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The Impact of Foreign Direct Investment on the Productivity Growth in the Moroccan Manufacturing Sector: Is Source of FDI important?

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Abstract: This paper analyzes the different impacts of foreign investments originate from France and Spain on the Total Factor Productivity (TFP) related to the manufacturing industries sector in Morocco. In this direction, we used Generalized Method of Moments, (GMM System) in dynamic panels for a subset of 22 branches of this sector between 1985 and 2012. We have 616 observations (22 sectors and 28 years).

The main results show that considering the source country of investment in particular those originate from France and Spain, the TFP is differently impacted. Indeed, the impact of French investments on TFP is negative with a statistical significance, especially in medium and high level technology industries. As for the Spanish investment, the impact is positive and statistically significant regardless the considered technology level classification.

The negative impact of French investment on TFP in the scope of medium and high level technology can be mainly explained by the effect of firms' competition due to (i) the gap in terms of productivity between local and French companies and to (ii) the importance of the investment rate held by the French side with a control ability on technological transfer.

Keywords: foreign presence, manufacturing industries sector in Morocco, total factor productivity, foreign investment, source country, technological transfer, absorptive capability

JEL Classification: C33, F21

1. Introduction

Nowadays, the attractivity of Foreign Direct Investments (FDI) is a core issue in the strategy of development worldwide, especially in developing countries. The FDI are targeted due to the fact that they are a long-term engagement with the investment host country and to their stability in comparison to other forms of fund flows. The FDI are also attractive for their ability to improve the economic growth, in particular through the development of domestic investment, work position creation, Improvement in the Balance of Payments, the contribution in creating the direct added value by the foreign company production and the improvement of competitiveness of the local economy. Moreover, these FDI help in bringing new management methods and techniques through direct and indirect contacts between foreign affiliates and local firms, facilitating the knowledge and technological transfer to the targeted economy.

Due to this importance of FDI in terms of economy growth, Morocco conducted many efforts during these two decades to ensure the setting of an environment that encourages investment by means of making FDI promotion and attraction policies.

Indeed, the attraction policy set by Morocco, in particular, starting from the 1990s, goes in the line of the diversification of the national economy funding sources, in order to improve the economy growth and the development of promising sectors in terms of knowledge transfer as well as technological one, particularly for manufacturing industries.

In this paper, we study the impact of FDI on Total Factor Productivity (TFP) in different branches of manufacturing sector in Morocco and we investigate whether the investment origin impacts differently the TFP of Moroccan manufacturing industries. To our knowledge, just a few studies considered this side to explain the effect of FDI on the economy performance. Therefore, the hypothesis set is that investment coming from different countries does not impact in the same manner and degree the increase of the manufacturing industries TFP.[1] The nature of these investments, their technological content and the manner and conditions of the related technological transfer to the targeted country, i.e., Morocco, are not necessary the same and have a trend that differs from a country to another. Hence, regarding the French and Spanish investments in manufacturing industries, we expect a different effect on TFP.

The paper presents a synthesis of state of the art from theoretical and empirical perspectives. This synthesis analyses the impact of FDI on the improvement of the economy performance, in particular in the industrial sector, with a special focus on the case of Morocco. It proposes, as well, a descriptive analysis of economic performance with a comparison between French, Spanish, and Moroccan firms in the context of different branches. Finally, the objective of this paper is to empirically evaluate the diversity of French and Spanish funding impacts on the TFP related to the Moroccan manufacturing industries. This assessment considers a set of 22 branches in manufacturing industries in Morocco during the period 1985-2012.

2. Effect of FDI on Industrial Sector in Targeted Countries: Theoretical and Empirical Works

The growth models endogenous asset that technical progression in terms of endogenous results from production of ideas (Romer , 1986, 1990, 1993 ; Lucas, 1988 ; Grossman and Helpman, 1991 ; Benhabib and Spiegel, 1994 ; Barro and Sala-i-Martin, 1995). In other words, the authors consider the growth, as a source of productivity gain, a particular type of fund.

The basic idea is the fact that the accumulation of human capital, through R&D and innovation, contributes to the creation of new technological and organizational knowledge. This knowledge creation, brought by FDI, rewards the effect of decreased capital rendement and allows the economy to maintain a good level of long-term growth, under conditions related to knowledge externalization. Thus, FDI can positively contribute to the economic growth of the host country by improving TFP through knowledge spreading and technological externalisation.

Although the positive impact of FDI on the improvement of host country economic performance is a theoretical assessment that is largely believed and reported, there are some limitations to argue this in terms of related empirical results, especially in the level of firms.

[1] Helpman, Mélitz and Yeaple (2004) report that all firms are not in the same efficiency level in a given activity branch. Therfore, there is a possibility that the effect on productivity growth of the host country economy is different with respect to the origin country and the performance degree as well as the foreign firms specialization.

The first category of empirical results confirms the positive relation between FDI and local productivity of host countries. In this direction, Hoffman and Tan (1980) report that firms under the foreign control in Malaysia, in the 1960s, contributed up to 23% in the investment and up to 17.7% in the Gross Domestic Product (GDP) increasing. Similarly, Chuang and Lin (1999) and Lipsey and Sjöholm (2001) showed that FDI had a positive impact on the growth of the economy in Taiwan and Indonesia respectively.

Blomstrom and Wolf (1994) tried to determine if FDI repercussions on Mexican manufacturing were so higher to help local firms to trend to a productivity level that is similar to the American firms' one from 1965 to 1982. Their results show a positive impact of foreign investments with a significance in terms of local productivity growth rate.

