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This paper is from the
GTAP Annual Conference on Global Economic Analysis
https://www.gtap.agecon.purdue.edu/events/conferences/default.asp

Risky Business: Political Instability and Sectoral Greenfield Foreign Direct Investment in the Arab World

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Abstract: Which foreign direct investments are most affected by political instability? Analysis of quarterly greenfield investment flows into countries in the Middle East and North Africa during the period from 2003 to 2012 shows that adverse political shocks are associated with significantly reduced investment inflows in the non-resource tradable sectors. By contrast, investments in natural resource sectors and non-tradable activities appear insensitive to such shocks. Political instability is thus associated with increased reliance on non-tradables and aggravated resource dependence.

JEL classification codes: F21, F23, P48, O13, O16

Key words: Foreign direct investment, Greenfield FDI, political instability, natural resources, tradables, non-tradables.

How does political instability affect the level and composition of foreign direct investment (FDI)? The answer to this question has important implications for countries' development trajectories since not all types of FDI are considered equally conducive to economic growth. Alfaro (2003) demonstrates that the growth spillovers associated with FDI vary across sectors, being positive in manufacturing, ambiguous in the services sector and negative in the primary sector. Her findings help explain why many countries have been especially eager to

attract FDI in manufacturing and services (Harding and Javorcik 2011) and why investments in natural resources are considered a mixed blessing, and even a curse (Sachs and Warner 2001; Poelhekke and Van der Ploeg 2010).[1]

Existing studies of the effect of political instability on investment have focused mostly on aggregate relationships. They typically document a strong negative relationship between political instability and aggregate investment (Alesina and Perotti 1996; Mauro 1993), foreign direct investment (Busse and Hefeker 2007; Daude and Stein 2007; Alfaro et al. 2008), and growth (Barro 1991; Alesina et al. 1996).[2,3] However, some authors find no significant or even positive effects and argue that political unrest and institutional quality are not important determinants of investment flows (Noorbakhsh et al. 2001; Campos and Nugent 2003; Blonigen and Piger 2014). In specific instances, some foreign companies find it especially advantageous to invest during periods of instability. For example, incumbent diamond mining companies operating in Angola benefitted from its civil war; they were able to attain higher profits on account of lower licensing costs resulting from the reduced bargaining power of the Angolan authorities and laxer enforcement of transparency standards (Guidolin and La Ferrara 2007).

One possible explanation for the divergent results is that the effect of political instability on FDI varies across sectors.[4] To start with, resource-seeking multinationals may have limited opportunities for investment due to the geographically constrained availability of resources. Second, investments may differ in the degree to which they are reversible and in the extent to which their profitability hinges on first-mover advantages. Third, the cost of finance likely varies across investors, with resource firms typically being less dependent on external finance. Fourth, different types of investments might be differentially exposed to political instability. Production of natural resources typically takes place outside major urban centers and often occurs offshore, which might insulate it from disruptions due to political shocks. At the same time, both resource extraction and production of non-tradables are often subject to extensive state intervention,

rendering political developments potentially more important for investments in these sectors. These and other potential explanations for different sectoral sensitivities to political unrest are elaborated upon in the next section.

The discussion shows that the effect of intensified political instability on the level and composition of FDI flows is theoretically ambiguous. The remainder of the paper therefore empirically tests how this effect varies with the type of cross-border greenfield FDI flows into countries in the Middle East and North Africa (MENA) from 2003 to 2012. Political instability is defined as the propensity of a country to experience regime or government change; political, religious, and ethnic violence as well as practices that have a detrimental effect on contracts, law and order, and the stability and efficiency of institutions. Shocks to political stability affect economic conditions and thereby affect expected rates of return as well as risk perceptions. The paper examines whether these shocks affect investments in different sectors differentially, distinguishing between (i) resources and energy, (ii) non-tradable manufacturing and services (iii) tradable manufacturing and (iv) tradable services.[5]

We assemble a quarterly panel data set of greenfield investments by destination, sector, and source in MENA from 2003 to 2012. The focus on greenfield FDI is motivated by the fact that this is a homogeneous form of finance for new projects. This assuages concerns that heterogeneity of FDI flows drives our results and the possibility that they reflect investments needed to repair facilities financed with prior investments in a project. Greenfield FDI is also the dominant mode of entry into MENA countries, accounting for more than 80% of all FDI flows into developing MENA during the period of investigation and for more than 95% of all FDI flows into the developed Gulf economies.

The MENA region provides a relevant context to test for sector specificity in the relationship between political instability and FDI. The last decade was characterized, if not defined, by high political instability, epitomized by but not limited to the Arab Spring. Political

developments in MENA have been volatile, with many events being intense, but short-lived, resulting in high (intra-year) variability in political instability indicators. Moreover, the region is rich in natural resources, which are an important motivation for FDI, and the MENA countries are varied in terms of their institutional set-up and resource-dependence, which aids identification.

Our main results can be summarized as follows. The paper documents a strong negative association between adverse shocks to political stability and aggregate greenfield FDI inflows. This finding is consistent with the literature which points towards a negative association between political instability and the level of FDI flows into the MENA region (Chan and Gemayel 2004; Méon and Sekkat 2004; Mina 2012). Our results, however, suggest that the negative effect is especially large for greenfield flows into the non-resource tradable sectors. By contrast, investment flows into the natural resource and non-tradables sectors are not significantly correlated with political instability. Differential sectoral sensitivities to instability thus offer an explanation for the variation in estimates of the effect of political instability on aggregate FDI flows. Through its effect on the composition of FDI portfolios, political instability entrenches resource-dependence, harming the growth of non-resource tradables relative to non-tradables.[6]

The remainder of this paper is organized as follows. Section I motivates the empirical investigation by reviewing the literature and explaining why one might expect multinationals in different sectors to exhibit different reactions to intensified political instability. Section II presents the econometric framework and the data. Section III discusses estimation issues, the baseline results on the effect of political instability on aggregate greenfield investments flows, and robustness checks. Section IV studies the extent to which the relationship between political instability varies across sectors and the robustness of the estimates to controlling for unobserved source-country characteristics and differences in adjustment dynamics. Section V concludes and provides suggestions for future research.

I. WHAT DETERMINES INVESTORS' RESPONSES TO POLITICAL INSTABILITY?

How foreign investors respond to increased political instability is theoretically ambiguous, and depends on a host of factors (Ghosal and Loungani 2000; Pennings and Altomonte 2006), including the anticipated evolution of returns, the extent to which the profitability of investments is contingent on their timing, the extent to which investments are irreversible, financing, and, crucially, how exposed investments are (perceived to be) to political instability, as well as how political instability affects economic conditions which in turn have an effect on the profitability of investments. These factors, in turn, drive differences in sectoral sensitivities of foreign investment to political instability. This paper distinguishes between four broad sectors which differ in their market and financing structures, growth prospects, and exposure and sensitivity to political instability, notably: (1) resources and energy, (2) non-tradable manufacturing and services (mostly construction-related activities and financial services), (3) tradable non-resource manufacturing, and (4) tradable services.

Political instability affects expectations about both the level and variability of returns to investing. While standard economic theory predicts that lower expected returns discourage investment, the effect of increased uncertainty on investment is theoretically ambiguous (Carrut et al. 2000). Early work by Hartmann (1972) and Abel (1983) pointed to the possibility that increased uncertainty can incentivize investment by raising the marginal product of capital.[7] By contrast, real options models of irreversible investments in which firms have flexibility over the timing of their investment decisions emphasize that increased uncertainty increases the option value of waiting, and thereby discourages investment (McDonald and Siegel 1986; Dixit and Pindyck 1994). However, uncertainty may simultaneously increase the probability of reaching a certain trigger level of returns at which investing immediately is optimal, such that the total effect of increased uncertainty on investment is ambiguous (Sarkar 2000; Lund 2005), and potentially

non-monotonic. Appendix 1 illustrates these different possibilities by means of numerical simulations with a commonly used real options model.

An important insight of these real options models is that the effect of uncertainty on investment is contingent on the growth prospects of the firm as the option value of waiting is especially high when returns are expected to rise rapidly. The growth prospects of multinationals in the resources and non-tradeables sectors are constrained by limited investment opportunities due to the constricted supply and geographic concentration of natural resources (Busse 2004) and heavy government intervention in these markets. By contrast, multinationals producing tradable (non-resource) manufacturing goods and services can choose among many alternative investment locations as these sectors do not have very specific location requirements and global competition in attracting FDI into these sectors is intense (Burger et al. 2013). Thus, based on growth prospects, one would anticipate an increase in political instability, and therefore uncertainty, to have an especially adverse effect on FDI flows into non-resource manufacturing and tradable services, as the option value of waiting is higher in these sectors.

Returns to investing may also critically depend on their timing (Frynas et al. 2006; Lieberman and Montgomery 1998). First mover advantages may be particularly important in the resources and non-tradables sectors. For instance, since the resource sector is characterized by high entry costs and a limited supply of natural resources, resource firms may have strong incentives to secure exclusive extractive permits ahead of competitors (Mason and Weeds 2010). Similarly, firms selling services for which switching between suppliers is costly have an incentive to enter early (Jiménez et al. 2014). In general, firms can benefit from early entry by building brands, establishing relationships with suppliers, obtaining preferential treatment from governments, and pre-emptively investing in excess capacity to deter potential competitors (Tirole 1988). In addition, political instability may reduce governments' time horizon or reduce the stake of future contests, resulting in rapacious extraction of resources and auctioning off of

investment licenses at discounted prices, thus opening up additional investment opportunities for multinationals in the resource and non-tradables sectors.[8]

Multinationals' sensitivity to rising political instability furthermore depends on the degree to which the investments they consider making are irreversible (Dixit and Pindyck 1994). FDI into services, such as real estate and office buildings, might be easier to repurpose than investments into manufacturing and resource projects which tend to be more specific and characterized by greater indivisibility. One might thus anticipate investments in resources and manufacturing to be more sensitive to political instability than investments in services and non-tradables.

