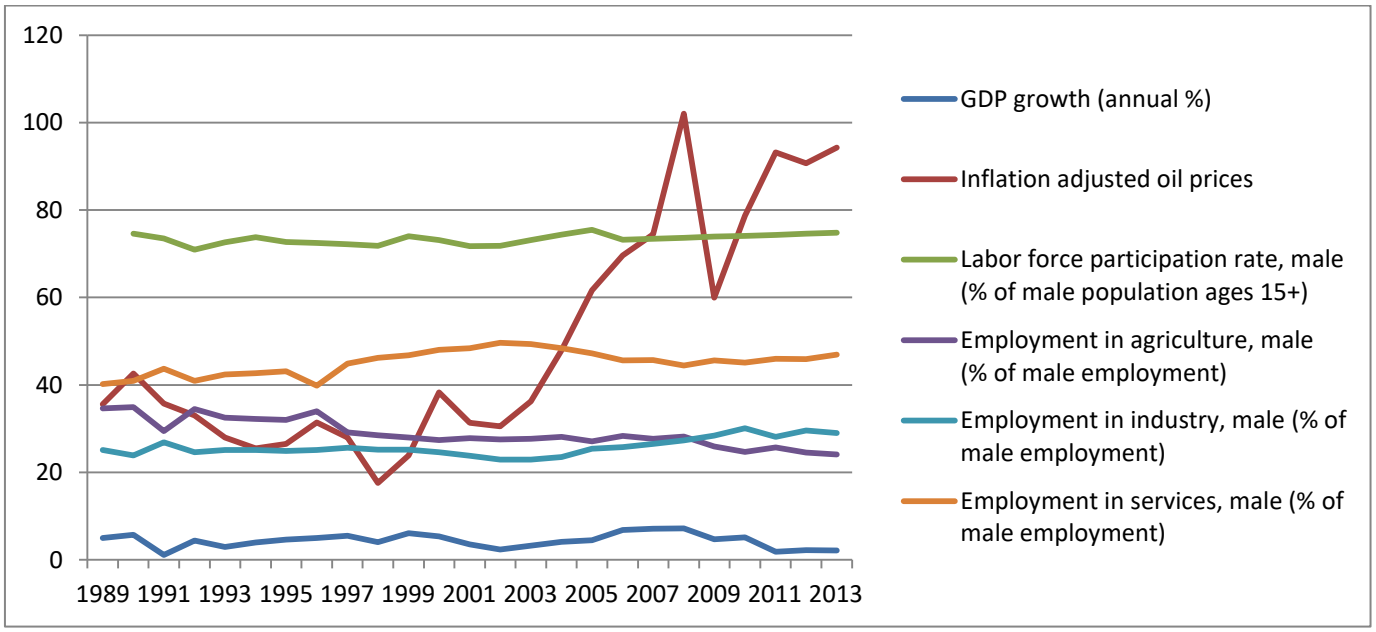

Figure 4.2. Oil prices versus aggregate indicators.

Notes. Oil prices are inflation adjusted and expressed in $ per Barrel (primary Y-axis). Labor Force participation rate, Employment in agriculture, industry and services are from International Labor Organization, Key indicators of the Labour Market Database. GDP growth rates are from the World Bank National accounts data files.

Table 4.1: Descriptive statistics on the sample of Stayers versus Returnees in the 1980s cohort

	Stayers		Returnees		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
Individual characteristics					
Age in 1980	15.040	4.937	16.420	4.354	-1.388***
Age at first job	19.981	3.929	20.655	3.474	-0.673***
Ever-married in 2010	0.976	0.153	0.987	0.114	-0.011
No educational degree	0.155	0.362	0.079	0.270	0.076***
Primary or preparatory education	0.169	0.375	0.092	0.290	0.077***
Secondary education	0.392	0.489	0.569	0.496	-0.177***
Above secondary education	0.283	0.451	0.260	0.439	0.023
Geographical region in 1980					
Cairo	0.111	0.314	0.063	0.242	0.048**
Alexandria and Canal cities	0.107	0.309	0.030	0.170	0.077***
Urban Lower Egypt	0.130	0.336	0.178	0.383	-0.048**
Urban Upper Egypt	0.199	0.399	0.148	0.356	0.051**
Rural Lower Egypt	0.244	0.430	0.375	0.485	-0.131***
Rural Upper Egypt	0.210	0.408	0.207	0.406	0.003
Parental background - Mother's level of education					
Illiterate	0.817	0.387	0.829	0.377	-0.012
Literate	0.101	0.302	0.122	0.327	-0.020
Less than intermediate	0.051	0.221	0.033	0.179	0.018
Intermediate and above	0.025	0.157	0.016	0.127	0.009
University and above	0.005	0.072	0.000	0.000	0.005
Parental background - Father's level of education					
Illiterate	0.558	0.497	0.539	0.499	0.018
Literate	0.199	0.399	0.257	0.437	-0.058
Less than intermediate	0.119	0.324	0.109	0.312	0.011
Intermediate and above	0.081	0.272	0.072	0.260	0.008
University and above	0.044	0.205	0.023	0.150	0.021
Number of observations	956		304		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table 4.2: First and current job characteristics for Stayers and Returnees in the 1980s cohort

	Stayers		Returnees		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
First job characteristics in the 1980s					
Sector of employment					
Government	0.279	0.449	0.151	0.359	0.128***
Public Enterprises	0.040	0.195	0.026	0.160	0.013
Private	0.681	0.466	0.822	0.383	-0.141***
Economic activity					
Agriculture, Forestry, Fishing	0.204	0.403	0.197	0.399	0.007
Manufacturing, Mining, Quarrying	0.166	0.373	0.145	0.352	0.022
Construction	0.134	0.341	0.247	0.432	-0.113***
Wholesale, retail trade, transportation and other activities	0.215	0.411	0.230	0.422	-0.015
Professional, scientific, technical and administrative activities	0.017	0.128	0.033	0.179	-0.016*
Other activities	0.264	0.441	0.148	0.356	0.116***
Incidence of work contract and social security					
Work contract	0.364	0.481	0.355	0.479	0.009
Indicator for missing work contract	0.315	0.465	0.234	0.424	0.081***
Social security	0.361	0.481	0.184	0.388	0.177***
Current job characteristics in 2010					
Sector of employment					
Government	0.408	0.492	0.500	0.501	-0.092***
Public Enterprises	0.062	0.241	0.043	0.203	0.019
Private	0.531	0.499	0.457	0.499	0.074**
Economic activity					
Agriculture, Forestry, Fishing	0.111	0.314	0.095	0.294	0.015
Manufacturing, Mining, Quarrying	0.157	0.364	0.122	0.327	0.035
Construction	0.097	0.296	0.072	0.260	0.025
Wholesale, retail trade, transportation and other activities	0.229	0.420	0.214	0.411	0.015
Professional, scientific, technical and administrative activities	0.017	0.128	0.026	0.160	-0.010
Other activities	0.389	0.488	0.470	0.500	-0.081**
Incidence of work contract and social security					
Work contract	0.533	0.499	0.576	0.495	-0.042
Indicator for missing work contract	0.213	0.013	0.253	0.025	-0.040
Social security	0.601	0.490	0.658	0.475	-0.056*
Number of Observations	956		304		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table 4.3: The ISCO-88 1 digit occupations, corresponding index values and standard errors

Category name	Corresponding 5 categories	Index value			
		(1)	(2)	(3)	(4)
Skilled agricultural and fishery workers	Agriculture	0.054	-0.030	-119,720	-0,891
		(0.023)	(0.023)	(26.316)	(0.159)
Elementary Occupations	Low skilled blue collar	0.059	-0.029	-128,611	-0,928
		(0.020)	(0.021)	(24.380)	(0.147)
Crafts and related trades workers	High skilled blue collar	0.095	0.009	-82,681	-0,656
		(0.015)	(0.016)	(18.531)	(0.112)
Plant and Machine Operators and assemblers	Low skilled blue collar	0.132	0.043	-51,328	-0,456
		(0.016)	(0.018)	(22.034)	(0.133)
Service workers and shop and market sales workers	Low skilled white collar	0.217	0.138	76,837	0,305
		(0.026)	(0.028)	(37.133)	(0.221)
Clerks	Low skilled white collar	0.287	0.210	166,123	0,840
		(0.017)	(0.019)	(26.335)	(0.156)
Technicians and associate Professionals	High skilled white collar	0.303	0.227	185,507	0,961
		(0.010)	(0.011)	(15.503)	(0.092)
Legislators, Senior Officials and managers	High skilled white collar	0.502	0.457	517,666	2,904
		(0.017)	(0.020)	(28.961)	(0.170)
Professionals	High skilled white collar	0.521	0.482	556,219	3,121
		(0.011)	(0.114)	(19.508)	(0.114)

Notes. Occupational indices are reported and their standard errors in brackets. To compute occupational indices, we regress the log of monthly wage on column (1), the log of hourly wage in column (2), the monthly wage in column (3) and the hourly wage in column (4), on the number of years of schooling and its squared term, the work experience and its squared term, controlling for marital status, geographical regions and the number of years in the current job and its squared term for the 1980s estimation sample. Occupational indices are computed as following: first we multiply the estimated coefficients on the number of years of schooling and its squared term and the number of years of work experience and its squared term, obtained from the wage regression, by the levels for each individuals. Second, we sum the resulting products and they are averaged at the ISCO88 1-digit occupation to obtain our occupational ranking. Military occupations are eliminated.

Table 4.4: Computation of the occupational rankings

Rank	Category name	Index value			
		(1)	(2)	(3)	(4)
1	Agriculture	0.054	-0.030	-119.720	-0.891
2	Low skilled blue collar	0.095	0.007	-89.969	-0.692
3	High skilled blue collar	0.096	0.009	-82.681	-0.656
4	Low skilled white collar	0.252	0.174	121.480	0.573
5	High skilled white collar	0.442	0.389	419.797	2.329

Notes. To compute occupational indices, we regress the log of monthly wage on column (1), the log of hourly wage in column (2), the monthly wage in column (3) and the hourly wage in column (4), on the number of years of schooling and its squared term, the work experience and its squared term, controlling for marital status, geographical regions and the number of years in the current job and its squared term for the 1980s estimation sample. Occupational indices are computed as following: first we multiply the estimated coefficients on the number of years of schooling and its squared term and the number of years of work experience and its squared term, obtained from the wage regression, by the levels for each individuals. Second, we sum the resulting products and they are averaged at the ISCO88 1-digit occupation to obtain our occupational ranking. Military occupations are eliminated.

Table 4.5: Mean hourly and monthly wages by occupation

Occupation	Mean hourly wage	Mean monthly wage
Agriculture	4,463	691,951
	(0.368)	(58.612)
Low-skilled blue collar	5.650	1104,198
	(0.512)	(85.111)
High-skilled blue collar	6,188	1186,362
	(0.474)	(103.25)
Low-skilled white collar	6,783	1267,643
	(0.726)	(99.928)
High-skilled white collar	9,844	1695,364
	(0.480)	(74.842)

Notes. Hourly and monthly wages in 2012 are reported in Egyptian Pounds, by occupation for the 1980s estimation sample. Standard errors are reported between brackets.

Table 4.6: First, current occupations and occupational mobility indicators for Stayers and Returnees in the 1980s cohort

	Stayers		Returnees		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
First occupation in the 1980s					
Agriculture	0.203	0.402	0.197	0.399	0.006
Low-skilled blue collar	0.122	0.328	0.095	0.294	0.027
High-skilled blue collar	0.204	0.403	0.313	0.464	-0.109***
Low-skilled white collar	0.129	0.335	0.194	0.396	-0.065***
High-skilled white collar	0.342	0.475	0.201	0.401	0.141
Current occupation in 2010					
Agriculture	0.107	0.309	0.0954	0.294	0.011
Low-skilled blue collar	0.165	0.372	0.132	0.339	0.034
High-skilled blue collar	0.143	0.351	0.105	0.307	0.038*
Low-skilled white collar	0.118	0.323	0.118	0.324	0.000
High-skilled white collar	0.467	0.499	0.549	0.498	-0.083**
Occupational mobility indicators					
Degree of mobility	0.388	1.173	0.789	1.467	-0.401***
Upward mobility	0.251	0.434	0.464	0.500	-0.213***
Downward mobility	0.080	0.271	0.109	0.312	-0.029
Immobility	0.669	0.471	0.428	0.496	0.242***
Number of Observations	956		304		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table 4.7: Employment transition Matrices for Stayers versus Returnees in the 1980s cohort

	Current occupation					
First occupation	Agriculture	Low skilled blue collar	High skilled blue collar	Low skilled white collar	High skilled white collar	Total (% of total)
Panel A: Stayers (N=956)						
Agriculture	48.969	15.464	9.278	10.825	15.464	100.000 (20.293)
Low skilled blue collar	2.564	64.957	7.692	5.128	19.658	100.000 (12.238)
High skilled blue collar	1.538	16.410	49.744	9.231	23.077	100.000 (20.397)
Low skilled white collar	0.813	12.195	2.439	52.033	32.520	100.000 (12.866)
High skilled white collar	0.000	1.529	3.058	1.223	94.190	100.000 (34.205)
Total	10.669	16.527	14.331	11.820	46.653	100.000
Panel B: Returnees (N=304)						
Agriculture	41.667	11.667	1.667	10.000	35.000	100.000 (19.736)
Low skilled blue collar	0.000	31.034	3.448	17.241	48.276	100.000 (9.539)
High skilled blue collar	2.105	17.895	28.421	10.526	41.053	100.000 (31.250)
Low skilled white collar	3.390	6.780	5.085	22.034	62.712	100.000 (19.408)
High skilled white collar	0.000	4.918	0.000	3.279	91.803	100.000 (20.066)
Total	9.539	13.158	10.526	11.842	54.934	100.000

Notes. The employment transition matrices are computed as % of the rows. The diagonal cells represent the percentage of individuals who stayed in the same occupational category between the first job in the 1980s and the current job in 2010. The cells above the diagonal represent the percentage of individuals who witnessed upward mobility, whereas, the cells below the diagonal represent the percentage of individuals who witnessed downward mobility.

Table 4.8: First stage regressions

Panel A: For the 1980s cohort			
	(1)	(2)	(3)
VARIABLES	Return migrant	Return migrant	Return migrant
Oil price at age 25	0.020***		
	[0.001]		
Oil price at age 26		0.022***	
		[0.001]	
Oil price at age 27			0.024***
			[0.001]
Observations	1,239	1,239	1,239
R-squared	0.832	0.831	0.868
Kleibergen-Paap rk Wald F statistic	823.254	572.011	814.185
Panel B: For the 1990s cohort			
	(1)	(2)	(3)
VARIABLES	Return migrant	Return migrant	Return migrant
Oil price at age 24	0.022***		
	[0.001]		
Oil price at age 25		0.019***	
		[0.001]	
Oil price at age 26			0.017***
			[0.001]
Observations	2,263	2,263	2,263
R-squared	0.837	0.794	0.787
Kleibergen-Paap rk Wald F statistic	908.101	715.617	727.245
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
First job characteristics	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

*Notes.*Coefficient estimates for first stage IV-regressions for the 1980s cohort (Panel A) and for the 1990s cohort (Panel B). For the 1980s cohort, we use the historical inflation-adjusted oil prices when the individual was 26 years old, being the mean age at migration for our sample of Egyptian men. For robustness, we also tried to match the oil prices at age 25 and age 27. For the 1990s cohort, we use the historical inflation-adjusted oil prices when the individual was 25 years old, being the mean age at migration for our sample of Egyptian men. For robustness, we also tried to match the oil prices at age 24 and age 26.

Table 4.9: Estimating the effect of return migration on occupational mobility for the 1980s cohort

VARIABLES	Probit Model Upward mobility	Linear Probability Model Upward mobility	IV Probit Upward mobility	IV regression Upward mobility
Return migrant	0.087**	0.087***	0.347***	0.091***
	(0.034)	(0.032)	(0.119)	(0.032)
Observations	1,260	1,260	1,239	1,239
R-squared		0.248		
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1 Robust standard errors in parentheses

Notes. Marginal effects are reported for Probit and IV Probit models and coefficient estimates are reported for Linear Probability and IV regression models.

Table 4.10: Estimating the effect of return migration on occupational mobility for the 1980s cohort, Ordered Probit and IV-ordered Probit Model

Panel A: Ordered Probit Model				
VARIABLES	(0)	(1)	(2)	(3)
Return migrant	-0.072**	0.026**	0.025**	0.021**
	(0.030)	(0.011)	(0.011)	(0.009)
Panel B: IV-Ordered Probit Model				
Return migrant	-0.059*	0.013*	0.017*	0.030*
	(0.030)	(0.007)	(0.009)	(0.015)
Panel C: IV-Ordered Probit Model with bootstrapped standard errors				
Return migrant	-0.106***	0.028***	0.027***	0.051***
	(0.036)	(0.010)	(0.010)	(0.017)
Observations	1,260	1,260	1,260	1,260
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Marginal effects are reported for Ordered Probit and IV-Ordered Probit models. The (0) category refers to staying in the same occupation between the first job in the 1980s and the current occupation, or downgrading, the (1) category refers to moving up the occupational ladder one step, the (2) category refers to moving up the occupational ladder two steps and the (3) category refers to moving up the occupational ladder 3 or 4 steps.

Table 4.11: Estimating the effect of return migration on occupational mobility, conditional on the country of destination of returnees for the 1980s cohort

VARIABLES	Probit Model Upward mobility	Linear Probability Model Upward mobility
Return migrant (oil country)	0.085**	0.085**
	(0.037)	(0.034)
Return migrant (non-oil country)	0.101	0.101
	(0.076)	(0.073)
Observations	1,246	1,246
R-squared		0.248
Individual Controls	YES	YES
Household Controls	YES	YES
First job characteristics	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Marginal effects are reported for Probit Model and coefficient estimates using Linear Probability Model.

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Table 4.12: Difference-in-Differences Approach for the 1980s cohort

Panel A: Treatment is return migration **Sample of Returnees=304, Sample of Stayers=956**			
	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Returnees	3.105	3.895	0.789***
(Treatment group)	(0.079)	(0.082)	(0.113)
Stayers	3.285	3.673	0.388***
(Control group)	(0.050)	(0.047)	(0.068)
Difference	-0.179	0.222**	0.401***
	(0.099)	(0.096)	(0.137)
Panel B: Treatment is return migration (Oil Countries) **Sample of Returnees=248, Sample of Stayers=956**			
	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Returnees	3.145	3.895	0.750***
(Treatment group)	(0.086)	(0.090)	(0.124)
Stayers	3.285	3.673	0.388***
(Control group)	(0.050)	(0.047)	(0.068)
Difference	-0.139	0.223**	0.362**
	(0.107)	(0.103)	(0.149)
Panel C: Treatment is return migration (Non-Oil Countries) **Sample of Returnees=42, Sample of Stayers=956**			
	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Returnees	2.833	3.976	1.143***
(Treatment group)	(0.228)	(0.227)	(0.322)
Stayers	3.285	3.673	0.388***
(Control group)	(0.050)	(0.047)	(0.068)
Difference	-0.451*	0.304	0.755**
	(0.241)	(0.230)	(0.333)

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. In Panel A, treatment is considered as return migration unconditional on the destination country. In Panel B and C, treatment is considered as return migration from Oil countries versus Non-Oil countries, respectively, considering returnees' destination during the last migration episode. Before the treatment refers to the first occupation in the 1980s and after the treatment refers to the current occupation in 2010. The dependent variable is the individual's occupation. It takes values from 1 to 5 for the following categories respectively: agriculture, low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar.

Table 4.13: Propensity Score Matching combined with Difference-in-Differences Approach for the 1980s cohort

	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Panel A: Treatment is return migration			
Sample of Returnees=292, Sample of Stayers=951			
Returnees	3.116	3.880	0.764***
(Treatment group)	(0.081)	(0.084)	(0.117)
Stayers	3.284	3.668	0.384***
(Control group)	(0.050)	(0.047)	(0.069)
Difference	-0.167*	0.212**	0.380***
	(0.100)	(0.097)	(0.140)
Panel B: Treatment is return migration (Oil Countries)			
Sample of Returnees=237, Sample of Stayers=951			
Returnees	3.156	3.865	0.709***
(Treatment group)	(0.089)	(0.092)	(0.128)
Stayers	3.284	3.668	0.384***
(Control group)	(0.048)	(0.048)	(0.069)
Difference	-0.128	0.197**	0.325**
	(0.109)	(0.105)	(0.152)
Panel C: Treatment is return migration (Non-Oil Countries)			
Sample of Returnees=40, Sample of Stayers=913			
Returnees	2.775	4.000	1.225***
(Treatment group)	(0.233)	(0.232)	(0.329)
Stayers	3.234	3.628	0.393***
(Control group)	(0.051)	(0.048)	(0.070)
Difference	-0.459*	0.372	0.832**
	(0.248)	(0.237)	(0.342)

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Propensity score matching, using the nearest neighbor estimator combined with a Difference-in-Differences Specification is estimated. In Panel A, treatment is considered as return migration unconditional on the destination country. In Panel B and C, treatment is considered as return migration from Oil countries versus Non-Oil countries, respectively, considering returnees' destination during the last migration episode. Before the treatment refers to the first occupation in the 1980s and after the treatment refers to the current occupation in 2010. The dependent variable is the individual's occupation. It takes values from 1 to 5 for the following categories respectively: agriculture, low-skilled blue collar, high-skilled blue collar, low-skilled white collar and high-skilled white collar.

