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Determinants of FDI Location in Egypt—Empirical Analysis Using Governorate Panel Data

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Abstract

We empirically analyse the determinants of inward foreign direct investment (FDI) in Egypt employing a novel panel dataset of 26 Egyptian governorates for the period 1992–2008. Using the case of Arab FDI to Egypt, we also investigate whether FDI location determinants are different depending on similarity of culture and language between FDI source and host region. Our results indicate that domestic private investment, well-functioning Free Zones, and labour abundance positively affect FDI location. In contrast to results for other countries, we find no significant effect of concentration of previous FDI stocks on the location of inward FDI. Moreover, regional investment preferential policies in Egypt—with the exception of Free Zones—do not affect the unequal spatial FDI distribution. Finally, we find that the location of Arab FDI inflows to Egypt is not sensitive to the usual determinants. Arab investors are more willing to invest in less investment-agglomerated areas and are less affected by economic considerations and incentives.

JEL Codes: F21, E22, R12, O53, Z10

Keywords: Foreign direct investment; FDI location; agglomeration; cultural similarity; regional FDI; Arab countries.

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1. Introduction

The share of developing countries in worldwide foreign direct investment (FDI) inflows is increasing significantly. Since 2012, developing countries have received more FDI inflows than developed economies (UNCTAD, 2013, 2014a). On an annual basis, Egypt has received either the largest or the second largest amount of FDI in Africa since 2004 (excluding the year 2011, where the 25th of January Uprising deterred FDI in Egypt). Among Arab countries, Egypt received the third largest amount of FDI in this time period, after Saudi Arabia and the United Arab Emirates (UNCTAD, 2014b). FDI is a major contributor to capital accumulation in the Egyptian economy. During the period 2004–2010, FDI inflows constituted an average of 30% of Egyptian gross fixed capital formation. This is much higher than the average in North Africa (15%), Arab countries (19%), Africa (16%), developing countries (12%), and worldwide (11%).¹ In spite of its importance, empirical research on FDI in Egypt is still limited.²

FDI is very unevenly distributed across regions in Egypt (Hanafy, 2015). For example, Egypt consists of 27 governorates, but roughly 90% of greenfield FDI has been directed to 10 governorates only, with the governorates Cairo and Giza together attracting about two-thirds of it. Thus, it appears that some governorates are more attractive in terms of FDI than are others. In this paper, we ask two questions. First, what factors are statistically significant and economically relevant determinants of the location of FDI inflows in Egypt? And second, do these factors also explain the spatial distribution of FDI from other Arab countries, that is, FDI when cultural and language are similar between the FDI source and the recipient country?

To answer these questions, we use a novel panel dataset of 26 governorates in Egypt for the period 1992–2008, exploring the role played by different potential determinants of FDI spatial distribution across Egypt. Specifically, and based on findings of previous literature, we

¹ This is the annual average before the Egyptian Uprising, in line with the time focus of our analysis. When including recent years, the average contribution of FDI inflows to gross fixed capital formation in Egypt was 23% in 2004–2013, which is again higher than North Africa (12%), Arab countries (16%), Africa (15%), developing countries (11%), and worldwide (10%) (UNCTAD, 2014b).

² Louis et al. (2003) conducted a survey on FDI in Egypt. Kamaly (2004) analyses the determinants of FDI in Egypt at the national level for the period 1986–2001, finding a very weak persistence of FDI flows, a positive effect of economic growth and openness, and a negative effect of nominal exchange rate and international interest rate.

investigate the impact of agglomeration and market variables, labour market variables as well as regional investment policy variables.

The paper makes several contributions to the literature. First, to the best of our knowledge, to date no empirical study identifies the location determinants of FDI in Egypt. A considerable body of literature explores the location of foreign investors within various developed and developing countries, for example, the United States (Coughlin et al., 1991; Friedman et al., 1992; Head et al., 1994, 1995, 1999; Bobonis and Shatz, 2007; Halvorsen, 2012); China (Head and Ries, 1996; Broadman and Sun, 1997; Cheng and Kwan, 2000; Coughlin and Segev, 2000; He, 2002; Sun et al., 2002), and, more recently, India (Nunnenkamp and Stracke, 2008; Mukim and Nunnenkamp, 2012). The results of these studies show how FDI location determinants can differ across countries and samples. Accordingly, our analysis allows us to assess whether FDI location determinants in Egypt are different from those found in the literature for other countries. Our results are of direct relevance for policymakers.

The paper's second contribution is the use of a novel panel dataset on Egyptian governorates that the author collected and consolidated from various data sources and one that, as far as we know, has not previously been used for econometric research. In fact, we are not aware of any econometric study that uses a panel dataset at the Egyptian governorate level. Presumably, this is due to the difficulties of collecting economic data in Egypt.

Third, the paper contributes to the strand of literature on the role of culture and language as potential FDI determinants. In a recent paper, Méon and Sekkat (2015) demonstrate how formal and informal institutions interact in determining FDI. The authors highlight the particular importance of this interaction for MENA countries. Guiso et al. (2009) show that bilateral trust, which is affected by cultural relationships, enhances bilateral FDI. Analysing the role of culture in the case of Asian FDI, Gao (2003) shows the significant importance of ethnic Chinese networks. The relevance of cultural similarity for FDI in the case of Arab countries has been tackled by two studies. First, Roberts and Almahmood (2009) find a significant effect of cultural similarity when investigating FDI to Saudi Arabia. Second, Sekkat

(2014) uses a panel of FDI in 13 Arab countries for the period 1995–2009 to compare determinants of intra-Arab FDI with FDI from non-Arab countries. Sekkat (2014) shows that determinants of FDI inflows to Arab countries vary depending on whether their source is Arab or non-Arab countries and that intra-Arab FDI is higher than can be deduced from empirical models, suggesting cultural similarity as well as regional strategic considerations as explanations for this phenomenon.

Our contribution to this strand of literature is our focus on FDI location determinants *within* the same host country. Using the case of Arab FDI to Egypt, our data allow us to investigate whether these determinants are different depending on the similarity of culture and language between the FDI source and recipient country. Specifically, we distinguish between location determinants of Arab versus non-Arab FDI to Egypt, which is the largest recipient of intra-Arab FDI (Bolbol and Fatheldin, 2006). Arab investors share the Arabic language and are relatively close, culture-wise, to the host Egypt, which facilitates communication, access to information, and networking. In contrast, non-Arab investors in Egypt are exposed to higher information asymmetries and information costs. Therefore, we expect non-Arab investors to follow more the location choices by previous investors.³

The results of this paper provide first insight into the location choice behaviour of foreign investors in Egypt. We find that domestic private investment, well-functioning Free Zones, and labour abundance positively determine the distribution of FDI inflows in Egypt on the governorate level. In contrast to results from other countries, we find no significant effect of previous FDI, which suggests no self-reinforcing effect of FDI. Further, while we do find a positive effect of labour quantity, we do not find any significant effect of labour education on FDI location. Our results also show that a number of regional policies in Egypt—with the exception of Free Zones—the FDI distribution in the country.

Finally, our analysis reveals substantial differences between the location determinants of Arab versus non-Arab FDI in Egypt. The differences are robust to restricting the analysis to

³ Du et al. (2012) similarly analyse the effect of cultural proximity between China and its FDI source countries on FDI location within China, but have a different focus than ours. Du et al. (2012) investigate how cultural proximity affects the impact of regional institutional quality—where variations are pronounced in China—on FDI location choice. They show that higher cultural difference induces stronger aversion to investing in regions with weaker economic institutions.

one FDI sector only. Our results suggest that regional investors from other Arab countries—who share the Arabic language and are culturally quite similar to Egypt—are more willing to invest in less investment-agglomerated areas compared to non-Arab investors, which is in line with our hypothesis. Moreover, and somewhat surprisingly, our findings also reveal that there appears to be no significant effect of agglomeration economies or incentive reactions by Arab FDI. In fact, Arab FDI location does not seem to be affected by any of the usual determinants. As similarly argued by Bolbol and Fatheldin (2006) and Sekkat (2014) for intra-Arab FDI, our finding seems to suggest that regional strategic and political considerations are of more relevance than economic considerations for the location of Arab FDI.

The paper is structured as follows. Section 2 contains a short review of FDI in Egypt. Section 3 reviews the related literature and sets forth our hypotheses on the determinants of FDI location. Section 4 introduces the empirical model and the data; the results are reported and discussed in Section 5. Section 6 concludes.