The relationship between political instability and investment also depends on how firms finance investments (Ghosal and Loungani 2000; Tan et al. 2010). The cost of capital and financing constraints tend to be lower for larger firms with more valuable assets and less debt (Tan et al. 2010). Large financial reserves, combined with limited investment opportunities, may make multinational resource and non-tradable service firms less sensitive to political instability.

Last but certainly not least, how intensified political instability affects investment depends on (perceived) exposure to political instability which may vary considerably across sectors. The production of natural resources is often geographically constrained and can take place outside the conflict zones within a country (e.g. offshore), which might insulate resource investments (Dai et al. 2013). At the same time, both resource extraction and production of non-tradables (e.g. banking and infrastructure projects) are often subject to extensive state intervention, rendering political developments potentially more important for investments in these sectors. Investors that operate in regulated sectors may also have differential access to risk mitigation and coping measures, including political influence (García-Canal and Guillen 2008; Jiménez et al. 2013). Furthermore, multinationals, especially those investing in non-tradables, are differentially exposed

to domestic macroeconomic risks such as exchange rate volatility, some of which stem from intensified political instability.

To summarize, changes in expected returns and perceived risks associated with increased instability are likely heterogeneous across sectors. How intensified political instability affects sectoral foreign direct investment is therefore theoretically ambiguous. Determining the effect of political instability on the level and composition of FDI flows to MENA is ultimately an empirical question which is addressed in the next two sections.

II. ECONOMETRIC STRATEGY

A sector-specific, reduced-form investment model is estimated:[9]

$$F_{it}^{s} = \alpha_0 + \alpha_1 F_{i(t-1)}^{s} + \alpha_2 P_{i(t-1)} + \alpha_3 X_{i(t-1)} + \mu_t^s + \mu_i^s + \varepsilon_{it}^s \qquad (1)$$

where *s* is the sector (or set of sectors) of interest, F_{it}^{s} is the aggregate flow of greenfield FDI in current US dollars into sector *s* in recipient country *i* in quarter *t*, $P_{i(t-1)}$ is an indicator of political stability in the recipient country *i* at quarter *t-1* (i.e. the quarter prior to the current realization of investment), $X_{i(t-1)}$ is a vector of variables capturing macroeconomic conditions in the recipient country *i* at time *t-1* thought to affect the return to investment, μ_t^s is a vector of time dummies included to capture common shocks, including commodity price fluctuations and technological shocks (Forbes and Warnock 2012; Burger and Ianchovichina 2013), and μ_i^s is a vector of country dummies used to control for time-invariant country-sector characteristics, including factor endowments, country size (Dunning 1993; Markusen 1995) and regulations that do not change over the sample period (Wang et al. 2012). The lagged dependent variable $F_{is(t-1)}$ is included to tackle serial correlation. The main parameter of interest is α_1 which tells us how the relationship between investment and political instability varies by sector and source country. In the baseline regression *s* is not restricted to a particular sector and refers to all greenfield

investment flows into a country reported in the fDi Markets database. In each of the sector-specific regressions, *s* is restricted to one of the four sectors defined below. As a robustness check which ensures that the results are not driven by source-country characteristics[10] and developments, the paper presents estimates from gravity models (presented in section IV) which exploit the bilateral nature of the FDI flows and control for country-pair fixed effects, as well as source-country shocks.

Measuring Political Instability

Political instability is an elusive concept that is both difficult to define and quantify. While some papers define political instability narrowly as regime or government change or the incidence of political upheaval and violence in a society, this paper instead takes a broader approach by using a proxy for political instability that also encompasses policy uncertainty (inter alia pertaining to the enforcement of contracts and property rights). This broader measure of instability is appealing given the complexity of political developments in the region over the period considered. Following earlier work on the relationship between investment and this broader concept of instability (Busse and Hefeker 2007; Alfaro et al. 2008; Asiedu and Lien 2011; Méon and Sekkat 2012), this paper uses the political risk index from the International Country Risk Guide (ICRG) – a commercial database geared at providing information to firms that plan to invest abroad – as a proxy for political instability. This index is a measure of country's political instability constructed on the basis of experts' subjective assessments of a country's socio-economic conditions, investment profile, internal and external conflict, corruption, the influence of the military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucratic quality in a country. The political instability score ranges from zero to 10, with higher scores indicating more instability. According to the ICRG methodology, a score above 5 indicates high degree of political instability, while a score below 2 would indicate that the country is characterized by a very low degree of political instability.

The ICRG's political instability measure does not proxy risk or uncertainty in a Knightian sense, but rather reflects prevailing political conditions. Since our regressions include country-fixed effects, the coefficient on the ICRG indicator is interpreted as reflecting changing political circumstances that entail changes in political instability. This interpretation is consistent with evidence presented in Appendix 2 which demonstrates that the ICRG indicator correlates well with objective proxies for political violence, notably violent conflicts and protests, which are unfortunately available only for a few countries in the region. Note also that the ICRG indicator varies considerably both over time and across countries, which aids identification.

The paper also examines the effect of the Arab Spring on greenfield investment flows. To this end, an Arab Spring quarter dummy is defined to take the value 1 if a country experienced a civil war, revolution or sustained civil disorder during that quarter in the period Q4 2010 – Q4 2012; otherwise it is set to 0. Only Bahrain, Egypt, Libya, Syria, Tunisia, and Yemen experienced such events during the period Q4 2010 – Q4 2012.[11] Note that countries that experienced only protests are not considered to have been affected by the Arab Spring using this definition.

Measuring Greenfield FDI Flows

Data on greenfield FDI by sector, destination, and origin are obtained from the fDi Markets database, a detailed register of cross-border greenfield investments across the world.[12] Greenfield FDI flows, represent the majority of FDI flows to the region (Burger and Ianchovichina 2013), and constitute a fairly homogeneous set of investments.[13] The database covers both new greenfield investment projects and expansions[14] in 17 MENA countries during the period January 2003 – December 2012.[15] A major advantage of these data is that they enable us to classify investment flows both by sector and source country, which allows us to test for heterogeneity in the relationship between political instability and FDI flows.

Overall, the fDi Markets database contains 7,427 investments made in the region by well over 4,500 multinational corporations (MNCs) and these flows were aggregated to the sector-

country level. Table 1 shows the distribution of these investment flows across MENA countries and broad economic sectors: resources and energy, tradable non-resource manufacturing, tradable services, and non-tradable manufacturing and services. The sectors were defined based on the classification of Jensen and Kletzer (2005) and presented in Appendix 3. The non-tradables category is a residual group covering inter alia mostly investments in non-tradable services such as utilities, real estate, construction, and the financial services sector. Overall, most capital was invested in resources and energy (30%), followed by non-tradables[16] (28%), and tradable services (26%), with non-resource manufacturing (16%) ranking at the bottom. These broad aggregates, however, mask considerable differences in the sectoral distribution of greenfield FDI flows across destination countries. In terms of the amount of capital invested, most investments originated from the Middle East and North Africa (34%), followed by Europe and Central Asia (29%), South and East Asia (19%), and North America (16%).

{Table 1 here}

As a prelude to the econometric analysis presented in the next section, Figure 1 presents scatterplots of aggregate log greenfield FDI flows against political instability, both in levels (the figure on the left) and in changes (the figure on the right). Both scatterplots exhibit a clear negative correlation between aggregate greenfield FDI flows and political instability, which is consistent with the findings of the majority of studies that have examined the relationship between aggregate investment flows and instability reviewed in the introduction and section I.

Plotting the association between greenfield FDI flows and political instability by sector, as is done in Figure 2, unveils that the aggregate relationships presented in Figure 1 obscure significant sectoral heterogeneity in the relationship between instability and greenfield investment. The association between instability and FDI inflows is manifestly negative for manufacturing and tradable services. By contrast greenfield FDI flows into the resources sector

appear uncorrelated with political instability. Investments in non-tradables constitute an intermediate case, being weakly negatively correlated with FDI inflows.

{Figures 1 and 2 here}

Economic Variables

When examining the relationship between investment and political instability it is obviously important to account for economic factors. Unfortunately, high frequency data on economic variables for MENA countries are scarce, but two sources provide quarterly data on inflation, industrial production, and exchange rates. Inflation, measured as the quarterly change in the consumer price index, was derived from national statistical offices, and in some cases the Economist Intelligence Unit database (EIU). The high-frequency database of the Middle East and North Africa Department of the International Monetary Fund (IMF) was the source for the industrial production and nominal exchange rate data. In those cases when no industrial production data are available, quarterly export data from the IMF Direction of Trade Statistics database were used. Descriptive statistics of the variables included in the models are provided in in Appendix 4.

III. ESTIMATION ISSUES AND BASELINE RESULTS

One challenge in isolating the effect of political instability on greenfield FDI flows is that political instability and deteriorating macroeconomic performance often go hand in hand and may in fact aggravate each other. Moreover, there is a possibility of reverse causality, with reductions in greenfield FDI flows exacerbating political unrest. One solution to this problem would be to instrument political instability, but unfortunately finding credible instruments is hard. Therefore, the results should be interpreted as conditional associations, rather than causal relationships.[17]

A related concern is omitted variable bias, which was minimized by including as many relevant economic variables for which one could obtain quarterly data for, notably inflation, changes in the nominal exchange rate, industrial production and changes therein.[18,19] While ideally a richer array of macroeconomic factors should have been included as controls, high frequency economic data are unfortunately not widely available.