Démurger and Chen (2002), by analysing the role of FDI in the productivity growth considering Chinese manufacturing industries from 1988 to 1994, found a positive correlation between this productivity growth and the presence of foreign funds in the household goods industries. Similarly, Liu and Wang (2003) report positive benefits on total factor productivity in the industrial sectors in China in 1995.

Along with the Chinese case, Kokko, Chen and Tingvall (2011), highlight that local firms have profits from FDI through the "contagion effect" and the "concurrence effect". However, these profits are not proportional with the level of foreign funding in Chinese industries. Indeed, the "concurrence effect" are linear with the level of productivity and technology sophistication of foreign firms when the fallout from the "contagion effect" have a strong impact on the foreign firms as well as local firms.

By studying the impact of FDI on the productivity of Lithuanian industries, over the period 1996-2000, Javorcik (2004), reports that it is the upstream or vertical links, derived from contacts between global firms and local businesses that generate the greatest benefits. However, these positive spillovers originating mainly from firms that are partially funded with foreign investments and not those totally owned by foreigners.

The second category of empirical studies, having investigated the relationship between FDI and growth of local productivity, points out that the presence of foreign firms in a country has low or negative effects on the productivity performance of local firms. In this direction, Hanson (2001) and Gorg and Greenaway (2003) support the idea that the positive effect of foreign direct investment on the productivity of targeted countries firms is weak or mixed.

For researchers such as Mansfield and Romeo (1980), Haddad and Harrison, (1993), Kokko (1994), Kokko et al. (1996) and Aitken and Harrison (1999), the impact of FDI on the productivity of local firms is negative. This negative effect was confirmed by Djankov and Hoekman (2000) showing that a 10% increase of foreign investments led to a 1.7% decrease in the productivity of local firms. Also, Levchenko et al. (2008) found that the liberalization of the capital account, which allows flexibility in terms of entering and exiting investment, has no effect on TFP.

3. The Impact of Foreign Investment on TFP in Moroccan Industrial Sector

In the case of Morocco, empirical research on the interaction between FDI and TFP in the manufacturing sector is not so conclusive. In fact, in a study covering the period 1985-1989 on the Moroccan manufacturing TFP, Haddad and Harison (1993) found a negative impact of FDI on the growth of productivity. The authors also show that the benefits do not have the same effect among the different sector branches. Similarly, Harrison (1995) reported little empirical evidence regarding the existence of technology transfer to local firms. Its conclusion is that the

impact of the foreign presence on productivity may be negative in the short term due to the loss of local market share by domestic firms.

However, Bouoiyour and Toufik (2003, 2004, 2005 and 2007) show that the positive externalities induced by the presence of FDI in Morocco exist, but they are weak and depend on a number of conditions; among these, there are the technological gap that persists between national and foreign firms. It is in the low-technology sectors (textiles in particular) that positive externalities occur.

Nevertheless, the presence of foreign firms in the high technology sectors may prove disadvantageous to the Moroccan counterpart. Thus, the FEMISE report (2008), dedicated to the assessment of the impact of foreign presence on the productivity of Tunisian firms (total factor productivity) and Moroccan (labor productivity) reveals that in the case of Morocco, the skilled labor, export capability and foreign presence have a positive and significant impact on the apparent labor productivity of local firms. However, the impact of foreign presence appears weak and depends on the absorptive capability of Moroccan firms and the technology gap between them and foreign firms.

Similarly, a research conducted by African Bank of Development, it was argued that foreign investments are not relevant regarding their effect for innovation incitation in Moroccan firms and do not appear to have an effect on their productivity.

While the results of empirical studies are inconclusive regarding the impact of FDI on the industrial TFP, there is a broad consensus on some preconditions for the interaction between FDI and the improvement of the productivity in that sector.

4. Main Determinants of FDI Impact on Firms Productivity

The successful of transfer of technology on the TFP growth through FDI depends on several factors including the absorptive capability of the host country and the nature and origin of the sector targeted by foreign firm investment.

4.1. Absorptive Capability

One of the determinants of FDI impact on domestic firms' productivity is their absorptive capability. Thus, firms with greater absorptive capability may benefit from greater spillovers (Blomström, Zejan and Kokko, 1994; Kokko, 1994; Blomström, Globerman and Kokko, 1999; Blomström and Kokko, 2002; Blomström and Kokko, 2003; Kokko, 2006; Crespo and Fontoura, 2007 Marcin, 2008 and Kokko, Chen and Tingvall, 2011). One of the indicators used to measure the absorptive capability of domestic enterprises is the availability of high-level human skills and education. That is to say, when host countries already have an important capital of skilled and high educated human (Borensztein, De Gregorio and Lee, 1998; Ben Abdallah and Drine, 2001; De Gregorio, 2003; Bengoa and Sanchez-Robles, 2003). Indeed, if such human capital would be lower than a certain threshold, technology transfer is blocked. It is also important to have a certain scale of investment in research and development, Cohen and Levinthal (1989); Cadiz, Sawyer and Griffith (2009). Thus, Freeman, (1991 1994b), Coe and Helpman (1995), Helpman et al. (2008) show that research and development (R & D) of foreign firms impacts the TFP when interacting with domestic R & D.