2. FDI in Egypt: Data, Distribution, and Policies

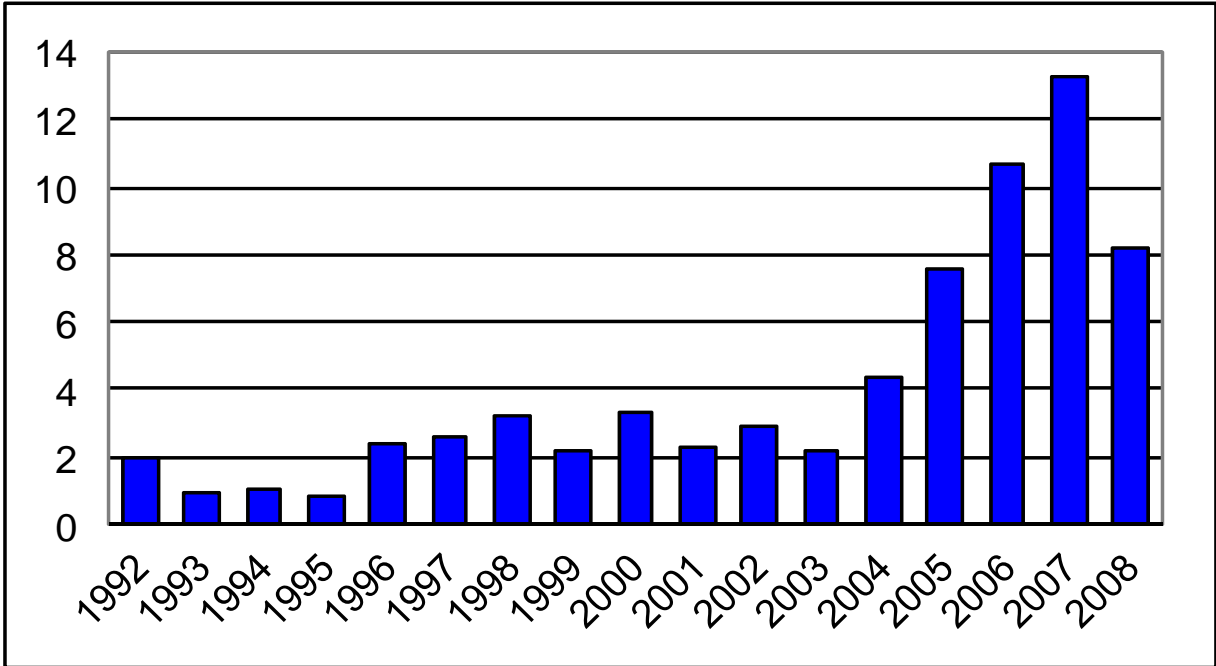
2.1. Data and Patterns

FDI in Egypt is described thoroughly in Hanafy (2015) and thus is only briefly discussed here. Our data are based on registered investments by foreign firms. These investments are registered at and approved by the General Authority for Investment and Free Zones (GAFI), which is the principal governmental authority in charge of licensing, registering, regulating, and promoting foreign and domestic investment projects in Egypt. This data source is employed because FDI data collected by the Central Bank of Egypt (CBE) are not reported on the governorate level.

The data by GAFI are focussed on greenfield FDI and company expansions and exclude foreign investments in the petroleum sector, as well as privatisation proceeds (Hanafy, 2015). This suits the purposes of this paper very well as it seems reasonable to focus on investment types and modes for which investors are relatively flexible in their location choice. Greenfield plants, of course, require an explicit decision about the investment

location (Guimaraes et al., 2000), but acquisition or resource-seeking FDI may not. Resource-seeking FDI in the oil and gas sector is by default strongly restricted regarding geographical flexibility within the country and is expected to be located near the natural resource. Acquisitions based on privatisation procedures are also geographically restricted by the location of the public company to be privatised. Our focus on greenfield FDI is similar to that found in other literature (e.g., Cheng and Kwan, 2000; Guimaraes et al., 2000). For the sake of simplicity, we often use ‘FDI’ in this paper as shorthand for ‘non-petroleum greenfield FDI’.

Figure 1: Flow of real ‘non-petroleum greenfield’ FDI to Egypt for the period 1992–2008 (in billions EGP at constant 1992 prices)



Source: Author’s calculations, based on data from GAFI.

Hanafy (2015) thoroughly describes FDI data in Egypt since commencement of the open-door policy in the 1970s. Here, we briefly focus on the time period of our model analysis, which is restricted by the availability of certain variables (see Section 4). Figure 1 shows the flow of real ‘non-petroleum greenfield’ FDI to Egypt for the period 1992–2008 in billions of EGP at constant 1992 prices. Real FDI in Egypt surged in the mid 2000s, reaching an unprecedented level of 13.3 billion EGP in 2007.⁴ The surge of FDI during this time period

⁴ Nominal FDI had been 36.4 billion EGP (equivalent to 6.4 billion USD).

may be mainly attributed to the increase in global and regional liquidity, as well as the substantial reforms undertaken by the—then new—government in Egypt to improve the climate for domestic and foreign investment (Ismail, 2010). For example, a new investment facilitation law was introduced in 2004 (Law no. 14/2004), making GAFI the sole body that investors need to deal with when establishing their companies, thus significantly decreasing the amount of bureaucracy involved in such a venture. GAFI records indicate that the average amount of time it took to register a company dropped significantly after the establishment of the ‘One-Stop Shop’, from an average of 34 days (and up to 140 days) to only three days. Accordingly, in 2007, the World Bank rated Egypt as the top world reformer in doing business (World Bank, 2009). In 2008, however, the world financial crisis had some impact on foreign investments to Egypt.⁵

Given the focus of this paper’s analysis, two characteristics of FDI patterns in Egypt are noteworthy. First, the geographic distribution of FDI in Egypt is highly uneven. Egypt has 27 governorates, but during the period 1992–2008, on average, 60% of FDI flows in Egypt were directed to the governorates of Cairo (32%) and Giza (28%). Further, the data reveal that roughly 90% of FDI flows targeted only 10 governorates (Figure A.1).⁶ Figure A.2 shows the average distribution of FDI inflows in 1992–2008 for different regions in Egypt, clearly illustrating the strongly uneven distribution among the regions.⁷ Note that each region consists of a different number of governorates (shown in parentheses in the event there are more than one). For example, three Suez Canal governorates attracted an average of 11% of FDI inflows, as much as eight governorates together in Lower Egypt. The five Frontier governorates together received 7%. Upper Egypt, with eight governorates, has been the least successful region in attracting FDI, receiving only 3% of FDI inflows. For a breakdown of the inbound FDI shares by governorate, see the first column of Table A.1 in the Appendix.

The second important feature of FDI flows in Egypt has to do with their source. Both Arab and non-Arab investors play a major role in non-petroleum greenfield FDI in Egypt. In the

⁵ The full impact of the crisis was felt in 2009 (Kamaly, 2011), at which point ‘non-petroleum greenfield’ FDI flows sunk lower than 1 billion EGP (Hanafy, 2015).

⁶ The governorates are Cairo, Giza, Alexandria, Suez, Red Sea, Sharkia, Ismalia, Damietta, Port Said, and Kalyoubia (ordered by share of average FDI flows).

⁷ We adopted the same classification of regions as the Egyptian Ministry of Planning (e.g., MOP, 2011), since doing so allows better insight into the data compared to using other common classifications.

1990s, the two groups of investors contributed almost equally to FDI inflows in Egypt. In the 2000s, the average share of non-Arab FDI was a bit higher (60%).⁸ The average geographic distribution of Arab and non-Arab FDI in Egypt for the period 1992–2008 is set out in Columns (2) and (3) of Table A.1 in the Appendix. A similarity between these two FDI origins is the high concentration in the top recipient governorates Cairo and Giza. However, the data also suggests some differences in the average geographical distribution of Arab and non-Arab FDI. For example, a relatively higher share of non-Arab than Arab FDI targeted Cairo, Alexandria, Suez, Port Said, and Damietta, whereas a relatively higher share of Arab FDI than non-Arab FDI went to Giza, Ismailia, Sharkia, and Behera. Finally, Arab and non-Arab FDI show only small differences in terms of their sectoral composition during our sample period (Figures A.3 and A.4 in the Appendix).⁹

2.2. Regional Investment Policies

Since the mid-1970s, various laws have been enacted with the intention of making Egypt more attractive to foreign investors by offering tax and investment-related incentives (UNCTAD, 1999; Louis et al., 2003). In this section, we sketch the different regional (foreign) investment policies that might have affected regional distribution of FDI in Egypt. The policies encompass the establishment of Free Zones (FZs), Industrial Zones (IZs), Special Economic Zones (SEZs), and the regional One-Stop Shops (OSS), as well as regional representation of investment authorities in Egyptian governorates.

The key regional incentive instrument for attracting FDI in Egypt was the establishment of Free Zones (FZs), which were initiated in 1974. According to GAFI, which is in charge of Free Zones in Egypt, their main purpose is to increase exports and attract foreign investment. Investors in FZs are offered a package of investment incentives, such as an exemption from all customs, taxes, import and export regulations, limited exemptions from labour provision,

⁸ Our dataset does not reveal the specific countries of origin for annual FDI at the governorate level. However, CBE data for the second half of the last decade, as reported by Kamaly (2011), show that most Arab FDI to Egypt came from the Gulf countries (especially the United Arab Emirates, Kuwait, and Saudi Arabia), while most non-Arab FDI came from the United States and the United Kingdom.

⁹ The fraction of Arab FDI that targets manufacturing is a bit smaller than non-Arab FDI, whereas a slightly larger share of Arab FDI targets tourism, construction and agriculture. For more details on sectoral FDI in Egypt, see Hanafy (2015).

and relatively lower land rental and energy prices.¹⁰ To date, nine public FZs are hosted by nine different governorates in Egypt. Investors are also allowed to establish private FZs, which are single zones for large factories or projects that cannot be accommodated in a public Free Zone in the same governorate. Private FZs benefit from the same incentive packages granted to investors in public FZs (CAPMAS, 2010).

