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

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CERTIFICATE

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Dedicated to

My Beloved Parents,

Esteemed Supervisor, Dr. Eatzaz Ahmad,

Valued Co-Supervisor, Ms Haleema Sadia,

&

Last but not the Least

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Table of Content

List of Tables and Figures

CHAPTER
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)]. Attracting foreign capital has become an essential part of development strategies among less developed countries. These strategies offer special incentives to foreign investors such as, tax holidays, tariff reductions or exemptions, and subsidies for infrastructure.[1] One of the main rationales for these incentives is the belief that domestic firms can benefit from the presence of foreign multinationals through productivity spillovers.

Foreign ownership is often mentioned as an important driver of productivity. 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. Productivity spillovers arise when the production level of one firm is influenced by the actions of other firms in the same or related industries. In general, foreign ownership typically supports the internationalization of products and, thus, spurs the trade openness of an economy. It also supports better diffusion of foreign technology. More 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

[1] In China foreign-invested firms are exempt from paying income tax for 2 years from the first profit making year and are allowed a 50% tax reduction thereafter for 3 years. For an overview of FDI in China, see Liu (2001).

studies such as Vernon (1966) and Caves (1974) suggest that foreign firms are more productive than their domestic counterparts. Also 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. These spillovers thus may have important impacts on the efficiency, productivity and competitiveness of firms, industries, and countries (particularly in middle and low-income countries). In addition, the presence of foreign firms in a country may increase competition in the local market. The competitive pressures force local firms to operate more efficiently and introduce new technology. Furthermore, foreign capital can provide financial sources, which are sometimes scarce in the recipient countries. Altogether, these aspects of foreign ownership are likely to improve the host country's long-term growth prospects [for details see Lim (2001) and OECD (2003)]. The net effects of foreign ownership in terms of positive productivity spillovers depends on the amount and form of entry of foreign capital, motives behind internal transactions and government policies of the host country.

However, sometimes domestic firms may be affected adversely by presence of foreign firm. According to Aitken and Harrison (1999) this possibility arises when more productive multinational enterprises (MNEs) steal the market share from less efficient domestic producers, which increases their average cost and, hence, reduces productivity. Moreover, competition over limited resources like skilled manpower and high technological gap between local and foreign firms also lead to negative spillover. There are also other costs associated with inflow of foreign capital, such as restrictive business practices by foreign firms (intra-firm trade[2], transfer pricing[3], and profit repatriation[4]). These costs are related to

[2] Intra-firm trade consist of trade between parent companies of a compiling country with their affiliates abroad

those developing countries where the governments forgo tax revenue collected on foreign capital inflows or provide high subsidies to foreign investors. Recent surveys of the literature provided by Gorg and Greenaway (2004) and Blomstrom and Kokako (1998) suggest that aggregate benefits of foreign investment that accrue to all types of domestic firms equally are not much evident.

In the context of foreign investment flows in developing countries, most of the research concentrated on the aggregate level impact of foreign capital. Some studies are conducted to analyze the real contribution of foreign capital, that is, the degree of improvement in productivity for the developing countries. But for Pakistan economy research has concentrated only on examining the link between foreign investment and economic growth. No attention has been paid on the impacts of foreign investment at the disaggregated level.[5]

The present study aims to fill this gap. The objective of the study is to examine the impact of foreign ownership on total factor productivity in two major sectors namely for Food and Tobacco, and Financial Business sectors of Pakistan.[6] The study uses annual data for 12 and 32 firms from Food and Tobacco, and Financial Business sectors respectively. These companies are listed either at Karachi, Lahore or Islamabad stock exchange. The data are taken from the annual reports of companies.

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and trade of affiliates under foreign control in this compiling country with their foreign parent group.

[3] Transfer pricing refers to the pricing of contributions (assets, tangible and intangible, services, and funds) transferred within an organization. This type of pricing is a major concern for fiscal authorities who worry that multi-national entity may set transfer prices on cross-border transactions to reduce taxable profits in their jurisdiction.

[4] Profit repatriation refers to return of foreign-earned profits back to the company's home country.

[5] 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.

[6] 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)].

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 spillovers included all aspects resulting from the presence of MNCs in a host country enhances technical efficiency of the domestic firms thus raising their 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*, random effects model 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.

To the best of our knowledge, no study at disaggregate level has been conducted for Pakistan's economy to analyze the impact of foreign ownership on firm level productivity. Worldwide most of disaggregated studies on the issue are conducted for manufacturing sector. But even across the world, evidence on the study of the impact of foreign ownership on the productivity in services sector is scant.

According to United Nations Conference on Trade and Development (2007), global foreign capital stock in the services sector contributes 48.34 % to the total investment of 1.8 trillion US dollars in 1990. In 2005 the service sector contributed 58.6% to the total investment of 10.5 trillion US dollars. Contribution of manufacturing sector decreased from 40% in 1990 to 28.5% of total investment in 2005. Also for Pakistan economy, contribution of services sector in foreign investment is growing significantly. Services sector attracted 57% of total foreign investment in Pakistan during 2007 that is higher than the previous year's contribution [Government of Pakistan (2007)]. These statistics suggest that just like in the world economy, Pakistan is also undergoing a surge of internationally connected service activities in trade and foreign investment. Moreover, share of manufacturing relative to services sector is declining. Although the service industries were traditionally treated as "non-tradable," it has now changed into the major driving force of globalization.

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

CHAPTER
2

Literature Review

2.1 Introduction

This chapter presents a detailed overview of the theoretical and empirical literature on the impact of foreign capital on total factor productivity (TFP). Despite voluminous research, the nature and extent of the impacts of foreign investment on TFP in the host countries remain an unsettled issue. Some studies find that foreign presence has a positive impact on the firm's productivity, while other studies find out no evidence or a negative effect. Mixed evidence suggests that rather than being an automatic process, productivity spillovers from foreign ownership depend on local firms and host country specific characteristics. In addition, Gorg and Strobl (2001) show that there are several problems in the research design that might lead to different results, such as, the utilization of cross-section versus panel data techniques, the model specification used to explain the productivity spillovers effect of foreign ownership and the variables used as the proxy for foreign presence. The following sections present the brief overview of the both sector, major theoretical and empirical literature.

2.2 Overview of Food and Tobacco Sector

During 2000 with bumper rice and wheat crops, and a considerable increase in fishing, the supply position of these food items noticeably improved. On the other hand, supply constraints on sugar, edible oil, and pulses, were mostly on account of a fall in the production of sugarcane, pulses, vegetable ghee and cigarettes, that leads to a growth of -23.6%. Large-scale manufacturing staged a strong recovery with 8.4% growth during 2001. This was

driven by a sharp turn around in food and tobacco, which had been showing negative growth in production during the last two years.

Against a robust growth of 18.2% last year, output of the food and tobacco group increased by 8.2% during 2002. The major item that recorded an output decline in this group was vegetable ghee, while growth in the production of sugar remained lower (at 9.8%) relative to the 21.7 percent growth in 2001. The increase in domestic sugarcane supplies during 2002 provided a boost to the output of sugar even over the high production in 2001. Despite a significant 13.5 percent increase in sugar production, growth in the production of food and tobacco sub-group remained lower (6.6%) during 2003, compared to 2002. This was mainly due to a sharp decline in the production of vegetable ghee, cigarettes (6.8, 10.4 and 7.3% respectively). Significant improvement was evident in the food and tobacco sub-group of LSM, which reflected acceleration in growth to 15.7% during 2004 compared to the low growth of 6.6% in 2003. This improvement was mainly due to an increase in the production of vegetable ghee, sugar, cigarettes, cooking oil.