In a context of complex industrial technological products and information as well as quick technological change, it is necessary to have skilled local workers (Dosi, 1988; Cohen and Levinthal, 1989, 1990), through R & D in order to facilitate the assimilation and accelerate the spreading and continuous adaptation of these technologies.

In addition, the technological gap between the origin country of FDI and the host country closely determines the extent of the technology transfer process. There are two contrasting arguments in the literature: (i) the first suggests that FDI benefits increase with the technology gap between local and foreign firms, as it allows domestic firms to boost the opportunities to get high levels of efficiency "technological catch-up hypothesis" (Findlay, 1978; Wang and Blomström, 1992 and Kokko, 1992); (ii) However, the second argument comes from researchers like Haddad and Harrison (1993) demonstrating that the technology gap and lag between the skills of the local population and those brought by foreign firms should not be very high in order to facilitate learning and assimilation by national firms.

Beyond the absorptive capability and assimilation of technologies from developed countries, which is a prerequisite for positive externalities of FDI on TFP growth, the origin of investment also impacts the mechanisms of the technology transfer.

4.2. Origin of FDI

The FDI come from different countries whose are specialized in a specific sector, which can impact the operations, technology transfer and business management of local firms in the host country.

In this direction, Banga (2003) showed, in a study on the impact of US and Japanese FDI on the TFP of Indian firms operating in the automotive, electrical and chemical industries that the FDI originating from Japan contribute more significantly to the TFP growth of Indian firms than those originating from US firms. This result is justified by the competitive advantage of Japanese firms compared to US firms in the above-mentioned sectors.

In fact, foreign firms may not be similar in their technology transfer even if they operate in the same industry. Besides, Helpman, Melitz and Yeaple (2004) pointed out that foreign firms are not in the same level of efficiency in a given industrial sector. There is a possibility, therefore, that the effect of FDI on the improvement of host countries economic productivity will be different depending on the degree of performance and specialization of each foreign company.

In the case of Morocco, the examination of the origin of FDI in the manufacturing sector highlights the predominance of those coming from the European Union countries, particularly France and Spain. To our knowledge, there were no attempts to analyze the effect "origin" of these countries' investment on the TFP of the manufacturing sector.

Before addressing this issue, it is important to analyze the performance of French and Spanish firms against local enterprises in the manufacturing sector.

5. Comparative Analysis of Weight and Performance Indicators by Origin Country: Firms with French and Spanish Investments

The analysis of the FDI' origin in the Moroccan manufacturing sector shows the predominance of French and Spanish investments in the form of equity participation in the sector. These investments represent an annual average of 30% and 12%, respectively, out of the foreign investments in the sector over the period 1985-2012.

Other weight indicators related to firms of these two countries show their role in the Moroccan industrial fabric. Thus, the share of firms with French and Spanish funding in the value added is 36% and 10%, respectively. This share was 34% and 8% in production, 31% and 9% of exports, 37% and 8% in body investment flows, 33% and 8% in turnover. Moreover, the firms said countries employ successively 39% and 9% of the total workforce and 44% and 14% of all foreign-funded enterprises in the sector. The weight of the presence of these two countries in

the industrial sector can have direct and indirect effects of training on the performance of local businesses.

As for other indicators that characterize the sector performance of Moroccan firms, French and Spanish, we tried to calculate the following key indicators:

Other indicators showing the weights of these two countries' firms among the foreign firms witness their important role in the Moroccan industrial fabric. Thus, the share of firms with French and Spanish capital in the foreign value added is 36% and 10% respectively. This share was 34% and 8% in production, 31% and 9% of exports, 37% and 8% in body investment flows, 33% and 8% in turnover. Moreover, the firms of these countries employ successively 39% and 9% of the total workforce and 44% and 14% of all foreign-funded enterprises in the sector. The presence of these two countries in the industrial sector have such weight to have direct and indirect driven impact on the performance of local businesses.

As for other indicators that characterize the sector performance of Moroccan firms, French and Spanish, we tried to calculate the following key indicators:

- **Malmquist Total Factor Productivity indices**

To compare TFP and its components in France-affiliated, Spain-affiliated and domestic firms in each industry we use non-parametric approach. We construct a deterministic production frontier using linear programming technique. The method used for this is the Data Envelopment Analysis (DEA) [2], which evaluates the performance of a set of peer entities called decision-making units (DMUs).

Using panel data, DEA is used to arrive at input-or-output based Malmquist indices to measure productivity change for each firm over time and decompose this into technological change and technical efficiency change.

The Malmquist TFP indices were calculated for 22 branches of the Moroccan manufacturing over the period 1985-2012:

$$\underbrace{M_i(x^{t+1}_i, y^{t+1}_i, x^t_i, y^t_i)}_{\text{TFP}} = \underbrace{\left[\frac{D^t_{i,CRS}(x^{t+1}_i, y^{t+1}_i)}{D^t_{i,CRS}(x^t_i, y^t_i)}\right]}_{\text{Technical efficiency change}} \underbrace{\left[\left\{\frac{D^{t+1}_{i,CRS}(x^t_i, y^{t+1}_i)}{D^{t+1}_{i,CRS}(x^{t+1}_i, y^{t+1}_i)}\right\}\left\{\frac{D^t_{i,CRS}(x^t_i, y^t_i)}{D^{t+1}_{i,CRS}(x^t_i, y^t_i)}\right\}\right]^{1/2}}_{\text{Technological change}}$$

The comparison of French and Spanish affiliated firms performance and domestic firms' one, highlights the significant differences in TFP (see Table 1 in appendix), in particular over the sub-period 1986-2004. Thus, the French and Spanish-owned firms are successively 3.45 and 2.12 times more productive than domestic firms. This gap is the result of performance made by technological progress that is 3.73 and 2.23 times better in French and Spanish firms, respectively, with respect to domestic ones. As for the second sub-period 2005-2012, the Moroccan firms have become 0.23 times as productive as Spanish firms but are still less productive than their French counterparts, despite the observed decrease in productivity of the latters over the given period.

