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SPILLOVERS IN THE MENA REGION: THE CASE OF TURKEY

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Abstract

This paper examines the impact of foreign direct investment (FDI) flows on the Turkish economy in the aftermath of its liberalization in the early eighties, with an emphasis on the technology transfer related aspects of FDI, i.e. FDI-related productivity and wage spillovers. We first examine the sources of internationalization of the activities of foreign firms and discuss the evolution of the role assigned by economic theory to FDI in the industrialization process of developing countries, with the focus being on the factors leading to the diffusion of intangible assets of foreign companies to domestic firms (competitors, suppliers or customers). A section is devoted to the analysis of the evolution of FDI flows in the world economy in an effort to grasp the new trends occurring in this domain. We then turn our attention to the Turkish case and carry out a thorough descriptive analysis of the characteristics of FDI flows in the Turkish economy on the basis of a number of indicators such as the evolution of the amount of FDI, number of foreign firms, sectoral distribution of FDI, the equity structure of foreign firms, their country of origin. We then carry out an econometric analysis in order to test for the existence of FDI-related productivity and wage spillovers in the Turkish manufacturing sector, and to identify the channels through which they transit. A unique firm-level database for the Turkish manufacturing industry covering the period 1983-2001 is used in our analysis. Productivity and wage equations are estimated by using appropriate estimation techniques and including control variables at the firm and sector level are added. Our findings point to a negative effect of FDI-related spillovers on the productivity of domestic firms and to a significant and positive impact on the wages paid by domestic firms.

ملخص

تدرس هذه الورقة أثر تدفقات الاستثمارات الأجنبية المباشرة علي الاقتصاد التركي في أعقاب تحرره في أوائل الثمانينيات مع التركيز علي جوانب الاستثمارات الأجنبية المباشرة المتعلقة بنقل التكنولوجيا مثل جوانب الإنتاجية وفوائض الأجور.

قمنا أولا بدراسة مصادر تدويل نشاطات الشركات الأجنبية وناقشنا تطوير الدور الذي تخوله النظرية الاقتصادية للاستثمارات الأجنبية المباشرة في عملية التصنيع عند الدول النامية، مع التركيز علي العوامل المؤدية إلي انتشار الأصول غير الملموسة الخاصة للشركات الأجنبية إلي الشركات المحلية (المنافسين أو الموردين أو العملاء).

وقد خصص فصل لتحليل التقويم الخاص بتدفقات الاستثمارات الأجنبية المباشرة في الاقتصاد العالمي في محاولة لفهم الاتجاهات الجديدة في هذا الميدان. ثم ركزنا علي النموذج التركي وأجرينا تحليلا وصفيا شاملا لخصائص تدفقات الاستثمارات الأجنبية المباشرة في الاقتصاد التركي علي أساس عدد من المؤشرات مثل تطوركمية الاستثمارات الأجنبية المباشرة وعدد الشركات الأجنبية والتصنيف القطاعي للاستثمارات الأجنبية المباشرة وبنية الحصص للشركات الأجنبية ودول المنشأ الخاصة بهم.

وأجرينا بعد ذلك تحليلا اقتصاديا قياسيا للتأكد من وجود جوانب الإنتاجية وفوائض الأجورالمتعلقة بالاستثمارات الأجنبية المباشرة في قطاع التصنيع التركي ولتحديد القنوات التي من خلالها تتم عملية النقل. واستخدمنا في تحليلنا قاعدة بيانات متفردة ذات مستوي ثابت عن الصناعة التحويلية التركية خلال الفترة ما بين 1983-2001 .

وتقدر معادلات الإنتاجية والأجورباستخدام تقنيات تقدير ملائمة متضمنة متغيرات المراقبة في الشركة بالإضافة إلي مستوي القطاع.وتشير نتائجنا إلي أثر سلبي للفوائض المتعلقة بالاستثمارات الأجنبية المباشرة علي إنتاجية الشركات الداخلية ولكنها تؤثرتأثيرا إيجابيا ذا بال علي الأجورالتي تدفعها الشركات الداخلية.

Introduction

Contrarily to the mainstream view held in development theory and policies implemented from the early sixties to the eighties, Foreign Direct Investment (FDI) flows into developing countries (DCs) has received increasing attention for the last 30 years.

As predicted by the neo-classical growth model of the late fifties, FDI was supposed to flow from developed to developing countries as a result of differences in profitability of capital, itself reflecting differences in marginal product of capital between these two regions. Its predicted positive impact was to accelerate the process of capital accumulation in DCs by transferring foreign savings to these resource-poor countries through investments carried out mainly multinational or transnational companies. Of course, this accelerated pace in capital accumulation was expected to be accompanied by employment generation – directly and immediately due to the investment and indirectly due to the increase in rate of growth to which it would finally lead. Moreover, one other major positive impact expected from FDI was technology transfer, i.e. transfer of embodied and disembodied technological knowledge conceived and used for the first time by the firms in developed nations. Note that this kind of technology transfer is considered to be one of the *sine qua non* conditions of a successful catch up – a necessary albeit not a sufficient one.

Analysis of technology transfer-related aspects of FDI flows into DCs has recently received increased attention and focused on the notion of FDI-related *spillovers*. This emphasis on externalities involved in FDI can be explained by the (re)discovery of the public good properties of knowledge which makes its monopolization by foreign firms in DCs extremely difficult. The public good nature of knowledge is a result of the partial excludability and non destruction of the knowledge about production processes and management techniques held by foreign firms in the form of intangible assets – which can enable them compete with domestic firms on their local markets.

Mainly, two types of spillovers have been studied by researchers: FDI-related *productivity* and *wage* spillovers.

The first one, *productivity spillovers*, is the joint outcome of competition-, demonstration - and knowledge-related aspects of (new) technologies possessed and used by foreign firms in DCs. If domestic firms are able to access and use new production technologies and/or management techniques possessed by their foreign counterparts in their industry, they will certainly increase their productivity levels or efficiency with which they use existing inputs in the production process. The second type of spillovers, FDI-related *wage spillovers*, is linked but not limited to the aforementioned productivity-enhancing effect of FDI. However, if the productivity-increasing impact (in domestic firms) of FDI is established, this can lead, in competitive markets, to an increase in labor demand due to a move of labor demand curve to the right. Furthermore, (higher) wages paid by foreign firms in an industry can exert upward pressure on wages paid in domestic firms due to a simple imitation effect. Whatever the sources of these wage spillovers, their positive impact on equity and poverty should be analyzed.

Together with these new theoretical underpinnings as to the implications of FDI on DCs economies, a surge in FDI flows around world was observed: the rate of growth of FDI flows since the eighties reached and surpassed growth observed in the worldwide income as well as foreign trade flows. At the same time, the direction of FDI flows as well as the motivation behind these flows changed radically: most FDI flows have taken place between developed nations – although the share of DCs in these flows has steadily increased –FDI taking the form of mergers and acquisitions are larger then greenfield FDI.

As a country situated in the MENA region, Turkey's policies towards FDI changed in the course of time and depended to a great extent on the development strategy she adopted in order to industrialize. The amount of FDI inflows Turkey received amounted to only 229 US dollars over the period 1954- 1980, which corresponds to the period during which Turkey pursued an import-substitution based and inward-oriented development strategy. After the switch to a more outward-oriented industrialization strategy in the early 1980s, FDI inflows began to increase gradually, reaching an annual amount of about one billion dollars from the mid 1980s onward. Liberalization of the regulatory framework concerning FDI has contributed to this increase: requirements relating to exports and local input use were relaxed in the mid-eighties and were followed by a similar relaxation of rules on equity participation. The final liberal touch was given in 2003 when permissions required to carry out FDI was simply abolished by the government.

Available data show that although rather low in macroeconomic terms if compared with other emergent countries – but not if compared to other MENA countries – FDI inflows in the Turkish economy are by no means negligible for the manufacturing sector. Data obtained from the Annual Survey of Manufacturing Industries conducted by the Turkish Statistical Institute indicate that the share of "foreign" firms –defined as those with at least 10 % of their capital owned by foreigners– present in the manufacturing industry in its gross and net output increased from 10 to 30 % over the period 1983 to 2001. This remarkable increase occurred mainly in high- and medium-technology industries where the share of foreign firms reached 50 %. Moreover, time series on wages and productivity – to be examined later in this report – indicate that foreign firms performed better than domestic firms on both fronts.

However, in spite of the growing importance of FDI in the Turkish economy and its increased role in economic theory, a handful empirical studies attempted to assess the impact of FDI flows on the Turkish economy. More specifically, an even lower number of papers examined the evidence in favor of FDI-related productivity and wage spillovers for the Turkish economy – mainly for the manufacturing sector – and arrived at conflicting results. These studies – to be examined later in this report – are plagued with a number of problems related to the data used, estimation methodology adopted and explanatory variables used in the regressions. Moreover it seems to us that that there is a real need for studies aiming at the analysis of the impact of FDI on the Turkish economy, especially on its implications on the productivity-related indicators.

Indeed, we can expect that the switch from an inward-oriented growth process to a much more outward-oriented one would bring about a more efficient allocation of resources which would then transmit into a sustainable growth path with a steady increase in per capita income. However, several studies, surveyed in Rodrik (1995), distinguish between two effects of trade liberalization on growth in DCs: on the one hand, *static effects* which entail intersectoral resource transfers due to the modification of the relative price structure and, on the other hand, *dynamic effects* arising from productivity growth due to increased exposure of local firms to competition on foreign and domestic markets, to a increase in technology imports embodied in capital and intermediate goods and to the transfer of other kind of technical knowledge through informal means. It is remarkable that the presence of foreign firms in DCs is potentially capable of leading to all the productivity-enhancing effects mentioned above. Since the aforementioned dynamic effects are to be materialized through sustained productivity growth in firms, and given that the role FDI can play in this process is ubiquitous, we need (more) studies aimed at assessing the dynamic effects of foreign presence on the operations of domestic firms in DCs. This is the purpose of this report as far as the Turkish economy is concerned after she switched to a more liberalized and outward-oriented

economy in the 1980s. Certainly, lessons can be drawn from the findings of this study for other developing countries and especially those located in the MENA region.

The *second chapter* of this report is dedicated to a literature survey pertaining to the implications of FDI flows for the economies of DCs as well as the causes that drive firms in the developed nations to internationalize their activities. The relationship between FDI flows and technology transfer is examined as well, with an emphasis on the different types of FDI-related spillovers. Especially, theoretical underpinnings of productivity and wage spillovers are discussed.

In the *third chapter* of our report, we first analyze recent trends in FDI flows at the world level, among other things the distribution of FDI flows by destination and country of origin. The main topics examined are relationship between globalization and FDI, and especially the main drivers and determinants of FDI flows in the globalization era. Secondly, we examine more thoroughly theoretical bases of FDI-related spillovers – i.e. productivity and wage spillovers – introduced in the previous section and present the evidence in favor of or against it in existing econometric studies pertaining to developed as well as developing countries. The third and last section of this chapter is dedicated to a thorough – non-quantitative – analysis of FDI flows in the Turkish economy: the evolution of the amount invested over time, their sectoral distribution, evolution of the regulatory framework pertaining to FDI are some of the topics examined here. Finally, an attempt will be made – to our knowledge the first of its kind – to survey empirical studies aimed at testing for the existence of FDI-related productivity and wage spillovers in the Turkish economy.

The *fourth chapter* of this report contains a carefully-designed econometric analysis in order to test for the existence of FDI-related productivity and wage spillovers in the Turkish manufacturing sector, and to identify the channels through which they transit. A unique firm-level database for the Turkish manufacturing industry covering the period 1983-2001 is used in our analysis. Productivity and wage equations are specified and estimated using appropriate estimation techniques. Findings are presented and discussed in order to assess the existence and direction of FDI-related spillovers and whether they exert a positive or a negative effect on the performance of domestic manufacturing firms.

In the *final and fifth chapter*, we summarize our findings and make some suggestions for future research.

Literature Review

Following the work of Hymer (1976), economic analysis has addressed a number of issues concerning FDI mainly with an objective to explain the internalization of firms – mainly multinational companies (MNCs). FDI decisions were treated as only one of three alternative means of operating abroad, i.e. exporting (goods or services), licensing of technology and carrying out FDI abroad. According to the 'eclectic' theory developed by J.H Dunning[1], the magnitude and determinants of MNCs activity abroad is influenced by three major factors : *ownership advanta*ges, *localization advantages* and *internalization advantages* –the OLI model.

When investing abroad, MNCs are in a disadvantageous position with respect to domestic firms who have better knowledge of local economic conditions that affiliates of MNCs. Therefore, MNCs must possess some assets that enable them to compensate this initial disadvantage. These firms do indeed possess firm-specific, intangible assets which enable them to compete successful with domestic competitors abroad. These intangible knowledge-

[1] Dunning (1993).

based assets are superior production technologies, better management skills and marketing techniques, ability to access easily international capital markets, possession of brand names providing monopolistic advantages, and so on.

As far as localization advantages are concerned, they arise mainly from inter-country differences in input prices (cheap labor, for instance) and productivity levels, from the existence of barriers to trade in goods or services, and from a large or growing markets in the host countries.

Possession of proprietary knowledge by MNCs that confer them competitive advantage on host country market and locational advantages of these markers are necessary but sufficient conditions for MNCs to invest abroad. The third determinant of FDI by these firms, internalization advantage, plays a major role as well. Because investing in a foreign country is a costly and risky business, MNCs could instead prefer to sell or license their intangible assets to host countries' enterprises rather than capitalize on these assets by investing abroad. There are, however, at least two factors that militate against such an option. Firstly, as was pointed out in Arrow (1962), markets for technology are often imperfect and characterized by information asymmetries involved in their transfer: it is extremely difficult to value the technology and agree about its price and licensing costs that are suitable both to the seller and the buyer. This will especially be the case when tacit elements are present in technology. In such circumstances, it is extremely difficult that a licensing transaction takes place. Secondly, if the technology licensed by MNCs is used by domestic firms to produce goods that are sold under MNC's own brand name, stringent quality requirement will have to be met by domestic firms in order not to harm its reputation. Monitoring cost that have to be incurred to prevent such a phenomenon are likely to be very high, so that MNCs will simply refuse to license their technology. The presence of internalization incentives provides the last requirement for explaining FDI flows.

The expectation that intangible assets possessed by multinationals (technological knowledge, marketing and management skills, export contacts, and reputation) will confer them sensible advantages is confirmed in empirical studies that compare a number of performance indicators between foreign-owned and local firms in host countries[2]. These studies show that in host countries, sectors where MNC affiliates operate productivity – however measured – and wage levels are higher there than those observed in local firms. In other words, activities of MNC's foreign affiliates rise the average level of productivity and wages in host countries.

The pertinent question for policy purposes is the effects of FDI on domestic industry and firms because the technological superiority of foreign firms per se does not necessarily imply any benefit for the host economy. Indeed, there is theoretical and empirical evidence that the beneficial effects of FDI inflows in host countries – developing countries in the sequel – are not limited; however, to foreign firms recording higher productivity levels and paying higher wages. Because of their non-rival and partially excludable nature, competitive advantages conferred by intangible proprietary assets can spill over to local firms and increase their productivity and wage levels.

A number of surveys exists that review theoretical and empirical done about the effects of FDI-based spillovers on productivity and wages[3]. These surveys first identify potential sources of productivity spillovers, then examine findings of available econometric studies and finally discuss reasons that may explain the positive, negative of neutral effects of spillovers.

[2] Kumar (1998), Görg and Greenaway (2004) and Ramstetter and Sjoholm (2006).

[3] For example, see Blomström and Kokko (1998), Haskel et al. (2002) and Görg and Greenaway (2004). Note that research conducted in this area concerns solely the manufacturing sector.

Since wage spillovers are explained *partly* by productivity spillovers and since this last one has been first and extensively investigated, we will begin this section by addressing issues related to the analysis of productivity spillovers.

Productivity spillovers stem from the presence of foreign firms that enjoy high productivity levels– higher than those observed in local firms – in the manufacturing sector, explained by the possession of some kind of proprietary knowledge about production and management techniques that confer them technological superiority over their local competitors. Several channels of transmission have been identified as far as FDI-based productivity spillovers are concerned: (i) efforts by local firms that aim to imitate foreign firms' production technologies – by way of reverse engineering, for instance; (ii) transmission of skills or human capital acquired in foreign firms to new or existing local firms through mobility of the workforce; (iii) a competition effect that may occur as foreign firms entering an industry may force local firms to reduce their X-inefficiencies and (iv) export spillovers accruing from foreign to local firms that may lead them to increase their export intensities and consequently their productivity levels since export markets are highly competitive[4].

At the origin of productivity spillovers lies a productivity gap between foreign and local firms. This gap, in turn, is due to superior competencies held in the field of production and management by foreign firms. The crucial point becomes then whether the magnitude of productivity spillovers depends positively on the extent of the "technological gap" or on the contrary, whether there are some threshold effects that prevent all local firms in a sector benefit *equally* from such spillovers. In conformity with the line of research launched by the economic historian A. Gerschenkron[5], some authors argue that the extent of backwardness and the magnitude of foreign presence in developing countries will impact positively on the importance of productivity spillovers[6]. In the wake of the rediscovery by development economists of "development traps" in the 1990s, most researchers rejected this – rather naive – view of technology-based catch-up process and maintained that a minimum level of technological capability is required if firms are to benefit from knowledge spillovers originating in foreign firms. A too weak level of technological capacity in the local economy may impact on the type of technology transferred – relatively simple or sophisticated – transferred by multinationals to their foreign affiliates[7]. As well, a large technology gap between foreign and local firms may exert a *negative* affect on the productivity levels of local firms if they loose their market shares to more productive foreign firms[8].

What can be said so far about the existence and sign of productivity spillovers on the basis of available evidence?

The paper by H. Görg and D. Greenaway – cf. supra – lists findings of 40 published econometric studies of productivity spillovers in developing, developed as well as in transition economies – Central and Eastern European countries and China – that use different types of data and covers different time periods. Although refined and extended over time, these studies adopt the same analytical tools, especially a regression framework where an indicator of productivity – mostly labor or total factor productivity – is regressed on an

[4] Recent research has been very critical of this assumption, however, since most productive firms may self-select into exporting: for example, see Clerides et al. (1998).

[5] Gerschenkron (1962).

[6] For instance, see Findlay (1978).

[7] Glass and Saggi (1998).

[8] This would show up as negative productivity spillovers in econometric studies using firm-level panel data. Aitken and Harrison (1999) is, to our knowledge, the first econometric study pointing to such an effect.

indicator of foreign presence at the sector level and a number of control variables supposed to be correlated with the dependent variable in an attempt to prevent any spurious correlation that might bias values of estimated coefficients.

Table 1 below has been constructed on the basis of information provided in Görg and Greenaway (2004)[9]. It shows the *sign* and the *number* of significant or insignificant coefficients on the foreign presence indicator included in regressions, according to the type of data (cross-section or panel data) and the type of units (industry of micro-level[10] data) used in the analysis. A number of observations can be made on the basis of Table 1.

Firstly, as far as developing countries are concerned, it turns out that most investigations were carried out using cross-section data. However, these studies – to which we will refer as the *first generation* of investigations about the effects of productivity spillovers in developing countries–indicate at the same time a positive and statistically significant effect of productivity spillovers on the productivity of local firms. These findings are hardly reliable since in regressions using cross-section data, especially industry-level data, it is difficult to control for industry-specific factors that are correlated with the extent of foreign presence without being caused by it: for example, multinational companies may set up their affiliates precisely in those sectors that enjoy high productivity levels, not the other way around. In econometric studies using cross-section data where the time dimension is absent, this might show up as a positive productivity spillover effect although, as indicated above, foreign presence is the result, not the cause of high productivity levels observed in the sector.

Therefore, findings of econometric studies using panels of firm-level data will be more informative and more reliable when it comes to uncover the relationship between foreign presence at the sector level and productivity in local firms. This conclusion led the *second generation* of econometric work to use extensively firm-level panel data in an attempt to investigate more carefully this relationship[11]. Table 1 indicates that only one of the six studies using appropriate data and econometric methods obtains a statistically significant positive coefficient for the foreign presence variable included in regressions. Of the four remaining studies, three indicate absence of any productivity spillovers and one study finds negative spillover effects. A similar picture emerges for the transition economies from the Table 1. It is also worth mentioning that most findings indicate positive spillovers in the case of developed countries, suggesting that knowledge transfers involved there are of a different nature than those occurring in developing countries.

It has previously been mentioned that potential negative effects of FDI spillovers may arise since foreign firms can attract demand away from local firms thanks to the advantages conferred to them by their superior proprietary technology. As for the findings indicating absence of productivity spillovers, they may be explained by the existence of lags when local firms try to learn from foreign firms – which are not appropriately taken into account in empirical work – and by the ability of foreign firms in preventing knowledge being leaked out to competitors. Furthermore, although some local firms may be able to benefit from productivity spillovers, others might not due to an excessive gap between their technological capacities and those of foreign firms in their sector of activity. In this case, to suppose that *all* firms are affected *equally* by spillovers – and specifying productivity equations accordingly – will fail to deliver any spillover effect. This issue has been addressed by researchers in a

[9] See their Table 2 (pp. 177-178).

[10] Micro data may be firm-, establishment- or plant-level data.

[11] This second generation of research began with Haddad and Harrison (1993), and Aitken and Harrison (1999).

variety of ways[12]. Some researchers included indicators of absorptive capacity in their productivity equations and made them interact with the foreign presence variable. Others have split their dataset into subsets according to the distance of each firm's productivity level to that of the industry leader – which often happens to be a foreign firm. Although findings are mixed, they indicate again that local firms have to secure a minimum level technological capacity if they expect to be able to assimilate knowledge flows accruing from foreign firms.