Another instrument of regional industrial and investment promotion policy in Egypt has been the ongoing establishment of regional Industrial Zones (IZs) since the 1970s. IZs are chiefly intended to offer the required infrastructure for industrial projects in Egypt (M. Abdallah, GAFI Department of Investment in Governorates, personal communication, September 26, 2011). IZs also occur in investment-scarce southern Egypt. Currently, there are more than 70 IZs in 24 of the 27 Egyptian governorates. The three governorates that have no IZs are Gharbia, Red Sea, and South Sinai (M. Abdallah, GAFI Department of Investment in Governorates, personal communication, September 26, 2011).

In 2002, a legal framework for establishing export-oriented Special Economic Zones (SEZ) in Egypt was put in place. Firms operating in these zones are allowed to import capital equipment, raw materials, and intermediate goods duty free, are exempted from sales and indirect taxes, and can operate under more flexible labour regulations (US Bureau of Economic and Business Affairs, 2013). The first SEZ in Egypt, in the northwest Gulf of Suez, began development in 2009 (Bräutigam and Tang, 2011).

In 1993, GAFI began to establish regional GAFI representation offices to oversee regional promotional activities as well as collect investment-related information (M. Abdallah, GAFI Department of Investment in Governorates, personal communication, September 26, 2011). The offices perform no executive tasks, as such are undertaken at GAFI headquarters or in regional One-Stop Shops. The offices, which are affiliated with GAFI's Department of Investment in Governorates, were established in nine governorates at various times during

¹⁰ These investors are subject to only a 1% fee on goods that enter or leave the FZ. Investors in FZs can sell a certain percentage of production domestically if custom duties are paid, but they must export at least 50% of their production. <http://www.gafinet.org/English/Pages/FreeZones.aspx>, <http://www.gafinet.org/English/Pages/InvestmentRegimes.aspx>. Accessed on 6 September 2011.

1993–2007. In five other governorates, a GAFI representative, with duties the same as those of GAFI representation offices, was hired between 2008 and 2009.

In the context of GAFI's 2004 mandate to act on behalf of all governmental agencies and provide investors with all needed licenses and approvals, GAFI established a One-Stop Shop (OSS) in Cairo at its headquarters and three regional OSS branches in Alexandria, Assiut, and Ismailia. While this seems to be a step toward the decentralization of investment bureaucracy in Egypt, most foreign investors prefer to do the paperwork in Cairo, irrespective of the investment location. A GAFI senior official believes that this is because the investors' lawyers are mostly based in Cairo (GAFI Department of Investment in Governorates, personal communication, September 27, 2011). Data provided by GAFI show that 89% of registered companies in the period 2005–2010 were registered in Cairo (5% in Alexandria, 3% in Ismailia, 3% in Assiut).

3. Related Literature and Hypotheses

The investment location choice of foreign firms is typically determined by the expected relative profitability of the investment (Cheng and Kwan, 2000), meaning that, generally speaking, foreign investors will choose what they expect to be the most profitable destination for their investments. Relevant factors for location choice by MNEs are the subject of a great deal of research,¹¹ and fall into three broad categories (Dunning and Lundan, 2008; Mariotti et al., 2010): (i) endowment effects, which explain why a certain economic activity would be 'naturally' attracted to a particular location; (ii) agglomeration effects, which have to do with knowledge and labour spillovers and the cost-effective access to specialized inputs; and (iii) policy-induced effects. In our analysis, we rely on this framework and group the factors that potentially affect the spatial distribution of non-petroleum greenfield FDI inflows across Egypt into three groups of variables: (1)

¹¹ The idea of location advantages is part of Dunning's eclectic theory of FDI groups, which is also known as the OLI Framework (ownership, internalization, location) (Dunning, 1981, 1988). For a review of theoretical FDI determinants models, see Faeth (2009), who concludes that an empirical analysis of FDI determinants should combine explanatory variables from the different theoretical models and not be based on just one theoretical model only.

agglomeration and market effects, (2) labour supply effects, and (3) regional investment policy effects.

3.1. Agglomeration and Market Effects

Ever since Marshall (1890), economists have been aware of how agglomeration affects economic activity.¹² Positive externalities and economies of scale emerging from the geographic co-location of economic activity are referred to as agglomeration economies and are the focus of the growing new economic geography literature (Krugman, 1991; Venables, 1996; Fujita et al., 2001). Sources of agglomeration economies are knowledge and labour spillovers, as well as forward and backward linkages, which promote complementarities among firms. These factors mostly outweigh competition-induced dispersion (Kinoshita and Mody, 2001; Crozet et al., 2004). Therefore, the positive externalities suggest that agglomeration is in some way self-reinforcing (Krugman, 1991; Cheng and Kwan, 2000). A considerable body of empirical literature shows that agglomeration has a significant effect on foreign investment location (for the USA, see, e.g., Head et al., 1995; Bobonis and Shatz, 2007; for Portugal, see Guimaraes et al., 2000; for China, see Head and Ries, 1996; Cheng and Kwan, 2000; He, 2002; Du et al., 2008; for France, see Crozet et al., 2004; for Hungary, see Boudier-Bensebaa, 2005).

Informational externalities are another relevant aspect of investment agglomerations and are important for foreign investors' location decisions (He, 2002; Crozet et al., 2004; Mariotti et al., 2010). When planning a foreign investment, investors normally suffer from information asymmetry and business uncertainties, both of which are accompanied by high information costs (Mariotti and Piscitello, 1995; Caves, 1996; He, 2002). This is especially true for location-specific information, which is needed for the investment location decision (He, 2002; Mariotti et al., 2010). Accordingly, a rational foreign investor would favour those locations that minimize information costs (He, 2002).

Foreign investors normally rely on both publicly available as well as privately held information when making an investment decision (Kinoshita and Mody, 2001; He, 2002).

¹² Marshall (1890) suggests that agglomeration effects may occur within industries via lower transaction costs, sharing a common pool of labour, and knowledge spillovers. Jacobs (1969) points to positive externalities and synergies across different industries.

However, since publicly available information about characteristics and business environment at the regional level is limited in developing countries like Egypt, private information and information signalling become even more important for FDI decisions (Kinoshita and Mody, 2001). For example, foreign investors perceive the behaviour of other firms that made similar decisions in the past as an informational signal of the location's relative attractiveness (Kinoshita and Mody, 2001; Mariotti et al., 2010). Hence, and especially given the high private costs of information gathering, foreign firms are likely to imitate others' location choices, inducing herding behaviour and locational cascades (Kinoshita and Mody, 2001; Mariotti et al., 2010, Pinheiro-Alves, 2011).¹³ Moreover, business-concentrated areas offer an easier and cheaper platform for exchanging private information, for example, through business relationships with other foreign investors (Kinoshita and Mody, 2001; He, 2002). To sum up, clusters of regional investment can be viewed as locations with low information costs due to information externalities *before* making the investment location decision, and with easier information exchange *during* the investment period.

In our analysis, we differentiate between the effects on spatial distribution of new FDI inflows of two types of agglomeration: (1) the effect of foreign-specific agglomeration, that is, concentration of previous FDI, and (2) the effect of the concentration of domestic private investment.¹⁴ As to the former, our hypothesis is that new FDI is attracted to regions with previous FDI due to the above-mentioned agglomeration economies and information spillovers. Empirical findings from various countries generally mostly confirm this effect (e.g., Cheng and Kwan, 2000; He, 2002; Bobonis and Shatz, 2007; Du et al, 2008; Mukim and Nunnenkamp, 2012). However, results by Guimaraes et al. (2000) suggest that foreign-specific agglomeration does not seem to matter in Portugal.

Concerning the second type of agglomeration, our prior is that FDI is attracted to regions with higher domestic private investment due to the mentioned agglomeration and information externalities. However, we further expect that the effect of concentrated

¹³ For a theoretical model on the relationship between herding behaviour and investments, see Scharfstein and Stein (1990).

¹⁴ Guimaraes et al. (2000) similarly disentangle agglomeration types, among which is foreign-specific agglomeration.

domestic private investment is stronger than the effect of previous FDI concentration for the following reasons. Although a stronger presence of local and foreign investment generally signals higher relative attractiveness of the host region (Kinoshita and Mody, 2001), it is likely that domestic investors have better information about the most profitable investment locations in their own country (Crozet et al., 2004). This is especially the case under the high information asymmetry in developing countries such as Egypt. Furthermore, foreign investors might be interested in joint ventures with local investors, who bring in local knowledge and networks and thus reduce information costs (He, 2002), which would foster co-location.

Only a few empirical papers on FDI location determinants account for the effect of local private investment and the relative importance of both agglomeration effects. Crozet et al. (2004), who use a large sample of about 4,000 foreign investments in France to thoroughly study agglomeration effects, show, similar to our conjecture, that the coefficient on agglomeration with domestic firms is much higher than agglomeration with foreign firms. In the case of China, Sun et al. (2002) find a negative impact of cumulative FDI relative to cumulative domestic investment on new FDI in Chinese provinces.¹⁵

Regarding the effect of local market size on FDI inflows, some literature argues that researchers should take the underlying level of regional disaggregation, as well as the type of FDI, into consideration (e.g., Blonigen et al., 2007; Mukim and Nunnenkamp, 2012). For instance, investors are likely to be attracted to local markets of bigger size and purchasing power. However, this is more likely if horizontal FDI—where investors are mainly motivated by market access—is dominating.¹⁶ As a proxy for local market size, we use regional real GDP. We would expect a larger regional market to go in hand with more FDI, if FDI at the governorate level is mainly horizontal.¹⁷

¹⁵ In contrast, Mariotti et al. (2010) find that MNEs in Italy agglomerate with each other but only with domestic companies in the event these have some comparative advantage.