The food and tobacco sector, which has a 19.1% share in the LSM industries, witnessed a 2% fall in production during 2005 as against a rise of 13.5% in the preceding year. Three food sub-sectors of LSM particularly registered a decline in production in 2005 in contrast to only one group during the previous year. This decline was mainly due to the fall in the production of food sub-group especially sugar industries and a lower growth recorded by the vegetable and cooking oil sub-sector, which together account for about 69.6 percent weight in food group.

During 2006, the production of sugar declined by 5.0 percent as against the targeted decline of 3.2%. Production in the food and tobacco sector also accelerated in 2007. Growth in the sector received a significant impetus from the robust sugarcane and wheat harvests (that underpinned the remarkable recovery in sugar industry and acceleration in wheat and grain milling), satisfactory performance of food and tobacco industry and significant FDI inflows.

2.3 Overview of Financial Business Sector

We provide brief overview of banking and non-bank financial institutions (NBFIs) as our analysis only deals with banking and non-banking firms of the Financial Business sector.

Banking Sector Performance during 1990s

During 1990s, total assets of banking sector grew at a compound annual growth rate of 14.4%, from Rs 426 billion at the beginning of decade to Rs 1,641 billion by the end of 2000. However, the growth trend indicated a structural break at the end of 1997. Specifically, annual average growth in the first period, up to 1997, was in double digit at 17.8% and decelerated to 7% in the last three years. Higher growth in the first phase was spurred by the entrance of new banks in the private sector and permission for residents to open foreign currency accounts. It is, however, important to note that the financial performance of private and foreign banks was far better than that of overall banking industry, especially before the freezing of foreign currency accounts in May 1998.

Banking Sector Performance during 2000-2005

Benefiting from the ongoing reform process and strengthening of macroeconomic fundamentals, Pakistan's banking system witnessed visible improvements in size, structure, outreach and financial health during 2001-2005. Assets of the banking sector registered

almost a three-fold increase to reach at Rs 3.7 trillion in 2005, up from Rs 1.8 trillion in 2000; showing a robust average annual growth rate of 15.2% that out-paced the growth in nominal GDP during the period under review. As a result, the banking sector's assets to GDP ratio jumped from 47.2% in 2000 to 55.6% in 2005; which was in sharp contrast from the declining trend in banks' assets to GDP ratio during the second half of the 1990s.

Performance of Non-bank Financial Institutions during 1990s

Financing activities of NBFIs registered a healthy growth in 1990s, except for last three years. Deposits mobilized by NBFIs were 2.6% of GDP in 1990, which increased to 5.2% in 1997. This rapid growth, however, witnessed sharp reversal for the rest of the decade, as deposits to GDP ratio declined to 2.9% in just three years. This was mainly attributed to overall economic slowdown along with freezing of foreign currency accounts.

Performance of Non-Bank Financial Institutions during 2000-2005

During 2000-2005, NBFIs have transformed rapidly through restructuring and improved supervision. Regulatory policies focused on consolidating weak institutions, resulting in a large number of mergers and acquisitions, which in turn, lead to a decline in the number of NBFIs. However, asset growth has largely remained intact as the total asset base of NBFIs has increased at an average annual growth of 11.2 percent. The strong growth of mutual funds and leasing companies mainly contributed in the overall expansion of the NBFIs' business.

2.3 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. Dependency theorists

argue that the First-World nations become wealthy by extracting labor and material resources from the Third-World. Moreover, developing countries are inadequately compensated for their labor and natural resources. [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 the 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.

In addition, Sasidharan (2006) considers foreign investment as the best means to keep control over the technological knowledge. Since the technology has the characteristic of a public good, a part of the technology spills from the foreign firms to the domestic firms. The spillovers can be in the form of improvement in the productivity of the domestic firms. This is neo-classical view on spillover effects.

Generally productivity spillovers take place when the entry or presence of foreign firms leads to productivity or efficiency benefits to the firms located at host country. The arrival of a multinational firm in a host economy potentially raises the demand for labor and other factors, thus raising factor incomes. Foreign firms also crowds inefficient domestic firms out

of the market by bidding away resources and capturing the market share from these firms. It generates spillovers, which may raise or lower the productivity and hence profitability of domestic firms. To compete in foreign markets, where local firms have better knowledge of local markets, consumer preferences, and business practices, MNEs must enjoy some other specific advantages, such as superior managerial expertise or technological capabilities.

An important reason for productivity spillover from MNEs is that the technologies used by multi-national are not always available in the market before the arrival of MNEs. Abstracting from the fact that the several means of extracting technology rents may occur simultaneously in reality, we can assume that the MNCs have three alternative ways to exploit their technological advantage internationally. These MNCs can produce for exports in the home country, they can sell their technology to foreigners or they can establish affiliates abroad and control foreign production directly.

The literature on technology transfer essentially overlaps with the MNCs literature in general. However, the focus in that literature is not on the spillover effects to host industries but on the phenomenon of technology diffusion itself, i.e., the cost of transfer; alternative channels of transfer such as imitation, licensing, foreign direct investment, foreign trade; the strategic decision of internationalization of production, or licensing, technological agreements, research and development (R&D) activities, innovatory capacity of MNCs, etc. All of these issues are directly or indirectly related to spillovers. The existence of positive spillover effects on domestic firms in all of these works are the main presumption, even though the literature does not explicitly address that point. So, given the objective of our

work, we will exclude this strand of literature and will focus only on the literature that is directly relevant to the productivity spillover effects of foreign ownership.

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.

Another study by Findlay (1978) models technological spillover from foreign capital, which is in the form of contribution of the presence of foreign capital to the capital formation in domestic economy. In this model the productivity spillover to domestic economy is a by-product process of the presence of foreign capital.

According to Blomstrom and Kokko (1998), the existing literature does not explicitly address the question of spillover effects but it contributes to our knowledge in a number of ways. Firstly, MNCs may improve allocative efficiency through the effects on market structure in host country. Secondly, transfer of technical efficiency via MNCs affects the level of competition and new vintage technology in host markets. The study also state that formal modeling is very scarce in this early literature and the contributions by formal modeling accelerated towards the end of 1970s.

The insights provided by the above models constitute a theoretical ground for analyzing productivity spillovers from the industrial activity of foreign firms. This discussion also shows that these spillovers are materialized in the form of a variety of mechanisms. The

summary in Blomstrom and Kokko (1998) outlines these mechanisms. The spillover effects from the foreign ownership can be broadly classified into horizontal (intra-sectoral) and vertical (inter-sectoral) spillover. Such spillovers have the potential to raise productivity and their exploitation might be related to the structural characteristics of the host economy, in particular absorptive capacity. Models of both horizontal and vertical multinational activity provide a natural explanation of why foreign firms are more productive than those that only serve the domestic market.