Another explanation for the absence of productivity spillovers might be that knowledge flows depend on geographical proximity between foreign and local firms rather than on the magnitude of foreign presence in a sector of activity. Difficulties encountered in codifying knowledge may explain this phenomenon. Information on the geographical localization of firms is necessary to test this hypothesis and studies that attempted this obtain mixed results. And finally, it may be that knowledge spillovers are an inter-industry (vertical) rather than intra-industry (horizontal) phenomenon, which, of course fails to manifest itself in studies where the indicators of foreign presence introduced in productivity equations are constructed on a horizontal basis. Vertical spillovers originating in foreign firms may have both a voluntary or involuntary aspect and can occur as the result of increases in the efficiency of local suppliers or customers that came into contact with foreign firms. A limited number of recent econometric studies testing for horizontal *and* vertical spillovers exist and their findings are encouraging since they find more often significant positive *vertical* spillovers than horizontal ones[13].

Recently, a number of innovative studies based on firm-level data available over a long period and using up-to-date econometric techniques have been carried out. This new line of research –to which we will refer as the *third generation* of studies on FDI spillovers – uses panel data techniques in order to eliminate any possible time-invariant individual effect as well as GMM-based estimators to correct for the endogeneity resulting from the inclusion of lagged values of dependent variable in the productivity equation. Available studies pertain, however, almost exclusively to developed countries[14] and not to developing nations, a situation explained likely by the characteristics of available datasets for these countries – i.e. paucity of firm-level data of over a relatively long span of time.

What can be said about the sources of wage spillovers stemming from foreign presence in a sector? Firstly, if genuine productivity spillovers occur from foreign to local firms, this will likely lead local firms to pay higher wages to their employees in competitive markets.

However, wage spillovers from foreign to local firms can take place even in the absence of productivity spillovers. Indeed, activities of foreign firms in a sector in a developing country may raise the equilibrium wage simply by increasing the labor demand at the sector level. Note that this might not happen if local and foreign firms serve different segments in an industry, for example foreign firms serving the upper end of the market where price discrimination is possible and local firms being present solely at the price competitive lower end. As a result of operating on different segments of the product market, foreign and local firms might also operate on different segments of the labor market[15].

On the other hand, as foreign firms pay in general higher wages than local firms and if they compete on the same labor market, local firms may have to pay higher wages to attract

[12] Kinoshita (2000), Haskel et al. (2002), and Girma (2005).

[13] Only five published works on vertical spillovers are mentioned in Görg and Greenaway (2004): see their Table 3 (p. 183). See also, Ugur and Ruane (2004).

[14] For example, see Görg and Strobl (2003), Keller and Yeaple (2003), and Girma and Görg (2002).

[15] This point is made in Kumar and Siddharthan (1997).

employees and/or to prevent them from leaving local firms. In a similar vein, with or without wage spillovers due to productivity spillovers, there might be a labor-market crowding out effect of FDI: indeed, if a certain type or worker is in short supply – skilled workers, for instance – foreign firms can attract them by offering higher wages than in local firms. Depending on the value of the elasticity of substitution, this may lead local firms to substitute low-skilled employees to high-skilled ones, resulting in lower wages in local firms (i.e. negative wage spillovers). Naturally, as in the case of productivity spillovers, wage spillovers may simply not exist if none of the aforementioned transmission channels works.

What does the available evidence tells us about wage spillovers in developing countries?

The regression framework used in testing for productivity spillovers is also adopted here: a wage equation is estimated with the dependent variable being wages paid in local firms and by including among explanatory variables an indicator of foreign presence at the sector level. Other explanatory variables included are firms-specific determinants of wages (firm size, capital intensity, share of skilled and female employees in the workforce) as well as sector-level determinants of firms-level wages, especially variables measuring the aforementioned potential crowding out effect due to foreign presence.

The evidence about wage spillovers in developing countries is scarce. Indeed, we are aware of only two published papers aimed at testing the existence of wage spillovers in therein[16]. One uses a panel of industry-level data for Venezuela and the other a cross-section of firm-level data for Indonesia. These studies find negative and positive wage spillovers effects, respectively. However, the type of data they use makes theirs findings rather unreliable[17].

Although wage spillovers have been investigated less thoroughly than productivity spillovers, there is no justification for such a situation since two developments make the analysis of this phenomenon necessary. In an era of accelerated technological change due to emerging of new and sophisticated technologies, the need to absorb them quickly becomes crucial, especially in developing countries[18]. This is all the more important in an environment where the role of arm's length licensing in transferring technologies and know-how from developed to developing countries diminished and replaced in part by FDI as a mode of major technology transfer. Moreover, being paid higher wages in foreign *and* local firms would be one manner in which problems poverty and income inequalities would be somewhat attenuated in developing countries in an area of rapid globalization of the world economy.

FDI in the World: Trends, Motivations and Spillovers

Globalization and Trends in FDI

As stated by Penalver (2002), globalization is a combination of four major trends, consisting of the expansion of international trade, financial flows (with FDI as the most important component of these flows), global communications (including transport) and movements of people (immigration). These four factors were main drivers in the so-called "first wave of globalization" of 1870-1914, and they have been present in the post World War II period through the 1970s and in the most recent wave, starting in the 1980s and consolidating in the decade of the 1990s.

[16] Aitken et al. (1996) is about Venezuela and Lipsey and Sjoholm (2001) concerns Indonesia. A preliminary study testing for wage spillovers in the Turkish manufacturing sector is Pamukçu (2002).

[17] For a number of econometric studies testing wage spillovers in developed countries, see Table 4 in Görg and Grenaway (2004).

[18] Nelson and Phelps (1966) have emphasized four decennies earlier the importance of skilled workforce in the assimilation of new technologies.

Although four major trends are common in the three globalization waves, these three waves differ in terms of their causes, characteristics and effects. The first wave of global integration was triggered by a combination of falling transport costs and reductions in tariff barriers. New technologies such as railways created huge opportunities for land-intensive commodity exports. Trade pattern was land-intensive primary commodities against manufactures. In this period, exports and growth increased sharply, globalizing countries converged to each other due to mass migration equalizing incomes. The impact of globalization on inequality within countries depended on the ownership of land.

The second wave of globalization began after the period of retreat of nationalism during 1914 and 1945. United Nations persuaded governments to cooperate to reduce the trade barriers. The lifting of barriers between them greatly expanded the exchange of manufactures. International specialization within manufacturing became important and this helped to drive up the incomes of the rich countries relative to the rest. Due to the rapid growth and greater equity on industrial world, this period is referred as golden age.

In the third wave of globalization, while a large group of developing countries broke into global markets; other developing countries suffered declining incomes and rising poverty. International migration and capital movements, which were negligible during second wave globalization, have again become substantial (World Bank, 2002). These three waves of globalization period and changes in the major factors can be shown in Figure 2.1.

The new globalization wave has brought a significant policy change in developing countries, leading them to switch from inward-looking import substitution to outward-looking, market-determined strategies. This resulted in greater openness to FDI as one of the key features of liberalization. This policy change is important in terms of FDI policies due to the finding of Bhagwati (1978) that FDI was shown to be more growth-enhancing in countries that pursue export promotion than in those promoting import substitutions.

With the recent globalization wave after 1980s, there has been a sharp increase in foreign capital flows for both developing and developed countries. Figure 2.2 provides information on the pattern of FDI globally, as well as for specific regions. Global FDI inflows rose by 29% to $916 billion in 2005, compared to a 27% increase in 2004.

Increasing volume of inflows during this new globalization wave has been an important issue about FDI. The most important factors explaining the surge of FDI inflows into the developing countries in recent years have been the foreign acquisition of domestic firms in the process of privatization, the globalization of production, and increased economic and financial integration. Besides the increasing volume of FDI globally, another important issue has been the composition of FDI. In terms of composition of FDI, investing in a recipient country is in two ways: cross-border mergers and acquisitions (M&As) -entering a foreign market by buying an existing enterprise- and greenfield investment -entering a foreign market by building a new enterprise. Earnings reinvested in foreign owned companies; and cross-border loans and trade credits between related enterprises are the other two ways of FDI. Although reinvested earnings sometimes make up a significant part of the FDI flows between mature economies, when FDI is analyzed in development context, greenfield investments and M&As are the main concern.

M&As are the result of a legal joining of two firms under a single ownership and include different types of transactions, such as acquisition of private domestic companies by foreign investors, or privatization of state-owned enterprises, when the buyers are foreign investors. M&As are the main channel of FDI inflows to developing countries. But according to Table 2.1, between 2003 and 2005 about 83% of all cross-border M&As took place in the developed

countries. In monetary terms, cross border M&As accounted for $297 billion in 2003 to $716 billion in 2005 for the global economy.

Greenfield investments involve the construction of new production facilities, rather than the purchase of existing facilities. According to UNCTAD (2006), between 2003 and 2005 about 42% of greenfield investments went to developed countries while greenfield FDI projects decreased from 47% in 2003 to 45% in 2005 for developing countries as sources of greenfield investment (Table 2.2). As destinations, approximately 84% of greenfield investments are made by developed countries.

Drivers and Determinants of FDI Flows

Drivers of FDI

The composition of FDI, between greenfield FDI and M&As, has changed considerably towards M&As. Between 1980 and 1999, the value of M&A increased each year, by an average of 42% and reached a level of $3.400 billion in 2000. For all developing countries, the share of M&As in foreign investment increased from 18% in 1995 to 36% in 1999. Trends in the mode of entry of firms investing in developing countries differ considerably from those of developed countries, where greenfield investment continues to dominate. However, in developing countries M&As have become an increasingly important mode of entry driven by privatization in recent years.

Besides the different modes of FDI inflows, the motives for investing abroad also differ among investors who want to invest abroad. According to Narula and Dunning (2000), four main motives for investors especially in developed countries are to seek natural resources, to seek new markets, to restructure existing foreign production in terms of lower costs and efficiency, and to seek new strategic assets. First three motives of FDI is asset-exploiting motives which aim to generate economic rent by using existing foreign production and the last motive is asset-augmenting motive to acquire new assets that protect or enhance existing assets.

Resource-seeking FDI: The availability of abundant or cheap production factors in a developing country is a motivation for transnational corporation (TNC) presence in that country. Natural resources are a type of production factors that traditionally has attracted greatest interest among foreign investors. Especially, in the first wave of globalization, colonial powers invested in their colonies to extract natural resources and they subsequently used them in their home countries.

Natural resource-seeking is still the main FDI motive for TNCs operating in sectors such as mining, mineral extraction and operating in large-scale agricultural business. Countries with an abundance of the relevant natural resources, especially, least developed countries are potential investment regions for investors seeking natural resources in TNCs. TNCs may seek natural resources for three reasons: to meet the needs of its own downstream refining or manufacturing activities, to sell the minerals directly in host, home or international markets, or to secure the strategic requirements of energy or other minerals for its home country (as formulated by the country's government) (OECD, 2002; UNCTAD, 2007).

Human resource-seeking motive for FDI arouse due to the potential of obtaining cheap labour. Human resource-seeking FDI depends on the relative pricing of labour with a given level of qualifications. Besides natural resource seeking, the availability of skilled inexpensive labour in developing countries is becoming an increasingly important motivation among foreign investors. On the other hand, since TNCs generally respond to rising wage pressures at home by shifting labour-intensive production processes to developing countries, this type of FDI is also related with the efficiency-seeking approach.

***Market-seeking FDI*:** Especially in the manufacturing sectors of developing countries, where import-substitution and related policies hinder direct export from the home countries, market-seeking FDI is an important motive to access to host-country markets for processed goods. However many developing countries have liberalized their import regime after 1980s and this liberalization policy enabled TNCs to choose between exporting and undertaking FDI. According to Nunnenkamp (2001), there may be a decline in purely market-seeking FDI due to liberalization policies, but it should also be taken into account that the possible decline of market-seeking FDI is largely restricted to FDI in manufacturing industries. The opening of service industries to FDI is the reason behind the existence of market-seeking FDI motive today. Some other reasons of market-seeking FDI are transport costs, differences in consumer tastes and the total magnitude of the host economy.

***Efficiency-seeking FDI*:** TNCs invest in developing countries to boost efficiency beyond the simple reallocation of labour-intensive production. Key factors for efficiency seeking investment include labour costs, skills and availability, and access to international markets. Efficiency-seeking FDI is often made with the specific objective of accessing low-cost labour for labour-intensive production or taking advantage of relatively abundant supplies of educated and skilled workers. Efficiency-seeking FDI is motivated by creating new sources of competitiveness for firms and strengthening existing ones whereas market-seeking FDI aims at penetrating the local markets of host countries. Investment related to efficiency-seeking may be seen in different forms. One form is that firms in developing countries undertake to supply TNCs with fully manufactured products that will bear the TNCs' brand names. Another form is that foreign enterprises try to provide products adapted to local tastes and quality requirements. The composition of this form of FDI may be either greenfield investment or M&A. This kind of FDI mostly goes to large or economically advanced developing countries.

Strategic asset-seeking FDI: FDI is a means to acquire strategic assets such as technology, marketing, and management expertise available in a host country. Companies investing abroad with the purpose of acquiring strategic assets aim at a competitive edge, as well a degree of a monopoly just at the beginning. Strategic asset-seeking FDI is popular among medium income and fast-growing industrializing countries as they seek to establish a speedy presence in the innovative and dynamic markets of the advanced countries (Dunning et al., 1996). Developing countries may make themselves more attractive to such FDI by investing in human resources and infrastructure. (OECD, 2002).

Table 2.3 below shows the predominant motivation factors and the modes of FDI entry to the recipient economy. According to this table, resource-seeking FDI comes mostly on the form of greenfield investments while efficiency-seeking and strategic-asset seeking FDI are shown in M&As mode.

FDI motives such as resource-seeking and efficiency-seeking FDI are due to the comparative advantage of the host country. If the FDI motive is the host country's comparative advantage instead of by-passing trade barriers in the host country, then it may contribute positively to the export growth. Thus, resource-seeking and efficiency-seeking FDI would promote exports while market-seeking FDI and strategic asset-seeking FDI may not be a catalyst to export growth (Banga, 2003).

Determinants of FDI

Until the recent globalization wave, it was strongly agreed that FDI is mainly attracted by strong economic fundamentals such as market size, the costs and efficiency of production, the quality of infrastructure and access to skills. The most important determinants are market size and income level which shows that market-seeking is the major motive of investment flows to

developing countries especially in the second wave of industrialization. Additionally; skills, trade policies, and political and macroeconomic stability are other central determinants. While investment incentives were seen as relatively minor determinants of FDI decisions, globalization has changed this picture and made incentives a more important determinant of international investment decisions (Kokko, 2003).

Besides many different options such as exporting, licensing, or entering into a joint venture or strategic alliance to extend operations abroad, Dunning (1993) explains why FDI is chosen by TNCs within OLI-framework (Ownership advantages, Location advantages, and Internalization advantages).

According to OLI-framework, ownership advantages (O) refer to the assets such as superior technology or management knowledge of a firm that allow it to compete successfully in overseas markets, despite a lack of knowledge of the local market and the costs of setting up a foreign affiliate. Location advantages (L) are the benefits that a host country can offer a firm: large markets, low labour or production costs or both, and a good infrastructure. Internalization advantages (I) refer to transaction-costs, and occur when it is cheaper to exploit ownership and location advantages through FDI rather than exporting. A firm can go abroad by simply exporting its products to foreign markets; however, uncertainty, search costs and tariff barriers are additional costs that will deter such trade. Similarly, the firm could license a foreigner to distribute the product but the firm must worry about opportunistic behavior by the licensee. As a result, TNC can substitute its own internal market and save more. While ownership and internalization advantages are investor specific determinants, the location advantage is specific to the host country (OECD, 2001).

Location determinants of FDI are categorized as in the Table 2.4 below firstly by Dunning (1993) and then, by UNCTAD (1998).

Recently, the location advantages gained additional importance in attracting FDI by host countries due to potential gains of investment flows. The development of capacities, the amount of investment flows that host country can hold, and capabilities, necessary conditions that host country can provide for investment climate, is important for attracting FDI. When the host country's local capabilities such as human resource, supplier and technological capabilities are strengthened and new capabilities are created, FDI inflows start to rise. They stagnate or fall, otherwise. According to Borensztein et al. (1998) and Xu (2000), countries require a minimum stock of human capital to realize the growth effects of FDI through technology transfer. Blomström and Kokko (1997) also argue that benefits of FDI increase over time as the skill level of local entrepreneurs grows, new suppliers emerge and local content increases.

In terms of location determinants, absorptive capacity is an important concept related with FDI spillovers. Abramovitz (1979) uses the term "absorptive capacity" to denote domestic capabilities for assimilating knowledge as the benefit of FDI. Absorptive capacity includes the ability to internalize knowledge created by others and modifying it to fit their own specific applications, processes, and routines (Narula and Marin, 2003). According to Narula (2004), absorptive capacity is decomposed into four constituent parts: firm-sector absorptive capacity, basic infrastructure, advanced infrastructure and formal/informal institutions. Firm-sector absorptive capacity includes domestic firms with appropriate human and physical capital to internalize technology flows and TNC affiliates acting both as users and creators of technology flows. Basic infrastructure includes roads, railways, telephones, electricity, basic skilled human capital (primary and secondary education), primary and secondary schools, hospitals. Universities, advanced skilled human capital, research institutes, banks and insurance firms are classified as advanced infrastructure. Intellectual property rights regime,

technical standards, weights and measures, incentives and subsidies to promote adoption and creation of new technologies, taxation, competition policy, investment promotion and targeting schemes, promotion of collaboration between economic actors (domestic or foreign), promoting entrepreneurship are formal and informal institutions constituent of absorptive capacity. At earlier stages of development, basic infrastructure is the main part associated with the increases in absorptive capacity.

In context of absorptive capacity, technology gap, i.e. the differential or ratio of domestic firms' productivity to the average or maximum productivity of foreign firms in the sector, is important since it is a signal to TNC about absorptive capacity. It is thought that there should be some level of technological gap between domestic firms and TNCs in order for domestic firms to benefit from the higher technology associated with TNCs. If the technological gap is too small, TNCs will transmit few benefits to the domestic firms (Kokko, 1994). According to technological catch-up hypothesis of Findlay (1978) and, Wang and Blomström (1992), the magnitude of FDI spillovers will increase with the technological gap (relative backwardness), as it increases the opportunities for domestic firms to obtain higher levels of efficiency via imitation of foreign technology. According to technological catch-up hypothesis, technology diffusion is not an automatic and direct effect, but it also requires the recipient to have the capacity to absorb and adopt such technology. If there is a large technology gap between two countries, domestic firms have a human capital which is not probably as well as the physical infrastructure and distribution networks; that is, the system of intermediaries between the producer and the final users; required to support inward FDI. This, in turn, influences not only the decision to invest, but also the kind of technology transferred (Glass and Saggi, 1998). A large technology gap, therefore, signals small domestic absorptive capacity and decreases the potential gains by domestic firms.

Narula (2004) analyzes the level of absorptive capacity to obtain technological benefits. While insufficient absorptive capacity tends to lead to the inefficient use of technology inflows, knowledge accumulation is much more rapid once the threshold level of absorptive capacity is crossed. Countries that receive FDI with the highest potential for capability development are, ironically, those with strong domestic absorptive capacities.

Absorptive capacity is significant for development because it allows host country to capture knowledge that exists abroad. Where absorptive capacity is lacking in domestic firms, then they may be crowded out instead of absorbing technological benefits from FDI (Agosin and Mayer, 2000).

Regional dimension is another important location determinant to facilitate technology spillovers. In terms of the benefits of geographical proximity, firstly, direct contacts with local suppliers and distributors seem to be the main regional benefit. This may be local in nature in order to minimize transport costs and facilitate communication between the supplier/distributor and the TNC. Secondly, training of employees by TNCs and subsequent turnover of labour is another way for spillovers (Haacker, 1999). As regional labour mobility is extremely low (Greenaway et al., 2000), many of the benefits in terms of a better skilled workforce with tacit technical knowledge gained from TNCs will be experienced by local employers. Thirdly, demonstration effects may also be local if firms only closely observe and imitate other firms in the same region (Blomström and Kokko, 1998). Finally, knowledge flows may be regional in character. For example, the spread of new ideas is realized most intensively in the area close to the innovation.

Differentials in factor endowments, cost structures, and market/institutional characteristics of the host country are other locational FDI determinants besides absorptive capacity and regional dimension (Lall, 1978).

Most developing countries lack technology capability. In these countries, FDI can serve to facilitate technology transfer and reduce the technology gap between developing countries and industrial countries. However, there is a basic paradox between FDI and local capabilities. When local capabilities are weak, industrialization has to be more dependent on FDI. However, FDI cannot drive industrial growth without local capabilities.

The growing empirical literature shows that FDI promotes growth with either absorptive capacity or supportive business environment in host countries. While higher per capita income (Blomström, Lipsey and Zejan, 1994), and better endowment of human capital (Borensztein, de Gregorio, and Lee, 1998) are factors related with absorptive capacity, trade openness (Balasubramanyam, Salisu and Sapsford, 1996) and domestic financial market development (Alfaro, Chanda, Kalemli-Ozcan and Sayek, 2004) are shown to be crucial for positive impact of FDI on growth in terms of supportive business environment.

