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Household behaviour in times of political change: Evidence from Egypt

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Household behaviour in times of political change: Evidence from Egypt*

Abstract

Using representative household survey data, we study the short-term microeconomic effects of the Egyptian revolution on household behaviour in terms of education, health expenditure and savings. We construct a new measure of political instability by analysing the number of fatalities during political protests throughout the country. Difference-in-Differences estimations show that affected households increased spending on education, especially on their sons' higher education. This can be explained by a positive outlook towards the future, with better labour market prospects. At the same time, households decreased spending on health and increased savings, which can be interpreted as precautionary behaviour.

Keywords: Egypt, education, health, household savings, political uncertainty.

JEL Classification: D14, D74, I10, I22

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1 Introduction

“Enough is enough! We want change. Enough of this man ruling all these years. We don’t want inherited rule. This is a state, not a kingdom.”

From the Guardian 1/25/2011, quote of an Egyptian student in Tahrir Square, Cairo.

On 11 February 2011 long lasting protests and demonstrations in Egypt led to President Mubarak stepping down after 30 years in power. This paper exploits this major political change in Egypt to analyse how households respond to and cope with a politically unstable environment. Social unrest and instability is not uncommon in many countries and analysing how these sporadic yet recurrent events affect households is critical in understanding development.

To study the effects of the outbreak of the Egyptian Revolution we rely on two datasets. We combine the representative Egypt Household Income, Expenditure and Consumption Survey with survey rounds in 2009, 2011 and 2013 with the *Wiki Thawra* dataset, a unique statistical record of all individuals arrested, injured or killed during political protests throughout the country. This unique dataset allows us to measure not only exposure to violence but also exposure to varying intensities of the revolution. Our key assumption is that, while everyone is aware of the casualties and violence occurring during demonstrations and protests through various media channels, individuals are more sensitive to casualties in their area of residence because of the increased perception that they themselves or relatives and friends could be affected. Using a difference-in-difference estimator and comparing affected and less affected households, we study several dimensions along which households may respond to the political change and unstable environment: 1) household income and expenditure; 2) education related investment choices by child’s education level and gender; 3) health expenditure; and 4) household savings. We also analyse heterogeneous effects along income levels and location (rural/urban) of the household.

Our findings show that the political change and unstable environment had sizeable effects on household behaviour in Egypt, even after controlling for a set of socio-economic variables. While we do not identify strong effects on overall income and expenditures, we observe that households

increase education spending as a percentage of total expenditure indicating an increased preference for education after the political change. Specifically, households increase overall education expenditures by 11 percent and this increase seems to be driven by households with sons enrolled at the higher education level. Education expenditures for daughters remain unaffected indicating a gender bias and a strong preference for the education of sons. We do not observe expenditure effects on children at primary school level and only weak results for the secondary education level. Furthermore, households living in close proximity of violent events decrease their health expenditures by 23 percent, and this result is mainly driven by households with a high income level. Affected households also save a larger share of their income after the outbreak of the revolution. This result is particularly driven by high-income households. We test the validity of our findings by conducting a range of robustness checks (excluding Cairo, constructing different measures of political instability) and placebo tests to which our estimates remain robust.

We further explore some channels that could explain our results. We interpret the increase in savings and decrease in health expenditure as precautionary behaviour due to an uncertain environment. To explain the increase in education expenditure we look into two additional data sources: election outcome data of the 2012 presidential election and the Arab Democracy Barometer Survey. We find that the increase in education expenditures is particularly prominent in areas where households were in favour of a regime change. We argue that after the fall of Mubarak those households had a positive outlook towards the future, with better labour market prospects, and therefore invested more in their sons' education.

Our research is related to several strands of the literature. Cross-country analyses at the macro-level have shown that political instability and civil unrest are barriers to economic development in terms of growth, investment and saving rates (Alesina and Perotti, 1996; Alesina et al., 1996; Barro, 1991; Yiannis P. Venieris, 1986).¹ There is also a growing literature on the micro-level effects of violence on non-income variables in the context of developing countries generally identifying negative

¹Existing research shows that episodes of social unrest and their associated market disruptions, even if short-lived, may have long-term consequences, especially in low-income countries where individuals lack savings, insurance, and other formal means of coping with shocks. (See for example Frankenberg et al. (2003) on household responses to the Asian Financial Crisis in Indonesia, McKenzie (2003) on Mexican Peso Crisis, and Stillman and Thomas (2008) on the 1996-1998 economic crisis in Russia)

effects on variables of interest. For example, Akresh et al. (2011) and Leon (2012) show negative effects on educational attainment in post-conflict Rwanda and Peru respectively. Shemyakina (2011) looks at the 1992-1998 conflict in Tajikistan and finds that exposure to violence leads to a lower likelihood of being enrolled in school, especially for girls. There is also research showing negative effects on health outcomes e.g. in Burundi (Bundervoet et al., 2009), Cote d'Ivoire (Minoiu and Shemyakina, 2012) and Colombia (Camacho, 2008). Thirdly, this paper is also related to the literature investigating whether violence changes the perception of risk and economic decisions. Aaberge et al. (2014) find that, in line with a precautionary savings model, households save more following a political shock in the context of China.

Callen et al. (2014) investigate the relationship between violence and economic risk preferences in Afghanistan and identify a preference for certainty with more exposure to violence. Large adverse shocks can thus alter savings and investments decisions, and potentially have long-run consequences - even if the shocks themselves are temporary. Dupas and Robinson (2012) study the economic and social consequences of a post-election crisis in Kenya and find that in addition to lost income, workers engaged in riskier health behaviour. On the other hand, Voors et al. (2012) examine the impact of exposure to conflict on social, risk and time preferences and find that individuals exposed to violence display more altruistic behaviour towards their neighbours, are more risk-seeking, and have higher discount rates.

Our contribution to the literature is threefold. First, and most importantly, we analyse a major and unanticipated intense political crisis which has had significant effects in many countries in the Middle East, including Egypt, a country that has not been extensively researched by the literature. While previous literature has shown that civil war has devastating effects on affected communities, our contribution is to show that violence and unrest, a milder and more common form of conflict, can also have important significant effects on the behaviour of households. Our unique dataset allows us to analyse the effects of violence and political change on a geographically disaggregated level with detailed information on the intensity of the events. Second, we add to the literature on the response of households to shocks by exploring the relation between violence and political change, education and health expenditure as well as savings. We offer an innovative and new

interpretation of a surprising result - the increase in education expenditure of affected households - although this result needs to be observed with caution due to a small sample size. Third, this paper contributes to the large literature on risk-coping and decision making after large and traumatising aggregate shocks. We contribute to this literature by showing the effects of violent demonstrations and protests on savings behaviour in the context of post-revolution Egypt.

The paper is organised in the following way: Section 2 provides an overview of the outbreak of the Egyptian Revolution and the economic and political context in Egypt. Section 3 describes our data and presents descriptive statistics and Section 4 describes the empirical identification strategy. Section 5 discusses results and Section 6 provides a heterogeneity analysis. Section 7 shows robustness checks and Section 8 discusses our channels. The final Section concludes.

2 Egypt and the 25 January Revolution

2.1 Context: The 25 January Revolution

On 17 December 2010, a 26-year old Tunisian man set himself on fire after abusive police confiscated his unlicensed vegetable cart, his only source of income. This desperate act of protest inspired a movement that swept the country and ignited calls for reform throughout the region. On 25 January 2011, Egyptians from a range of socio-economic and religious backgrounds came together by the thousands to launch a massive pro-democratic movement throughout the country and demanded the overthrow of President Hosni Mubarak. The sparks behind the outbreak were various political and legal issues, including police brutality, lack of free elections and freedom of speech, corruption and economic issues such as high unemployment and low wages². Eighteen days of mass protests forced Hosni Mubarak to resign in February 2011, after three decades in power.

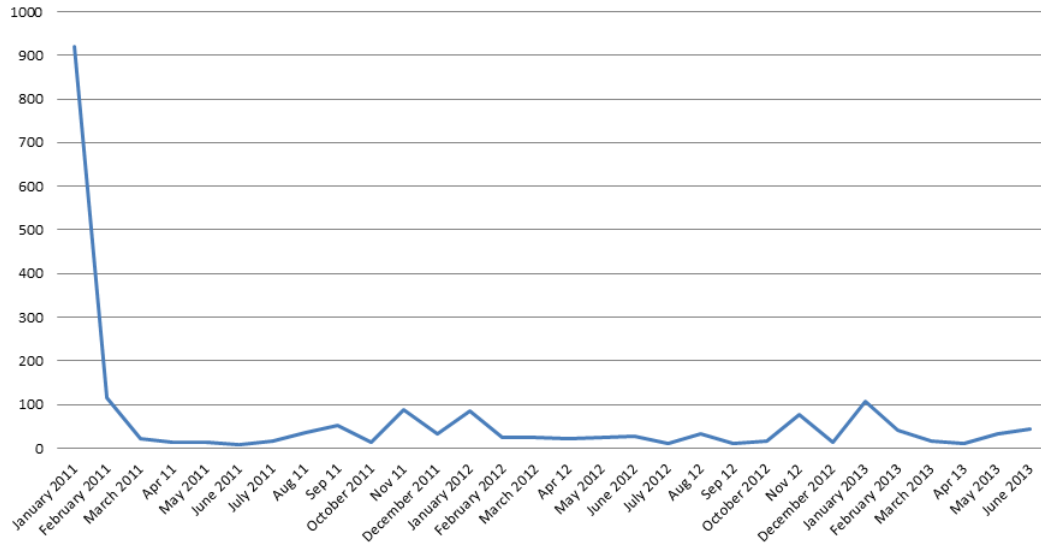
Following Mubarak's resignation, the Supreme Council of the Armed Forces (SCAF) assumed presidential powers. Parliamentary elections in 2012 saw an overwhelming victory for the Muslim Brotherhood's Freedom and Justice Party. In June 2012, Mohammed Morsi (Muslim Brotherhood party) was elected president with 52 percent of votes. Public opposition to Morsi began to build