Horizontal Spillovers

Horizontal Spillover (also known as sectoral or intra-industry 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 can be summarized as follows.

a) Demonstration 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 market by inspiring the technologies brought by MNCs. Das (1987) presents a model to analyze the transfer of technology from the parent firm to its subsidiary in the host country. The model recognizes that local firms learn from the multinational enterprises (MNEs) and become more efficient. However, the increase in the efficiency among local firm is assumed to be exogenous and, therefore, costless to them. The model

recognizes that the MNE affiliates are aware of the technology leakage and determine their technology transfer behavior based on this recognition. Yet the behavior of local firm is still not explicitly taken into considerations.

Wang and Blomstrom (1992) develop a model in which international technology transfer through MNCs emerges as a Nash equilibrium phenomenon, resulting from the strategic interaction between foreign subsidiaries of MNEs and host country firms. The model explicitly recognizes the cost of transferring technology within MNEs and learning cost of the host country firms, and treats technology transfer in a game theoretic context where local firms and policies affecting their behavior play important roles in the technology transfer process. The most interesting implication of Wang and Blomstrom model is that technology transfer through foreign investment is positively related to the level of local firm's learning capacity. In addition, the model suggests that multinational respond to local competition by introducing newer technologies more rapidly in the host country.

b) Labor Turnover

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.

Fosfuri *et al.* (2001) build a model in which productivity spillovers arise due to labor mobility. Productivity spillovers arise when the trained worker is hired by the local firm. The

study finds that productivity spillovers do not occur if the joint profit of the MNEs and local firm is highest and MNEs can use the technology as a monopolist. The implication is that one should expect higher labor mobility and more spillovers when local firm can operate in markets for product which are unrelated or complimentary to the products of MNEs. The study also indicates that spillover is likely to happen, when on-the-job training is general rather than specific or the absorptive capacity of the local firm is high.

c) Competition Effects

The 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. MNCs usually enter markets that are highly concentrated. The main characteristic feature of such markets is the high entry barrier created by few domestic firms. In such a scenario, the entry of foreign firms forces the domestic firms to become more efficient, thereby reducing the market concentration.

Competition effect can be negative. 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". The study shows that foreign firms actually divert demand from the domestic firms. Therefore in the short run, the

productivity of the domestic firms declines. This stealing has negative effects on domestic firms' productivity by forcing them up their average cost curve.

Vertical Spillovers

Vertical spillover (also known as inter-sectoral 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.

Pack and Saggi (2001) conduct a theoretical study of vertical technology transfer by multinationals. In the case of vertical multinationals, the affiliate may produce through upstream/backward linkages or downstream/ forward linkages. In practice, multinational activity may involve elements of both, as when the affiliate produces at the same stage of production as the parent firm but uses headquarter services from the parent, including marketing, management, distribution and product-specific R&D.

The 'backward-forward' linkages are related to the input-output structure of the industry. These linkages are then directly related to market access spillovers. In the presence of high returns, foreign presence may allow local firms to overcome market-size constraints, making it easier to overcome the potentially high fixed cost of producing certain goods.

Rodriguez-Clare (1996) documents 'backward' (upstream in the production chain) effects of spillover. These effects arise if local firms furnish intermediate goods to foreign firms. This kind of effect is more important if 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. Furthermore, the quality standards required by multinational companies may have indirect effects by revealing to local firms the need to adapt to new standards.

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' (downstream in the production chain) 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. Moreover, linkages are likely to increase over time, as the skill levels of local entrepreneurs grow, new suppliers are identified and local content increases.

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.

2.5 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. Haddad and Harrison (1993) examine the effects of foreign presence on the relative productivity of local firms. The study uses firm level panel data from an annual survey of all the manufacturing firms in Morocco covering the period from 1985-1989. The study compares firm-level productivity with the best practice firm in the industry and finds no

evidence of spillover. However, local firms are able to capture positive spillovers related to foreign presence if they have sufficient technological ability to do so.

Ito (2002) finds the productivity differentials between foreign and local establishments in the Indonesian automobile industry. The study uses the establishment-level data for 1990-1999 collected by the Central Bureau of Statistics of Indonesia. The results suggest that when foreign establishments enlarge in size, they enjoy higher labor productivity and, hence, pay higher wages than local ones. In addition, foreign establishments show a higher import ratio than local ones. However, the study does not support the earlier findings that the foreign plants enjoy higher TFP.

In another study for Indonesia, productivity spillovers derived from the existence of foreign multinational plants are examined by Takii (2005). The study uses data from manufacturing industry over the period 1990–1995. The author also investigates the relationships among the magnitude of spillovers and characteristics of foreign-owned plants. The study shows existence of positive spillovers, but results also indicate that greater presence of majority or wholly foreign plants reduce the magnitude of spillovers to domestics firms. In addition, if technological gap between foreign and locally owned plants are large then the magnitude of spillovers from foreign multinational plants to domestic firms tends to be smaller.

Yet in another study, taking the long panel dataset for Indonesian manufacturing industry from 1975-2000, Temenggung (2007) examines the issue of productivity spillovers and foreign ownership. The results show positive and significant productivity spillovers for the whole sample period. Furthermore, local firms in labor intensive and low technology industry receive positive spillovers from foreign firms. But the local firms in high technology and

capital intensive sector either do not receive any significant spillovers or receive negative effect due to increase in competition with foreign firms.

Using the longitudinal data is used over period 1983-2000, Taymaz and Lenger (2004) investigate productivity spillover from MNCs to the Turkish manufacturing industry. The study differentiates among the spillover effects from MNC activities with respect to time, ownership structure, size categories and R&D profile of industry. The study provides no evidence for positive spillover effect from the activities of MNCs. However, market share of foreign firms is found to capture both demonstration and competition effects, but negative competition affects out weigh the positive demonstration effects.

Javorcik (2004) analyzes the impact of foreign investment on productivity of domestic firms through backward linkages. The study considers unbalanced firm level panel data covering the period 1996-2000 for Lithuanian enterprises. The findings suggest that productivity spillover has been taking place through backward linkages. However, these benefits are associated with partially but not fully-owned foreign projects. The study finds no evidence for intra-industry spillover.

Using panel data over the period of 1987-1996 for the Nigerian Agro/agro-allied sector, Ayanwale and Bamire (2004) analyze linkage between the firm level productivity and foreign capital. The study shows that productivity level of foreign firm is higher than that of the domestic firms. The results indicate positive and significant spillover effect at firm level. Also, larger foreign firms are more export oriented and employee more worker.

Covering the period 1994-1999 for Estonia, Sinani and Meyer (2004) investigate the impact of technology transfer from MNCs on the productivity of domestic firms. The study uses panel data techniques and finds positive effect of technology transfer on the productivity of domestic firms. However, the magnitude of the spillover effect depends on the characteristics of incoming foreign capital and the recipient local firms. In addition, spillovers vary with the measurement of foreign presence, recipient firm's size, structure of ownership, and trade orientation.

Analyzing the aggregated as well as industry level disaggregated flows of foreign investment from USA and Japan to a sample of developing countries, Lemi (2004) examines the effects of foreign investment on host country productivity, value added and exports during the period 1989-1998. The sample of host countries is taken from Africa, Asia, and Latin America. The results show that foreign investment flows have negative spillover effect on productivity of host country. The results also indicate the positive effects of foreign investment on value added and exports of host countries.