The potential impact of FDI differs among sectors as well as among recipient countries. The benefits of FDI are not limited to the industry that receives FDI, but they may also be diffused to the rest of the economy through the interactions with local suppliers and consumers - backward and forward linkages, respectively. Backward linkages might arise by helping prospective suppliers to set up production facilities or by providing technical assistance to raise the quality of supplier's products. Forward linkages, on the other hand, appear by the provision of help to the development of local distributors and sales organizations (Blomström and Kokko, 1997). According to World Investment Report 2001 (UNCTAD), the linkage potential differs across primary, manufacturing and services sectors. Since primary sector is mostly capital intensive and the scope for linkages between foreign companies and the rest of the economy is often limited, the growth impact of FDI is not obvious. On the other hand, FDI flows in manufacturing sector may have a larger impact in the economy due to a broad range of potential linkage-intensive activities. Greenfield investments in manufacturing sector, with efficiency-seeking motive besides market-seeking one, are the major factors for positive FDI impact on growth. Also, FDI to the services sector mostly serves to the domestic market since services sector includes wide range of different activities such as finance, infrastructure (such as electricity, water, and telecommunications), wholesale and retail, real estate as well as tourism. For this reason, potential forward linkages for the services sector are quite strong, while backward linkages may vary by industry. Most of the FDI in the sector come through M&As in developed countries and privatization deals in developing countries both of which are not necessarily associated with new investments as Klein, 2000 mentioned (Sayek and Aykut, 2005).

FDI remains the most important means of transferring technology either to domestic firms by spillovers or to only foreign firms in developing countries. Technology transfer through FDI generates benefits that cannot be obtained by using other modes of transfer. Besides technology, FDI brings with it know-how and managerial skills; influences the production, employment, income, prices, exports/imports; and thus accelerates growth and development (Aitken, Hanson, and Harrison, 1997; Blomström and Kokko, 1997; Borensztein, De Gregorio, and Lee, 1998). The growth and development effect of FDI can be seen as a result of the increasing returns in production via externalities and productivity spillovers. The typical features of TNCs such as marketing and sales experience can contribute significantly to exploiting the technology in a profitable manner. TNCs also offer brand names and access to regional and global markets (UNCTAD, 1999). According to the empirical findings of Borensztein, De Gregorio, and Lee (1998), the impact of foreign investment exceeds the impact of domestic investment on growth.

The impact of FDI on growth is expected to be greater, the greater the value-added content of FDI-related production and productivity spillovers associated with FDI. Also, FDI plays a role on human capital augmentation and technological change in developing economies by providing specific productivity-increasing labour training and skill acquisition, encouraging the incorporation of new inputs and technologies in the production function of the recipient economy and promoting the use of more advanced technologies by domestic firms. In case of new inputs, output growth can result from the use of a wider range of intermediate goods in FDI-related production. In case of new technologies, FDI is expected to be a potential source of productivity gains via spillovers to domestic firms.

Entering dynamic trade and production systems, and contribution to increasing productivity and competitiveness of domestic industries can be seen as the main benefits of FDI for the recipient economy. Also, flows of FDI contribute to build strong economic links among developing countries, besides links between industrialized countries and developing countries. Due to the fact that, attracting foreign direct investment is an important policy motive for policy makers in many developing and transition economies.

However, these potential benefits are accompanied by probable costs. A highly efficient TNC operating in host country may lead to a fall in the number of domestic firms if the less efficient domestic firms are forced out of business. Although this may increase overall resource allocation in the long-term, the short-term consequences for local employment and market concentration may be severe (OECD, 2001).

FDI-related Spillovers and Technology Transfer

TNCs prefer to set up affiliates overseas rather than export directly or license their product or technology due to the existence of proprietary knowledge and market failures in protecting that knowledge at the same time. Thus TNCs internalize certain transactions to protect their brand, technology, and marketing advantages. Instead of exporting directly, TNCs also invest abroad to access new markets by eliminating transportation costs. However, when FDI is domestic market-oriented, the impact of FDI on technology diffusion is rather limited. Especially, it is observed in the import substitution era that since the main incentive for TNCs to undertake investment is the heavily protected domestic market; in such an environment, they prefer to transfer old and outdated technology to their factories in developing countries, creating little technology diffusion (Dutz et al., 2005).

On the other hand, if FDI is an export-oriented investment, the impact on technology diffusion will generally be more significant than the impact made by a domestic market-oriented investment. In fact, the more modern and complex the technology, the more TNCs prefer to transfer it to an affiliate rather than to a third party. Although TNCs wish to retain technology internally or to charge a market price for transfers to third parties, positive externalities in the form of technology spillovers may be created. This transfer and diffusion of technology is one of the important contributions of FDI to the host country. A TNC brings its production technology, its access to global production and distribution networks, and its know-how and experience by investing in the host country. The diffusion of technology may lead to improvements in the productivity of domestic firms in ways that do not allow the TNC to capture all the related benefits.

According to Blomström and Kokko (1998), as TNC affiliates become major players in the domestic market, domestic firms will be forced to adopt newer and more advanced technologies and to use the existing resources of the firm (either because they operate on an inefficient scale; that is, there exists idle resources which are not used in production process in the firm, or because they produce their output with inefficient combinations of inputs) more efficiently in order to survive.

The technology transfer may take the forms of either import of machinery/ equipment, i.e. embodied transfer, or know-how, knowledge and licenses, i.e. disembodied transfer. Embodied or disembodied technology transfer cause direct and indirect effects on productivity. The direct effect consists of increased productivity due to superior technology and human capital. The indirect effects of FDI on domestic firms such as change in the nature and evolution of concentration, changes in financing, marketing, technological and managerial practices and finally changes in productivity and growth of domestic firms are described as spillovers. The indirect effect results from increased absorptive capacity, which in turn increases the ability of the firm to internalize and utilize outside technology and knowledge. Domestic firms will not find it difficult to organize the transfer of embodied technology such as import of machinery, but disembodied technology like knowledge requires some additional operations to transfer.

To explain the transfer of disembodied technology or technology spillovers, there are three different models suggested by Marin and Bell (2006). The first model for the technology spillovers to the host country is *the pipeline model.* According to this model, technological spillover impact of FDI is seen in two steps. The first step involves TNC parent-to-affiliate international transfer of technology that is superior to the prevailing technology in the host country. The second step involves the subsequent spread of this technology to domestic firms – a technological spillover effect. Spillover effects arise from FDI independently of both the domestic firms' absorptive capacities and subsidiaries' knowledge-creating and accumulating activities in the host country. The second model is *the absorptive capacity model.* In this model, potential spillover effects arise from FDI, but they are captured only by domestic firms with high absorptive capacities. According to the third model, which is *the active affiliate model*, spillover effects arise from FDI only when foreign affiliates are technologically active in the host country.

Technology spillovers related with FDI are also classified in three types: horizontal, vertical and labour spillovers. Horizontal spillovers are spillovers from foreign firms to others operating in the same industry or in the same region, while vertical spillovers are defined as spillovers from foreign firms to others operating in vertically related industries, either from foreign suppliers to domestic users or from foreign users to domestic suppliers. Spillovers through employment of workers who worked for foreign firms by domestic firms are called labour spillovers (Lenger and Taymaz, 2006). These three types of spillovers can occur through any of the five main channels: demonstration/imitation, labour mobility, exports, competition, and backward and forward linkages with domestic firms.

Demonstration/imitation: Spillovers may take place when domestic firms improve their efficiency by copying technologies of foreign affiliates operating in the domestic market via observation channel. Either demonstration of TNCs or imitation by domestic firms is the most evident spillover channel according to Das, 1987; Wang and Blomström, 1992. After the observation of a product innovation or a new form of organization adapted to local conditions, local entrepreneurs may attempt to imitate the innovation. The introduction of a new technology into a given market may be too expensive and risky for a domestic firm to undertake, due to the costs inherent in acquiring its knowledge and the uncertainty of the results that may be obtained. However, as domestic firms interact with existing technology users; this interaction reduces their innovation and imitation costs. Thus, information is diffused, uncertainty is reduced, and imitation levels increase (Blomström and Kokko, 1998). Finally, the improvement in total factor productivity speeds up (Helpman, 1999). Imitation of the technology either by reverse engineering or any other way works mainly among firms within same industries and referred as intra-industry spillovers.

Labour mobility: The second channel is related to the possibility of hiring workers who have knowledge and experience of the technology and who are able to apply this in that firm by domestic firms (Fosfuri, Motta, & Ronde, 2001; Glass & Saggi, 2002). This type of spillovers is also intra-industry spillovers such as the ones caused by demonstration effect. Domestic firms' internalization of improved management practices and organizational efficiency of TNCs is expected to be the result of training of local employees in TNCs (Globerman, 1979). Even supporting staff acquires skills, attitudes and ideas on the job through exposure to modern organization forms and international quality standards. These people make a significant contribution by raising productivity when working for domestic firms or when setting up new entrepreneurial businesses. The productivity improvements caused by the movement of labour from TNCs to other existing or new domestic firms are realized through two mechanisms: through direct spillover to workers engaged in the same type of job and through knowledge carried by workers who move to another firm.

Nevertheless, it is important to note a possible negative impact arising through this channel, as TNCs may attract the best workers away from domestic firms by offering higher wages and leaving them with less-skilled employees (Girma et al., 2001; Sinani & Meyer, 2004). The market-stealing effect and the skill-stealing effect could be large enough to offset the positive effect of FDI. Also, the influence of labour mobility on the efficiency of domestic firms is difficult to evaluate, as it involves tracking the workers in order to investigate their impact on the productivity of other workers (Saggi, 2002). For this reason, if TNCs and domestic firms compete in the same labour market, domestic firms may have to pay higher wages to attract workers.

Exports: The third channel through which the presence of TNCs may benefit domestic firms is exports (Aitken, Hanson and Harrison, 1997; Greenaway, Sousa and Wakelin, 2004). TNCs enable domestic firms to become more successful exporters by spreading their knowledge of global markets to domestic firms. According to Görg and Greenaway (2004), domestic firms' exports can be affected through three primary channels. Firstly, export activity involves costs associated with the establishment of distribution networks, transport infrastructures or knowledge of consumers' tastes in foreign markets and TNCs have better access to information about foreign markets. This can spill over through their export activities. Secondly, demonstration effect also increases the export performance of domestic firms. They can learn the TNCs' superior production or management techniques through observation and this enables them to compete more successfully in export markets by reducing the entry costs in the foreign market. Finally, competition with TNCs at home and in foreign markets can induce domestic firms to improve their export performance.

Competition: When TNCs decide to penetrate a new market through directly investing in the country, they tend to bring with them more sophisticated technology and superior managerial practice in order to compete with domestic firms who tend to be more familiar with the consumer preferences and business practices in the local market (Blomstrom, Sjoholm, 1999). Since FDI promotes efficiency through the economy by increasing competition in domestic industries, an increased competition induced by TNCs becomes the fourth channel of spillovers from FDI (Markusen and Venables, 1999; Wang and Blomström, 1992). Technology advances due to increased competition may be both intra- and inter-industries spillovers.

Competition with TNCs may force domestic firms to increase their competitive capacity by reforming management styles and updating production technology. While competition between TNCs and domestic firms in the domestic economy is an incentive for the domestic

firms to make a more efficient use of existing resources and technology or even to adopt new technologies, on the other hand, it may restrict the market power of domestic firms.

The efficiency of domestic firms may also be negatively affected through this channel, if foreign firms with advanced technologies produce at a lower marginal cost. By taking market share from domestic firms and forcing them to operate on a less efficient scale, with a consequent increase of their average costs, TNCs may lower the productivity of domestic firms (Aitken and Harrison, 1999). However, domestic firms may also react to foreign competition by using the existing technology more efficiently or by investing in new technology in order to maintain their market shares (Blomström and Kokko, 1998).

Linkages: The final channel is backward and forward linkages between TNCs and domestic firms. Domestic firms may learn by observing TNCs when there are close relationships between them, and may benefit from the technical support, the demand, and the supply provided by the TNCs with which they have an upstream or downstream relationship in the business chains (Aitken and Harrison, 1999; Buckley et al., 2002). The relationship that domestic firms establish in local markets as suppliers to TNCs is referred as backward linkages and the relationship that domestic firms establish in local markets as customers of intermediate inputs produced by TNCs is referred as forward linkages (Lall, 1980; Rodrı´guez-Clare, 1996; Markusen and Venables, 1999; Lin and Saggi, 2004). Spillovers caused by backward or forward linkages are referred as inter-industry spillovers.

Backward linkages: With increasing returns to scale, if TNCs increase the demand for local inputs to save transportation costs or to accommodate local content requirements, this may benefit domestic suppliers by creating a backward linkage since they want to ensure a certain quality pattern. TNCs provide technical support for the improvement of the quality of goods or for the introduction of innovations by training personnel (supply-side). TNCs demand suppliers to meet standards of reliability and speed of delivery; which in turn creates a pressure on domestic suppliers (demand-side). Acquisition of raw materials, and support at the organizational and management levels are also provided by TNCs (Lall, 1980). Competition to become TNC suppliers also increases the efficiency of domestic firms.

Forward linkages: Forward linkages refer to relations with buyers, either consumers or other firms using the TNC's intermediate products in their own production process, as with machinery. These buyers can also be distributors, which can benefit from the marketing and other knowledge of TNCs. Forward linkages are observed when TNCs supply higher quality inputs to domestic producers or end-user consumer goods to consumers at a lower price (Markusen and Venables, 1999).

Technology spillovers related with FDI are more likely to be vertical rather than horizontal in nature. The reason of vertical spillovers is that although TNCs have an incentive to prevent information leakage that would enhance the performance of their local competitors, they may want to transfer knowledge to their local suppliers. On the other hand, TNC affiliates established through M&As or joint ventures are likely to source more locally than those taking the form of greenfield investments. Since full foreign ownership is a proxy for greenfield investments, it is expected that fully-owned foreign affiliates may rely more on imported inputs, while M&As with local capital participation will tend to source more locally due to the advantages of the supplier relationships established by the acquired firm or their local partner. Then, M&As or joint ventures result in greater vertical spillovers than greenfield investments.

Empirical Studies about Spillovers

Productivity spillovers

Studies about spillovers utilizing econometric models start to appear from the early 1970s. These econometric studies generally investigate the relationship between FDI and productivity. If there is a positive correlation between productivity and FDI, then it is considered that there are spillovers. However, according to Smarzynska (2002), TNCs tend to locate in high productivity industries; where they may force domestic firms to exit from the market during their attempt to increase their share of the host country market. This would raise the average productivity in the industry. Then the positive correlation between FDI and sectoral productivity can be attributed to the TNCs behaviour in the market rather than the productivity spillovers.

While the earliest analyses about spillovers focus on productivity and to some extent on the competitiveness, recent studies focus on the implications of changes in the market shares of foreign and domestic firms.

In all these models, labour productivity is used as a dependent variable with the explanatory variables being FDI, factor inputs, concentration ratio (sector level variable), and labour quality. Several empirical studies also searched possible heterogeneity in the estimated spillover effect between firms or sectors. Heterogeneity arising from differences in the level of technological advances (low versus large technological gap sectors), the degree of competition in the domestic market, the degree of foreign ownership, the relative size of the firm, and the level of development of the host country (developed versus developing countries) was investigated. The evidence from the literature leads to the view that some factors influencing spillovers depend on the characteristics of the specific firm, specific industry or the particular country hosting FDI (Dimelis, 2005). The host country characteristics such as industry and the policy environment (Blomström and Kokko 1998), the level of human capital stock (Borensztein et al. 1998; Noorbakhsh et al. 2001), and the absorptive capacity of domestic firms (Kinoshita 2001) affect the spillover effects of FDI.

Although FDI is considered as an important channel for the transfer of advanced technologies introduced by TNCs to developing countries, there is no consensus on the direction, extent or even the existence of these spillover effects of TNCs in empirical studies. Early studies using industry level and cross-sectional designs find positive results, but cannot identify the relevant causality (Marin and Bell, 2006). Using firm level designs combined with panel data analysis, recent studies find evidence of spillovers in some cases. However, the positive results generally seen in the earlier research are not replicated in a wide range of countries. Empirical research analyzing FDI spillovers via technology transfer to domestic firms in transition, developing, and developed economies provides mixed results. While many empirical studies find that there exist significant positive spillovers from FDI, some others find no or statistically insignificant spillover effects.

The reason of the variation in the outcome of empirical studies of different countries on spillover effects may be the use of different methods to conduct empirical estimation. The empirical studies are categorized based on the level of aggregation. Some studies utilize data collected at the firm/plant level, while others examine the FDI spillover effects on the more aggregate level using sectoral data. Moreover, the studies are grouped into either cross-sectional studies where information is collected at one point of time or panel studies where firm/sector specifics are gathered over a period of time. Direction of causality between FDI and productivity improvements cannot be identified with the cross-section specifications. For instance, a positive coefficient may be due to FDI spillovers contributing to domestic firms' productivity or it may be caused by TNCs investing in more productive sectors in the host

economy. On the other hand, panel data allows measuring not only the effect of foreign firms on the productivity levels of domestic firms but also the effect on the rate of productivity growth of domestic firms across the sectors of manufacturing industry. Panel data permit the investigation of the development of domestic firms' productivity over a longer time period, rather than at one point in time and allow investigation of spillovers after controlling for other factors. According to Görg and Ströbl (2001) and Aitken and Harrison (1999), panel data analysis is a more appropriate method to determine productivity spillovers.

Besides the methodological problems stated above, any unspecified factor such as the technology gap between domestic firms and TNCs or their local affiliates may be a reason of variation in the studies.

When the empirical studies are analyzed in terms of the results which they obtain specifically, the early studies of spillovers are undertaken by Caves (1974), Globerman (1979), and Blomström and Persson (1983). Caves (1974) tests the spillover benefits of FDI in the manufacturing sectors of Australia and Canada. Using foreign firms' share of industry employment as a proxy for foreign presence, Caves finds a positive correlation between the foreign share and the productivity level in competing domestic firms. Globerman (1979) also studies on Canadian manufacturing industries and uses the labour productivity as a dependent variable in domestic manufacturing plants for his model. The results also provide support for the proposition that spillover efficiency benefits domestic firms.

Blomström and Persson (1983) carry out their analysis using the Mexican industries data from the 1970 census. They relate labour productivity to capital intensity, labour quality, economies of scale, FDI, average effective work days during 1970, and the degree of competition measured by different concentration indices such as the Herfindahl index. This study finds strong support for the existence of spillover benefits from FDI.

In these three models, the dependent variable is defined as the ratio of total value added in locally owned plants in an industry to total employment engaged in the plants. The key independent variable is a measure of the foreign share, such as the share of foreign-owned plants in total employment or value added. Other variables affecting average labour productivity in the industry are also included as independent variables. These studies interpret the coefficient on the foreign share variable as an indication of the magnitude of spillovers.

Besides the common definitions used, findings of these studies are also similar. In these studies, it is thought that there are positive spillovers if the coefficient on the foreign share variable is statistically significant and positive. This interpretation is initiated by Findlay (1978). According to this study, technical innovations are most effectively copied when there is personal contact between those who already have the knowledge of the innovation and those who eventually adopt it. This implies that larger foreign shares at the industry level are positively correlated with the potential opportunities for locally owned plants to interact with foreign-owned plants. This interaction then facilitates the spread of sophisticated technology from TNCs to locally owned plants.

FDI-related spillovers have lasted to be examined empirically as well as theoretically after these studies. For example, Blomström (1986) tests spillovers based on an efficiency index for Mexican manufacturing industry using industry level data in a period from 1970 to 1975. An industry may be viewed as a number of establishments embodying techniques ranging from the most modern one, using the current best- practice technique, to the oldest operating establishment incorporating the best-practice technique of an earlier age. The ratio between the actual labour productivity in industry and the productivity of the best practice of the industry is defined as efficiency index. The Herfindahl index, market growth variables, the rate of technological progress (the changes in labour productivity in the best practice plants

within each industry) and foreign share (the share of employees in foreign plants) are independent variables of the model. According to this model, foreign presence is positively correlated with structural efficiency in Mexican manufacturing industries. Industries dominated by foreign firms tend to be more efficient than others in the sense that the average firms come closer to the best-practice firm. On the other hand, foreign entry is positively related to productivity changes in the industry average; that is, structural changes only in the modern part of the industries. As a result, the most important source of spillover efficiency is found to be in the competitive pressure induced by foreign firms.

Another study by Blomström and Wolff (1989) tries to explain the effects of the penetration of a sector by foreign-owned firms on the productivity of domestic firms in that sector in Mexican manufacturing industries, using data of year 1965 to year 1984. They also examine the convergence of productivity between foreign-owned and domestic firms in the industry. The results provide support for the spillover hypothesis.

Aitken and Harrison (1991) test the impact of foreign firms on the productivity of Venezuelan manufacturing industry firms between 1976 and 1989. They find that domestic firms exhibit higher productivity in sectors with a larger foreign share. They also examine the geographical dispersion of FDI and suggest that the positive spillovers of FDI accrued mainly to the domestic firms located close to the foreign firms.

Also, Kokko (1994) and Kokko (1996) find evidence for positive spillover effects of FDI on the productivity of domestic firms. Kokko (1994) uses the Mexican manufacturing data at the industrial level in 1970 to account for the magnitude of spillovers. Using three technological characteristics of the industries which are average payments of patent fees per employee, average capital intensity of foreign affiliates, and the labour productivity gap between local and foreign firms in each industry; he estimates the relationship between spillovers and the foreign share. Then, he compares the magnitude of the coefficients on foreign share variable indicating the magnitude of spillovers. Productivity gap and foreign share together explains the spillovers according to empirical results.