²See archives of numerous newspaper articles including in Al Jazeera, The Economist, France 24, Reuters etc.

in November 2012, when he issued a decree granting himself far-reaching powers, and were fuelled by the passage of what some considered an Islamist-leaning draft constitution. Morsi was deposed by the military in June 2013 after thousands of protesters took to the streets and he was replaced by an interim government. Security forces then launched a crackdown on the Muslim Brotherhood, killing almost 1,000 people at two pro-Morsi sit-ins in Cairo and Giza. In December 2013, a constituent assembly finished drafting a new constitution to replace the 2012 charter. Since then, Egypt has been polarised between supporters of the interim government and the military on one side, and supporters of the Muslim Brotherhood and those who fear the authorities have become too repressive on the other side. We have summarised the key dates of the Egyptian Revolution below:

- **25 January 2011:** Outbreak of the Egyptian Revolution forcing President Mubarak to resign.
- **18 June 2012:** First elections held since President Hosni Mubarak stepped down. The Muslim Brotherhood Party represented by Mohammed Morsi wins the election.
- **3 July 2013:** Mohammed Morsi is deposed by the military and replaced by an interim government.
- **8 June 2014:** Abdel Fattah El-Sisi (previously head of the Egyptian Armed Forces) is sworn into office as President.
- **Since:** Occasional demonstrations and protests.

Figure 1: Death occurrence per month



2.2 Context: Egypt

With over 83 million inhabitants, Egypt is the largest country in the Middle East and North Africa. From the mid-2000s to 2011, the Egyptian economy has been growing at a strong pace. Since 2011, the macroeconomic picture has deteriorated due to unresolved political tensions. The GDP growth rate in Egypt averaged 3.69 percent from 1992 until 2014, reaching an all time high of 7.30 percent in the first quarter of 2008 and a record low of -4.30 percent in the first quarter of 2011. In terms of the Human Development Index (HDI) of Egypt, reported by the United Nations to measure the progress of a country, Egypt scored 0.682 points in 2013, leaving it in 104th place in the table of 178 countries published. Egypt is divided into 27 governorates and each governorate has a capital. The governorates are further divided into regions or districts.

Egypt is going through a demographic phase marked by a significant portion of young people in the population that is projected to increase in the next decade. With past high rates of population growth, the current age structure is heavily weighted towards the young: one-third of the population is under the age of 14, and another third is between the ages of 15 and 29. While this age structure can be advantageous to a country, the pressure to provide employment opportunities is enormous.

This paper focuses on changes in education and health expenditure as well as savings following the outbreak of the Egyptian Revolution in January 2011. It is useful to start by briefly providing basic information concerning the education and health system in Egypt.

The adult literacy rate of 67 percent does not reflect the historically high primary school enrolment and completion rates, calling into question the efficacy of primary education. The school system consists of six years of primary school education (age 6-12), three years of preparatory school (age 13-15) and three years of either general or vocational secondary school (age 16-18). Compulsory schooling ends after the 9th grade. Those students who graduate from the general secondary school can enter university (roughly 30 percent per cohort). Upper secondary education and higher education are heavily oriented towards academic university degrees, instead of towards the skills demanded in the labour market. At all levels of the education system, parents can choose whether they wish to send their children to the public education institutions or to higher quality but also more expensive private institutions. According to the Ministry of Education, the share of public expenditures on education is about 12.5 percent, close to that of the Organisation for Economic Cooperation and Development (OECD) countries, which calls for efficiency improving.

Egypt manages a complex social security system, including employment services, social insurance (health, pension, and unemployment) and social assistance (food and fuel subsidies and cash transfers). The system faces significant challenges, in particular high youth unemployment, a large informal sector, and costly untargeted subsidies, which are a large burden on the budget. In Egypt, the health care system provides health care services through three channels. These channels are: the public sector, the private sector and the civil society. While the government provides basic and emergency care through public hospitals, many times Egyptians need to pay for better or special treatment. Health care costs can cause financial hardship directly via health care payments, and indirectly due to lost income resulting from the inability to work. Some households may use savings, borrowing or selling assets to cope with health shocks. Other households with limited resources may have no option but to cut their spending on necessary goods to cover their health expenses. According to the World Health Organisation (WHO) database, the share of the government in total health spending declined from 41.7 percent in 2010 to 37 percent in 2011 putting more burden on

households. So-called out-of-pocket payments account for about 60 percent of total health spending.

3 Data and Descriptive Statistics

Findings of this paper rely on two main data sources: the Egypt Household Income, Expenditure and Consumption Survey (HIECS) collected by the Central Agency for Public Mobilisation and Statistics (CAPMAS) and “Wiki Thawra”³ an independent statistical database of the Egyptian Revolution, collected by the Egyptian Center for Economic and Social Rights.

3.1 The Household Survey

The Household Income, Expenditure and Consumption Survey (HIECS) is administered by the CAPMAS and made available by the Economic Research Forum⁴. The survey was conducted every five years until 2009 and is now implemented every two years. In this study, we use three rounds of the HIECS: 2008-2009, 2010-2011 and 2012-2013 (in short 2009, 2011, and 2013). Survey samples are nationally representative and stratified by governorate, and urban and rural substrata. The original full samples of the 2009 survey included 48,000 households, but starting from 2011 the survey includes a smaller sample of 16,000 households. The households are selected via a multi-stage random process from a master sample constructed from the 2006 population census. The survey period of each HIECS extends over a 12 months period, starting from July and ending in June of the following year. Households were observed for two continuous weeks to collect information on food expenditure.

The HIECS is one of the largest household surveys and has been used extensively for the study of poverty and living standards in Egypt. The survey includes information on various aspects of a household’s income, expenditure and consumption. The CAPMAS provides researchers with access to only 50 percent of observations of the HIECS. Also, the household questionnaire contains much more detailed questions on all sorts of expenditures but not all responses have been published by the institutions. The quality of the Egyptian household survey data has been assessed by the World

³<http://wikithawra.wordpress.com/>

⁴www.erf.org.eg

Bank (2014), a study that carried out a number of quality tests on the data related to income and expenditure. The study did not find relevant problems related to measurement, data input and item non-response.

3.2 Revolution Intensity

The Egyptian Center for Economic and Social Rights’ project “Wiki Thawra” aims to provide neutral documentation of Egypt’s revolution. *Thawra* is Arabic and means “revolution”. Wiki Thawra aggregates a large quantity of material, including videos, news clips, official and human rights reports, and lists those killed, injured and detained since 25 January 2011. With a comprehensive and detailed inventory of those killed during protests, Wiki Thawra tracks recent events from the outbreak of the January 25 Revolution to the ouster of former President Mohamed Morsi in 2013. According to Wiki Thawra 1983 individuals have been killed in protests and demonstration from 25 January 2011 to 30 June 2013 throughout the country. The database contains information on each victim including the day of death, event, exact place of death as well as personal information such as age, profession, address etc. Reputable NGO’s such as Amnesty International, Human Rights Watch and others are relying on the data of Wiki Thawra.

We have combined the two datasets at the governorate level (see Table 1). The *Wiki Thawra* database would allow a more disaggregated analysis as we can observe the address of each individual included in the database. The household questionnaire does include information at district level, but this data is neither publicly available nor available upon request. Table 1 provides the population number by region and shows the fraction of death occurrences by population, sorted by death occurrences as a fraction of the population size in each region. The significance of a given number of deaths in a domestic disturbance or a civil war clearly depends to some extent on the size of the population. Thus, the number of deaths are measured in per capita, not in absolute, terms. As expected, Cairo witnessed the highest number of death occurrences in total numbers. However, some small regions (North Sinai, Port Said, South Sinai, Suez) appear to be more strongly affected when the population size is taken into account. We can see that only the Red Sea region has not experienced any death occurrences.