Last but not least, the presence of a lagged endogenous variable creates a potential upward endogeneity bias when estimating equation (1) using Ordinary Least Squares, due to a correlation between the time invariant unobserved fixed effects and explanatory variables. By contrast, Fixed Effects estimates tend to be biased downwards because of the so-called Nickell bias (Nickell 1981; Kiviet 1995) – a non-negligible correlation between the transformed residuals and the transformed error term. However, Monte Carlo evidence suggests that bias-reduction methods, developed by Bun and Kiviet (2003) and Bruno (2005), work well when T is relatively large and the serial correlation relatively modest, as appears to be the case in our data. The raw correlation between greenfield FDI flows and lagged greenfield FDI flows is 0.49 and on average there are 36 time series observations per country. These least squares dummy variables bias-corrected estimators are our preferred estimation method for they allow us to control for time-invariant unobservable variables while minimizing the Nickell bias.

As a robustness check, the paper also presents estimates obtained using alternative methods, including GMM (Table 3). While these have been very popular due to their ability to tackle endogeneity, they are not ideally suited to tackle the problem at hand. To start with, the estimation data do not conform to the typical small T–large N configuration, but instead contain a relatively large number of time-series observations. As T increases, the Nickell bias reduces, but the GMM estimates may suffer from potential overfitting and weak instrument bias due to instrument proliferation. Moreover, the mean stationarity assumption underpinning Systems GMM may not be accurate in the present context which is marred by major instability. In

addition, from a pragmatic point of view, results are sensitive to the choice of instruments. Nonetheless, the paper presents GMM estimates as robustness checks. It also presents estimates using the Han-Phillips estimator (Han and Phillips, 2010), a linear dynamic panel estimator that is especially well-equipped for panels with a moderate time dimension, where variables may develop according to a unit root process.

Table 2 reports the estimates of regressions using as dependent variable the log of total capital invested in greenfield FDI projects in all sectors *s* in millions of USD.[20] All models are estimated using the Least Squares Dummy Variable bias Corrected (LSDVC) estimation method with bootstrapped standard errors. Seven specifications are estimated; the first three specifications control separately for political instability (column 1) and economic variables (column 2), and subsequently for both (column 3). Comparisons of the results of specification three with specifications one and two enable one to gage how large the indirect influence of political instability might be due to its effect on macroeconomic management. The fourth specification (column 4) includes only a dummy variable for Arab Spring unrest as an alternative proxy for political instability instead of using the ICRG index; it is intended both as a robustness check and to capture the magnitude of the decline in investment associated with the Arab Spring in countries most affected by it. The fifth specification (column 5) includes economic controls in addition to the Arab Spring dummy. The sixth specification (column 6) replicates the fifth specification but also includes the ICRG political instability index; the simultaneous inclusion of the Arab Spring dummy and the political instability measure allows us to assess to what extent the reduction in investment due to Arab Spring events was associated with intensified political instability. The seventh specification (column 7) shows the results when we interact political instability with aggregate greenfield FDI flows into the Arab countries in our sample.[21] All specifications include lagged dependent variables as well as country and time dummies. The country fixed effects capture time-invariant, country specific factors, while time dummies control region-wide shocks, including the supply of liquidity. Conditioning on quarter dummies has

important implications for the interpretation of the results, and the coefficient on the Arab Spring dummy and political instability measures, in particular; these capture the effect of political instability net of region-wide shocks.

{Table 2 here}

Starting with the result of focal interest, political instability is strongly and negatively correlated with greenfield FDI flows and this effect is consistently statistically significant at conventional 5% significance levels and economically meaningful; a one standard deviation increase in political instability is associated with a reduction in investment flows of roughly three-fifths of their initial value. Moreover, controlling for economic factors, as is done in specification three, does not attenuate this relationship and, if anything, marginally strengthens it. This result does not imply that economic factors do not matter. On the contrary, investments are strongly negatively and significantly correlated with inflation (Table 2, column 2) – a finding which is not surprising, as it is well known that political instability and inflation often concur (Edwards and Tabellini 1991; Cukierman et al. 1992). In addition, lagged industrial production is also associated with higher levels of greenfield FDI, albeit this association is only significant at the 10% level. By contrast, changes in industrial production and changes in the exchange rate are not significant predictors of greenfield FDI flows, ceteris paribus.[22] This third specification is our preferred one as it estimates the "direct" effect of political instability on greenfield investment inflows net of its possible (indirect) effect through economic variables. Recall, however, that this result does not establish causality.

The paper next examines the effect of the Arab Spring on greenfield FDI inflows using a quarter dummy variable that takes the value 1 if a country experiences a revolution, civil war, or sustained political disorder associated with the Arab Spring during that quarter, and 0 otherwise (see Section II). There is a negative and statistically significant association between Arab Spring unrest and greenfield FDI flows, when political instability or economic factors are not controlled

for (Table 2, column 4). Thus defined, the Arab Spring was associated with reductions in greenfield FDI flows of approximately three-fifths of their initial value. The coefficient estimate on the Arab Spring dummy becomes smaller but remains statistically significant, when the estimation includes the economic controls (Table 2, column 5). However, once the ICRG indicator of political instability is added as another control variable (Table 2, column 6), the Arab Spring dummy loses statistical significance and becomes much smaller. It thus appears that the reduction in FDI flows during the Arab Spring was predominantly driven by intensified political instability.

Since most of the Arab Spring was taking place following a global stop of greenfield FDI, foreign investors might have been especially sensitive to the Arab Spring events. To explore whether the association between political instability and greenfield FDI depends on the supply of greenfield financing (Méon and Sekkat 2012), the estimation includes an interaction term between the demeaned political instability variable and the demeaned total volume of greenfield FDI flows into the countries in our sample in a certain quarter. The results shown in Table 2 (column 7) do not reject the null hypothesis that risk taking in MENA does not covary with aggregate greenfield FDI flows into Arab countries.[23]

As an additional robustness check, Table 3 presents our preferred specification, shown in column 3 of Table 2, re-estimated using alternative estimation methods, notably difference GMM (column 1), systems GMM (column 2), OLS (column 3), LSDV (column 4), and the Han-Phillips estimator (column 5).[24] Political instability remains consistently significantly negatively correlated with greenfield FDI regardless of which estimation method we use. The LSDVC and LSDV estimates are very similar, suggesting that the magnitude of the Nickell bias is relatively limited. By contrast, the difference and systems GMM estimations result in quite different coefficient estimates, with the latter being very close to the OLS estimates presented in column 4 of Table 3.

As discussed in Roodman (2009), this could be indicative of an overfitting or weak instrument problem.

{Table 3 here}

IV. SECTORAL HETEROGENEITY

Now that a robust negative association between greenfield FDI flows and political instability has been established, the paper turns to its main focus – testing for the presence of sectoral heterogeneity. First, we repeat the baseline regression estimations for the separate sectors and present the sector-specific results. Second, we present a discussion of the results with gravity models that account for source-country heterogeneity.

Differences across Sectors

Table 4 examines the hypothesis that the relationship between political instability and greenfield investment varies across sectors by separately estimating our preferred specification for investments into (1) natural resources and energy,[25] (2) non-resource manufacturing, (3) tradable services, and (4) non-tradable activities. While the results provide evidence of a strong negative association between political instability and investments in the tradable non-resource manufacturing[26] and commercial services sectors, political instability is not correlated with investments in resource and energy related activities; the parameter estimate on the political instability variable is very close to 0 and, moreover, statistically insignificant.[27] This finding is in line with the hypothesis that firms in the resource sector are less deterred by a decrease in political stability, perhaps because of the absence of many alternative location sites and relatively high returns which remain positive even when adjusted for increased risk.[28] The coefficient estimate on political instability for investments in non-tradables is negative, yet statistically insignificant, suggesting investments in this sector too are relatively insensitive to political instability.[29]

Analyzing the impact of the Arab Spring on greenfield FDI flows (Table 5) yields similar results; countries which experienced sustained upheaval or violence during this period witnessed a significant reduction in investments in non-resource manufacturing activities, but not in other sectors. The results thus attest to significant sectoral heterogeneity in the sensitivity of investments to political instability.

{Tables 4 and 5 here}

Robustness

One might be concerned that these results are driven by unobserved source country characteristics. This section explores whether this is the case using a gravity estimation (Wei 2000; Anderson and Van Wincoop 2003) which exploits the quarterly data on bilateral greenfield investments between 96 source countries and the 17 MENA destination countries in the fDi Markets database for the estimation period.[30] Country-pair fixed effects are included to capture time-invariant source and destination country characteristics as well as bilateral factors such as the geographical and cultural distance between countries. In addition, source-country-quarter dummies are included to control for source-country shocks that may determine outward greenfield FDI, such as cyclical fluctuations. Thus, the following model, which is a marginally modified version of the baseline model (1), is estimated:

$$F^s_{jit} = \alpha_0 + \alpha_1 F^s_{ji(t-1)} + \alpha_2 P_{i(t-1)} + \alpha_3 X_{i(t-1)} + \mu^s_{jt} + \mu^s_{ji} + \varepsilon^s_{jit}, \qquad (2)$$

where F^s_{jit} is the aggregate flow of greenfield FDI into sector *s* in current US dollars from source country *j* into recipient country *i* in quarter *t*, μ^s_{jt} is a vector of source-country time dummies, and μ^s_{ji} a vector of country-pair dummies.

The results displayed in Table 6 present gravity estimations both for aggregate greenfield FDI flows and for each of the four broad sectors. The results are qualitatively consistent with our previous estimations: investments in manufacturing and services are negatively correlated with

political instability, while those in the natural resources and non-tradables sector are not. Hence, the results are not driven by unobserved source country characteristics and shocks.

Another potential concern is that the results are driven by differences in adjustment dynamics and investment gestation periodicity across sectors. Some extraction activities require years of planning and perhaps investors financing such projects are less concerned with short-term risks but instead have long term planning horizons. To assess whether this might help explain the patterns of results obtained, we re-estimated the sectoral models presented in Table 4 using both 1-year and 2-year moving averages of the ICRG variable as proxies for political instability as well as using deeper lags of the political instability variable (one to four quarters). The results, which are presented in Table 7, are robust to allowing longer adjustment periods and using deeper lags; the associations between the different proxies for political instability and greenfield FDI flows into non-resource tradable manufacturing and commercial services remain significantly negative, while the associations between political instability and greenfield FDI flows into the resources and non-tradable sectors are insignificant.