On the other hand, Blomström, Kokko, and Zejan (1994) conduct a study to test the determinants of technology transfer. For Mexican manufacturing firms from 1970 to 1975, they test the hypothesis that market rivalry and the availability of skilled labour may encourage TNCs to introduce more technology into their foreign operations. The estimation results show that there is a significant relationship between the technologies imported by foreign affiliates and the local competitors' investment, output growth, and labour skills and support the hypothesis regarding foreign firms' technology imports.

According to the firm-level study of China in 1991 by Chuang and Lin (1999), FDI and local technology purchase are substitutes for domestic firms' R&D activity. This study suggests the policy of encouraging FDI to foster technology transfer and knowledge spillovers to developing countries at first. Once a country's technological capability is established, it appears critical to switch to policies that provide a favourable environment to stimulate R&D investment.

Although most studies that measure the spillover effects of TNCs on host countries are cross sectional and limited to labour productivity in manufacturing for a single country, Hejazi and Safarian (1999) extends this approach by adding FDI stocks to foreign trade as a channel linking total factor productivity (TFP) levels between countries. They use TFP levels from 1971 to 1990 and argue that technological spillovers through multinational production and FDI are likely to be larger than the one through international trade.

Sjöholm (1999) applies the methodology that a number of factors affect the magnitude of spillovers to plant-level data for Indonesian manufacturing in 1980 and 1991. He examines the relationships between spillovers and productivity gaps, between spillovers and the level of competition in industries. He finds that spillovers are larger for locally owned plants in industries with a high degree of competition and industries where technology in domestic firms is far behind technology in TNCs.

Blomström and Sjöholm (1999) analyze spillovers from foreign-owned plants in Indonesian manufacturing sector in 1991. They group the foreign-owned plants according to their ownership share, and conclude that there is not any role of TNCs on facilitation of technology diffusion for the local plants with foreign participation. Also, the type of ownership of foreign-owned plants does not seem to be a determinant of the degree of spillovers. According to their findings about the relationship between spillovers and exports of plants, non-exporters benefit from spillovers, while exporters already facing competition in world markets do not.

Another study on Indonesian manufacturing industry by Takii (2005) also finds supporting evidence for spillover effects from FDI. Investigating technology spillovers for manufacturing industries using panel data, Griffith (1999), Liu et al. (2000), Harris and Robinson (2003), and Haskel et al. (2002) find evidence that a foreign presence in the sector affects the productivity of domestic firms in the UK positively.

Besides the studies suggesting that foreign presence will create a spillover effect, a number of studies find no significant spillover effects on domestic productivity from FDI. In some studies, FDI may even have a negative effect on domestic firms' output growth. Haddad and Harrison (1993) examine the effect of foreign presence on the relative productivity of domestic firms by comparing firm level productivity with that of the best practice firm in the industry and find no evidence of spillovers. There is no significant relationship between larger foreign presence and higher productivity growth. In their analysis, they use Moroccan firm level panel data. According to these results, FDI associates with a one-time increase in domestic firm efficiency rather than a long-term dynamic association between FDI and domestic firm efficiency although domestic firms exhibit higher levels of productivity in sectors with a larger foreign presence.

For Venezuela, Aitken and Harrison (1999) estimate the production function of a group of Venezuelan plants and find negative spillovers. Although they find positive correlation between foreign presence at the firm level and plants' productivity (the "own-plant" effect), FDI from joint ventures to Venezuelan firms has a negative effect on domestic firms' productivity growth. Thus, the gains from FDI appear to be entirely captured by joint ventures. Since FDI reduces domestic plant productivity in the short run by forcing domestic firms to cut production, they describe the negative spillover effect as market stealing effect.

Okamoto (1999) examines the spillover hypothesis using firm-level data for Japanese investment in the US auto parts industry from 1982 to 1992. According to his analysis, contrary to the expectation, Japanese-owned firms are less productive than their US counterparts. Additionally, there is an improvement on US-owned suppliers' performance, but this improvement is to a small extent due to the technology transfer from Japanese assemblers to US-owned suppliers. He interprets the improvement in productivity as an increase in competitive pressure rather than technology transfer; however, there is not enough explanation about the contradiction between the spillover hypothesis and the findings.

Kathuria (2000) analyzes the spillover effect using the data for India. He finds that when foreign presence is measured as a share of sales, there is no benefit for domestic firms. However, they benefit from having foreign capital stock available. He finds spillover effects

in scientific industries where domestic firms invest in R&D activities, whereas there is no spillover effect for non-scientific industries. Kathuria (2002) runs over the study for the firms with and without R&D for the 1989-90 period and obtain the same results that only the domestic firms who are actively engaged in R&D are affected by the spillovers. According to these studies, domestic efforts are important to benefit from spillovers. Also, the study of Feinberg and Majumdar (2001) estimates the production functions for foreign and domestic firms in India and find that TNCs gain from each others' R&D spillovers, although domestic firms do not.

Using firm-level panel data, Djankov and Hoekman (2000) investigate spillovers for Czech firms in 1992-96 period. Although they find a positive significant impact of FDI on the growth of sales for their entire sample of Czech firms including both domestic and foreign firms, spillovers have a negative impact on the growth of sales of domestic firms since growth of sales in the industry occurs in the foreign-owned firms.

Konings (2001) also finds negative spillovers to domestic firms in Bulgaria and Romania while no evidence of any spillovers to domestic firms in Poland. The negative spillover effect is caused by the crowding-out effect of competition dominating the positive effect of technology transfer.

Liu, et al. (2001) analyzes the spillover effects in China using the ownership structure as a main determinant in 1995. According to this cross section analysis, they find spillovers for state owned enterprises due to increased competition. On the other hand, private and collectively owned firms benefit from spillovers through demonstration and contagion effects. Also, market oriented TNCs produce spillover effects by increasing competition whereas there is not any increase in the competition for export oriented TNCs.

Liu (2002) investigates the correlation between FDI presence and productivity growth in China using industry-level data for the 1993-98 period for the intra- and inter-industry types of spillovers. He finds a positive and significant effect of spillovers for overall sample and for the sub-sample of domestic firms. However, these results may not be robust to use more disaggregated, firm-level panel data. According to empirical results, the ownership structure is an important determinant to benefit from FDI in Chinese manufacturing industry. State owned sector and joined owned sector get positive spillovers from FDI whereas collective owned sector (including township and village enterprises) is affected negatively from FDI. Liu (2002) also finds that foreign sectors (sectors dominated by foreign-owned firms) do not benefit from other foreign investments.

In the empirical analysis of Czech manufacturing industry for the 1995-98 period, Kinoshita (2001) examines the indirect effect of R&D in productivity growth. He looks for any intra-industry spillover effect of R&D via developing domestic absorptive capacity. According to his findings, foreign presence in the industry such as joint ventures with foreign partners has no contribution in the form of spillover effects.

Yudaeva et al. (2003) also investigate technology spillovers based on firm-level panel data for transition economies and find no or negative spillovers to domestic firms. Some other studies finding negative results are Kokko, Tansini and Zejan (1996) on Uruguayan manufacturing sector, Aslanoğlu (2000) on Turkish manufacturing industry, Hu and Jefferson (2002) on Chinese manufacturing sector.

Wage spillovers

Findings of econometric studies aimed at identifying wage spillovers are summarized in Table 6 below[19]. One is stroke by the fact that there are much less studies on wage spillovers than on productivity spillovers.

The two econometric studies on developing countries which find out negative effects of foreign presence at the sector level on wages pertain to Mexico (1984-1990) and Venezuela (1977-1989) and both use industry-level data. On the other hand, the study which finds out positive effects of foreign presence on firm-level wages is about Indonesia (1996): it uses, however, firm-level data but for one year (cross-section data).

FDI in the Turkish Economy: Historical Background

The history of FDI in Turkey begins in 1954. The Foreign Capital Law, enacted in 1954, is the first legislation governing foreign investments to Turkey. This law remained in force until the late 1980s and allowed utilization of foreign capital for all sectors open to local private capital. Also, the foreign capital investment was allowed to be not only in the form of money but also in forms of tangible and intangible assets by this law (Kepenek and Yentürk, 2003). As Öniş (1994) mentioned, although this early legislation provided a liberal framework designed to create a favourable environment for FDI, the cumulative authorized FDI reached only $229 million from 1950 to 1980.

Evolution of FDI Flows in Turkey

According to statistics, level of FDI was low in the pre-1980 period. It is thought that this low level of FDI was due to restrictive bureaucratic practices (Erdilek, 1982). Besides these restrictions, another possible reason is that as a consequence of the import substitution industrialization strategy, Turkey was a relatively closed market to foreign companies until 1980. Turkey had to abandon this strategy after the severe balance of payments crisis in 1979. On January 24, 1980, the Turkish government announced a stabilization program that was implemented under the military regime after September 1980 and initiated a series of reforms which aims minimization of state intervention, establishment of a free market economy and integration of the economy with the global economic system. After following inward-oriented development strategies for 50 years, Turkey switched to outward-oriented policies in 1980, pressurized by the IMF. According to this program, which especially focused on attracting foreign investors and promoting export; product and capital markets were liberalized. In 1980s, The Foreign Investments Act was reorganized and the investment climate was made more attractive by eliminating all discriminatory treatment of foreign investors, requirements on local equity participation, and restrictions on the transfer of earnings (Erdilek, 1986; Akpınar, 2001).

Besides transition to free market economy, opening to foreign markets, and export-led growth strategy, many other structural reforms and legislative regulations such as reducing the weight of public sector in the economy, privatization, liberalization of the financial system, facilitating to enter the banking sector, developing non-banking financial institutions, utilization of flexible interest and exchange rates, lifting restrictions in foreign currency and free flow of capital or at least alleviating these restrictions, allowing those living in Turkey to open foreign exchange accounts (FX deposits), establishing a capital market, re-organizing the body of Istanbul Stock Exchange and activating it, encouraging both foreign and local investments, funding public expenses heavily with debt due to loss of public revenue because of tax incentives and discounts were made in early 1980s in scope of the recent globalization

[19] For details, see Gorg and Strobl (2003).

wave in the world (Alıcı and Ucal, 2003). These policy changes attracted the interest of foreign investors in Turkey.

As seen from Figure 3.1, FDI inflows increased from $35 million level in 1980 to $663 million in 1989. Foreign investors' role in the Turkish economy increased substantially in 1980s. In Figure 3.1, authorized FDI means what investors said they were going to invest, while realized FDI shows what they actually invested. Although there is difference between authorized and realized FDI in this period, they show an increasing trend parallel to each other towards the end of 1980s. The most important reason of this difference is the realization time of investments. Since investments could not be completed in the authorization year and continue in years following the authorization year, a difference is seen between authorized and realized FDI. According to data obtained from Undersecretariat of Treasury, total amount of authorized FDI is $ 4,6 billion between 1980 and 1989.

The adopted economic approach including amendments in legal procedures, newly established institutions, free flow of capital movements, improved level of communication technology, the policy of funding the public sector have been concretely effective on the economy as of the beginning of 1990 (Alıcı and Ucal, 2003). The authorized FDI amount increased to $21 billion totally in 1990-1999 period compared to the 1980-1989 period while the average annual FDI inflows reached the $770 million level in 1990s from $184 million level in 1980s. Although the approved and realized FDI has been quite closely matched during 1990s (shown in Figure 3.2), realized FDI deviated from the approved one between 1995 and 1997. It was during this period that Turkey and the EU formed a Customs Union, which was associated with a wave of new announcements of manufacturing investment in Turkey. However, most of the new investment was not realized due to the negative or at least not positive conditions in reverse of the investors' expectations.

As seen from Figure 3.2, annual FDI flows remained static during 1990s although global FDI flows accelerated in this period exceeding the growth in world trade since 1989. The reasons behind the inadequate long-term investment were increasing vulnerability of Turkish economy due to the liberalization and integration of Turkish financial sector with the world economy, dependency to short-term capital flows, and two significant economic crises in Turkey in 1994 and in 1999. The economic crises caused some policy interventions such as exchange-rate intervention and stimulated an IMF supported stabilization program. Also during 1990s, the Asian Economic Crisis and Russian crisis affected the Turkish economy negatively together with the effects of the Marmara earthquake in August 1999, adding further fiscal burdens to the Turkish economy. Furthermore, the effects of Customs Union with the European Union (EU) were added to those mentioned in mid-1990s.

After the increasing trend of both global and local FDI inflows in 1990s, global FDI flows decreased by 51% in 2001 due to the economic recession which was deepened after the September 11 terrorist attacks. Turkey faced the effects of this decline in global FDI in 2002. As seen in Figure 3.2, FDI inflows to Turkey decreased by 66% during this period.

The new Foreign Direct Investment law, which was enacted in 2003, brought a new system for potential investors. The new system was based on providing information about the investment process instead of authorization and approval procedure.

FDI inflows reached $9,7 billion level in 2005. It was 3,5 times greater than the FDI level in 2004. When the components of these inflows are analyzed, it is seen that 80% of FDI was in the form of capital transfer while the rest of them was purchase of real-estates in Turkey by residents abroad.

Upturn on the macroeconomic indicators such as growth, inflation and interest rates, the positive reflections of negotiations about full membership to European Union on expectations and the acceleration of the structural reforms to improve the investment conditions made Turkey more attractive to FDI. The interest of foreign investors especially on M&As in finance sector and privatizations are examples of this attractive situation of Turkey.

The ongoing improvements in economic conditions provided an upward trend in FDI inflows in 2006. Although the composition of FDI and FDI trends in Turkey are similar to global FDI inflows, the increase in FDI inflows in 2005-2006 period is greater than the increase in developed and developing countries at the same period. According to the estimations on FDI amounts in 2006, 98% increase in Turkey compared to previous year is observed while the increase is just only 34,5% globally. According to provisional data of CBRT, this upward trend was continuing in 2007.

The upward trend of FDI inflows in recent years is not enough to provide Turkey a competitive position in attracting investment flows. According to Table 3.1, approximately 65% of global FDI inflows go to top ten recipient countries and the best ranking of Turkey is 22, which is attained in 2005. According to WIR (2006), only 1% of global investment, which creates production capacity and employment in a remarkable level, flows to Turkey. Also, the increase in FDI inflows to Turkey mostly depends on M&As and privatizations of state enterprises.

Although there is an upward trend of FDI inflows through the macroeconomic improvements and reforms in public finance sector, the investment flows is still unsatisfactory due to microeconomic situation in Turkey. Insufficient skilled labour force, education system which is far from growing up competitive skilled labour, insufficient R&D investments and technology development structure, high tax rates on inputs in manufacturing sector are main determinants of the level of FDI inflows (Yılmaz, 2006).

From a long-term perspective on economic history of Turkey, there have been some structural problems that caused the low levels of FDI inflows since 1950s. One of the major obstacles to investment inflows was the high rate of inflation, to which all companies (disregarding whether they were local or international corporations) operating in Turkey was exposed. Upward trend in government debt as a result of high real interest rates and high public sector borrowing increased the probability of financial crisis and discouraged foreign investors from investing in Turkey. Also, according to Yılmaz and Barbaros (2005), the burden of steady budget deficit which originated from high interest expenses, inefficient tax collection, failure to reform social security, agriculture, banking and privatization made the economy insolvent in financial difficulties and these difficulties limited the level of FDI due to uncertainty about Turkey's future.

According to Yılmaz and Barbaros (2005), Turkish legal structure comprises many problematic aspects, which may also negatively impact the investors. The slow progress of judgment process, low protection for minority shareholders, uncertainty about certain business laws, disallowance of international sharing for large projects involving government concessions seem to be the major problematic issues related to legal structure.

Another obstacle to FDI is restrictions on ownership. Since 100% ownership eases the decision process inside the company and allows for a better control over intangible assets such as technology, product quality and credibility, the investors may prefer full ownership of the investment. Some other factors preventing FDI inflows to Turkey may be listed as; complex tax system and insufficient collection of taxes, subjective application of law and regulations. Additionally, Turkey's negative image (scandals corruption, bribery, misuse of authority, mistrust), lack of transparency, political interference, negative government attitudes

towards foreign investments and internal social tensions may be considered as obstacles for FDI.

As a result, Turkey has not attracted FDI parallel to her potential. Although there are some advantages in terms of market size, infrastructure, liberalization on economy and market attraction; economic instability affects FDI inflows negatively (Erdal and Tatoğlu, 2002).

As a developing country, Turkey's policy change from import-substituting industrialization to a more outward-oriented industrialization is a result of the recent globalization wave around the world and the liberalization period after 1980s. Removal on the protection of foreign capital inflows in 2003 made Turkey possessing a high FDI potential. Table 3.2 shows the FDI performance matrix of world countries: Turkey is one of the countries below potential, with a high FDI potential but low FDI performance.

When sectoral breakdown of FDI in Turkey is analyzed, it is seen that investments flows are transferred from manufacturing sector to services sector in 2000s (as in Figure 3.3). As 60% of FDI goes to manufacturing sector and 38% goes to services sector in 2000, the percentages approximately become reverse of this in 2006 (30% to manufacturing sector and 68% to services sector). There are no considerable amounts of FDI flows into agriculture and mining sectors (primary sectors). This trend of FDI inflows from manufacturing to services sector is seen in most of the developed and developing countries after the second phase of 1990s. Moreover, most of the investment in services sector, especially in infrastructure and finance sub-sectors, goes to developing countries in response to the privatization and liberalization policies of these countries. This is acceptable for investment inflows to Turkey in recent years.

Sectoral composition of FDI is an important concept in the analysis of FDI and its effects on economic growth. According to the studies in this context such as Sayek and Aykut (2007), an increase in the share of investment flows to manufacturing sector may increase productivity and provide economic growth. Whereas, increases in the share of primary or services sector investments has an insignificant effect on economic growth. In case of Turkey, when productivity and number of foreign firms in manufacturing sector are compared between 2000 and 2006, it is seen in Figure 3.4 that there is a similar pattern in these values.

According to data, it is seen that Turkey is closely affected from the world trends. With the recent globalization wave, there have been many structural changes in Turkish economy and these changes have reflected in most of the economic indicators. After seeing the historical background of investment inflows of FDI, it is worth noting the empirical studies in Turkish manufacturing industry.

Turkey is a developing country or according to the jargon of the globalization period is an "emerging market".

Historically, the policy makers of the country have stated that the foreign direct investment is welcomed so far as it accept the same rules as domestic capital. However, after the Second World War foreign aid and investment were considered important for development by the governments. Accordingly a specific Law of Foreign Capital was issued in 1954. With its counterpart the Petrol Law, this Law was providing more favorable climate to foreign investments. The same attitude continued during the period of planned economic development, where the import substitution polices are followed and the rate of domestic saving was not enough for the targeted rate of growth.

Turkey has decided to implement more liberalized economic policies after 1980. After some severe economic and political crises and with the help of the military coup and the IMF, the government has decided to leave the import- substitution economic policy and replace it with

an open market approach. With that, foreign capital as well as the products could easily enter to the country and the so called "market forces" will determine all types of economic activities. Thus, all the barriers in front of the entry of international investments were removed one by one. Making the rules of foreign exchanges and monetary transactions easier and starting the implementation of privatization process, the policy makers have always tended to embed the Turkish economy into global forces. For instance, the customs union with the European Union (EU) has reinforced openness to trade since 1996.

Turkey is the largest economy in the South Eastern Europe, the Balkans and the Black Sea region. It is also the EU's sixth biggest trading partner. Öğütçü (2002) asked an interesting question in that sense: "How can a country which has a high economic potential fail to attract high level of FDI inflows?"

It is generally hypothesized that the negative economic and political climate of a country will flow affect the FDI activities more forcefully. The FDI decision involves three major determinants: economic, political- institutional and enabling environment (Öğütçü, 2002). It obvious that Turkey has a great advantage for foreign investors because it has a large domestic market and also of its geographical location. But Turkey is not so powerful in its political- institutional conditions. It is argued rightly that the chronic high inflation and the economic and political instability that lasted until 2000's; the widespread corruption; a weak and unpredictable legal system; failure of privatization until recently; the inadequate protection of intellectual property rights such as patents, trademarks and copyrights as well as the lack of the inflation accounting have acted as major obstacles of FDI inflow to Turkey (Erdilek (2003). But, with the strict rules and regulations that put forward by the IMF stabilization programs, the political stability during the 2000's and the starting of the negotiations for the full membership to European Union Turkey's international economic profile is improving as documented by the international valuation institutions. The governments have wanted to join into global economic and political networks in every sense.

In fact, since 2002 Turkey has adopted numerous legal changes in order to improve her investment environment. A major step was taken when the FDI Law is issued in 2003 where the requirement for obtaining permission from the Turkish government is completely abolished. In addition the formation of the Improvement of the Investment Environment Coordination Board (IIECB) was a crucial step because it represents a significant change in mentality towards foreign investment on the part of bureaucrats and politicians. With the new FDI Law, approved in June 2003, equal treatment principle was adopted, so that foreign investors acquire the same rights and obligations with that of domestic investors.

One of the interesting points in FDI phenomenon in Turkey is that: although the share of developing countries in FDI inflows in the world has increased especially during the last decade, Turkey was unable to benefit from that properly. That is to say, the share of Turkey in world's FDI inflows is about 0.35 percent between 1989- 1994. But, this share did not increase after these years. The share of Turkey was 0.17 percent and 0.10 percent in 1999 and 2003 respectively (Table 1).

As it is seen from Table 2 and Graph1, the FDI flows of Turkey have been in upward trend in general terms since 1980. But is it enough for a developing country? For Erdilek (2003), this upsurge does not seem that impressive as much of the rest of the world, including other developing countries, was much more successful than Turkey in attracting FDI.