Table 4.14: Conditional mixed process model taking into account selection into migration and selection into return migration

VARIABLES	(1) Upward mobility	(2) Migration	(3) Return
Return migrant	0.087**		
	[0.040]		
Oil prices		0.022***	
		[0.000]	
Conflict			0.238***
			[0.034]
Observations	1,502	1,502	1,502
Individual controls	YES	YES	YES
Household controls	YES	NO	NO
First job characteristics	YES	NO	NO
lnsig	-0.908***	-1.738***	-0.923***
	[0.020]	[0.020]	[0.032]
atanhrho_12		-0.013	
		[0.032]	
atanhrho_13		-0.218***	
		[0.081]	
atanhrho_23		0.019	
		[0.041]	

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Model 1 is probability of upward mobility (sample includes stayers and return migrants). Model 2 is probability of migration (sample includes current migrants, return migrants and stayers). Model 3 is probability of return migration (sample includes current migrants and return migrants). Model 1 includes a full set of controls. Models 2 and 3 include educational dummies, a dummy for rural residence, age and its squared term (for Model 3, age is at migration). The exclusion restriction used to identify migration is the inflation adjusted historical oil prices (in US dollars). The exclusion restriction used to identify the return migration equation is the number of active armed conflicts in a country-year derived from UCDP Monadic Conflict Onset and Incidence Dataset.

Table 4.15: Employment transition Matrices for Returnees in the 1980s cohort, by educational attainment

	Current occupation					
Initial occupation	Agriculture	Low skilled blue collar	High skilled blue collar	Low skilled white collar	High skilled white collar	Total (% of total)
Panel A: The less educated returnees (N=52)						
Agriculture	60.000	20.000	5.000	0.000	15.000	100.000 (38.462)
Low skilled blue collar	0.000	100.000	0.000	0.000	0.000	100.000 (11.538)
High skilled blue collar	5.263	15.789	52.632	10.526	15.789	100.000 (36.538)
Low skilled white collar	0.000	14.286	28.571	42.857	14.286	100.000 (13.462)
High skilled white collar	0.000	0.000	0.000	0.000	0.000	100.000 (0.000)
Total	25.000	26.923	25.000	9.615	13.462	100.000
Panel B: The high educated returnees (N=252)						
Agriculture	32.500	7.500	0.000	15.000	45.000	100.000 (15.873)
Low skilled blue collar	0.000	13.043	4.348	21.739	60.870	100.000 (9.127)
High skilled blue collar	1.316	18.421	22.368	10.526	47.368	100.000 (30.159)
Low skilled white collar	3.846	5.769	1.923	19.231	69.231	100.000 (20.635)
High skilled white collar	0.000	4.918	0.000	3.279	91.803	100.000 (24.206)
Total	6.349	10.317	7.540	12.302	63.492	100.000

Notes. In Panel A, the less educated individuals are those who have less than secondary education. In Panel B, the high educated individuals are those who have secondary or more education. The employment transition matrices are computed as % of the rows. The diagonal cells represent the percentage of individuals who stayed in the same occupational category between the first job in the 1980s and the current job in 2010. The cells above the diagonal represent the percentage of individuals who witnessed upward mobility, whereas, the cells below the diagonal represent the percentage of individuals who witnessed downward mobility.

Table 4.16: Employment transition Matrices for Returnees who had their first job in Egypt in the 1980s cohort

Panel A: Transition between the first occupation in Egypt and the occupation in the last migration episode (N=180)

	Occupation in the last migration episode					
Initial occupation	Agriculture	Low skilled blue collar	High skilled blue collar	Low skilled white collar	High skilled white collar	Total (% of total)
Agriculture	33.333	3.922	49.020	13.725	0.000	100.000 (28.333)
Low skilled blue collar	0.000	50.000	14.286	28.571	7.143	100.000 (7.778)
High skilled blue collar	1.923	9.615	76.923	7.692	3.846	100.000 (28.889)
Low skilled white collar	4.762	9.524	33.333	38.095	14.286	100.000 (11.667)
High skilled white collar	2.381	7.143	7.143	11.905	71.429	100.000 (23.333)
Total	11.111	10.556	42.778	15.556	20.000	100.000

Panel B: Transition between the occupation in the last migration episode and current occupation in Egypt in 2010 (N=180)

	Current occupation					
Occupation abroad	Agriculture	Low skilled blue collar	High skilled blue collar	Low skilled white collar	High skilled white collar	Total (% of total)
Agriculture	45.000	5.000	0.000	15.000	35.000	100.000 (11.111)
Low skilled blue collar	5.263	47.368	10.526	21.053	15.789	100.000 (10.556)
High skilled blue collar	14.286	15.584	28.571	10.390	31.169	100.000 (42.778)
Low skilled white collar	14.286	10.714	7.143	10.714	57.143	100.000 (15.556)
High skilled white collar	0.000	5.556	2.778	5.556	86.111	100.000 (20.000)
Total	13.889	15.000	15.000	11.111	45.000	100.000

Notes. In Panel A, the table represents employment transition matrices between the first occupation in Egypt and the occupation during the last migration episode and in Panel B, employment transition matrices between the occupation during the last migration episode and the current occupation in Egypt in 2010. The employment transition matrices are computed as % of the rows. The diagonal cells represent the percentage of individuals who stayed in the same occupational category between the first job in the 1980s and the current job in 2010. The cells above the diagonal represent the percentage of individuals who witnessed upward mobility, whereas, the cells below the diagonal represent the percentage of individuals who witnessed downward mobility.

Table 4.17: Employment transition Matrices for Returnees who had their first job abroad in the 1980s cohort

Transition between the first occupation abroad and the current occupation in Egypt episode (N=110)						
	Current occupation					
Initial occupation abroad	Agriculture	Low skilled blue collar	High skilled blue collar	Low skilled white collar	High skilled white collar	Total (% of total)
Agriculture	14.286	0.000	0.000	14.286	71.429	100.000 (6.364)
Low skilled blue collar	0.000	14.286	0.000	21.429	64.286	100.000 (12.727)
High skilled blue collar	0.000	10.811	13.514	8.108	67.568	100.000 (33.636)
Low skilled white collar	2.778	11.111	0.000	16.667	69.444	100.000 (32.727)
High skilled white collar	0.000	0.000	0.000	6.250	93.750	100.000 (14.545)
Total	1.818	9.091	4.545	12.727	71.818	100.000

Notes. The table represents employment transition matrices between the first occupation abroad and the current occupation in Egypt in 2010. The employment transition matrices are computed as % of the rows. The diagonal cells represent the percentage of individuals who stayed in the same occupational category between the first job in the 1980s and the current job in 2010. The cells above the diagonal represent the percentage of individuals who witnessed upward mobility, whereas, the cells below the diagonal represent the percentage of individuals who witnessed downward mobility.

Table 4.18: Employment transition Matrices for current migrants

Transition between the occupation before leaving and occupation abroad (N=207)

	Current occupation abroad					
Initial occupation	Agriculture	Low skilled blue collar	High skilled blue collar	Low skilled white collar	High skilled white collar	Total
Agriculture	30.556	11.111	45.833	11.111	1.389	100.000 (34.783)
Low skilled blue collar	0.000	73.333	20.000	6.667	0.000	100.000 (7.246)
High skilled blue collar	3.448	3.448	82.759	10.345	0.000	100.000 (28.019)
Low skilled white collar	0.000	14.286	14.286	57.143	14.286	100.000 (6.763)
High skilled white collar	0.000	6.250	6.250	10.417	77.083	100.000 (23.188)
Total	11.594	12.560	42.995	13.527	19.324	100.000

Notes. The table represents employment transition matrices for current migrants between the first occupation before leaving and the current occupation abroad in 2012. The employment transition matrices are computed as % of the rows. The diagonal cells represent the percentage of individuals who stayed in the same occupational category between the occupation before leaving and the current occupation abroad. The cells above the diagonal represent the percentage of individuals who witnessed upward mobility, whereas, the cells below the diagonal represent the percentage of individuals who witnessed downward mobility.

Table 4.19: Investigating the heterogeneity of the effect of return migration on upward occupational mobility for the 1980s, by educational attainment

	Less educated		More educated	
VARIABLES	Linear Probability Model	IV Regression	Linear Probability Model	IV Regression
Return migrant	0.010	0.006	0.095***	0.098***
	(0.069)	(0.069)	(0.036)	(0.036)
Observations	362	358	898	881
R-squared	0.101		0.317	
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Coefficient estimates using a linear probability model and IV-regression. The less educated individuals are those who have less than secondary education and the high educated individuals are those who have secondary or more education.

Table 4.20: Investigating the heterogeneity of the effect of return migration, by migration duration

Panel A:	**Duration ≤ 1 year**		**2-3 years**	
	Linear Probability Model	IV-Regression	Linear Probability Model	IV-Regression
VARIABLES	Upward mobility	Upward mobility	Upward mobility	Upward mobility
Return migrant	0.123**	0.151**	0.108**	0.087*
	(0.061)	(0.064)	(0.049)	(0.047)
Observations	1,027	1,022	1,053	1,048
R-squared	0.227		0.243	
Panel B:	**4-6 years**		**Duration ≥ 7 years**	
Return migrant	0.131**	0.148***	0.072	0.084
	(0.057)	(0.055)	(0.060)	(0.061)
Observations	1,017	1,015	1,031	1,022
R-squared	0.241		0.226	
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Coefficient estimates using a linear probability model and IV-regression. Migration duration is split into its four quartiles (less than or equal one year, two to three years, four to six years and 7 years or more). Sample includes returnees with corresponding migration duration versus all stayers.

Table 4.21: Estimating the heterogeneity of the effect of return migration, by years since final return

Panel A:	**Less than 10 years**		**11 to 16 years**	
	Linear Probability model	IV-Regression	Linear Probability model	IV-Regression
VARIABLES	Upward mobility	Upward mobility	Upward mobility	Upward mobility
Return migrant	0.026	0.040	0.092*	0.115**
	(0.065)	(0.063)	(0.054)	(0.053)
Observations	1,011	1,004	1,026	1,019
R-squared	0.221	0.220	0.239	0.232
Panel B:	**17 to 20 years**		**More than 21 years**	
Return migrant	0.280***	0.295***	0.404***	0.421***
	(0.056)	(0.056)	(0.048)	(0.052)
Observations	1,035	1,032	1,048	1,044
R-squared	0.266	0.264	0.317	0.318
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Coefficient estimates using a linear probability model and IV-regression. Years since final return in Egypt are split into its four quartiles (less than 10 years, 11 to 16 years, 17 to 20 years and 21 years or more). Sample includes returnees with corresponding number of years since final return versus all stayers.

Table 4.22: Estimating the effect of return migration on occupational mobility, for the 1990s cohort

VARIABLES	Probit Model Upward mobility	Linear Probability Model Upward mobility	IV Probit Upward mobility	IV Regression Upward mobility
Return migrant	0.131***	0.139***	0.304***	0.104***
	(0.035)	(0.034)	(0.111)	(0.037)
Observations	2,276	2,276	2,263	2,263
R-squared		0.160		
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Marginal effects are reported for Probit and and IV-Probit models.

Table 4.23: Difference-in-Differences Approach for the 1990s cohort

Panel A: Treatment is return migration

Sample of Returnees=220, Sample of Stayers=2056

	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Returnees	3.100	4.300	1.200***
(Treatment group)	(0.115)	(0.098)	(0.151)
Stayers	4.139	4.461	0.321***
(Control group)	(0.031)	(0.031)	(0.044)
Difference	-1.039***	-0.161	0.879***
	(0.103)	(0.099)	(0.143)

Panel B: Treatment is return migration (Oil Countries)

Sample of Returnees=157, Sample of Stayers=2056

	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Returnees	3.318	4.312	0.994***
(Treatment group)	(0.135)	(0.113)	(0.176)
Stayers	4.139	4.461	0.321***
(Control group)	(0.031)	(0.031)	(0.044)
Difference	-0.821***	-0.149	0.672***
	(0.120)	(0.115)	(0.166)

Panel C: Treatment is return migration (Non-Oil Countries)

Sample of Returnees=58, Sample of Stayers=2056

	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Returnees	2.431	4.241	1.810***
(Treatment group)	(0.206)	(0.205)	(0.290)
Stayers	4.139	4.461	0.321***
(Control group)	(0.031)	(0.031)	(0.044)
Difference	-1.708***	-0.219	1.489***
	(0.190)	(0.186)	(0.031)

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. In Panel A, treatment is considered as return migration unconditional on the destination country. In Panel B and C, treatment is considered as return migration from Oil countries versus Non-Oil countries, respectively, considering returnees' destination during the last migration episode. Before the treatment refers to the first occupation in the 1990s and after the treatment refers to the current occupation in 2010.

Table 4.24: Propensity Score Matching combined with Difference-in-Differences Approach for the 1990s cohort

	Before the treatment (t=0)	*After the treatment (t=1)*	*Difference*
Panel A: Treatment is return migration			
Sample of Returnees=215, Sample of Stayers=2056			
Returnees	3.149	4.316	1.167***
(Treatment group)	(0.115)	(0.099)	(0.152)
Stayers	4.139	4.461	0.321***
(Control group)	(0.031)	(0.031)	(0.044)
Difference	-0.990***	-0.144	0.846***
	(0.104)	(0.100)	(0.144)
Panel B: Treatment is return migration (Oil Countries)			
Sample of Returnees=154, Sample of Stayers=2021			
Returnees	3.364	4.312	0.948***
(Treatment group)	(0.135)	(0.114)	(0.177)
Stayers	4.120	4.444	0.324***
(Control group)	(0.032)	(0.031)	(0.044)
Difference	-0.757***	-0.133	0.624***
	(0.120)	(0.116)	(0.167)
Panel C: Treatment is return migration (Non-Oil Countries)			
Sample of Returnees=54, Sample of Stayers=1921			
Returnees	2.537	4.222	1.685***
(Treatment group)	(0.214)	(0.216)	(0.304)
Stayers	4.082	4.413	0.331***
(Control group)	(0.032)	(0.032)	(0.045)
Difference	-1.545***	-0.191	1.355***
	(0.196)	(0.192)	(0.275)

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Propensity score matching, using the nearest neighbor estimator combined with a Difference-in-Differences Specification is estimated. In Panel A, treatment is considered as return migration unconditional on the destination country. In Panel B and C, treatment is considered as return migration from Oil countries versus Non-Oil countries, respectively, considering returnees' destination during the last migration episode. Before the treatment refers to the first occupation in the 1990s and after the treatment refers to the current occupation in 2010.

Appendix B

Table B1: Descriptive Statistics on the sample of Returnees in the 1980s cohort, by educational attainment

	Returnees (less educated)		Returnees (more educated)		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
Individual characteristics					
Age in 1980	14.210	4.216	16.88	4.248	2.669***
Age at first job	18.000	3.475	21.200	3.218	3.202***
Ever-married in 2010	0.981	0.139	0.988	0.109	0.007
Geographical region in 1980					
Cairo	0.019	0.139	0.071	0.258	0.052
Alexandria- Suez Canal	0.058	0.235	0.024	0.153	-0.034
Urban Lower Egypt	0.192	0.398	0.175	0.380	-0.018
Urban Upper Egypt	0.077	0.269	0.163	0.370	0.086
Rural Lower Egypt	0.288	0.457	0.393	0.489	0.104
Rural Upper Egypt	0.365	0.486	0.175	0.380	-0.191***
Parental background - Mother's level of education					
Illiterate	0.904	0.298	0.813	0.390	-0.090
Literate	0.077	0.269	0.131	0.338	0.054
Less than intermediate	0.000	0.000	0.040	0.196	0.040
Intermediate and above	0.019	0.139	0.016	0.125	-0.003
University and above	0.000	0.000	0.000	0.000	0.000
Parental background - Father's level of education					
Illiterate	0.692	0.466	0.508	0.501	-0.184**
Literate	0.231	0.425	0.262	0.441	0.031
Less than intermediate	0.058	0.235	0.119	0.324	0.061
Intermediate and above	0.019	0.139	0.083	0.277	0.064
University and above	0.000	0.000	0.028	0.165	0.028
Number of Observations	52		252		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table B2: First and current job characteristics for Returnees in the 1980s cohort, by educational attainment

	Returnees (less educated)		Returnees (more educated)		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
First job characteristics in the 1980s					
Sector of employment					
Government	0.039	0.194	0.139	0.347	0.100**
Public Enterprise	0.000	0.000	0.032	0.176	0.032
Private	0.962	0.194	0.794	0.405	-0.168***
Economic activity					
Agriculture, Forestry, Fishing	0.385	0.491	0.159	0.366	-0.226***
Manufacturing, Mining, Quarrying	0.096	0.298	0.155	0.362	0.059
Construction	0.269	0.448	0.242	0.429	-0.027
Wholesale, retail trade, transportation and other activities	0.231	0.425	0.230	0.422	-0.001
Professional, scientific, technical and administrative activities	0.000	0.000	0.040	0.196	0.040
Other activities	0.019	0.139	0.175	0.380	0.155***
Incidence of work contract and social security					
Work contract	0.115	0.323	0.405	0.492	0.289***
Indicator for missing work contract	0.404	0.495	0.198	0.400	-0.205***
Social security	0.058	0.235	0.210	0.408	0.153***
Current job characteristics in 2010					
Sector of employment					
Government	0.212	0.412	0.560	0.497	0.348***
Public Enterprise	0.000	0.000	0.052	0.222	0.052*
Private	0.788	0.412	0.389	0.488	-0.400***
Economic activity					
Agriculture, Forestry, Fishing	0.250	0.437	0.064	0.244	-0.187***
Manufacturing, Mining, Quarrying	0.173	0.382	0.111	0.315	-0.062***
Construction	0.135	0.345	0.060	0.237	-0.075*
Wholesale, retail trade, transportation and other activities	0.308	0.466	0.194	0.397	-0.113*
Professional, scientific, technical and administrative activities	0.000	0.000	0.032	0.176	0.032
Other activities	0.135	0.345	0.540	0.499	0.405***
Incidence of work contract and social security					
Work contract	0.250	0.437	0.643	0.480	0.393***
Indicator for missing work contract	0.423	0.499	0.218	0.414	-0.205***
Social security	0.346	0.480	0.722	0.449	0.376***
Number of Observations	52		252		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table B3: First and current occupations and occupational mobility indicators for Returnees in the 1980s cohort, by educational attainment

	Returnees (less educated)		Returnees (more educated)		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
First job occupation in the 1980s					
Agriculture	0.385	0.491	0.159	0.366	-0.226***
Low-skilled blue collar	0.115	0.323	0.091	0.289	-0.024
High-skilled blue collar	0.365	0.486	0.302	0.460	-0.064
Low-skilled white collar	0.135	0.345	0.206	0.405	0.072
High-skilled white collar	0.000	0.000	0.242	0.429	0.242***
Current job occupation in 2010					
Agriculture	0.250	0.437	0.064	0.244	-0.187***
Low-skilled blue collar	0.269	0.448	0.103	0.305	-0.166***
High-skilled blue collar	0.250	0.437	0.075	0.265	-0.175***
Low-skilled white collar	0.096	0.298	0.123	0.329	0.027
High-skilled white collar	0.135	0.345	0.635	0.482	0.500***
Occupational mobility indicators					
Degree of mobility	0.346	1.235	0.881	1.497	0.535**
Upward mobility	0.269	0.448	0.504	0.501	0.235***
Downward mobility	0.135	0.345	0.103	0.305	-0.031
Immobility	0.596	0.495	0.393	0.489	-0.203***
Number of Observations	52		252		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table B4 : Controlling for initial GDP per capita in Egypt

	(1)	(2)	(3)	(4)
Panel A: 1980s cohort				
	Probit	IV-Probit	Linear Probability Model	IV-Regression
VARIABLES	Upward mobility	Upward mobility	Upward mobility	Upward mobility
Return migrant	0.187***	0.349***	0.167***	0.159***
	(0.043)	(0.119)	(0.036)	(0.037)
Observations	1,246	1,239	1,246	1,239
R-squared			0.264	
Panel B: 1990s cohort				
Return migrant	0.200***	0.470***	0.197***	0.153***
	(0.041)	(0.129)	(0.036)	(0.042)
Observations	2,270	2,263	2,270	2,263
R-squared			0.169	
Individual Controls	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Notes. Marginal effects are reported when using Probit and IV-Probit models and coefficient estimates are reported when using Linear Probability and IV-regression models. In addition to individual, household and first job characteristics, we also control for initial Egypt's GDP/capita (in current US dollars) at the time of migration for returnees and at first job for stayers to control for business cycles.

Table B5: Robustness checks, restricting the sample to wage workers for the 1980s cohort

	Wage workers at current occupation in 2010			Wage workers at first and current occupations		
	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	IV-Probit	IV-Regression	Probit	IV-Probit	IV-Regression
VARIABLES	Upward mobility	Upward mobility	Upward mobility	Upward mobility	Upward mobility	Upward mobility
Return migrant	0.090**	0.357**	0.093***	0.097***	0.399**	0.109***
	(0.040)	(0.149)	(0.034)	(0.037)	(0.159)	(0.036)
Observations	980	964	964	887	873	873
Individual Controls	YES	YES	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes. Marginal effects are reported when using Probit and IV-Probit models and coefficient estimates are reported when using IV-regression. As a robustness check, we restrict the sample to wage workers: at current occupation in 2010 in columns (1) to (3) and to wage workers both at first and current occupations in columns (4) to (6).

