

**Impact of Foreign Ownership on Total Factor Productivity:
Evidence from Food, Tobacco and Financial Business
Sectors of Pakistan**

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The paper investigates the impact of foreign ownership on total factor productivity (TFP) for Food and Tobacco and Financial Business sectors of Pakistan. Theoretical framework of Caves (1974) is estimated to examine firm's productivity from foreign investment. Cobb-Douglas production function is estimated for each sector and then TFP is extracted from this function. Extracted TFP is regressed on set of variables including ownership dummies, foreign presence at sector level and firm size by using Random Effects model. The study concludes that foreign ownership has positive effect on TFP of both the sectors. However, the evidence for the impact of foreign presence at sector level is mixed. Firm size negatively affects TFP. The study recommends the provision of fiscal incentives to encourage research and development expenditures, rationalizing of labour laws and lower corporate tax rates to encourage joint ventures among foreign and domestic firm.

1. Introduction

Foreign ownership is perceived as a key source of capital inflow, advanced technology, managerial skills and market access in many developing countries (Blomstrom and Kokko, 1998). It is usually recognized that inflows of foreign capital can increase the productivity of all inputs in the production process by bringing new technologies and know-how that can spillover to the rest of the economy. More

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importantly, the technological benefit is not limited to locally affiliated firms but can also create technology spillovers to the host country's local firms.

Effect of foreign ownership on host country has been the subject of extensive research. Early studies such as Vernon (1966) and Caves (1974) suggest that foreign firms are more productive than their domestic counterparts. In addition, the presence of foreign firms has a positive impact on domestic firms' performance. Such positive externalities or spillovers diffuse to the domestic firms through their interaction with the foreign firms. In the context of foreign investment flows in developing countries, most of the research has concentrated on the aggregate level impact of foreign capital. Some studies have been conducted to analyze the real contribution of foreign capital, that is, the degree of improvement in productivity for the developing countries. To the best of our knowledge, no disaggregated study has been conducted for Pakistan's economy to analyze the impact of foreign ownership on firm level productivity.⁴ But across the world, evidence on the impact of foreign ownership on the TFP of the services sector is scant, with most of the studies conducted for manufacturing sector.

The present study aims to fill this gap. The objective of the study is to examine the impact of foreign ownership on TFP in two major sectors, namely Food and Tobacco and Financial Business sectors of Pakistan.⁵ The study uses annual data for 12 and 32 firms from Food and Tobacco, and Financial Business sectors covering the period 1994-2007 and 1995-2007 respectively. We followed the pioneering work of Caves (1974) to elaborate the impact of foreign ownership on firms' productivity. The author argues that foreign capital influence the host country conditions either by technology transfers or by increased competition. Technological spillover, that includes all aspects resulting from the presence of Multinational Corporations (MNCs) in a host country, enhances technical efficiency of the domestic firms thus raising their

⁴ This means the effect of foreign investment in the form of technology diffusion, productivity improvement, increased competitiveness and managerial skills of the domestic firms and industries.

⁵ Food and Tobacco and Financial Business sectors have been the major recipients of foreign investment in Pakistan during the recent year [Government of Pakistan (2007)].

productivity. Entry of foreign investment also promotes competition in the industry, thereby raises the efficiency of the domestic firms. These two effects are sometimes referred to as the direct effects of increased foreign investment. Moreover, inflow of foreign capital also has some indirect effects (known as externalities) such as spillovers from the foreign affiliates to domestic firms (see Gorg and Greenaway, 2001 for a survey of the spillover literature). For panel of both sectors Random Effects regression models are estimated. Choice of Random Effects model is justified in a number of ways; *firstly*, it accounts for the unobservable heterogeneity and time invariant factors that might affect productivity. *Secondly*, we conducted Hausman test that also favors Random Effects model over the Fixed Effects model. *Finally*, the choice of Random Effects model is consistent with our random sample selection based on availability of data.

The paper is organized as follows. The existing empirical as well theoretical literature on the subject is reviewed in section 2. Theoretical framework is presented in section 3. Data and econometric methodology are discussed in section 4. Section 5 presents major results and interpretations. Finally, section 6 concludes the study.

2. Literature Review

Despite voluminous research, the nature and extent of the impacts of foreign investment on TFP in the host countries remain an unsettled issue. Mixed evidence suggests that rather than being an automatic process, productivity spillovers from foreign ownership depend on local firms and host country specific characteristics.

2.1. Theoretical Framework

Early theories on the impact of foreign capital and Multinational Corporations (MNCs) on the host countries are found in the writings of dependency school (for details see Ghost, 2001 and Brewer, 1990). Later on, in neoclassical financial theory of portfolio flows multinationals enterprises (MNEs) have been viewed as simple arbitrageur of capital in response to changes in interest rate differential. In late 1970s, the theoretical models on foreign capital and spillover started to emerge. In pioneering study on MNCs, Hymer (1976) shifts

the attention away from neoclassical financial theory by viewing foreign investment more than a process of asset exchange internationally. According to this view, foreign investment involves international production process by which MNCs transfer a package of capital, management, and new technology to the host country. Most of the empirical studies on spillover effects of foreign investment are conducted in line of Hymer's work where foreign firms possess superior organizational and production techniques compared to the domestic firms.

The formal modeling remained very scarce in this early literature. Contributions by formal modeling accelerated towards the end of 1970s. The insights provided by Hymer (1976), Findlay (1978) and latter on Blomstrom and Kokko (1998) constitute a theoretical ground for analyzing productivity spillovers from the industrial activity of foreign firms. These models exhibit that these spillovers are materialized in the form of a variety of mechanisms, that are broadly classified into horizontal (intra-sectoral) and vertical (inter-sectoral) spillover.

Horizontal Spillover occurs when the foreign subsidiary operates at the same stage of the production process as the parent firms. The entry of foreign firms may lead to an increase in the productivity of the domestic firms in the same industry through various mechanisms. These mechanisms to produce technological spillovers for domestic industries are demonstration, labor turnover and competition effects.