Without concerning about an answer to such a question, we can admit that Turkey's tendency towards international cooperation in terms of FDI has been increasing; especially in the last three years. It is obvious that one of the main reason for why Turkey's share decreased in the beginning of the millennium is that the severe economic crisis of 1999 and 2001. As it is

mentioned before, the investors do not only look for the places that would bring more profit. The investor is always seeking for secure places both economically and politically. For that reason, the share of developed countries from FDI flows has increased in the beginning of 2000s.

As Table 2 does indicate, FDI is increased very rapidly in 2005 and after. In that year the rate of increase was more than threefold of the FDI of 2004 and again almost doubled in 2006. It should be added that the real estate investment was also increasing during the same period.

Inflows and Outflows

One of the main issues about the FDI is the relation or rather differences between inflows and outflows that gives the "net" FDI. The Graph 1 shows that during the last 25 years although inflows are outmatching the outflows the amount of the latter is increasing in especially the years of "after" crises, such as 1981-83, and again 1996 and 2000.

One of the important features of these figures is that the incredible increases in FDI inflows. Te amount of flows in 2006 is almost two times bigger that 2005. Moreover, in 2007, Turkey got 13.904 million dollars just in 8 months. This shows also that Turkey could pass beyond the success of 2005 (a whole year). Unfortunately, Turkey is not successful country in terms of outflow. In 2006, the amount of outflows was just 657 million dollars.

When all the values are taken into consideration, some trenchant ups and downs would be seen, particularly in the end years of 20th century. These changes are mainly caused by severe economic crisis that Turkey faced especially after 1990. For instance, the economic crisis due the incredible increase in foreign exchange values and interests (around 265 percent in one day) forced the government to take some precautions that were named as "5 April decisions". The other two crises shot Turkey in 1998 and 2001. The reasons of the FDI outflows in these years are definitely because of the instable economic condition of Turkey. To overcome the crisis, Turkish governments made agreements with IMF. With the help of strong economic measures, Turkey has increased its share in FDI activities in the world.

Another important point that should be given special emphasis is the sharp increase occurred after 2003. The government took an important step in FDI related policies. In order to attract more investments from abroad, the government made an important law; "Foreign Direct Investment Law" #4875 in July 2003. The main aim of that law is to regulate the principles to encourage the FDI; to protect the rights of foreign investors and to catch up the international standards in that manner. The law removes all the permits that should be taken from the government by the investors. It was believed that such kind of bureaucratic staff would fear the investors about the process. As it can be understood from the Table 2, the law has fulfilled its goal until now. The realized FDI inflows raised from 745 million of dollars in 2003 to 1.291 in 2004 and 8.536 in 2005 (See Appendix 2 for detailed graph). In other words, it can be stated that the share of FDI in economic activities raised 34.3 percent in the world whereas the same rate was 105,7 percent in Turkey. This is the one of the biggest increase in the world (Undersecretariat of Treasury, 2007).

According to World Investment Report 2007, the rank of Turkey in Inward FDI Performance increased from 99 (in 2005) to 73 (in 2006). We should admit that the FDI law would be very beneficial in that sense.

The five top entries in 2005 and 2006 are given below in Table C11.

BOX 1

FDI Attractiveness Score and Confidence Index of Turkey

Considering the benefits of FDI, attracting it has become a fierce competition among developing countries in last couple of decades. In order to attract more investment countries started to re-structure their political and economic policies, to adopt incentive regimes or to remove barriers in front of the foriegn investors.

The Attractiveness Score and the Confidence Index can be seen as different ways of profiling the countries about their FDI regime. The highest rank means the best condition for the investors.

FDI Attractiveness Score: It is obvious that investors does not only seek for profit while investing. They prefer countries that have well-functioning market economy and demand minimum bureaucratic requirements They compare countries on the basis of their respective *pocket list for investment* (See Appendix for the full list), which includes various information from political and economic stability to taxes, incentives, investment location, logistic costs, personnel costs, presence of skilled labor, costs and condition of infrastructure for transportation, telecommunication, and energy (TUSİAD and YASED, 2004). It should be admitted that a country cannot be the best in all subjects. That is to say, they will combine all the factors and the countries. The studies life attractiveness score or confidence index are expected to make contributions to countries and investors in that sense.

Turkish Industrialists' and Businessmen's Association (TUSIAD) and International Investors Association (YASED) accounted Turkey's FDI attractiveness index according to 31 subjetcs (such as general macroeconomic conditions, political environment, labour, energy, tax and incentives, infrastructure for transportation and telecommunication) and compare them with 15 countries. The data of the analysis is mostly taken from World Development Indicators (2003) of World Bank and World Competitiveness Yearbook (2003) of IMD (Institute for Management Development). Every subject has its own weight. The total of all factors determines the rank of a country.

Among 16 countries, Turkey is ranks 15th. Ireland is ranked as first.

http://www.tusiad.us/content/uploaded/turkey-foreign-direct-investment-attractiveness.pdf

The FDI Confidence Index tracks the impact of political, economic and regulatory changes on foreign direct investment intentions and preferences of leaders of top companies around the world. The leaders or the CEOs who were chosen from the largest 1000 companies were asked about their opinions of FDI activities and their intentions about the countries. The companies in that survey are responsible for about the 70 percent of world's FDI. The study includes also the country's physical and infrastructural assets.

According to the latest Confidence Index Study, published in 2005, China is seeded at the highest rank with its 2.197 index point. The second country is India and the third is USA. Their points are 1.951 and 1.420 respectively.

Turkey is 13th country on that Index. The interesting point is that Turkey's last year rank is 29. In other words, Turkey was one of the fastest ranking country in the Index. (At Kearney's Global Business Policy Council FDI Confidence Index 2005)

FDI by Countries

According to World Investment Report 2007, the FDI inflows increased in all three groups of economies: developed countries, developing countries and the transition economies of South-East Europe and the Commonwealth of Independent States. The flows to developing countries and the transition economies attained their highest levels ever: $379 billion (a 21 percent increase over those in 2005) and $69 billion (a 68 percent increase) respectively. Moreover, Turkey is counted as the major exporters of manufactures in the world. The others are: Brazil, China, Hong Kong (China), India, Republic of Korea, Malaysia, Mexico, the Philippines, Singapore, Taiwan Province of China, Thailand.

According to Table 5, USA and Netherlands were two most investors countries in 2006. Only Netherlands and United Kingdom's interests on Turkey have continued in these three years. The most striking increases in the amount of investments were realized by Australia, USA and Netherlands between 2005 and 2006. Besides, in 2006, Turkey's amount of FDI increased almost two times than 2005. The successful uptrend still continues in 2007.

The point that should be mentioned is the increasing share of the EU countries in FDI activities. According to the table, they are responsible for more than 60 percent of total inflow in 2006. The same rate is 42.3 percent in 2003 (UNCTAD, 2007). As a country, Netherlands and USA are the biggest investor countries in 2006.

In 2005 and 2006, most of FDI inflows were realized via mergers and acquisitions and privatization processes. In 2006, 154 mergers and acquisitions processes were realized in Turkey. The officially declared amount of 96 operations is around 18.3 billion dollars. 83 of 154 operations were made by foreign countries and 71 of them by Turkish companies (Undersecretariat of Treasury, Annual FDI Report - 2006). As an example, it is worth to mention that the amount of entry from Lebanon is almost 1.5 billion dollars coming from the sell of the government telecommunication institution to Oger Telecoms from the same country. The other important movement is the purchase of two Turkish Banks, Dışbank and Yapı Kredi by Belgian and Italian companies. In 2006, the amount of M&As in finance sector in Europe was around 61 billion Euro. It can be stated that the increase of financial movements in global is very interesting. Instead of the increase in production processes, the investors choose to invest in the areas of which they can get easy profits.

In 2007, the biggest investors countries are European countries (including the EU and non-EU countries) and the USA with the amounts of 7.125 billion dollars and 3.581 billion dollars respectively. They compromise 88.5 percent of total investments.

In terms of number foreign companies operating in Turkey is 17.400 until August 2007 and the share of the EU companies is 55.2 percent (9.606 companies). Most investor country is Germany with 3.007 companies. The second biggest investor is England with 1.719 companies. Concerning the other part of the world, USA and Iran, as a country, are the biggest investor countries (Table 6). The historical continuum of the tendency of Netherlands' firms is worth of further research. There are no ups and downs in the numbers of firms in all years.

In 2007, until the end of August, the number of firms of which the amount of equity capital is bigger than 500.000 dollars is 214. The EU and Near and Middle East countries are the leading regions with 123 and 33 firms respectively. On the other hand, mostly companies which have less than fifty thousand as equity of capital came to invest to Turkey.

Sectoral Distribution

The most FDI attractive sectors in Turkey, in 2006, are *Financial Intermediation* and *Transport, Storage and Communication*[*] sectors with the amount of 6.957 billion dollars and 6.7 billion dollars respectively (Table 8). The third biggest sector is manufacturing. The sectors that attracted small amount of FDI are *agriculture and electricity sectors*. Among the sub-sectors of Manufacturing, the leaders sector is *the manufacturing of food products and the manufacturing of chemicals and chemical products* with the amounts of 607 billion dollars and 602 billion dollars respectively.

Especially, the sector of financial intermediation in Turkey is very interesting for foreign investors. In 2006, two of the five biggest entry of FDI in terms of million $ are the buying of two Turkish Banks by foreigners. Denizbank and Finansbank are bought by Belgian and Greek companies respectively. On the other hand, there is also a sharp increase in the amount of entry regarding the telecommunication sector in 2006. Two biggest Turkish communication companies, Telsim and Türk Telekom, are sold to foreigners. Turk Telekom was a state owned company. That is to say, along with FDI attracting policies, the government is giving special emphasis also to privatization activities.

From the figures, it can be admitted that the foreigners are very much keen on investing in core sectors of Turkey such as telecommunication, financial and energy sectors. Notably, it is emphasized that the share of foreign investors in banking sector is about 60 percent of the whole. Moreover, Turkey is a dependent country to external sources in terms of energy. More that 80 percent of its demand has been met from abroad. Now, main energy companies like Petrol Ofisi, are managed by foreign investors. This is also an interesting point that calls for further studies.

In terms of the seeding according to the number of companies, different picture is seen. Wholesale, real estate and manufacturing sectors are the biggest respectively. The number company operating in wholesale and retailing sector is in 2006. The grand total (since 1954 until August 2007) is 5.491.

[*] In this report, the sector classification of the Undesecretariat of Treasury is used.

BOX 2

PERMITS

Until the June of 2003, the investors should take permits from the government for their investments. That is to say, the investment operations were bound to a set of rules and regulations.

But, in 2003, all the permits were abolished by the government. Because, it was thought that the permission process was too slow and bureaucratic which might make the investor to worry about the process and might avoid from the investment. The investor looks obviously for better places, like politically secure countries or economically stable regions, to operate. In order to attract the foreign investor, the government has desired to provide best conditions for the investor. For that reason, it established the Law of FDI (#4875).

It will be beneficial to investigate to look at the period before the removal of all the barriers. For example, in 1981 the amount of permission in 1981 is 338 million dollars. But the realized inflows were around 141 million dollars. On the other hand, in 2003, the total amount of permission was 1.208 million dollars. But, the realized inflows were still very few in amount with 745 million dollars. The table given above gives the clear historical development of permits and inflows.

FDI by Years with annual permits (in million dollars)

Years	Annual Permission	Realized Inflows
1981	338	141
1985	235	99
1990	1.861	684
1995	2.938	934
2000	3.477	1.707
2001	2.725	3.374
2002	2.243	622
2003	1.208	745

*Source: Undersecretariat of Treasury

The most striking feature of the table is the obvious difference between the amounts of permissions and realized inflows. One of the main reasons behind may be that despite the given permission, the investor may not want to invest at that time (Candemir, 2007). Another reason, the period of investment may exceed the time of give permission.

Only in 2001, the amount of realized inflows was higher than the permission. It can be concluded that Turkey cannot improve its ability of attracting foreign investors despite the permissions. As it will be mentioned later, this problem has still existed today also. Although Turkey has attracted more FDI after the removal of permissions, it cannot get benefit as it is expected. The share of Turkey in the global FDI flows is very low.

In 2006, the number of the firms in Wholesale and Retailing sector is 862 which is the highest number (Table 9). 724 companies operated in Real Estate, Renting and Business Activities sector. Unfortunately, the manufacturing sector is at third level with 459 companies. But, in total manufacturing is the second biggest sector in terms of the number of companies.

Sectoral Breakdown of FDI according to OECD and SPO Classifications

In order to stimulate industrial growth of Turkey, State Planning Organization (SPO) gives special emphasis to the studies on industrial sectors. SPO makes a classification of industries according to the types of goods for better planning especially in manufacturing sector since it covers many sub sectors. The classification is as: Consumption Goods, Intermediary Goods and Investment Goods. (See the Appendix for detailed list- Table 12)

It can be stated that Turkey is not a successful country in terms of attracting high technology sectors. It is accepted that knowledge and technology are the most powerful aspects in the global economy. The developing countries should improve their technological capacities in order to compete equally with the developed countries. But, as it can be observed in Turkey case, most of developing countries cannot successfully provide science and technology policies in that sense. Turkey R&D capacity and expenditures are still at very low levels when it is compared to developed countries. For that reason, for Turkey, it will be necessary to attract foreign high- tech capacities to the country. By creating technology spillovers with proper policies, Turkey may stimulate its technological and information capacity at high levels. But, in order to do that, the national policies should be implemented properly and urgently.

As it can understood from Table 9, Turkey's capacity of technology remains very low. Unfortunately, only in two sectors Turkey has attracted high amount of investment; one is food and beverages and the other is manufacturing of chemical products. That means also, these two sectors can be considered also as sectors that have low- level of technological capacity. Turkey should directly establish necessary policies in order to attract sectors which have high technological capacities. In that way, Turkey can generate dissemination of knowledge around the country and stimulate its capacity.

As it is mentioned before, manufacturing is the third sector according to the number of companies investing in Turkey (see Table 8). Unfortunately, there is no much company with high or medium technological capacities operating in Turkey. The institutions should give special emphasis to attract high- tech companies to Turkey. For example, special incentive mechanisms may be provided for such companies. The technological spillover that will be created will stimulate the capacity of domestic firms also.

Survey of Empirical Studies of FDI-related Spillovers for the Turkish Economy

Productivity spillovers

Spillover analysis has become an important debate for developing economies especially after 1980s. This is due to the fact that the globalization wave after 1980s affects all developing countries and causes a policy shift towards more liberal policies in these countries. This fact is valid for Turkey as well who faces a policy change from import substituting industrialization to export-promoting industrialization policies in 1980s.

Although there was a policy change in 1980, the stock and inflows of FDI to Turkey was relatively negligible till the end of the 1980s. Since this negligible amount of FDI has no significant impact on economic development, there is no quantitative study examining the impact of FDI on Turkish economy at the sector or firm-level until the 2000s. Also, another reason of limited studies on analysis of impacts of FDI is "the availability of disaggregated

data" problem on the performances of both domestic and foreign firms (Aslanoğlu, 2000). The considerable amount of FDI inflows to Turkey after 1990s makes spillover analysis an important debate for Turkey, although the data problem still exists[20].

Aslanoğlu (2000) is the first study about spillover effects of FDI on Turkish manufacturing industry. He uses regular survey results of Istanbul Chamber of Commerce (ISO) on the largest 500 industrial firms of Turkey as data source. In this study, spillover effects of FDI are examined by five single equation econometric models using the data of the largest 500 firms in 1993. For some variables which need data for different time periods, the data of 1988 is used. According to the ISIC (International Standard of Industrial Classification) 3-digit industrial classification, 28 sectors of the manufacturing industry are analyzed. In terms of composition of capital, firms having at least 15% of foreign share are considered as foreign firms.

The first two models estimate the spillover effects of the presence of foreign firms on the productivity and competitiveness of domestic firms. Different proxies for the presence of foreign firms such as the share of foreign firms in total employment, total sales of an industry, total gross value added or total net assets of an industry are used in these models.

The three remaining models measure the importance of technology gap on the productivity of domestic firms. Estimation results suggest that while the presence of foreign firms increases competition in domestic industries, there is no significant contribution on the productivity of domestic firms. According to two of the remaining three models, no significant relation is found between domestic and foreign firms in terms of the impact of technology gap on the productivity and market growth of domestic firms. The final model estimates the impact of the initial technology gap on the change in technology gap in the course of time and a significant correlation is found. The conclusion of the study is that if locational advantages of the country are developed by proper policies, spillover effects on the domestic industries could be materialized with the rising competition, which has already brought into by the presence of foreign firms.

In Alıcı and Ucal (2003), the developments in Turkish economy in relation to growth rate, export and FDI are investigated using Granger causal relationship in macro level. The effect of Turkey's liberalization process on economic growth is demonstrated by investigating a Granger causal relationship running from exports to economic growth in Turkey from 1987-I to 2002-IV. Additionally, causality tests among trade, FDI and output for the same period are performed to show the inter-relatedness of trade, FDI and growth. Three variables were utilized in the model: export, industrial production and FDI. Although this paper does not concentrate on the manufacturing industry in terms of FDI-led growth, it is one of a few empirical studies which are analyzing FDI and growth relationship and the spillover effects in Turkey.

According to estimation results, industrial production and export are causally related in the long run, and the Granger causality is unidirectional running from export growth to output growth. There exists no causality link between FDI-industrial production and FDI-export, in other words for the Turkish economy it is not found any significant positive spillovers from FDI to export suggesting a kind of FDI-led export growth linkage.

The results of this study are in line with the export-led growth (ELG) hypothesis, but do not confirm the existence of FDI-growth relationship. The results indicate that the integration of the Turkish economy with the world economy should be enhanced with policies to attract more FDI in order to gain the spillover effects of FDI to output and FDI-led export growth.

[20] See also, Omuzlu Aksoy (2008).

According to the findings of this study, Turkey's outward looking development strategy should include FDI as an essential part in addition to export-promotion strategy followed from 1980 on.

Lenger and Taymaz (2004) is another quantitative study about productivity spillovers in Turkish manufacturing industry. This study examines the role of TNCs as creator and diffuser of new and superior technologies. The role of TNCs is discussed with respect to the spillover effects those firms create on domestic firms. The question of the study is whether size of the recipient firms and the R&D intensity matter in productivity spillovers from the activity of TNCs, and whether spillovers change as time goes by.

The empirical investigation utilizes a longitudinal data over the 1983-2000 period consisting of 28 industries in three-digit level in various categories such as public firms, and private small, medium and large sized firms in Turkey. The data set used in this study was obtained from Turkish Statistical Institute (TurkStat).

According to results of the study, there are negative spillover effects in Turkish manufacturing industry although spillovers from TNCs for the domestic sector of the Turkish manufacturing industry differentiate with respect to time and to some industry specific characteristics. Foreign market share has a negative and significant spillover effect on all industries but the sign of this spillover turns to positive when one period lagged value of market share of TNCs employed. Spillover effects can vary with respect to ownership structure, size categories and R&D profile of industries. For example, small and large firms get negative spillovers from the activities of TNCs whereas there is no evidence of any kind of spillover for public firms and medium sized firms. However, this explanation does not hold in the case of low tech medium sized firms that are exposed to negative competition effect.

One of the most important conclusions derived from the theoretical and empirical literature review is that technological capability is the major determinant in the process of benefiting from productivity spillovers potentially available in Turkish manufacturing industry. Therefore, this intuitive thinking lends some support to the interpretation of the gap between productivity of domestic and foreign industries such that the domestic firms were exposed to negative spillover effects. Econometric analysis precisely and strongly supports this argument.

Lenger and Taymaz (2006) is an empirical study estimating the impact of horizontal, vertical and labour spillovers on technological activities of Turkish manufacturing firms. They model and estimate the determinants of two types of technology acquisition, innovation and technology transfer, respectively; and test whether foreign ownership matters for technology decisions. They test whether foreign firms are more likely to transfer technology from abroad, and whether they have any impact on the technology transfer decisions of domestic firms.

Their model consists of a number of firm- and sector-specific factors and a number of variables are defined as proxy for horizontal, vertical and labour spillovers. The data on innovativeness are collected by TurkStat through two Innovation Surveys following the methodology set by the Oslo Manual (OECD, 1997), and the Community Innovation Survey of the European Union. The first survey conducted in 1998 covers the period 1995–1997 and the second one conducted in 2002 covers the period 1998–2000. The data on technology transfer come from the Annual Survey of Manufacturing Industries, collected by the TurkStat.

Their analysis shows that foreign firms are more innovative than their domestic counterparts, and transfer technology from abroad (mostly from their parent companies). Horizontal spillovers from foreign firms seem to be insignificant. The effects of foreign firms on technological activities of other firms in vertically related industries are ambiguous. High-tech

suppliers tend to have a high rate of innovation when the share of foreign users is high, but the opposite is true for users: high-tech users supplied mainly by foreign firms tend to have a lower rate of innovation. Labour turnover is found to be the main channel of spillovers. Their findings repeat the importance of tacitness of knowledge, and confirm that technology cannot easily be transferred through passive mechanisms.

Another econometric study estimating the effects of FDI on productivity and development in the Turkish economy is Ayvaz, Baldemir and Ürüt (2006). They investigate whether there are externalities of fully foreign-owned firms to the labour and capital productivity of local and public enterprises.

The data used in this study is obtained from the Largest 500 Industrial Cooperation study of Istanbul Chamber of Industry for the manufacturing sector in 2001. The data is classified as fully foreign-owned firms, domestic firms and public firms. The model analyzes whether there is positive spillover effects from foreign firms on total labour productivity.

According to empirical results, there is no difference between domestic and foreign firms in terms of externality effects of foreign presence in the sector. Also, there are positive spillover effects of foreign share in Turkish manufacturing industry. The study concludes that domestic firms must increase their capital and labour resources to compete with foreign firms.