Table B6: Internal mobility matrices for Stayers versus Returnees in the 1980s cohort

	Current geographical region						
Geographical region in 1980	Cairo	Alexandria and Canal cities	Urban Lower Egypt	Urban Upper Egypt	Rural Lower Egypt	Rural Upper Egypt	Total (% of total)
Panel A: Stayers (N=956)							
Cairo	98.113	0.000	0.000	0.000	0.943	0.943	100.000 (11.088)
Alexandria and Canal Cities	0.981	99.020	0.000	0.000	0.000	0.000	100.000 (10.669)
Urban Lower Egypt	6.452	9.677	79.032	0.000	4.839	0.000	100.000 (12.971)
Urban Upper Egypt	11.053	1.579	0.526	83.158	0.526	3.158	100.000 (19.874)
Rural Lower Egypt	2.146	2.575	2.146	0.000	93.133	0.000	100.000 (24.372)
Rural Upper Egypt	0.498	2.488	0.000	5.473	0.498	91.045	100.000 (21.025)
Total	14.644	13.285	10.879	17.678	23.640	19.874	100.000
Panel B: Returnees (N=304)							
Cairo	94.737	0.000	0.000	5.263	0.000	0.000	100.000 (6.250)
Alexandria and Canal Cities	0.000	88.889	11.111	0.000	0.000	0.000	100.000 (2.961)
Urban Lower Egypt	5.556	11.111	81.481	0.000	1.852	0.000	100.000 (17.763)
Urban Upper Egypt	4.444	2.222	0.000	88.889	0.000	4.444	100.000 (14.803)
Rural Lower Egypt	0.000	2.632	1.754	0.000	95.614	0.000	100.000 (37.500)
Rural Upper Egypt	0.000	0.000	0.000	11.111	0.000	88.889	100.000 (20.724)
Total	7.566	5.921	15.461	15.789	36.184	19.079	100.000

Notes. The table represents internal mobility matrices between the geographical region in 1980 and the current geographical region. The internal mobility matrices are computed as % of the rows. The diagonal cells represent the percentage of individuals who stayed in the same geographical region between the two time periods. The cells above and below the diagonal represent the percentage of individuals who moved to a different geographical region compared to their geographical region in 1980.

Table B7: Descriptive statistics on the sample of Stayers versus Returnees in the 1990s cohort

	Stayers		Returnees		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
Individual characteristics					
Age in 1990	14.500	4.802	14.950	4.694	-0.446
Age at first job	19.650	3.748	19.590	3.325	0.060
Ever-married in 2010	0.890	0.313	0.955	0.209	-0.064***
No educational degree	0.089	0.285	0.055	0.228	0.034*
Primary or preparatory education	0.127	0.334	0.082	0.275	0.046**
Secondary education	0.506	0.500	0.655	0.477	-0.148***
Above secondary education	0.277	0.448	0.209	0.408	0.068**
Geographical region in 1990					
Cairo	0.093	0.290	0.055	0.228	0.038*
Alexandria and Canal cities	0.085	0.279	0.023	0.149	0.062**
Urban Lower Egypt	0.140	0.347	0.159	0.367	-0.019
Urban Upper Egypt	0.179	0.383	0.100	0.301	0.079***
Rural Lower Egypt	0.261	0.439	0.423	0.495	-0.162***
Rural Upper Egypt	0.243	0.429	0.241	0.429	0.002
Parental background - Mother's level of education					
Illiterate	0.786	0.410	0.873	0.334	-0.087***
Literate	0.094	0.292	0.064	0.245	0.030
Less than intermediate	0.067	0.249	0.023	0.149	0.044**
Intermediate and above	0.037	0.188	0.036	0.188	0.001
University and above	0.017	0.129	0.005	0.067	0.012
Parental background - Father's level of education					
Illiterate	0.511	0.500	0.536	0.500	-0.026
Literate	0.204	0.403	0.259	0.439	-0.055**
Less than intermediate	0.141	0.348	0.082	0.275	0.059**
Intermediate and above	0.092	0.290	0.073	0.260	0.020
University and above	0.052	0.222	0.050	0.218	0.016
Number of Observations	2,056		220		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 7: is t-test for whether the difference in means between the two groups is statistically significant.

Table B8: First and current job characteristics for Stayers and Returnees in the 1990s cohort

	Stayers		Returnees		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
First job characteristics in the 1990s					
Sector of employment					
Government	0.167	0.373	0.068	0.253	0.099***
Public Enterprises	0.031	0.172	0.018	0.134	0.012
Private	0.802	0.399	0.914	0.282	-0.112***
Economic activity					
Agriculture, Forestry, Fishing	0.193	0.394	0.218	0.414	-0.026
Manufacturing, Mining, Quarrying	0.159	0.366	0.100	0.301	0.059**
Construction	0.159	0.365	0.318	0.467	-0.160***
Wholesale, retail trade, transportation and other activities	0.280	0.449	0.250	0.434	0.030
Professional, scientific, technical and administrative activities	0.036	0.185	0.023	0.149	0.013
Other activities	0.175	0.380	0.091	0.288	0.084***
Incidence of work contract and social security					
Work contract	0.247	0.431	0.236	0.426	0.011
Indicator for missing work contract	0.330	0.470	0.277	0.449	0.052
Social security	0.259	0.438	0.105	0.307	0.154***
Current job characteristics in 2010					
Sector of employment					
Government	0.281	0.449	0.168	0.375	0.112***
Public Enterprises	0.058	0.234	0.023	0.149	0.035**
Private	0.661	0.473	0.809	0.394	-0.148***
Economic activity					
Agriculture, Forestry, Fishing	0.193	0.394	0.141	0.349	-0.036*
Manufacturing, Mining, Quarrying	0.159	0.366	0.091	0.288	0.084***
Construction	0.159	0.365	0.223	0.417	-0.096***
Wholesale, retail trade, transportation and other activities	0.280	0.449	0.300	0.459	-0.025
Professional, scientific, technical and administrative activities	0.036	0.185	0.041	0.199	-0.009
Other activities	0.175	0.380	0.205	0.404	0.082***
Incidence of work contract and social security					
Work contract	0.423	0.494	0.264	0.442	0.160***
Indicator for missing work contract	0.203	0.403	0.268	0.444	-0.065**
Social security	0.482	0.500	0.323	0.469	0.159***
Number of Observations	2,056		220		

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table B9: First, current occupations and occupational mobility indicators for Stayers and Returnees in the 1990s cohort

	Stayers		Returnees		
	(1)	(2)	(3	(4)	(5)
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Difference
First occupation in the 1990s					
Agriculture	0.183	0.387	0.209	0.408	-0.026
Low-skilled blue collar	0.160	0.366	0.109	0.312	0.050**
High-skilled blue collar	0.240	0.427	0.373	0.485	-0.132***
Low-skilled white collar	0.170	0.376	0.150	0.358	0.020
High-skilled white collar	0.247	0.431	0.159	0.367	0.088***
Current occupation in 2010					
Agriculture	0.099	0.298	0.136	0.344	-0.038*
Low-skilled blue collar	0.199	0.400	0.195	0.397	0.004
High-skilled blue collar	0.190	0.393	0.236	0.426	-0.046*
Low-skilled white collar	0.166	0.372	0.096	0.295	0.070***
High-skilled white collar	0.346	0.476	0.336	0.474	0.009
Occupational mobility indicators					
Degree of mobility	0.321	1.114	0.359	1.366	-0.038
Upward mobility	0.240	0.427	0.318	0.467	-0.078***
Downward mobility	0.090	0.286	0.091	0.288	-0.001
Immobility	0.670	0.470	0.455	0.499	0.217***
Number of observations	2,056			220	

*** p<0.01, ** p<0.05, * p<0.1

Notes. Column 5: is t-test for whether the difference in means between the two groups is statistically significant.

Table B10: Robustness checks, considering males aged 50 to 55 in 2010

	Linear Probability Model	IV-Regression
	(1)	(2)
VARIABLES	Upward mobility	Upward mobility
Return migrant	0.101**	0.099**
	(0.043)	(0.045)
Observations	500	478
R-squared	0.383	
Individual Controls	YES	YES
Household Controls	YES	YES
First job characteristics	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes. Coefficient estimates using a linear probability model and IV-regression. As a robustness check, we focused on workers aged 50 to 55 years old in 2010 and considered their mobility between the first occupation and their current occupation in 2010. We consider those aged at least 15 years old at first job. We control for all the variables at the year of first job.

Table B11: Robustness checks eliminating those who had high skilled white collar occupations at first job

	1980s cohort			1990s cohort		
	(1)	(2)	(3)	(4)	(5)	(6)
	Linear Probability Model	IV Regression	IV Probit	Linear Probability Model	IV Regression	IV Probit
VARIABLES	Upward mobility	Upward mobility	Upward mobility	Upward mobility	Upward mobility	Upward mobility
Return migrant	0.064*	0.092**	0.280**			
	(0.038)	(0.040)	(0.126)			
Return migrant				0.143***	0.106***	0.299**
				(0.037)	(0.040)	(0.119)
Observations	872	856	856	1,740	1,729	1,729
R-squared	0.214			0.143		
Individual Controls	YES	YES	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes. Coefficient estimates are reported using a linear probability model and IV-regression and marginal effects are reported using IV-Probit. As a robustness check, we eliminate men who had high skilled white collar occupations at first job for the 1980s cohort in columns (1) to (3) and for the 1990s cohort in columns (4) to (6), as they can't by definition move up the occupational ladder between their first job in the 1980s or the 1990s and their current job in 2010.

Table B12: Robustness to aggregating and disaggregating occupational categories

	Aggregating 3 occupational categories		Disaggregating 9 occupational categories			
VARIABLES	IV-Probit	IV-Regression	Probit	IV-Probit	Linear probability model	IV-Regression
Return migrant	0.286**	0.057*	0.131***	0.360***	0.118***	0.114***
	(0.135)	(0.029)	(0.037)	(0.112)	(0.033)	(0.034)
Observations	1,211	1,239	1,260	1,239	1,260	1,239
Individual Controls	YES	YES	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes. Marginal effects are reported when using Probit and IV-Probit models and coefficient estimates are reported using IV-regression. The dependent variable is a dummy variable for upward occupational mobility (equal one if the occupational ranking of the current occupation in 2010 is greater than the occupational ranking of the first occupation in the 1980s). As a robustness check, we aggregate the occupations into 3 occupational categories: agriculture, blue collar occupations and white collar occupations (ranked 1 to 3, respectively) and to disaggregate the occupations into 9 occupational categories corresponding to the ISCO-88 one digit occupations: skilled agricultural and fishery workers, elementary occupations, crafts and related trades workers, plant and machine operators and assemblers, service workers and shop and market sales workers, clerks, technicians and associate professionals, legislators, senior officials and managers, and professionals (ranked 1 to 9 respectively).

Table B13: Occupational rankings for the ISCO-88 1 digit occupations

Rank	Category name	Corresponding 5 categories	Index value	
			(1)	(2)
1	Skilled agricultural and fishery workers	Agriculture	0.054	-0.030
2	Elementary Occupations	Low skilled blue collar	0.059	-0.029
3	Crafts and related trades workers	High skilled blue collar	0.095	0.009
4	Plant and Machine Operators and assemblers	Low skilled blue collar	0.132	0.043
5	Service workers and shop and market sales workers	Low skilled white collar	0.217	0.138
6	Clerks	Low skilled white collar	0.287	0.210
7	Technicians and associate Professionals	High skilled white collar	0.303	0.227
8	Legislators, Senior Officials and managers	High skilled white collar	0.502	0.457
9	Professionals	High skilled white collar	0.521	0.482

Notes. To compute occupational indices, we regress the log of monthly wage on column (1) and the log of hourly wage in column (2), on the number of years of schooling and its squared term, the work experience and its squared term, controlling for marital status, geographical regions and the number of years in the current job and its squared term for our estimation sample of returnees. Occupational indices are computed as following: first we multiply the estimated coefficients on the number of years of schooling and its squared term and the number of years of work experience and its squared term, obtained from the wage regression, by the levels for each individual. Second, we sum the resulting products and they are averaged at the ISCO88 1-digit occupation to obtain our occupational rankings. Military occupations are eliminated.

Table B14: First stage regressions, clustering at the community level

Panel A: For the 1980s cohort			
	(1)	(2)	(3)
VARIABLES	Return migrant	Return migrant	Return migrant
Oil price at age 25	0.020***		
	[0.001]		
Oil price at age 26		0.022***	
		[0.001]	
Oil price at age 27			0.024***
			[0.001]
Observations	1,239	1,239	1,239
R-squared	0.832	0.831	0.868
Kleibergen-Paap rk Wald F statistic	167.466	162.978	165.333
Panel B: For the 1990s cohort			
Oil price at age 24	0.022***		
	[0.001]		
Oil price at age 25		0.019***	
		[0.001]	
Oil price at age 26			0.017***
			[0.001]
Observations	2,263	2,263	2,263
R-squared	0.837	0.794	0.787
Kleibergen-Paap rk Wald F statistic	120.353	116.472	117.182
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
First job characteristics	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses clustered at the community level.

*Notes.*Coefficient estimates for first stage IV-regressions for the 1980s cohort (Panel A) and for the 1990s cohort (Panel B). For the 1980s cohort, we use the historical inflation-adjusted oil prices when the individual was 26 years old, being the mean age at migration for our sample of Egyptian men. For robustness, we also tried to match the oil prices at age 25 and age 27. For the 1990s cohort, we use the historical inflation-adjusted oil prices when the individual was 25 years old, being the mean age at migration for our sample of Egyptian men. For robustness, we also tried to match the oil prices at age 24 and age 26.

Table B15: First stage regressions, clustering by year of birth

Panel A: For the 1980s cohort			
	(1)	(2)	(3)
VARIABLES	Return migrant	Return migrant	Return migrant
Oil price at age 25	0.020***		
	[0.002]		
Oil price at age 26		0.022***	
		[0.002]	
Oil price at age 27			0.024***
			[0.002]
Observations	1,239	1,239	1,239
R-squared	0.832	0.831	0.868
Kleibergen-Paap rk Wald F statistic	96.899	80.618	113.409
Panel B: For the 1990s cohort			
Oil price at age 24	0.022***		
	[0.002]		
Oil price at age 25		0.019***	
		[0.002]	
Oil price at age 26			0.017***
			[0.002]
Observations	2,263	2,263	2,263
R-squared	0.837	0.794	0.787
Kleibergen-Paap rk Wald F statistic	82.366	74.754	53.285
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
First job characteristics	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses clustered by year of birth.

*Notes.*Coefficient estimates for first stage IV-regressions for the 1980s cohort (Panel A) and for the 1990s cohort (Panel B). For the 1980s cohort, we use the historical inflation-adjusted oil prices when the individual was 26 years old, being the mean age at migration for our sample of Egyptian men. For robustness, we also tried to match the oil prices at age 25 and age 27. For the 1990s cohort, we use the historical inflation-adjusted oil prices when the individual was 25 years old, being the mean age at migration for our sample of Egyptian men. For robustness, we also tried to match the oil prices at age 24 and age 26.

Table B16: Robustness checks, Results using community level clustering and year of birth clustering

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1980s cohort				**1990s cohort**			
VARIABLES	Probit Upward mobility	IV-Probit Upward mobility	Linear Probability Model Upward mobility	IV-Regression Upward mobility	Probit Upward mobility	IV-Probit Upward mobility	Linear Probability Model Upward mobility	IV-Regression Upward mobility
Panel A: Community level clustering								
Return migrant	0.187***	0.575***	0.167***	0.159***	0.200***	0.470***	0.197***	0.153***
	(0.044)	(0.146)	(0.037)	(0.038)	(0.043)	(0.133)	(0.038)	(0.044)
Observations	1,246	1,239	1,246	1,239	2,270	2,263	2,270	2,263
R-squared			0.264				0.169	
Panel B: Year of birth clustering								
Return migrant	0.187***	0.575***	0.167***	0.159***	0.200***	0.470***	0.197***	0.153***
	(0.038)	(0.167)	(0.031)	(0.041)	(0.042)	(0.096)	(0.037)	(0.031)
Observations	1,246	1,239	1,246	1,239	2,270	2,263	2,270	2,263
R-squared			0.264				0.169	
Individual Controls	YES	YES	YES	YES	YES	YES	YES	YES
Household Controls	YES	YES	YES	YES	YES	YES	YES	YES
First job characteristics	YES	YES	YES	YES	YES	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses clustered at the community level (Panel A) and clustered by year of birth (Panel B).

Notes. Marginal effects are reported when using Probit and IV-Probit models and coefficient estimates are reported when using a linear probability and IV-regression models. In columns (1) to (4), results are reported for the 1980s cohort while in columns (5) to (8) results are reported for the 1990s cohort. In Panel A, we report results using community level clustering and in Panel B, standard errors are clustered by individual's year of birth.

Table B17: Robustness checks, using oil prices at age of migration for the 1980s cohort

VARIABLES	IV-Probit Upward mobility	IV-regression Upward mobility
Return migrant	0.366***	0.115***
	(0.118)	(0.037)
Observations	1,239	1,239
Individual Controls	YES	YES
Household Controls	YES	YES
First job characteristics	YES	YES

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Notes. Marginal effects are reported for IV-Probit model and coefficient estimates are reported for IV regression model. As a robustness check, instead of using oil prices when the individual is aged 26 years old (average age at migration for men in the 1980s estimation sample during the last migration episode), we match the oil prices using the year of the last migration episode.

5 Did the Egyptian protests lead to change? Evidence from Egypt's first free presidential elections

5.1 Introduction

Protesting has long been a mode of political action to express discontent with deteriorating political or economic conditions. The Arab Spring protests were people-led mass demonstrations that erupted in several countries in the Middle East and North Africa, where people were taking to the streets to protest against their longstanding authoritarian regimes. Inspired by the Tunisian revolution, the 25th of January 2011 marks the beginning of the Egyptian revolution. The spark that ignited the Egyptian protests was the death of a 28 years old man, called Khalid Said, after an encounter with the Egyptian police in Alexandria. The story of Khalid Said's murder rapidly spread all over blogs and social media, creating moral outrage that built up to trigger the 25th of January 2011 protests. After 18 days of protests that unfolded all over Egypt, and specifically in the famous *Tahrir,* Liberation, Square, Hosni Mubarak stepped down after 30 years in power.

The Supreme Council of the Armed Forces (SCAF) took power in Egypt after Mubarak's resignation, until elections could be held. Under this transitional phase, a constitutional review committee was formed and on the 19th of March 2011, a constitutional declaration was approved by referendum. A term limit for future presidents, separation of powers and call for judicial oversight of elections were the main constitutional amendments dictated by the transitional context. In May and June 2012 were held Egypt's first free presidential elections in two rounds, where thirteen candidates were qualified to contest the elections. During the second round, Mohamed Morsi, the Muslim brotherhood candidate and Ahmed Shafik, a former Prime minister under Mubarak, were competing for presidency, setting the stage for the division between Islamist and secular lines, as well as opposition versus support for the old regime elite. Mohamed Morsi, the Muslim brotherhood candidate, won Egypt's first free presidential elections with 51.7% of votes and became Egypt's first elected Islamist President.

The Egyptian revolutionaries' grievances were motivated primarily by economic reasons as well as, by political and civil freedoms. However, the question remains as to what extent the protests have brought about political change in Egypt. Although, the 2012 elections have been associated with the 2011 demonstrations, this paper examines the relationship between protests and political change in the context of the Arab Spring protests and particularly, in the context of Egypt. The existing literature on the causal effects of protests is very sparse. To my knowledge, very few studies have examined the relationship between protests, on the one hand and political change, on the other hand and in the context of the Arab Spring protests, there is no empirical work on the effects of protests on political outcomes. Hence, this paper attempts to fill this gap in the literature and to shed light on an important and yet understudied research question.

In this paper, I examine the effects of the first and second waves of Egyptian protests that started in 2011, on voting outcomes during Egypt's first free presidential elections. This setting allows testing the relationship between the 2011 protests and the subsequent 2012 presidential elections. Using unique information from the Statistical database of the Egyptian revolution, I geocoded the "martyrs" - demonstrators who died during the protests – based on the site of death and exploit the variation in the districts' exposure to the Egyptian protests. In fact, the number of fatalities during a demonstration is a function of two variables: the number of protesters and the type of revolutionary action undertaken by the protesters. A high number of fatalities is more likely to occur when storming a government building, while the latter revolutionary action is likely to happen only when a critical mass of revolutionaries is present at the demonstration. Hence, the number of "martyrs" is considered as a proxy for protests' intensity, as it is correlated with the number of protesters as well as, with a number of other measures of protests' intensity, such as the number of injured or arrested during the protests (El-Mallakh, Maurel and Speciale, 2017).

Why should we care about how the protests impact political change? It is important to understand if the recent waves of revolutions in the Arab World have been effective in bringing political change and more importantly, in achieving the economic, social and political demands of the masses. This paper is linked to the large body of literature on democracy, democratization in developing countries and economic performance (Rodrik and Wacziarg, 2005; Papaioannou and Siourounis, 2008, Rodrik, 1999; Barro, 1996; Tavares and Wacziarg, 2001) and to the literature on the quality of institutions and long-term economic performance (Acemoglu, Johnson and Robinson, 2001; Hall and Jones, 1999). Since political transition paths in the aftermath of revolutions are likely to shape economic policies as well as economic performance, understanding how revolutions are affecting voting outcomes is key to evaluate political transitions and subsequently, economic performance during transition.

The existing empirical literature on the causal effect of protests is very sparse. Exception is Collins and Margo's (2004) empirical work on the labor market effects of the riots following the assassination of Martin Luther King Junior. They use rainfall at the month of April 1968 as an instrument for riot severity and find that the late 1960s riots had lingering effects on the average local income and employment for African Americans up to twenty years later. Madestam, Shoag, Veuger and Yanagizawa-Drott (2013) also exploit variation in rainfall to investigate the impact of the Tea Party movement in the United-States on policy making and political behavior. Using rainfall on the day of these rallies as an exogenous source of variation in attendance, they find that the protests increased public support for Tea Party positions and led to more Republican votes in the 2010 midterm elections.

Using data on the Arab Spring in Egypt, Acemoglu, Hassan and Tahoun (2016) investigate the effects of the recent protests on stock market returns, for firms connected to three groups: elites associated with Mubarak's National Democratic Party (NDP), the military, and the Muslim Brotherhood. They construct a daily estimate of the number of protesters in Tahrir Square as measure of revolution intensity, using information from Egyptian and international print and online media.