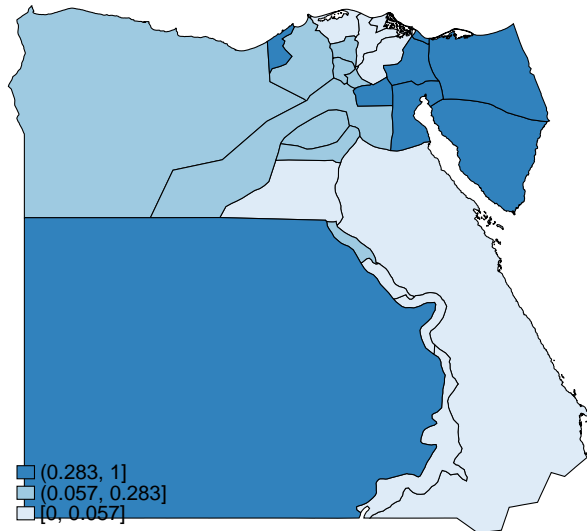
Table 1: Death occurrence by governorate between January 2011 and June 2013

Region	Population	Number of deaths	Per 10,000 inhabitants
North Sinai	395,000	118	2.9873
Port Said	628,000	144	2.2929
South Sinai	159,000	20	1.2578
Suez	576,000	61	1.0590
Cairo	8,762,000	650	0.7418
New Valley	208,000	15	0.7211
Alexandria	4,509,000	150	0.3326
Ismailia	1,077,000	32	0.2971
Matrouh	389,000	11	0.2827
Giza	6,979,000	183	0.2622
Faiyum	2,882,000	65	0.2255
Asyut	3,888,000	81	0.2083
Qalyubia	4,754,000	90	0.1893
Beni Suef	2,597,000	28	0.1078
Beheira	5,327,000	52	0.0976
Gharbia	4,439,000	38	0.0856
Monufia	3,657,000	25	0.0683
Minia	4,701,000	27	0.0574
Damietta	1,240,000	7	0.0564
Qena	2,801,000	14	0.0499
Dakahlia	5,559,000	26	0.0467
Asuan	1,323,000	6	0.0453
Al Sharqia	6,010,000	27	0.0449
Sohag	4,211,000	17	0.0403
Luxor	1,064,000	3	0.0281
Kafr El Sheikh	2,940,000	8	0.0272
Red Sea	321,000	0	0
Total	81,396,000	1983	0.2436

Notes: Source: Population numbers from CAPMAS (as of January 2012) and number of deaths from Wiki Thawra for the period 25.January 2011 to 30.June 2013. Column 4 shows the relative number of deaths, dividing column 3 by column 2 and multiplying by 10,000.

Figure 2 displays the geographical distribution of death occurrences between January 2011 and June 2013. Based on the Wiki Thawra database, we created three revolution intensity levels: weak, medium and strong. A weak intensity group witnessed less than 10 deaths in their region and contains one third of all observations. The strong (medium) intensity group witnessed more than 160 death occurrences (between 11 and 159) and contains one third of all observations. We have conducted robustness checks by creating several other intensity measures (by number of regions, relative number of deaths etc.) to verify whether we receive different results but the results were consistent with any type of intensity measure. The reason for this is that regions typically change their position in the ranking only slightly if we use alternative measures and thus they stay in the same category of weak, medium or strong treatment. To summarise, strongly affected regions have witnessed a relatively high number of death occurrences. These regions are marked in dark blue in Figure 2.

Figure 2: Egypt revolution intensity at governorate level



Notes: Deaths per 10.000 inhabitants.

3.3 Measuring Political Instability

Social and political instability is hard to define and to measure in a way which can be used for econometric work. Political instability can be viewed in two ways. The first one emphasises executive instability. The second one is based upon indicators of social unrest and political violence.

The first approach defines political instability as the 'propensity to observe government changes'. These changes can be 'constitutional', i.e. take place within the law, or 'unconstitutional', i.e. they can be coups d'état. The basic idea is that a high propensity to executive changes is associated with political uncertainty. Alesina and Perotti (1996) investigate the relationship between political instability and per capita GDP growth and find that in countries with a high propensity of government collapse, growth is significantly lower. Yiannis P. Venieris (1986) identify an inverse relationship between political instability and the savings rate. In their paper, political instability introduces a new element of uncertainty in the decision-making calculus of the economic actor since it is usually perceived as a precursor of conceivable changes in the governmental regime, which, in turn, may affect one's future level of accumulated wealth and income.

The second approach to measuring political instability is constructing an index which summarises various variables capturing phenomena of social unrest. Our paper is in line with the second approach, although it is not the first one aiming to measure political instability by focusing on the number of deaths occurring during demonstrations. Notably, Barro (1991) uses indicators such as number of assassinations, the occurrence of violent revolutions and military coups in a cross-country analysis to study their effects on average growth levels on a large sample of countries. Alesina and Perotti (1996) study the effects of income distribution on investment, by focusing on political instability as the channel which links these two variables. Their paper relies on an index constructed by using information on the number of politically motivated assassinations; the number of people killed during mass violence as a fraction of total population; the number of successful coups etc. An important reference on this point is Hibbs (1973), who uses the method of principal components to construct such an index. Gupta (1990), Özler and Tabellini (1991) and Benhabib and Spiegel (1992) have used several indices of socio-political instability as an explanatory variable

in various regressions in which the dependent variable is growth, savings or investment.

3.4 Descriptive Statistics

This Section aims at providing some basic descriptive statistics. Table 2 contains summary statistics of the Egypt Household Income, Expenditure and Consumption Survey across all three time periods we are observing (2009, 2011 and 2013). We look at several variables such as household total expenditure, total disposable income, some household characteristics, and focus on expenses on education by educational level, health expenses as well as savings. In the Household Income, Expenditure and Consumption Survey all expenditure variables are recorded as yearly amounts. The data is deflated using specific inflation rates that differ by rural and urban region and by expenditure category (specific education and health inflation rates). 2009 and 2011 (column 1 and 2) show outcomes for households before the revolution started and 2013 (third column) presents outcomes for households after the revolution had started. We observe that between 2009 and 2011 total expenditure and all education related expenditures have increased. Between 2011 and 2013, however, these expenditures have decreased. Medical expenses increase continually over the years, whereas savings decrease between the first two rounds and increase again between 2011 and 2013. The number of earners per household as well as the household size (number of persons) decreased over the three survey years. There are over 7000 households observed in each survey year.

It is worth mentioning that the variable *expenditure on education* includes expenses for all education levels and does not cover expenditure on educational materials such as books, catering and transport services. Education expenses by education level (primary, secondary and tertiary) also include costs of private tutoring and tutoring groups. Expenses on health include medical products, appliances and equipment, outpatient services, and hospital services. Payments for health insurances are excluded. Savings are calculated by deducing total expenditure from total disposable income.

The revolution started on 25 January 2011. However, we consider the two survey years 2009 and 2011 as the pre-revolution phase, and only 2013 as post-revolution. This is mainly because the relevant variables on household expenditure and income are provided on an annual basis and we

consider the few months after 25 January 2011 as too short to identify any effect of the revolution. Therefore, the survey year 2010/2011 is considered as pre-revolution in our analysis. We have conducted a robustness check by running the same estimations without the year 2010/2011 and we receive consistent results.

Table 2: Descriptive statistics by year

	2009	2011	2013	Total
Total expenditures	18025.4 (14328.0)	19042.4 (14294.1)	18707.3 (11752.8)	18586.0 (13538.9)
Total disposable income	21838.9 (24750.0)	21533.3 (17738.7)	21712.4 (15398.5)	21695.9 (19779.3)
Net wages	13791.8 (11321.1)	14273.9 (11059.9)	15288.9 (10698.2)	14430.2 (11055.0)
Number of earners	1.781 (0.955)	1.735 (0.933)	1.646 (0.868)	1.722 (0.922)
Expenses on education	1087.3 (3473.8)	1266.3 (3942.2)	1145.8 (2486.8)	1163.7 (3355.9)
Expenses on primary education	475.2 (2048.5)	562.7 (1379.9)	509.9 (990.1)	514.3 (1559.2)
Expenses on secondary education	910.1 (2298.4)	1027.1 (2607.7)	968.9 (1670.5)	967.3 (2221.7)
Expenses on tertiary education	1296.4 (3080.8)	1887.0 (5960.0)	1453.9 (3870.4)	1518.2 (4342.6)
Education exp. as % of total expenditure	0.0409 (0.0516)	0.0438 (0.0535)	0.0432 (0.0529)	0.0426 (0.0526)
Expenses on health	999.2 (3098.4)	1702.1 (2872.5)	1911.1 (2828.0)	1529.4 (2963.7)
Savings	3813.5 (17945.3)	2490.9 (10245.1)	3005.1 (8150.0)	3109.9 (12918.5)
Observations	7913	7719	7528	23160

Notes: This table shows the mean and the standard deviation in brackets. Data is deflated, using 2010 as the basis year. The price index is based on information provided by CAPMAS. These figures are annual numbers for the Egyptian financial year, i.e. 2009 means July 2008-June 2009. Source: CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

Table 3 provides basic descriptive statistics for the different governorates by revolution intensity (weak, medium and strong) in 2013. There are considerable differences among households living in these three regions. Total expenditure, income and wages are much higher in the strongly affected regions. Overall education expenditure in strongly affected regions is double the expenditure in weakly affected regions (three times as high for primary education). When it comes to health expenditures, however, there are only small differences. Savings are slightly lower in strongly

affected areas. Overall, we observe 7528 households in 2013 with a slightly higher number in weakly affected areas.