{Tables 6 and 7 here}

V. CONCLUSIONS

Political instability is often alleged to undermine incentives to invest, yet empirical studies have resulted in widely varying estimates of the relationship between political instability and FDI inflows. One possible explanation for the ambiguity in empirical findings is that the relationship between political instability and FDI inflows varies across sectors. Our analysis of quarterly greenfield FDI flows into the MENA countries during the period from 2003 to 2012 attests to the importance of sectoral heterogeneity in investment sensitivity to political shocks. Political instability is associated with significantly reduced greenfield FDI flows into tradable non-resource manufacturing and commercial services. By contrast, investments in natural resources and non-

tradables appear insensitive to political instability. Countries which experienced Arab Spring related violence witnessed significant reductions in greenfield investments in non-resource manufacturing when instability intensified, while investments in other sectors were not significantly impacted. The relationship between political instability and aggregate greenfield FDI flows is thus critically contingent on the initial sectoral composition of these inflows.

Political instability appears most detrimental to those types of investments that the region most needs, notably in labor-intensive and high technology tradeable manufacturing and services industries. Greenfield foreign investments in these activities could help countries create jobs and accelerate economic transformation (Rodrik 2013). Through its effect on the composition of FDI, instability entrenches resource-dependence and constrains the expansion of tradable relative to non-tradable activities, giving rise to effects similar to those of Dutch Disease.

Finally, the results suggest some avenues for future research. The focus on greenfield FDI flows was motivated by the fact that these are fairly homogeneous and account for more than 80% of the FDI flows to countries of the Middle East and North Africa. However, worldwide greenfield investments are not as dominant as a mode of entry into developing countries. It is therefore of interest to examine whether political instability differentially affects different types of FDI flows to developing countries. It would also be worthwhile to investigate the medium to long-run effects of political instability, as well as to pinpoint the precise mechanisms by which heterogeneity in sectoral impacts arises.

APPENDIX 1

To illustrate that real options models yield ambiguous predictions regarding the response of investment to instability, we present numerical simulations of a conventional real options model discussed in detail by Sarkar, (2000) and Lund (2005), in which firms are identical in all respects except the expected growth of the returns to investing.

The Sarkar Model: Here we only present a broad outline of the model to provide intuition. Interested readers are referred to Sarkar (2000), Lund (2005) and Dixit and Pindyck (1994) for detailed derivations. Assume a firm is considering an infinite-horizon project which generates a random earnings stream of x_t per unit of time *t,* which follow a stochastic lognormal process: $dx_t = \mu x_t dt + \sigma dz_t$ where μ is the expected growth rate of the cash flow stream and σ is the standard deviation of the growth rate. Assume furthermore that the project can be implemented at any time at a cost of \$1, the risk free interest rate is *r,* the market price of risk is λ, and the correlation between the project and the market portfolio is *ϱ*. The optimal time for a firm to invest is the first time x_t reaches a trigger level of investment $x_i^* = \frac{\alpha\delta}{\alpha-1}$ from below (where $\alpha = \frac{1}{2} - \frac{r-\delta}{\sigma^2} + \sqrt{\left(\frac{1}{2} - \frac{r-\delta}{\sigma^2}\right)^2 + \frac{2r}{\sigma^2}}$ and $\delta \equiv r + \lambda\rho\sigma - \mu$).[1] The probability of this happening within a given time period *T* is:

$$Prob\ (Inv) = \Phi\left(\frac{vT - \ln\left(\frac{x_i^*}{x_0}\right)}{\sigma\sqrt{T}}\right) + \left(\frac{x_i^*}{x_0}\right)^{\frac{2v}{\sigma^2}} \Phi\left(\frac{-vT - \ln\left(\frac{x_i^*}{x_0}\right)}{\sigma\sqrt{T}}\right)$$

where Φ is the standard normal distribution function and $v = \mu - \frac{\sigma^2}{2}$.

Numerical Simulations: We consider three different cases, notably (i) zero-expected earnings growth, $\mu = 0\%$, which mimics Sarkar (2000) and represents a low-growth firm

[1] It is assumed that the process starts at $x_0 < x_i^*$ for else it would be optimal to invest immediately

operating in a regulated industry or a resource firm with limited investment opportunities (ii) positive, but low earnings growth, $\mu = 0.1\%$, which can be considered a suitable scenario for a nontradables firm operating in a regulated industry, and (iii) rapid earnings growth, $\mu = 0.5\%$. This last scenario is most befitting of a firm producing tradeable goods or services with excellent growth prospects. All other parameters are calibrated following Sarkar (2000) (see the notes to Figure A1.1).

Results: The results are presented in Figure A1.1 below, which depicts the probability of investment for each of these three cases as a function of volatility σ. Starting with the case of zero expected earnings growth (μ=0%) when volatility σ is low, the probability of investing is initially an increasing function of σ because uncertainty increases the probability of reaching the critical trigger level of returns at which investing immediately is optimal. This so-called "realization effect", discussed in Metcalf and Hasset (1995), dominates the impact of uncertainty on the option value of waiting, which disincentivizes investment. However, after a certain point the latter effect starts to dominate the realization effect and the probability of investing becomes a decreasing function of uncertainty σ. When the expected earnings growth is positive but low (e.g. $\mu = 0.1\%$), as in the second scenario which represents the case of a nontradables firm operating in a regulated industry, the probability of reaching the trigger level declines and the positive realization effect is dominated even at low levels of volatility (Figure A1.1). The option value of waiting is highest when returns are expected to grow fastest ($\mu = 0.5\%$), as in the case of a high growth firm, whose investment behavior is the most responsive to changes in uncertainty.

The main takeaway of this simulations exercise is that one can conjure scenarios in which the relationship between investment and uncertainty is ambiguous and possibly even non-monotonic. The analysis furthermore suggests that investments whose returns are expected to rise rapidly are likely to exhibit the greatest sensitivity to increased uncertainty.

{Figure A1.1 here}

APPENDIX 2

To assess the quality of the ICRG measure of political instability, we explore its correlations with arguably more objective proxies for political turmoil, notably indicators of political protests and conflict events, which are obtained from the Armed Conflict Location and Event Dataset database. The latter dataset covers only Northern African countries for the entirety of the period and is thus not available for our entire sample. Nonetheless, for the Northern African sub-sample we find strong and very significant correlations between the ICRG risk indicators and measures of political protests, conflict events, and fatalities associated with political violence – as demonstrated in Table A2.1 below. The ICRG index thus correlates strongly with objective proxies for political instability.

{Table A2.1 here}

For illustrative purposes, we also plot the evolution of riots and conflict events by country over time (Figure A2.1). Perhaps the strongest commonality between the graphs is the increase in political instability associated with the Arab Spring. The graphs also show that while the political instability measure mimics political violence, this is by no means its only determinant.

{Figure A2.1 here}

APPENDIX 3

{Table A3.1 here}

APPENDIX 4

{Table A4.1 here}

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Figure 1. Political Instability and Aggregate FDI Flows into MENA Countries over Time