Related literature on Egypt includes Elsayyad and Hanafy (2014) who study the main determinants of Islamist versus secular voting of Egypt's first parliamentary elections after the Arab Spring and find education to be negatively associated with Islamist voting and higher poverty levels to be associated with a lower Islamist vote share. Al Ississ and Atallah (2014) identify the relative impact of patronage versus ideology on voting behavior during Egypt's first presidential elections after the January 2011 revolution. They find a positive effect of patronage on voting for the status quo through the ability of the incumbent candidate to mobilize voters on elections' day.

This paper contributes to the literature on the effects of protests on political outcomes, namely on voting outcomes in Egypt's first presidential elections after the January 2011 uprisings. Understanding how protests influence electoral choices is key to evaluating the effectiveness of such modes of political action. Two possible scenarios come to mind: protests could contribute to politicize people who were previously not politically active; but protests could also lead to a conservative backlash among those segments of the population that fear radical political change. Using official elections' results collected from the Supreme Presidential Electoral Commission (SPEC), I examine the effects of exposure to varying-levels of protests intensity on districts' voting behavior.

A key empirical challenge in estimating the effects of the 2011 protests on districts' voting outcomes, is that unobservable characteristics might simultaneously affect the district's voting behavior, as well as the district-level measure of protests' intensity. I address this empirical challenge by using Census data, from Egypt Population, Housing and Establishments Census 2006, to control for a wide-range of pre-revolution district characteristics including demographic, labor market, education, poverty and telecommunications controls and governorate fixed effects to capture all governorate level time-invariant characteristics. Controlling for districts' characteristics using Census data, I find suggestive evidence that higher exposure to protests' intensity leads to a higher share of votes for former regime candidates, both during the first and second rounds of Egypt's first presidential elections. The results are robust to various sensitivity checks, including sensitivity to covariates' inclusion, flexible covariates specification, to outliers' exclusion, correction for spatial dependence and potential spillovers between districts.

Relying on pooled cross-sectional data from two survey rounds of the Arab Barometer conducted in Egypt, the first being conducted in 2011 immediately after Mubarak's resignation while the second about two years later in early 2013, I examine the effects of the protests on individuals' political values and attitudes, perceptions of democracy and civil liberties, and evaluation of government performance. I find that the protests had affected negatively the popular mood in Egypt over the course of these two years through several channels: negative economic expectations, general dissatisfaction with the government and its performance managing the democratic transition, creating employment opportunities and improving health services, decreasing levels of trust towards public institutions including the police, the army and religious leaders, as well as increasing recognition of limitations on civil and political liberties. From the period of euphoria following the toppling of Mubarak to the

sobering realities of the political transition process in 2013, the evidence suggests that a wave of pessimism and general dissatisfaction overtook the popular mood in Egypt.

The remainder of this paper is organized as follows. Section 5.2 provides background information on the 2011 Egyptian protests and the subsequent presidential elections. Section 5.3 presents the data. Section 5.4 describes the empirical strategy. Section 5.5 presents the results as well as robustness and identification checks. Section 5.6 briefly concludes.

5.2 Background information: Egyptian protests and the first presidential elections

The first wave of the Egyptian revolution began on the 25th of January 2011. Hundreds of thousands of Egyptians rallied against Mubarak's government. This people-led mass protest gathered Egyptians from different ideological and social backgrounds in one of the biggest revolutionary movements in recent years.

The Egyptian revolution was positioned among a series of Arab Spring uprisings that started in Tunisia. These waves of demonstrations spread rapidly throughout the region, in several countries in the Arab World as protesters were taking to the streets to protest against their respective authoritarian regimes. A few weeks of mass demonstrations ultimately forced longtime President Ben Ali in Tunisia and Mubarak in Egypt to resign from office. Several Arab countries - Jordan, Bahrain, Libya, Syria, Iraq, Lebanon, Morocco and Saudi Arabia - have witnessed similar series of revolutionary movements, inspired by the Egyptian and Tunisian protests.

In the immediate aftermath of Mubarak's resignation, the Supreme Council of the Armed Forces (SCAF) took power in Egypt until Egypt's presidential elections were held in two rounds in May and June 2012. Twenty-three candidates submitted nomination papers to be listed on the ballot. The Supreme Presidential Electoral Commission (SPEC) dismissed the candidacies of ten presidential hopefuls on legal grounds, leaving only thirteen candidates to run for the presidency. These thirteen candidates were ideologically very diverse, along Islamist versus secular lines but also the pro-change versus old regime axis. In the first round, with a voter turnout of 46%, Mohamed Morsi, the Muslim brotherhood candidate and Ahmed Shafik, a former prime minister under Mubarak, won the majority of votes to compete in the second round of the elections. The second round elections set the stage to the two clear divisions that were to follow, along secular and Islamist lines and those supporting and those opposed to the former regime elite. Morsi won his opponent by a small margin 51.7% versus 48.3%.

5.3 Data

5.3.1 The statistical database of the Egyptian Revolution

This paper takes advantage of a unique dataset: the Statistical database of the Egyptian Revolution, administered by the Egyptian Center for Economic and Social rights.[81] Fatalities, injuries and arrests are all documented during the period of the Egyptian revolution as a result of political and social changes. The data is collected during the first eighteen days of the protests (from the 25th of January 2011 to the 11th of February 2011), during the rule of the Supreme Council of the Armed Forces (SCAF) (from the 11th of February 2011 to June 2012), during former president Mohamed Morsi's rule (from July 2012 until June 2013) and, lastly, most recent data cover the period from July 2013 to May 2014. These individual level data were collected on a daily basis. They document the names of the "martyrs" *i.e.* demonstrators who died during the protests, the injured and the arrested, their place of residence, occupation, marital status, date of birth, the type and the classification of incident leading to the death, injury or arrest, the date of the incident, the governorate where the incident took place, the site and the cause of death, as well as other relevant data for documentation purposes.[82]

The Statistical Database of the Egyptian Revolution locates the "martyrs" in each of the 27 governorates. Based on the site of death, I geocoded the "martyrs" and further localized each at the *district level* to build a rather disaggregated measure of protests' intensity. I utilized information from the first and second waves of the protests, namely the first eighteen days of the 2011 protests and the second wave of protests until June 2012, under the Supreme Council of Armed Forces rule, to match it with the elections results data that took place between May and June 2012.

Using information from the Statistical Database of the Egyptian Revolution, all locations in Egypt where fatalities occurred during the protests are pinpointed in Figure 5.1. Each circle represents one death location, which could correspond to one death incidence or many death incidences. Death locations are identified in each of the Egyptian governorates: ranging from one death location in Luxor to 91 different death locations in Cairo. As I identify each site of death by its GPS coordinates, I use this disaggregated information to build a proxy of protests' intensity measure as the district-level number of fatalities per district's inhabitants.

In Figure 5.2, I present a closer view of Cairo and its neighboring districts to give a glance of the level of disaggregation of the data. In this figure, locations are differentiated by color, according to the number of deaths that occurred in each. Cairo's Tahrir Square, located in *Qism Kasr el-Nil* was the epicenter of the demonstrations and is represented by the large blue dot as the location with the highest number of death incidences during the uprisings, 109

[81] The Egyptian center for Economic and Social Rights is a non-governmental organization that carries out research and advocacy projects on economic, social and cultural rights in several countries in the world, in collaboration with local human rights advocates and activists.
[82] See Section 3.3.1 for a detailed discussion of the Statistical Database of the Egyptian revolution and the geocoding.

deaths. The second biggest deadly site is represented by the green dot in Figure 5.2, where 52 deaths were geocoded in Mohamed Mahmoud Street, located in *Qism Abdeen*. This is known as "Mohamed Mahmoud clashes" in media coverage and corresponds to deadly street clashes between protesters and the Central Security Forces (CSF). These clashes lasted for 5 days from the 19th of November to the 24th of November 2011 as protests took place in response to a Central Security Forces' attack on a sit-in in Tahrir Square (Le Monde, 2011).

Other identified death locations in the surroundings of Tahrir Square include the Maspero Television Building neighborhood, located in *Qism Bulaq* where 30 deaths were localized. This is represented by the light green dot close to Tahrir Square, in Figure 5.2. Clashes broke out between a group of protesters mainly composed by Egyptian Copts and security forces as they were protesting against the demolition of a Coptic church in Upper Egypt (BBC, 2011a).

In *Qism Sayyidah Zaynab*, 25 fatalities were geocoded in the neighborhood of the Ministers' Cabinet. In Figure 5.2, the Ministers' Cabinet is represented by the yellow dot close to Tahrir Square. Protests spread from Tahrir Square to reach the headquarters of the Ministers' Cabinet and clashes with the security forces occurred, as the demonstrators were protesting against the appointment of Kamal Ganzouri by the military, a former Prime Minister under Mubarak (BBC, 2011b).

In Figure 5.3, I present a histogram showing the number of "martyrs" per districts. Out of the 349 districts in the empirical analysis, 156 districts are untreated. The number of "martyrs" per district varies between 1 and 122 fatalities per district. 69 districts had one "martyr" and 27 districts had 2 "martyrs." Districts with a number of "martyrs" higher than 2 are almost equally distributed over three intervals: those who have a number of "martyrs" equal 3 or 4, those with a number of "martyrs" between 5 and 12 and those with a number of "martyrs" between 13 and 122.

5.3.2 Elections data

Official elections results are collected from the Supreme Presidential Electoral Commission website for the first and second rounds of the 2012 Egyptian elections. The results of the first round are available at the district level, while the second round's results are available at the polling station level that I aggregate to same level of aggregation, the district level.

We focus on the total number of registered voters, the total valid votes, the total invalid votes and the votes accrued by each candidate during the first and second rounds. For the first round of the 2012 Egypt presidential elections, there were 13 candidates and I classified candidates as either independent, former regime or Islamist candidates. Independent candidates include: Hamdeen Sabahi, Khaled Ali, Hisham Bastawisy, Abu Al-Izz Al-Hariri and Mahmoud Houssam. Former regime candidates include: Mohamed Fawzi, Amr Moussa, Ahmed Shafik, Houssam Khairallah and Abdullah Alashaal. Islamists candidates include: Mohamed Morsi, Abdel Moneim Aboul Fotouh and Mohammad Salim Al-Awa. For the second round of the

2012 presidential elections, Mohamed Morsi, the Muslim Brotherhood candidate was competing against Ahmed Shafik, the former Prime minister under Mubarak. The votes are expressed in terms of shares: the valid votes accrued by each divided by the total valid votes. I also focused on the voter turnout rates in both rounds, computed as the share of valid and invalid votes, to the total number of district's registered voters and on the share of spoilt votes, computed as the ratio between the number of invalid votes and the total number of the district's registered voters.

In Table 5.1, district-level summary statistics for elections outcomes, are summarized by exposure to protests' intensity. Districts are divided into below and above median exposure to violent protests, according to the number of "martyrs" per district number of inhabitants. The median number of martyrs per 1000 inhabitants is equal to 0.003. Districts where the demonstrations were more intense had a significantly higher voter turnout rates in both the first and second rounds of the 2012 presidential elections by about 6% and 4%, respectively. During the first round, districts that were exposed to higher protests' intensity exhibited a statistically significant higher share of votes for independent candidates and significantly lower share of votes for the Islamist candidates. As for the second round, districts belonging to the above median exposure to protests' intensity category were more likely to vote for Ahmed Shafik, the former regime candidate to the detriment of Mohamed Morsi, the Muslim brotherhood candidate, however, the difference is not statistically significant. Although during the second round the voter turnout rate was still significantly higher among districts where the protests were the most intense, voter turnout from the first to the second rounds increased more in districts exposed to below median protests' intensity compared to districts exposed to above median protests' intensity: by 13% versus 5%, respectively. The difference in voter turnout rates between the two groups was thus narrower in the second round. Additionally, the share of spoilt votes drastically increased between the two rounds in districts exposed to below and above median protests intensity by 75% and 171%, respectively. The increase being greater in districts where the protests were the most intense could be interpreted as intentional spoiling, as voters were intentionally expressing their disapproval against the two candidates standing in the elections, Mohamed Morsi and Ahmed Shafik, by invalidating their votes.

5.3.3 Census data

Egypt Population, Housing and Establishments Census 2006 is the most recent Census available in Egypt. It is conducted by the Central Agency for Public Mobilization and Statistics (CAPMAS), Egypt's statistical agency. I derive a wide-range set of covariates from the 2006 Census data to control for potential confounding factors that might simultaneously affect the protests' intensity and electoral outcomes at the district level, including demographic, labor market, poverty, education, and telecommunications controls, presented in details in Section 5.4.

In Table 5.2, all pre-revolution district covariates are summarized by districts' exposure to protests' intensity. Districts are split into below and above median number of "martyrs" per district's number of inhabitants. Districts that were exposed to higher protests' intensity are found to have a higher population and population density. They are also found to have a higher share of adult population aged 36 years old and above by about 3%, compared to districts that were exposed to below median protests' intensity. In terms of the share of immigrants and emigrants, there isn't any significant difference between districts that were exposed to below and above median protests' intensity. However, the share of Christians among total population is significantly more important in districts that were exposed to higher protests' intensity, by about 2%. Apart from the above-mentioned demographic characteristics, districts that were exposed to higher protests' intensity have also a 5% higher share of public sector employment, a 1% higher unemployment rate and 3% higher female labor force participation. As proxies for poverty, districts that were exposed to higher protests intensity don't exhibit any statistically significant difference in the share of households having electricity access. However, they have a smaller share of households who aren't connected to sewage disposal system. In terms of education, the incidence of university education is significantly higher in districts that were exposed to the most intense protests and reciprocally the illiteracy rate is also significantly lower in the latter group. As telecommunication infrastructure played a crucial role in mobilizing the protestors during the revolution, districts exposed to higher protests intensity have also significantly higher shares of households with Internet access and computer availability, however, they have a lower share of households with cell-phone availability compared to districts that were exposed to below median protests intensity. In the regression specification, I control for all these pre-revolution district's covariates to purge any pre-existing differences between districts that are exposed to varying levels of protests' intensity in order to be able to test the effects of the protests on the subsequent 2012 presidential elections.

5.3.4 Arab Barometer

I also make use of the two available Arab Barometer surveys conducted in Egypt to study the effects of the protests on individuals' political attitudes, conceptions about changes and reforms, government's performance and trust in political institutions. The first wave was fielded between June 16 and July 3, 2011 and the second wave was fielded between March 31 and April 7, 2013. The Arab barometer is carried out in Egypt in cooperation with the Ahram Center for Strategic Studies. Using a national probability sample design, face-to-face interviews are conducted in Arabic to a sample of adults aged 18 years old and above, in Egyptian governorates. The Arab Barometer seeks to measure citizen attitudes and values with respect to freedoms, trust in government's institutions and agencies, political identities, conceptions of governance and democracy, civic engagement and political participation.

5.4 Empirical strategy and regression specification

5.4.1 The effects of the protests on voting outcomes

Using official elections results collected from the SPEC and data on the "martyrs" from the Statistical database of the Egyptian Revolution, I examine the effects of the protests on districts' voting behavior, while controlling for a wide-range of districts' characteristics, derived from the Egypt Population, Housing and Establishments Census 2006. Explicitly, I exploit the variation in the districts' exposure to the Egyptian protests and examine the extent to which the latter had affected the subsequent elections, namely the Egypt's first presidential elections, using equation (5.1):

$$Y_d = \alpha_0 + \alpha_1 martyrs_d + \alpha_2 Z_d + \beta_g + \varepsilon_d \qquad (5.1)$$

Y_d are the different voting outcomes. For the first round of the presidential elections, candidates are classified as independent, former regime or Islamist candidates.[83] The dependent variables are the district-level share of votes cast to the different groups of candidates, expressed in % of the district's number of valid votes. For the second round of the presidential elections, the dependent variables are the shares of votes cast to either the Islamist candidate, Mohamed Morsi or the former regime candidate, Ahmed Shafik, also expressed in % of the district's number of valid votes. Along with the shares of votes, voting outcomes also include the voter turnout rate and the share of spoilt votes for the first and second rounds of the presidential elections. The voter turnout is equal to the total number of votes (valid and invalid votes) divided by the number of registered voters per district and the share of spoilt votes is equal to the number of invalid votes divided by the number of registered voters per district. $martyrs_d$ is the main variable of interest and is equal to the district-level number of "martyrs," expressed in % of a district's population and it captures the districts' differential exposure to protests intensity. Z_d is a vector of pre-determined district covariates derived from the Egypt Population, Housing and Establishments Census 2006. It includes a wide range of covariates to control for demographic, education, poverty, labor market characteristics and telecommunication access. Demographic controls include: the logarithm of a district's population size, the logarithm of population density (number of inhabitants/km^2), the share of a district's population aged less than 36 years old, the share of a district's population aged more than 35 years old, the share of immigrants to district's population, the share of emigrants to district's population (those with overseas migration experience), the share of Muslims to district's population and the share of Christians to district's population. Labor market controls include the share of public sector employment, the unemployment rate and female labor force participation. Poverty measures include the share of households with electricity access and the share of households not connected to sewage disposal system.

[83] For the first round of presidential elections, candidates are classified as independent, former regime or islamist candidates. Independent candidates include: Hamdeen Sabahi, Khaled Ali, Hisham Bastawisy, Abu Al-Izz Al-Hariri and Mahmoud Houssam. Former regime candidates include: Mohamed Fawzi, Amr Moussa, Ahmed Shafik, Houssam Khairallah and Abdullah Alashaal. Islamists candidates include: Mohamed Morsi, Abdel Moneim Aboul Fotouh and Mohammad Salim Al-Awa.

Educational controls include the share of a district's population above 10 years of age with university education and the share of illiterates in the district's population aged 10 years and above. Telecommunications controls include the share of households with internet access, the share of households with computer availability and the share of households with cell phone availability, in percent. β_g are the governorate fixed effects. Standard errors are clustered at the governorate level to allow for arbitrary within-governorate correlation.[84]

It is important to note that there is no information on wages or household income in the Census data. However, the two poverty proxies vary within urban districts and even within Cairo itself and particularly, the share of households not connected to sewage disposal system is a variable with significant variation. The share of households with electricity access within urban districts varies between 53% and 100%. Districts that belong to the lowest 1% in terms of electricity access have only 53% of the households with electricity access. Districts that belong to the lowest 5%, 10% in terms of electricity access have 93% and 98% of the households with electricity access. As for the share of households not connected to sewage disposal system, it ranges between 0.1% and 97% within urban districts. While on average the share of households in urban districts with electricity access is 98% (standard deviation is equal to 0.056), the mean percentage of household not connected to sewage disposal system is equal to 24% and with higher variance (standard deviation is equal to 0.337). Districts that belong to the highest 10%, 25% of the distribution have 93% and 46% of households not connected to a sewage disposal system, respectively. Even within Cairo, the majority of the districts have almost 100% of households with electricity access (although districts that belong to lowest 1% of the distribution have only 98% of households with electricity access). However, in terms of connection to sewage disposal system, even within Cairo, there is significant variation. The share of households not connected to sewage disposal system within Cairo ranges between 0.1% and 16%.

5.4.2 The effects of the protests on political attitudes

To test how the protests influenced popular expectations between the two Arab Barometer survey rounds, the first being conducted immediately after Mubarak stepped down and the second two years later, I use equation (5.2) relying on the pooled cross-sectional Arab Barometer:

$$Outcome_{igt} = \beta_0 + \beta_1 martyrs_g + \beta_2 2013_t + \beta_3 martyrs_g \times 2013_t + \beta_4 X_{igt} + \beta_5 X_{igt} \times 2013_t + \varepsilon_{igt} \quad (5.2)$$

[84] A possible omitted variable is "the geography of the former regime." This is indeed problematic as the distribution of political protests could have matched the distribution of the former regime support. I am currently working on coding a list of 6,000 prominent NDP members posted online by activists in the aftermath of Mubarak's resignation to have a measure of former regime geography at the district level. This list was created as part of a campaign, "Emsek Felool" ("to catch remnants" of the old regime), to publicly identify the cronies of the old regime and is no longer publicly available. The author is grateful to Ahmed Tahoun for sharing the data.

$Outcome_{igt}$ are dummy variables for several outcomes reflecting political attitudes, $martyrs_g$ is the governorate level number of "martyrs" per 1000 inhabitants[85], 2013_t is a dummy variable indicator equal one for the year 2013 and zero for the year 2011. X_{igt} is a vector of individual control variables and it includes a dummy for rural residence, four dummies for educational attainment (no educational degree whether illiterate or literate, a dummy for primary or preparatory education, a dummy for secondary education and a dummy for above secondary education), a dummy for being married, a dummy for being Muslim, five dummies for individual's working status (working, unemployed, retired, housewife, student), two dummy indicators to proxy wealth: a dummy for owned house and a dummy for individuals reporting that their household income does not cover their expenses and they face either some difficulties in meeting their needs or significant difficulties in meeting their needs. Regressions also include the interaction between individual level controls and the year dummy to account for time-varying effects of the individual level controls. The main variable of interest is thus the interaction term between $martyrs_g$ and the year dummy 2013_t, it captures the effects of the protests on individuals' political attitudes from the period immediately after Mubarak's resignation to the post revolution phase.

5.5 Results and robustness checks

5.5.1 Did the protests lead to change?

Early evidence provided in Table 5.3 that features the shares of votes for the former regime candidates for districts belonging to the highest decile in terms of protests intensity, as measured by the number of "martyrs" per 1000 inhabitants suggests that these districts exhibited higher than average shares of votes for the former regime figures, both during the first and second rounds of the 2012 presidential elections. While the average shares of votes for former regime candidates in the first and second rounds for the full sample are 34% and 46%, respectively, for districts belonging to the highest decile of protests intensity, the average shares of votes for former regime candidates are found to 39% and 57% respectively. Interestingly, the district *Kasr Al-Nil* in Cairo, where Tahrir Square is located, with the highest share of fatalities to population size and with the highest absolute number of fatalities geocoded, the shares of votes for the former regime candidates goes to 57% in the first round and 75% in the second round. Similarly, *Abdeen* located in Cairo and very close to Tahrir Square, the second highest in terms of fatalities to district's population, exhibits very high shares of votes for former regime figures both during the first and second rounds of elections, 43% and 66% respectively.

