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Foreign affiliates, technological catch-up, and productivity growth: Evidence from MENA oil and non-oil-producing countries☆

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ABSTRACT

Previous studies on Middle East and North Africa (MENA) countries have not investigated the hypothesis that foreign affiliates yield positive productivity spillovers for host countries. This study contributes to the empirical literature by investigating foreign direct investment (FDI) as a channel of productivity growth in MENA oil and non-oil-producing countries. To illustrate the link between FDI, technological catch-up, and host-country labor productivity growth, we present a simple theoretical model. Using a cross-sectionally correlated and timewise autoregressive (CCTA) model, our panel data regression results show that FDI spillovers are *insignificant* in oil and non-oil-producing countries during the period 1992–2008, whereas technological catch-up significantly affects labor productivity growth in these countries. Two aspects can explain these results. First, local firms' competitive capabilities in MENA countries are relatively weak. Second, most FDIs to oil and non-oil-producing countries are low-quality FDI, which flows to extractive and natural resource-based sectors.

1. Introduction

Previous studies show mixed support for the hypothesis that foreign affiliates are the main channel of embodied knowledge flows (Lall, 2001). The share of foreign direct investment (FDI) inflows to the MENA region in global FDI has increased in the past decade (see Table A.1, appendix A). Specifically, 59% of the FDI inflows to MENA countries in 2010 were for four countries: Saudi Arabia (37%), Egypt (8%), Israel (7%), and Qatar (7%). Most FDI to the MENA region does not flow to the manufacturing and information and communications technology (ICT) sectors, which are more relevant to technology diffusion than other sectors are (e.g., natural resources or tourism).[1]

Barro and Sala-i-Martin (1997) indicate the importance of technology diffusion as a channel of economic growth in developing countries. Fransman (1985) indicates that international technology diffusion uses two different types of transactions. The first is "formal" transactions, which include joint ventures, licensing, and goods trade. The second is "informal" transactions, which include linkages between multinational enterprises (MNEs) and local firms as well as scientific exchange. In both modes, MNEs are the main source of technology diffusion (Lall, 2001).

Blomstrom and Sjoholm (1998) argue that foreign affiliates may affect the productivity of local firms in two aspects. First, MNEs have strong technological and financial capabilities that allow them to compete with local firms. Second, the entry of MNEs

☆ MENA Countries: According to World Bank (2013), the Middle East and North Africa (MENA) region includes 21 countries: Algeria, Bahrain, Djibouti, Egypt, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, the United Arab Emirates, Palestine, and the Republic of Yemen.

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[1] This point is discussed in detail in UNCTAD (2006) and OECD (2004)

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encourages local firms to improve their capabilities to become competitive with foreign affiliates. This may force local firms to change their production techniques and their managerial skills. With these two aspects in mind, this study investigates the ability of MENA countries to absorb technology diffusion from foreign affiliates. Specifically, this study contributes to the empirical literature by investigating the impact of FDI on labor productivity (not economic growth)[2] in MENA countries. Previous studies have focused on the determinants of FDI and the impact of FDI on economic growth in MENA countries (see Ahmadi & Ghanbarzadeh, 2011, for a review). In addition, this study develops a simple theoretical model to illustrate the link between foreign affiliates, technological catch-up, and host-country labor productivity growth.

The remainder of this study is organized as follows. Section 2 discusses the main theoretical approaches and empirical difficulties in testing the technology diffusion from FDI. Section 3 provides the empirical specifications. Section 4 discusses the data sources. Section 5 indicates the empirical findings. Section 6 offers a conclusion and policy implications.

2. Theoretical background

Economic theory provides two approaches to studying the effects of FDI (Blomström & Kokko, 1998). The first approach, based on the work of Macdougall (1960), stems from the theory of international trade. The second approach, based on the work of Hymer (1960), stems from the theory of industrial organization. More specifically, industrial organization theory indicates that foreign affiliates should have nontangible productive assets in order to successfully compete in international markets (Aitken & Harrison, 1999). Findlay (1978) uses the following ratio to reflect the role of FDI in technology diffusion:

$$FCR = \frac{\mathrm{KF\ (t)}}{\mathrm{KD\ (t)}} \tag{1}$$

where KF (t) is the capital stock of foreign firms, KD (t) is the capital stock of domestic firms, and *FCR* is the ratio of capital stock of foreign firms in the developing economy. Findlay argues that the technological efficiency growth rate in developing economy is a function of both FDI and its technology level:

$$\frac{\dot{E}}{E} = f(FCR\ \ ,\mathrm{TEC}) \tag{2}$$

where $\frac{\dot{E}}{E}$ is the growth rate of technological efficiency in a developing economy and TEC is the technology gap between this developing economy and another developed economy (e.g., USA):

$$TEC = \frac{\mathrm{E\ (t)}}{\mathrm{D\ (t)}} \tag{3}$$

where *TEC* measures the gap between the technological efficiency level of a developing economy E (t) and the technological efficiency level in another developed economy D (t). To link the approach of Findlay (1978) to growth accounting, we can write the Cobb–Douglas technology function for country *i* at time *t*,

$$\cdot Y_{it} = A_{it}(K_{it})^{\beta}(L_{it})^{1-\beta}. \tag{4}$$

By dividing both sides by $L_{it,}$ we obtain Eq. (5):

$$Y_{it}/L_{it} = A_{it}(K_{it}/L_{it})^{\beta} \tag{5}$$

Let output per worker $\mathrm{y_{it}} = \mathrm{Y_{it}/L_{it}}$ and capital per worker $\mathrm{k_{it}} = \mathrm{K_{it}/L_{it}}$. Then,

$$y_{it} = A_{it}(k_{it})^{\beta} \tag{6}$$

By taking the logs, repeating for time t + 1 and taking the differences, we obtain Eq. (7):

$$\Delta\, y_{it} = \Delta\, a_{it} + \beta\, \Delta\, k_{it} \tag{7}$$

Following Benhabib and Spiegel (2002) and Sadik and Bolbol (2001), the growth rate of total factor productivity (TFP) depends on technological catch-up and FDI.

$$\Delta\, a_{it} = c + \quad \mu(ymax_t - y_{it})/y_{it} + \rho\, FDI \tag{8}$$

[2] Stiglitz and Walsh (2009) shows that output growth = growth of hours worked + productivity growth per hour. The productivity per hour (labor productivity) growth derives from the change in human capital and technological change (see also Elmawazini et al., 2013).