¹⁶ In contrast to horizontal FDI, vertical FDI allocates certain steps of the production process to a certain location to profit from factor price differences. Thus, vertical FDI is rather indifferent to local market size.

¹⁷ A body of literature specifically analyses the effect of surrounding markets on FDI location within the recipient country (e.g., Coughlin and Segev, 2000; Blonigen et al., 2007; Bobonis and Shatz, 2007; Mukim and Nunnenkamp, 2012). In our analysis, which is the first to analyze FDI location in Egypt, we disregard potential surrounding market effects. This can be justified by Mukim and Nunnenkamp's argument (2012) that the surrounding markets' potential is less important in the case of larger spatial units such as, in our case, Egyptian governorates.

3.2. Labour Supply Effects

Labour-intensive activity is an important type of FDI in developing countries. Hence, we expect FDI in Egypt to be more attracted to governorates with a larger pool of potential employees. There are no available governorate-level data on labour costs. However, we do not believe this is a problem for our analysis, as wage disparity tends to be rather small within low-cost countries (Mukim and Nunnenkamp, 2012). Even if there are wage disparities between regions, these differences will be nearly time-invariant over our sample period and thus captured by the governorate dummies. Further, wage differences are likely to capture differences in labour skills and productivity.¹⁸

It is likely that investors are not only concerned with labour availability but also with its quality. Indeed, in the FDI theoretical literature, the availability of skilled labour is embodied as a requirement for FDI inflows to developing countries (see, e.g., Lucas, 1990; Feenstra and Hanson, 1997; Zhang and Markusen, 1999).¹⁹ Noorbakhsh et al. (2001) find a significant positive effect of human capital on FDI inflows to developing countries. However, evidence from within-country studies is ambiguous.²⁰ These ambiguous results—even for the same country—are likely driven by the use of different samples and different labour education proxies. Since it is not a priori clear which labour education level is relevant for foreign investors, we run the regressions using different ones. Our hypotheses are that a higher labour force illiteracy rate deters, and a larger pool of skilled labour attracts, foreign investment.²¹

¹⁸ Note that Kamaly (2004) finds no significant effect of real wages on FDI inflows in Egypt at the national level.

¹⁹ Feenstra and Hanson (1997) argue that although outsourced activities from developed countries are mainly those that primarily need relatively unskilled labour from the developed country's perspective, they demand skilled labour from the developing country perspective.

²⁰ In China, for instance, Broadman and Sun (1997) and Coughlin and Segev (2000) find a negative effect of illiteracy rate on FDI location, whereas Cheng and Kwan (2000) find no significant education effect using three other proxies (population share with primary/junior secondary/senior secondary school education). For India, Mukim and Nunnenkamp (2012) find that FDI is attracted to more educated districts (using population share with higher-secondary education), while Nunnenkamp and Stracke (2008) do not find a similar effect for Indian states (using literacy rate and enrolment in higher than primary education).

²¹ Note that labour laws in Egypt prevent companies from hiring more than 10% non-Egyptians (OECD, 2010).

3.3. Regional Investment Policy Effects

In this section, we develop our hypothesis regarding the impact of the different regional policy instruments in Egypt described in Section 2. Although some of the policy variables may be linked to the agglomeration effects discussed above, we prefer to include them in a separate category due to their direct policy relevance, since they can be directly changed by modifications in regional policy. Governments often use different promotion policies to attract investment to relatively deprived regions (Devereux et al., 2007). Faeth (2009) reviews the empirical literature on FDI determinants and concludes that the effect of fiscal and financial investment incentives on FDI is small compared to other determinants. If the implemented policies in Egypt were effective, we would expect them to increase FDI inflows in the respective region.

The Egyptian government established different types of zones, which is a frequently used method of attracting foreign investments. Depending on the zone type, different incentive packages and preferential treatments are offered. In addition to fiscal incentives, a common feature of such zones is a dedicated infrastructure.²² In China, for example, provinces that host Special Economic Zones (SEZ) or other zone types attract significantly more FDI (Cheng and Kwan, 2000).

Concerning Free Zones (FZs) in Egypt, we expect that their hosting governorates attract more FDI due to the extensive package of investment incentives, the usually well-developed infrastructure in their surrounding areas, and the positive agglomeration externalities in well-functioning FZs and their surrounding areas. Moreover, compared to other investment locations in Egypt, public information on FZs and their hosting governorates is usually more available and also in the English language, both of which are likely to reduce foreign investors' costs of obtaining information (He, 2002).

As to Industrial Zones (IZs), we expect governorates that host (more) IZs to attract more FDI due to the proper investment infrastructure that they usually provide. Special Economic Zones (SEZ) are not included in our model, since the first SEZ in Egypt (in the northwest Gulf

²² For an overview of the different types of zones, their characteristics, and effects, see Akinci and Crittle (2008).

of Suez) only began development in 2009 (Bräutigam and Tang, 2011), leaving the assessment of its impact on FDI to future research.

If GAFI representation is effective in promoting the respective governorate, we would expect FDI to increase in those governorates that are home to GAFI representation. In our analysis, we include a dummy for GAFI representation to capture its potential effect on regional FDI inflows.

Finally, we account for the annual flow of public investment at the governorate level. Egypt has long been characterised by a large and dominant public sector. Despite a significant decrease since the early 1990s, public investment still constitutes about 40% of total investment by the end of our sample period (MOP, 2009). In their analysis of the relationship between public and private investment in developing countries, Blejer and Khan (1984) find that public investment in infrastructure is complementary to private investment, while other types of public investment crowd out private investment. This is because adequate public infrastructure reduces the cost of doing business and thus attracts investment. Employing a larger sample of 116 developing countries for the period of 1980–2006, Cavallo and Daude (2011) find a dominating crowding-out effect of private investment by public investment. Fawzy and El-Megharbel (2006) confirm the results of Blejer and Khan (1984) for the case of Egypt. The authors find that public investment in non-infrastructure activities crowds out private investment, whereas public investment in infrastructure complements and encourages it. Since no disaggregated data on public investment are available at the governorate level, our findings on the total effect of public investment on FDI inflows must of necessity be exploratory in nature.²³

3.4. FDI Origin: Arab Versus Non-Arab FDI

We also investigate whether Arab investors, who share the same language and culture with the hosting country Egypt, behave differently than non-Arab investors in terms of their investment location determinants. To do this, in a separate analysis, we split our FDI dependent variable into FDI from Arab countries and that from the rest of the world.

²³ Note that the effect of public investment on FDI to Egypt at the national level is insignificant, according to Kamaly (2004).

Having language and culture in common with Egypt is expected to facilitate Arab investors' access to relevant information (for their location decision) and thus reduce their information costs, compared to those of non-Arab investors. This should be especially the case given that a great deal of investment-relevant data and information in Egypt are available only in Arabic (OECD, 2010).²⁴ Moreover, having language and culture in common likely also results in better access to and understanding of local knowledge and easier direct as well as informal communication with locals. The latter would facilitate obtaining privately held information. In contrast, the greater cultural distance and language barriers of non-Arab investors are likely to result in greater uncertainties, more pronounced information asymmetries, and higher information costs.

Based on our discussion on information costs, FDI inflows are expected to follow the location choice of previous investments more when uncertainties and information costs are higher.²⁵ Consequently, we hypothesize that—compared to Arab FDI—non-Arab FDI in Egypt will have a higher tendency to agglomerate with previous FDI and domestic private investment. That is, we expect more herding behaviour by non-Arab investors regarding their investment location.²⁶

4. Empirical Estimation and Data

To empirically investigate our hypotheses on the determinants of regional FDI inflows in Egypt, we employ a panel data regression of 26 Egyptian governorates over the period

²⁴ My own fieldwork experience in collecting data and information for this project very much supports this argument. Most information and data at the governorate level is very difficult to access and available only in Arabic.

²⁵ Similarly, Mariotti et al. (2010) argue that the higher the uncertainty in the local context and the higher the relevant information costs, the more MNEs are likely to imitate other MNEs.

²⁶ A body of literature analyses whether foreign investors specifically prefer those locations where investors from their same country of origin have invested (e.g., Head et al. 1995, 1999; Crozet et al., 2004; Bobonis and Shatz, 2007; Mukim and Nunnenkamp, 2012). However, the aggregation level of our data does not allow testing this hypothesis. In a robustness analysis, we check whether foreign-specific agglomeration can be found among Arab or non-Arab FDI, respectively.

1992–2008.²⁷ We begin our estimations with a panel of aggregate FDI inflows, that is, FDI from all regions of the world. For our analysis of the role of cultural and language similarity, we split our sample into two subsamples: FDI inflows from Arab countries (Arab FDI) and FDI inflows from the rest of the world (non-Arab FDI). Our model timeframe is mainly restricted by available data on regional GDP. The panel is unbalanced due to lack of data on the population-scarce frontier governorates in the 1990s.