[2] DEAFrontier2007 software.

Over the whole period 1986-2012, French affiliated firms are by far better than domestic firms in terms of annual average TFP (2.41 times) while these are at the same level of productivity as firms with Spanish-funding (1.03 times). It is important to note that while the level of productivity is almost equivalent between the Spanish and Moroccan firms, there are significant differences in the contribution of technical efficiency and technological change in TFP. Thus the contribution of technological progress to TFP is greater than 0.22 times in the case of Spain while the contribution of technical efficiency to TFP is 0.14 times more in the case of Morocco.

- **The level of the average wage paid by Moroccan, French and Spanish firms**

The average wage (AW) paid is determined by the ratio of personal costs and number of workers in French and Spanish firms compared to Moroccan firms.

$$AW_{it} = \frac{(AW_{it})_{foring \quad firms}}{(AW_{it})_{Morocco}}$$

The salaries paid by French firms are higher than those paid by domestic firms for all branches. This level is on average 1.43 times higher compared to local firms. This gap in pay is likely to prevent movement of labor sufficiently formed by French firms to domestic firms that seek for the experience and knowledge acquired in the FMN.

In contrast, the average wage paid by Spanish firms is almost equivalent to that paid by Moroccan firms (0.98). In this case, the movement of human resources and knowledge transfer are possible.

If the French and Spanish firms are performing significantly compared to local firms in the manufacturing sector, especially in terms of productivity, it is necessary to consider the impact of this productivity differential on the performance of national manufacturing industries sector? And how it takes advantage of the foreign presence?

The following empirical analysis tries to confirm the effect of the French and Spanish funding's on the TFP of the Moroccan manufacturing sector enterprises.

6. Methodology and Estimation Procedures

As we have already noticed in the introduction, research on the role of FDI in the TFP growth of the Moroccan manufacturing industry did not investigate their effect depending on the country of origin. In this article, we try to check the various impacts of the French and Spanish funding's on the TFP of the Moroccan manufacturing sector.

These two countries were considered based on the importance of their participations in the sector. These are estimated over the period 1985-2012, 30% for France and 12% in the case of Spain, for a total share of 42% of all foreign funding's drained by the sector.

Moreover, the choice of the considered variables is based: (i) firstly, on the theoretical and empirical arguments justifying the relationship between FDI, human capital, trade openness and TFP and, (ii) secondly, on the availability of data per branch in the case of the Moroccan industry. Before estimating the econometric model, we first determine the Moroccan manufacturing firms' TFP.

Total factor productivity (TFP) of the Moroccan manufacturing sector represents the dependent variable. Its analysis is essential to assess the sector's performance in technology.

TFP is calculated using the following method:

$$y_{it} = F(L_{it}, K_{it}) = A_{it} L_{it}^{\alpha} K_{it}^{1-\alpha} \quad (1)$$

Where y_{it} is the value-added of the manufacturing industry a function of two inputs capital and labor; A_{it} represents the level of productivity, which is assumed to vary across firms within each sector i and across time t; L[3] and *K*[4] *are* Labor and physical capital, respectively. The coefficients on the growth of labor and capital are simply their share in value-added.

Using the log-linearization, the TFP is measured as follows:

$$LogY_{it} = Log(TFP_{it}) + \alpha Log(K_{it}) + (1-\alpha) Log(L_{it}) \quad (2)$$

$$Log(TFP_{it}) = LogY_{it} - \alpha Log(K_{it}) - (1-\alpha) Log(L_{it}) \quad (3)$$

Therefore, the relationship between FDI and TFP of the sector i in a given date t and explanation factors are described as follows:

$$TFP_{it} = \alpha_i + \beta_1 FDIF_{it} + \beta_2 FDIS_{it} + \beta_3 FDIOC_{it} + \beta_4 H_{it} + \beta_5 TO_{it} + \beta_6 TG_{it} + \beta_7 TFPFF_{it} + \varepsilon_{it} \quad (4)$$

Where:

TFP is total factor productivity of Moroccan firms (independent variable).
FDI (Foreign direct investment): Share of equity capital held by French, Spanish and other world countries' firms in the industrial sector of domestic firm within each sector i and across time t. FDIF (FDI France); FDIS (FDI Spain); FDIOC (FDI Other Countries).
H (human capital): in order to evaluate skilled Labour in the Moroccan manufacturing industry, we have used a proxy factor consisting in the measure of the average of paid salaries gap with respect to the SMIG[5] within sector i across time t.

TO (Trade openness): Total exports of firm divided by total added value.

$TO_{it} = \frac{X_{it}}{AV_{it}} \times 100$: TO (Trade openness), X (exports), AV (added value).

TG (Technological Gap): the technological gap as defined by Wang and Blömstrom (1992) ie the ratio of TFP between the foreign firms and their Moroccan counterparts. The Technological Gap as a proxy of absorptive capability.

TFPFF (total factor productivity of foreign firms): This variable is introduced to test the impact of competition generated by the presence of foreign firms in the total productivity of domestic firms.