Using plant-level panel data over the period 1998-2004, Hsieh (2006) measures the effect of foreign ownership on TFP in Chinese manufacturing sector. The study finds that foreign-owned firms are more productive than domestic firms within manufacturing industry. The results also provide a positive but insignificant evidence for the impact of foreign presence on the average productivity of domestic firms. Nevertheless, with respect to size, large domestic firms appear to benefit more significantly from the presence of foreign firms than the small domestic firms.

Similarly in another study for Chinese manufacturing sector, Abraham *et al.* (2006) determine the direct and indirect effects of foreign ownership. The study uses panel data of more than 10,000 plants over the period 2002-2004. The study provides three major results. First, the structure of ownership and absorptive capacity of plant is an important determinant of the incidence of spillover. Second, significant differences exit between the performances of foreign owned firm and domestic owned firms. Third, the hypotheses that the smaller the distance to the frontier, the more the firm is able to benefit from the presence of MNCs within industry is supported.

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. Furthermore, the horizontal and backward spillovers operate only in small foreign share industry.

The presence of productivity spillovers to domestic firms through backward and horizontal linkages for India is examined by Thangavelu and Pattnayak (2005). The study utilizes panel data for 200 firms taken from pharmaceutical industry over the period 1989-2000. The results show positive and significant horizontal spillover to the domestic firms. However, the study also finds negative and significant spillovers from the backward linkages with foreign firms, which suggest the possibility of large technology and efficiency gap between local and foreign firms.

Petkova (2007) conducts another study for Indian manufacturing sector to analyze the relationship between firm productivity and the foreign ownership. Firm level panel data is used for 9500 companies covering the period 1988-2006. The study generalizes that even in the absence of any spillover effects there are still potential productivity gains form foreign ownership.

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.

Gachino (2007) uses panel data to examine the effect of foreign presence on firm level productivity on Kenyan manufacturing industry over the period of 1994-2001. Appling both traditional and recent development in productivity measurement techniques the study shows no evidence of productivity spillover through foreign presence in the sector.

Konings (2000) shows the effect of foreign investment on the performance of firms in three emerging market economies namely Bulgaria, Romania and Poland. The study uses unbalanced panel data covering the period 1993-1997 by taking 1400, 1800, and 26000 firms for Bulgaria, Poland, and Romania respectively. By employing fixed effects model, the study indicates that foreign firms perform better than domestic firms and the TFP increases with the change in foreign participation in the domestic firms. Moreover, the study finds no evidence of technological spillover to Bulgaria and Romania and negative technological spillover to Poland.

Melentieva (2000) explores the effect of foreign ownership on firms' productivity in Russia. The results indicate that foreign-owned firms are characterized by higher productivity than domestic establishments. The analysis also shows that the impact of foreign ownership on productivity does not differ significantly by the size of the foreign share. However, it depends on other factors such the as size of the domestic firms, the level of economic reforms, and the level of education in the region.

Likewise, Yudaeva *et al.* (2001) conduct a comparative study of firm productivity for domestic and foreign owned firms for Russia. The study employs data over the period 1992-1997 and finds that foreign owned firms are more productive than domestic owned firms. Any difference between productivity of foreign and domestic firms depend on the development level in the region. The study also shows positive spillover from foreign owned firm to domestic owned firm within the industry, and negative spillover to domestic firms that are vertically related to foreign owned firms.

An unbalanced database of enterprises is used by Sgard (2001) to assess the relationship between foreign investment and TFP in the level and growth terms in the Hungarian firms over the period 1992-1999. The study shows that foreign owned firms have higher productivity and they produce substantial positive spillover effects on local firms in the sector. Moreover, domestic firms that are located in developed region get most of the benefits associated with foreign investment.

Schoors (2007) analyzes the horizontal and vertical productivity spillovers for a panel of Romanian firms. The study finds that the level of technology, the degree of foreign

ownership, and the size of local firms play important roles in determining the nature and extent of spillovers. The results show that horizontal labor market spillover is especially beneficial when foreign owned firms employ local labour. Moreover, the vertical spillover is economically more significant than horizontal spillover. The study also explores that on average Romanian firms enjoy significant positive productivity spillover at the initial level of technology.

An early study by Globerman (1979) investigates the productivity spillover benefit to Canadian manufacturing industries employing the methodology and specification as given in Caves (1974). 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.

Backer and Sleuwaegen (2002) analyze the contribution of foreign subsidiaries and domestic firms to productivity growth in aggregate Belgian manufacturing industry. The study uses firm-level data covering the period 1990-1995. The results show that foreign firms contribute excessively to aggregate productivity growth. Moreover, the study shows that foreign ownership is an important source of firm heterogeneity affecting the productivity dynamics.

Based on the sample of 3742 manufacturing firms, Dimelis and Louri (2004) identify the effects of foreign investment and technology spillover for Greece economy. The study shows that subsidiary firms exhibit higher productivity but no spillover to domestic firms. Furthermore, positive spillovers occur only from small foreign firms to small domestic firms. Karpaty (2005) identifies the relationship between foreign acquisition and productivity. The study uses data from Swedish manufacturing industry over the period of 1986-2002. The

results indicate that foreign ownership has positive and significant effect on the firms' performance. In addition, foreign acquisition increases the productivity of Swedish firms, but this productivity effect does not occur immediately, it takes place some year after the acquisition takes place.

For the UK manufacturing industry, Liu *et al.* (2000) examine intra-industry productivity spillover from foreign ownership over the period 1991-1995. The study uses common effects, fixed effects, and random effects estimation. Fixed effects model provide the best specification. The results indicate that the productivity in UK-owned firms is determined by their capital intensity, learning efforts, technological capabilities, the very presence of foreign firms and the existing level of technological competence of local firms relative to that of foreign firms. The evidence suggests that multinational enterprises do generate positive spillover in the UK industries. The study also supports the proposition that industry in which technological gaps between local and foreign firms are small, experience the most intensive positive spillover effects.

Harris and Robinson (2002) provide additional evidence for the UK's manufacturing industry to measure the indirect impact of foreign investment on TFP of domestic plants by using standard production based approach. The study uses data over the period 1974-1995. The results show no clear picture of productivity spillover within and between industries. The study concludes that there is no clear evidence of overall beneficial effects from foreign investment.

Similarly Girma *et al.* (2007) investigate the productivity spillovers from foreign ownership. The study uses firm level panel data for the UK's manufacturing industries covering the

period 1992-1999. The study explores spillovers through horizontal, backward and forward linkages. Also, the study differentiates between spillovers from export oriented vs. domestic market oriented foreign investment. The results find positive horizontal spillovers only from export oriented multinationals. However, domestic market oriented MNEs generate positive spillovers through forward linkages for both domestic exporters and domestic non-exporters. Moreover, domestic exporters gain from backward linkages with export oriented multinationals.

To investigate whether the entry of foreign-owned firms has positive effect on domestic firms' productivity growth, the firm-level panel data are used by Murakami (2007) for Japanese manufacturing sector over the period 1994-1998. The result shows that an increase in foreign firms' share in an industry lowers the TFP growth rates of domestic firms in short run. This implies that entry of foreign firms has an adverse effect on the share, cost and profitability of domestic firms. However, in long-run the entry of foreign-owned firms has positive effect on the productivity of local firms as a result of technology spillover. In addition, foreign firms bring competitive pressure that forces Japanese firms to raise their productivity growth with a high level of technological capabilities.