We estimate the following panel data model:

$$y_{it} = \alpha_i + \beta' x_{it} + \mu_t + \eta_{it}$$

α_i denotes the governorate-specific effect, μ_t is a time-specific effect, and η_{it} is an error term. y_{it} stands for our dependent variable, which is the aggregate real FDI flow in Model 1, the Arab real FDI flow in Model 2, and the non-Arab real FDI flow in Model 3.²⁸ The time-specific effects are those that affect all governorates in a year, such as new relevant national or international policies or shocks that affect all regions equally. The governorate-specific effects capture any time-invariant governorate characteristics, such as geographic location or natural resource endowments.²⁹ As described above, we group the explanatory variables into three sets.

Agglomeration and market variables include the real FDI stock to account for foreign-specific agglomeration, the stock of real domestic private investment to account for agglomerations

²⁷ Egypt consists of 27 governorates. However, we merged the governorates Qena and Luxor for the sake of consistency, since Luxor was only split from the governorate Qena to become a single governorate in 2010. Before 2010, Luxor was a 'Supreme City' attached to the governorate of Qena. Thus, most data sources do not report separate data for Luxor for the period under study.

²⁸ We use the amount of FDI inflows as dependent variables rather than employing a discrete choice model of investment projects, since the latter would limit the analysis to determinants of a discrete FDI location choice, without taking the magnitude of FDI activity into consideration (Blonigen et al., 2007). Moreover, our GAFI data do not separately report the number of foreign investment projects.

²⁹ In our search for infrastructure proxies, we found that the main port or airport in each governorate—if any—had been built long before the timeframe of our analysis. Hence, the presence of a port and the presence of an airport are captured by the governorate-specific effect as well. Moreover, the governorate's degree of urbanisation is also captured by the governorate dummy, since data on the urbanisation rate, which are available in the Egypt Human Development Reports by UNCTAD for some years of our timeframe, show hardly any variation over time.

with domestic private investment, and the real GDP to account for market size and potential. Table 1 describes all variables; more information on the variables and data sources can be found in the Appendix.

Table 1: Definition of model variables and expected sign of explanatory variables

Variable	Description	Expected Sign
<i>Dependant variables</i>		
(1) FDI flow	Real FDI flow (log)	
(2) Arab FDI flow	Real Arab FDI flow (log)	
(3) Non-Arab FDI flow	Real non-Arab FDI flow (log)	
<i>Explanatory variables</i>		
Agglomeration & market variables		
FDI stock	Real FDI stock (log)	+
Domestic private investment stock	Real domestic private investment stock (log)	+
GDP	Real GDP (log)	(+)
Labour market variables		
Labour force	Share of labour force in population in % (log)*	+
Labour force illiteracy rate	Share of illiterates in labour force in % (log)	-
Labour force holding secondary education	Share of labour force holding secondary education in % (log)	+
Regional investment policy variables		
Free Zone	Stock of real investments in Free Zones (log)	+
Industrial Zone	Sum of total area of Industrial Zones (in feddan, log)	+
GAFI representation	Dummy equal to 1 if GAFI is locally represented; 0 otherwise	+
Public investment	Real public investments (log)	?

Notes: All real variables in 1992 prices. Where indicated, the logarithm of the variable (+ 1) is taken, that is, one is added to allow for a zero observation.

*We do not take the absolute number of labour force due to collinearity with the GDP variable.

As to labour market variables, we include the labour force to capture labour abundance. We use stock instead of flow variables on education, as the former better capture the education level of the labour force (Noorbakhsh et al., 2001). A priori, it is not clear which level of

labour education is relevant for foreign investors. Therefore, we run the regressions with different levels of labour education. We first employ two proxies in our regressions: (a) labour force illiteracy rate and (b) share of labour force that holds an intermediate or higher level of education (equivalent to secondary education or higher). As a robustness check, we substitute the latter by the share of labour force that holds a university degree.

The final group includes regional investment policy variables. To capture the effect of Free Zones, we use the real investment stock in FZs. We opt for this specification instead of employing a dummy variable on FZ existence for two reasons. First, this specification avoids having a nearly time-invariant dummy variable on FZ existence since most FZs were established before the period of our analysis. Second, our proxy takes the FZs' actual operation into account. Governorates with well-established FZs that host a higher stock of investments are expected to attract more FDI.³⁰ To capture the presence of IZs, we include the sum of the area of all IZs in a governorate, which captures the IZ effect better than using the number of IZs in a governorate, as the size of IZs in Egypt varies substantially.³¹ We use a dummy variable coded 1 if GAFI is represented in a governorate and 0 otherwise. As the establishing years of GAFI representation range between 1993 and 2007, the dummy variable contains much variation over time. Finally, a further variable on annual real public investment is included.

Given the skewness of our FDI data, we adopt a log-linear specification, which helps transform a nonlinear relationship between FDI inflows and the explanatory variables into a linear one. Consequently, our regression coefficients measure elasticity of FDI inflows with respect to the explanatory variables. To allow for some time lag for the different explanatory variables to have an impact on foreign investment decisions and to avoid endogeneity, we lag the explanatory variables by one year. Cluster-robust standard errors are used.

³⁰ Similar to this argument, Wang (2013) finds that later-established SEZs in China have a smaller effect on FDI than older ones.

³¹ It was impossible to obtain data on annual investment amounts in IZs so as to have data similar to that we have for FZs.

5. Results

Table 2 provides the regression results for the different specifications of our model, which are discussed below.

Table 2: Fixed-effects estimation results

	Model 1	Model 2	Model 3
Dependent variable	Aggregate FDI (log)	Arab FDI (log)	Non-Arab FDI (log)
Agglomeration & market variables			
FDI stock (log)	-0.13 (0.15)	-0.09 (0.06)	-0.07 (0.17)
Domestic private investment stock (log)	0.41* (0.21)	0.09 (0.12)	0.39* (0.22)
GDP (log)	0.29 (0.78)	-0.04 (0.61)	0.43 (0.93)
Labour market variables			
Labour force (% pop, log)	1.61* (0.93)	1.22 (0.78)	1.13 (1.10)
Labour force illiteracy rate (% , log)	-0.43 (0.38)	0.12 (0.31)	-0.5 (0.36)
Secondary education (% labour force, log)	-1.21 (1.09)	-0.74 (0.72)	-0.87 (0.74)
Policy variables			
Free Zone (log)	0.15* (0.08)	0.05 (0.05)	0.26*** (0.10)
Industrial Zone (log)	0.00 (0.06)	-0.05 (0.04)	0.02 (0.05)
GAFI representation	0.22 (0.33)	-0.12 (0.18)	0.23 (0.34)
Public investment (log)	-0.49 (0.31)	-0.16 (0.29)	-0.69** (0.27)
Constant	-4.00 (17.15)	1.10 (13.08)	-6.15 (20.82)
Model joint significance	F(25,25)=388***	F(25,25)=222***	F(25,25)=364***
Time dummies (significant)	Yes	Yes	Yes
Observations	376	376	376
R ² for within model	0.38	0.34	0.31

Notes: (i) *, **, *** indicate significance at a 10%, 5%, and 1% level, respectively. (ii) Dependent variables are the logged real inflows of aggregate FDI in Model 1, the logged real Arab FDI inflows in Model 2, and the logged real FDI inflows from non-Arab countries in Model 3. (iii) Coefficient estimates, except for GAFI representation, are elasticity estimates due to the log-log form. (iv) Cluster-robust standard errors are used and reported in parentheses below each coefficient estimate.

5.1. Aggregate FDI

In Model 1, we regress the explanatory variables on the logged real inflows of aggregate FDI. The model is jointly significant at the 1% level, as shown by the F-test of joint significance at the bottom of the table.

Regarding the agglomeration and market variables, we find no significant effect of real FDI stock on new real FDI inflows. Thus, we reject our hypothesis on FDI foreign-specific agglomeration. This is an interesting result, given the strong FDI spatial concentration in Egypt. Our result implies that foreign firms are not attracted to locations of previous FDI per se and that other factors seem to be responsible for the concentration. Our result is in contrast to those for other countries, where, generally, new FDI is significantly attracted to locations of former FDI. Our result, however, is in line with that of Guimaraes et al. (2000) for FDI in Portugal. We argue that the unexpected lack of foreign-specific agglomeration of greenfield FDI in Egypt is good news because self-reinforcement of FDI location would indicate a level of path dependency which cannot be easily influenced by policymakers, who aim to stimulate investment in investment-scarce regions. Our result indicates that it is not too late for governorates that to date have been less attractive for foreign investors to attract new or more FDI in the future.

In line with our conjecture, our results show a positive effect of the concentration of domestic private investment on FDI inflows. That is, a 1% higher stock of Egyptian private investment increases FDI inflows to the same governorate by 0.4% at the 10% significance level. Our results are also in line with our hypothesis on the higher relative importance of agglomeration with domestic firms. In fact, foreign-specific agglomeration is not significant at all. Forward and backward linkages, as well as joint venture options, are expected to be more prevalent where domestic investment is concentrated; moreover, domestic investors are likely to have better information with respect to profitable locations (Crozet et al., 2004). Sun et al. (2002) and Crozet et al. (2004) find similar results with regard to the relative importance of both agglomeration effects. Since many empirical studies on FDI location determinants in other countries do not take local investments into account, it would be interesting to discover whether including local private investment changes their FDI

coefficients. In our case, omitting the variable on domestic private investment does not change our result for FDI stock.