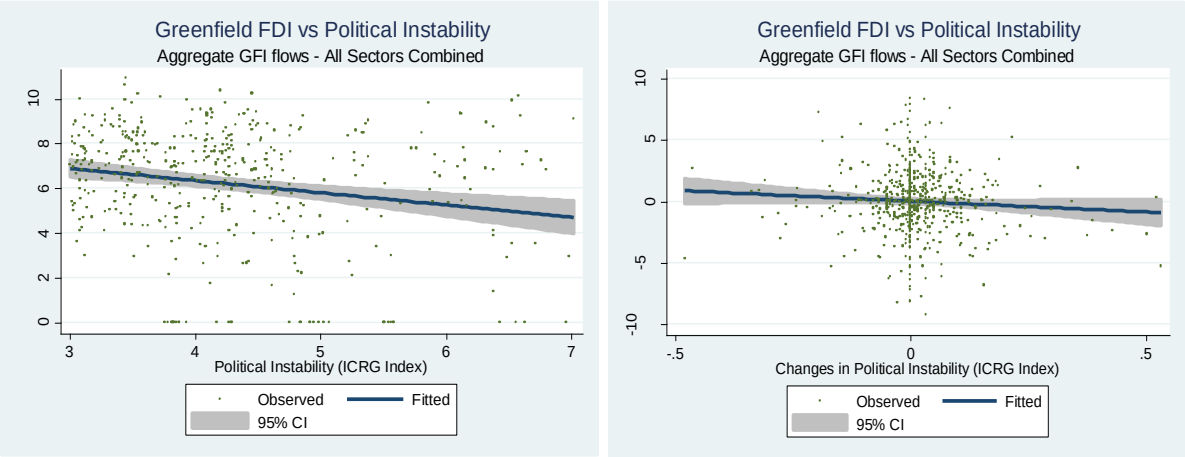


Figure 2. Political Instability and FDI Flows into MENA Countries By Sector

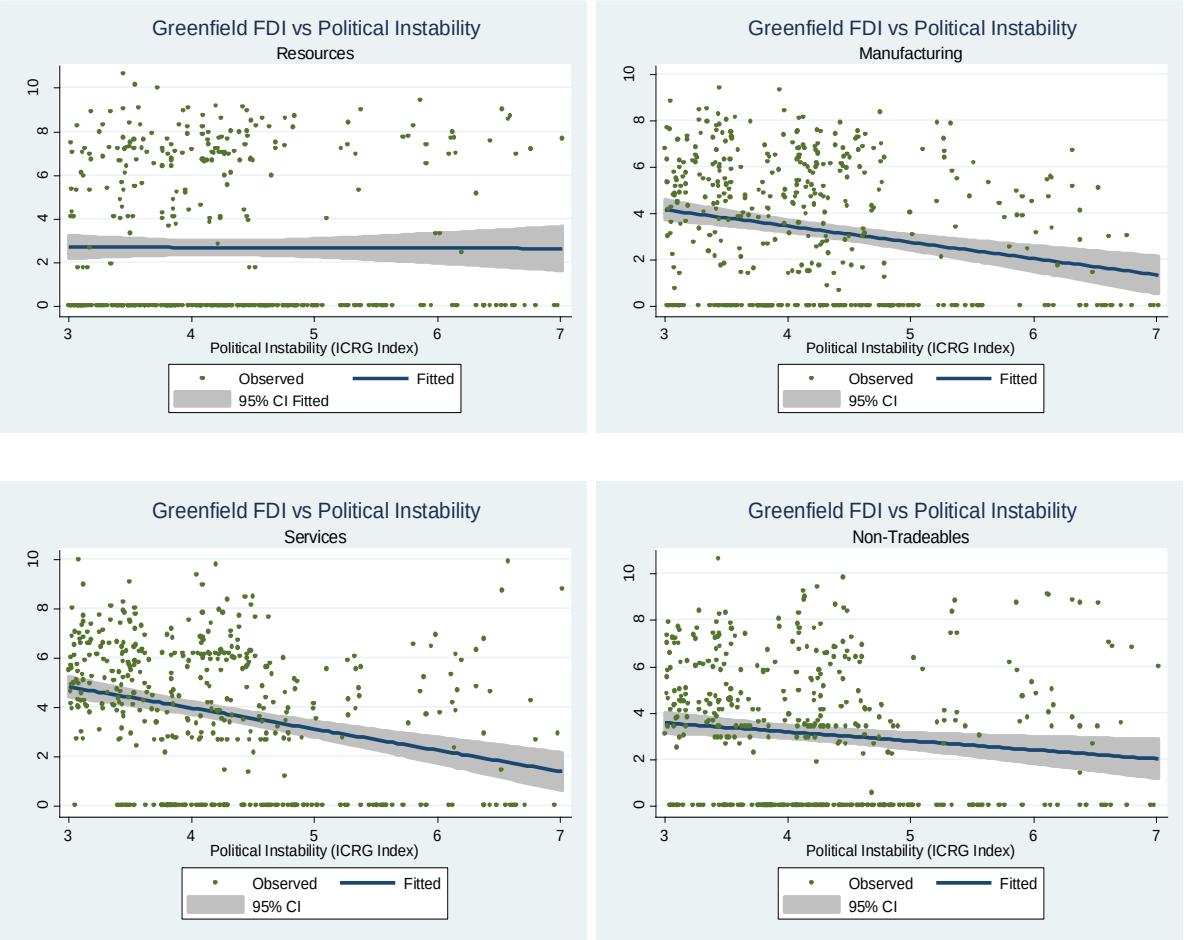
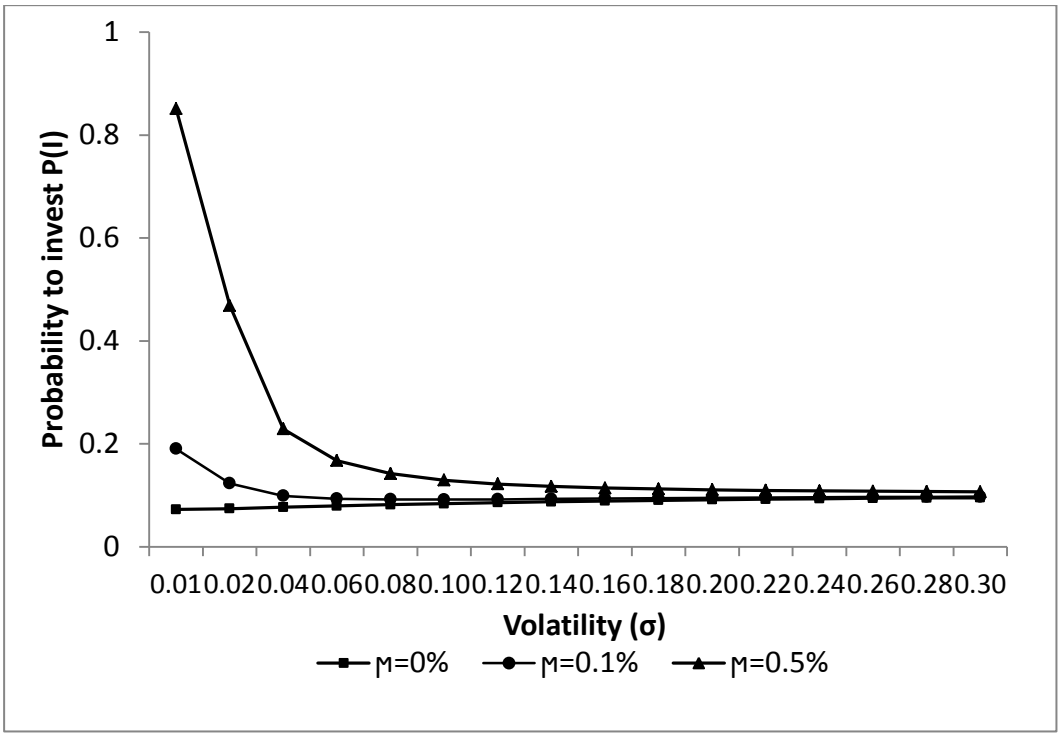


Figure A1.1. Probability of investing by type of firm as a function of volatility



Note: The case of μ=0% replicates the case shown in Figure 1 in Sarkar (2000). All cases shown above are calculated using Sarkar's parameters: x_0=0.1, risk free rate of return (r=10%), market price of risk (λ=0.4), correlation of the project with the market portfolio (ϱ =0.7), and timeframe for investing of 5 years.

Figure A2.1. Political Instability, Conflict and Riots in Northern Africa

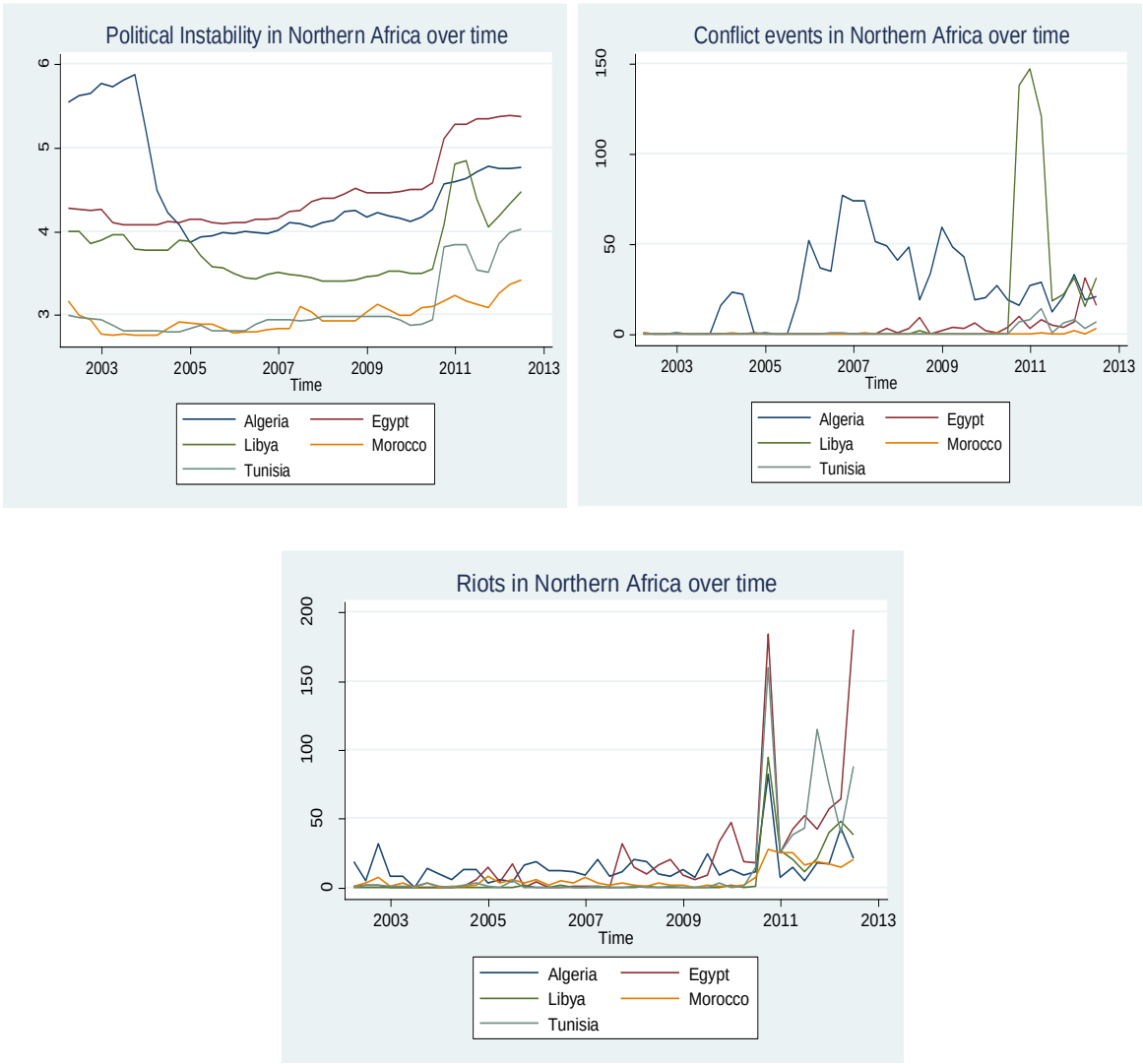


Table 1. Greenfield FDI Flows by Destination and Sector in MENA ($US Billion), 2003-2012

The Distribution of Greenfield FDI Flows into MENA countries by Destination and Origin 2003-2012
$US Billion