Table 3: Descriptive Statistics by revolution intensity (in 2013)

	Weak	Medium	Strong	Total
Total expenditures	17422.1 (9330.6)	17745.1 (10085.5)	21043.0 (14872.2)	18707.3 (11752.8)
Total disposable income	20455.9 (12565.5)	20954.4 (14785.0)	23825.7 (18344.3)	21712.4 (15398.5)
Net wages	14792.4 (9509.0)	14067.5 (9641.7)	16852.4 (12379.4)	15288.9 (10698.2)
Number of earners	1.610 (0.851)	1.729 (0.925)	1.610 (0.827)	1.646 (0.868)
Expenses on education	806.5 (1604.2)	676.7 (1393.9)	2004.1 (3672.5)	1145.8 (2486.8)
Expenses on primary education	311.4 (463.8)	295.9 (515.1)	978.7 (1533.9)	509.9 (990.1)
Expenses on secondary education	707.0 (897.3)	594.1 (1113.7)	1648.6 (2451.6)	968.9 (1670.5)
Expenses on tertiary education	1024.0 (2949.5)	1077.6 (2232.3)	2103.1 (5163.6)	1453.9 (3870.4)
Education exp. as % of total expenditure	0.0341 (0.0424)	0.0282 (0.0363)	0.0686 (0.0667)	0.0432 (0.0529)
Expenses on health	1928.1 (2575.0)	1737.8 (2313.7)	2054.5 (3460.6)	1911.1 (2828.0)
Savings	3033.8 (7024.1)	3209.3 (8830.4)	2782.7 (8646.3)	3005.1 (8150.0)
Observations	2763	2298	2467	7528

Notes: This table shows the mean and the standard deviation in brackets. Data is deflated, using 2010 as the basis year. The price index is based on information provided by CAPMAS. These figures are annual numbers for the Egyptian financial year, i.e. 2009 means July 2008-June 2009. Weak (Strong) means the 33 percent least (most) affected regions (measured in number of deaths). Source: CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

4 Empirical Identification Strategy

In this paper, we provide evidence on how households respond to political instability and political change using the outset of the Egyptian Revolution on 25 January 2011 as a quasi-natural experiment. This involves answering the counterfactual question: what would have been the household's behaviour in terms of expenditure, income and consumption in the absence of the Egyptian Revolution? Obviously, it is impossible to observe the same household in these two scenarios at the

same time and therefore, we rely on the construction of a counterfactual to assess the impact of an increased politically unstable environment. Although the Egyptian Revolution affected the entire country, it is possible to differentiate the intensity of the revolution by region.

One key assumption behind our approach is that individuals living closer to violent demonstrations and casualties are more sensitive, because of the higher perception that they themselves or relatives may be affected. While everyone is aware of the violent events through various media channels, households residing in higher risk areas are more likely to feel insecure and at risk.

We measure political instability by the number of deaths per region that occurred during political demonstrations. Violences and deaths are to a large extent unpredictable events. To account explicitly for the possibility that households in the affected regions had different time-invariant characteristics, the identification strategy is based on the comparison of household expenditure, income and consumption before and after the outbreak of the Egyptian Revolution in weakly, medium and strongly affected regions. This approach could be interpreted as a continuous difference-in-difference analysis (Meyer, 1995).

Suppose that there are two groups indexed by treatment status $D = 0, 1$ where $D = 0$ indicates households living in a region where very few or no violences took place, i.e. the control group, and $D = 1$ indicates households living in a region that was affected by violences, i.e. the treatment group. We take into account that the intensity of the revolution varies by region, therefore the treatment variable has different intensities measured by the number of death occurrences (medium and strong) across regions. Assume that we observe households in two time periods, $t = 0, 1$ where $t = 0$ indicates a time period before treatment i.e. before the revolution started, in our dataset this would be the years 2008/9 and 2010/11 and $t = 1$ indicates a time period after treatment i.e. after the revolution started, in our dataset this would be the year 2012/13. The outcome is modeled by the following equation:

$$y_{h,t} = \alpha + \beta D_{m/s} + \gamma t + \delta(D_{m/s} * t) + \lambda X_{h,t} + \epsilon_{h,t} \quad (1)$$

where h and t are household and time indices. X consists of a number of additional controls,

such as household size, education of the household head and rural area. The coefficients given by $\alpha, \beta, \gamma, \delta$ are all unknown parameters and ϵ is a random, unobserved “error” term which contains all determinants of y_h that the model omits. The coefficients in the equation have the following interpretation:

α = constant

β = treatment group specific effect (to account for average permanent differences between treatment and control group)

γ = time trend common to control and treatment groups

δ = treatment effect for coefficient of interest

The purpose of the analysis is to find a good estimate of δ through a difference-in-difference approach. The difference-in-difference estimator is defined as the difference in average outcome in the treatment group before and after treatment *minus* the difference in average outcome in the control group before and after treatment:

$$\delta_{DD} = [E(treated_{after}) - E(treated_{before})] - [E(control_{after}) - E(control_{before})]$$

The method of estimation is least squares and clustered standard errors at the governorate level are calculated throughout. For the main specification above to yield causal estimates of the treatment effects, we rely on two assumptions: 1. Exogenous revolution pattern; 2. Common trend assumption. We complement this with a placebo test.

4.1 Balancing Test

Table 4 provides a balancing test for 2009 including the mean and standard deviation for each variable of interest as well as the t-test for the difference of means. We have split the governorates by revolution intensity i.e. low, medium and strong. Low means that this group was weakly or not affected by the revolution in terms of number of death occurrences. This is our control group. The other two groups were affected by an increasing intensity level. A balancing test allows us to understand if the affected areas (by intensity level) had different baseline characteristics in

2009 (pre-revolution). We can see that the difference between the control group (i.e. low) is not significantly different from the medium affected group (column 5). This means that the baseline characteristics of these two groups are very similar i.e. they are comparable. The difference between the strongly affected group and the other two, however, is significant, which means that the baseline characteristics of these comparison groups are quite different and they cannot be compared easily. The only variable where the difference is insignificant across groups is the variable for savings suggesting that savings behaviour is similar across all three groups. In the difference-in-difference analysis it is not problematic to have different baseline characteristics, as long as the trends are the same. We will analyse this in the next subsection.

Table 4: Balance table, 2009

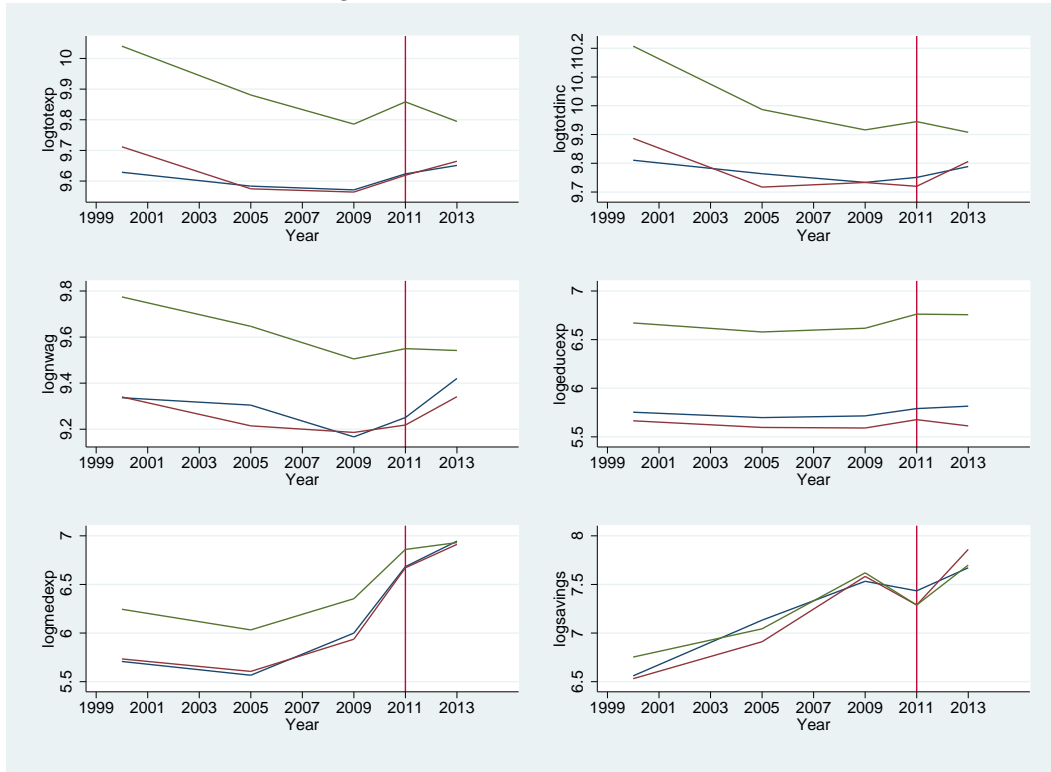
	(1) Total	(2) Low	(3) Medium	(4) Strong	(5) t-test M-L	(6) t-test S-L	(7) t-test S-M
Total expenditure	18586.03 (13538.93)	16889.62 (9738.98)	16933.25 (9958.22)	21816.32 (18266.89)	43.63 (-0.27)	4926.69*** (-19.57)	4883.06*** (-21.70)
Total disposable income	21695.94 (19779.30)	20067.15 (15235.51)	20222.56 (20846.51)	24671.45 (21461.21)	155.41 (-0.51)	4604.30*** (-14.54)	4448.89*** (-13.57)
Net wage	14430.22 (11054.99)	13009.92 (9158.60)	12861.02 (9302.30)	17016.68 (13218.76)	-148.90 (0.78)	4006.77*** (-16.44)	4155.66*** (-19.24)
Rural residence	0.46 (0.50)	0.28 (0.45)	0.27 (0.45)	0.80 (0.40)	-0.01 (0.92)	0.52*** (-73.54)	0.53*** (-80.07)
Number of earners	1.72 (0.92)	1.73 (0.92)	1.76 (0.95)	1.68 (0.89)	0.03 (-2.22)	-0.05*** (3.24)	-0.08*** (5.79)
Household size	4.48 (2.05)	4.52 (2.10)	4.71 (2.16)	4.20 (1.83)	0.18*** (-5.21)	-0.33*** (9.93)	-0.51*** (16.28)
Education expenditure	1163.70 (3355.87)	736.39 (1709.78)	703.95 (1648.02)	2061.52 (5203.87)	-32.44 (0.90)	1325.13*** (-14.81)	1357.56*** (-17.71)
Primary education exp	514.28 (1559.24)	289.98 (540.09)	284.18 (477.17)	1005.64 (2603.36)	-5.80 (0.46)	715.65*** (-14.03)	721.45*** (-16.61)
Secondary education exp	967.29 (2221.73)	598.39 (793.22)	605.37 (963.47)	1745.67 (3587.36)	6.98 (-0.27)	1147.28*** (-14.38)	1140.31*** (-16.39)
Tertiary education exp	1518.23 (4342.56)	1100.08 (3426.19)	1067.30 (3319.39)	2185.44 (5445.69)	-32.78 (0.18)	1085.36*** (-4.35)	1118.14*** (-4.90)
Education of total exp	0.04 (0.05)	0.03 (0.04)	0.03 (0.04)	0.07 (0.07)	-0.00 (1.62)	0.03*** (-26.46)	0.03*** (-31.91)
Health expenditure	1529.43 (2963.70)	1445.71 (2511.24)	1383.96 (3121.14)	1760.48 (3109.19)	-61.75 (1.30)	314.77*** (-6.54)	376.52*** (-7.76)
Savings	3109.91 (12918.51)	3177.52 (10632.10)	3289.30 (16687.22)	2855.13 (9339.62)	111.78 (-0.47)	-322.39 (1.94)	-434.17 (2.04)