I turn to test formally the effects of the protests on districts' voting. Table 5.4 presents the district level estimates of the effect of the protests on voting outcomes, for the first round of

[85] The Arab Barometer in Egypt is stratified by governorate and further stratified by urban/rural and interviews were conducted proportional to population size. Districts of residence are not identified in the Arab Barometer.

the Egyptian presidential elections, while controlling for governorate time-invariant characteristics and district-level predetermined covariates derived from the 2006 Egypt Census. Results suggest that an increase in the share of "martyrs" to a district's population significantly increases the share of votes cast to former regime candidates and significantly decreases the share of votes for Islamist candidates during the first round, while not significantly affecting the share of votes for independent candidates. One percentage point increase in the share of "martyrs" to a district's population increases the share of votes cast to former regime candidates by about 11 percentage points while decreasing the share of votes cast for Islamist candidates by around 9 percentage points. Evaluating the effects using a standard deviation increase in the share of "martyrs," 0.1 percentage point, leads to an increase in the share of votes to former regime candidates by 1.1 percentage points and a decrease in the share of votes for Islamist candidates by 0.9 percentage point or approximately, an increase of 3% and 2% from a sample mean of 0.345 and 0.453, respectively.[86] These results are substantial, knowing that a district like *Kasr Al-Nil* in Cairo had a share of "martyrs" of 1%, as 122 deaths were geocoded in this neighborhood. *Abdeen* in Cairo also witnessed a share of "martyrs" of 0.2%, as 92 fatalities were also localized. *Al-Manshiyah* in Alexandria and *Bur Fuad 1* in Port-Said had each a share of "martyrs" of 0.1%, as 28 and 73 fatalities were geocoded in these districts, respectively. Unsurprisingly, a higher district-level share of Christians led to a significantly higher share of votes for former regime candidates at the expense of the independent candidates.

When facing a dichotomous choice of voting to either an Islamist candidate, Mohamed Morsi or a former regime candidate, Ahmed Shafik, during the second round of the elections, districts that were exposed to a higher protests' intensity also had a higher share of votes for Ahmed Shafik. In Table 5.5, regression results are reported for the second round of presidential elections. An increase in the share of "martyrs" by 0.1 percentage point leads to an increase in the share of votes for Ahmed Shafik, by 0.9 percentage point, equivalent to an increase of 2% from a sample mean of 0.464. Interestingly, when confronted to a former regime candidate and an Islamist candidate during the second round, a higher share of "martyrs" also significantly increased the share of spoilt or invalid votes, which could be intentional spoiling. This is in line with the descriptive statistics provided in Section 5.3.2. The voters are intentionally expressing their protest or disapproval against the candidates standing in the elections, by invalidating their votes. An increase in the share of "martyrs" by 0.1 percentage point leads to an increase in the share of spoilt votes by 0.05 percentage point, approximately a 3% increase from a sample mean of 0.017. It is also important to note the substantial increase in the share of spoilt votes between the first and the second rounds of the elections as presented in Table 5.1: the share of spoilt votes increased by 75%, from 0.8% during the first round to 1.4% in the second round for districts exposed to below median protests' intensity and by even, 171% from 0.7% in the first round to 1.9% in the second round in districts exposed to the most intense protests. This suggests more than an accidental spoilt voting.

[86] In Table C7 in the Appendix, I examine the effects of exposure to protests' intensity on the distribution of votes among the Islamist candidates in the first round. Results suggest that the protests have significantly reduced the share of votes cast for both Abdel Monein Aboul Fotouh and Mohamed Morsi, while it didn't significantly affect the share of votes for Mohamed Salim Al-Awa (who only had 1% of the total votes in the first round).

In Table 5.7, I investigate the non-linear relationship between the exposure to protests' intensity and elections' outcomes. The "martyrs" variable in Table 5.7 being standardized, a standard deviation increase in the number of "martyrs" increases the share of votes for former regime candidates by 11% from a sample mean of 0.345, by reducing the shares of votes for both the independent and Islamist candidates in the first round. In the second round, an increase in the share of "martyrs" by one standard deviation, reduces the share of votes for the Islamist candidate Mohamed Morsi (in favor of the former regime candidate, Ahmed Shafik), by 7% from a sample mean of 0.537. In line with previous findings, I also find suggestive evidence that the protests have significantly increased the share of spoilt or invalid votes during the second round by 12%, evaluated at sample mean. Interestingly, the results also suggest that there is a non-linear relationship between exposure to protests' intensity and voting outcomes in the 2012 Egypt's elections. As the number of "martyrs" increases beyond a certain threshold, the share of votes for the former regime candidates declines in favor of the independent candidates in the first round and in favor of the Islamist candidate Mohamed Morsi in the second round. The turning point is found to be approximately 10 "martyrs" per 1000 inhabitants.[87]

5.5.2 Robustness checks

Before digging into the mechanisms driving the results, a bunch of robustness checks were performed. First, I checked the robustness of the main findings with respect to the covariates included in the regression specification. In Table 5.8 and Table 5.9, I present the results for the first and second rounds of the presidential elections respectively, including the pre-revolution district covariates gradually, one set of covariates at a time and including all the covariates simultaneously as in our preferred specification summarized in Table 5.6.

As presented earlier, all the covariates are derived from Egypt Population, Housing and Establishments Census 2006 and all the regressions include governorate fixed effects to capture any time-invariant differences between the Egyptian governorates and standard errors are also clustered at the same geographical level. In specification (1), I only include demographic controls. In specification (2), educational control variables are additionally included, along with the demographic controls. In specification (3), regressions also include a set of poverty measures, in addition to all the control variables included in (2). In specification (4), I additionally include a set of labor market controls, along with the previously included controls: demographic, educational, poverty controls. Specification (5) is our benchmark specification that includes a full-set of pre-determined districts' controls: demographic, educational, poverty, labor market and telecommunication controls. Our results are

[87] The turning point is equal to (the linear term/2*the squared term)*(-1)= 9.75 in column (2) and 9 in column (4). Given that this is a standardized variable and that the standard deviation is equal to 0.001. Based on a turning point of 9.75, the non-standardized number of martyrs per district's population is equal to approximately 0.010 (10 per 1000 inhabitants).

consistently robust to the different regression specifications, for both the first and second rounds of presidential elections. The magnitude of the coefficients is also very stable.[88]

Second, I checked the robustness of the findings to scaling in logarithm the main variable of interest, martyrs as a % of population in Table 5.10, Panel A. In line with the benchmark specification, a higher share of martyrs to a district's population significantly increased the share of votes for former regime candidates during the first and second rounds of the presidential elections at the expense of the Islamist candidates. Simultaneously, a higher share of "martyrs" significantly increased the share of spoilt votes during the second round, when confronted to either voting for a former regime or an Islamist candidate.

Additional robustness checks were performed to make sure that outliers in terms of population density do not drive my results. In Table 5.11, we eliminate outliers in terms of population density, by dropping districts that belong to either the 1st decile of population density (Panel A) or those that belong to the 10th decile of population density (Panel B) or by eliminating simultaneously districts that belong to the lowest or the highest deciles in population density (Panel C). Coefficient estimates remain very stable in magnitude and the main findings highlighted earlier remain unchanged with respect to the different checks.

In Table 5.10, Panel B, I also checked the robustness of the results to the elimination of the five frontier governorates: Red Sea, New Valley, Matruh, North Sinai and South Sinai. According to Minnesota Population Center (2015), in 2006 no more than 2% of the Egyptian population lived in these border governorates. The main findings of the paper are also robust to eliminating these five frontier governorates.

To check the robustness of the findings with respect to spatial correlation, following Conley (1999), standard errors corrected for spatial dependence are reported in Table C1 in the Appendix. This technique allows for spatial dependence in each spatial dimension (longitude and latitude) to decline in distance between districts' centroids and is equal to zero beyond a maximum distance. Several maximum distances were used for computing the standard errors (the greater the maximum distance, the lower the standard errors). Given the geographical extension of the Egyptian territory, the maximum cutoff points used are 1, 3, 5 and 7 degrees. Standard errors are found to be even lower than the governorate-level clustered standard errors and the results are robust to assuming spatial correlation between districts centroids that declines in distance and is equal zero beyond these cutoff thresholds.

To account for potential spillover between Egyptian districts, as a robustness check, each district is attributed the number of "martyrs" in that district as well as the number of fatalities that occurred in its neighboring districts, sharing a common border in Table C2 in the Appendix. The main variable of interest thus becomes the number of martyrs in a specific district and in the neighboring ones normalized by districts' population. Results are also robust to accounting for spillover effects between districts.

[88] Results were also robust to using a flexible covariates specification following Madestam, Shoag, Veuger and Yanagizawa-Droit (2013), where for each covariate is split into its 9 decile dummies according to the covariate's distribution (one decile being the reference category).

Finally in Table C3 in the Appendix, I also proceed by eliminating one governorate at a time in order to ensure that my results are not driven by a particular governorate. The results remain robust in terms of both significance and magnitude, with respect to these additional checks. [89] In Table C6 in the Appendix, I also report results for Cairo only. In line with the main findings in Section 5.5.1, we find that a higher exposure to protests' intensity leads to a higher share of votes for former regime candidates both during the first and second rounds and also to a significant increase in the share of spoilt votes. Contrasting results on Cairo versus all the other governorates (Table C3, second row), the magnitude of the estimated coefficients for Cairo is greater in terms of magnitude compared to the other governorates. Evaluating the effects in Cairo at sample means, a standard deviation increase in the share of "martyrs" leads to an increase in the share of votes for former regime candidates in the first round by 3.6% and a reduction in the share of votes for Mohamed Morsi (in favor of Ahmed Shafik, the former regime candidate) by 3.3% as well as an increase in the share of spoilt votes in the second round by 4.6%. [90]

With respect to the empirical strategy, I also estimated a conditional mixed process model following Roodman (2011) that fits a simultaneous equation model and allows the error terms of the interrelated equations to be correlated through a multidimensional distribution. In Table C4 in the Appendix, for the first round, I estimated simultaneously the share of votes for independent candidates, former candidates and the share of spoilt votes and for the second round, the share of votes for the former candidate and the share of spoilt votes were estimated simultaneously. Taking into account the potential correlation between the errors terms of the separate equations, results are robust and are in line with the main findings described in Section 5.5.1.[91]

In Table C5 in the Appendix, I opt for a different identification strategy through internal migrants. In the Census data, data is available on the current district of residence of an individual as well as his governorate of birth. Hence, one can easily compute the share of internal migrants in a particular district as the share of individuals who were born in a governorate to which the current district of residence does not belong. The idea here is that internal migrants can spread information from parents and friends living in their governorate of origin. Hence, one can compute the intensity of the protests in a particular district as the weighted average of protests' intensity of internal migrants' governorate of origin. As long as the distribution of internal migrants in one district is orthogonal to district-level

[89] It is important to note that when eliminating the Matruh governorate, this results in substantial changes in the estimated coefficients (a substantial increase in the share of votes for the former regime candidates in the first and second rounds). This is because Matruh governorate is the greatest supporter for the Muslim brotherhood and Islamist candidates, in the first round the share of votes for the Islamist candidates was to 82% and in the second round, 88% (highest rates among all governorates).

[90] In unreported regressions, I have also examined the heterogeneity of the effects in urban versus rural districts. Results are significant only for urban districts. However, the insignificant results for rural districts are not due to differential treatment effects but because there is not enough variability in the rural sample (the intensity of the protests as measured by the number of "martyrs" in rural areas is almost zero as well as its standard deviation).

[91] In this setting, I am also able to test for cross-equation restrictions; I test whether the variables "martyrs" across all equations (within the two models) are jointly significant. Indeed the "martyrs" variables are jointly significant in Panels A and B.

unobservables, one could rely on this variable to achieve identification. [92] I report results in Table C5 in the Appendix, I find indeed that the sign of the estimated coefficients are the same however, the results are not significant suggesting that the distribution of votes is not significantly correlated with the weighted average of protests' intensity in internal migrants' governorates of birth.

5.5.3 Underlying mechanisms: how the protests soured popular expectations?

Analyzing individuals' responses between these two waves, the first being conducted right in the aftermath of the Egyptian protests, while the second being conducted about two years after the eruption of the 25th of January revolution results in striking differences. Individuals were much more positive in their responses regarding the evaluation of the country's economic situation, perceptions about democracy, evaluation of several dimensions of government's performance, trust in the state's institutions and agencies, evaluation of personal and political freedoms just in the aftermath of the revolution. By contrast, individuals' responses regarding the same outcomes two years after were negative.

Using pooled cross-sectional individual level data from the Arab Barometer, I examine the effects of the protests on individuals' perceptions of democracy and human rights in Table 5.12. The dependent variable in column (1) is a dummy variable equal one for individuals evaluating that the state of democracy and human rights in Egypt is bad or very bad. In column (2), based on a scale of 1 to 10, where 1 means that democracy is absolutely inappropriate for Egypt and 10 means that democracy is absolutely appropriate for Egypt, the dependent variable is a dummy variable equal one for individuals reporting that democracy is appropriate for Egypt (score equal to 6 and above). The dependent variable in column (3) is a dummy variable equal one for individuals reporting that the lack of respect for human rights for security purposes in Egypt is justified to a great, medium or limited extent. As reported at the bottom of the table, on average in 2013 individuals were more likely to report negative responses compared to the year 2011. Worth mentioning that only 21% of the individuals interviewed in 2011 reported that the state of democracy in Egypt is bad or very bad, versus 63% in the year 2013. In 2011, 68% of the individuals believed that democracy is appropriate for Egypt, while only 44% of the individuals in 2013 do. Testing this formally, I also find that the protests increase the probability of reporting that the state of democracy in Egypt is bad or very bad. However, in line with the previous findings in Section 5.5.1 on electoral outcomes, I find that the protests had led to a conservative backlash among citizens as evidenced in column (2), the protests reduce the probability of reporting that democracy is appropriate for

[92] This variable could be denoted as x_i and is equal to $x_k = \sum_{i \neq g(k)} w_{ik}^{2006} p_i$, where let w_{ik}^{2006} represent the share of individuals born in governorate i and residing in district k at the time of the census, given that k does not belong to governorate I, this is the share of internal migrants. p_i is the measure of protest intensity in governorate i, which is the governorate of birth of the internal migrants.

Egypt and the associated time trend is also found to be negative and statistically significantly. A standard deviation increase in the governorate level share of "martyrs," 0.325, leads to a decrease in the probability of reporting that democracy is appropriate for Egypt by 7 percentage points, equivalent to a decrease by 12% from a sample mean of 0.576. In addition, I also find that the protests increase the probability of reporting that the lack of respect for human rights is justified for security, again supporting the previous finding of support to an undemocratic absolute rule. Evaluating this effect using a standard deviation increase in the "martyrs" share, leads to an increase in reporting that the lack of respect for human rights can be justified by 8 percentage points which is equivalent to an increase by 21% from a sample mean of 0.355.

I investigate several potential mechanisms that might support the findings: individuals' perceptions regarding institutional reforms, changes and security, individuals' satisfaction with the government and its performance, conceptions of freedoms and trust in public institutions and state's agencies. In Table 5.13, the dependent variable in column (1) is a dummy variable equal one for individuals reporting that the state is not or definitely not undertaking far reaching and fundamental reforms and changes in its institutions and agencies. The dependent variable in column (2) is a dummy variable equal one for individuals reporting that the economic situation in Egypt during the next few years (3-5 years) will be somewhat worse or much worse. The dependent variable in column (3) is a dummy variable equal one for individuals that report feeling that their own personal and family's safety and security are not ensured or absolutely not ensured. The dependent variable in column (4) is a dummy variable equal one for individuals that report feeling that their own personal and family's safety and security are not ensured or absolutely not ensured, compared to this time last year. I find that only 21% of individuals interviewed in 2011 reported that there are no fundamental changes in institutions whereas 68% of the individuals interviewed in 2013 did. Perceptions about economic performance had also been affected negatively over the course of these two years, from very optimistic responses in 2011 where only 7% of the individuals reported that the economic situation will be worse in the next few years, to very pessimistic responses in 2013 where 55% of the individuals interviewed reported that the economic situation will be worse in the next 3 to 5 years. As for personal and family security, between the two survey rounds, individuals were also more likely to report that their own personal and family safety is not ensured. However, when they were asked if they felt that their personal and family security is not ensured compared to this time last year, 61% of the individuals in 2011 reported that they feel less ensured compared to last year versus 56% in 2013. The reference for 2011 being 2010 before the eruption of the protests under Mubarak regime, where citizens felt more secure. The evidence on the effects of the protests suggest that a standard deviation increase in the share of "martyrs" increase the probability of reporting that there are not any fundamental institutional reforms undertaken by 10 percentage points, an increase by 23% from a sample mean of 0.435. In addition, the protests had affected negatively speculations regarding future economic situation in Egypt by increasing the probability of reporting that the economic situation will be worse by about 9 percentage points using a standard deviation increase in the "martyrs" and about 29% increase from a sample mean of 0.303.

In Table 5.14, I analyze the effects of the protests on individuals' satisfaction with the government and how they evaluate its performance with respect to key public services and policies. In column (1), on a scale of 1 to 10, where 1 means that you are absolutely not satisfied with government performance and 10 means that you are absolutely satisfied with government performance, the dependent variable is a dummy variable equal 1 for individuals reporting being not satisfied with government performance (score of 5 or less). The dependent variables in columns (2), (3), (4) and (5) are dummy variables equal one for individuals reporting that government performance is bad or very bad in creating employment opportunities, in narrowing the gap between the rich and the poor, in improving health services and in managing the democratic transition process, respectively. Across all the above-mentioned satisfaction indicators, consistently higher percentages of individuals reporting discontent with government performance are to be found in 2013 compared to 2011. The protests increase the probability of individuals reporting their dissatisfaction with the government in general by 7 percentage points using a standard deviation increase in the main independent variable of interest "martyrs," which is equivalent to an increase by 11% from a sample mean of 0.598. Along the several indicators of dissatisfaction with respect public services and policies, the protests increased the probability of reporting a bad or very bad government performance when it comes to creating employment opportunities by 5 percentage points, to improving health services and to managing the democratic transition by 7 percentage points each. Evaluating these effects at sample means is equivalent to an increase by 6%, 10% and 11%, respectively.

Interestingly, regarding freedoms in Table 5.15, no more than 2% of individuals in 2011 reported lack of freedom of expression, press, to join political parties, to participate in protests or to join NGOs and civil society organizations, except when it comes to freedom to sue the government and its agencies 4% reported lack of freedom in this matter, whereas, in 2013, increasing recognition of limitations on civil and political liberties is evidenced. The dependent variables in Table 5.15 are dummy variables equal one if the individual reported that the respective freedom is not guaranteed in Egypt. Between the 2011 and the 2013 rounds, I find a negative effect of the protests on individuals perceptions regarding freedom of press, freedom to join political parties, NGOs and civil society organizations, freedom to participate in protests and to sue the government and its agencies. The magnitude of these effects is substantial when evaluated at sample means of the dependent variables using a standard deviation increase in "martyrs." The increase in perceptions that freedoms are not guaranteed is about 200% for freedom of press, by 141% for freedom to join political parties, by 87% for freedom to participate in protests, by 154% for freedom to join civil society associations and by 72% for freedom to sue the government and its agencies.

The protests seem to have also decreased tremendously trust in several public institutions between 2011 and 2013. In Table 5.16, the dependent variables are dummy indicators for individuals reporting that they absolutely do not trust the institution in question. The public institutions under consideration are the following: the government, the police, the army, which was managing the democratic transition process in Egypt until the June 2012 elections, religious leaders, and the Muslim Brotherhood. The protests significantly increased the

probability that individuals would report that they absolutely don't trust the public security, the army and the religious leaders, by 21%, 3% and 64% respectively from sample means of the dependent variables and using a standard deviation increase in "martyrs."

5.6 Concluding remarks

Did the January 2011 Egyptian protests lead to political change? In this paper, I studied the effects of the January 2011 uprising on Egypt's first free presidential elections that took place in May and June 2012. Relying on unique information from the Statistical Database of the Egyptian Revolution, I geocoded each "martyr" – demonstrators who died during the uprisings – based on the site of death to exploit the geographical variation in districts' exposure to protests intensity. Combined with official elections results from the Supreme Presidential Electoral Commission (SPEC) and Egypt Census data to control for a wide range of districts' pre-revolution characteristics, I find suggestive evidence that higher exposure to protests' intensity leads to a higher share of votes for former regime candidates, both during the first and second round of Egypt's first free presidential elections. Despite the expectations that the popular protests would increase public support for radical social change, the results suggest that the share of votes for candidates associated with the former regime actually increased in the districts where the demonstrations were most intense. This conservative backlash was fueled by a wave of pessimism and general dissatisfaction that overtook the popular mood in Egypt during the transitional period following the revolution. The protests negatively affected individuals' satisfaction with government performance, including trust in state institutions and public agencies, economic expectations, and perceptions on personal and civil liberties.