However, there is a problematic aspect of this study. Their analysis does not produce results about spillover effects. According to regressions, only the difference between foreign-owned and domestic firms in terms of productive efficiency is tested. For this reason, the empirical results of this study are not reliable enough.

Yılmaz and Özler (2004) analyzes direct and indirect effects of foreign ownership on productivity using plant-level data for Turkish manufacturing industry between 1990 and 1996. Productivity measures are obtained from Olley-Pakes production function estimates. This paper aims to identify horizontal and vertical linkages at the plant level and hence improve over the results with industry-based measures of linkages instead of proposing a new methodology or an approach to the analysis of FDI and productivity spillovers. A disaggregated database on products sold and inputs purchased by manufacturing plants in Turkey is used to identify linkages.

In this study, data set is collected by TurkStat for the Turkish manufacturing industry. Sample consists of plants with 25 or more employees and is limited only on private establishments.

According to Olley-Pakes production function estimations using total factor productivity measures; the following results are obtained. First, foreign affiliates are shown to be more productive than local plants. Furthermore, majority foreign-owned foreign affiliates are more productive than minority foreign-owned foreign affiliates, and fully foreign-controlled plants are more productive compared to majority foreign-owned foreign affiliates.

Second, using sectoral output shares of foreign affiliates as a measure of horizontal linkages, and 1990 input-output flows to identify vertical linkages, regression results support the presence of productivity spillovers from foreign affiliates to local plants through horizontal and forward linkages. However, the coefficient estimates on linkage measures are sensitive to the inclusion of other linkages.

When the plant level data is used on the value of output and inputs to obtain product-based measures of horizontal and vertical linkages, the regression results do not fully support the results obtained with the industry-based measures of linkages. Statistically meaningful positive spillovers are found to be generated through backward linkages only. The magnitude of spillover effects are much smaller than the ones obtained with industry-based measures.

Another paper testing FDI spillovers is Bertinelli, Pamukçu and Strobl (2007). They test for the existence of intra-industry FDI spillovers in the Turkish manufacturing sector over the period 1983-1994 by using firm-level data that come from the Annual Surveys of Manufacturing Industry of TurkStat. This dataset covers all establishments in the manufacturing industry employing ten or more employees.

In this study, an index of total factor productivity in local firms is used as dependent variable. To analyze productivity spillovers, different indicators are used as explanatory variables like the share of foreign enterprises in the number of employees or in gross output at the four-digit sector level. Also, some control variables are included in estimations either firm-level or sector-level such as scale, skill level, Herfindahl index, import penetration and relative productivity. Firm-specific and sector-specific determinants of productivity level are introduced in the regressions accompanied with an interaction term in order to find out whether productivity gaps existing between foreign and local firms exert a positive or negative effect on the productivity of local firms. Other interaction terms are also added to the productivity equation in order to figure out whether explanatory variables reduce or increase a possible spillover effect.

According to estimation results, activities of foreign firms in the Turkish manufacturing sector do not generate any spillover that impact positively on local firms' productivity levels. In this study, four spillover indicators are used and all point to a negative spillover effect. The results of estimations with interaction terms show that productivity of firms that face extensive import competition and have a large market share benefit less from FDI-based spillovers.

As a result, there are some critical points to mention for all these empirical studies. Firstly, firm-level studies use Istanbul Chamber of Commerce (ISO) data while sector and plant-level studies use TurkStat data. Although dataset obtained by annual reports on 500 largest firms of ISO do not include all industrial value added, it is the most reliable dataset for the firm-level spillover analyses. In this context, the desegregation level of data is an important factor in terms empirical results. Secondly, these studies differ in terms of the cross-section or panel data. This may be a reason of different results of the spillover analyses.

Thirdly, spillover effects are analyzed using total factor productivity or labour productivity as a dependent variable. Different foreign share variables such as the share of foreign firms in total employment, total sales of an industry, total gross value added or total net assets of an industry are used as spillover measures. Modelling with these measures, some studies provide negative results while most of the studies produce positive results either significant or significant. The intuition behind the negative results is the gap between productivity of domestic and foreign industries since technological capability is the major determinant in the process of benefiting productivity spillovers potentially available in Turkish manufacturing industry according to empirical and theoretical literature.

The empirical studies mentioned above are shown in Table 3.3. Table 3.3 provides a comparison of the empirical studies about Turkey in terms of period covered, data used, aggregation level, variables chosen and the result obtained.

Wage spillovers

In contrast with the aforementioned studies of FDI-related productivity spillovers in the Turkish manufacturing industry, there is only one econometric study pertaining to wage spillovers and that is the one in Demeulemeester and Pamukçu (2002).

In their paper pertaining to the Turkish manufacturing sector, authors use around 5,000 plant each year from 1987 to 1992 (32,493 observations) and make use of panel data techniques in

order to take into account the time series and cross-sectional dimensions of their sample. A Hausman test rejects the random effects estimation method in favor of fixed effect method, pointing to the importance of firm-level fixed effects among the determinants of wage rates. Authors, however, estimate a static wage equation and not a dynamic one, and therefore fail to take into account persistency observed in wage rates.

Their findings can be summarized as follows: (i) all else equal, foreign-owned firms actually pay higher wages in domestic firms, due to the intangible assets they possess and (ii) domestic firms pay higher wages thanks to the foreign presence in their industry, i.e. FDI-related wage spillover effects due to productivity spillovers and labor demand effect arising from foreign presence. They conclude that FDI exerted positive effect on the Turkish economy via its positive impact on wages.

Appendix

Table 1: Global FDI Indicators (current prices, billion dollars)

	1982	1990	2003	2004	2005	2006
FDI Inflows	59	208	633	648	946	1.306
FDI Inward Stock	628	1.769	7.987	8.902	10.048	11.999
Cross- border M&As	--	151	297	381	717	881
Sales of foreign affiliates	2.765	5.727	16.963	18.677	21.394	25.177
Gross product of foreign affiliates	647	1.476	3.573	3.911	4.184	4.862
Exports of foreign affiliates	730	1.498	3.073	3.690	4.197	4.707
Total assets of foreign affiliates	2.113	5.937	32.186	36.008	42,637	51.187
Employment of foreign affiliates ('000)	19.579	24.471	53.196	57.394	63.770	72.627
GDP (in current prices)	11.758	22.610	36.327	40.671	44.486	48.293
Gross fixed capital formation	2.398	4.905	7.853	8.869	9.115	10.307
Exports of goods and services	2.247	4.261	9.216	11.069	12.588	14.120

Source: UNCTAD- World Investment Report 2007

Table 2: International Direct Investment Inflows (million US$)

International Direct Investment Total (Net)	**982**	**3.352**	**1.137**	**1.752**	**2.883**	**10.027**	**19.982**	**12.908**	**13.904**
International Direct Investment Capital	**982**	**3.352**	**1.133**	**754**	**1.540**	**8.186**	**17.060**	**10.820**	**12.315**
Equity Investment (Net)	**982**	**3.352**	**617**	**737**	**1.191**	**8.135**	**17.052**	**10.831**	**12.029**
Inflow	1.707	3.374	622	745	1.291	8.536	17.709	10.893	12.086
Liquidation Outflow	-725	-22	-5	-8	-100	-401	-657	-62	-57
Intra Company Loans*	**--**	**--**	**516**	**17**	**349**	**51**	**8**	**11**	**286**
Real Estate (Net)	**--**	**--**	**--**	**998**	**1.343**	**1.841**	**2.922**	**2.088**	**1.589**

Loans which companies with foreign capital take from foreign patners ** Provisional Data,
Source: Central Bank of Republic of Turkey

Table 3: FDI flows in the Turkish economy (1981-2007)

	Permits		Realized		Net
Years	**Cumulative**	**Annual**	**Inflows**	**Outflows**	
1981	338	338	141	46	95
1982	505	167	103	48	55
1983	608	103	87	41	46
1984	879	271	113	0	113
1985	1.114	235	99	0	99
1986	1.478	364	125	0	125
1987	2.133	655	115	0	115
1988	2.954	821	354	0	354
1989	4.466	1.512	663	0	663
1990	6.327	1.861	684	0	684
1991	8.294	1.967	907	97	810
1992	10.114	1.820	911	67	844
1993	12.178	2.063	746	110	636
1994	13.655	1.477	636	28	608
1995	16.593	2.938	934	49	885
1996	20.429	3.836	914	192	722
1997	22.107	1.678	852	47	805
1998	23.754	1.647	953	13	940
1999	25.454	1.700	813	30	783
2000	28.931	3.477	1.707	725	982
2001	31.656	2.725	3.374	22	3.352
2002	33.899	2.243	622	5	617
2003	35.107	1.208	745	8	737
2004			1.291	100	1.191
2005			8.536	401	8.135
2006			17.719	657	17.062
2006			7.778	62	7.716
2007			11.065	34	11.031
Total			**55.209**	**2.720**	**52.489**

Source: Central Bank of Turkey, State Planning Organization, Undersecretariat of Treasury

Table 4: Breakdown of FDI inflows according to home country (million US$)

Eu Countries (25)	**455**	**555**	**1.025**	**5.003**	**14.586**	**9.933**	**7.125**
Germany	86	142	73	391	366	270	587
France	22	120	34	2.107	444	337	66
Netherlands	73	50	568	383	5.122	4.903	2.021
United Kingdom	8	141	126	165	635	378	492
Italy	241	1	15	692	209	36	63
Other EU Countries	25	101	209	1.265	7.810	4.009	3.896
Other European Countries (Non-EU)	**64**	**70**	**109**	**1.650**	**84**	**72**	**222**
African Countries	**0**	**0**	**--**	**3**	**32**	**14**	**3**
USA	**2**	**52**	**36**	**88**	**851**	**449**	**3.581**
Canada	**7**	**6**	**61**	**26**	**121**	**115**	**8**
Middle America and Caribbeans	**0**	**0**	**--**	**8**	**33**	**22**	**17**
South America					**1**	**1**	**467**
Asia	**70**	**60**	**60**	**1.756**	**1.946**	**280**	**637**
Gulf Countries	5	0	--	1.675	1.791	245	100
Near and Middle East	0	1	54	3	124	25	175
Other Asian Countries	65	59	6	78	31	9	362
Australia	**0**	**0**	**--**	**1**	**108**	**--**	**26**
Non- cilassified	**24**	**2**	**--**	**1**	**7**	**7**	**--**
Total	**622**	**745**	**1.291**	**8.536**	**17.769**	**10.893**	**12.086**

Provisional Data , 2007 August

Source: The Undersecretariat of Treasury- International Direct Investment Information Bulletin- October 2007

Table 5: Breakdown of companies with international capital according to their home country (number of companies)

Eu Countries (25)	**2.158**	**263**	**252**	**227**	**468**	**1.067**	**1.684**	**2.088**	**1.371**	**1.399**	**9.606**
Germany	775	78	65	64	153	383	509	600	381	380	3.007
Netherlands	338	64	38	44	73	142	214	276	182	170	1.359
United Kingdom	272	31	42	36	67	144	341	487	302	299	1.719
Diğer AB Ülkeleri	773	90	107	83	175	398	620	725	506	550	3.521
Other European Countries (Non-EU)	**501**	**41**	**42**	**48**	**144**	**283**	**349**	**396**	**256**	**330**	**2.134**
African Countries	**61**	**4**	**8**	**14**	**30**	**44**	**61**	**42**	**31**	**33**	**297**
North America	**272**	**36**	**38**	**44**	**61**	**108**	**118**	**144**	**85**	**90**	**911**
USA	254	32	36	40	53	96	104	118	72	71	804
Canada	18	4	2	4	8	12	14	26	13	19	107
Middle and South America, Caribbean	**33**	**5**	**6**	**2**	**5**	**12**	**17**	**10**	**8**	**15**	**105**
Near and Middle East Countries	**842**	**65**	**74**	**112**	**270**	**380**	**415**	**438**	**296**	**346**	**2.942**
Azerbaijcan	63	7	12	13	38	61	63	87	56	74	418
Iraq	119	10	13	26	40	54	64	78	52	73	477
Iran	269	15	19	26	109	131	126	112	81	70	877
Others	391	33	30	47	83	134	162	161	107	129	1.170
Other Asia	**234**	**24**	**48**	**28**	**112**	**166**	**177**	**180**	**109**	**208**	**1.177**
China	61	10	17	13	46	58	34	27	11	36	302
South Korea	34	3	11	2	15	19	18	13	8	15	130
Others	139	11	20	13	51	89	125	140	90	157	745
Other Countries	**40**	**9**	**9**	**20**	**15**	**35**	**24**	**52**	**45**	**24**	**228**
Total	**4.141**	**447**	**477**	**495**	**1.105**	**2.095**	**2.845**	**3.350**	**2.201**	**2.445**	**17.400**

Source: Undersecretariat of Treasury

Table 6: Breakdown of companies with international capital by home country according to size of equity capital (2004-2007) (number of companies)

Eu Countries (25)	**1.117**	**405**	**84**	**78**	**1.684**	**1.281**	**531**	**137**	**139**	**2.088**	**819**	**365**	**92**	**123**	**1.399**
Germany	333	122	32	22	509	363	162	44	31	600	211	113	29	27	380
Netherlands	140	54	10	10	214	172	58	21	25	276	104	31	12	23	170
United Kingdom	248	71	13	9	341	320	133	14	20	487	182	84	18	15	299
Diğer AB Ülkeleri	396	158	29	37	620	426	178	58	63	725	322	137	33	58	550
Other European Countries (Non-EU)	**230**	**79**	**27**	**13**	**349**	**242**	**104**	**27**	**23**	**396**	**185**	**95**	**31**	**19**	**330**
North African Countries	**28**	**12**	**2**	**--**	**42**	**18**	**5**	**1**	**--**	**24**	**9**	**10**	**0**	**1**	**20**
Other African Countries	**13**	**6**	**--**	**--**	**19**	**12**	**5**	**1**	**--**	**18**	**6**	**6**	**1**	**0**	**13**
North America	**75**	**28**	**9**	**6**	**118**	**91**	**31**	**12**	**10**	**144**	**60**	**15**	**7**	**8**	**90**
USA	68	23	8	5	104	75	26	9	8	118	49	9	7	6	71
Canada	7	5	1	1	14	16	5	3	2	26	**11**	**6**	**0**	**2**	**19**
Middle and South America, Caribbeans	**10**	**2**	**2**	**3**	**17**	**4**	**3**	**--**	**3**	**10**	**13**	**0**	**0**	**2**	**15**
Near and Middle East	**245**	**132**	**27**	**11**	**415**	**231**	**152**	**34**	**21**	**438**	**160**	**121**	**32**	**33**	**346**
Azerbaijcan	41	21	1	**--**	63	44	35	3	5	87	33	29	6	6	74
Iraq	32	25	5	2	64	35	34	5	4	78	35	28	9	1	73
Iran	71	45	7	3	126	68	39	5	--	112	36	24	6	4	70
Others	101	41	14	6	162	84	44	21	12	161	56	40	11	22	129
Other Asian Countries	**111**	**48**	**8**	**10**	**177**	**106**	**46**	**19**	**9**	**180**	**107**	**58**	**19**	**24**	**208**
Other Countries	**9**	**8**	**3**	**4**	**24**	**34**	**12**	**1**	**5**	**52**	12	5	3	4	24
Total	**1.838**	**720**	**162**	**125**	**2.845**	**2.019**	**889**	**235**	**207**	**3.350**	**1.371**	**675**	**185**	**214**	**2.445**

Source: The Undersecretariat of Treasury

Table 7: Sectoral distribution of FDI inflows (million dollars)

Agriculture, Hunting and Forestry	**0**	**1**	**4**	**5**	**5**	**0**	**0**
Fishing	**0**	**0**	**2**	**2**	**1**	**0**	**3**
Mining and Quarrying	**2**	**14**	**75**	**40**	**122**	**70**	**318**
Manufacturing	**110**	**448**	**214**	**788**	**1.867**	**1.070**	**2.576**
Food Products and Beverages	14	249	78	68	607	575	253
Textiles	10	8	14	183	27	15	32
Chemicals and Chemical Products	9	9	39	174	602	250	851
Machinery and Equipment n.e.c.	13	17	8	13	54	51	24
Electrical Machinery and Apparatus	2	4	2	13	53	41	75
Motor Vehicles, Trailers and Semi-trailers	33	145	35	106	63	45	63
Other Manufacturing	19	14	38	227	458	93	1.278
Electricity, Gas and Water Supply	**68**	**86**	**69**	**4**	**112**	**111**	**537**
Construction	**3**	**8**	**23**	**80**	**293**	**149**	**242**
Wholesale and Retail Trade	**89**	**92**	**103**	**68**	**1.167**	**1.124**	**79**
Hotels and Restaurants	**0**	**4**	**1**	**42**	**23**	**12**	**12**
Transport, Storage and Communications	**1**	**2**	**639**	**3.285**	**6.700**	**4.876**	**461**
Financial Intermediation	**260**	**51**	**69**	**4.016**	**6.957**	**3.187**	**7.384**
Real Estate, Renting and Business Activities	**0**	**6**	**3**	**29**	**93**	**56**	**446**
Health and Social Work	**5**	**23**	**53**	**74**	**265**	**162**	**17**
Other Community, Social and Personal Activities	**84**	**10**	**36**	**86**	**104**	**76**	**11**
Total	**622**	**745**	**1.291**	**8.536**	**17.709**	**10.893**	**12.086**

Provisional Data- August 2007
Source: Undersecreteriat of Treasury

Table 8: Classifications of Manufacturing Industries According to Technology Intensity

The Classification of the State Planning Organization for Manufacturing Goods

CONSUMPTION GOODS	INTERMEDIARY GOODS	INVESTMENT GOODS
Food Products, Beverages, Tobacco Products, Textiles, Wearing Apparel, Leather and Leather Products	Wood and Cork Products, Paper and Paper Products, Printing and Publishing, Coke and Petroleum Products, Chemicals, Fertilizers, Rubber and Plastic Products, Glass Products, Cement Products, Ceramic, refractory, non-metallic minerals, Iron and Steel, Nonferrous Metals	Fabricated Metal Products, Machinery, Agricultural Machinery, Computing Machinery, Electrical Machinery, Motor Vehicles, Shipbuilding, Railway Vehicles, Aircraft, Other Industries

Source: www.dpt.gov.tr

The OECD Classification of Industries Based on Technology (ISIC rev.2)

High-technology Industries	Medium- high-technology industries	Medium- low- technology Industries	Low- technology Industries
Aircraft, Office& computing equipment	Professional goods	Rubber& plastic products	Paper, products& printing
Drugs& medicines	Motor vehicles	Shipbuilding& repairing,	Textiles, apparel& leather
Radio, TV& communication equipment	Electrical machines excl. comm. equip.	Other manufacturing	Food, beverages& tobacco
	Chemicals excl. drugs	Non- ferrous metals	Wood products& furniture
	Other transport,	Non- metallic mineral products	
	Non- electrical machinery	Metal products	
		Petroleum refineries& products	
		Ferrous metals	

Source: www.oecd.org

List of Categories and Factors for Attractiveness Score

1. General macroeconomic condition of local market

Gross Domestic Product ("GDP") per capita

Domestic market size and growth prospects

Stability of macroeconomic conditions

Strength of financial institutions and financial possibilities, % of GDP

Public budget surplus/deficit

Credit flows from financial institutions

2. Political environment and public governance

Political stability

Legal framework

Bureaucratic procedures

Bribing and corruption

Laws concerning the encouragement of foreign capital

3. Labor

Labor cost

Productivity of labor force

Skilled workforce

Percentage of labor force

4. Energy

Cost

Energy consumption

5. Taxes/Incentives

Average corporate tax rate on profit

Collected corporate tax

Taxes on goods and services, % of total current revenue

Taxes on international trade, % of total current revenue

Other taxes, % of total current revenue

Tax incentives and grants

6. Infrastructure for transportation and telecommunication

Roads, density of networks

Railroads, density of networks

Water transportation

Air craft departure

International fixed telephone costs

Internet cost

Local telephone cost

7. Research and development ("R&D")

Expenditures for R&D, % of GDP

Econometric Analysis of the Impact of FDI-related Spillovers on the Turkish economy

Data

The main data source is the Longitudinal Database of the Statistical Institute of Turkey (Turkstat)[21]. Turkstat conducts *Annual Surveys of Manufacturing Industries* (ASMI) at private establishments with 10 or more employees and all public establishments.

The Turkish Statistical Institute (TurkStat) collects the plant level dataset used in this study. TurkStat periodically conducts Census of Industry and Business Establishments (CIBE).[22] In addition, the TurkStat conducts Annual Surveys of Manufacturing Industries (ASMI) at establishments with 10 or more employees.[23] The set of addresses used during ASMI are those obtained during CIBE years. In addition, every non-census year, addresses of newly opened private establishments with 10 or more employees are obtained from the chamber of industry.[24] For this study we use a sample that matches plants from CIBE and ASMI for the 1983-2000 period.[25]

The data is well suited for our purposes because it contains information on variables that are commonly used in estimation of firm level production functions. Specifically, the data includes value of sales, number of employees, values of material inputs, electricity, fuels and investment. Since the CIBE does not include plant with less than 10 employees, even though, not all the key variables needed for this study have been collected for establishments in the 10-24-size group. Thus our sample consists of plants with 10 or more employees. [26]

For this study we limited the sample for the post 1983 period, mainly because questions on foreign ownership in the Turkish manufacturing industry were added to the ASMI questionnaire in 1983 for the first time.