FDI*H (interactive variable): like Borensztein, De Gregorio and Lee (1998), we introduce in the model the interactive variable (FDI and human capital) to highlight their effect on the TFP growth of the Moroccan manufacturing sector.

The estimation of effects brought by FDI on TFP growth is usually biased due to endogeneity problems. To this end, the main biases that could affect our results are the simultaneity bias and

[3] We consider here the total number of employees in each industrial branch.
[4] K is measured though the perpetual inventory method.
[5] This indicator can also reflect productivity effects from efficiency wage allocation.

the problem of heterogeneity of the estimated coefficients. The simultaneity bias, results from a possibility of reverse causality effects (Impact of TFP on the explanatory variables) presence. As for the problem of individual heterogeneity of the estimated coefficients, it comes from the fact that the effect of foreign participation differs from one industrial sector to another.

To adjust this endogeneity bias, most empirical studies adopt a dynamic model estimation using the Generalized Instrumental Variables Estimation (GMM) Blundell and Bond (1998) that provides better estimation results efficiency and robustness through the manipulation of endogenous variables by their respective differences and delays.

The validity of the selected material can be confirmed or rejected through Hansen test and Sargan test as well as the autocorrelation tests proposed by Arellano and Bond AR (1) and AR (2).

To estimate the model, we used the STATA software.

7. Data Sources

The variables used in this article are calculated by the author from the results of annual surveys conducted by the Ministry of Industry, Trade, Investment and Moroccan Digital Economy. This survey is conducted on a regular and ongoing basis by the Ministry with all the Moroccan manufacturing sector since 1985 and focuses on a set of variables such as social capital (state, Moroccan private, foreign), revenue, exports, investment in tangible assets, production, value added, personal costs and total employee strength (permanent and part-time).

The minimum salary, which was used to calculate the human capital is the only outcome variable of the Haut-Commissariat au Plan (HCP) governmental organization in Morocco.

In this work, the data sets used cover a period from 1985 to 2012 (i.e. 28 years) and involve 22 branches (15 to 36) of the sector according to the new Moroccan nomenclature of industrial activities. Therefore, we have a panel cylinder capability and a total number of observations in the sample of 616 (N = 22 x 28).

8. Results and Discussion

The tables 2 and 3 (see appendix) present the results of estimations using the GMM method to explain TFP by FDI by country of origin and by technology classification.

Taking account of the origin of FDI, namely those from France, Spain and other countries, the TFP the Moroccan manufacturing sector is impacted in a different way.

With respect to this, the impact of FDI coming from France is negative and statistically significant while the effect of FDI from the other countries is negative but not significant. However, FDI from Spain seem significant and act in a positive way on TFP of the Moroccan manufacturing industry even if its positive effect is weak. Therefore, the hypothesis that states that FDI can have different effects on TFP by country of origin is verified in our case study.

These results can be interpreted as follows: in the case of France, its participations are concentrated, mostly in medium and high technology sectors where technological spillovers require a absorptive capability and high assimilation through qualified and skilled workers. Indeed, the French participations in medium and high technology industries exceeded 30% overall foreign ownership in that sector and sometimes reach levels above 70% as in the case of the automotive industry and in the sector of other transport equipment manufacturing.

However, the Spanish participations do not exceed 10% in medium and high technology industries. Rather, their presence are displayed in the low-technology branches where penetration rates sometimes reach over 50% as in the case of the woodworking industry and manufacturing of wooden article, the textile industry and the furniture manufacturing industry and various industries.

These findings mean that the transfer of technology through foreign presence in the manufacturing sector applies only to low-technology or medium-low industries where the technology gap between foreign and local firms is negligible. Moreover, the impact of the technological gap (TG) on TFP, in our estimation, is negative and statistically significant, meeting the arguments behind the hypothesis that the technological gap between foreign and domestic firms reduces the technology transfer from the former to the latter firms, especially in a context characterized by a low level of skilled and required human capital (Haddad and Harison, 1993).

In addition, technological spillovers transferred through competition pressure (PTFE) brought by foreign firms, are proved to be statistically significant and positively affect TFP of local businesses even with weak effect.

For the human capital variable, it seems significant and has a positive effect on TFP. Therefore, human capital contributes to the improvement of productivity even if the current level of qualification of the Moroccan workforce is not able to absorb and assimilate technologies from foreign firms including those French ones that are concentrated in medium and high technology industries. Moreover, the interaction between FDI coming from France and Spain, considering the human capital variable was positive but not significant.

As of trade liberalization, it is statistically significant and positive, despite the trade deficit of Morocco with France, Spain and the other countries of the world. However, the import of equipment goods is the kind of investment to improve the TFP of the sector.

From Table 3 (see appendix), the impact of FDI on TFP of Low-technology manufacturing is positive regardless of the country of origin (France, Spain and other countries). This confirms previous arguments arguing that industrial branches with low-technology witness faster technology transfer since the Moroccan firms have the absorptive capability and assimilation of such technologies.

On the other side, the effect of FDI on TFP in industrial branches with medium-technology and high-technology is positive in the case of Spain but negative in the case of France. This result illustrates that technology transfer can also be reached in medium and high-level technology industries per country of origin.

Regarding this point, it is appropriate to note that the level of productivity and the importance of control through the participation rate brought by foreign firms is likely to influence TFP differently among the branches with medium-technology and high-technology.