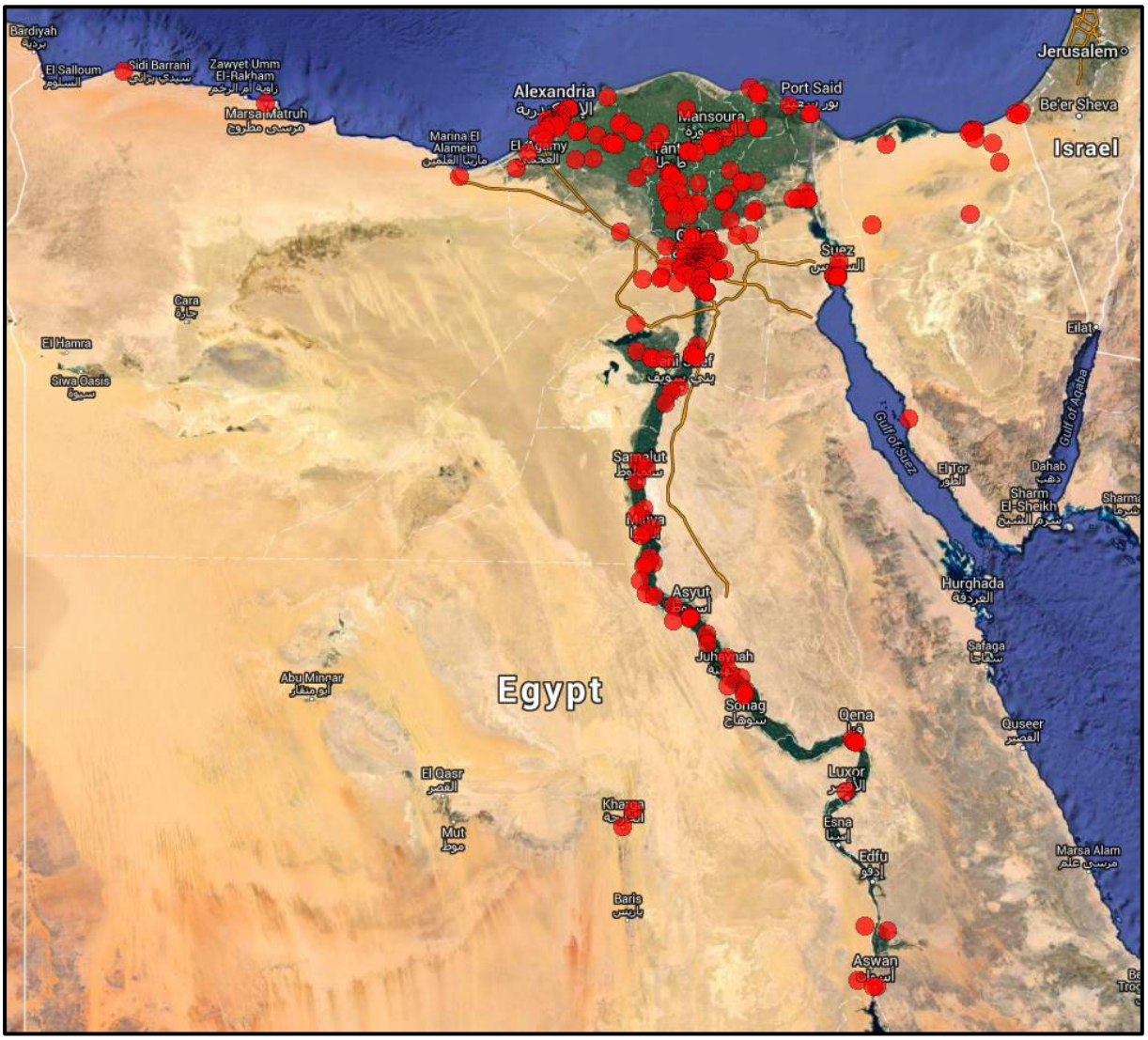

Figure 5.1. Geocoding the "martyrs."

Notes: The "martyrs" from the 25th of January 2011, until the end of June 2012 are geocoded based on the site of death. Each circle represents a location. Each location corresponds to either one incidence of death or several incidences of death. Identified locations are concentrated along the Nile Valley as the five border governorates: Matruh, New Valley, Red Sea, North Sinai and South Sinai, contain no more than 2% of the Egyptian population in 2006 (Minnesota Population Center, 2015). Sources: Google maps and Statistical Database of the Egyptian Revolution.

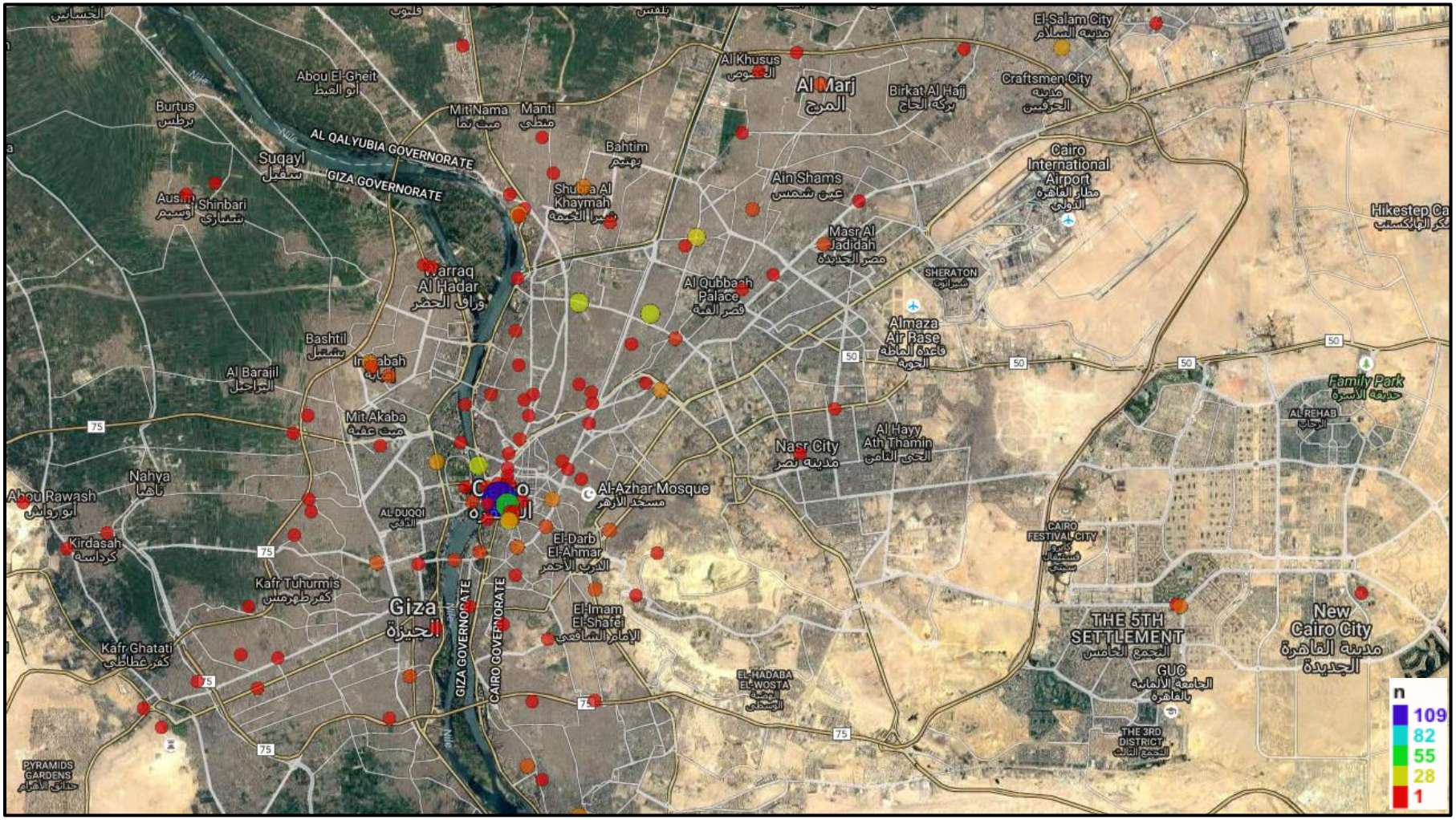

Figure 5.2. Geocoding the "martyrs" in Cairo and its neighboring districts.

Notes: The "martyrs" from the 25th of January 2011, until the end of June 2012 are geocoded based on the site of death. Each circle represents one location. Circles are differentiated by color, according to the number of deaths that occurred in each location. The location with the highest number of death incidences in Cairo is Tahrir Square (the blue dot). Sources: Google Maps and the Statistical Database of the Egyptian Revolution.

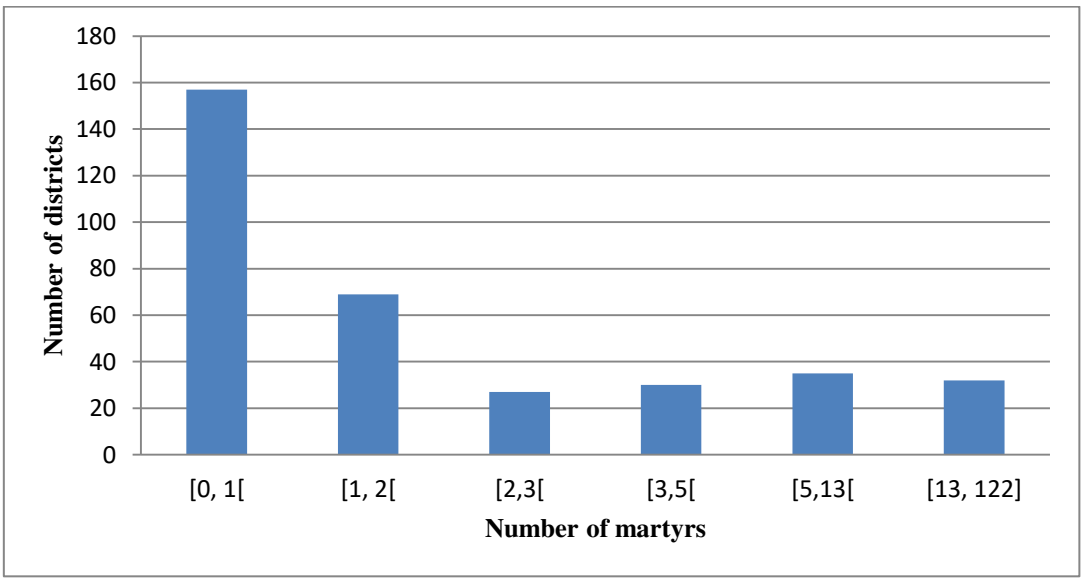

Figure 5.3. Distribution of the number of "martyrs" per districts.

Notes: The "martyrs" refer to the number of fatalities from the 25th of January 2011, until the end of June 2012 and is represented on the X-axis. On the Y-axis, the number of districts with the corresponding number of "martyrs" is reported.

Table 5.1: District-level summary statistics for elections outcomes, by exposure to protests

	Below median		Above median		
	(1)	(2)	(3)	(4)	(5)
	Mean	St. Dev.	Mean	St. Dev.	Difference
Panel A: Elections' outcomes					
First round of the 2012 presidential elections					
Share of votes for independent candidates	0.183	0.141	0.223	0.122	-0.041***
Share of votes for former regime candidates	0.344	0.124	0.343	0.098	0.001
Share of votes for Islamist candidates	0.473	0.151	0.434	0.148	0.039**
Voter turnout	0.436	0.157	0.501	0.152	-0.064***
Share of spoilt votes	0.008	0.004	0.007	0.004	0.000
Second round of the 2012 presidential elections					
Share of votes for Islamist candidate	0.548	0.149	0.525	0.136	0.024
Share of votes for former regime candidate	0.452	0.149	0.475	0.136	-0.024
Voter turnout	0.491	0.105	0.528	0.083	-0.038***
Share of spoilt votes	0.014	0.007	0.019	0.008	-0.004***

*** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Districts are divided into below and above median exposure to violent protests, according to the number of "martyrs" per district number of inhabitants. The median number of martyrs per 1000 inhabitants is equal to 0.003. Elections results for the first and second rounds of the 2012 first presidential elections are collected from the Supreme Presidential Electoral Commission (SPEC) website. The shares of votes for independent, former regime and Islamist candidates are computed as the number of votes cast for the candidates divided by the district's number of valid votes. For the first round of presidential elections, candidates are classified as independent, former regime or Islamist candidates. Independent candidates include: Hamdeen Sabahi, Khaled Ali, Hisham Bastawisy, Abu Al-Izz Al-Hariri and Mahmoud Houssam. Former regime candidates include: Mohamed Fawzi, Amr Moussa, Ahmed Shafik, Houssam Khairallah and Abdullah Alashaal. Islamists candidates include: Mohamed Morsi, Abdel Moneim Aboul Fotouh and Mohammad Salim Al-Awa. Voter turnout is equal to the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. Share of spoilt votes is equal to the number of invalid votes cast divided by the number of registered voters per district. For the second round, the Islamist candidate was Mohamed Morsi and the former regime candidate was Ahmed Shafik. Column (5) is a t-test for whether the difference between the mean of the two groups of districts is statistically significant.

Table 5.2: District-level summary statistics for predetermined controls, by exposure to protests

	Below median		Above median		
	(1)	(2)	(3)	(4)	(5)
	Mean	St. Dev.	Mean	St. Dev.	Difference
Demographic controls					
Log of population	11.700	1.373	11.970	1.162	-0.271**
Log of population density	6.481	2.314	8.200	2.360	-1.718***
% of population 0-35 years of age	0.731	0.044	0.698	0.068	0.033***
% of population 36-above years of age	0.269	0.044	0.302	0.068	-0.033***
Share of immigrants (% of population)	0.008	0.036	0.006	0.018	0.002
Share of emigrants (% of population)	0.110	0.174	0.132	0.159	-0.022
Share of Muslims (% of population)	0.959	0.058	0.938	0.069	0.020***
Share of Christians (% of population)	0.040	0.056	0.062	0.069	-0.021***
Labor market controls					
Share of public sector employment	0.235	0.117	0.281	0.127	-0.046***
Unemployment rate	0.087	0.044	0.101	0.038	-0.012***
Female labor force participation	0.171	0.105	0.202	0.085	-0.031***
Poverty measures					
Share of households with electricity access	0.970	0.074	0.982	0.065	-0.012
Share of households not connected to sewage disposal system	0.583	0.358	0.312	0.365	0.271***
Educational controls					
University education rate	0.084	0.077	0.132	0.099	-0.048***
Illiteracy rate	0.309	0.116	0.244	0.105	0.065***
Telecommunications controls					
Share of households with Internet access	0.019	0.042	0.039	0.055	-0.019***
Share of households with computer availability	0.060	0.088	0.117	0.113	-0.057***
Share of households with cell phone availability	0.756	0.172	0.662	0.163	0.094***

*** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Districts are divided into below and above median exposure to violent protests, according to the number of "martyrs" per district number of inhabitants. The median number of martyrs per 1000 inhabitants is equal to 0.003. Predetermined controls are derived from the Egypt Population, Housing and Establishments Census 2006, collected by the Central Agency for Public Mobilization and Statistics (CAPMAS). Demographic controls include: the logarithm of a district's population size, population density (number of inhabitants/km^2), the share of a district's population aged less than 36 years old, the share of a district's population aged more than 35 years old, the share of immigrants to district's population, the share of emigrants to district's population (those with overseas migration experience), the share of Muslims to district's population and the share of Christians to district's population. Labor market controls include the share of public sector employment, the unemployment rate and female labor force participation. Poverty measures include the share of households with electricity access and the share of households not connected to sewage disposal system. Educational controls include the share of a district's population above 10 years of age with university education and the share of illiterates in the district's population aged 10 years and above. Telecommunications controls include the share of households with internet access, the share of households with computer availability and the share of households with cell phone availability, in percent. Column (5) is a t-test for whether the difference between the mean of the two groups of districts is statistically significant.

Table 5.3: The share of votes for former regime candidates in the 2012 presidential elections, for the highest decile in terms of protests intensity

Governorate	District	Former first round	Former second round	Martyrs per 1000 inhabitants
Cairo	Al-Azbakiyah	0.557	0.734	0.071
Gharbia	Tanta 2	0.393	0.640	0.075
Cairo	Shubra	0.630	0.780	0.084
Beheira	Markaz Wadi Al-Natrun	0.343	0.454	0.097
Giza	Imbabah	0.340	0.529	0.104
Cairo	Al-Amiriyah	0.317	0.501	0.105
Cairo	Al-Zawiyah Al-Hamra	0.389	0.562	0.105
Sharqia	Al-Salhiyah Al-Jadidah	0.289	0.440	0.106
Beni Suef	Beni Suef Al-Jadidah	0.327	0.440	0.112
Monufia	Shibin Al-Kawm	0.466	0.660	0.113
Fayoum	Markaz Al-Fayoum	0.169	0.221	0.134
Cairo	Hadaiq Al-Qubbah	0.376	0.564	0.141
Cairo	Al-Waili	0.409	0.628	0.206
Cairo	Al-Maadi	0.325	0.516	0.218
Alexandria	Al-Atarin	0.369	0.559	0.271
Cairo	Al-Sayidah Zaynab	0.398	0.636	0.295
Cairo	Al-Darb Al-Ahmar	0.408	0.647	0.314
Ismailia	Ismailia 1	0.356	0.545	0.376
Cairo	Bulaq	0.437	0.620	0.496
Suez	Al-Suways	0.349	0.471	0.517
Port-Said	Bur Fuad 1	0.287	0.502	1.100
Alexandria	Al-Manshiyah	0.360	0.572	1.186
Cairo	Abdeen	0.428	0.656	2.179
Cairo	Kasr Al-Nil	0.568	0.753	12.157
Mean of highest decile		0.387	0.568	0.857
Mean of full sample		0.344	0.464	0.0001

Notes. The unit of analysis is the district. The shares of votes for former regime candidates are computed as the number of votes cast for the candidates divided by the district's number of valid votes, both during the first and second rounds of the 2012 presidential elections. Districts featured in this table are those who belong to the highest decile in terms of protests intensity (the number of "martyrs" per 1000 inhabitants), excluding the five frontier governorates. At the bottom of the table, means are reported for the subsample of districts belonging to the highest decile of protests intensity and for the full sample of districts.

Table 5.4: Estimating the effect of exposure to protests, First round of presidential elections

VARIABLES	(1) Independent	(2) Former	(3) Islamist	(4) Turnout	(5) Spoilt
Martyrs, % of population	-1.425	10.593***	-9.167***	-4.381	0.079
	[2.915]	[3.590]	[2.126]	[2.751]	[0.090]
Cell-phone availability	-0.190***	0.091	0.099	-0.192**	0.004
	[0.053]	[0.137]	[0.148]	[0.088]	[0.003]
Computer availability	0.204	-0.274	0.070	-0.072	-0.009
	[0.202]	[0.360]	[0.365]	[0.410]	[0.008]
Internet access	-0.416*	0.142	0.274	-0.607**	0.002
	[0.216]	[0.425]	[0.521]	[0.287]	[0.011]
Unemployment rate	0.178	0.009	-0.187	0.146	-0.002
	[0.141]	[0.128]	[0.195]	[0.152]	[0.005]
Female labor force participation	0.070	-0.033	-0.037	0.079	0.001
	[0.060]	[0.118]	[0.124]	[0.096]	[0.004]
Public sector employment	-0.140*	0.036	0.104	-0.008	-0.003
	[0.080]	[0.062]	[0.083]	[0.101]	[0.003]
Electricity access	-0.035	0.057	-0.022	0.248*	0.003
	[0.052]	[0.107]	[0.084]	[0.135]	[0.003]
No sewage disposal system	-0.038	0.000	0.037	-0.100*	-0.001
	[0.026]	[0.021]	[0.027]	[0.058]	[0.002]
University education	-0.231	0.340	-0.109	0.701	0.006
	[0.199]	[0.202]	[0.219]	[0.564]	[0.014]
Illiteracy rate	-0.173*	0.124	0.049	-0.041	0.004
	[0.087]	[0.174]	[0.224]	[0.225]	[0.006]
Population less than 35 years old	-0.482**	-0.566***	1.048***	0.362	-0.009
	[0.191]	[0.161]	[0.265]	[0.264]	[0.007]
Immigrants' share	0.193*	-0.286	0.092	-0.409*	-0.011*
	[0.111]	[0.266]	[0.237]	[0.227]	[0.006]
Christians' share	-0.362***	0.502***	-0.140	-0.021	-0.005
	[0.089]	[0.078]	[0.122]	[0.114]	[0.003]
Emigrants' share	-0.017	-0.020	0.038	-0.070	0.001
	[0.036]	[0.062]	[0.069]	[0.088]	[0.002]
Log of population	-0.002	0.009	-0.007	-0.022*	0.000
	[0.004]	[0.006]	[0.007]	[0.012]	[0.000]
Log of population density	0.008**	-0.000	-0.008	-0.008	-0.000
	[0.004]	[0.007]	[0.008]	[0.005]	[0.000]
Observations	349	349	349	349	349
R-squared	0.895	0.695	0.788	0.547	0.422
Governorate FE	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.468	0.008

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variable in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (4) is the voter turnout and is equal to the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variable in column (5) is the share of spoilt votes and is equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.5: Estimating the effect of exposure to protests, Second round of presidential elections