Our estimated effect of GDP is not statistically significant. Accordingly, a governorate's higher GDP does not seem to attract more FDI inflows. Our results suggest that FDI within Egypt is mostly not horizontal.³²

As to the labour supply effects, we find—in line with our conjecture—a positive effect of labour abundance on FDI inflows at the 10% significance level. The effect is relatively large; the elasticity of 1.6 is greater than unity, implying a quite elastic relationship. However, the data reject our hypotheses on the effect of labour education. We find that higher illiteracy of the labour force at the governorate level does not appear to deter foreign investors at any reasonable significance level. Further, labour force education, in terms of at least secondary-school education, shows an insignificant effect as well. Both labour education variables are also jointly insignificant ($F(2,25) = 0.86$). Consequently, our results suggest that labour education is not a determinant of FDI location in Egypt.

Although our result is similar to Méon and Sekkat (2004) for MENA countries and to that of Cheng and Kwan (2000) for China,³³ it is still surprising given that skilled labour shortage is often mentioned as an obstacle for foreign investors in Egypt (UNCTAD, 1999;³⁴ US Bureau of Economic and Business Affairs, 2013). We propose three possible explanations for our different finding. First, the difference might be driven by the discrepancy between formal education in Egypt and the professional skills needed in the labour market (UNDP, 2010; World Bank, 2007). This would suggest that our proxies are not capturing the labour skills needed by foreign investors. A second explanation is that although (foreign) investors do care about skilled labour, they do not care much about its abundance at the chosen investment location because of the relative ease of internal migration in Egypt. Third, the

³² Note that the insignificant FDI stock and GDP variables are also jointly insignificant. Moreover, our results are robust to estimating the model only with the group of agglomeration variables.

³³ Méon and Sekkat (2004) use primary education as a proxy.

³⁴ UNCTAD (1999) reports the results of a survey in which foreign investors in Egypt were asked about obstacles to business establishment and operation. On a scale from 0 to 5 (highest rank), the average investor's score on the factor 'labour skills' was about 3.5.

result could be driven by FDI aggregation across different sectors, each of which might require a different level of skill intensity.

Regarding the policy variables, our results reveal a significantly positive effect of Free Zones, whereas the effect of Industrial Zones is not significantly different from zero. The result is consistent with the greater investment incentives and preferential treatment given to FDI in Free Zones compared to Industrial Zones in Egypt. Similarly, Cheng and Kwan (2000) find the effect of SEZ in China to be higher than that of any other zone type, which is in line with SEZ's more preferential treatment of FDI. Specifically, our FZ elasticity estimate suggests that governorates with 1% higher investment operations in FZs receive 0.15% more FDI inflows. Our result is in accordance with our conjecture and implies that the presence of well-operated FZs promotes FDI inflows to the governorate in which the FZs are located. The FDI could be targeting the FZ itself to profit from granted incentives and provided infrastructure or targeting the FZ governorate in general, which is likely to have better infrastructure and offer agglomeration externalities.³⁵

The presence of a GAFI office or representative does not have a significant effect on FDI at any reasonable level of significance. This suggests that GAFI local representation has not significantly promoted FDI inflows in the respective governorate.³⁶ Finally, we find no significant effect of real public investment on FDI inflows. Our result is in line with findings by Kamaly (2004) for FDI in Egypt at the national level.

5.2. Arab versus Non-Arab FDI

In Model 2 of Table 2, we regress the logged real FDI inflows from Arab countries on the same 10 explanatory variables as in Model 1, whereas in Model 3, we regress the logged real FDI inflows from the rest of the world (non-Arab countries) on the same 10 explanatory variables. Our regression results reveal interesting differences between Arab and non-Arab FDI in terms of their location determinants.

³⁵ The FDI stock variable remains insignificant when excluding the FZ variable from our model.

³⁶ However, we still believe that such local representation seems a step toward a decrease of centralisation in a highly centralized country like Egypt and toward improving the collection of scarce regional data on investment locations.

Although Model 2 on non-Arab FDI is jointly significant, none of the 10 explanatory variables is significant at any reasonable level of significance.³⁷ The 10 variables, as well as each of the three groups of variables, are also jointly insignificant. Accordingly, only the groups of significant time as well as governorate dummies contribute to the significance of the model. Other than in the case of Arab FDI, our results from Model 3 show that domestic private investment, FZs, and public investment matter for non-Arab FDI to Egypt in a significant and economically relevant way. Consequently, our results suggest that regional Arab investors might, at most, be affected by long-run economic effects (which are time-invariant in our sample period and captured by our fixed effects), but not by any of the short-run economic effects incorporated in our model. Our finding seems to be in accordance with empirical findings by Sekkat (2014), who shows that—other than non-Arab FDI in Arab countries—economic and institutional variables do not affect intra-Arab FDI. A possible explanation offered by Sekkat (2014) is that intra-Arab FDI is largely influenced by regional strategic considerations of government-related entities. Similarly, Bolbol and Fatheldin (2006) posit that intra-Arab FDI is determined by non-economic factors where relationships play a major role. An official at the Egyptian Ministry of International Development (personal communication, March 23, 2014) has a similar explanation for Arab FDI in Egypt, stating that ‘political reasons played a major role in the location of Arab FDI under the time of ex-president Mubarak’.

As to the non-Arab investors, our findings show that governorates with a 1% higher stock of Egyptian private investment receive 0.4% higher non-Arab FDI. The result is in line with our conjecture that non-Arab investors, who face higher uncertainties and information costs, tend to follow (more) the location of Egyptian private investors. Non-Arab investors are also likely to be more interested in joint ventures with local investors, who bring in local knowledge and networks, as well as the ability to deal with the challenges of local bureaucracy.

Moreover, we do not find a significant effect of FDI stock on new non-Arab FDI inflows. This confirms our finding from Model 1 that agglomerations with local private investments, rather than with previous FDI, play a significant role in the location of this type of FDI. Nor do

³⁷ Only the variable ‘labour force’ is close to significance (p-value = 0.13).

we find a significant effect of GDP, labour education, IZ, or GAFI offices on non-Arab FDI, which is similar to our result for aggregate FDI.³⁸

Our results further reveal the significance of FZs for non-Arab FDI location. The coefficient is higher than in Model 1 on aggregate FDI, where Arab FDI inflows were also included. Governorates with 1% higher FZ operation activities attract 0.26% higher non-Arab FDI flows. In addition to the incentive packages, FZs and their hosting governorates are low information cost areas for non-Arab investors due to the better availability of (English) information. Our result that FZs do not significantly matter for Arab FDI is again in line with findings by Sekkat (2014).³⁹

Finally, our results show a negative effect of public investment flows on the non-Arab FDI location. A 1% higher public investment flow is associated with 0.69% less non-Arab FDI, significant at the 5% level. This result suggests a dominating crowding-out effect of non-Arab FDI by Egyptian state-owned enterprises, which have a dominant role in the Egyptian economy. For example, the public sector still accounts for about 40% of the country's production (ADB, 2009). On the contrary, public investment does not seem to crowd out Arab FDI, which might be due to the relevance of political relationships and considerations for Arab FDI, as brought forth in our interview with an official at the Egyptian Ministry of International Development (2014).

5.3 Robustness Checks

We conduct several robustness checks. First, we re-run our regression models while restricting the FDI inflows to those in the manufacturing sector in order to rule out that our different results for Arab and non-Arab FDI are driven by differences in their sectoral composition. We conduct the analysis for manufacturing FDI for various reasons. First, the manufacturing sector hosts the largest share of FDI in Egypt. Second, FDI flows into this sector show the highest geographic dispersion in Egypt. For more details on sectoral FDI in

³⁸ These variables are also jointly insignificant. Similar to Arab FDI, our variable on labour endowment has a p-value of 0.12. Our result on labour education is in line with Sekkat (2014), who finds that primary and secondary education have no significant effect on non-Arab FDI in Arab countries.

³⁹ In addition to the positive investment incentives, FZs are specifically attractive for export-oriented FDI. Sekkat (2014) finds that, in contrast to non-Arab FDI in Arab countries, openness does not significantly matter for intra-Arab FDI.

Egypt, see Hanafy (2015). Third, agglomeration externalities in terms of economies of scale and forward and backward linkages are expected to be most pronounced in this sector. Fourth, many agricultural activities as well as some services, such as tourism, are partly location bound, which limits investor location choice. Accordingly, we re-run the regressions using (1) Arab FDI and (2) non-Arab FDI, both restricted to the manufacturing sector, as dependent variables. The results are in line with our findings above, suggesting that the differences in location determinants between Arab and non-Arab FDI are not driven by their sectoral composition.⁴⁰

Second, as it is not a priori clear which level of labour education matters for FDI in Egypt, we substitute our variable on secondary education by the share of labour force that holds a university degree. We do not include both variables in the model for multicollinearity reasons. Our education results do not change for aggregate FDI, Arab FDI, or non-Arab FDI. In fact, we find a negative coefficient for university education, significant at the 10% level. While Sekkat (2014) similarly finds primary and secondary education to be insignificant for non-Arab FDI in Arab countries, he finds a positive effect of tertiary education, which we cannot confirm in the specific case of the location of non-Arab FDI in Egypt.