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 form foreign investment for the developing economies. However, most of the studies conducted for developed and European economies suggest strong evidence in favor of potential horizontal and especially vertical spillover effects and growth in TFP resulting by foreign ownership. Moreover, local firms' technological capability, R&D profile, size of the

domestic firm, improvement in economic reforms, level of education and development level in the region are also important factors that may affect the productivity spillovers. 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.

CHAPTER
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. Initially we chose three major sectors that account for 67% of the foreign investment in Pakistan [Government of Pakistan (2007)].[1] However, this choice was constrained by the data availability.[2] So we had to restrict the analyses to Food and Tobacco and Financial Business sectors. We start with basic framework of production function pioneered by Caves (1974).

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. This approach includes both operating and interest expenses as inputs, and the loans and other major assets as outputs. 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.[3]

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

[1] Communication, Financial Business and Food & Tobacco sectors contribute34.2%, 21%, and 11.8% to total investment respectively during the year 2006-2007.
[2] We dropped Communication sector for our analysis due to non availability of data, mergers of major firms, and the limited number of listed firms.
[3] Berger and Humphrey (1997), Fixler and Zieschang (1999) and Pasiouras and Sifodaskalakis (2007) provide details on the banking sector productivity and measurement of output.

suitable when the focus is on bank's profitability.

Econometric Specification

Our main issue is to analyze the effect of foreign ownership on total factor productivity (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 at time t

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

E_{it} = Energy input used in the i[th] firm at time t

M_{it} = Raw Material used in the i[th] firm at time t

TFP_{it} = Total factor productivity of the i[th] firm at time t

$OD1_{it}$ = Ownership dummy for i[th] small foreign firm at time t

$OD2_{it}$ = Ownership dummy for i[th] large foreign firm at time t

FPS_t = Foreign presence in the sector at time t

FS_{it} = Size of the i[th] firm at time t

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

$$\ln(Y_{it}) = \ln A + \alpha_1 \ln(L_{it}) + \alpha_2 \ln(K_{it}) + \alpha_3 \ln(E_{it}) + \alpha_4 \ln(M_{it}) + \varepsilon_{it} \quad (3.1)$$

$$\ln(Y_{it}) = \ln A + \beta_1 \ln(L_{it}) + \beta_2 \ln(K_{it}) + \beta_3 \ln(E_{it}) + \varepsilon_{it} \quad (3.2)$$

Assuming constant returns and, hence, imposing the condition $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 1$ in equation (3.1) and $\beta_1 + \beta_2 + \beta_3 = 1$ in equation (3.2), the above production functions can be written in intensive form. We get intensive form equations (3.3) and (3.4) by rearranging equations (3.1) and (3.2) respectively. Following equation will be estimated for Food and Tobacco sector;

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \ln A + \alpha_2 \ln\left(\frac{K_{it}}{L_{it}}\right) + \alpha_3 \ln\left(\frac{E_{it}}{L_{it}}\right) + \alpha_4 \ln\left(\frac{M_{it}}{L_{it}}\right) + \varepsilon_{it} \tag{3.3}$$

For Financial Business sector, we will estimate following equation;

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \ln A + \beta_2 \ln\left(\frac{K_{it}}{L_{it}}\right) + \beta_3 \ln\left(\frac{E_{it}}{L_{it}}\right) + \varepsilon_{it} \tag{3.4}$$

Equations (3.3) and (3.4) are more appropriate for estimation as compared to equations (3.1) and (3.2). 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.

TFP will be calculated by applying by employing Solow (1956) residual approach for each sector. We get TFP equation (3.5) for Food and Tobacco sector by rearranging equation (3.3) and then applying antilog on both sides as follow;

$$TFP_{it} = A + \varepsilon_{it} = \exp\left[\ln\left(\frac{Y_{it}}{L_{it}}\right) - \alpha_2 \ln\left(\frac{K_{it}}{L_{it}}\right) - \alpha_3 \ln\left(\frac{E_{it}}{L_{it}}\right) - \alpha_4 \ln\left(\frac{M_{it}}{L_{it}}\right)\right] \quad (3.5)$$

Similarly TFP equation for Financial Business sector (that is equation 3.6) is extracted from equation (3.4) as follow;

$$TFP_{it} = A + \varepsilon_{it} = \exp\left[\ln\left(\frac{Y_{it}}{L_{it}}\right) - \beta_2 \ln\left(\frac{K_{it}}{L_{it}}\right) - \beta_3 \ln\left(\frac{E_{it}}{L_{it}}\right)\right] \quad (3.6)$$

We will regress the TFP calculated in equations (3.5) and (3.6) 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 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. In line with Wei and Lui (2006) and Unden (2007), the coefficients of ownership dummies ($OD1_{it}$ and $OD2_{it}$) can take either positive or negative value. 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. 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. These economies of scale help them to improve their productivity.[4] 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.

[4] Economies related to scale are increased specialization, indivisibility of plants, technical, marketing, and financial economies, trained and skilled workers and disintegration.

As a result, small firms may be unable to improve productivity. If market is populated with large number of inefficient small or medium sized firms, overall productivity of the firms can not improve. 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.

$$TFP_{it} = \gamma_0 + \gamma_1 OD1_{it} + \gamma_2 OD2_{it} + \gamma_3 \ln(FPS_t) + \gamma_4 \ln(FS_{it}) + \mu_{it} \qquad (3.7)$$

Equation (3.7) will be estimated by applying Random Effects model for each sector.

CHAPTER
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 variables considered for our analysis include output, capital, labor, energy, raw material, ownership dummies, foreign presence at sector level and firm size.

The data on output (Y) are taken from Profit and Loss accounts of companies' annual report. 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. These changes in sales during a year are incorporated by adding net change in stocks and spare items (inventory) into sales of the company.

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 deposit and lending services banks charge fees and interest rates respectively. In order to recover costs associated with these services banks may either charge higher fees, or higher interest margins, or more likely can use some combination of fee charges and interest income. 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 repots. Data on energy input are taken from the section on Administrative Expenses of annual report. Data on capital are taken from the Balance Sheet given in annual report.

For Food and Tobacco sector, output is deflated by food and tobacco price deflator and raw material is deflated by raw material price deflator. Capital and energy are deflated by building material price deflator, and fuel and lighting price deflator respectively for both the sectors. Data on price deflators are taken from State Bank of Pakistan's publication *Handbook of Statistics on Pakistan Economy* (2005).

Nominal output of Financial Business sector is deflated by Finance and insurance deflator. We construct finance and insurance price deflator (FIPD) as follow;

$$FIPD = \frac{GDP\ of\ finance\ and\ insurance\ \text{sec}tor\ at\ currrent\ \text{cos}ts}{GDP\ of\ finance\ and\ insurance\ \text{sec}tor\ at\ cons\text{tan}t\ \text{cos}ts}$$

Data on GDP for finance and insurance sector are taken from State Bank of Pakistan's publication *Handbook of Statistics on Pakistan Economy* (2005).