	Resources and Energy	Non-resource Manufacturing	Tradable Services	Non-Tradables
Algeria	21.1 (33)	19.2 (30)	12.7 (20)	11.9 (18)
Bahrain	4.1 (15)	3.7 (13)	13.7 (49)	6.4 (23)
Egypt	31.9 (31)	12.1 (12)	18.9 (18)	41.6 (40)
Iran	23.2 (67)	10.0 (29)	0.7 (2)	1.0 (3)
Iraq	24.6 (36)	1.3 (2)	18.8 (28)	23.3 (34)
Jordan	2.3 (8)	5.8 (19)	15.4 (50)	7.1 (23)
Kuwait	1.6 (18)	0.2 (2)	4.4 (52)	2.4 (28)
Lebanon	0.4 (4)	1.2 (11)	5.6 (54)	3.2 (31)
Libya	9.7 (25)	1.7 (4)	3.1 (8)	24.0 (62)
Morocco	9.9 (21)	8.1 (17)	15.4 (33)	13.8 (29)
Oman	7.5 (18)	16.4 (40)	5.0 (12)	11.9 (29)
Qatar	46.5 (45)	11.9 (12)	14.7 (14)	29.2 (29)
Saudi Arabia	69.1 (52)	30.1 (23)	23.1 (17)	11.4 (9)
Syria	11.7 (35)	2.5 (7)	14.7 (44)	4.5 (13)
Tunisia	5.2 (12)	3.8 (8)	16.3 (37)	19.3 (43)
United Arab Emirates	7.8 (6)	24.8 (19)	54.0 (41)	44.9 (34)
Yemen	6.2 (62)	0.7 (7)	1.6 (16)	1.4 (14)
Total	282.2 (30)	153.5 (16)	238.1 (26)	257.3 (28)

Source: Authors' calculations based on fDi Markets. GCC=Gulf Cooperation Council. Row percentages are shown in parentheses.

Table 2. Determinants of Greenfield FDI Flows into MENA, Baseline Regressions

	Dependent Variable: Log GFI (in millions of USD), Q1 2003 – Q4, 2012 LSDVC Estimates						
	(1) Only Political Instability	(2) Only Economic Controls	(3) Political Instability and Economic Controls	(4) Only Arab Spring	(5) Arab Spring and Economic Controls	(6) Full Specification	(7) Robustness: Interaction with Aggregate Arab Greenfield FDI (cf. Méon and Sekkat, 2012)
Political Instability $_{t-1}$	-0.89***		-0.94***			-0.86**	-0.92***
	(0.30)		(0.32)			(0.36)	(0.32)
Arab Spring Dummy $_{t-1}$				-0.94**	-0.73**	-0.31	
				(0.47)	(0.37)	(0.41)	
Political Instability $_{t-1}$ * Aggregate Arab Greenfield FDI $_{t-1}$ #							0.19
							(0.12)
GFI $_{t-1}$	0.17***	0.16***	0.13***	0.18***	0.14**	0.13**	0.13**
	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)
ln Industrial Production $_{t-1}$		0.75*	0.76*		0.62	0.70*	0.76*
		(0.40)	(0.39)		(0.39)	(0.39)	(0.39)
Δ ln Industrial Production $_{t-1}$		0.81	0.64		0.84	0.67	0.60
		(0.69)	(0.69)		(0.69)	(0.70)	(0.69)
Inflation t-1		-12.10***	-10.35***		-11.95***	-10.44***	-10.03**
		(3.42)	(3.49)		(3.43)	(3.49)	(3.51)
Δ Exchange Rate $_{t-1}$		4.49	3.37		4.17	3.34	3.61
		(4.87)	(4.80)		(4.85)	(4.80)	(4.80)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	604	604	604	604	604	604	604
Number of Countries	17	17	17	17	17	17	17

Note: Bootstrapped standard errors are shown in parentheses; ***p<0.01, ** p<0.05,* p<0.10. #The interaction term is demeaned. The Arab Spring dummy takes value 1 if a country experienced a civil war, revolution or sustained civil disorder during that particular quarter and 0 otherwise.

Table 3. Determinants of Greenfield FDI Flows into MENA, Different Estimation Methods

Estimation Method	Difference GMM	Systems GMM	OLS	LSDV	Han-Phillips
	(1)	(2)	(3)	(4)	(5)
Political Instability $_{t-1}$	-1.65***	-0.37***	-0.32**	-0.99**	-1.26***
	(0.14)	(0.11)	(0.12)	(0.39)	(0.31)
GFI $_{t-1}$	0.05	0.25***	0.27***	0.10	0.02
	(0.07)	(0.06)	(0.06)	(0.07)	(0.08)
ln Industrial Production $_{t-1}$	0.82***	0.14***	0.11***	0.79*	0.94**
	(0.26)	(0.02)	(0.03)	(0.38)	(0.38)
Δ ln Industrial Production $_{t-1}$	0.38	0.98	1.21	0.62	0.56
	(0.72)	(0.92)	(1.09)	(0.86)	(0.63)
Inflation t-1	-10.62***	-14.44***	-11.87***	-10.36***	-11.03***
	(2.88)	(3.22)	(3.02)	(2.80)	(3.65)
Δ Exchange Rate $_{t-1}$	0.88	-2.37	1.37	3.36	3.83
	(3.36)	(3.28)	(2.80)	(3.15)	(4.91)
Country FE	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	587	604	604	604	604
Number of Countries	17	17	17	17	17
Number of Instruments	502	521			
AR-2 (p-value)	0.288	0.134			
Sargan test(p-value)	0.171	0.723			
Difference-in-Sargan (p-value)		0.273			

Note: Cluster-robust standard errors are shown in parentheses; ***p<0.01, ** p<0.05,* p<0.10. Note: Han-Phillips regression was estimated using normal standard errors.

Table 4. Determinants of Greenfield FDI Flows into MENA, Estimations by Broad Sector

Dependent Variable: Log GFI (in millions of USD), Q1 2003 – Q4, 2012 *LSDVC Estimation*				
Sector:	(1) Resources and Energy	(2) Non-resource Manufacturing	(3) Tradable Services	(4) Non-tradables
Political Instability $_{t-1}$	-0.02	-1.46***	-1.18***	-0.53
	(0.52)	(0.40)	(0.35)	(0.43)
GFI $_{t-1}$	0.07	0.02	0.05	0.11***
	(0.04)	(0.04)	(0.04)	(0.04)
ln Industrial Production $_{t-1}$	0.96	0.30	-0.17	0.48
	(0.67)	(0.51)	(0.45)	(0.56)
Δ ln Industrial Production $_{t-1}$	0.79	-0.41	0.18	-0.04
	(1.08)	(0.82)	(0.72)	(0.89)
Inflation $_{t-1}$	-7.65	-10.26**	-12.46***	-2.18
	(5.54)	(4.19)	(3.68)	(4.56)
Δ Exchange Rate $_{t-1}$	4.29	3.91	1.45	-10.95*
	(7.57)	(5.73)	(5.04)	(6.24)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	604	604	604	604
Number of Countries	17	17	17	17

Note: Bootstrapped standard errors are shown in parentheses; ***p<0.01, ** p<0.05,* p<0.10.

Table 5. Determinants of Greenfield FDI Flows in MENA, Arab Spring Effect

Dependent Variable: Log GFI inflows (in millions of USD) by broad sector and source, Q1 2003 – Q4 2012

LSDVC Estimates

Sector	***Resources and Energy***		***Non-resource Manufacturing***	
	Arab Spring Effect	Full Specification	Arab Spring Effect	Full Specification
	(1)	(2)	(3)	(4)
Arab Spring Dummy $_{t-1}$	0.08	0.10	-0.76*	-0.04
	(0.59)	(0.66)	(0.44)	(0.48)
Political Instability $_{t-1}$		-0.05		-1.44***
		(0.56)		(0.42)
Economic Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	604	604	604	604
Number of Countries	17	17	17	17

Sector	***Tradable Services***		***Non-tradables***	
	Arab Spring Effect	Full Specification	Arab Spring Effect	Full Specification
	(5)	(6)	(7)	(8)
Arab Spring Dummy $_{t-1}$	-0.34	0.30	-0.72	-0.52
	(0.38)	(0.42)	(0.48)	(0.53)
Political Instability $_{t-1}$		-1.27***		-0.39
		(0.36)		(0.46)
Economic Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	604	604	604	604
Number of Countries	17	17	17	17

Note: Bootstrapped standard errors are shown in parentheses; ***p<0.01, ** p<0.05,* p<0.10. The Arab Spring dummy takes value 1 if a country experienced a civil war, revolution or sustained civil disorder during that particular quarter and 0 otherwise.

Table 6. Determinants of Greenfield FDI in MENA region, Gravity Estimations by Broad Industry

Dependent Variable: Log GFI (in millions of USD), Q1 2003 – Q4, 2012 *LSDV Estimation*					
Sector:	(1) All	(2) Resources and Energy	(3) Non-resource Manufacturing	(4) Tradable Services	(5) Non-tradables
Political Instability $_{t-1}$	-0.08***	-0.00	-0.05***	-0.03**	-0.01
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
GFI $_{t-1}$	0.02	-0.01	0.00	0.001	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln Industrial Production $_{t-1}$	0.03	0.01*	0.00	-0.00	0.02
	(0.02)	(0.001)	(0.01)	-(0.01)	(0.01)
Δ ln Industrial Production $_{t-1}$	0.00	0.014	-0.01	0.011	-0.00
	(0.02)	(0.01)	(0.01)	(0.013)	(0.01)
Inflation t-1	-0.28	-0.021	-0.12	-0.10	-0.08
	(0.18)	(0.11)	(0.09)	(0.10)	(0.09)
Δ Exchange Rate $_{t-1}$	-0.17	0.02	-0.03	-0.24	-0.11
	(0.24)	(0.13)	(0.13)	(0.15)	(0.15)
Country-pair FE	Yes	Yes	Yes	Yes	Yes
Source country-quarter FE	Yes	Yes	Yes	Yes	Yes
Observations	57984	57984	57984	57984	57984
Number of Country Pairs	1632	1632	1632	1632	1632

Note: Cluster-robust standard errors are shown in parentheses; ***p<0.01, ** p<0.05,* p<0.10.