The data, especially on employment and production, have been carefully controlled by the Turkstat staff during the annual surveys, and the firms were contacted again if inconsistencies were detected. We also checked the data for "outliers" for ratio variables, and outliers were replaced by averages of the previous and next years' values, if the data on these years were available. Otherwise, the outliers were assigned as "missing". On average, the proportion of outliers was less than 2 percent of plant-year observations.

Note that "establishment" is the statistical unit in the database. An "establishment" (or "plant") is defined as a functional and decision-making unit that operates at a single location. All data, including the accounting data, are collected at the establishment level.

It should be pointed out here that our analysis of the determinants of FDI-related spillovers on firm-level productivity and wages will be carried over the period 1983-2001. The main reason

[21] Note that "State Institute of Statistics" (SIS) was the official name of the institution before 2005.We prefer to use the new name along this study, even though our datasets come from the pre-2005 period.

[22] Since the formation of the Turkish Republic CIBE has been conducted 7 times (in 1927, 1950, 1963, 1970, 1980, 1985, and 1992).

[23]TurkStat also collects data on establishments with less than 10 employees. However, up to 1992 data on these establishments were collected only during CIBE years. Since then TurkStat collects annual data for a small sample of establishments with less than 10 employees.

[24] Thus plant entry can be observed in every year of the sample. Though not reported here, in the CIBE years we observe a larger number of new plants, and a higher fraction of smaller plants. Both of these observations reflect the concerted effort by the TurkStat to include all establishments in the CIBE years.

[25] The ASMI and CIBE data are available in a machine-readable form starting from 1980. For this study we limited the sample for the post 82 period primarily because in the years prior to 1983 the quality of data is less reliable and much work is needed for its improvement and that data on FDI is available on from 1983 on.

[26] During the 1983-92 period 10-24 size group, and 24+ group were administered different survey forms.

this period ends in the year 2001 is that statistical units surveyed in ASMI has changed from 2001 onward. Indeed, whereas establishments were surveyed period to year 2002 "enterprises" were surveyed afterward, and an enterprise can – and will most probably – include several establishments so that we can not match units surveyed by ASMI before 2002 with those surveyed after this year[27]. ASMI's name itself changed and became "Structural Business Statistics Survey".

We provide below data in order to draw a recent picture of the Turkish manufacturing industry.

The evolution of the relative importance of nine industries within the manufacturing sector over the period 1995-2001 is presented in Tables 28-30 in terms of the distribution of employment, value added and number of firms.

It turns out that food-beverage-tobacco (ISIC 31) and textile-wearing apparel-leather products (ISIC 32) have together accounted for half of the manufacturing sector in terms of the aforementioned variables-and their share is relatively stable. Note that the share of the second sector is the double of the share of the second sector as far as employment and number of firms are concerned, but not in terms of value added. These figures point to the importance of labor intensive and low (medium) technology activities in the Turkish manufacturing sector by the late nineties.

Another major sector is fabricated metal products, machinery and equipment sector (ISIC 38). This sector is more heterogeneous compared to the two previous sectors: indeed, it contains low-, medium- as well as high technology sectors – manufacture of fabricated metal products (381), manufacture of transport equipment (384) and manufacture of professional and scientific instruments (385), respectively. The share of this sector is relatively stable over the period 1995-2001: it accounts on average for 20 % of all the three variables included in Tables 3.1 to 3.3.

Finally, another major sector is ISIC 35 (chemicals and chemical, petroleum, coal, rubber and plastic products): although its share in manufacturing employment and number of firms is much lower than the three previous sectors, its weight in sector-level value added increased from 19.1 % in 1995 to 30.3 % in 2001. This divergent evolution is likely to be explained mainly by the existence presence of a few very capital-intensive state firms in petrochemicals.

[27] In fact, enterprises are or may be composed of several "local units" – an entity close to but not the same as an establishment. The change intervened in the ASMI after 2001 is explained by the efforts of Turkstat to collect data according to principles set by EUROSTAT.

Table 9: Distribution of employment in the Turkish manufacturing sector (%)

ISIC[28]	1995	1996	1997	1998	1999	2000	2001
31	17.5	16.7	15.6	15.4	16.0	15.5	15.2
32	33.4	35.0	35.5	34.7	33.6	34.7	33.6
33	2.2	2.2	2.3	2.4	2.4	2.5	2.3
34	3.5	3.5	3.2	3.0	3.0	3.0	2.9
35	8.9	8.8	8.9	9.1	9.6	9.2	9.4
36	7.0	6.6	6.5	6.6	7.0	6.6	6.3
37	6.7	5.8	5.7	5.6	5.5	5.4	5.1
38	20.0	20.4	21.5	22.2	21.8	22.0	21.6
39	0.6	0.6	0.6	0.7	0.7	0.8	0.9

Source: Own calculations from TurkStat's ASMI database.

Table 10: Distribution of value added in the Turkish manufacturing sector (%)

ISIC	1995	1996	1997	1998	1999	2000	2001
31	17.6	17.5	14.1	13.8	15.5	17.2	16.9
32	19.6	20.3	20.6	17.9	15.8	16.5	18.0
33	1.3	1.4	1.5	1.3	1.4	1.5	0.94
34	3.8	4.2	3.6	2.8	3.0	3.0	2.6
35	19.1	17.5	16.9	28.8	31.7	26.9	30.3
36	8.0	7.6	8.1	7.0	7.3	6.9	6.2
37	7.7	7.2	9.1	6.1	5.3	5.4	5.5
38	22.5	23.9	25.7	21.9	19.7	21.9	18.6
39	0.3	0.4	0.5	0.3	0.4	0.7	1.0

Source: Own calculations from TurkStat's ASMI database.

Table 11: Distribution of number of firms in the Turkish manufacturing Sector (%)

ISIC	1995	1996	1997	1998	1999	2000	2001
31	17.5	17.2	16.3	15.7	15.8	15.4	15.2
32	30.8	31.6	31.8	31.0	30.2	30.5	31.1
33	4.0	3.9	4.3	4.2	4.0	4.0	4.1
34	3.5	3.5	3.4	3.5	3.4	3.6	3.6
35	8.6	8.6	9.0	9.0	9.3	9.3	9.5
36	8.3	7.9	7.7	7.8	7.9	7.8	7.2
37	3.9	3.6	3.6	3.6	3.7	3.6	3.6
38	22.3	22.6	22.9	24.4	24.6	24.8	24.6
39	1.0	1.0	1.0	1.0	1.1	1.1	1.2

Source: Own calculations from TurkStat's ASMI database.

[28] 31: Food, beverages and tobacco; 32: Textile, wearing apparel and leather industries, 33: Wood and wood products, including furniture; 34: Paper and paper products, printing and publishing; 35: Chemicals and chemical, petroleum, coal, rubber and plastic products; 36: Non-metallic products; 37: Basic metal industries; 38: Fabricated metal products, machinery and equipment; 39: Other manufacturing industries.

Table 31 summarizes information on the size distribution of firms in the Turkish manufacturing sector for the year 1996 and the share of different size classes – seven in total – in terms of number of establishments and employees, wage bill, and value added.

Table 12: Size distribution of firms in the Turkish manufacturing sector – 1996 (%)

	Number of establishment	Number of employees	Payments to Employees	Value added
Size classes				
10-24	36.4	5.7	2.2	2.2
25-49	28.5	10.3	4.8	4.9
50-99	14.7	10.4	6.2	7.2
100-199	10.1	14.3	11.4	10.8
200-499	7.0	21.8	22.5	24.1
500-999	2.3	16.1	21.7	19.2
1000	1.2	21.4	31.2	31.6
Total	100.0	100.0	100.0	100.0

Size is measured by the number of employees.
Source: Own calculations from TurkStat's ASMI database.

Firms belonging to the first two categories represented 65 % of the total number of firms but accounted only for 16 % of all employees, 7 % of the wage bill and 7.1% of the value added in the manufacturing sector in the year 1996. This observation is not modified if the third size category is included in the analysis: it then turns out that 80% of firms in the Turkish manufacturing firms accounted for 26.4 % of employees, 12.3 % of the wage bill and 13.3 % of the value added created in 1996. On the other hand firms with more than 500 employees account for slightly more than 50 % of payments made to employees and value added, 37.5 % of the number of employees whereas they represent 3.5 % of all firms with more than ten employees.

Data provided in Table 3.4 points to the massive presence of small and medium size enterprises in the formal manufacturing sector in Turkey and at the same time to their poor performance in terms of four major indicators of manufacturing activity included in this table. Causes of this situation are manifold and include factors such as poor access to capital markets, low human capital, lock-in into low-technology sectors that are open to fierce international competition based on low wages, insufficient in-firm training and a tax and regulatory system that penalizes SME activity.

Methodology

Empirical model and estimation strategy for the econometric analysis of productivity spillovers

A direct production function approach will be adopted in our study in order to assess the impact of FDI-related productivity spillover on firm-level total factor productivity.

A Cobb-Douglas production function will be specified in the following manner: firm-level output (Y) will be assumed to be a function of (i) firm's capital stock (K), labour (L), raw materials (M) and energy (E) inputs on the one hand, and (ii) a term reflecting the baseline total factor productivity level in the firm:

$$Q = A\, f(K, L, M, E) \quad (1)$$

In Cobb-Douglas form;

$$Q = A\, K^{\alpha} L^{\beta} M^{\gamma} E^{\gamma} \quad (2)$$

Then, the basic production function can be written in logarithmic form:

$$\ln Q = \ln A + \alpha \ln K + \beta \ln L + \gamma \ln M + \delta \ln E \qquad (3)$$

Firm-level output will be measured by its gross output, i.e. production rather than value added. Firm-level capital stocks are calculated in accordance with the perpetual inventory[29]. Initially, we included two measures of the workforce in the model: the first one refers to all employees and the second one refers to employees working in production sphere (production workers) and to employees working in administration (administrative employees)[30] The variable that measures energy input (E) includes firm-level expenditures on fuels and electricity.

This direct production function approach is used in Haskel et al. (2002) to investigate whether inward FDI generates productivity spillovers for domestic plants in the UK. According to this study, the production function given by equation (3) is to be augmented by measures of foreign presence and other controls, where coefficient estimates on the *non-input regressors* capture their contribution to total factor productivity (measured by the term *log A* in equation 3).

We are interested mainly in the impact of two proxies of FDI-related productivity spillovers which will measure the extent of foreign presence in the Turkish manufacturing sector both at sectoral and spatial levels: first, the market share (share in gross output) of foreign firms at the four-digit ISIC (rev. 2) level and second, their share at the regional (province) level.

Foreign ownership is defined as those firms with at least 10% of their capital detained by foreign shareholders and only firms with at least 10% foreign ownership are used for the calculation of this variable. Note that this proxy of FDI-related spillovers is used as a proxy for analyzing horizontal spillover effects. The coefficient on the FDI share variable indicates the short-run impact of FDI-based technology spillovers on firm -level productivity.

In order to control for the influence of other determinants of firm-level total factor productivity and to avoid a omitted variable bias, the following variables were added to equation (3):

- The *share of administrative employees* in the number of total employees in order to control for a "composition" effect that might affect productivity at the firm level.
- A number of *interaction variables* between FDI-related productivity spillovers – both at the sector and spatial (province) level were added to the regressions. Only those interaction terms that involve a measure of the firm size, the number of employees at the firm-level, turned out to be statistically significant, hence will be discussed.
- Time dummies are included in equation (3) in order to account for the effect of macro shocks common to all firms that occurred during the period of estimation, i.e. during the period 1983-2001.
- Estimation of the model was first carried out for the whole manufacturing industry. In a second stage, estimations were run separately for four different industries identified in accordance with the sectoral classification introduced in Pavitt (1984): these four industries were selected identified by Pavitt on the basis of the sources and modes of innovation of their firms, hence the pertinence of its classification for our study since innovation activities of firms is one of the main determinants of their productivity levels.

[29] This data is from an ongoing TUBITAK project: see Taymaz et al. (2008).

[30] Although these last two variables produced significant results, findings only for the total number of employees will be presented and discussed in our study.

Finally, in order for our estimations not to suffer from an omitted variable bias due to unobserved time-invariant firm-specific factors, the fixed-effects estimation method was used in out study of the impact of FDI-related spillovers on firm-level productivity.

Empirical model and estimation strategy for the econometric analysis of wage spillovers

The wage equation that will be used in the econometric part of our paper will be derived from a wage bargaining model[31]. The resulting wage equation indicates that wage rate (w) is a function of the bargaining power of the workers (ϕ), productivity of the firm (Q/L) and the outside or alternative wage (w*)[32]:

$$w = (1-\phi)w^* + \phi(Q/L) \quad (1)$$

where $0 \leq \phi \leq 1$

Equation (1) indicates that if the workers in a firm have any bargaining power ($\phi > 0$), they will claim a part of the increase in profits generated, for instance, by any new investment, and raise their wage rates. However, if the workers do not have any bargaining power ($\phi = 0$), they will not be better off than the alternative if $\phi = 0$, then w = w*.

Note that in such a model, even if the workers have no bargaining power, an investment in tangible and intangible assets may oblige the firm to raise its wages by increasing the outside wage[33]. Such an outcome can be observed, for example, whenever an investment made in general training is sunk and embodied in the worker as human capital. The worker, whose productivity has increased, may be lured by another firm with the offer of a higher wage. The increase in the outside wage as a result of investment in tangible and intangible assets in the firm depends on the transferability of the asset embodied in workers to other firms. This eventuality will, off course, push the firm to raise its wage rate in order to retain its workers within the firm.

We will first decompose the outside wage rate w*. We will denote by U the rate of unemployment, which proxies the probability that a worker will be unemployed and by B the level of benefits received by the unemployed people. Then the alternative wage can be expressed as below:

$$w^* = U.B + (1-U)\bar{w} \quad (2)$$

where $\bar{w}$ is the average wage in the economy.

Now let us decompose the average wage by making a distinction between average wages paid by foreign firms ($\bar{w}_f$) and wages paid by domestic firms ($\bar{w}_d$). If the share of foreign firms in total employment (s_f) indicates the probability that a worker will find a job in a foreign firm and s_d the corresponding probability for domestic firms, then the economy-wide average wage, $\bar{w}$ can be rewritten as follows:

$$\bar{w} = \left[s_d \bar{w}_d + s_f \bar{w}_f \right] \quad (3)$$

If we substitute the expression of $\bar{w}$ given by equation (3) in equation (2), we obtain:

[31] This model is based on McDonald and Solow (1981). See also Ballot et al. (2006) for a discussion.

[32] This alternative wage may be influenced by a host of factors such as wages paid in other firms, minimum wages, unemployment benefits, etc.

[33] Ballot et al. (2006).

$$w^* = U.B + (1-U)\left[s_d \bar{w}_d + s_f \bar{w}_f\right] \quad (4)$$

We will make the assumption that for a worker, the probability of finding an employment in foreign firms is larger than measured by the share of these firms in total employment[34]. Therefore, for $\lambda > 1$ we have:

$$w^* = U.B + (1-U)s_d \bar{w}_d + (1-U)\lambda s_f \bar{w}_f \quad (5)$$

Substituting w* in equation (2) by its expression given by equation (5), we obtain the basic wage equation that will be used in the next section in order to test for wage spillovers in the Turkish economy:

$$\begin{aligned} w &= (1-\phi)U.B + (1-\phi)(1-U)s_d \bar{w}_d + (1-\phi)(1-U)\lambda s_f \bar{w}_f + \phi(Q/L) \\ &= (1-\phi)U.B + \alpha_1 \bar{W}_d + \alpha_2 \bar{W}_f + \phi(Q/L) \end{aligned} \quad (6)$$

where $\alpha_1 = (1-U),\ \alpha_2 = (1-U)\lambda$

$\bar{W}_d$ = average wage paid by domestic firms

$\bar{W}_f$ = average wage paid by foreign firms

Therefore, the wage equation that we will use in the next section order to test for wage spillovers in the Turkish economy will be based on:

$$w_{ij} = \alpha_i + \alpha_1 \bar{W}_{dj} + \alpha_2 \bar{W}_{fj} + \alpha_3 (Q/L)_i + \alpha_4 FDIQS_j \quad (7)$$

where i and j are used to index firms and sectors, respectively[35].

FDIQS = share of foreign firms in total sales at the sector level

α_i : unobservable firm-specific constant

Note that since the bargaining power of the workforce changes from firm to firm - we will also suppose that it does not change over the short term – we can consider the first term in equation (5) as being a time invariant firm-specific term, i.e. α_i.

Note that wages paid by firm i should not be taken into account while computing $\bar{W}_{dj}$ and $\bar{W}_{fj}$.

FDIQS measures the extent of foreign presence at the sector level and is therefore used as a proxy for the impact of FDI-related spillovers on wages paid by domestic firms.

This variable contains the genuine (positive) productivity spillover effect due to knowledge and human capital transfers from foreign to domestic firms. Note that these transfers may occur through labor mobility when employees of foreign firms leave in order to join domestic firms or to create their own company (spin off). These transfers also occur whenever knowledge or know-how flows from foreign to domestic firms through more informal means such as contacts established between their engineers or managers.

[34] This assumption is justified mainly on two grounds: (i) employees may prefer to work in foreign rather than domestic firms since the former pay higher wages and (ii) foreign affiliates may live longer than domestic firms since they are more likely to survive economic crises, especially if they have access to financial and human resources of their .

[35] This equation will be estimated separately for domestic and foreign firms .

FDIQS also includes the demonstration and competition effects that might exert a positive, negative or no effect at all on wages paid by domestic firms. These variables can be seen as being sources of (potential) FDI-related spillovers that might exert an impact on firm-level productivity but do not involve any real or genuine or direct transfer of intangible assets owned by foreign firms.

In practice, the available data seldom allow researchers to sort out the effects of the two aforementioned FDI-related spillovers on wages.

Finally, we can test whether $\lambda > 1$ by testing the equality between α_1 and α_2.

The dynamic wage equation used in our study in order to test for wage spillovers in the Turkish manufacturing sector over the period 1983-2001 is a modified version of the wage equation given by equation (7) in the previous section:

$$\boxed{\begin{aligned} w_{it} = {} & \alpha_i + \alpha_1 w_{it-1} + \alpha_2 \bar{W}_{djt} + \alpha_3 \bar{W}_{fjt} + \alpha_4 \bar{W}_{drt} + \alpha_5 \bar{W}_{frt} + \alpha_6 (Q/L)_{it} + \alpha_7 FDIQS_{jt} \\ & \alpha_8 FDIQS_{rt} + \alpha_9 V_{it} + \alpha_{10} M_{jt} + \alpha_{11} H_{rt} + ANNUAL_t + \varepsilon_{it} \end{aligned}} \quad (8)$$

where ε_{it} is a normally distributed error term with zero mean and homoscedastic variance.

Note that i, j and r are used to index firms (foreign or domestic), sectors and provinces, respectively. $\boxed{V_{it}}$ is a vector of remaining firm-specific variables that might exert an influence on firm-level wages. Similarly, $\boxed{M_{jt}}$ and $\boxed{H_{rt}}$ are remaining possible determinants of firm-specific wages at the sectoral and regional levels, respectively.

The one year lagged dependent variable (w_{it-1}) is added to equation (6) in order to test for partial adjustment mechanism, the lagged response being due to expectation errors and institutional rigidities. The logarithm of this variable is used in the regressions (*lagged wages*).

Firm-specific labor productivity $(Q/L)_{it}$ is included in the dynamic wage regression since it represents a conduit through which the bargaining power of workers might exert a positive impact on firm-specific wage rate. This variable is introduced in the regressions in its logarithmic form (*labor productivity*).

Based on equation (6), average wages paid by domestic firms $(\bar{W}_d)$ and those paid by foreign firms $(\bar{W}_f)$ were computed separately at the four-digit sector level $(\bar{W}_{djt}, \bar{W}_{fjt})$ and at the province level $(\bar{W}_{drt}, \bar{W}_{frt})$, and introduced into the regressions in order to check whether the labor-poaching effects discussed previously do occur at the sector or/and province level. These variables are used in logarithmic form in the regressions (*wage rate*).

Note that wages paid by firm i should not be taken into account while computing $\bar{W}_{dj}$ ($\bar{W}_{dr}$) and $\bar{W}_{fj}$ ($\bar{W}_{fr}$).

$ANNUAL_t$ is a dummy variable taking the value 1 for t, t=1983-2001. It is introduced in order to take into account macroeconomic shocks that affect all the manufacturing firms in our sample. Especially, business cycles, economic crises and high and volatile rates of inflation recorded in the Turkish economy during the period under investigation in this report are accounted for by this dummy variable.

We discuss below the remaining firm-, sector- and province-specific variables in equation (8) that will be used in the regressions.

A variable measuring the share of capital detained by Turkish government was used to test whether workers in State enterprises are paid on average at wages higher than those in the private firms (*public share*).

An indicator of the firm size is introduced in the regressions in order to test for the empirical finding of other studies which point to a positive impact of the size of a firm on its wage rate. Firms size will be measured by the number of employees at the firm level (*number of emp*).

An indicator of the capital intensity of the firm is used to check whether increased division of labor in more capital intensive firms exert a positive impact on firm-level wages (*capital intensity*).

Since the skill composition of the workforce might exert a positive effect on firm-level wages, a variable measuring the share of skilled people in the workforce at the firm level is introduced in the regressions (*skilled labor share*).

Female share of the workforce might be correlated with firm-specific wage and exert a negative effect on it. Indeed, concentration of women in labor-intensive industries and/or in declining sectors might lead to a negative correlation between these two variables[36]. We introduce a variable that is simply female labor share of the workforce to account for this relationship (*female labor share*).