Demonstration effects refer to copying or imitation of foreign firms' technology and organizational practices by the domestic firms. Domestic firms can adopt these technologies either by reverse engineering or simply by product imitation introduced by MNCs. New firms can enter to the market by inspiring the technologies brought by MNCs. According to Sasidharan (2006), labor turnover arises from the mobility of the skilled and trained workers from MNCs to domestic firms. These workers are carriers of technology. Multinationals can prevent the flow of labor by paying higher wages. On the other hand, there is a possibility of reverse labor turnover. The employees of domestic firms can move to foreign firms. The circulation of the labor force enables some original knowledge embedded in the labor to be transferred to other firms. Competition effects refer to a situation in which entry of foreign firm

forces the domestic firms to increase their efficiency by improving the existing methods of production or adoption of new ones. However, competition in market due to MNCs can either foster or suppress the domestic productive forces. Domestic firms compete with the superior technologies or products of MNC and, therefore, the indigenous efforts level for product and technology improvement increases. This phenomenon is known as 'positive spillover' where MNC force domestic firms to be more competitive. On the other hand, if markets are populated by inefficient domestic firms, then foreign entry to market would sweep out these inefficient firms from market. Aitken and Harrison (1999) attribute such an effect as "market stealing effect". This stealing has negative effects on domestic firms' productivity by forcing them up their average cost curve.

Vertical spillover occurs when the foreign subsidiary operates at a different stage of production as compared to the parent. The inter-industry spillover arises mainly by the customer-supplier relationship between foreign firms and domestic firms. According to Pack and Saggi (2001), in case of vertical multinationals the affiliate may produce through upstream/backward linkages or downstream/ forward linkages. The 'backward-forward' linkages are related to the input-output structure of the industry. These linkages are then directly related to market access spillovers.

Backward effects arise if local firms furnish intermediate goods to foreign firms and foreign firms are intensive users of local intermediates. Hence, foreign presence allows local firms to expand their production scope and reduce their average cost through increasing return to scale. Backward linkages from foreign investment are beneficial to the local suppliers in forms of increased output and employment, improved production efficiency, technological and managerial capabilities and market diversification. The forward effects occur because MNC's production may be used as intermediates by local firms. Foreign investment increases competition, which may further improve product diversity and consequently benefit to domestic firms.

Foreign ownership can have a positive or negative impact on the productivity of local firms depending on whether the negative competition effects outweigh the positive effects of demonstration and

imitation, the training of employees and the positive effect of backward and forward linkages.

2.3. Empirical Literature

There have been numerous empirical studies conducted in transition, developing and developed economies to analyze the effects of foreign investment on firms' productivity. For developing economies of Haddad and Harrison (1993) examine the effects of foreign presence on the relative productivity of local firms in Morocco covering the period from 1985-1989. The study finds no evidence of productivity spillover through foreign presence in the sector. Similar results are found by Ito (2002) for Indonesian automobile industry over 1990-1999 and Gachino (2007) for Kenyan manufacturing industry over the period of 1994-2001. In another study for Indonesia manufacturing industry over the period 1990–1995, Takii (2005) examine productivity spillovers derived from the existence of foreign multinational plants. The study shows existence of positive spillovers. Temenggung (2007) also concludes same results for Indonesian manufacturing industry over 1975-2000. Other studies showing positive evidence are Ayanwale and Bamire (2004) over the period of 1987-1996 for the Nigerian Agro/agro-allied sector, Hsieh (2006) for Chinese manufacturing sector covering the period 1998-2004, Yudaeva *et al.* (2001) for Russian firms over the period 1992-1997. To investigate the impact of foreign ownership on the productivity of domestic companies, Tomohara and Yakota (2006) use plant level panel data between 1999 and 2001 for Thailand. The results demonstrate that on average foreign ownership improves productivity of domestic companies in the same and upstream sectors. The study finds no evidence of productivity spillover to domestic firms in downstream sectors. Thangavelu and Pattnayak (2005) find same result for Indian pharmaceutical industry over the period 1989-2000. Recently Sasidharan and Ramanathan (2007) use firm-level data of Indian manufacturing industries to examine the spillover effects from the entry of foreign firms considering both horizontal and vertical spillover. The study finds no evidence of horizontal spillover effects. On the contrary, it finds negative vertical spillover effects. The negative results indicate the possibility of lack of local sourcing by the multinationals.

For developed economies, an early study by Globerman (1979) investigates the productivity spillover benefit to Canadian manufacturing industries. The results indicate a positive relationship between labour productivity of local firms and foreign presence, indicating that MNCs bring positive spillovers that are responsible for the increase in technical efficiency and productivity among the local firms. Similarly Backer and Sleuwaegen (2002) Belgian manufacturing industry covering the period 1990-1995, Karpaty (2005) from Swedish manufacturing industry over the period of 1986-2002, manufacturing industry, Liu *et al.* (2000) UK's manufacturing industries the period 1991-1995, Girma *et al.* (2007) for the UK's manufacturing industries covering the period 1992-1999, Murakami (2007) for Japanese manufacturing sector over the period 1994-1998 find that foreign ownership has positive and significant effects on the firms' performance and multinational enterprises do generate positive spillover in domestic firms.

Summing up, the analysis of existing literature on the foreign ownership and firm level productivity suggests that there is mix evidence about the nature of spillover and TFP of the firms arising from foreign investment for the developing economies. However, most of the studies conducted for developed economies suggest strong evidence in favor spillover effects and growth in TFP resulting by foreign ownership. Lack of consensus about the impact of foreign ownership on TFP for the developing economies motivated us to reinvestigate the issue for Pakistan's Food and Tobacco, and Financial Business sectors.

3. Framework of Analysis

In order to investigate the impact of foreign ownership on productivity performance of Pakistani firms from Food and Tobacco and Financial Business sectors, we initially choose three major sectors that account for 67% of the foreign investment in Pakistan [Government of Pakistan (2007)].⁶ However, this choice was constrained by the data availability.⁷

⁶ Communication, Financial Business and Food & Tobacco sectors contribute 34.2%, 21%, and 11.8% to total investment respectively during the year 2006-2007.

⁷ We dropped Communication sector for our analysis due to non availability of data, mergers of major firms, and the limited number of listed firms.

So we had to restrict the analyses to Food and Tobacco and Financial Business sectors. Most of the studies examining spillovers from foreign investment have been largely based on productivity techniques pioneered by Caves (1974) who presented the first systematic production function framework examining spillovers from foreign investment. According to Caves, technological spillovers include all aspects resulting from the presence of MNCs in a host country that increases the productivity and efficiency of locally owned firm.

Two main approaches are used in literature to identify banks' inputs and output, that is, the intermediation approach (IA), and the production approach (PA). Intermediation approach views banks as financial intermediaries that collect purchased funds and use these funds for provision of loans and purchase of the other assets. The production approach assumes that banks produce loans and deposit account services by using labour and capital as inputs. Output is represented by the services of loans and deposit account provided to customers.⁸ Grifell-Tatje and Lovell (1997) mention that the production approach is preferred when the analysis focuses on productivity of the banking firms, while the other approaches are most suitable when the focus is on bank's profitability.