Third, we check whether foreign-specific agglomeration can be found among Arab or non-Arab FDI, respectively. To do this, we rerun the regressions in Models 2 and 3 while splitting our explanatory variable on FDI stock into two explanatory variables: (a) Arab FDI stock and (b) non-Arab FDI stock. The regression results do not show any agglomeration among Arab FDI, nor among non-Arab FDI.⁴¹

Fourth, our results are robust to sample modifications, including (i) re-estimating our regression models based on the available balanced panel, (ii) excluding from our sample the governorates Cairo and/or Giza, which host the most FDI, or (iii) excluding from our sample the two Sinai governorates, which have some special (time-variant) regulations regarding foreign investments.

⁴⁰ Again, none of the variables is a significant determinant of the location of manufacturing FDI from Arab countries. All robustness results are available upon request.

⁴¹ Our finding, of course, cannot exclude agglomerations of FDI from the same-source country. This cannot be analyzed given the aggregation of available data.

6. Concluding Remarks

This paper is the first to investigate the determinants of FDI spatial distribution in Egypt based on a novel panel dataset of Egyptian governorates. Our results suggest that domestic private investment and well-functioning Free Zones, as well as labour abundance are regional pull factors for FDI inflows to Egypt. Regional policies in Egypt—with the exception of Free Zones—do not affect the uneven FDI spatial distribution in the country, which is an important piece of information for policymakers. Despite the strong spatial concentration of FDI in Egypt (Hanafy, 2015), our results do not support that new FDI flows are attracted to regions with higher previous FDI, as often found in the literature. Our result implies that foreign firms are not attracted to locations of previous FDI per se and that other factors seem to induce the concentration.

We argue that the lack of foreign-specific agglomeration of FDI in Egypt is good news for the remote governorates. This lack of path-dependency indicates that it is not too late for governorates that to date have been less attractive for foreign investors to attract new or more FDI in the future. The current concentration of FDI in only a few regions might prevent the dissemination of possible positive FDI effects throughout the whole economy and thus increase regional divergence (Mumkin and Nunnenkamp, 2012). Recent political events in Egypt show that inequality can be a major source of political unrest in the country. Our results suggest that facilitating domestic private investment in investment-scarce regions in Egypt (e.g., through financial reforms and better access to credit) could increase both domestic private and foreign investments in these regions.

Our analysis further reveals substantial differences between the location determinants of FDI from countries of the Arab region and FDI from the rest of the world. These differences also hold when restricting the analysis to manufacturing FDI. Agglomeration of domestic private investment and Free Zones positively affect the spatial distribution of non-Arab FDI, but not FDI from Arab countries. Arab investors, who have language and culture in common with the FDI host Egypt, are more willing to invest in less investment-agglomerated areas. The good news is that Arab FDI could help smooth the high inequality of investment distribution in Egypt. Our results further imply that Arab FDI is less affected by economic

considerations and incentives. This makes Arab FDI less vulnerable to economic downturns and instability, both of which characterise the post-uprising era in Egypt.⁴²

Finally, we recommend substantial improvements to the GAFI website, which is the major tool for disseminating information on investment sites in Egypt. The GAFI website—in both its Arabic and English versions—was often down (not available) during our period of research. Substantial improvement in the availability, quality, and dissemination of information about the different governorates and investment sites in Egypt, preferably offered in both English and Arabic, is likely to diminish information asymmetries for foreign investors. GAFI representation offices in the different governorates could play a major role in this matter.

Our analysis is limited by data availability and could be expanded in many directions. For example, the availability of a panel of firm data would further decrease potential endogeneity concerns and allow for a more rigorous analysis of agglomeration effects. Further, the analysis of location determinants would profit from being able to distinguish between 100% foreign enterprises and joint ventures. Moreover, FDI data by country of origin at the governorate level would allow for a better integration of source-country characteristics, as well as the analysis of possible country-specific agglomerations, and could be the next step toward a more rigorous analysis of the role of cultural distance on FDI location. Future research should analyse the effects of FDI on growth and development at the regional level in Egypt. Employing spatial econometric techniques would enhance the models' ability to account for geographical factors.

⁴² In fact, the contribution of Arab countries to FDI inflows in Egypt increased from an average of 33% in the three years before the unpredicted 25th of January Uprising in 2011 to 52% in the three years after the uprising (CAPMAS, 2015).

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APPENDIX

Appendix A: Data Sources and Details

The appendix provides sources and background information for the data used in the analysis.

Dependent variables:

- Real FDI flow (in million EGP, log). The FDI inflows are based on unpublished raw data of investments by foreign enterprises registered at the General Authority for Investment and Free Zones (GAFI). Real figures have been calculated using the GDP deflator (1992 = 100) reported by the World Bank. The logarithm of the variable (+1) is taken where one is added to allow for a zero observation.
- Real Arab FDI flow (in million EGP, log). Calculation similar to real FDI. Source: GAFI.
- Real non-Arab FDI flow (in million EGP, log). Calculation similar to real FDI. Source: GAFI.

Exploratory variables:

Market and agglomeration variables

- Real FDI stock (in million EGP, log). The real FDI stock is defined as the amount of cumulative real FDI flows from 1972 until the end of the respective year at 1992 prices (see real FDI flow above). Egypt's open-door policy started in 1974, but the country had already begun receiving first inflows in 1972. Many governorates, however, did not experience positive FDI stocks until the 1990s. To calculate the real FDI stock, we used an annual depreciation rate of 4%, based on the calculations by Hevia and Loayza (2012) for Egypt. The logarithm of the variable (+1) is taken where one is added to allow for a zero observation.
 - Real Arab FDI flow (in million EGP, log). Calculation similar to FDI stock.
 - Real non-Arab FDI flow (in million EGP, log). Calculation similar to FDI stock.
- Real stock of domestic private investments (in million EGP, log). Calculation similar to FDI stock. Source: GAFI.
- Real GDP (in million EGP, log). Data on nominal GDP per capita were collected from several English and Arabic *Egypt Human Development Reports* by UNCTAD. These reports are not issued annually and thus data are missing for a few years. Where possible, we used governorates' *Human Development Reports*, made available by the National Institute of Planning, to fill in missing data on governorate GDP per capita. To fill in remaining gaps, we conducted a linear interpolation. We used the GDP deflator (1992 = 100) reported by the World Bank to obtain real figures. The annual GDP per capita was multiplied by the population at the governorate level to obtain the governorate's GDP. Finally, the logarithm of the real GDP is taken. Note that GDP data on the population-scarce frontier governorates are available only since 2000. Thus, our panel is an unbalanced one.
We obtained the population data at the governorate level from two sources: (1) the population since 1995 was collected from available CAPMAS yearbooks and (2) the

population for the period 1990–1992 was obtained from the Annual Labour Force Sample Issues by CAPMAS. To bridge the gap of the two missing years of 1993 and 1994, we conducted a linear interpolation of population data.⁴³

Labour market variables

Data on labour force and labour force education are from the Annual Labour Force Sample Issues by CAPMAS. As no issue is available for the year 1996, the data were interpolated to fill this gap.

- Labour force. This is the share of labour force in the population in percent. The logarithm of the variable is taken.
- Labour education. We use three proxies for labour education: (a) the share of illiterate labour force in percent, (b) the share of labour force that holds at least an intermediate level of education (equivalent to at least secondary education), and (c) the share of labour force that holds a university degree. The logarithm of the respective variable is taken.

Regional investment policy variables

- Free Zones (FZ). This is the stock of investments in Free Zones (in million EGP, log). Unpublished raw data on issued capital in Free Zones was provided by GAFI's Department of Free Zones. We converted the data from USD to Egyptian pounds using the year average exchange rate by IMF. Real investment figures were calculated using the GDP deflator (1992 = 100) by the World Bank. An annual depreciation rate of 4% (Hevia and Loayza, 2012) was used to calculate the real stock of investments. The logarithm of the variable (+1) is taken.
- Industrial Zones (IZ). This is the sum of Industrial Zones' area (in feddan; 1 feddan = 0.42 hectares = 4,200 square meters). The unpublished raw data on areas of different Industrial Zones were obtained from two complementary sources: (i) GAFI's Industrial Zones Department and (ii) the Industrial Development Agency (for IZs in new urban community cities). The logarithm of the variable (+1) is taken.
- GAFI representation. A dummy equal to 1 if GAFI is locally represented by a GAFI office or a GAFI representative; 0 otherwise. Source: Unpublished raw data from GAFI's Department for Investment in Governorates.
- Public investment (in million EGP, log). Unpublished regional public investment data, which were made available by the Ministry of Planning, are disaggregated at the governorate level starting in 1997. For the years before 1997, only annual aggregate public investments were made available according to five-year-plans. To estimate public investments per governorate for 1992–1996, we made the assumption that a governorate's share in total public investment is the same as the average of the following five years (1997–2001). To obtain real investment figures, we used the GDP deflator (1992 = 100) by the World Bank.

⁴³ Similarly, Blonigen et al. (2007) use linear interpolation to fill missing data.