Thus, the comparison of performance in terms of TFP and its two components, namely technological change and technical efficiency change, between French, Spanish and Moroccan firms over the period 1986-2012, shows a significant gap particularly at a technological change. Consequently, French firms are 2.56 times better than Moroccan ones, considering the annual average, while the latter are quite similar to firms with Spanish participations (1.22 times). This differential in productivity, particularly in the case of France, generates vicious competition for domestic firms and negatively impact productivity especially in medium-technology and high-technology manufacturing where the absorptive capability of local firms is already low.

Similarly, the important participation rate of French enterprises in medium- technology and high-technology branches reduces the diffusion of technological spillovers and limits the spreading and transmission of knowledge and managerial expertise to local firms. This is due, firstly, to the supremacy of their power of control and, secondly, to the differential in salaries which is 1.43 times higher than the salaries obtained in domestic firms.

Moreover, in the case of Spain, where the power of control in medium and high technology sectors is low and the gap in terms of wages paid is negligible compared to domestic firms, the effect of their holdings on TFP is positive and is statistically significant.

Therefore, the robustness of the above results (Table 2 and 3) seems to be confirmed. Thus, the Hansen test shows that the instruments used in the regressions are valid, as indicated by the (p-value) associated with this test that exceeds 10%. In addition, Arellano and Bond autocorrelation tests show that the second order autocorrelation hypothesis is rejected, as confirmed by the (p-value) related to test AR (2) which goes above 5% or 10%.

9. Conclusions

In this paper, we analysed different impacts of French and Spanish investment on TFP in the Moroccan manufacturing industries. Indeed, we used the Generalized Instrumental Variables Estimation in dynamic panel systems considering a set of 22 branches (15 à 36) of the manufacturing sector in the period 1985-2012.

The main results of this study show that considering the origin of FDI, in particular those coming from France and Spain

The main results of this research show that the consideration of the origin of FDI namely those from France and Spain has a different way on TFP in this sector. In this respect, the impact of French investments on TFP is negative and statistically significant, particularly in the case of medium and high technology sectors, when the effect of the capital of Spanish origin which is significant and positive what the technology classification restraint.

Therefore, the transfer of technology including that embodied in medium and high technology industries depends first, the absorptive capability of the host country, namely Morocco. Thus it is necessary to prepare human skills in science and management and to encourage research and development at the state level and at the enterprise level to improve the transfer capability technology to local firms.

Then the importance of FDI firms controlling power of the home country offers them the possibility of limiting the transfer of technology particularly in the case of France. Similarly, the difference in pay between French and local firms is likely to prevent the movement of skilled human skills and therefore limit the transfer of knowledge and managerial know-how.

Finally the differential in terms of productive performance (due to competition) between French firms and their local counterparts acts negatively on the productivity of the latter.

The main results of this research show that considering the origin of FDI namely those emanating from France and Spain the impact on the sector TFP is different. In this regard, the impact of French investments on TFP is negative and statistically significant, particularly in the case of medium and high technology sectors, while Spanish capitals have a significant and positive impact regardless the considered technology classification.

Therefore, the transfer of technology including that embodied in medium and high technology industries depends, first, on the absorptive capability of the host country, namely Morocco.

Thus, it is necessary to prepare workers with good skills in scientific and management areas and to encourage research and development nationally and locally in enterprises in order to improve the capability of technology transfer to local firms.

Thereafter, the importance of the control power allow the foreign firms concerned by FDI, particularly in the case of France, setting some limits on the technology transfer. Similarly, the difference in salaries ranges between French and local firms is likely to prevent the skilled workers' shifting and, therefore, limit the transfer of knowledge and managerial expertise.

Finally, the differential in terms of productive performance (due to firms' competition) between French firms and their local counterparts acts negatively on the productivity of the latters.

Endnotes

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References

Aitken, B., Harrison, A. 1999. «Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela », the American Economic Review, vol. 89, n°3.

Banga, R. 2003. « Differential impact of Japanese and U.S foreign direct investments on productivity growth: A firm level analysis », Indian Council for Research on International Economic Relations, 19 p.

Banque Africaine de Développement. 2014. « Innovation et productivité : analyse empirique pour les pays de l'Afrique du Nord », note économique, 22 p.

Ben Abdallah, M., Drine, I., Meddeb, R. 2001. « Interaction entre IDE, régime de change, capital humain et croissance dans les pays émergents », ouverture Economique et Développement, GDR, Economica, Paris.

Bengoa, M., Sanchez-Robles, B. 2003. « Foreign Direct Investment, Economic Freedom And Growth: New Evidence From Latin America», European Journal of Political Economy, vol. 19, pp. 529-545.

Benhabib, J., Spiegel, M. 1994. « The role of human capital in economic development », Journal of Monetary Economics, vol. 34, n° 2, pp. 143-173.

Blomström, M., Globerman, S., Kokko, A. 1999. « The determinants of host country spillovers from Foreign direct investment: review and synthesis of The literature», Working Paper n° 76.

Blomström, M., Kokko, A. 2002. « FDI And Human Capital: A Research Agenda», Working Paper n° 195, organised by the OECD Development Centre, Paris, 34 p.

Blomström, M., Kokko, A. 2003. « The Economics of Foreign Direct Investment Incentives », Nber Working Paper 9489, pp. 26.

Blomström, M., Kokko, A., Zejan, M. 1994. «Host Country Competition and Technology Transfer by Multinationals », Weltwirts chaftliches Archive, Band 130, pp. 521-533.