To analyze the effect of foreign ownership on TFP, we will estimate the Cobb-Douglas production function for each sector and then we will extract TFP from this function. The list of variable used in the following formation is given as under:

Y_{it} = Total output of i^{th} firm at time t

L_{it} = Number of workers in the i^{th} firm in time t

K_{it} = Fixed assets (property, plants, and equipment) in the i^{th} firm in time t

E_{it} = Energy input used in the i^{th} firm in time t

M_{it} = Raw Material used in the i^{th} firm in time t

⁸ Berger and Humphrey (1997), Fixler and Zieschang (1999) and Pasiouras and Sifodaskalakis (2007) provide details on the banking sector productivity and measurement of output.

TFP_{it} = Total factor productivity of the i^{th} firm in time t

$OD1_{it}$ = Ownership dummy for i^{th} small foreign firm in time t

$OD2_{it}$ = Ownership dummy for i^{th} large foreign firm in time t

FPS_t = Foreign presence in the sector at time t

FS_{it} = Size of the i^{th} firm in time t

Cobb-Douglas production functions for panel of Financial Business and Food & Tobacco sectors are as follow;

$$\ln(Y_{it}) = \ln A + \alpha_1 \ln(L_{it}) + \alpha_2 \ln(K_{it}) + \alpha_3 \ln(E_{it}) + \alpha_4 \ln(M_{it}) + \varepsilon_{it} \quad (1)$$

$$\ln(Y_{it}) = \ln A + \beta_1 \ln(L_{it}) + \beta_2 \ln(K_{it}) + \beta_3 \ln(E_{it}) + \varepsilon_{it} \quad (2)$$

Assuming constant returns and, hence, imposing the condition $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 1$ in equation (1) and $\beta_1 + \beta_2 + \beta_3 = 1$ in equation (2), the above production functions can be written in intensive form. We get intensive form equations (3) and (4) by rearranging equations (1) and (2) respectively. Following equation will be estimated for Food and Tobacco sector;

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \ln A + \alpha_2 \ln\left(\frac{K_{it}}{L_{it}}\right) + \alpha_3 \ln\left(\frac{E_{it}}{L_{it}}\right) + \alpha_4 \ln\left(\frac{M_{it}}{L_{it}}\right) + \varepsilon_{it} \quad (3)$$

For Financial Business sector, we will estimate following equation;

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \ln A + \beta_2 \ln\left(\frac{K_{it}}{L_{it}}\right) + \beta_3 \ln\left(\frac{E_{it}}{L_{it}}\right) + \varepsilon_{it} \quad (4)$$

Equations (3) and (4) are more appropriate for estimation as compared to equations (1) and (2). In labour intensive form several econometric problems such as heteroscedasticity arising from cross-sectional data, simultaneity arising from endogeneity problem of production inputs, or multicollinearity arising from the interdependence of the two inputs are reduced [Dimelis and Louri (2004)]. All the estimated coefficients of the factor inputs (capital per worker, raw material per worker and energy per worker) are expected to be positive for the panel of Food and Tobacco sector. Likewise, the estimated coefficients of the factor inputs

(capital per worker and energy per worker) are also expected to be positive for Financial Business sector.

We will calculate the TFP from equation (3) and (4) by employing Solow (1956) residual as follows;

$$TFP_{it} = A + \varepsilon_{it} = \exp \left[\ln \left(\frac{Y_{it}}{L_{it}} \right) - \alpha_2 \ln \left(\frac{K_{it}}{L_{it}} \right) - \alpha_3 \ln \left(\frac{E_{it}}{L_{it}} \right) - \alpha_4 \ln \left(\frac{M_{it}}{L_{it}} \right) \right] \quad (5)$$

$$TFP_{it} = A + \varepsilon_{it} = \exp \left[\ln \left(\frac{Y_{it}}{L_{it}} \right) - \beta_2 \ln \left(\frac{K_{it}}{L_{it}} \right) - \beta_3 \ln \left(\frac{E_{it}}{L_{it}} \right) \right] \quad (6)$$

We will regress the TFP calculated in equations (5) and (6) on a set of variables [ownership dummies ($OD1_{it}$ and $OD2_{it}$), foreign presence at sector level (FPS_t) and firm size (FS_{it})] in order to evaluate the impact of foreign ownership on the firm's productivity separately for each sector. Different variables are used in literature but our investigation is limited to the above list of variables due to the limited availability of data.

Ownership dummies measure the degree of foreign investment in each firm. Ownership dummies ($OD1_{it}$ and $OD2_{it}$) can have positive or negative effect on the productivity of local firms depending on whether or not the positive effects of demonstration and imitation, the training of employees and the positive effect of backward and forward linkages outweighs the negative competition effects. However, most plausible empirical findings support the positive sign for estimated coefficients of foreign ownership [Sgard (2001), Dimelis and Louri (2004), Karpaty (2005) and Yasar and Paul (2007)]. Foreign presence at sector level (FPS_t) indicates the presence of foreign investment at sector level. According to Aitken and Harrison (1999) and Wei and Lui (2006), the expected sign for the foreign presence coefficient at sector level is either positive or negative. A positive coefficient indicates improvement in TFP through transfer of technology, knowledge, and skills from foreign to local firms. In contrast, negative coefficient shows that productivity of domestic firms decrease with the presence of foreign firms. It happens when foreign firms operate in isolation or in cluster, or large technological gap between foreign and local firms impede the transfer of

spillover benefits from foreign to local firms. It is also possible that foreign firms have established few vertical and horizontal linkages with domestic firms, thus hindering steady flow of knowledge, techniques and other spillovers to the local firms.

Firm size (FS_{it}) can play a dual role in effecting the TFP. Firstly, as the firm size increases, it brings in economies of scale in production of the final goods that help them to improve their productivity. Secondly, firm size is related to the level of technology of the firms as it indicates the state of knowledge from research and development (R&D) activities of firms. Firms having intensified R&D department can imitate the improved technology. This imitation may help them to improve their competitiveness and productivity. Usually larger firms possess well developed human capital, high absorptive capacity, and improved technology. These attributes help them to improve their productivity. Nevertheless, the larger firms may already be very competitive or operating so close to their maximum efficiency level that further increase in their size leads to suboptimal plant size and hence decreases the TFP.