Notes: This table shows differences in the control group (low) and the two treatment intensities (medium and strong) for 2009. All figures are deflated, using 2010 as the basis. For column (1) to (4), it shows means and standard errors in parenthesis: * p<0.10, ** p<0.05, *** p<0.01. Column 5-7 respectively show the mean difference between medium treatment intensity and the control group, strong treatment intensity and the control group and medium and strong treatment intensity (t-statistic in parenthesis). Source: CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

4.2 Common Trends Assumption

The difference-in-difference estimation strategy requires that the counterfactual *trend* behaviour of treatment and control group is the same. Treatment, which is in our case being exposed to a medium or high level revolution intensity, induces a deviation from this common trend. Although the treatment and control regions can differ, this difference is meant to be captured by the respective region fixed effect. The common trends assumption can be investigated by using data on multiple periods. We obtained data of the Egypt Household, Expenditure and Consumption Survey for the 2000 and 2005. This enables us to investigate the common trends assumption for the variables of interest. For most variables, the graphs in Figure 3 and 4 provide strong visual evidence that follow a common underlying trend, and a treatment effect that induces a deviation from this trend. Figure 3 shows trends for total expenditure, total disposable income, net wage, education expenditure, medical expenditure and savings (all in logarithms).

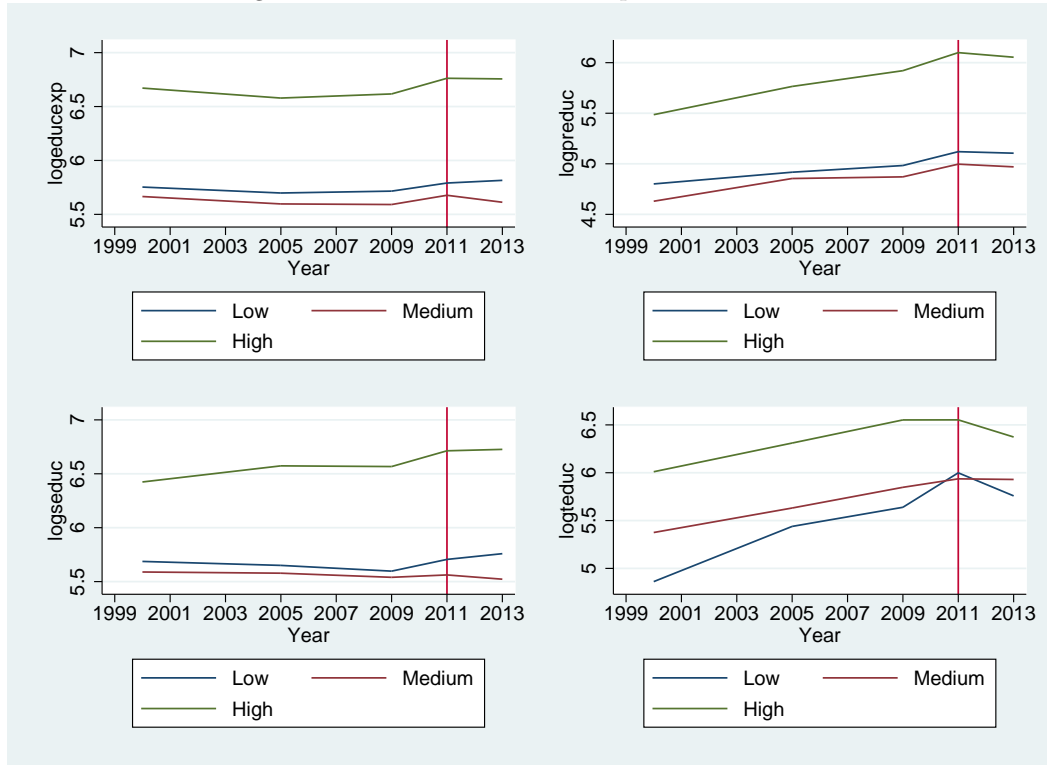
Figure 3: Trends for outcome variables



Notes: Blue indicates weak, red medium and green strong treatment. The red line marks the onset of the revolution. Data is deflated. Source: CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

Figure 4 shows trends for expenditure on education (all education levels) and well as education expenditure by education level (primary, secondary and tertiary level, all in logarithms).

Figure 4: Trends for education expenditure variables



Notes: Blue indicates weak, red medium and green strong treatment. The red line marks the onset of the revolution. Data is deflated. Source: CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

4.3 Placebo Analysis

An important validity instrument of the assumptions in our research context is a placebo test. The placebo test verifies whether treated and control regions have experienced different behaviour also during previous time periods, in the absence of the violent protests and demonstrations. Table 5 provides a placebo test for the main outcome variables using the year 2007 as the placebo year. The results of the placebo test confirms our original assumption of the parallel trend in variables of interest across governorates that were to a varying degree affected by the revolution. As we do not

find any significant effects we can conclude that the results we identify are driven by the casualties during violent demonstrations and protests.

Table 5: Placebo table, using 2007 as the revolution year

	(1)	(2)	(3)	(4)
	Wages	Tertiary education exp.	Health expenditures	Savings
Strong*After	-0.0117 (0.0252)	0.0477 (0.189)	-0.154 (0.110)	0.199 (0.130)
Medium*After	0.0259 (0.0227)	0.00831 (0.207)	0.0331 (0.118)	0.0591 (0.138)
Strong Revolution	-0.149*** (0.00860)	-0.477*** (0.0383)	0.165*** (0.0313)	-0.646*** (0.0414)
Medium Revolution	-0.108*** (0.00956)	-0.363*** (0.0530)	0.0172 (0.0293)	-0.377*** (0.0376)
after_placebo	0.205*** (0.0194)	0.527*** (0.153)	0.627*** (0.102)	-0.726*** (0.130)
logtotdinc	0.675*** (0.0147)	0.852*** (0.0437)	0.828*** (0.0211)	1.899*** (0.0850)
Observations	51232	8344	74197	63350
r2	0.574	0.282	0.366	0.354

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Variables are measured in logarithms. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008–June 2009. Controlling for urban, education of household head, household composition. The source is CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

5 Estimation Results

In this paper we address the question whether and to which extent a politically unstable environment affects household's economic behaviour in terms of expenditure and savings. This Section presents the estimation results on 1) overall income and expenditure; 2) education expenditures (by education level and child); 3) health expenditures and 4) savings. We show heterogeneous effects throughout the Section where applicable (by income level and gender).

5.1 Average Effects on Income and Expenditures

Table 6 presents the results of our estimation with total expenditure, total expenditure per capita, total disposable income and net wage and salaries as dependent variables. These variables are not the primary focus of our analysis and the results are mainly presented to provide a complete

picture of the revolution effects. The coefficients of interest are the interaction terms *Strong*2013* and *Medium*2013*. They illustrate households after the revolution in medium or strongly affected areas. We can see that the revolution had a sizeable and significant effect on almost all variables. Total expenditure decreased by 3.0 percent in strongly affected areas. The revolution had the strongest effects on net wage with a 12.1 percent decrease in strongly affected areas and a 3.8 percent decrease in medium affected areas.