Appendix B: Tables

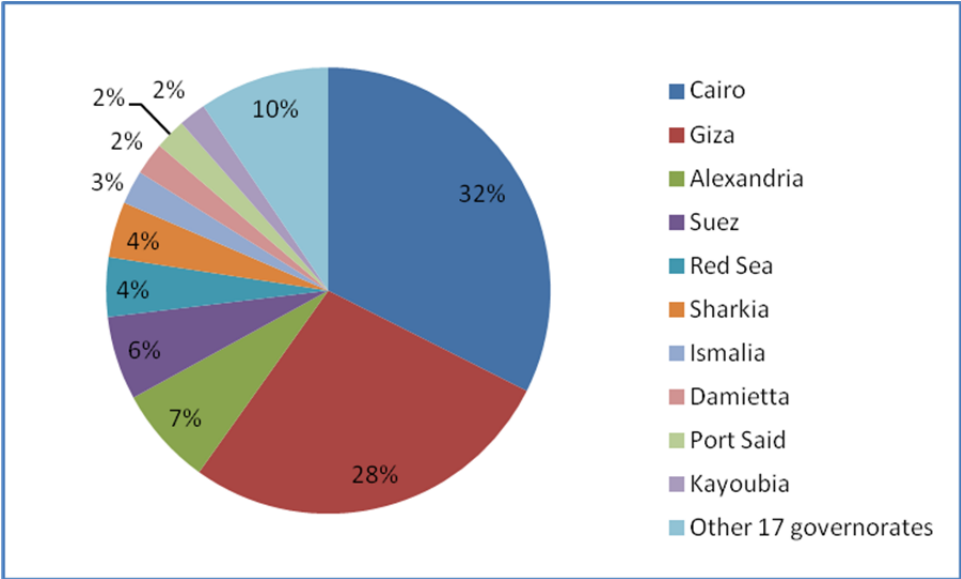
Table A.1: Distribution of ‘non-petroleum greenfield’ FDI flows across Egyptian governorates and regions (average of 1992–2008), by origin

Governorates and regions	Aggregate FDI (%)	Arab FDI (%)	Non-Arab FDI (%)
Cairo	32.42	28.90	35.15
Giza	27.46	32.71	23.44
Alexandria	7.16	4.80	8.99
<i>Suez Canal Governorates</i>	<i>10.77</i>	<i>9.64</i>	<i>11.56</i>
Port Said	2.25	0.68	3.46
Suez	6.08	4.38	7.30
Ismalia	2.44	4.58	0.80
<i>Lower Egypt</i>	<i>11.34</i>	<i>11.15</i>	<i>11.49</i>
Damietta	2.37	0.50	3.82
Dakahlia	0.16	0.25	0.09
Sharkia	4.04	5.55	2.88
Kalyoubia	1.99	1.60	2.29
Kafr El-sheikh	0.08	0.03	0.12
Gharbia	0.33	0.03	0.56
Menoufia	1.44	1.33	1.53
Behera	0.92	1.85	0.21
<i>Upper Egypt</i>	<i>3.47</i>	<i>4.30</i>	<i>2.83</i>
Beni Suef	1.24	1.09	1.35
Fayoum	0.66	1.30	0.17
Menia	0.44	0.23	0.61
Assuit	0.19	0.05	0.30
Suhag	0.03	0.02	0.03
Qena	0.03	0.02	0.03
Luxor	0.07	0.08	0.07
Aswan	0.81	1.51	0.27
<i>Frontier Governorates</i>	<i>7.88</i>	<i>8.55</i>	<i>7.37</i>
Red Sea	4.29	5.43	3.42
New Valley	0.15	0.30	0.03
Matrouh	0.32	0.47	0.21
North Sinai	0.92	0.29	1.40
South Sinai	1.45	2.01	1.02

Source: Author’s calculations based on GAFI data.

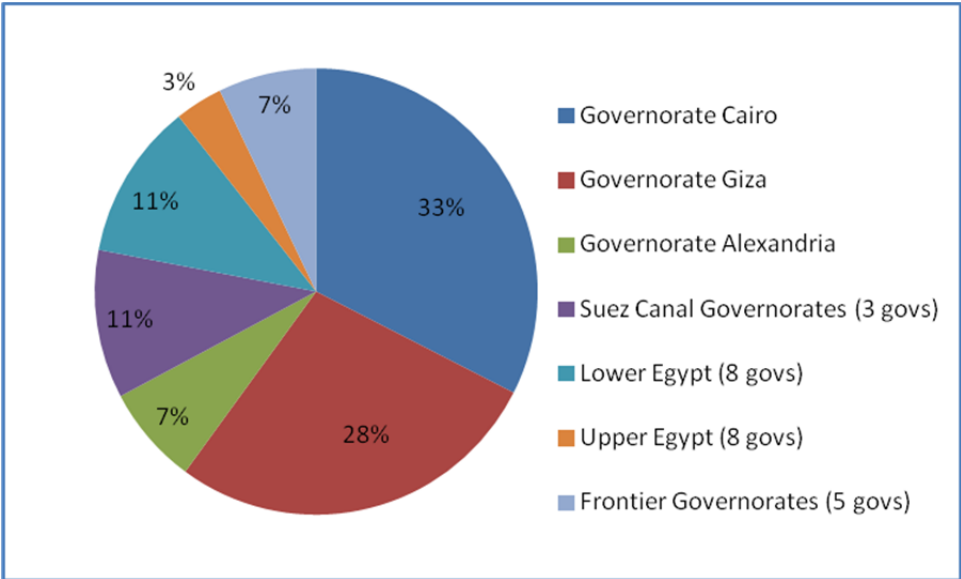
Appendix C: Figures

Figure A.1: Distribution of ‘non-petroleum greenfield’ FDI flows by governorates in Egypt (average of 1992–2008)



Source: Author’s calculations based on GAFI data.

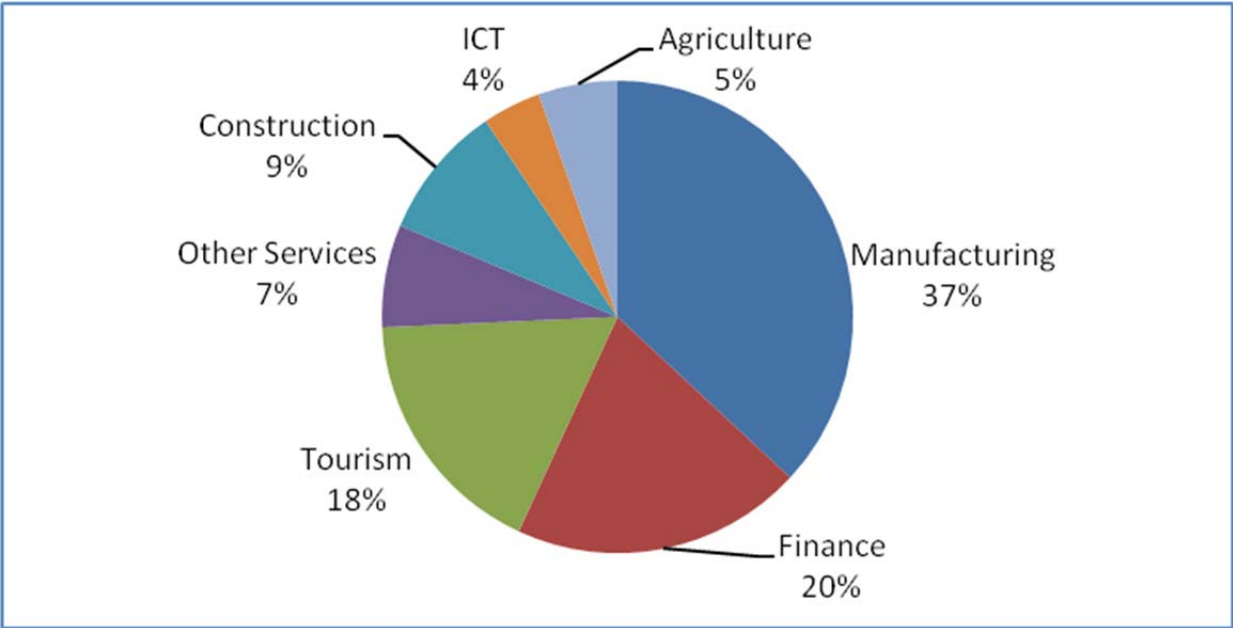
Figure A.2: Distribution of ‘non-petroleum greenfield’ FDI flows by regions in Egypt (average of 1992–2008)



Source: Author’s calculations based on GAFI data.

Notes: ‘govs’ is used as an abbreviation of governorates. The Suez Canal governorates are Ismailia, Port Said, and Suez. The Lower Egypt governorates are Behera, Damietta, Dakahlia, Gharbia, Kafr El-Sheikh, Kalyoubia, Menoufia, and Sharkia. The Upper Egypt governorates are Assuit, Aswan, Beni Suef, Fayoum, Luxor, Menia, Qena, and Suhag. The Frontier Egypt governorates are Matrouh, North Sinai, New Valley, Red Sea, and South Sinai.

Figure A.3: Sectoral composition of ‘non-petroleum greenfield’ Arab FDI flows in Egypt (average of 1992–2008)



Source: Author’s calculations based on GAFI data.

Figure A.4: Sectoral composition of ‘non-petroleum greenfield’ non-Arab FDI flows in Egypt (average of 1992–2008)