Table 7. Determinants of Greenfield FDI Flows into MENA region, Alternative Definitions of Political Instability and Different Lags

Dependent Variable: Log GFI (in millions of USD), Q1 2003 – Q4, 2012 LSDVC Estimation				
Alternative Proxies for Instability Countries=17 Observations=604	(1) Resources and Energy	(2) Non-resource Manufacturing	(3) Tradable Services	(4) Non-tradables
Moving Averages				
1 Year Moving Average Political Instability	0.15 (0.53)	-1.37*** (0.40)	-0.98*** (0.35)	-0.29 (0.44)
2-Year Moving Average Political Instability	0.69 (0.57)	-1.34*** (0.43)	-0.97*** (0.37)	-0.06 (0.46)
Deeper Lags				
Political Instability $_{t-2}$	0.057 (0.52)	-1.37*** (0.39)	-1.04*** (0.34)	-0.32 (0.42)
Political Instability $_{t-3}$	0.22 (0.50)	-1.18*** (0.38)	-0.726** (0.32)	-0.20 (0.41)
Political Instability $_{t-4}$	0.24 (0.46)	-0.89** (0.35)	-0.55* (0.30)	-0.02 (0.38)

Note: Bootstrapped standard errors are shown in parentheses; ***p<0.01, ** p<0.05,* p<0.10. All specifications include country and quarter dummies, as well as economic controls.

Table A2.1. Correlations between ICRG and objective measures for political instability

Correlations between ICRG measure and objective proxies for political instability			
ρ (N=210) p-value	**Political Instability (ICRG)**	**Riots (ln)**	**Battles (ln)**
Riots (ln)	0.498 *P=0.000*		
Battles (ln)	0.488 *P=0.000*	0.653 *P=0.000*	
Fatalities (ln)	0.490 *P=0.000*	0.686 *P=0.000*	0.886 *P=0.000*

Table A3.1. Subsectors Included in the Analysis

Subsector	Broad Sector
Aircraft	Manufacturing
Aircraft engines, other parts & auxiliary equipment	Manufacturing
All other electrical equipment & components	Manufacturing
All other food	Manufacturing
All other industrial machinery	Manufacturing
All other transportation (Automotive OEM)	Manufacturing
Alumina & aluminum production and processing	Manufacturing
Animal food	Manufacturing
Animal production	Manufacturing
Animal slaughtering & processing	Manufacturing
Apparel accessories & other apparel	Manufacturing
Apparel knitting	Manufacturing
Architectural & structured metals	Manufacturing
Artificial & synthetic fibers	Manufacturing
Asphalt paving, roofing, & saturated materials	Manufacturing
Audio & video equipment	Manufacturing
Automobiles	Manufacturing
Bakeries & tortillas	Manufacturing
Basic chemicals	Manufacturing
Batteries	Manufacturing
Biological products (except diagnostic)	Manufacturing
Boiler, tank, & shipping container	Manufacturing
Breweries & distilleries	Manufacturing
Building material & garden equipment & supplies dealers	Manufacturing
Clay product & refractory	Manufacturing
Clothing & clothing accessories	Manufacturing
Coating, engraving, heat treating, & allied activities	Manufacturing
Coffee & tea	Manufacturing
Commercial & service industry machinery	Manufacturing
Communication & energy wires & cables	Manufacturing
Computer & peripheral equipment	Manufacturing
Converted paper products	Manufacturing
Cosmetics, perfume, personal care & household products	Manufacturing
Crop production	Manufacturing
Cut & sew apparel	Manufacturing
Cutlery & handtools	Manufacturing
Dairy products	Manufacturing
Electric lighting equipment	Manufacturing
Electrical equipment	Manufacturing
Electromedical and Electrotherapeutic Apparatus	Manufacturing
Engines & Turbines	Manufacturing
Food & Beverage Stores (Food & Tobacco)	Manufacturing
Food product machinery	Manufacturing
Food services	Manufacturing
Footwear	Manufacturing
Forestry & logging	Manufacturing
Forging & stamping	Manufacturing
Foundries	Manufacturing
Fruits & vegetables & specialist foods	Manufacturing
Furniture, homeware & related products (Consumer Products)	Manufacturing
Furniture, homeware & related products (Textiles)	Manufacturing
Furniture, homeware & related products (Wood Products)	Manufacturing
General purpose machinery	Manufacturing
Glass & glass products	Manufacturing
Grains & oilseed	Manufacturing
Guided missile & space vehicles	Manufacturing
Hardware	Manufacturing
Heavy duty trucks	Manufacturing

Household appliances	Manufacturing
In-Vitro diagnostic substances	Manufacturing
Iron & steel mills & ferroalloy	Manufacturing
Jewelry & silverware	Manufacturing
Laminated plastics plates, sheets & shapes	Manufacturing
Leather & hide tanning and finishing	Manufacturing
Light trucks & utility vehicles	Manufacturing
Measuring & control instruments	Manufacturing
Medical equipment & supplies	Manufacturing
Medicinal & botanical	Manufacturing
Metalworking machinery	Manufacturing
Military armored vehicle, tank, & components	Manufacturing
Motor vehicle & parts dealers (Automotive Components)	Manufacturing
Motor vehicle & parts dealers (Automotive OEM)	Manufacturing
Motor vehicle body & trailers	Manufacturing
Motor vehicle brake systems	Manufacturing
Motor vehicle electrical & electronic equipment	Manufacturing
Motor vehicle gasoline engines & engine parts	Manufacturing
Motor vehicle seating & interior trim	Manufacturing
Motor vehicle steering & suspension components	Manufacturing
Motorcycle, bicycle, & parts	Manufacturing
Nonstore retailers	Manufacturing
Office supplies	Manufacturing
Other (Building & Construction Materials)	Manufacturing
Other (Business Machines & Equipment)	Manufacturing
Other (Ceramics & Glass)	Manufacturing
Other (Consumer Electronics)	Manufacturing
Other (Consumer Products)	Manufacturing
Other (Space & Defense)	Manufacturing
Other (Textiles)	Manufacturing
Other chemical products & preparation	Manufacturing
Other fabricated metal products	Manufacturing
Other motor vehicle parts	Manufacturing
Other plastics products	Manufacturing
Other rubber products	Manufacturing
Paints, coatings, additives & adhesives	Manufacturing
Pesticide, fertilizers & other agricultural chemicals	Manufacturing
Pharmaceutical preparations	Manufacturing
Plastic bottles	Manufacturing
Plastic pipes, pipe fitting & unlaminated profile shapes	Manufacturing
Plastics & rubber industry machinery	Manufacturing
Plastics packaging materials & unlaminated film & sheets	Manufacturing
Power transmission equipment	Manufacturing
Printing machinery & equipment	Manufacturing
Pulp, paper, & paperboard	Manufacturing
Railroad rolling stock	Manufacturing
Resin & artificial synthetic fibers & filaments	Manufacturing
Rubber hoses & belting	Manufacturing
Seafood products	Manufacturing
Seasoning & dressing	Manufacturing
Semiconductors & other electronic components	Manufacturing
Ships & boats	Manufacturing
Sign manufacturing	Manufacturing
Snack food	Manufacturing
Soap, cleaning compounds, & toilet preparation	Manufacturing
Soft drinks & ice	Manufacturing
Sporting goods, hobby, books & music	Manufacturing
Spring & wire products	Manufacturing
Steel products	Manufacturing
Sugar & confectionary products	Manufacturing
Textile machinery	Manufacturing
Textiles & Textile Mills	Manufacturing

Tobacco	Manufacturing
Tires	Manufacturing
Urethane, foam products & other compounds	Manufacturing
Ventilation, heating, air conditioning, and commercial refrigeration equipment manufacturing	Manufacturing
Wineries	Manufacturing
Wiring devices	Manufacturing
Wood products	Manufacturing
Agriculture, construction, & mining machinery	Manufacturing*
Accommodation	Non-Tradables
Accounting, tax preparation, bookkeeping, & payroll services	Non-Tradables
Amusement & theme parks	Non-Tradables
Business schools, computer & management training	Non-Tradables
Business support services	Non-Tradables
Cement & concrete products	Non-Tradables
Commercial & institutional building construction	Non-Tradables
Corporate & investment banking	Non-Tradables
Educational support services	Non-Tradables
Environmental consulting services	Non-Tradables
General medical & surgical hospitals	Non-Tradables
Industrial building construction	Non-Tradables
Machine shops, turned products, screws, nuts & bolts	Non-Tradables
Newspaper, periodical, book, & directory publishers	Non-Tradables
Nursing & residential care facilities	Non-Tradables
Offices of physicians, dentists, & other healthcare practitioners	Non-Tradables
Other (Healthcare)	Non-Tradables
Other (Real Estate)	Non-Tradables
Other amusement & recreation industries	Non-Tradables
Other support services	Non-Tradables
Outpatient care centers & medical & diagnostic laboratories	Non-Tradables
Performing arts, spectator sports, & related	Non-Tradables
Printing & related activities	Non-Tradables
Professional, scientific & technical services	Non-Tradables
Radio & TV broadcasting	Non-Tradables
Real estate services	Non-Tradables
Rental & leasing services	Non-Tradables
Residential building construction	Non-Tradables
Retail banking	Non-Tradables
Schools, colleges, universities, & professional schools	Non-Tradables
Technical, trade & other schools	Non-Tradables
Travel arrangement & reservation services	Non-Tradables
Waste management & remediation services	Non-Tradables
Water, sewage & other systems	Non-Tradables
Wireless telecommunication carriers	Non-Tradables
Biomass power	Resources & Energy
Fossil fuel electric power	Resources & Energy
Geothermal electric power	Resources & Energy
Gold ore & silver ore mining	Resources & Energy
Hydroelectric power	Resources & Energy
Iron ore mining	Resources & Energy
Lime & gypsum products	Resources & Energy
Natural, liquefied and compressed gas	Resources & Energy
Nonferrous metal production & processing	Resources & Energy
Nonmetallic mineral mining & quarrying	Resources & Energy
Nuclear electric power generation	Resources & Energy
Oil & gas extraction	Resources & Energy
Other (Transportation)	Resources & Energy
Other electric power generation (Alternative/Renewable Energy)	Resources & Energy
Other electric power generation (Coal, Oil and Natural Gas)	Resources & Energy
Other metal ore mining	Resources & Energy
Other non-metallic mineral products	Resources & Energy