On the other hand, small firms are characterized by low human capital, low absorptive capacity. Small firms consider the technology either irrelevant or too difficult to implement. As a result, small firms may be unable to improve productivity. Hence the expected sign for the coefficient of firm size can either be positive or negative [see Karpaty and Lundberg (2004), Ayanwale and Bamire (2004) and Dimelis and Louri (2004)]. Hence we specify the following regression equation for the determination of TFP in each of two sectors in our analysis.

$$TFP_{it} = \gamma_0 + \gamma_1 ODI_{it} + \gamma_2 OD2_{it} + \gamma_3 \ln(FPS_t) + \gamma_4 \ln(FS_{it}) + \mu_{it} \quad (7)$$

4. Data and Econometric Methodology

The study uses annual data by taking 12 firms from Food and Tobacco and 32 firms for Financial Business sectors of Pakistan economy. These firms are listed either at Karachi, Lahore or Islamabad stock exchanges. The data are taken from the annual reports of various companies. The

time series annual observations vary for each firm dependent on the availability of annual reports.

The data on output (Y) are taken from Profit and Loss accounts of companies' annual reports. Following Javorcik (2004), Abraham *et al.* (2006) and Tomohara and Yakota (2006), we measure output by sales of the firms for Food and Tobacco sector. Sales are adjusted for the changes in the inventories to account for changes in sales during one year. Within Financial Business sector, banks are typical multi-input and multi-output firms. We used production approach for measuring output of the banking firms. Output is measured by sum of the net markup and non-markup incomes generated from loan and deposit account services by banks. For leasing and securities, operating income is taken as output.

Data on labour and raw material are taken from the section on Notes to the Accounts in the annual reports. Energy inputs are taken from the section on Administrative Expenses of annual report. Data on capital are taken from the Balance Sheet given in annual report. Output, raw material, capital and energy are deflated by food and tobacco price deflator, finance and insurance price deflator, raw material price deflator, building material price deflator and fuel and lighting price deflator respectively. Data on price deflators are taken from State Bank of Pakistan's publication *Handbook of Statistics on Pakistan Economy* (2005). We construct finance and insurance price deflator (FIPD) as follow;

$$FIPD = \frac{GDP \text{ of finance and insurance sector at current costs}}{GDP \text{ of finance and insurance sector at constant costs}}$$

The data for ownership is extracted from the Annual Reports' section on Pattern of Shareholdings of the firms. We followed the definition of foreign ownership given by *International Monetary Fund* (IMF) and *Organization of Economic Cooperation and Development* (OECD). According to the IMF/OECD recommendations, foreign firm is defined as incorporated or unincorporated enterprise in which foreign investor owns 10% or more of the ordinary shares or voting power of an incorporated enterprise or the equivalent of an unincorporated

enterprise.⁹ Ownership dummy $OD1_{it}$ takes value equal to 1 if foreign investors hold more than 10% but less than 50% shares in a firm. It indicates that the firm is a small foreign firm. Similarly $OD2_{it}$ takes the values equal to 1 if the foreign investors hold more than 50% shares in a firm, hence categorized as large foreign firm. Base category is defined by those firms in which foreigners hold less than 10% shares. Such firms are categorized as domestic firms.

Foreign presence at sector level (FPS_t) and firm size (FS_{it}) are used as control variables in our estimation.¹⁰ FPS_t is the share of equity capital held by foreign firms in each sector at time t. It indicates the net stock of foreign capital in the sector. The data on FPS_t are taken from various annual issues of *Foreign Liabilities and Assets and Investment in Pakistan* published by State Bank of Pakistan. FS_{it} is size of the i^{th} firm at time t. Following Karpaty and Lundberg (2004), we measure firm size by employment of the i^{th} firm relative to average employment per firm in the industry, that is;

$$FS_{it} = \frac{L_{it}}{n^{-1} \sum_{j=1}^n L_{jt}}$$

where n = Number of firms in the industry.

L_{it} = Number of workers in i^{th} firm at time t

L_{jt} = Number of workers in j^{th} industry at time t

Data on number of firms in the industry are taken from listed firms in the stock exchange markets. For finding average employment in each firm, data on employed labor force in the economy are taken from various issues of the annual reports of the State Bank of Pakistan. Percentage of employed labor force in Food and Tobacco, and Financial Business are taken from *Handbook of Pakistan Economy* (2005)

⁹ For details see Falzoni (2000).

¹⁰ Control variables are taken in order to avoid the specification error due to omission of some important variables.

published by State Bank of Pakistan. The list of selected firms from the two sectors is reported in Table I.

Table I: The List of Selected Companies

Companies	Number of Observations (Period)
Food and Tobacco Sector	
Lakson Tobacco Company Limited	13 (1995-2007)
Pakistan Tobacco Company	13 (1994-2006)
Rafan Maize product Corporation Limited	12 (1995-2006)
Unilever Pakistan Limited	11 (1996-2006)
Clover Pakistan Limited	10 (1998-2007)
Rafan Best Foods Limited	9 (1998-2006)
National Foods Limited	9 (1995-2003)
Ismail Industries Limited	9 (1995-2003)
Nestle Pakistan Limited	7 (2000-2006)
Mitchell's Fruit Farms Limited	5 (1999-2003)
Shezan International Limited	5 (1996-2000)
Noon Pakistan Limited	4 (1997-2000)
Financial Business Sector	
Orix Leasing Pakistan Limited	13 (1995-2007)
First Capital Securities Corporation Limited	13 (1995-2007)
Al Faysal Investment Bank Limited	11 (1996-2006)
Pak-Gulf Leasing Comp Limited	11 (1997-2007)
Bank AI-Falah	10 (1997-2006)
United Bank Limited	10 (1997-2006)
First Fidelity Leasing Modarabah	8 (2000-2007)
Capital Assets Leasing Corporation Limited	8 (2000-2007)

Table I: The List of Selected Companies

Companies	Number of Observations (Period)
Al-Mal Securities & Services Limited	8 (1996-2003)
Trust Securities & Brokerage Limited	8 (1996-2003)
InterAsia Leasing Company Limited	8 (1995-2002)
Network Leasing Corporation Limited	8 (1996-2003)
Saudi Pak Leasing Company Limited	8 (1996-2003)
Orix Investment Bank Pakistan Limited	7 (1997-2003)
Asian Leasing Corporation Limited	7 (1996-2002)
Crescent Leasing Corporation Limited	7 (1996-2002)
Pakistan Industrial Leasing Corporation Ltd	6 (1996-2001)
Security Leasing Corporation Limited	6 (1996-2001)
Universal Leasing Corporation Limited	6 (1996-2001)
Muslim Commercial Bank Limited	6 (1996-2001)
Metropolitan Bank Limited	6 (1996-2001)
Prime Commercial Bank Limited	6 (1996-2001)
Askari Commercial Bank Limited	5 (1996-2000)
Sigma Leasing Corporation Limited	5 (1997-2001)
English Leasing Limited	5 (1996-2000)
Security Investment Bank Limited	5 (1996-2000)
Soneri Bank Limited	5 (1996-2000)
Pakistan Industrial Credit & Investment Corporation Limited	5 (1996-2000)
Grays Leasing Limited	4 (1998-2001)
Arif Habib Securities Limited	4 (2000-2003)
Union Leasing Limited	4 (1998-2001)
Meezan Bank	4 (2003-2006)

For extracting TFP equation (3) and (4) are estimated by Pooled Least-Square method. For analyzing the impact of foreign capital and other control variables on TFP, equation (7) is estimated for each sector by Random Effects Model. We also applied Hausman's (1978) Specification test. The test results also favor the Random Effects model over the Fixed Effects model.