Blomström, M., Wolff, E. 1994. « Multinational Corporations and Productivity Convergence in Mexico», in Baumol, W., Nelson R. et Wolff, E., ''Convergence of Productivity: Cross-National Studies and Historical Evidence'', Oxford University Press.

Borensztein, E., de Gregorio, J., Lee, J. W. 1998. « How does foreign direct investment affect economic growth? », Journal of international Economics 45, pp. 115-135.

Bouoiyour, J. 2004. « Foreign Direct Investment in Morocco », in Foreign Direct Investment in Developing Countries: Leveraging the role of multinational, Agence Française de Développement (AFD) and Institut Français des Relations Internationales.

Bouoiyour, J. 2005. « Partenariat Euro-marocain et dynamique des investissements directs étrangers », CATT, Université de Pau.

Bouoiyour, J., Toufik, S. 2003. « Productivité des industries manufacturières marocaines et investissements directs étrangers », In Critique économique : revue trimestrielle, n° 9.

Bouoiyour, J., Toufik, S. 2007. « L'impact des investissements directs étrangers et du capital humain sur la productivité des industries manufacturières marocaines », Revue Région et Développement n° 25, pp.115-136.

Cadiz, D. M., Sawyer, J. E., Griffith, T. L. 2009. « Developing and Validating Field Measurement Scales for Absorptive Capability and Experienced Community of Practice», Educational and Psychological Measurement, 69 (6), pp. 1035-1058.

Chuang, Y., Lin, C. 1999. « Foreign Direct Investment, R&D and Spillover efficiency: Evidence from Taiwan's Manufacturing Firms », The Journal of Development Studies 35(4), pp. 117-37.

Coe, D. T., Helpman, E. 1995. «International R&D spillovers», European Economic Review 39(5), pp. 859–887.

Coe, D.T., Helpman, E., Hoffmaister, A. W. 2008. «International R&D Spillovers and Institutions», WP n°08/104, International Monetary Fund, pp. 1-35.

Cohen, W.M., Levinthal, D.A. 1989, « Innovation and Learning: The Two Faces of R & D», The Economic Journal, vol. 99, n°397, pp. 569-596.

Cohen, W.M., Levinthal, D.A. 1990. « Absorptive Capability: A New Perspective on Learning and Innovation», Administrative Science Quarterly, Special Issue: Technology, Organizations and Innovation, vol. 35, n°1, pp. 128-152.

Crespo, N., Fontoura, M. P. 2007. «Determinant Factors of FDI Spillovers-What Do We Really Know? », World Development, 35(3), pp. 410-425.

De Gregorio, J. 2003. « The Role of Foreign Direct Investment And Natural Resources In Economic Development », Central Bank of Chile Working Papers n° 196, 26 p.

Démurger, S., Chen, Y. 2002. « Croissance de la productivité dans l'industrie manufacturière chinoise : Le rôle de l'investissement direct étranger », Economie internationale, 2002/4 n° 92, pp. 131-163.

Djankov, S., Hoekman, B. 2000. « Foreign Investment and Productivity Growth in Czech Enterprises », The World Bank Economic Review », vol. 14 (1), pp. 49-64.

Dosi, G. 1988. «Sources, Procedures, and Microeconomic Effects of Innovation», Journal of Economic Literature n°26, pp. 1120–1171.

FEMISE. 2008. « Dynamique des investissements, mutations sectorielles et convertibilité du compte de capital : impacts des mesures de libéralisation et expériences comparées Tunisie - Maroc », 78 p.

Findlay, R. 1978. « Relative Backwardness, Direct Foreign Investment and the Transfer of Technology: A Simple Dynamic Model », Quarterly Journal of Economics, vol. 92, pp. 1-16.

Freeman, C. 1991. «Networks of innovators: a synthesis of research issues», Research Policy 20, pp. 499–514.

Freeman, C. 1994b. «The economics of technical change: critical survey», Cambridge Journal of Economics 18, pp. 463–514.

Gorg, H., Greenaway, D. 2003. « Much Ado About Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?», Discussion Paper n° 944, the Institute for the Study of Labor (IZA), pp. 1-34.

Grossman, G., Helpman, E. 1991. «Innovation and Growth in the Global Economy, MIT Press, Cambridge MA».

Haddad, M., Harrison, A. 1993. « Are there Positive spillovers from direct foreign investment? Evidence from Panel Data for Morocco», Journal of Development Economic, n°42, pp. 51–74.

Hanson, G., H. 2001. « Should Countries Promote Foreign Direct Investment? », G-24 Discussion Paper n° 9, United Nations, New York, pp. 1-31.

Harrison, A. 1995. « Determinants and effects of direct foreign investment in Cote d'Ivoire, Morocco, and Venezuela», MPRA Paper 36594, University Library of Munich, Germany, pp. 163-183.

Helpman, E., Melitz, M., Yeaple, S. 2004. «Export versus FDI with Heterogeneous Firms», American Economic Review, 94, pp. 300-316.

Hoffmann, L., Tan, T.N. 1980. «Industrial growth, employment and foreign investment in Malaysia» (Kuala Lumpur, Oxford University Press).

Javorcik, B. S. 2004. « Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages», The American Economic Review, vol. 94, n°3, pp.605- 627.

Kokko, A. 1992. «Foreign Direct Investment, Host Country Characteristics and Spillovers», EFI/The Economic Research Institute, Stockholm School of Economics, pp. 1-214.