Table 6: The effects of the revolution on expenditure, income and wages

	(1) expenditures	(2) log(exp.)	(3) log (exp. p.c.)	(4) log(income)	(5) wages
Strong*2013	-934.9** (382.7)	-0.0296** (0.0129)	-0.0166 (0.0156)	-0.0235 (0.0419)	-0.121*** (0.0307)
Medium*2013	-743.5* (406.2)	-0.00927 (0.0134)	-0.0148 (0.0157)	0.0980*** (0.0318)	-0.0377 (0.0289)
Strong Revolution	5370.5*** (165.4)	0.110*** (0.00651)	0.0861*** (0.00886)	0.0496** (0.0209)	-0.191*** (0.0103)
Medium Revolution	2212.9*** (218.9)	0.0351*** (0.00519)	-0.00230 (0.00652)	0.00977 (0.0127)	-0.116*** (0.0104)
2013	285.5 (299.2)	0.0293** (0.0113)	0.0291** (0.0126)	0.0383 (0.0278)	0.136*** (0.0241)
income	17844.6*** (2371.7)	0.767*** (0.0244)	0.705*** (0.0311)		0.703*** (0.0158)
Observations	23159	23159	23159	23159	15121
r2	0.583	0.853	0.780	0.389	0.445

Notes: This table shows the mean and standard errors (clustered at the governorate level) in parenthesis: * p=0.10, ** p=0.05, *** p=0.01. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year. Controls: governorate, rural, household size, education of household head. Column (1) shows total expenditures, column (2) total expenditures in logs, column (3) shows total per capita expenditures in logs and column (4) total disposable income in logs. Column (5) shows a standardised measure of wages. Data source: CAPMAS/ERF, HIECS.

5.2 Effects on Education Expenditure

Analysing revolution effects on education expenditure is one of our main purposes for this paper. Particularly in post-conflict contexts and in otherwise fragile states, education plays a significant stabilising role. Education is the one public service that touches the lives of most individuals and the quality of education is quickly apparent to most people. Educational outcomes are fundamental in determining what opportunities are available to an individual after leaving school. If, because of a politically unstable environment, households invest less in their children's education this would be another "cost" of the Egyptian Revolution because of negative long-terms effects. Education

is normally paid by the parents who expect their children to benefit in the future (provided that expectations of returns to education are large enough) but at the same time opportunity cost need to be taken into account. Theoretically, parental decision can go into two directions: First, education is a consumption good and parents are altruistic. In case of liquidity constraints, a redistributive policy is needed. Second, education is an investment and because parents are considered selfish there is an underinvestment in education. In this case, subsidising educational expenditure is needed.

With political instability, education expenditure can develop in both directions: Households may chose to invest more in education because there is a possibility that returns to education might increase with the prospective change of the political system. At the same time, household may chose to disinvest in education because political instability makes it unlikely that returns to education will be sufficiently high. Also, with household budget constraints, households may prefer family members to work in order to smooth consumption. The empirical literature on the effects of idiosyncratic shocks shows that in richer countries, like the United States, child health and education outcomes are counter-cyclical: they improve during recessions. In poorer countries, mostly in Africa and low-income Asia, the outcomes are pro-cyclical: infant mortality rises and school enrollment and nutrition fall during recessions. In middle-income countries, the picture is more nuanced: health outcomes are generally pro-cyclical and education outcomes counter-cyclical.

Tables 7- 9 show our estimation results for all education related outcome variables. Table 7 shows the effects of political instability (by revolution intensity) for overall education expenditure by income level. Table 8 presents education expenditure by child and by education level. Table 9 shows education expenditure by gender. Existing literature argues that parental education positively influences children's schooling by improving children's ability through home education and also through the better management of children's health conditions (Strauss and Thomas, 1995). We therefore control for the education of the household head, the region and the household size throughout the analysis.

5.2.1 Total education expenditure

Table 7 provides the result of the difference-in-difference estimation of the revolution effect on households' total education expenditure. We observe that being exposed to a strong revolution intensity, leads households to spend on average 10 percent more on education. Households living in medium affected areas do not seem to significantly change their behaviour. We analyse what type of household drives this result by looking at different income levels. It seems that medium income households spend relatively more on education when being exposed to a highly unstable environment. This might be due to the fact that the top income tertile already spends a lot on education, whereas the bottom tertile cannot afford to spend more. It is thus the middle class that significantly increases education expenses.

Table 7: Education expenditure by income level

	expenses on education	logeducexp	top33%	medium33%	bottom33%
Strong*2012	26.17 (179.6)	0.109*** (0.0377)	-0.0292 (0.0837)	0.238*** (0.0741)	0.0754 (0.192)
Medium*2012	-189.5 (123.5)	-0.0216 (0.0479)	-0.148 (0.0961)	0.136** (0.0606)	-0.0803 (0.0833)
Strong Revolution	1799.5*** (72.73)	0.865*** (0.0280)	0.940*** (0.0376)	0.535*** (0.0258)	-0.346*** (0.0571)
Medium Revolution	371.9 (260.2)	0.436*** (0.0448)	0.571*** (0.0538)	0.162*** (0.0175)	-0.762*** (0.0398)
2013	-83.64 (85.21)	-0.0176 (0.0262)	0.132*** (0.0400)	-0.160*** (0.0456)	0.00529 (0.0712)
Controls	X	X	X	X	X
Observations	13231	13231	5510	4792	2929
r2	0.198	0.401	0.338	0.223	0.282

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for urban, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

5.2.2 Education expenditure by child

Table 8 shows our estimation results on education expenditure by child and by education level. Children enter school at the age of 6 or 7 and attend primary school up to the age of 15 (column 1 and 2). Post-compulsory education (upper-secondary education level) covers teenagers between 15-17 years of age (column 3 and 4), and finally students attend tertiary education at the age of 18 or

above (column 5 and 6). After adding a set of relevant controls (column 2, 4 and 6), being exposed to a politically unstable environment does not seem to have an effect on education spending by child at primary school level, regardless of the revolution intensity. The strongest effects are observed at tertiary education level: households increase their education expenditures by 30.7 percent per student enrolled in tertiary education. The effects for medium affected households are somewhat weaker although this coefficient is not significant after including the control variables.

Table 8: Education expenditure by child, by education level

	primary	primary	secondary	secondary	tertiary	tertiary
Strong*2013	-0.151** (0.0588)	-0.0753 (0.0556)	0.0247 (0.140)	0.213 (0.142)	0.366** (0.175)	0.307* (0.178)
Medium*2013	-0.0250 (0.0471)	-0.0432 (0.0461)	-0.0249 (0.124)	0.0222 (0.126)	0.362** (0.182)	0.288 (0.181)
Strong Revolution	0.855*** (0.223)	0.694*** (0.233)	0.686 (0.531)	0.733** (0.346)	-0.748*** (0.204)	-0.889** (0.397)
Medium Revolution	0.174 (0.233)	0.155 (0.248)	-0.229 (0.573)	0.119 (0.410)	-1.167*** (0.292)	-1.042** (0.464)
2013	0.216*** (0.0364)	0.0765** (0.0361)	0.130 (0.0939)	-0.134 (0.0969)	-0.0245 (0.130)	-0.132 (0.133)
Controls		X		X		X
Observations	18460	16538	5193	4458	3259	2651
r2	0.129	0.276	0.140	0.247	0.0509	0.220

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling in column 2, 4 and 6 for total disposable income, urban, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

5.2.3 Expenditure by gender

Table 9 shows our estimation results on the effects of the revolution on education expenditure by gender (by gender and by education level). We observe no significant results at primary and secondary education level. At tertiary education level, however, we observe that households spend 60 percent more on their male children (i.e. students) and insignificantly more on their female children at tertiary education level. This result shows that households seem to have a preference for their sons attending university in a politically unstable environment. Parents might expect the returns to higher education to increase with the prospect of a change of government and therefore invest

more in their sons. Another interpretation could be that the labour market deteriorated following the outbreak of the revolution which meant that young men could not find any employment. Due to the lack of job offers, households therefore prefer to send their sons to university. The result for female students is not as high since young women were much less likely to work before the outbreak of the revolution and therefore the change is not as strong. The coefficient for female tertiary level students, however, is not significant and therefore does not allow to draw meaningful conclusions.

Table 9: Education expenditure by gender

	primary_f	primary_m	secondary_f	secondary_m	tertiary_f	tertiary_m
Strong*2013	0.0549 (0.104)	-0.0656 (0.0968)	0.145 (0.180)	0.173 (0.180)	0.119 (0.266)	0.601** (0.268)
Medium*2013	-0.0101 (0.0868)	0.0235 (0.0851)	-0.259 (0.167)	0.171 (0.160)	0.219 (0.270)	0.149 (0.269)
Strong Revolution	0.569 (0.360)	0.645 (0.457)	1.479*** (0.545)	1.759*** (0.675)	0.542*** (0.173)	-0.474* (0.259)
Medium Revolution	0.0972 (0.378)	0.507 (0.492)	1.095* (0.607)	0.958 (0.731)	1.302*** (0.349)	-0.216 (0.510)
2013	-0.0616 (0.0676)	0.0846 (0.0651)	-0.0695 (0.125)	-0.240* (0.123)	-0.0474 (0.185)	-0.231 (0.204)
Controls	X	X	X	X	X	X
Observations	8009	8529	2181	2277	1183	1468
r2	0.228	0.206	0.280	0.287	0.242	0.188

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for region, disposable income, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

5.3 Health Expenditure

Table 10 provides results of the difference-in-difference estimation of the revolution effect on households' total medical expenditure. Health expenditures decreased significantly in strongly affected areas as well as for the top 33 percent income levels. In strongly affected areas, top income-level households spend 32.8 percent less on health, whereas bottom income-level household decrease health expenditure by 10.1 percent. It is somewhat surprising that top income-level households decreased their health expenses by a higher percentage than bottom income-level households. This could potentially be explained by the fact that wealthier households spend more on their health to begin with. In related papers, findings show that relatively poor households have to decrease health

spending to cope with budget constraints (Frankenberg et al., 2003). As described above, expenses on health, cover medical products, appliances and equipment, outpatient services, and hospital services. Payments for health insurances, however, are excluded. In Egypt, health insurances cover approximately 57 percent of all households, although coverage is particularly low in rural areas and the majority of low-income households does not have a health insurance.