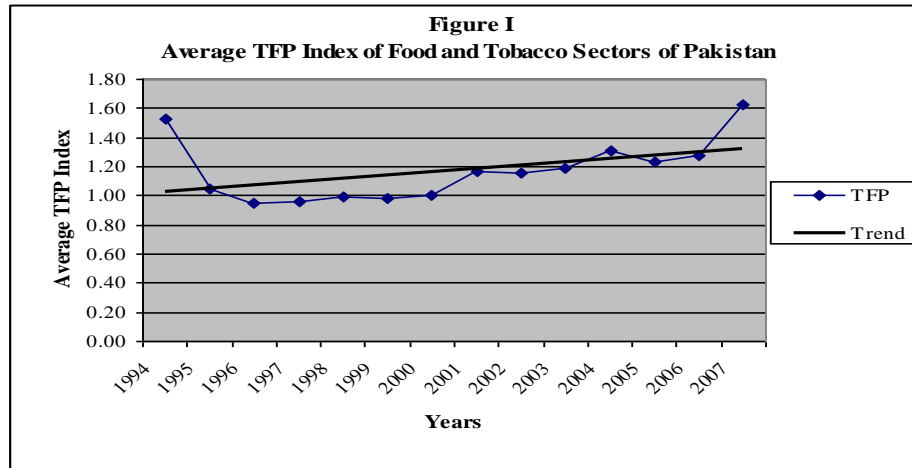
5. Results and Discussion

The results for Cobb-Douglas production function estimation for both the sectors are reported in Table II. The second and third columns of the table present the results for Food and Tobacco and Financial Business sector. The estimated coefficient of capital per worker, energy per worker and raw material per worker are positive and statistically significant at 1 per cent level of significance. The bottom part of Table II reports sample size, number of firms, R^2 , Durbin-Watson statistic and F statistic. The high values of R^2 indicate quite satisfactory overall goodness of fit of the estimated equations. Durbin-Watson statistics is close to 2 indicates that there is no serious problem of autocorrelation in the regression residuals. Probability of F-statistic is less than 1 per cent, which confirms the rejection of null hypothesis of joint insignificance of the slope coefficient.

Table II: Estimation Results for Cobb-Douglas Production Function

Independent Variable	Food and Tobacco Sector	Financial Business Sector
Intercept	2.856270 (0.0000)*	7.796540 (0.0000)*
log(K/L)	0.313463 (0.0000)*	0.206669 (0.0000)*
log(E/L)	0.287595 (0.0000)	0.064825 (0.0050)*
log(M/L)	0.337399 (0.0000)*	—
AR (1)	0.693801 (0.0000)*	0.286942 (0.331866)
R^2	0.991656	0.961927
F-Statistic	625.9082 (0.0000)*	50.14230 (0.0000)*
Durbin-Watson statistic	2.059284	2.224030
Number of Firms	12	32
Number of observations	81	195

Note: Values in parentheses are the p-values. The statistics significant at 1 per cent level are indicated by *.

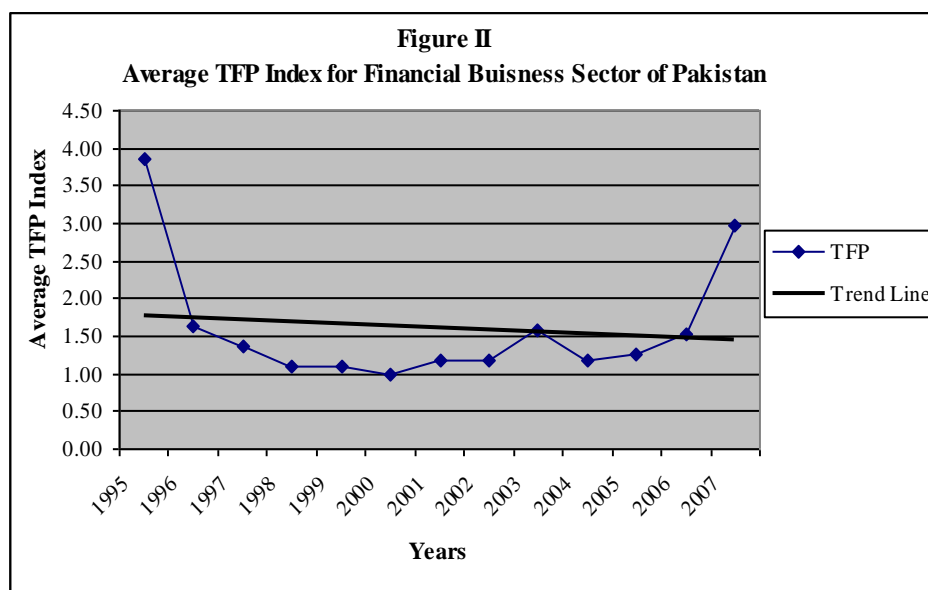


Since TFP depends on the units of measurements of variables, we convert it into an index setting the base year value equal to one. Figure I show the trend in TFP index of Food and Tobacco sector of Pakistan economy. During the 1990s Food and Tobacco sector has experienced slowdown in TFP. This slowdown can be attributed to unused production capacity resulting from economic recession. Demand decreased resulting in under utilisation of capacity and fall in TFP. In the 1990s some other contributing factors in slowdown of TFP in Food and Tobacco sector were lack of contribution of manufacturing exports¹¹ and decline in the vintage capital.¹² During the 2000-2007 periods the growth in manufacturing exports enhanced TFP of the sector. Moreover, private investment increased in the sector, which led to better technology and hence improved TFP of the sector.