VARIABLES	(1) Islamist	(2) Former	(3) Turnout	(4) Spoilt
Martyrs, % of population	-8.588**	8.660**	-2.795	0.502***
	[3.926]	[3.928]	[1.791]	[0.169]
Cell-phone availability	-0.015	0.011	0.004	-0.003
	[0.164]	[0.164]	[0.050]	[0.006]
Computer availability	0.436	-0.427	-0.071	0.056**
	[0.419]	[0.418]	[0.220]	[0.023]
Internet access	0.058	-0.055	-0.330	-0.095**
	[0.562]	[0.559]	[0.195]	[0.045]
Unemployment rate	-0.050	0.034	0.013	-0.002
	[0.180]	[0.179]	[0.100]	[0.009]
Female labor force participation	-0.047	0.053	0.066	-0.000
	[0.163]	[0.163]	[0.058]	[0.006]
Public sector employment	-0.005	0.018	0.083	0.001
	[0.086]	[0.086]	[0.071]	[0.006]
Electricity access	-0.086	0.092	0.303**	0.009**
	[0.120]	[0.120]	[0.117]	[0.004]
No sewage disposal system	0.035	-0.036	-0.035**	-0.004**
	[0.024]	[0.024]	[0.015]	[0.002]
University education	-0.619**	0.599**	0.462*	0.059***
	[0.224]	[0.224]	[0.261]	[0.020]
Illiteracy rate	-0.128	0.142	-0.165	0.020**
	[0.247]	[0.246]	[0.105]	[0.009]
Population less than 35 years old	0.805***	-0.813***	0.462***	0.005
	[0.251]	[0.250]	[0.163]	[0.019]
Immigrants' share	0.197	-0.215	-0.373**	-0.004
	[0.275]	[0.276]	[0.137]	[0.012]
Christians' share	-0.355***	0.351***	0.231***	-0.014
	[0.122]	[0.122]	[0.046]	[0.012]
Emigrants' share	0.041	-0.037	-0.025	-0.004
	[0.082]	[0.082]	[0.049]	[0.003]
Log of population	-0.007	0.008	-0.011	-0.000
	[0.008]	[0.008]	[0.007]	[0.000]
Log of population density	-0.005	0.005	-0.008**	-0.000
	[0.009]	[0.009]	[0.003]	[0.000]
Observations	349	349	349	349
R-squared	0.744	0.744	0.778	0.733
Governorate FE	YES	YES	YES	YES
Number of clusters	27	27	27	27
Dependent variable mean	0.537	0.464	0.510	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variable in column (1), column (2) are the shares of votes for Islamist and former regime candidates, Mohamed Morsi and Ahmed Shafik respectively, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variable in column (3) is the voter turnout and is equal to the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variable in column (4) is the share of spoilt votes and is equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.6: Summarizing the effects of exposure to protests on elections' outcomes

	(1)	(2)	(3)	(4)	(5)
		First round		*Second round*	
VARIABLES	Independent	Former	Islamist	Islamist	Spoilt
Martyrs, % of population	-1.425	10.593***	-9.167***	-8.588**	0.502***
	[2.915]	[3.590]	[2.126]	[3.926]	[0.169]
Observations	349	349	349	349	349
R-squared	0.895	0.695	0.788	0.744	0.733
Predetermined district controls	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.537	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variable in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (4) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variable in column (5) is the share of spoilt votes for the second round of the 2012 presidential elections and is equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.7: Investigating non-linearity in exposure to protests on elections' outcomes

	(1)	(2)	(3)	(4)	(5)
		First round		*Second round*	
VARIABLES	Independent	Former	Islamist	Islamist	Spoilt
Martyrs, % of population	-0.020***	0.039***	-0.020***	-0.036***	0.002**
	[0.006]	[0.006]	[0.005]	[0.007]	[0.001]
Martyrs, % of population, squared	0.001***	-0.002***	0.001	0.002***	-0.000
	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]
Observations	349	349	349	349	349
R-squared	0.895	0.697	0.789	0.746	0.734
Predetermined district controls	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.537	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variable in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (4) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variable in column (5) is the share of spoilt votes for the second round of the 2012 presidential elections and is equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs" and its squared term, expressed a % of district's population, standardized. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.8: First round presidential elections, sensitivity checks to covariates' inclusion

	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Former	Islamist	Former	Islamist	Former	Islamist	Former	Islamist	Former	Islamist
Martyrs, % of population	10.648***	-8.692***	10.924***	-8.525***	10.607***	-8.757***	10.491***	-8.881***	10.593***	-9.167***
	[3.829]	[1.927]	[3.730]	[2.068]	[3.717]	[2.009]	[3.657]	[2.082]	[3.590]	[2.126]
Observations	349	349	349	349	349	349	349	349	349	349
R-squared	0.685	0.781	0.689	0.783	0.690	0.785	0.691	0.787	0.695	0.788
Demographic controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Education controls			YES	YES	YES	YES	YES	YES	YES	YES
Poverty controls					YES	YES	YES	YES	YES	YES
Labor market controls							YES	YES	YES	YES
Telecommunications controls									YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27	27	27	27	27	27
Dependent variable mean	0.345	0.453	0.345	0.453	0.345	0.453	0.345	0.453	0.345	0.453

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variables are the shares of votes for former regime and Islamist candidates, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The main variable of interest is the number of "martyrs," expressed a % of district's population. In the regressions, we include gradually a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4, as sensitivity checks. In specification (1), only include demographic controls are included. In specification (2), educational control variables are additionally included, along with the demographic controls. In specification (3), regressions also include a set of poverty measures, in addition to the demographic and educational controls. In specification (4), a set of labor market controls is additionally included, along with the previously included controls: demographic, educational, poverty controls. Specification (5) is the preferred specification that includes a full-set of predetermined districts' controls: demographic, educational, poverty, labor market and telecommunication controls. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.9: Second round presidential elections, sensitivity checks to covariates' inclusion

	(1)		(2)		(3)		(4)		(5)	
VARIABLES	Islamist	Spoilt	Islamist	Spoilt	Islamist	Spoilt	Islamist	Spoilt	Islamist	Spoilt
Martyrs, % of population	-8.494**	0.607***	-8.399**	0.487***	-8.223**	0.476***	-8.184**	0.477***	-8.588**	0.502***
	[3.584]	[0.149]	[3.706]	[0.134]	[3.950]	[0.146]	[3.966]	[0.151]	[3.926]	[0.169]
Observations	349	349	349	349	349	349	349	349	349	349
R-squared	0.737	0.618	0.738	0.710	0.740	0.719	0.741	0.720	0.744	0.733
Demographic controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Education controls			YES	YES	YES	YES	YES	YES	YES	YES
Poverty controls					YES	YES	YES	YES	YES	YES
Labor market controls							YES	YES	YES	YES
Telecommunications controls									YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27	27	27	27	27	27
Dependent variable mean	0.537	0.017	0.537	0.017	0.537	0.017	0.537	0.017	0.537	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variables are the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes and the share of spoilt votes which is equal to the number of invalid votes cast divided by the number of registered voters per district, for the second round of the 2012 presidential elections. The main variable of interest is the number of "martyrs," expressed a % of district's population. In the regressions, we include gradually a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4, as sensitivity checks. In specification (1), only include demographic controls are included. In specification (2), educational control variables are additionally included, along with the demographic controls. In specification (3), regressions also include a set of poverty measures, in addition to the demographic and educational controls. In specification (4), a set of labor market controls is additionally included, along with the previously included controls: demographic, educational, poverty controls. Specification (5) is the preferred specification that includes a full-set of predetermined districts' controls: demographic, educational, poverty, labor market and telecommunication controls. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.10: Robustness checks, scaling the martyrs in log and eliminating frontier governorates

Panel A: Scaling in log the martyrs, % of population								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		First round				*Second round*		
VARIABLES	Independent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Log martyrs, % of population	-1.444	10.692***	-9.248***	-4.419	0.079	-8.670**	-2.821	0.506***
	[2.941]	[3.614]	[2.141]	[2.773]	[0.091]	[3.954]	[1.804]	[0.170]
Observations	349	349	349	349	349	349	349	349
R-squared	0.895	0.695	0.788	0.547	0.422	0.744	0.778	0.733
Panel B: Eliminating the frontier governorates								
Martyrs, % of population	-6.950***	20.671***	-13.721***	-3.958*	-0.027	-20.355***	-3.415**	0.808***
	[1.303]	[1.880]	[1.795]	[1.990]	[0.067]	[2.584]	[1.363]	[0.152]
Observations	311	311	311	311	311	311	311	311
R-squared	0.899	0.735	0.790	0.522	0.452	0.747	0.796	0.721
Predetermined district controls	YES	YES	YES	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.468	0.008	0.537	0.510	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. In Panel A, the main variable of interest is scaled in log, the number of martyrs per district's population. In Panel B, the 5 frontier governorates: Red Sea, New Valley, Matruh, North Sinai and South Sinai are eliminated. The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.11: Robustness checks, eliminating outliers in terms of population density

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			First round				*Second round*	
VARIABLES	Independent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Panel A: Eliminating districts belonging to the 1st decile of population density								
Martyrs, % of population	-7.212***	21.173***	-13.961***	-3.547	-0.033	-20.804***	-3.199**	0.806***
	[1.505]	[2.407]	[2.216]	[2.116]	[0.073]	[3.139]	[1.444]	[0.161]
Observations	314	314	314	314	314	314	314	314
R-squared	0.902	0.738	0.798	0.524	0.457	0.757	0.778	0.729
Panel B: Eliminating districts belonging to the 10th decile of population density								
Martyrs, % of population	-1.744	11.231***	-9.487***	-4.025	0.100	-8.852**	-2.552	0.512***
	[2.778]	[3.724]	[2.566]	[2.933]	[0.092]	[4.210]	[1.969]	[0.179]
Observations	315	315	315	315	315	315	315	315
R-squared	0.894	0.693	0.777	0.542	0.420	0.737	0.781	0.732
Panel C: Eliminating districts belonging to the 1st and 10th deciles of population density								
Martyrs, % of population	-6.678***	20.638***	-13.960***	-3.982*	-0.052	-19.990***	-3.482**	0.780***
	[1.892]	[2.291]	[2.334]	[1.963]	[0.086]	[2.924]	[1.528]	[0.177]
Observations	280	280	280	280	280	280	280	280
R-squared	0.902	0.735	0.788	0.521	0.457	0.751	0.785	0.731
Predetermined district controls	YES	YES	YES	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.468	0.008	0.537	0.510	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. In Panel A, districts that belong to the 1st decile of population density are eliminated, in Panel B, districts that belong to the 10th decile of population density are eliminated and in Panel C, districts that belong to either the 1st decile or the 10th decile of population density are eliminated. The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table 5.12: Examining the effects of the protests on individual perceptions of democracy

VARIABLES	(1) State of democracy and HR is bad	(2) Democracy is appropriate for Egypt	(3) Lack of respect for HR justified for security
Martyrs × year	0.267***	-0.219*	0.234**
	[0.100]	[0.112]	[0.107]
Martyrs	0.051	0.162**	-0.070
	[0.067]	[0.064]	[0.068]
Year	-0.037	-0.419***	0.155
	[0.150]	[0.147]	[0.166]
Observations	2,196	2,083	2,169
R-squared	0.226	0.088	0.037
Individual controls	YES	YES	YES
Individual controls × Year	YES	YES	YES
Dependent variable mean	0.410	0.576	0.355
Dependent variable mean 2011	0.212	0.683	0.326
Dependent variable mean 2013	0.629	0.443	0.386

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Each cell represents a coefficient estimate using Linear Probability model using individual level pooled cross-sectional data from the Arab Barometer conducted in Egypt. Martyrs is the governorate level number of martyrs from January, 2011 to June, 2012 per 1000 inhabitants. Year is a dummy variable equal one for the second wave of the Arab Barometer fielded between March 31 and April 7, 2013 and equal zero, for the first wave fielded between June 16 and July 3, 2011. The dependent variable in column (1) is a dummy variable equal one for individuals evaluating that the state of democracy and human rights in Egypt is bad or very bad. In column (2), based on a scale of 1 to 10, where 1 means that democracy is absolutely inappropriate for Egypt and 10 means that democracy is absolutely appropriate for Egypt, the dependent variable is a dummy variable equal one for individuals reporting that democracy is appropriate for Egypt (score equal to 6 and above). The dependent variable in column (3) is a dummy variable equal one for individuals reporting that the lack of respect for human rights for security purposes in Egypt is justified to a great, medium or limited extent. Regressions include Martyrs, Year and the interaction term between Martyrs and Year. Regressions also include individual level controls, as well as their interaction with the year dummy to account for time-varying effects of the potential individual level controls. Individual level controls are the following: a dummy for rural residence, four dummies for educational attainment (no educational degree whether illiterate or literate, a dummy for primary or preparatory education, a dummy for secondary education and a dummy for above secondary education), a dummy for being married, a dummy for being Muslim, five dummies for individual's working status (working, unemployed, retired, housewife, student), two dummy indicators to proxy wealth: a dummy for owned house and a dummy for individuals reporting that their household income does not cover their expenses and they face either some difficulties in meeting their needs or significant difficulties in meeting their needs. Dependent variable means are reported in the last three rows, for the full sample of pooled cross-sectional data, for the year 2011 and the year 2013, respectively.

Table 5.13: Examining the effects of the protests on individual perceptions regarding institutional reforms, economic performance and security

VARIABLES	(1) No fundemental changes in institutions	(2) Worse future economic situation	(3) Personal and family security not ensured	(4) Personal and family security compared to last year
Martyrs × year	0.302***	0.266***	0.230**	0.172*
	[0.094]	[0.087]	[0.092]	[0.097]
Martyrs	0.033	0.056	0.171**	0.157**
	[0.065]	[0.042]	[0.077]	[0.068]
Year	0.108	0.396***	0.098	-0.479***
	[0.161]	[0.138]	[0.129]	[0.163]
Observations	2,224	2,214	2,342	2,331
R-squared	0.262	0.314	0.143	0.050
Individual controls	YES	YES	YES	YES
Individual controls × Year	YES	YES	YES	YES
Dependent variable mean	0.435	0.303	0.624	0.583
Dependent variable mean in 2011	0.212	0.072	0.477	0.608
Dependent variable mean in 2013	0.679	0.554	0.776	0.558

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Each cell represents a coefficient estimate using Linear Probability model using individual level pooled cross-sectional data from the Arab Barometer conducted in Egypt. Martyrs is the governorate level number of martyrs from January, 2011 to June, 2012 per 1000 inhabitants. Year is a dummy variable equal one for the second wave of the Arab Barometer fielded between March 31 and April 7, 2013 and equal zero, for the first wave fielded between June 16 and July 3, 2011. The dependent variable in column (1) is a dummy variable equal one for individuals reporting that the state is not or definitely not undertaking far reaching and fundamental reforms and changes in its institutions and agencies. The dependent variable in column (2) is a dummy variable equal one for individuals reporting that the economic situation in Egypt during the next few years (3-5 years) will be somewhat worse or much worse. The dependent variable in column (3) is a dummy variable equal one for individuals that report feeling that their own personal and family's safety and security are not ensured or absolutely not ensured. The dependent variable in column (4) is a dummy variable equal one for individuals that report feeling that their own personal and family's safety and security are not ensured or absolutely not ensured, compared to this time last year. Regressions include Martyrs, Year and the interaction term between Martyrs and Year. Regressions also include individual level controls, as well as their interaction with the year dummy to account for time-varying effects of the potential individual level controls. Individual level controls are the following: a dummy for rural residence, four dummies for educational attainment (no educational degree whether illiterate or literate, a dummy for primary or preparatory education, a dummy for secondary education and a dummy for above secondary education), a dummy for being married, a dummy for being Muslim, five dummies for individual's working status (working, unemployed, retired, housewife, student), two dummy indicators to proxy wealth: a dummy for owned house and a dummy for individuals reporting that their household income does not cover their expenses and they face either some difficulties in meeting their needs or significant difficulties in meeting their needs. Dependent variable means are reported in the last three rows, for the full sample of pooled cross-sectional data, for the year 2011 and the year 2013, respectively.

Table 5.14: Examining the effects of the protests on individual satisfaction with the government and its performance

VARIABLES	(1) Not satisfied with government performance	(2) Bad performance Creating employment opportunities	(3) Bad performance Narrowing the gap between rich and poor	(4) Bad performance Improving health services	(5) Bad performance Managing democratic transition
Martyrs × year	0.200*	0.142*	0.090	0.215**	0.213**
	[0.110]	[0.075]	[0.079]	[0.089]	[0.084]
Martyrs	-0.155**	-0.122*	-0.004	-0.046	-0.059
	[0.072]	[0.068]	[0.071]	[0.074]	[0.072]
Year	0.182	0.179*	0.123	0.189	0.298**
	[0.175]	[0.103]	[0.135]	[0.150]	[0.151]
Observations	1,886	2,321	2,314	2,314	2,117
R-squared	0.151	0.078	0.092	0.078	0.246
Individual controls	YES	YES	YES	YES	YES
Individual controls × Year	YES	YES	YES	YES	YES
Dependent variable mean	0.598	0.830	0.787	0.721	0.639
Dependent variable mean 2011	0.478	0.748	0.687	0.620	0.420
Dependent variable mean 2013	0.797	0.915	0.891	0.825	0.870

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Each cell represents a coefficient estimate using Linear Probability model using individual level pooled cross-sectional data from the Arab Barometer conducted in Egypt. Martyrs is the governorate level number of martyrs from January, 2011 to June, 2012 per 1000 inhabitants. Year is a dummy variable equal one for the second wave of the Arab Barometer fielded between March 31 and April 7, 2013 and equal zero, for the first wave fielded between June 16 and July 3, 2011. In column (1), on a scale of 1 to 10, where 1 means that you are absolutely not satisfied with government performance and 10 means that you are absolutely satisfied with government performance, the dependent variable is a dummy variable equal 1 for individuals reporting being not satisfied with government performance (score of 5 or less). The dependent variable in column (2) is a dummy variable equal one for individuals reporting that government performance in creating employment opportunities is bad or very bad. The dependent variable in column (3) is a dummy variable equal one for individuals reporting that the government performance in narrowing the gap between the rich and the poor is bad or very bad. The dependent variable in column (4) is a dummy variable equal one for individuals reporting that the government performance in improving health services is bad or very bad. The dependent variable in column (5) is a dummy variable equal one for individuals reporting that the government performance in managing the democratic transition process is bad or very bad. Regressions include Martyrs, Year and the interaction term between Martyrs and Year. Regressions also include individual level controls, as well as their interaction with the year dummy to account for time-varying effects of the potential individual level controls. Individual level controls are the following: a dummy for rural residence, four dummies for educational attainment (no educational degree whether illiterate or literate, a dummy for primary or preparatory education, a dummy for secondary education and a dummy for above secondary education), a dummy for being married, a dummy for being Muslim, five dummies for individual's working status (working, unemployed, retired, housewife, student), two dummy indicators to proxy wealth: a dummy for owned house and a dummy for individuals reporting that their household income does not cover their expenses and they face either some difficulties in meeting their needs or significant difficulties in meeting their needs. Dependent variable means are reported in the last three rows, for the full sample of pooled cross-sectional data, for the year 2011 and the year 2013, respectively.

Table 5.15: Examining the effects of the protests on individual perceptions of freedoms

VARIABLES	(1) No Freedom of expression	(2) No Freedom of press	(3) No Freedom to join political parties	(4) No Freedom to participate in protests	(5) No Freedom to join civil society associations	(6) No Freedom to sue the government
Martyrs × year	0.107	0.420***	0.275***	0.218***	0.303***	0.357***
	[0.066]	[0.072]	[0.067]	[0.063]	[0.068]	[0.093]
Martyrs	0.029	0.023*	0.024	-0.010	0.010	0.030
	[0.021]	[0.014]	[0.016]	[0.008]	[0.014]	[0.031]
Year	-0.023	-0.172**	-0.047	0.307***	-0.029	0.097
	[0.093]	[0.078]	[0.085]	[0.111]	[0.074]	[0.113]
Observations	2,295	2,206	2,180	2,271	2,158	2,181
R-squared	0.111	0.142	0.086	0.112	0.099	0.182
Individual controls	YES	YES	YES	YES	YES	YES
Individual controls × Year	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.092	0.068	0.063	0.081	0.064	0.161
Dependent variable mean in 2011	0.019	0.010	0.018	0.012	0.014	0.039
Dependent variable mean in 2013	0.167	0.130	0.112	0.155	0.120	0.301

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Each cell represents a coefficient estimate using Linear Probability model using individual level pooled cross-sectional data from the Arab Barometer conducted in Egypt. Martyrs is the governorate level number of martyrs from January, 2011 to June, 2012 per 1000 inhabitants. Year is a dummy variable equal one for the second wave of the Arab Barometer fielded between March 31 and April 7, 2013 and equal zero, for the first wave fielded between June 16 and July 3, 2011. The dependent variable in column (1) is a dummy variable equal one for individuals reporting that the freedom to express opinions is not guaranteed. The dependent variable in column (2) is a dummy variable equal one for individuals reporting that the freedom of press is not guaranteed. The dependent variable in column (3) is a dummy variable equal one for individuals reporting that the freedom to join political parties is not guaranteed. The dependent variable in column (4) is a dummy variable equal one for individuals reporting that the freedom to participate in peaceful protests and demonstrations is not guaranteed. The dependent variable in column (5) is a dummy variable equal one for individuals reporting that the freedom to join NGOs and civil society organizations is not guaranteed. The dependent variable in column (6) is a dummy variable equal one for individuals reporting that freedom to sue the government and its agencies is not guaranteed. Regressions include Martyrs, Year and the interaction term between Martyrs and Year. Regressions also include individual level controls, as well as their interaction with the year dummy to account for time-varying effects of the potential individual level controls. Individual level controls are the following: a dummy for rural residence, four dummies for educational attainment (no educational degree whether illiterate or literate, a dummy for primary or preparatory education, a dummy for secondary education and a dummy for above secondary education), a dummy for being married, a dummy for being Muslim, five dummies for individual's working status (working, unemployed, retired, housewife, student), two dummy indicators to proxy wealth: a dummy for owned house and a dummy for individuals reporting that their household income does not cover their expenses and they face either some difficulties in meeting their needs or significant difficulties in meeting their needs. Dependent variable means are reported in the last three rows, for the full sample of pooled cross-sectional data, for the year 2011 and the year 2013, respectively.