Table 10: The effects of the revolution on health expenditures

	(1) health exp.	(2) log(health exp.)	(3) log(health exp.)	(4) top33%	(5) bottom33%
Strong*2013	-214.7 (177.2)	-0.230* (0.132)	-0.204* (0.116)	-0.328*** (0.101)	-0.101 (0.154)
Medium*2013	8.266 (196.4)	0.118 (0.0973)	0.0388 (0.0935)	-0.102 (0.0845)	0.131 (0.131)
Strong Revolution	1320.8*** (57.58)	0.824*** (0.0415)	0.694*** (0.0372)	1.499*** (0.0314)	0.815*** (0.0836)
Medium Revolution	1310.7*** (54.57)	0.816*** (0.0299)	0.584*** (0.0298)	1.268*** (0.0397)	0.497*** (0.0789)
2013	667.0*** (139.9)	0.567*** (0.0832)	0.546*** (0.0793)	0.631*** (0.0631)	0.448*** (0.118)
income			0.857*** (0.0418)	0.707*** (0.106)	0.936*** (0.0527)
Controls	X	X	X	X	X
Observations	22953	22953	22952	7637	7636
r2	0.0300	0.103	0.208	0.123	0.144

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for urban, education of household head, household composition. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

5.4 Savings Results

Table 11 provides results of the difference-in-difference estimation of the revolution effect on households' savings. Savings are calculated by deducting expenditure from total disposable income. Households save more following the revolution, particularly in strongly affected areas. Households in strongly (medium) affected areas save 25.5 percent (25.9 percent) more. This result is mainly driven by high income-level households, although the coefficient for low-income households is positive but not significant.

Table 11: The effects of the revolution on savings

	(1) savings	(2) log (savings)	(3) top33%	(4) medium33%	(5) bottom33%
Strong*2012	711.4 (423.8)	0.255*** (0.0711)	0.283*** (0.101)	0.275*** (0.0795)	0.214* (0.120)
Medium*2012	-436.9 (487.4)	0.259*** (0.0861)	0.261** (0.104)	0.316*** (0.0809)	0.128 (0.138)
Strong Revolution	-2058.3*** (391.3)	-0.365*** (0.0348)	-1.029*** (0.0470)	-0.717*** (0.0404)	0.222*** (0.0466)
Medium Revolution	-3123.1*** (149.8)	-0.373*** (0.0270)	-0.378*** (0.0426)	-0.490*** (0.0517)	0.432*** (0.0483)
2013	-920.9*** (322.1)	-0.312*** (0.0687)	-0.296*** (0.0893)	-0.438*** (0.0586)	-0.237** (0.104)
logtotdinc	11176.7*** (1590.5)	1.915*** (0.110)	1.675*** (0.109)	2.416*** (0.192)	1.721*** (0.0850)
Controls	X	X	X	X	X
Observations	23159	18922	6875	6485	5562
r2	0.157	0.361	0.253	0.133	0.121

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for urban, education of household head, household composition. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

6 Heterogeneity

Our data allows us to disentangle the heterogeneity of estimated effects by household characteristics. In Table 12, we estimate our empirical model on education expenditure, health expenditure and savings by the gender of the household head. In Table 13, we compare younger with older household heads.

In Table 12 we can observe that in strongly affected governorates households headed by a man spend significantly more on education even after controlling for income. As seen in previous sections, all affected households reduce their spending on health. Households headed by a woman, however, reduce their expenditure relatively more than households headed by a man. Households headed by a man also tend to save more than households headed by a woman, although the difference is weaker than for other outcome variables.

In Table 13 we look into expenditures and savings in affected households by age of the household head and we find that households with an older household head spend significantly more on education. Households with an older head reduce their health expenditures by a larger share which could

Table 12: Expenditure by gender of household head

	(1)	(2)	(3)	(4)	(5)	(6)
	educexp_m	educexp_f	medexp_m	medexp_f	savings_m	savings_f
Strong*2013	0.115** (0.0426)	0.0219 (0.135)	-0.177 (0.115)	-0.331** (0.150)	0.279*** (0.0736)	0.205* (0.106)
Medium*2013	-0.0181 (0.0506)	0.0317 (0.113)	0.0611 (0.0930)	-0.0552 (0.127)	0.277*** (0.0953)	0.290** (0.112)
strong_revolution3	0.860*** (0.0341)	0.178** (0.0810)	0.743*** (0.0394)	-0.0784 (0.0606)	-0.850*** (0.0356)	-0.292*** (0.0469)
medium_revolution3	0.123*** (0.0209)	-0.763*** (0.0477)	0.631*** (0.0326)	-0.300*** (0.0551)	-0.423*** (0.0324)	-0.277*** (0.0772)
2013	-0.0203 (0.0324)	0.0157 (0.0762)	0.524*** (0.0794)	0.636*** (0.106)	-0.339*** (0.0711)	-0.202** (0.0914)
Controls	X	X	X	X	X	X
Observations	11665	1566	19006	3946	15858	3064
r2	0.400	0.431	0.202	0.249	0.362	0.353

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for urban, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

be explained by a initially larger amount spent on health before the outbreak of the revolution. Households with a younger head tend to save more compared to households with an older head. A potential explanation could be that households with an older head already have a larger stock of savings and households with a younger head do not.

Table 13: Expenditure by age of household head

	(1)	(2)	(3)	(4)	(5)	(6)
	educexp_o	educexp_y	medexp_o	medexp_y	savings_o	savings_y
Strong*2013	0.165*** (0.0468)	0.0284 (0.0676)	-0.225 (0.143)	-0.192* (0.107)	0.219** (0.0850)	0.305*** (0.0867)
Medium*2013	-0.0495 (0.0708)	0.0117 (0.0665)	0.0555 (0.0968)	0.0255 (0.0991)	0.238** (0.0881)	0.311*** (0.0961)
strong_revolution3	1.136*** (0.0320)	0.800*** (0.0462)	1.106*** (0.0527)	1.501*** (0.0352)	-0.927*** (0.0363)	-0.448*** (0.0375)
medium_revolution3	0.606*** (0.0465)	-0.0292 (0.0442)	1.062*** (0.0442)	1.355*** (0.0284)	-0.959*** (0.0470)	-0.395*** (0.0282)
2013	-0.00106 (0.0338)	-0.0382 (0.0380)	0.560*** (0.0770)	0.518*** (0.0892)	-0.291*** (0.0667)	-0.333*** (0.0804)
Controls	X	X	X	X	X	X
Observations	7545	5686	11766	11186	9446	9476
r2	0.421	0.387	0.205	0.208	0.303	0.398

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for income, urban, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

7 Robustness Checks

To verify the robustness of our results, a number of different alternative specifications have been used. First, we have dropped all observations, which were collected during the 2010/2011 survey as they might already include some form of effects of the revolution. The survey data was collected from July 2010 to June 2011, which means that almost half of all interviews were collected after 25 January 2011. However, as the questionnaire asks for yearly (July 2010 to June 2011) income and expenditure, this should have only minor effects. Table 16 in the Appendix shows the effects of the revolution on the main outcomes but excluding the 2010/2011 observations and only comparing the 2008/2009 with the 2012/2013 observations. Most directions and significance levels remain the same, the results are just slightly less significant or weaker due to the loss of one third of observations. All other regression output tables have been checked using the same procedure and provide consistent results.

One might also be worried about the capital Cairo driving the results. Table 15 in the Appendix shows the results excluding Cairo. While the sample becomes smaller, all coefficients remain robust and only the coefficient of health expenditures loses significance (but remains positive). All other coefficient estimates remain robust or become slightly weaker if one excludes Cairo.

Another way to check the robustness of our results is to use a different measure for the revolution intensity. One option is to look at data on injured and arrested individuals by region instead of death occurrences. This does not lead to different results because the number of deaths, arrests and injured is highly correlated and the regions categorisation into low, medium and strong intensity (i.e. treatment) stays the same. Another option is to divide the governorates into low, medium and strong treatment using another method to split the sample. In the main part of the paper, we divided the governorates so that we have an equal number of observation per treatment group. Another way would be to use specific cut-offs for death occurrences, for instance, defining low treatment as governorates with a death occurrence from 0-10, medium treatment as governorates ranging from 11-100 and strong treatment as governorates above 101. Robust results are obtained for all regression tables.