¹¹ Pasha *et al.* (2002) argue that lack of manufacturing exports means less exposure to foreign competition and hence less TFP in the sector.

¹² Vintage capital is measured by share of new investment in capital stock. New plants are expected to embody the latest technology, which improves TFP.

Figure II shows trend in average TFP index of Financial Business sector of Pakistan.



During the 1990s and early 2000s decline in TFP can be attributed to short to medium term effects of deregulation of the sector. Liberalization of Financial Business sector led to entry of many new banks, especially foreign banks, selling more-or-less the same banking products with the product differentiation and branding. Entry of new banks converted oligoplistic structure of the banking sector into the monopolistic competition characterized by excess capacity. During this transition, the number of banks increased and excess capacity emerged and grew. This resulted in gradual decline in TFP. Moreover, investments in Financial Business sector have significant lags before full utilization is achieved. This under-utilization of existing capacities also contributed in declining TFP of the sector.

The declining trend in TFP was halted in the early 2000s when the number of banks becomes stable. Stock markets started to climb up in early 2002 following the 9/11 events. The investors' confidence increased, leading to inflow of foreign capital in Financial Business sector. Increased foreign ownership led to improvement in TFP.

Enhanced availability of export credit at reasonable interest rate, privatization and reduction in public ownership started to show positive effect on TFP. The results for the effects of foreign ownership on TFP indices of the two sectors are reported in Table III. The overall performance of the two estimated equations as indicated by the values of R^2 and F statistics appears reasonably good considering that our analysis is dominated by cross-sectional data. Durbin-h statistics suggest no serious problem of autocorrelation in regression residuals. Hausman specification test is conducted to choose between Random and Fixed Effects models. Small value of the Hausman statistic (or large probability) leads to acceptance of the null hypothesis that the Random Effects are consistent. Thus, the Random Effects model is preferred over the Fixed Effects model. This result is also consistent with our random sample selection.

**Table III: Random Effect Estimation for TFP Equations
(Dependent Variable is TFP Index)**

Independent variables	Food and Tobacco Sector	Financial Business Sector
C	0.066348 (0.7038)	37.41669 (0.1425)
OD1	0.138194 (0.0000)*	1.365351 (0.0000)*
OD2	0.06963 (0.0017)*	4.460218 (0.0001)*
log (FS)	-0.023048 (0.0263)**	-0.078733 (0.7514)
log (FPS)	-0.005807 (0.5027)	0.169651 (0.0774)***
TFP (-1)	0.948175 (0.0000)*	0.249372 (0.03075)**
TFP(-2)		0.098050 (0.0000)*
R^2	0.8593	0.660957
Number of cross-sections	12	32
Number of observations	81	163
Durbin-Watson h statistic	0.59	0.48
F-Statistic	91.6711 (0.0000)*	313.36 (0.0000)*
Hausman test χ^2 statistic	2.6549 (0.6241)	1.2534 (0.7902)

Note: Values in parentheses are the p-values. The statistics significant at 1 per cent and 5 per cent levels are indicated by * and ** respectively.

We now discuss the results for the Food and Tobacco sector in some detail. The coefficient of ownership dummy *OD1* shows that the presence of small foreign firms brings 0.138194 points improvement in TFP as compared to the base category of domestic firms. Probability of this coefficient indicates that the coefficient is statistically significant at 1 per cent level of significance. Our results are consistent with the theoretical predictions of Hymer (1976) that foreign investment does not simply represent transfer of capital, but it also represents the transfer of a 'package' that combines capital, management, new technology, etc. This 'package' leads to improvement in TFP of the sector.

The second ownership dummy *OD2* shows that TFP improves by 0.06963 points in the presence of large foreign firms in the industry as compared to the base category of domestic firms. Statistically this coefficient is significant at 1 per cent level of significance. The magnitudes of the regression coefficients of the ownership dummies *OD1* and *OD2* show that the presence of small foreign owned firms enhance the productivity performance of domestic firms in sector more as compared to the presence of large foreign firm. The reason behind higher improvement in TFP by the presence of small foreign firms is that the local firms can easily interact with small foreign firms. This easy interaction benefits the local firms in the form of direct access to information necessary for spillover benefits in the form of technological knowledge, management skills and labor training programs [Dimelis and Louri (2004)].

These findings regarding the impact of foreign ownership on TFP are in line with our hypotheses that the entry of foreign firms in a sector improves TFP of that sector. Our findings are consistent with most plausible empirical evidence provided by Aw (2004), Dimelis and Louri (2004), Karpaty (2005), Wei and Lui (2006), Yasar and Paul (2007) and Unden (2007). Positive coefficients of both ownership dummies show that foreign firms are more productive than domestic firms.

Firm size is negatively related to TFP. The magnitude of the regression coefficient implies that 100 per cent increase in firm size brings 0.023048 points decrease in TFP. This negative coefficient indicates that the firms are already operating close to their optimal sizes under the given technology and further increase in their size will lead to

suboptimal plant size and, hence, decreases the TFP. These findings are in line with Karpaty and Lundberg (2004) and Dimelis and Louri (2004).

The results show that foreign presence at sector level *FPS* has negative and statistically insignificant effect on TFP. The estimated coefficient shows that foreign presence at the sector level decreases productivity of firms in the sector by 0.005807 points. The negative correlation between foreign presence at sector level and TFP suggest that no spillover occurs from foreign investment in the industry to domestic firms. The result implies that foreign firms operate in seclusion or in clusters. These firms do not permit productivity spillover to the locally owned firms due to higher degree of concentration and technology gaps between the foreign and locally owned firms. It could also be the case that foreign firms have established few vertical and horizontal linkages with domestic firms, hindering steady flow of knowledge, techniques and other spillovers to the local firms. It also indicated that foreign presence in the industry takes longer time to produce an effect on domestic firms' productivity. One reasoning for this delayed productivity spillover can be that the industry-specific knowledge spillover (such as product design and production methods) takes longer time. Also these spillovers are related to the duration of time in which the foreign investment takes place in a sector.

Foreign presence can also reduce productivity of domestic firms, particularly in the short run. If imperfectly competitive firms face fixed costs of production, a foreign firm with lower marginal costs will have an incentive to increase production relative to its domestic competitors. In this environment, the entry of foreign firms draws demand away from domestic firms, forcing the domestic firms to cut down their production. The productivity of domestic firms would fall as they spread their fixed costs over a smaller market, forcing their average cost curves back to initial higher positions. If the productivity decline from this demand effect is large enough, net domestic productivity can decline even if the multinational transfers technology or its firm-specific asset to domestic firms. These two offsetting effects have formally been modeled in Aitken and Harrison (1997) and empirically observed in Aitken and Harrison (1997, 1999).