Other petroleum & coal products	Resources & Energy
Other pipeline transportation	Resources & Energy
Petroleum bulk stations & terminals	Resources & Energy
Petroleum refineries	Resources & Energy
Pipeline transportation of crude oil	Resources & Energy
Pipeline transportation of natural gas	Resources & Energy
Solar electric power	Resources & Energy
Support activities for mining & energy	Resources & Energy
Wind electric power	Resources & Energy
Advertising, PR, & related	Tradable Services
Air transportation	Tradable Services
Architectural, engineering, & related services	Tradable Services
Cable & other subscription programming	Tradable Services
Communications equipment	Tradable Services
Computer facilities management services	Tradable Services
Computer systems design services	Tradable Services
Couriers & messengers	Tradable Services
Custom computer programming services	Tradable Services
Data processing, hosting, & related services	Tradable Services
Employment services	Tradable Services
Freight/Distribution Services	Tradable Services
Heavy & civil engineering	Tradable Services
Insurance	Tradable Services
Internet publishing & broadcasting & web search	Tradable Services
Investment management	Tradable Services
Legal services	Tradable Services
Management consulting services	Tradable Services
Motion picture & sound recording industries	Tradable Services
Navigational instruments	Tradable Services
Other (Financial Services)	Tradable Services
Other telecommmunications	Tradable Services
Postal service	Tradable Services
Rail transportation	Tradable Services
Satellite telecommunications	Tradable Services
Software publishers, except video games	Tradable Services
Specialised design services	Tradable Services
Speciality trade contractors	Tradable Services
Support activities for transportation	Tradable Services
Transit & ground passenger transportation	Tradable Services
Truck transportation	Tradable Services
Video games, applications and digital content	Tradable Services
Warehousing & storage	Tradable Services
Water transportation	Tradable Services
Wired telecommunication carriers	Tradable Services

* Note: Manufacturing refers to non-resource tradable manufacturing activities.

Table A4.1. Economic and Political Variables – Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum
Political Instability	3.76	1.04	2.31	7.02
ln Industrial Production	20.29	4.50	4.36	23.59
Δ ln Industrial Production	0.00	0.15	-1.86	1.38
Inflation	0.02	0.02	-0.05	0.12
Δ Exchange Rate	2.39	3.09	-1.32	9.41

Note: Inflation and Δ Exchange Rate are winsorized at the 1% level.

NOTES

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[1] The benefits are not automatic. Borensztein et al. (1998) and Xu (2000) draw attention to the role of human capital; Alfaro et al. (2004) emphasize the role of financial markets, and Balasubramanyam et al. (1996) highlight the role of a country's export orientation.

[2] Different studies have highlighted different mechanisms by which instability may deter investment, including disruptions in the production process, increased uncertainty about government policies (Alesina and Tabellini 1989), as well as deteriorating property rights (Tornell and Velasco 1992) and worsening quality of institutions (Svensson 1998).

[3] See Schneider and Frey (1985) for a discussion of the relative importance of political and economic variables in FDI models.

[4] The literature is also inconclusive on which aspects of political instability matter most for foreign investors in different sectors (see e.g. Busse and Hefeker (2007) and Asiedu and Lien (2011)). The lack of consensus may reflect econometric issues. Accurately estimating the partial effect of different aspects of political instability is not easy as indicators measuring these different aspects are typically highly correlated, making results from regression models in which they are simultaneously included difficult to interpret. Addressing this problem by including them separately also presents a problem due to omitted variables bias.

[5] The natural resources and nontradeable sectors traditionally receive the bulk of FDI flows directed to MENA.

[6] These effects are reminiscent of Dutch Disease effects which in this case arise in the absence of any upward pressure on exchange rates and instead stem from intensified political instability. They also hint at another possible mechanism that may explain the absence of government accountability in many resource-rich countries, which is often ascribed to the government's ability to rely on resource rents, rather than taxation, to finance public spending (Collier and Hoefler 2009). Our results suggest that not only citizens but also international investors do not demand better governance and continue to pursue investment projects in politically unstable countries even when confronted with political turmoil and poor governance. As such, they contribute to the nascent literature on the political resource curse (Brollo et al. 2013).

[7] If the marginal product of capital (in a competitive firm) is convex in price then a mean-preserving increase in the variance of prices will raise the expected return on a marginal unit of capital.

[8] See Van der Ploeg and Rohner (2012) for a model in which both resource depletion and conflict are endogenous.

[9] Following the real options models of FDI discussed in Section I, our econometric strategy departs from the assumption that the decision to make greenfield investments abroad is a function of both expected returns and perceived risks (see e.g. Wheeler and Moody 1992; Méon and Sekkat 2012).

[10] Investors from source countries with strong institutions are often argued to be less apt at coping with political instability in recipient countries, face greater informational frictions, or are more concerned with corporate social responsibility (see for example, Cuervo-Cazurra 2006; Driffield et al. 2013).

[11] For Tunisia, the Arab Spring dummy takes the value of one during the period Q4 2010 – Q4 2012; for Egypt, Libya, Syria, and Yemen, the Arab Spring dummy takes the value of one during the period Q1 2011 – Q4 2012; for Bahrain, the Arab Spring dummy takes the value of one during the period Q1 2011 – Q3 2011.

[12] The fDi Markets data are recorded on the basis of formal announcements by the media, financial information providers, industry organizations, and market and publication companies and represent 78.6% of global FDI.

[13] Comparable data on the value of investments through mergers and acquisitions are not available

[14] Of all projects in MENA in the fDi Markets database, 94.4% were new projects and 5.6% encompassed expansions.

[15] West Bank and Gaza and Djibouti are excluded due to data sparseness.

[16] Investments in non-tradables mainly include investments in construction projects, real estate, and financial services.

[17] The estimations also do not explicitly control for potential spillovers across countries. Note, however, that the ICRG political instability index comprises a component capturing external conflict and the risk of foreign interference, which helps proxy the impact of unrest in the region on the political stability in the recipient economy.

[18] Quarterly exports data were used in the cases of countries without industrial production data (Bahrain, Lebanon, and Yemen). This does not yield any major problems since we only look at changes within countries over time.

[19] Ideally, we should have used quarterly Gross Domestic Product (GDP) data, but such series are not available for the majority of countries in the region.

[20] Please note that the logarithm of the dependent variable is transformed using an inverse hyperbolic sine transformation (Burbidge et al. 1988) in order to deal with country-quarters in which no investments were made.

[21] Note that we demean these variables prior to interacting them in order to facilitate interpretation.

[22] We also re-estimated the models using real effective exchange rate data from the database constructed by Darvas (2012), which includes real effective exchange rates for 13 MENA countries for at least part of the sample period. Despite a considerable reduction in the sample size, the estimation yielded qualitatively similar results.

[23] Moreover, the association between political instability remains always negative and almost always significantly negative. Only when greenfield FDI flows to the Arab world come close to their maximum value, the association between political instability and greenfield FDI becomes statistically insignificant. These results are available upon request.

[24] As an additional robustness check, not presented in the paper to conserve space but available upon request, we re-estimated the models separately for each sector using the alternative estimation methods used in Table 3. These alternative methods yielded qualitatively similar results.

[25] In this case, *s* in the regression model (1) refers to the industries classified under the natural resources sector in Appendix 3.

[26] To explore the possibly differential responsiveness of foreign investments to intensified instability across manufacturing sub-sectors, we also compared the responsiveness of greenfield FDI in natural resource-intensive manufacturing (metals, wood products and paper, printing and packaging) to that of greenfield FDI in natural resource-extensive manufacturing. The results, which are available upon request, suggest, however, that these sub-sectors do not differ significantly in their responsiveness to intensified political instability.

[27] The effect of political instability on greenfield FDI in resources and energy remains statistically insignificant when we exclude (1) the oil-importing countries (Egypt, Jordan, Lebanon, Morocco, and Tunisia) or (2) the more politically stable Gulf Council Cooperation countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates). These results are available upon request.

[28] In addition, we test whether the political instability coefficients differ significantly across sectors using seemingly unrelated estimation after estimation of the four models in Table 4 using LSDV instead of LSDVC (to retrieve a consistent estimate of the variance-covariance matrix). In

three instances the null-hypothesis of equality of coefficients is rejected. We find that the effect of political instability on greenfield FDI in natural resources and energy is significantly less negative than the effect of political instability on greenfield FDI in non-resource manufacturing (Wald Chi-square=5.99, $p<0.05$) and tradable services (Wald Chi-square=4.76, $p<0.05$). Moreover, the effect of political instability on greenfield FDI in non-tradables is significantly less negative than the effect of political instability on greenfield FDI in non-resource manufacturing (Wald Chi-square=4.38, $p<0.05$).

[29] As additional robustness checks which are not presented to conserve space, but which are available upon request, we also estimated regressions in which the dependent variable is given by the number of greenfield FDI projects, as well as the log of (1+the number of jobs created by greenfield FDI). Estimations using these alternative dependent variables do not lead to qualitatively different results. Notably, one still finds that greenfield investment into the resources and non-tradables sectors is not significantly correlated with the ICRG index of political risk.

[30] Due to computational complexity, all gravity models are estimated using the LSDV instead of the LSDVC estimator. Note also that country-pairs for which investment flows are never positive are excluded from the estimation.