Lastly, one can look at the relative death occurrence by region, measuring death occurrence per capita instead of in absolute numbers. This leads to very little changes because of two reasons. First, the relative and the absolute number of deaths occurrence are highly correlated. There are no regions, which are ranked high in absolute death occurrence and low in relative death occurrence or vice versa. Second, the governorates that change their position in the ranking, are typically very small states, that have an intermediate death occurrence in absolute terms but a high death occurrence in relative terms due to their small population size. However, those governorates only contribute relatively little to the regression because of their low number of observations and thus barely change the result.

8 Channels

We analyse two channels that could explain our results of increased education expenditure as well as decreasing health expenditure and higher savings. First, we argue that the decreased health expenditure and increased savings can be explained by precautionary savings behaviour for households that are particularly affected by the political change and unstable environment. Second, we argue that the increased education expenditures can be explained by some level of optimism by households after the fall of the dictator.

8.1 Precautionary Behaviour

In the theoretical literature, political instability enters economic models as a constraint that alters some critical element in the decision-making process of individuals. Theoretical models of buffer-stock saving predict that household consumption would drop when faced with an uncertainty shock. Political instability can therefore cause economic decisions, such as investment, production or labour supply to differ from the optima under no uncertainty. In the economics of psychology literature, the distortive effects of negative emotions on human behaviour can help in explaining people's "irrational" response to an unstable environment (Tversky and Kahneman, 1973, 1974). Our findings are thus in line with the precautionary savings behaviour model.

8.2 Optimism

“We thought people didn’t care and just threw their garbage on the street, but now we see that they just thought it was hopeless - why bother when it’s so dirty? Why not be corrupt when everything is corrupted? But now things have changed, and it’s a different mood overtaking. Even I can’t stop smiling myself.”

From the New Yorker 2/28/11, quote of an Egyptian student in the context of people cleaning up Tahrir square.

We find that affected households invest more in their sons’ higher education. Parents may be more or less willing to invest in their son’s education relative to their daughter depending on multiple factors. In the literature, there are several channels that may explain our results. First, parents may treat their sons as an investment for the future, especially if they consider that labour market prospects are likely to improve in the future. Labour market participation of women is very low in Egypt and therefore parents may have preferred investing in their sons’ higher education expecting labour market prospects to be higher. The second channel could be related to safety as young women may be perceived as more vulnerable to attacks and abuses on their way to school and university and therefore may have to stay at home for their protection. We find some evidence for the first channel.

We argue that the increased spending in particularly affected areas can be explained by a positive outlook towards the future: households were expecting or hoping for a change in Egypt with better labour market prospects for their children and therefore invested more in their education. We analyse data from the Arab Democracy Barometer as well as election results data of the 2012 election to provide some evidence for this channel.

The period after the presidential election in June 2012 was a period of optimism in Egypt. The Arab Democracy Barometer survey⁵ seeks to measure and track over time citizen attitudes, values, and behaviour patterns relating to pluralism, freedom, tolerance and equal opportunity;

⁵The third wave of the Arab Democracy Barometer was implemented from 2012-2014 in 12 countries: Algeria, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Palestine, Saudi Arabia, Sudan, Tunisia, and Yemen.

social and inter-personal trust; social, religious and political identities; conceptions of governance and an understanding of democracy; and civic engagement and political participation. In Egypt, data collection took place in the first week of April 2013 and 1200 individuals were interviewed. Results show that despite the negative perception of the economy and general awareness of the looming economic crisis, respondents were generally optimistic about the future. Overall, 82 percent expected the economy to improve within the next 3 years. Only 11 percent expected it to remain the same, while 7 percent expected it to worsen. At the same time, the confidence in public institutions increased.

We also analyse election results of the 2012 election at governorate level. We assume that in governorates where a large share of households voted for the opposition, households in those areas were particularly enthusiastic about the political change. According to our interpretation, therefore, education expenditure should increase especially in those governorates because of a more positive outlook towards the future. We analyse governorates where the Muslim Brotherhood party won the votes by at least 75 percent and higher, which is the case in two governorates (Matruh and Fayoum). We then implement our difference-in-difference estimator to detect the difference in education expenditures for governorates with a high vote share for Morsi (treatment) and compare it with governorates with a lower vote share (control). As can be seen in Table 14 we can indeed identify a significant increase in education expenditure in those governorates, which supports our preferred interpretation of households with a particularly positive outlook towards the future investing more in the education of their children. To the best of our knowledge, this is the first paper that provides suggestive evidence on the relationship between political affiliation, regime change and household investment behaviour.

Table 14: Education expenditure in pro-Muslim Brotherhood governorates

	(1) expenses on education	(2) log education expenses	(3) education expenses of total expenses
Mursi_75_2013	254.6* (99.18)	0.0844** (0.0253)	0.0838* (0.0361)
Mursi_75	-1527.1*** (105.4)	-1.078*** (0.0495)	-1.066*** (0.0243)
After	6.878 (81.95)	0.0687** (0.0236)	-0.0135 (0.0246)
Controls	X	X	X
Observations	13232	13232	13231
r2	0.103	0.324	0.236

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for urban, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

9 Conclusions

Egypt's economy has been strongly affected by the political events since 2011 as evidenced by soaring debt, significant unemployment increases and inflation. While those consequences are well known and studied, there are other, less evident but equally important, changes at the individual and household level that might have long-term consequences. We analyse their effects at household level and show that political change and higher levels of instability significantly affects household behaviour in many ways, affecting their savings as well as health and education investments. Our results suggest that political instability and political change can affect long-term outcomes for households.

We find that households experience a loss in income and have lower expenditures. Despite this result, households spend more on the the education of their children, especially on their sons enrolled in tertiary education. We can also observe that households spend less on their health and increase their savings. To explain the findings we show two mechanisms: precautionary behaviour and optimism. The channels leading to the results depend on the political affiliation of the household. To our knowledge, this is the first paper providing some indication in this direction.

Our results suggest that social unrest can be an important channel through which political instability can affect long-term outcomes for households. Those consequences of political instability may be difficult to quantify, or even to recognise, and they have not yet been sufficiently integrated

in a policy discussion on the consequences of the Egyptian revolution. Such a change in economic behaviour, however, requires policy responses that hedge the risks for individuals through targeted policies such as loans, insurances or risk pooling in order to keep the ‘cost’ of social unrest at a minimum. However, as research in emerging economies is scarce, this is often overlooked. With our research we aim to contribute to a better understanding of these mechanisms.

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Appendix: Additional Tables

Table 15: The effects of the revolution without Cairo

	(1)	(2)	(3)	(4)
	lognwag	logteduc	logmedexp	logsavings
Strong*2012	-0.100*** (0.0271)	0.168** (0.0768)	-0.109 (0.115)	0.248*** (0.0761)
Medium*2012	-0.0380 (0.0287)	0.147 (0.103)	0.0414 (0.0937)	0.250*** (0.0865)
Strong Revolution	0.105*** (0.0106)	1.465*** (0.0272)	0.868*** (0.0303)	-0.964*** (0.0280)
Medium Revolution	0.240*** (0.0132)	1.811*** (0.0369)	0.587*** (0.0297)	0.0266 (0.0338)
2013	0.135*** (0.0240)	-0.141** (0.0681)	0.546*** (0.0793)	-0.318*** (0.0702)
Observations	13222	1905	20286	16686
r2	0.425	0.205	0.210	0.376

Notes: This table shows the mean and the standard deviation in brackets, all standard errors are clustered at the governorate level. Data is deflated and 2010 is the basis year. These figures are annual numbers for the financial Egyptian year, i.e. 2009 means July 2008-June 2009. Controlling for urban, education of household head, household size, number of children under 14. The source is CAPMAS/ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

Table 16: The effects of the revolution without the 2010/2011 survey round

	(1)	(2)	(3)	(4)
	lognwag	logteduc	logmedexp	logsavings
Strong*2012	-0.148*** (0.0364)	-0.0882 (0.137)	-0.264* (0.151)	0.146 (0.104)
Medium*2012	-0.0472 (0.0306)	0.168 (0.143)	0.134 (0.144)	0.186 (0.111)
Strong Revolution	-0.00381 (0.0167)	-0.337*** (0.0362)	0.575*** (0.0720)	-0.668*** (0.0510)
Medium Revolution	0.0571*** (0.0157)	-0.233*** (0.0741)	0.323*** (0.0601)	-0.798*** (0.0593)
2013	0.173*** (0.0228)	-0.0510 (0.105)	0.843*** (0.107)	-0.494*** (0.0926)
logtotdinc	0.695*** (0.0172)	0.832*** (0.0790)	0.789*** (0.0444)	1.901*** (0.108)
Observations	10095	1585	15325	12863
r2	0.449	0.234	0.265	0.394

Notes: This table shows differences in the control group (low) and the two treatment intensities (medium and strong) for 2009. All figures are deflated, using 2010 as the basis. For column (1) to (4), it shows means and standard errors in parenthesis: * p<0.10, ** p<0.05, *** p<0.01. Column 5-7 respectively show the mean difference between medium treatment intensity and the control group, strong treatment intensity and the control group and medium and strong treatment intensity (t-statistic in parenthesis). Source: CAPMAS and ERF, Egyptian Household, Income and Expenditure Survey (HIECS).

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