The lagged value of TFP has positive and statistically significant coefficient on the current TFP. This coefficient shows the presence of feedback effect suggesting that higher TFP in the past year contributes to higher TFP in the current year.

For Financial Business sector, the coefficients of both the ownership dummies are positive, which indicate that the foreign firms are more productive than domestic firms, and the improvement in productivity increases with the increase in the share of foreign ownership in the firm. The coefficient for ownership dummy (*OD1*) shows that small foreign firms in the sector improve TFP by 1.365351 points as compared to the base category of domestic firms. Probability of this coefficient indicates that the coefficient is statistically significant at 1 per cent level of significance.

Positive coefficient of *OD2* shows that the presence of large foreign firms in the sector improves productivity of firms by 4.460218 points as compared to the base category of domestic firms. The coefficient *OD2* is also statistically significant at 1 per cent level of significance. Contrary to the results for Food and Tobacco sector, large foreign firms in Financial Business sector expand TFP more as compare to small foreign firm. The reason could be that foreign firms in Financial Business sector are more likely to have scale advantage such as better technology and broader geographic coverage of the host country's market. Furthermore in this sector the likelihood of technology transfer from larger foreign parent companies to local firms is better than from the small foreign firm.

As in Food and Tobacco sector, the TFP of firms is negatively related to relative firm size in the Financial Business sector as well. But the relationship in the latter case is statistically insignificant, even though the regression coefficient is larger in magnitude. Thus the evidence on diseconomies of scale in Financial Business sector is more uncertain rather than being weak.

The coefficient of the variable *FPS* shows that foreign presence at sector level enhances TFP of firms by 0.169651 points and the relationship is significant, indicating the presence of spillover effects from foreign to domestic firms within the sector. This result is contrary

to the result for Food and Tobacco sector, implying that foreign firms in Financial Business sector do not operate in isolation and have close interaction with the local firms. This translates into transfer of technology, knowledge and skills to local firms and, hence, improvements in their TFP. Similar results are found in Liu et al. (2000), Karpaty and Lundberg (2004) and Wei and Lui (2006). Finally, the first and second lagged values of TFP have positive and statistically significant coefficients, indicating strong inertia in the TFP series.

6. Conclusion and Policy Implications

The main finding of this paper is that foreign ownership in local firms enhances TFP both in Food and Tobacco and Financial Business sectors. However, in contrast to Financial Business sector, small foreign firms improve TFP more relative to large foreign firms in Food and Tobacco sector. Foreign presence at sector level also raises TFP significantly in Financial Business sector, indicating the presence of spillover to domestic firms from foreign presence within the sector. In Food and Tobacco sector, on the other hand, foreign presence at sector level has no significant effect on TFP. Conventional wisdom holds that Pakistan may adopt a welcoming stance towards foreign investment by providing some incentives for improving TFP and enjoying spillover benefits in both the sectors. Government may also search for some peaceful resolution of political and law and order problems in order to uplift the confidence of foreign investors. Technology gap between local and foreign firms reduces the utilization of foreign technologies by the domestic firms, fiscal incentives may be provided to encourage R&D expenditures. Furthermore, rationalizing of labor laws and lower corporate tax rates to encourage joint ventures among foreign and domestic firm may also be instrumental in raising productivity of firms.

The major limitation of this study is the limited availability of firm level data. Certainly more research is needed to fully understand the effect of foreign ownership on all industries of Pakistan. Moreover, it would be an interesting exercise to examine different channels of spillover from foreign to domestic firms for Pakistan economy. Hopefully, improved data availability will allow researchers to examine these issues in more detail.

References

- Abraham, F., Konings Josef., and Sloommaekers, V. (2006), FDI Spillovers, Firm Heterogeneity and Degree of Ownership: Evidence from Chinese Manufacturing, Unpublished Paper, Department of Economics, Catholic University of Leuven.
- Aitken, Brian J. and Harrison, Ann E. (1997), Do Domestic Firms Benefit from Foreign Direct Investment? Evidence from Panel Data, Mimeo, Columbia University
- Aitken, Brian J. And Ann E. Harrison (1999), "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela", *American Economic Review*, 89(3), pp 605-618
- Ayanwale, Adeolu. B. and Bamire, Simeon. (2004), "Direct Foreign Investment and Firm- level Productivity in the Nigerian Agro/agro-allied Sector", *Journal of Social Sciences*, 9(1): pp 29-36.
- Aw, Bee-Yan, (2004), Firm-Level Productivity and Foreign Direct Investments in Taiwan, in *Multinationals and Economic Growth in East, S. Urata, Chia Siow Yue and Fukunari Kimura(eds.)*, Routledge.
- Backer, de, Koen., and Sleuwaegen, Leo. (2002), Foreign Ownership and Productivity Dynamics, *Economics Letters*, 79 pp 177–183
- Berger, Allen N., and Humphrey David B. (1997), "Efficiency of Financial Institutions: International Survey and Directions for Future Research", *European Journal of Operational Research* 98: 175-212.
- Blomstrom, Magnus and Kokko, Ari. (1998), "MNCs and Spillovers", *Journal of Economic Surveys*, Vol (12), pp 97-110.
- Brewer, A. (1990), *Marxist Theories of Imperialism: A Critical Survey*. 2nd ed. London and New York: Routledge

Caves, R. (1974), "Multinational Firms, Competition, and Productivity in Host-Country Markets", *Economica*, Vol. 41 (162), pp. 176-193.

Dimelis, Sophia. and Louri, Helen. (2004), "Foreign Direct Investment Spillovers within and between Sectors: Evidence from Hungarian Data", *Review of World Economics*, Vol 140 Number 2, pp 1-28

Economic Survey of Pakistan 2006-2007, Government of Pakistan

Falzoni, Anna M. (2000), Statistics on Foreign Direct Investment and Multinational Corporations: A Survey, University of Bergamo, Centro de Studi Luca d'Agliano and CESPRI.

Findlay, R. (1978), "Relative Backwardness, Direct Foreign Investment and the Transfer of Technology: A simple Dynamic Model", *Quarterly Journal of Economics* 92, 1-16.

Fixler, D., and Zieschang K. (1999), "The productivity of the Banking Sector: Integrating Financial and Production Approaches to Measuring Financial Service Output", *The Canadian Journal of Economics*, Vol. 32, No. 2, pp. 547-569

Gachino, Geoffrey. (2007), Foreign Direct Investment and Firm Level Productivity A Panel Data Analysis, UNU-MERIT Working Paper Series, Number 2007-016, pp 1-45.