Table 5.16: Examining the effects of the protests on individual trust in public institutions

VARIABLES	(1) Don't trust government	(2) Don't trust public security	(3) Don't trust the army	(4) Don't trust religious leaders	(5) Don't trust the Muslim Brotherhood
Martyrs × year	0.047	0.182*	0.348***	0.386***	0.123
	[0.088]	[0.106]	[0.061]	[0.089]	[0.095]
Martyrs	0.140**	0.176**	0.007	0.059	0.129*
	[0.056]	[0.069]	[0.017]	[0.037]	[0.076]
Year	0.468***	-0.079	-0.091*	-0.040	0.190
	[0.135]	[0.124]	[0.052]	[0.132]	[0.159]
Observations	2,284	2,310	2,312	2,299	2,223
R-squared	0.353	0.117	0.148	0.229	0.188
Individual controls	YES	YES	YES	YES	YES
Individual controls × Year	YES	YES	YES	YES	YES
Dependent variable mean	0.354	0.280	0.038	0.194	0.527
Dependent variable mean in 2011	0.090	0.183	0.011	0.040	0.340
Dependent variable mean in 2013	0.627	0.378	0.067	0.355	0.708

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Each cell represents a coefficient estimate using Linear Probability model using individual level pooled cross-sectional data from the Arab Barometer conducted in Egypt. Martyrs is the governorate level number of martyrs from January, 2011 to June, 2012 per 1000 inhabitants. Year is a dummy variable equal one for the second wave of the Arab Barometer fielded between March 31 and April 7, 2013 and equal zero, for the first wave fielded between June 16 and July 3, 2011. The dependent variable in column (1) is a dummy variable equal one for individuals reporting that they absolutely don't trust the government. The dependent variable in column (2) is a dummy variable equal one for individuals reporting that they absolutely don't trust public security (the police). The dependent variable in column (3) is a dummy variable equal one for individuals reporting they absolutely don't trust the armed forces. The dependent variable in column (4) is a dummy variable equal one for individuals reporting that they absolutely don't trust religious leaders. The dependent variable in column (5) is a dummy variable equal one for individuals reporting that they absolutely don't trust the Muslim Brotherhood. Regressions include Martyrs, Year and the interaction term between Martyrs and Year. Regressions also include individual level controls, as well as their interaction with the year dummy to account for time-varying effects of the potential individual level controls. Individual level controls are the following: a dummy for rural residence, four dummies for educational attainment (no educational degree whether illiterate or literate, a dummy for primary or preparatory education, a dummy for secondary education and a dummy for above secondary education), a dummy for being married, a dummy for being Muslim, five dummies for individual's working status (working, unemployed, retired, housewife, student), two dummy indicators to proxy wealth: a dummy for owned house and a dummy for individuals reporting that their household income does not cover their expenses and they face either some difficulties in meeting their needs or significant difficulties in meeting their needs. Dependent variable means are reported in the last three rows, for the full sample of pooled cross-sectional data, for the year 2011 and the year 2013, respectively.

Appendix C

Table C1: Robustness checks, Conley's standard errors correction for spatial dependence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			First round				*Second round*	
VARIABLES	Independent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Martyrs, % of population	-1.425	10.593	-9.167	-4.381	0.079	-8.588	-2.795	0.502
Governorate clustered standard errors	[2.915]	[3.590]***	[2.126]***	[2.751]	[0.090]	[3.926]**	[1.791]	[0.169]***
Spatial dependence <1 degree	[2.487]	[2.905]***	[2.052]***	[2.642]*	[0.079]	[3.198]***	[2.094]	[0.145]***
Spatial dependence <3 degrees	[2.287]	[2.716]***	[1.642]***	[2.624]*	[0.078]	[3.092]***	[2.123]	[0.175]***
Spatial dependence <5 degrees	[1.974]	[2.322]***	[1.524]***	[2.395]*	[0.062]	[2.531]***	[1.886]	[0.163]***
Spatial dependence <7 degrees	[1.822]	[2.060]***	[1.318]***	[2.158]**	[0.049]	[2.176]***	[1.682]	[0.143]***
Observations	349	349	349	349	349	349	349	349
Predetermined district controls	YES	YES	YES	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.203	0.345	0.453	0.468	0.008	0.537	0.510	0.017

Standard errors are reported between brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. In the first row, coefficient estimates using OLS regression are reported. In the second row, governorate clustered standard errors are reported, as in the benchmark specification. In the third to the sixth rows, standard errors are adjusted for spatial dependence following Conley (1999), using different cutoff points: 1 degree, 3 degrees, 5 degrees and 7 degrees. In each spatial dimension (longitude and latitude), spatial dependence declines in distance between districts' centroids and is equal zero beyond a maximum distance (the different cutoff points). The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table C2: Robustness checks, accounting for spillover between districts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		First round				*Second round*		
VARIABLES	Independent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Martyrs neighboring districts, % population	-3.385	13.911***	-10.526**	-4.071	-0.087	-13.655***	2.640	0.530*
	[4.028]	[4.646]	[4.378]	[6.748]	[0.162]	[4.173]	[4.821]	[0.288]
Observations	350	350	350	350	350	350	350	350
R-squared	0.895	0.691	0.788	0.547	0.423	0.744	0.777	0.731
Predetermined district controls	YES	YES	YES	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.468	0.008	0.537	0.510	0.017

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. A district is attributed the number of martyrs in that district and in its neighboring districts, sharing a common border. The main variable of interest is the number of "martyrs" in specific district and its neighboring districts, expressed a % of these districts' population (expressed in dozens). The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table C3: Robustness checks, eliminating one governorate at a time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			First round				*Second round*	
	Indepedent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Full sample	-1.425	10.593***	-9.167***	-4.381	0.079	-8.588**	-2.795	0.502***
Cairo	0.613	6.873***	-7.486***	-4.751	0.123	-5.100*	-2.747	0.361*
Alexandria	-1.376	10.996***	-9.619***	-4.470	0.079	-9.014**	-2.849	0.538***
Port-Said	-1.535	10.899***	-9.364***	-4.339	0.074	-8.956**	-2.671	0.482***
Suez	-1.408	10.601***	-9.193***	-4.410	0.078	-8.593**	-2.830	0.503***
Damietta	-1.415	10.681***	-9.265***	-4.693	0.079	-8.701**	-3.074	0.497***
Dakahlia	-1.550	11.048***	-9.498***	-4.887	0.084	-8.697**	-3.223	0.415**
Sharqia	-1.199	9.241***	-8.041***	-4.805	0.080	-6.903*	-3.368*	0.495***
Qalyubia	-1.481	11.222***	-9.741***	-5.713**	0.051	-9.173**	-2.912	0.492***
Kafr El-Sheikh	-1.699	10.724***	-9.026***	-4.308	0.083	-8.518**	-2.718	0.501***
Gharbia	-1.388	10.456***	-9.069***	-4.389	0.080	-8.418**	-2.818	0.504***
Monufia	-1.518	10.527***	-9.009***	-3.395	0.110	-8.611**	-2.842	0.497***
Beheira	-1.330	10.834***	-9.504***	-4.457	0.080	-8.982**	-2.868	0.486***
Ismailia	-1.463	10.613***	-9.151***	-4.395	0.079	-8.640**	-2.787	0.502***
Giza	-1.933	11.008***	-9.075***	-3.898	0.103	-8.657*	-2.712	0.524***
Beni Suef	-1.255	10.752***	-9.497***	-4.099	0.053	-8.872**	-2.623	0.499***
Faiyum	-1.427	10.573***	-9.146***	-4.393	0.079	-8.562**	-2.790	0.499***
Minya	-0.640	10.676***	-10.036***	-2.991	0.030	-9.305**	-1.927	0.503***
Asyut	-1.485	10.577***	-9.093***	-4.449	0.079	-8.487**	-2.841	0.508***
Sohag	-1.253	10.627***	-9.374***	-3.262	0.052	-9.305**	-1.683	0.589***
Qena	-1.482	10.495***	-9.013***	-4.425	0.081	-8.490**	-2.819	0.497***
Aswan	-0.953	10.557***	-9.604***	-4.445	0.113	-8.620**	-3.146*	0.542***
Luxor	-1.489	10.490***	-9.001***	-4.446	0.078	-8.386**	-2.852	0.501***
Red Sea	-1.534	11.326***	-9.792***	-4.323	0.073	-9.259**	-2.714	0.502***
New Valley	-1.264	10.541***	-9.277***	-4.264	0.083	-8.661**	-2.709	0.514***
Matruh	-7.365***	18.083***	-10.718***	-4.459**	0.070	-15.758***	-3.042**	0.751***
North Sinai	-1.570	10.789***	-9.219***	-4.054	0.079	-8.687**	-2.344	0.501***
South Sinai	-1.370	10.013***	-8.642***	-4.456	0.063	-8.271**	-2.949	0.496***

Standard errors are clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The first row reports coefficient estimates using the full sample of districts. Subsequently, we eliminate one governorate at a time, as a robustness check and report corresponding coefficient estimates. For example, the second row reports coefficient estimates when we eliminate Cairo governorate. The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects.

Table C4: Estimating a system of equations

Panel A: First round			
	(1)	(2)	(3)
VARIABLES	Independent	Former	Spolit
Martyrs, % of population	-1.425	10.593***	0.079
	[2.725]	[3.356]	[0.085]
Observations	349	349	349
Predetermined district controls	YES	YES	YES
Governorate fixed effects	YES	YES	YES
Number of clusters	27	27	27
Dependent variable mean	0.203	0.345	0.008
lnsig	-3.162***	-2.811***	-5.808***
	[0.110]	[0.063]	[0.183]
atanhrho_12		-0.183*	
		[0.097]	
atanhrho_13		-0.185***	
		[0.072]	
atanhrho_23		-0.088	
		[0.079]	

Panel B: Second round		
	(1)	(2)
VARIABLES	Former	Spoilt
Martyrs, % of population	8.660**	0.502***
	[3.671]	[0.158]
Observations	349	349
Predetermined district controls	YES	YES
Governorate fixed effects	YES	YES
Number of clusters	27	27
Dependent variable mean	0.464	0.017
lnsig	-2.652***	-5.493***
	[0.054]	[0.090]
atanhrho_12	-0.089	
	[0.067]	

Robust standard errors in brackets, clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Results are reported using a conditional mixed process estimator, following Roodman (2011) to estimate a simultaneous equation model. In Panels A and B, results are reported for the first and second rounds respectively. In Panel A, equations (1), (2) and (3) are estimated simultaneously and in Panel B, equations (1) and (2) are estimated simultaneously. In Panel A, the dependent variables in column (1) and column (2) are the shares of votes for independent and former candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (3) correspond to the share of spoilt votes in the first round and is equal to the number of invalid votes cast divided by the number of registered voters per district. In Panel A, the dependent variable in column (1) is the share of votes for the former regime candidate Ahmed Shafik, expressed in % of valid votes, in the second round of the 2012 Egyptian residential elections. The dependent variable in column (2) is the share of spoilt votes for the second round of the 2012 presidential elections and is equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in each panel.

Table C5: Identification through internal migrants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		First round				*Second round*		
VARIABLES	Independent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Protests, internal migrants	0.021	0.109	-0.129	0.138	-0.006	-0.128	0.056	-0.011
	[0.116]	[0.177]	[0.241]	[0.131]	[0.005]	[0.255]	[0.093]	[0.009]
Observations	349	349	349	349	349	349	349	349
R-squared	0.894	0.685	0.785	0.547	0.423	0.741	0.777	0.730
Predetermined district controls	YES	YES	YES	YES	YES	YES	YES	YES
Governorate FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of clusters	27	27	27	27	27	27	27	27
Dependent variable mean	0.203	0.345	0.453	0.468	0.008	0.537	0.510	0.017

Standard errors are clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the weighted average of protests intensity in the governorate of birth of internal migrants living in a particular district. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

Table C6: Estimating the effects of exposure to protests' intensity on voting outcomes, Cairo only

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		First round					*Second round*	
VARIABLES	Independent	Former	Islamist	Turnout	Spoilt	Islamist	Turnout	Spoilt
Martyrs, % of population	-3.115	13.547***	-10.433**	-0.202	-0.193	-14.168**	-3.421	1.150**
	[1.985]	[4.346]	[4.316]	[4.589]	[0.125]	[5.219]	[3.102]	[0.462]
Observations	43	43	43	43	43	43	43	43
R-squared	0.788	0.935	0.918	0.837	0.557	0.915	0.852	0.763
Predetermined district controls	YES	YES	YES	YES	YES	YES	YES	YES
Dependent variable mean	0.290	0.378	0.333	0.567	0.007	0.434	0.554	0.025

Standard errors are reported between brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variables for columns (1) to (5) correspond to voting outcomes for the first round of the 2012 Egyptian presidential elections. The dependent variables in columns (6) to (8) correspond to voting outcomes during the second round of the 2012 Egyptian presidential elections. The dependent variables in column (1), column (2) and column (3) are the shares of votes for independent, former and Islamist candidates, respectively, expressed in % of valid votes, in the first round of the 2012 Egyptian presidential elections. The dependent variable in column (6) is the share of votes for the Islamist candidate Mohamed Morsi, expressed in % of valid votes, in the second round of the 2012 Egyptian presidential elections. The dependent variables in column (4) and column (7) correspond to voter turnout and are computed as the number of votes cast (valid and invalid votes) divided by the number of registered voters per district. The dependent variables in column (5) and column (8) correspond to the share of spoilt votes and are equal to the number of invalid votes cast divided by the number of registered voters per district. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. The dependent variables' means (for Cairo) are reported in the last row.

Table C7: Exposure to protests and the distribution of votes among Islamist candidates, first round of presidential elections

VARIABLES	(1) Fotouh	(2) Al-Awa	(3) Morsi
Martyrs, % of population	-5.099***	-0.216	-3.853*
	[1.007]	[0.156]	[1.914]
Observations	349	349	349
R-squared	0.788	0.591	0.722
Predetermined district controls	YES	YES	YES
Governorate FE	YES	YES	YES
Number of clusters	27	27	27
Dependent variable mean	0.186	0.010	0.257

Robust standard errors in brackets, clustered at the governorate level. *** p<0.01, ** p<0.05, * p<0.1

Notes. The unit of analysis is the district. Each cell represents a coefficient estimate using OLS regression. The dependent variables in column (1) and (2) and (3) are the shares of votes for Abdel Moneim Aboul Fotouh, Mohammad Salim Al-Awa and Mohamed Morsi expressed in % of valid votes, respectively, in the first round of the 2012 Egyptian presidential elections. The main variable of interest is the number of "martyrs," expressed a % of district's population. Regressions include a set of predetermined district controls derived from the Egypt Population, Housing and Establishments Census 2006, described in Section 5.4. Regressions also include governorate fixed effects. The dependent variables' means are reported in the last row.

6 Conclusion

This thesis examines novel research questions to understand the labor market and the institutional impacts of the Arab Spring protests in Egypt. First, it analyzes the effects of the 2011 Egyptian protests on intra-household differences in labor market outcomes. Using data from Egypt and relying on a Difference-in-Differences approach that allows for variable geographical treatment intensity, the analysis compares women and men's labor market outcomes from before and after the uprisings. Second, this thesis sheds light on the important yet understudied question of political outcomes following transformative revolutionary movements. At the intersection of migration, development and labor economics, this thesis also examines an interesting question for developing countries: the impact of return migration on the occupational mobility of returnees versus stayers.

These research questions contribute to various strands of the economic literature on protests, women's labor force participation, women's empowerment, institutions and economic performance, democratization and growth, return migration and human capital accumulation. The novelty of these research questions, the use of unique datasets and wide range estimation techniques are among the most important contributions of this dissertation. The questions addressed in this thesis are also of high relevance for the MENA region and for developing countries in general, in terms of contributions to the existing literature and to policymaking.

In terms of labor market responses to the Arab uprisings, the 2011 Egyptian protests were associated with important reductions in intra-household differences in labor market outcomes, by increasing both women's unemployment and their employment relative to men within the same household. These results are compatible and supported by an intra-household risk sharing mechanism, as the protests are also found to negatively affect men's wages and to increase their volatility. Through an "added worker effect" women increased their labor force participation in the aftermath of the Egyptian protests to face the risk and the instability of their husbands' income flows.

These findings suggest that some labor market adjustments are necessary, especially on the labor supply side. The 2011 political shock led Egyptian women to start searching actively for employment and indeed results suggest that women who belong to the poorest households, which are the most vulnerable to such a negative shock, were increasingly likely to start working. To complete this picture, women's employment was found to increase in "low quality jobs," i.e. in the informal private sector. Whereas, the employment of women who belong to the middle quartiles of the pre-revolution distribution of per capita household income seems irresponsive, as only unemployment increased. The finding suggests that women who belong to middle income quartiles are probably better positioned to bear the burden of the revolution induced negative economic shock without the need to take up jobs in the informal sector.

Even though these results are observed in the short run, some policy recommendations can be suggested in order to provide a means to increase women's labor force participation and employment in the long term. Indeed to absorb the increased influx of women entering the labor market from a previously inactive work status, formal jobs in the private sector enabling women to combine labor market and domestic work would be necessary. The public sector was historically the major employer of women, particularly since it provided flexibility and benefits, including maternity leaves, social security and the possibility to combine work with domestic responsibilities. Since the downsizing of public sector employment in the 1990s, however, employment opportunities are to be found primarily in the private sector, and therefore policies that encourage job creation would help ensure a long term persistence in women's labor force participation and labor supply.

As for political and institutional changes in relation with the Egyptian uprisings, the results suggest that higher exposure to protests intensity leads to a higher share of votes for former regime candidates both during the first and second rounds of the first free Egyptian presidential elections that were held in 2012. The popular protests led in fact to a conservative backlash in areas most affected by protests, in part due to the mismanagement of the transitional period. Indeed, the protests fueled a wave of mistrust towards public institutions and agencies, and led to negative economic expectations and general dissatisfaction with the government and its performance.

Why would it be the case? The reading of the results of this paper suggests that the popular mood soured when people's expectations did not materialize. Individuals were impatient to see rapid reforms and significant societal, economic and political improvements. Those expectations, though, could not be realized in the short term, and the fact that popular aspirations remained unanswered in the transitional period thus fueled a conservative backlash and support for the former regime, which became once again the symbol of security and stability.

Finally, the question of whether Egyptian returnees are more likely to climb the occupational ladder compared to stayers receives an affirmative answer. Not only returnees are more likely to witness upward occupational mobility compared to stayers but they are also found to be more likely to make bigger leaps across the occupational ladder. The results also suggest that only returnees who belong to the upper end of the educational distribution benefit from their migration experience in terms of occupational upgrading, thus highlighting the importance of human capital accumulation and skill acquisition overseas.

These findings offset the negative consequences of high skilled emigration highlighted in the literature and the public debate, as they suggest that high skilled emigration can result in a brain gain for the sending developing countries through return migration. Indeed, this is an aspect of international migration that remains understudied and that potentially could counterbalance the negative "brain drain" hypothesis.

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Genre, Migration et Printemps Arabe: Etude de cas de l'Egypte

Résumé

Cette thèse contribue à la littérature sur les manifestations, la participation des femmes au marché du travail et la migration de retour. Le premier chapitre examine l'impact des manifestations égyptiennes de 2011 sur les conditions du marché du travail des femmes en utilisant des données en panel d'avant et d'après la révolution. En utilisant la méthode des doubles différences ainsi que des données sur les « martyrs » de la révolution égyptienne, les résultats suggèrent que les manifestations de 2011 ont réduit les écarts homme-femme en termes de participation au marché du travail au sein du ménage, à travers l'effet du travailleur additionnel. Le deuxième chapitre examine l'impact de la migration temporaire sur la mobilité professionnelle des migrants de retour vis-à-vis des non-migrants. En employant l'approche de variable instrumentale, des doubles différences et des doubles différences combinées avec la méthode d'appariement, les résultats mettent en avant un effet positif de la migration de retour sur la mobilité professionnelle et surtout, pour les migrants de retour les plus éduqués. Le troisième chapitre examine l'impact des première et deuxième vagues de manifestations égyptiennes sur les résultats électoraux durant les premières élections libres et compétitives égyptiennes. Le résultat principal est qu'une exposition élevée aux manifestations mène à un pourcentage de votes plus élevé pour les candidats de l'ancien régime durant les deux tours de scrutin. Les résultats mettent aussi en lumière que les manifestions ont eu des répercussions conservatrices, aux côtés de prévisions économiques négatives, de l'insatisfaction générale à l'égard de la performance du gouvernement, de la réduction des niveaux de confiance envers les institutions publiques et de la reconnaissance croissante des limitations aux libertés civiles et politiques.

Mots-clés: Printemps arabe, Egypte, Révolution, Manifestations, genre, marché du travail, martyrs, migration de retour, mobilité professionnelle, élections, résultats électoraux.

Gender, Migration and the Arab Spring: Evidence from Egypt

Abstract

This thesis contributes to the literature on protests, women's labor force participation and return migration. The first chapter examines the effects of the 2011 Egyptian protests on the relative labor market conditions of women using panel data from before and after the protests. Using Difference-in-Differences approach and a unique dataset on the Egyptian "martyrs," the results suggest that the 2011 protests have reduced intra-household differences in labor force participation between husband and wife, through an added-worker effect. The second chapter examines whether temporary international migration enables returnees to climb the occupational ladder compared to non-migrants. Using an instrumental variable approach, Difference-in-Differences and Difference-in-Differences matching techniques, the results suggest that return migration increases the probability of upward occupational mobility, in particular for returnees who belong to the upper end of the educational distribution. The third chapter examines the effects of the first and second waves of Egyptian protests, on voting outcomes during Egypt's first free presidential elections. The main finding of this chapter is that higher exposure to protests' intensity leads to a higher share of votes for former regime candidates, both during the first and second rounds of Egypt's first presidential elections after the uprisings. Results also suggest that the protests led to a conservative backlash, alongside negative economic expectations, general dissatisfaction with government performance, decreasing levels of trust towards public institutions, and increasing recognition of limitations on civil and political liberties.

Keywords: Arab Spring, Egypt, Revolution, Protests, Gender, Labor market, martyrs, return migration, occupational mobility, elections, voting outcomes.