The data for ownership are 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.[1] Ownership dummy $OD1_{it}$ takes value equal to 1 if foreign

[1] For details see Falzoni (2000).

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.[2] 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 ith 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;

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

where

n = Number of firms in the industry.

L_{it} = Number of workers in ith firm at time t

L_{jt} = Number of workers in jth 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

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

Table 4.2

List of Selected Companies for Financial Business Sector

S. No	Companies	Identifier	No of Observations (Period)
1	Orix Leasing Pakistan Limited	OLP	13 (1995-2007)
2	First Capital Securities Corporation Limited	FCS	13 (1995-2007)
3	Al Faysal Investment Bank Limited	AFIB	11 (1996-2006)
4	Pak-Gulf Leasing Comp Limited	PGL	11 (1997-2007)
5	Bank AI-Falah	BAF	10 (1997-2006)
6	United Bank Limited	UBL	10 (1997-2006)
7	First Fidelity Leasing Modarabah	FFLM	8 (2000-2007)
8	Capital Assets Leasing Corporation Limited	CAL	8 (2000-2007)
9	Al-Mal Securities & Services Limited	AMS	8 (1996-2003)
10	Trust Securities & Brokerage Limited	TSBL	8 (1996-2003)
11	InterAsia Leasing Company Limited	IAL	8 (1995-2002)
12	Network Leasing Corporation Limited	NL	8 (1996-2003)
13	Saudi Pak Leasing Company Limited	SPL	8 (1996-2003)
14	Orix Investment Bank Pakistan Limited	OIB	7 (1997-2003)
15	Asian Leasing Corporation Limited	AL	7 (1996-2002)
16	Crescent Leasing Corporation Limited	CL	7 (1996-2002)
17	Pakistan Industrial Leasing Corporation Ltd	PIL	6 (1996-2001)
18	Security Leasing Corporation Limited	SL	6 (1996-2001)
19	Universal Leasing Corporation Limited	ULC	6 (1996-2001)
20	Muslim Commercial Bank Limited	MCB	6 (1996-2001)
21	Metropolitan Bank Limited	MBL	6 (1996-2001)
22	Prime Commercial Bank Limited	PCB	6 (1996-2001)
23	Askari Commercial Bank Limited	ACB	5 (1996-2000)
24	Sigma Leasing Corporation Limited	SLC	5 (1997-2001)
25	English Leasing Limited	EL	5 (1996-2000)
26	Security Investment Bank Limited	SIB	5 (1996-2000)
27	Soneri Bank Limited	SB	5 (1996-2000)
28	Pakistan Industrial Credit & Investment Corporation Limited	PIC	5 (1996-2000)
29	Grays Leasing Limited	GL	4 (1998-2001)
30	Arif Habib Securities Limited	AHS	4 (2000-2003)
31	Union Leasing Limited	UL	4 (1998-2001)
32	Meezan Bank	MB	4 (2003-2006)

For extracting TFP equation (3.3) and (3.4) in chapter 3 are estimated by Pooled Least-Square method. For analyzing the impact of foreign capital and other control variables on TFP, equation (3.7) in chapter 3 is estimated by Random Effects Model. Since we selected random sample for our analysis, hence choice of Random Effects Model is justified. We also applied Hausman's (1978) Specification test. The test results also favor the Random Effects model over the Fixed Effects model. The model has several advantages as it allows us to account for the unobservable heterogeneity and unobserved time invariant factors which might affect productivity. Random Effects approach replaces the firm specific intercept by firm specific disturbance term. Thus the residual term for random effects can then be expressed as $\mu_{it} = \theta_i + \varepsilon_{it}$. The component θ_i is the random disturbance characterizing the i^{th} observation and is constant through time that captures the firm specific effects.

CHAPTER 5

Results and Discussion

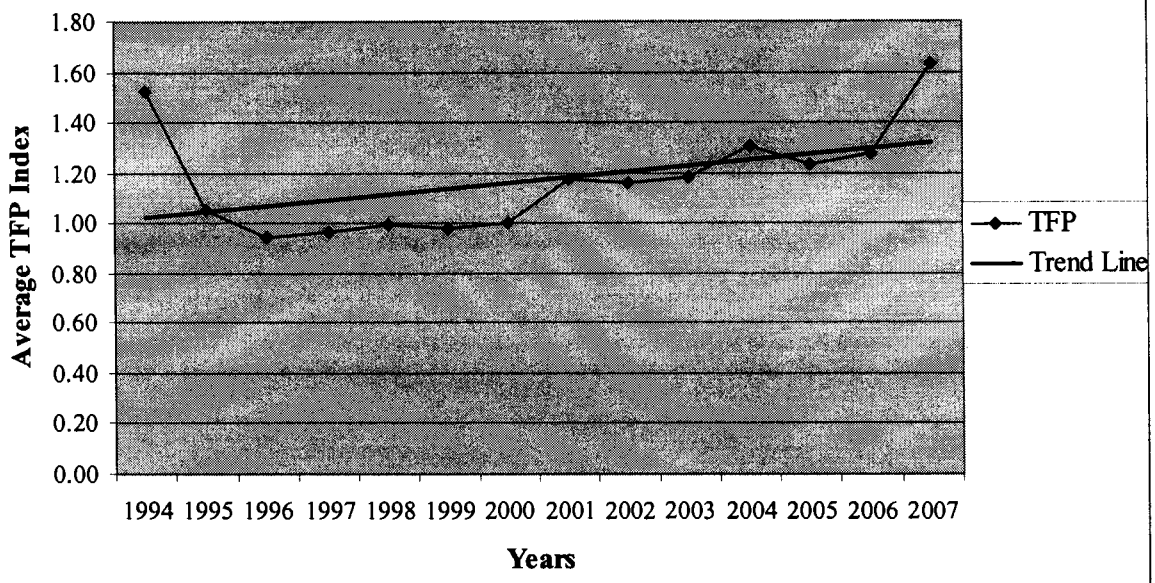
The analysis is based on pooled data for the sample of 32 firms in Financial Business sector covering the period 1995-2007 and 12 firms in Food and Tobacco sector covering the period 1994-2007. We estimate the Cobb-Douglas production functions separately for the Financial Business and Food and Tobacco sectors by using Pooled Least-Square method. Total factor productivity (TFP) is extracted from the estimated production functions. TFP is then regressed on a set of variables for analyzing the impact of foreign ownership on TFP in each sector.

The results for Cobb-Douglas production function estimation for both the sectors are reported in Table 5.1. The second column of the table presents the results for Food and Tobacco sector. The estimated coefficient of capital per worker, energy per worker and raw material per worker are positive and statistically significant at 1% level of significance. The results for Financial Business sector are displayed in the third column. The results show positive signs for the coefficient of capital per worker, and energy per worker. Here again all the coefficients are statistically significant at 1% level of significance. These estimation results are used to extract the TFP for both the sectors by applying Solow residual approach as shown by equations (3.5) and (3.6) in chapter 3. The Same approach has been used by Javorcik (2004), Abraham *et al.* (2006), Wei and Lui (2006), Tomohara and Yokota (2006) and Gachino (2007).