Ghost, B.N. (2001), Dependency Theory Revisited, Aldershot, Burlington, and Sydney: Ashgate.

Girma, Sourafel., Holger, Gorg., and Mauro, Pisu. (2007), "Exporting, Linkages and Productivity Spillovers from Foreign Direct investment", *CEPR Discussion Paper* No 6383, pp 1-31

Globerman, S. (1979), "Foreign Direct Investment and Spillover Efficiency Benefits in Canadian Manufacturing Industries", *Canadian Journal of Economics* 12, 42-56

Gorg, H., and D. Greenaway. (2001), Foreign Direct Investment and Intra-Industry Spillovers: A Review of the Literature, GEP Research Paper 01/37, University of Nottingham.

Grifell-Tatje, E. and Lovell, C.A.K. (1997), "The Sources of Productivity Change in Spanish Banking", *European Journal of Operational Research*, 98, 364-380.

Haddad, M., and Harrison, A. (1993), "Are there Positive Spillovers from Direct Foreign Investment? Evidence from Panel Data for Morocco", *Journal of Development Economics* Vol (42), pp 51-74

Handbook of Statistics on Pakistan Economy (2005), State Bank of Pakistan

Hausman, J. A. (1978), "Specification Tests in Econometrics", *Econometrica*, 46, pp 1251-71.

Hsieh, Chang-Tai. (2006), "Do Domestic Chinese Firms Benefit from Foreign Direct Investment?", *Working Paper Series* Vol. 2006-30, pp 1-16.

Hymer, S. (1976), The International Operations of National Firms: A Study of Foreign Direct Investment, Cambridge, Massachusetts: MIT Press.

Ito, Keiko. (2002), "Foreign Ownership and Productivity in the Indonesian Automobile Industry: Evidence from Establishment Data for 1990-1999", *ICSEAD Working Paper Series* Vol. 2002-25

Javorcik , B.S. (2004), "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages", *American Economic Review*, 94(3), 605-627.

Karpaty, Patrik. and Lundberg Lars. (2004), "Foreign Direct Investment and Productivity Spillovers in Swedish Manufacturing", *Orebro University Working Paper Series* 2: pp 1-28

- Karpaty, Patrik. (2005), Productivity Effects of Foreign Acquisitions in Swedish Manufacturing, EEA Conference, Amsterdam, The Netherlands.
- Liu, Xaiming. Silvre, Pamela., Wang, Chengqi., and Wei, Yingqi. (2000), "Productivity Spillover from Foreign Direct Investment: Evidence from UK Industry Level Panel Data", *Journal of International Business Studies*, Vol 31, No 3, pp 407-425
- Murakami, Yukako. (2007), "Technology Spillover from Foreign-Owned Firms in Japanese Manufacturing Industry", *Journal of Asian Economics*, Volume 18, Issue 2, Pages 284-293
- OECD. (2003), Economic Survey – Canada, Paris: Organization for Economic Co-operation and Development
- Pack, H. and Saggi, K. (2001), "Vertical Technology Transfer via International Outsourcing", *Journal of Development Economics*, 65(2): pp 389-415
- Pasha, H. A., Pasha. A.G. and Hyder, K. (2002), The Slowing Down of the Growth of Total Factor Productivity in Pakistan, Social Policy and Development Centre, Research Report Number. 44
- Pasiouras, Fotios., and Sifodaskalakis, Emmanouil. (2007), "Total Factor Productivity Change of Greek Cooperative Banks", *University of Bath School of Management Working Paper Series*, 13, pp 1-22 <http://www.bath.ac.uk/management/research/papers.htm>
- Sasidharan, Subash. (2006), "Foreign Direct Investment and Technology Spillovers: Evidence from the Indian Manufacturing Sector", *UNU-MERIT Working Paper Series*, Number 2006-010, pp 1-29
- Sgard, Jerome. (2001), "Direct Foreign Investments and Productivity Growth in Hungarian Firms, 1992-1999", *CEPII Working Papers* No 2001-19, pp 1-33
- Solow, R.M. (1956), "A Contribution to the Theory of Economic Growth", *The Quarterly Journal of Economics*, 70(1), pp. 65-94

Sasidharan., Subash. and Ramanathan, A. (2007), “Foreign Direct Investment and Spillovers: Evidence from Indian Manufacturing”, *International Journal of Trade and Global Markets* Volume 1, Number 1: pp 5-22

Takii, S. (2005), “Productivity Spillovers and Characteristics of Foreign Multinational Plants in Indonesian Manufacturing 1990-95”, *Journal of Development Economics*, Vol. 76, pp. 521-542

Temenggung, Della. Yeannie. Arsyad. (2007), Productivity Spillovers from Foreign Direct Investment: Indonesian Manufacturing Industry’s Experience 1975-2000, presented at DEGIT Conference Papers from DEGIT, Dynamics, Economic Growth, and International Trade

Thangavelu, S, M., and Pattnayak, S, S. (2005), Linkages Spillovers and Foreign Ownership: Evidence from the Indian Pharmaceutical Firms, Paper Presented at the 32nd European Association of Research in Industrial Economics (EARIE) Conference

Tomohara, Akinori. and Yokota, Kazuhiko. (2006), “Does Foreign Direct Investment Benefit Domestic Companies via Increased Productivity: Horizontal, Backward, and Forward Linkages”, *Working Paper Series* Vol. 2006-07, pp 1-22.

Unden, Charlotta. (2007), Multinational Corporations and Spillovers in Vietnam - Adding Corporate Social Responsibility, Master’s thesis Institution of Economics, Lund University

Vernon, R. (1966), “International Investment and International Trade in the Product Cycle”, *The Quarterly Journal of Economics* 106, 190-207.

Wei, Y., and Liu, X. (2006), “Productivity Spillovers from R&D, Exports and FDI in Chinese Manufacturing Sector”, *Journal of International Business Studies*, 37(4), pp 544–557

- Yasar, Mahmut. and Paul, Catherine .J. Morrison. (2007), “Firms Performance and Foreign Direct Investment: Evidence from Transaction Economies”, *Economic Bulletin*, Vol 15, No 21 pp1-11
- Yudaeva, Ksenia., Kozlov, Konstantin., Melentieva, Natalya., and Ponomareva, Natalya. (2001), “Does Foreign Ownership Matter? Russian Experience”, *Working paper*, Number WP/2001/027, pp 1-42.