Kokko, A. 1994. «Technology, Market Characteristics, and Spillovers», Journal of Development Economics, vol. 43, pp. 279-293.

Kokko, A. 1996. « Productivity Spillovers from Competition between Local Firms and Foreign Affiliates », Journal of International Development, Vol. 8, pp. 517-530.

Kokko, A. 2006. «The Home Country Effects Of FDI in Developed Economies», The European Institute of Japanese Studies, Working Paper n° 225, 36 p.

Kokko, A., Chen, T., Tingvall, P. G. 2011. «FDI and Spillovers in China: Non-linearity and Absorptive Capability», Journal of Chinese Economic and Business Studies, vol. 9, n° 1, pp. 1-22.

Levchenko, A. A., Rancière, R., Mathias, T. 2008. « Growth and Risk at the Industry Level: the Real Effects of Financial Liberalization », CEPR Discussion Papers 6715.

Lipsey, R. E., Sjöholm, F. 2001. « Foreign Direct Investment and Wages in Indonesian Manufacturing », NBER Working Paper n°8299, Cambridge, MA, National Bureau of Economic Research.

Liu, X., Wang, C. 2003. « Does foreign direct investment facilitate technological progress? Evidence from Chinese industries », Research Policy, 32, pp. 945-953.

Lucas, R. 1988. « On the Mechanics of Economic Development », Journal of Monetary Economics, 22, pp. 342-367.

Mansfield, E., Romeo, A. 1980. «Technology transfers to overseas subsidiaries by US-based firms», Quarterly Journal of Economics, n° 95, pp. 737-750.

Marcin, K. 2008. « How does FDI inflow affect productivity of domestic firms: The role of horizontal and vertical spillovers, absorptive capability and competition», The Journal of International Trade and Economic Development, 17(1), pp. 155-173.

Romer P. 1986. « Increasing Returns and Long-Run Growth », the Journal of Political Economy, vol. 94, n° 5, pp. 1002-1037.

Romer, P. 1990. «Endogenous technological change», Journal of Political Economy, vol. 98, pp. 71–102.

Romer, P. 1993. « Idea gaps and Object Gaps in Economic Development », Journal of Monetary Economics, vol. 32, n°3, pp. 543-573.

Wang, J., Blomstrom, M. 1992. « Foreign Investment and Technology Transfer », European Economic Review n°36, pp. 137-155.

Appendix

Table 1. Performance of Moroccan firms compared to French and Spanish-firms in terms of TFP

	France-affiliated/domestic firms			Spain-affiliated/ domestic firms		
	Technical efficiency change	Technological change	TFP	Technical efficiency change	Technological change	TFP
Annual average 1986-2004	0,94	3,73	3,45	0,95	2,23	2,12
Annual average 2005-2012	0,96	2,12	2,01	0,82	0,90	0,77
Annual average 1986-2012	0,95	2,56	2,41	0,86	1,22	1,03

Source: author's calculation using data from Moroccan Ministry of Industry (1985-2012)

Table 2. The impact of foreign investment on TFP growth in the Moroccan manufacturing industry per origin country: panel of two decades (1980–2012)

Independent variable	Generalized Method of Moments		
	Regression number (1)	Regression number (2)	Regression number (3)
Constant	2.339239 (0.014)*	4.076809 (0.000)*	4.426724 (0.000)*
FDI France	-0.055531 (0.028)*	-0.2368965 (0.000)*	-0.087481 (0.000)*
FDI Spain	0.0001079 (0.059)*	0.1302012 (0.000)*	0.0022075 (0.000)*
FDI other countries	-0.0092521 (0.637)***	-0.0137522 (0.628)***	-0.0100533 (0.613)***
Humain capital	0.1398812 (0.049)*		0.0342068 (0.019)*
Trade openness	0.108728 (0.011)*	0.1452835 (0.001)*	0.0837156 (0.005)*
FDI France*Humain capital		0.0225231 (0.425)***	
FDI Spain*Humain capital		0.0171849 (0.534)***	
Total factor productivity of foreign firms			0.0059633 (0.000)*
Technological Gap			-0.3424356 (0.000)*
Number of observations	484	484	484
Arellano-Bond test AR(1)	0.008	0.009	0.044
Arellano-Bond test AR(2)	0.157	0.376	0.068
Hansen test	0.130	0.208	0.488
Notes : (*) significant at 5 % ; (**) significant at 10% ; (***) no significant			

Source: author's calculation using STATA software.

Table 3. The impact of foreign investment on TFP growth in the Moroccan manufacturing industry per origin country and using technology-based classification: panel of two decades (1980–2012)

Independent variable	**Low-technology manufacturing**	**Medium-technology and high-technology manufacturing**
Constant	1.752124 (0.000)*	1.78739 (0.002)*
FDI France	0.1243233 (0.000)*	-0.1867934 (0.000)*
FDI Spain	0.0563169 (0.000)*	0.0877583 (0.000)*
FDI other countries	0.065907 (0.005)*	0.0042525 (0.892)***
Human capital	0.14561 (0.000)*	0.2369586 (0.000)*
Trade openness	0.1061235 (0.001)*	0.1047378 (0.001)*
Number of observations	420	224
Arellano-Bond test AR(1)	0.034	0.018
Arellano-Bond test AR(2)	0.146	0.93
Hansen test	0.243	0.172
Notes: (*) significant *at 5 %; (**) significant at 10%; (***) no significant.*		

Source: author's calculation using STATA software.