The bottom part of Table 5.1 reports sample size, number of firms, R^2, Durbin-Watson stat

and Tobacco sector of Pakistan economy. During 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 utilization 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 exports[1], and decline in vintage capital.[2]

Figure 5.1
Average TFP Index of Food and Tobacco Sector of Pakistan



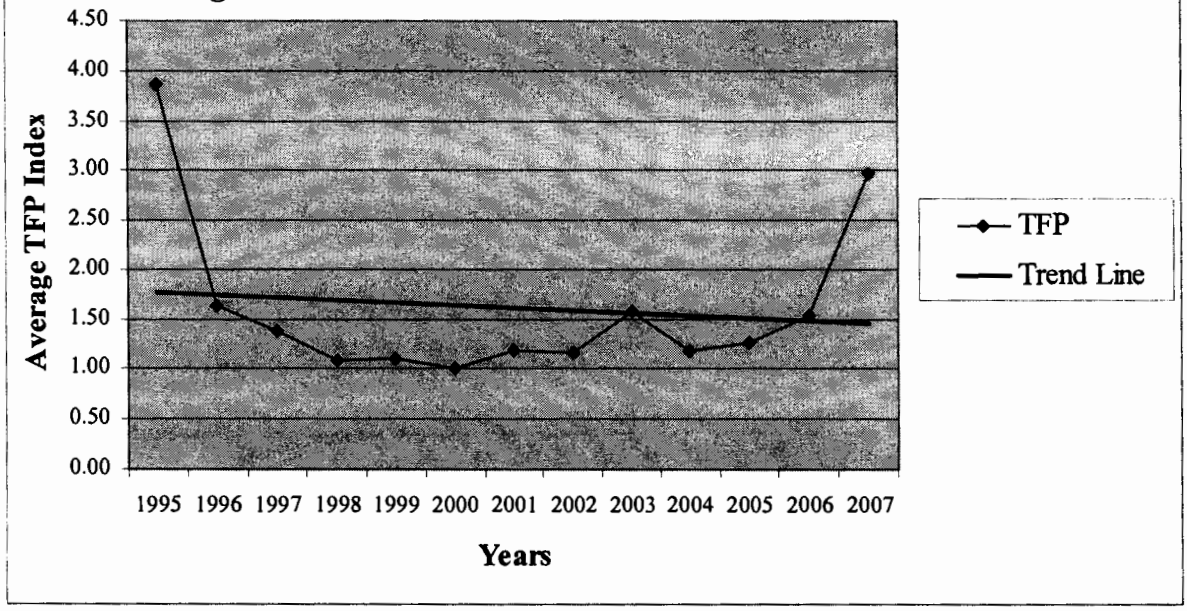
During the 2000-2007 improvement in manufacturing exports enhanced TFP of the sector. Moreover, private investment increased in the sector, which led to better technology and hence improved TFP of the sector.

[1] Pasha *et al.* (2002) used manufacturing exports variable to capture the effect of exposure to foreign competition on TFP in manufacturing sector of Pakistan economy. Lack of manufacturing exports means less exposure to foreign competition and hence less TFP of the sector.

[2] 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 5.2 shows trend in average TFP index of Financial Business sector of Pakistan. During 1990s and early 2000s decline in TFP can be attributed to short-to medium-term effect 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 industry into the monopolistic competition characterized by excess capacity. During this transition, the number of banks increased and excess capacity emerged and grew. This results in gradual decline in TFP. Moreover, investments in Financial Business sector have significant lag before full utilization is achieved. This under utilization of existing capacities also contributed in declining TFP of the sector.[3]

Figure 5.2
Average TFP Index for Financial Buisness Sector of Pakistan



The declining trend in TFP was halted in early 2000s when the number of banks becomes stable. Stock markets started to climb up in early 2002 as an aftermath of 9/11. The investor

[3] The best example for this underutilization is the substantial investments made by Independent Power Producer in additional electricity generation in the mid 1990s.

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 has started to show the positive effect on TFP.

The results for the effects of foreign ownership on TFP index of Food and Tobacco sector are reported in Table 5.2. Since our sample selection is quite random so we use Random Effect

Table 5.2

Random Effect Estimation for Total Factor Productivity Equation

(Food and Tobacco Sector)

Dependent Variable (TFP Index)	
Independent variables	Estimated Regression Coefficients
C	0.066348 (0.7038)
OD1	0.138194 (0.0000)*
OD2	0.06963 (0.0017)*
log (FS)	-0.023048 (0.0263)**
log (FPS)	-0.005807 (0.5027)
TFP (-1)	0.948175 (0.0000)*
R^2	0.8593
Number of Cross-Sections	12
Observations	81
Durbin-Watson h Statistic	0.59
F-Statistic	91.6711 (0.0000)*
χ^2 – *Statistic* for Hausman Test	2.6549 (0.6241)

Values in parentheses are p values. *, ** mean significant at 1% and 5%, respectively.

model for estimation. The coefficient of ownership dummy *OD*1 shows that the presence of small foreign firms in Food and Tobacco sector 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% 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 *OD*2 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% level of significance. The magnitudes of the regression coefficients of the ownership dummies *OD*1 and *OD*2 show that the presence of small foreign owned firms in the Food and Tobacco industry enhance the productivity performance of domestic firms more as compared to 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 [Dimelis and Louri (2004].[4]

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),

[4] Information transfer from small foreign to local firms can be in the form of technological knowledge, management skills and labor training programs.

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% increase in firm size brings 0.023048 points decrease in TFP. The regression coefficient is also statistically insignificant. This result is consistent with the findings in Karpaty and Lundberg (2004). This negative coefficient indicates that the firms are already operating close to their maximum efficiency level 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 estimated coefficient of foreign presence at sector level *FPS* has negative and statistically insignificant effect on TFP. The estimated coefficient shows that 100% increase in 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 to domestic firms in the industry. 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 them to shift 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 were formally modeled by Aitken and Harrison (1997). The negative coefficient of foreign presence at sector level is in line with Aitken and Harrison (1997, 1999).

The lagged value of TFP has positive and statistically significant coefficient at 1% level of significance. This coefficient shows the presence of feedback effect suggesting that higher TFP in the past year contributes to higher TFP in the current year.

The bottom part of Table 5.2 reports sample size, number of firms, R^2, Durbin-Watson statistic, F statistic and Hausman Test statistic. The value of R^2 is 0.8593, which is reasonable considering that our analysis is dominated by cross-sectional data. Durbin-Watson h statistic shows that there is no autocorrelation in regression residuals. F-statistic shows the

overall significance of coefficients. Probability of F-statistic is less than 1%, which indicates the rejection of null hypothesis of joint insignificance. Hausman specification test is conducted to choose between Random and Fixed Effects models. Hausman (1978) considered null hypothesis of consistent and efficient random effects. Small value of the Hausman statistic (or large probability) leads to acceptance of the null hypothesis in our case. Thus, the Random Effects model is preferred over the Fixed Effects model. This result is also consistent with our random sample selection.

For Financial Business sector, the results about the effect of foreign ownership on TFP are reported in Table 5.3. 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 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% 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 statistically significant at 1% level of significance. Large foreign firms in Financial Business sector expand TFP more as compare to small foreign firm. The reason is that large foreign firms have a higher relative scale, improved technology, and higher degree of export-orientation. Foreign parent companies hold control over their subsidiaries easily and likelihood of technology transfer from foreign parent

companies to their subsidiaries is higher than small foreign firm. Hence, this transfer of technology in case of large foreign firms located at host country leads to improvement in productivity.

Table 5.3

Random Effect Estimation for Total Factor Productivity Equation

(Financial Business Sector)

Dependent Variable (TFP Index)	
Independent Variables	Estimated Regression Coefficients
C	37.41669 (0.1425)
OD_1	1.365351 (0.0000)*
OD_2	4.460218 (0.0001)*
log (FS)	-0.078733 (0.7514)
log (FPS)	0.169651 (0.0774)***
TFP(-1)	0.249372 (0.03075)**
TFP(-2)	0.098050 (0.0000)*
R^2	0.9893
Number of Cross-Sections	32
Observations	163
Durbin-Watson h statistic	0.48
F-Statistic	313.36 (0.0000)*
$\chi^2 - Statistic$ for Hausman Test	1.2534 (0.7902)

Values in parentheses are p values. *, **, *** mean significant at 1%, 5% and 10% respectively.

These findings are in line with our hypothesis that the foreign firms enhance the TFP of the firms in a sector. Also our findings are in line with Aw (2004), Dimelis and Louri (2004), Karpaty (2005), Wei and Lui (2006), Yasar and Paul (2007) and Unden (2007).

The TFP of firms is negatively related to relative firm size, the coefficient of firm size (*FS*) show that 100% increase in firm size decreases TFP by 0.078733 points Statistically this variable is insignificant. The effect of firm size on TFP is similar in Financial Business sector as it appears in Food and Tobacco sector. Hence the same reasoning is applied for these results as given earlier.

The estimated coefficient for foreign presence at sector level (*FPS*) is positive and statistically significant at 10%. The coefficient of *FPS* shows that 100% increase in foreign presence at sector level enhances TFP of firms by 0.169651 points. The positive relationship between foreign presence at sector level and TFP suggests spillover effects from foreign firms to domestic firms within the sector. This positive coefficient indicates improvement in TFP through transfer of technology, knowledge and skills from foreign to local firms.

These findings, therefore, suggest that technology is transferable via imitation of foreign companies to domestic firms in the sector. This result is in line with the finding of Liu *et al.* (2000), Karpaty and Lundberg (2004) and Wei and Lui (2006) that the foreign presence within industry enhance TFP.

First and second lagged values of TFP has positive and statistically significant coefficient at 5% and 1% levels of significance respectively. The positive feedback effects show that TFP in current year correlates with TFP in last two years.

The bottom of Table 5.3 reports sample size, number of firms, R^2, Durbin-Watson statistic, F-statistic and Hausman Test statistic. The value of R^2 is 0.9893 for Financial Business sector, which is quite impressive. The Durbin-Watson h statistic shows that there is no autocorrelation in regression residuals. F-statistic shows the overall significance of estimation results. Probability of F-statistic is less than 0.01 which indicates the rejection of null hypothesis of joint insignificance. Small value of the Hausman statistic (or large probability) leads to acceptance of the null hypothesis in our case. Thus Random Effects model is preferred over the Fixed Effects model for Financial Business sector.

CHAPTER
6

Conclusion and Policy Implications

We have investigated the impact of foreign ownership on total factor productivity (TFP) for Food and Tobacco and Financial Business sectors of Pakistan. For this analysis, we pooled cross-sectional information over the period 1994-2007 and 1995-2007 for Food and Tobacco, and Financial Business sectors respectively. We considered sample of 12 firms for Food and Tobacco and 32 firms for Financial Business sector. We selected these two sectors for analysis because these two sectors have been the major recipients of foreign investment during the recent years.

Pooled least square method was applied to estimate Cobb-Douglas production function for extracting productivity residual. After extracting productivity residual we used Random Effects model to estimate the impact of foreign ownership on TFP. Main findings of our study are summarized as follows.

- Ownership dummies are positively correlated to TFP in both the sectors. Positive and significant coefficients of ownership dummies show that foreign firms enhance TFP in each sector. However, for Food and Tobacco sector, small foreign firms improve TFP more relative to large foreign firms. In contrast, for Financial Business sector, large foreign firms increase TFP more than that of small foreign firms. In general, positive contribution of foreign firms to productivity implies that foreign firms are more productive as compared to domestic firms.

- In both the sectors firm size is negatively related to TFP. This finding suggests that increase in firm size to sub-optimal levels decreases TFP.

- In Food and Tobacco sector, foreign presence at sector level has negative and significant impact on TFP. This suggests that there is negative productivity gains associated with foreign equity participation in the industry. Negative relationship between foreign presence at sector level and TFP shows that there is no spillover to domestic firms from foreign presence within the sector. The reason for absence of spillover effect within the sector is that most of the listed firms in Food and Tobacco sector are the major foreign firms. These foreign firms prefer to operate in isolation and do not permit spillover because of technological gap between these foreign firms and domestic firms.

- In Financial Business sector increase in foreign presence at sector level raises TFP. This enchantment in productivity leads to spillover from foreign firms to domestic firms in the sector. These findings support the hypothesis that foreign companies bring with them technology and skills, access to foreign markets and new employment opportunities that enhance the performance of host country's firms.

Policy Implications

Foreign investment is widely believed to play an important role for international transmission of new technology, stimulating productivity and economic growth in the host country.

1. Conventional wisdom holds that Government of Pakistan should welcome foreign investment by providing some incentives for improving TFP and enjoying spillover

benefits in Food and Tobacco and Financial Business 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.

2. In Food and Tobacco sector, huge technology gap between local and foreign firms reduces the utilization of foreign technologies by the domestic firms. The domestic firms in Food and Tobacco sector may benefit from foreign presence in the industry if the government provides fiscal incentives to encourage research and development expenditures as well as payments on royalties for acquisition of technologies. Such measures will speed up the imitation process. Similarly such policies could also be designed that are intended to increase local learning capabilities and labor skills as skilled labor is essential for increasing the absorptive capacity of domestic firms.

3. In addition, governments may increase spillovers from foreign investment by promoting competition and labour turnover between domestic to foreign firms in both the sectors.[1]

4. Overprotective labour laws do not encourage productivity and frighten away much needed productive investment. There is a need to rationalize the labour laws and multiple levies on employment that inhibit business expansion and job creation.

5. Lower corporate tax rates may be offered to joint ventures among foreign and domestic firm.

[1] Wang and Blomstrom (1992) argue that competition reduces the technology gap between domestic and foreign firms, which forces foreign firms to transfer more technology to the host country. Furthermore, competition also induces the domestic firms either to use their resources and existing technologies more efficiently or to search for new and better ones.

Limitations of the Study

The major limitation of this study is the availability of micro-level data for the Pakistani Firms. Communication sector contributed 34% of foreign investment in 2006-2007. But non availability of data, mergers of major firms and the limited number of listed firms left us with just 4 firms in the sector. Certainly more research is needed to fully understand the effect of foreign ownership on all industries of Pakistan economy. 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.

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Appendix A

Percentage Shares of Inputs in Total output

	Food and Tobacco Sector	Financial Business Sector
Share of Labor	8.5	28
Share of Capital	20.7	38.8
Share of Material	21.1	---
Share of Energy	33.6	13.3