Ceteris paribus, seniority of employees is likely to exert a – possible positive – effect on wages at the level of the firm. Although the database used in this report was collected at the establishment level – consequently no information is available at the employee level – two proxies aimed at measuring seniority at the firm-level will be introduced in the regressions.

The first indicator of seniority concerns those firms that were established after the year 1981. This indicator simply measures the 'age' of the firm, i.e. the number of years of presence in the database (*firm age*). Since this information is not available for firms that have been in the database from 1980 onwards, we constructed a dummy variable that take the value of 1 for firms present in the database since 1980 – and 0 otherwise – and introduced it in the regressions (*pre-1980 dummy*).

The remaining four sector-level variables were constructed in the following manner.

The indicator of the FDI-related productivity and competition spillovers – it was mentioned previously that data required to estimate separately the impact of these two variables is not available – is constructed as the market share[37] of foreign firms at the four digit ISIC (rev. 2) industry level and introduced in the regressions. Note that output level of firm i was subtracted both from the numerator ands denominator while constructing this indicator (*market share of foreign firms*).[38]

A variable measuring import penetration at the four digit ISIC (rev. 2) level was constructed as value of imports divided by value of production plus value of imports. The rational for adding this variable to the regression is to test this hypothesis that imports can lead to the reduction of the output of an industry and hence exert a downward pressure on wages. The

[36] See Ozler (2000).

[37] That is, the share of foreign firms in the sector-level gross output (production).

[38] Note that according to Driffield and Girma (2003) this variable rather measures the *direct* effect of FDI on wages, i.e. its positive impact on wages that materializes through the expansion of economic activity which might lead to more employment - or lower unemployment - (also called *labor demand effect*).

inclusion of the import penetration variable in the regressions is aimed at measuring this wage-disciplining effect of import competition (*import penetration*).

A variable measuring export propensity at the four digit ISIC (rev. 2) industry level was constructed as the ratio of exports divided by gross output and added to the regressions. The purpose of adding this variable to the model is to verify whether for a firm being present in an export-oriented sector increases its wages or at the contrary exerts a wage reducing effect (*export intensity*).

Finally, an indicator of the sectoral unemployment gap was constructed at the sector level by using the Hodrick-Prescott (HP) filter in order to obtain an estimate of the employment-trend. Difference between the observed sector-level employment and the smoothed employment values obtained by the application of the HP filter, further divided by the smoothed employment figures (*sectoral employment gap*).

The only variable, besides wage rates, calculated at the regional level is the regional unemployment gap calculated in a similar manner as the sectoral employment gap (*regional employment gap*).

Before presenting the estimation method used in our report, note that the dynamic wage equation (equation 8) will be estimated separately for production workers and administrative employees, on the one hand and for domestic and foreign firms on the other hand. By proceeding in this way, we hope to account for different dynamics that might characterize these two categories of firm and workforce as far as the determinants of their wages are concerned.

Initially, we have used fixed effects method[39] and Generalized Method of Moments (GMM) *a la* Arellano-Bond to estimate the dynamic wage equation given in equation (8).[40] GMM deals not only with unobservable individual effects but also with possible simultaneity of some variables present on the right hand side of equation (8). GMM estimators use variables in differences to eliminate unobservable individual effects, and use lagged values (in levels) as instruments to correct for simultaneity bias.

However, as emphasized by Griliches and Mairesse (1997), fixed effects and GMM estimators produce rather unsatisfactory results in the estimation of production functions. In other papers, it is shown that the lagged levels of a series provide weak instruments for first differences[41]. The suggestion is then to take into account additional nonlinear moment conditions which correspond to adding (T-2) equations in levels with variables in differences as instruments.[42] Since the GMM-system estimator yields more reasonable results, we report in our report only those estimation results obtained through the use of the GMM-system estimator.

Estimation Results

Data analysis

Data presented in Figures 8 to 32 provide information about the evolution of the extent foreign activity in the Turkish manufacturing sector over the period 1980-2001. The variables

[39] As mentioned previously, the bargaining power of the workforce – measured by the coefficient of the labor productivity variable in equation (8) – changes from firm to firm, and therefore the first term in equation (8), α_i, is considered as a time-invariant firm-specific term.

[40] Griliches and Mairesse (1997), Arellano and Bover (1995).

[41] Blundell and Bond (1998, 2000)

[42] Ahn and Schmidt (1995).

considered here are the number of firms, production, value added, employment and wages paid. Evolution of these variables over the period 1980-2001 are reported separately for domestic and foreign firms at the level of the whole manufacturing sector. Data on employment and wages are presented separately for production workers and administrative employees – as mentioned previously, a skill-based classification of the workforce is not available in Turkstat's database.

Information is also presented on the nominal wage rates paid by domestic and foreign firms to their employees and on the evolution of real labor productivity in these two groups of firms.

Figure 8 shows that the number of firms included in Turkstat's database is about 9,000 in 1982, reaches more than 12,000 in 1999 and falls to 10,000 in 2001. It is rare that a database with so many establishments, containing so many variables and followed over a long period be used for the econometric analysis. We are glad to be able to use it for the purposes of the present study.

Besides, definition of variables used in the regressions and mean values for these variables over the period 1983-200 are presented in Table 33.

Figures 9 to 13 present the evolution of the share of foreign and domestic firms in manufacturing production, value added and employment, respectively. The share of foreign firms in both manufacturing production and value added are were about 10 % at the beginning of the period. By the year 2001, their share in production and value added reached 21 % and 28 %, respectively – a considerable increase after all ! However, the evolution of foreign firms' share in total employment is less steep, with the share evolving from 5 % in 1980 tp 11 % in 2001. This finding points probably to the fact that foreign firms are more capital intensive than domestic firms, an assessment confirmed by the figures presented in Table 33.

Figures 15 to 18 present data on the evolution of foreign share in the workforce for production workers and administrative employees, separately. The evolution for the first labor category is similar to the one reported for all employees but is somewhat different for the second one, i.e. administrative employees: foreign firms' share for this second category reaches almost 20 % by the end of the period.

Figures 19 to 24 present similar data on employment but now for domestic and *majority-owned* foreign firms. The aforementioned findings as to the relatively low share of foreign firms in manufacturing employment remain.

Data on the evolution of wages paid by domestic and foreign firms to their production workers and administrative employees over the period 1980-2001 are presented in Figures 25 to 28. 10 % of the manufacturing wage bill for production workers are paid in foreign firms in 1980 and this figure reached 20 % by the end of the period. As for the administrative employees, their part in the manufacturing wages increased from 11 to 31 % over the same the period under examination, a remarkable increase ! In other words, foreign firms use relatively more intensively administrative rather than production workers in the manufacturing sector and the same observation is valid for wages paid to these two categories of labor.

Data on the evolution of real labor productivity in domestic and foreign firms over the period 1982-2001 is presented in Figure 30. This figure points to the existence of a persistent productivity gap between two types of firms in the manufacturing industry in favor of foreign

firms. Mean values for this variable over the whole period presented in Table 33 confirm this assessment.[43]

As for the Figure 29, it presents data on nominal wages rates in domestic and foreign firms for all employees, for production workers and for administrative employees (note that wage rates in domestic firms are taken as the reference point). The average foreign wage rate in is 50 % higher than its domestic counter in 1981. This gap increases and jumps to around 125 % by the end of the period. These findings are confirmed by the data available in Table 33.

The evolution is similar for the two labor categories distinguished in our study: the relative wage rates of production and administrative employees in foreign firms have always been larger than in domestic firms and the wage gap increased over time: for instance, by the end of the period, the average wage gap in favor of administrative employees in foreign firms reached 150 %.

The two last figures, Figure 31 and 32, pertain to the share of foreign and domestic firms in the manufacturing skilled workforce for production workers and administrative employees over the period 1986-2001. In general, foreign share is and remains larger than domestic share but the skill gap is by no means as large as the productivity or wage gap.

Productivity spillovers

Estimation results for the productivity equation are given below in Table 34.

We will first comment findings for regressions involving the whole manufacturing sector (first two columns) and afterwards findings concerning each of the four Pavittian industries considered in our study.

Our findings show that the four basic inputs included in the production function all have a positive and statistically significant – at the 1 % level – effect on labor productivity. The sum of their coefficients are reported at the end of the Table 34 (note that this sum is not statistically different from unity).

The variable measuring the share of administrative employees in the workforce is positive and points to a positive composition effect exerted on firm-level total factor productivity.

Two basic variables introduced in the regressions to measure FDI-related productivity and competition spillovers are the market share of foreign firms at the sector- and regional-levels. A number of interaction terms involving the aforementioned two variables were introduced in the regressions in order to verify whether any significant effect of FDI-related spillovers variables on productivity is function of other variables. The only statistically significant interaction term was the one involving a proxy of the firm size, i.e. the product of market share of foreign firms at the sector level multiplied by the logarithm of the number o employees.

The coefficient of the FDI-related spillover variable – reported in the second column of Table 34 –is negative and statistically significant at the 1 % level. Furthermore, the coefficient of the interaction variable is positive and significant at the 1 % level. This points to an interesting finding: for a given manufacturing industry, FDI-related spillovers exert a negative effect on firm-level total factor productivity up to a point and this effect becomes a positive one. The critical value of the firm size – measured by the number of employees – where the negative effect turns into a positive one is 47.

[43] This finding can be explained at least partly by the more capital intensive nature of foreign firms.

Therefore, our findings point to the fact that micro and small firms as ell as part of medium-sized enterprises are affected negatively by foreign presence in their sector. However, this same effect is positive when it comes to large firms.

As for the variable measuring FDI-related spillovers at the region level, note that it exerts a positive effect on firm-level productivity significant only at the 10 % level. Since the interaction term involving the firms size is not statistically different from zero, our finding indicates that sectors with larger foreign presence have larger productivity levels, and this result is valid for firms of all size in a given region.

We discuss below estimation results for the labor-, resource- and scale-intensive industries, as well as for specialized suppliers industries. We will discuss below only the findings for the FDI-related spillover variables in each sector since the coefficients for the four input variables are always positive and statistically significant at the 1 % level.

The regression where the sectoral share of foreign firms is introduced without the corresponding interaction term (third column in Table 34) point to a positive effect of FDI-related productivity and competition spillovers on firm-level total factor productivity. However, when the interaction term is added to the regression, the market share variable is not significant any more but only the interaction term is at he 1 % significance level (fourth column in Table 34). Although this result might be due to the existence of multicolinearity between these two variables, we are forced to conclude that FDI-related spillovers exert a positive effect on productivity that increases with the firm size. In other words, although all manufacturing firms in labor-intensive industries benefit from foreign presence in their industry, larger firms benefit more intensively from these spillovers.

Note that our findings for this industry do not point to a statistically significant impact of FDI-related spillovers at the regional level .

As for the resource-intensive industries, a picture similar to the one obtained for the whole manufacturing sector emerges: the impact of sector-level FDI spillovers is negative up to a firm size of 399 employees and switches to a positive effect which increases afterwards with firm size.

As for the regional FDI-spillovers, a positive effect at the 1 % level is identified if the foreign presence variable is introduced in the regressions without the corresponding interaction term.

Findings for the scale-intensive industries point to a negative effect of market share of foreign firms at the sector-level which is independent of the firm size. – the interaction term has a negative coefficient but is not significant at the 10 % level. On the other hand, foreign presence at the regional level exerts a positive and significant effect on firm-level total factor productivity.

Finally, sector-level FDI-related spillovers exert a positive effect on firm-level productivity in the specialized suppliers industry which is significant at 1 % level and increases with the firm size. Therefore, contrarily to the whole manufacturing sector and to the scale-intensive industries all firms benefit from FDI spillovers in the specialized–suppliers sector –these benefits increase off course with the firm size. As to regional spillovers, the evidence in their favor is weak since coefficient associated with the regional share variable is negative but significant only at the 10 % level – note that this coefficient becomes statistically insignificant once the interaction term is added to the regressions.

Table 13: Production function estimation results (fixed-effects estimation)

	All sectors		Labor intensive		Resource intensive		Scale intensive		Specialized suppliers	
Capital	0.057***	0.057***	0.053***	0.052***	0.045***	0.045***	0.054***	0.054***	0.071***	0.071***
	[0.002]	[0.002]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]	[0.005]
Raw materials	0.528***	0.527***	0.515***	0.515***	0.484***	0.483***	0.596***	0.596***	0.588***	0.588***
	[0.001]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.004]	[0.004]
Energy	0.063***	0.064***	0.062***	0.062***	0.085***	0.086***	0.046***	0.047***	0.042***	0.042***
	[0.001]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]
Labor	0.328***	0.321***	0.312***	0.306***	0.352***	0.342***	0.305***	0.302***	0.307***	0.284***
	[0.003]	[0.004]	[0.004]	[0.006]	[0.005]	[0.006]	[0.006]	[0.008]	[0.008]	[0.011]
Administrative emp share	0.015**	0.013*	0.028**	0.027**	-0.022*	-0.023*	0.016	0.015	0.009	0.004
	[0.007]	[0.007]	[0.013]	[0.013]	[0.012]	[0.012]	[0.016]	[0.016]	[0.020]	[0.020]
Sectoral foreign share	-0.012	-0.347***	0.534***	0.059	-0.227***	-0.593***	-0.412***	-0.335***	0.739***	0.380***
	[0.017]	[0.041]	[0.043]	[0.145]	[0.024]	[0.067]	[0.032]	[0.071]	[0.046]	[0.106]
Labor * Sectoral foreign share		0.090***		0.128***		0.099***		-0.020		0.096***
		[0.010]		[0.037]		[0.017]		[0.017]		[0.025]
Regional foreign share	0.033	0.093*	-0.064	-0.066	0.123***	0.094	0.092**	-0.086	-0.121*	-0.159
	[0.021]	[0.053]	[0.044]	[0.096]	[0.031]	[0.086]	[0.047]	[0.115]	[0.063]	[0.159]
Labor * Regional foreign share		-0.016		0.000		0.008		0.046*		0.011
		[0.013]		[0.021]		[0.021]		[0.027]		[0.040]
Returns to scale	0.976	0.961	0.942	0.927	0.966	0.945	1.001	0.989	1.008	0.992
Number of observations	183,838	183,838	68,067	68,067	58,771	58,771	34,703	34,703	22,297	22,297
Number of firms	27,926	27,926	11,485	11,485	7,991	7,991	5,260	5,260	3,190	3,190
R-squared	0.72	0.72	0.75	0.75	0.63	0.64	0.77	0.77	0.79	0.79
Log likelihood	-46,275	-45,332	-17,411	-17,045	-16,097	-15,738	-4,798	-4,534	-3,551	-3,469

Note: All models include time dummies. Standard errors in brackets.

*, ** and *** mean statistical significant at the 10%, 5% and 1%, respectively.

Wage spillovers

Estimation results for the dynamic wage equation are presented below in Table 35.

We will first examine findings obtained for production workers and secondly for administrative employees. For each labor category, estimation results will be discussed for domestic and foreign firms, respectively.

Domestic firms

We will examine the regression which includes all the firm-, sector- and region-specific in the dynamic wage equation (third column) over the period 1987-2001[44].

For *production workers*, the coefficient of the *lagged wage* term is positive and significant at the 1 % level, indicating the presence of a partial adjustment mechanism. The coefficient associated with the *labor productivity* variable is positive and significant at the 1 % level, pointing to a relationship between workers' bargaining power and the wage rate. As to the coefficient of the *public share* variable, it is negative and significant at the 5 % level , indicating that wage paid in state enterprises in the manufacturing sector are on average higher than wages paid in domestic private firms. *Capital intensive* firms pay higher wages as well as firms with a larger share of their workforce composed of *skilled workers* – the coefficient associated with this second variable is significant only at the 10 % level. An increase in the *share of female workers* in a firm's workforce is associated with a reduction in its wage rate, pointing to a negative association between the extent of female labor use and average wage at the firm level. As to the two variables measuring *seniority*, both have positive coefficients significant at the 1 % level – the second one exerts a stronger effect then the first one, as might be expected. Finally, estimation results point to a positive association between average wages and firm size which is significant at the 1 % level: a 10 % increase in firm size will rise the average wage rate by 5.6 %.

We now examine the impact of sector-level explanatory variables on the wage rate.

The market share of foreign firms at the four digit ISIC (rev. 2) industry level which is used to measure the FDI-related joint productivity and competition spillovers effects. The coefficient associated with this variable is positive but not significant at the 10 % level. So our data lead us to reject the existence of a joint FDI-related spillovers effect on the wage rate at the firm-level. This result might be due to the fact that both types of FDI-related spillovers are absent or that a negative effect overrules a positive one – for instance, a positive productivity spillover effect due to labor force moving from foreign to domestic firms might be eliminated by a negative competition spillover effect.

What about the impact exerted on a firm's wage rate by wages paid in other domestic and foreign wages present in the same four-digit ISIC industry? Estimation results indicate that both effects are positive and statistically significant at the 1 % level: a 10 % percent increase in wages paid by domestic firms rises on average domestic firms' wage rates by 8.8 % while a similar increase in wages paid by foreign firms leads to 7.8 % increase – this result leads us to reject the null hypothesis that such a wage spillover effect is larger for foreign than domestic firms. Therefore, we can conclude that FDI-related wage spillovers is phenomena that existed in the Turkish manufacturing industry over the period 1987-2001 through probably the labor-poaching threat or signal sent by higher wages paid in foreign exerted a

[44] Contrarily to the two previous models presented in Table 35 which are estimated over the period 1984-2001, this third model is estimated over the period 1987-2001 since data on two explanatory variables used in regressions, female labor share and skilled labor share, are available for this period only.

upward effect on wages in domestic firm. This does not preclude off course the existence of a similar positive wage effect occurring between domestic firms.

The sign of the import penetration variable is negative and therefore somewhat contrary to the expectations. Indeed, studies surveyed in Gorg and Strobl (2003) and findings presented in Driffield and Girma (2003) point either to a positive effect of this variable– which points then to a discipline effect exerted by imports on wages – or to the absence of any effect on wages. The negative and statistically significant – at the 1 % –coefficient for this variable can be interpreted as a sectoral 'composition' effect since most of Turkish imports are made of technology-intensive investment and intermediate goods. Therefore, one possible explanation is that domestic firms that are present in those technology-intensive are paying wages that are higher than wages paid by domestic firms In the remaining sectors – especially if they are using intensively skilled labor in the production process.

As to the impact of the sector-level export propensity, estimation results point to a negative and significant effect – at 1 % level – of this variable on wage rates in domestic firms. This result might be due again to a sectoral composition effect since most Turkish exports are concentrated in low-to medium technology industries – and in labor-intensive industries – where wages rates are on average lower then wages in remaining industries. Another possible explanation is that export-oriented activity in domestic firms is made possible mainly by a downward pressure on wage rates.

Note that the coefficient associated with the sectoral employment gap variable – introduced in the regressions to test the possible effect of unemployment on wages – is positive but not significant at the 10 % level.

What about the evidence in favor of wage spillovers occurring at the regional or province level? Estimation results point to a positive and significant – at 1 % level – wage spillover effect that originates from foreign as well as domestic firms: a 10 % increase in wages in the foreign firms at the province level increases on average wages in domestic firms operating in the same province by 8.7 % while the corresponding figure is 6.3 % for wages increases occurring in domestic firms. The chi-squared statistic that tests null hypothesis that wage spillovers originating from foreign firms is larger then those originating from domestic firms are not significant at the 10 %, leading us not to accept the alternative hypothesis stating the equality of these two wage spillovers effects.

Finally, the impact of the variable measuring unemployment at the province level is positive but not significant at the 10 % level.

The foregoing discussion concerned the determinants of wages paid to production workers in domestic firms. We now turn to the determinants of wages paid to administrative employees in domestic firms.

For *administrative employees*, the impact of firm-level explanatory variables on the wage rate is qualitatively similar[45] to those obtained above for production workers, except for the effect of the skilled and female labor shares in the administrative workforce.

Indeed, surprisingly, the coefficient associated to the indicator of the skill level is negative and significant at the 1 %. The interpretation of this coefficient remains problematic. As to the coefficient of the female share in administrative employees, it is positive bur not significant at the 10 % level. In other words, contrarily to the case of production workers, a higher share of

[45] By 'qualitatively similar', we mean similarity in the sign of coefficients -not necessarily in their magnitude- and in the significance levels.

workforce composed of women do not exert downward pressure on wages paid to administrative workers.

Concerning the estimation results for sector- and province-level variables, one major difference arise with respect to results obtained for production workers: the coefficient of the FDI-related spillover variable is positive and significant at the 1 % level: a 10 percentage point increase in the market share of foreign firm at the four-digit industry level has raised wages paid to administrative workers in domestic firms on average by 0.71 %. This positive effect of FDI-related spillovers which is absent in the case of production workers, may be mediated through productivity spillovers – achieved for instance through mobility of labor, informal contacts between engineers –, competition spillovers (imitation, demonstration, efficiency effects) or both.

The second difference concerns the sectoral employment gap: its coefficient is positive and significant at the 10 % while it does not exert any discernible effect on the wages paid to production workers.

Impact exerted by the remaining explanatory variables on wages paid to administrative employees are qualitatively similar to those obtained for production workers.

Foreign firms

The issue we aim tackling by estimating the dynamic wage equation separately for foreign firms is to verify whether the wage determination mechanism differed significantly between domestic and foreign firms in the Turkish manufacturing industry over the period 1987-2001.

Note that the number of observations in regressions involving foreign firms is much less than in regressions involving domestic firms: the number of observations for foreign firms over the period under invest amounts to 3,656 (659 firms) while it amounts to 104,296 (18,655 firms) for domestic firms.

For *production workers*, sign and significance levels associated with the coefficients of firm-level variables are qualitatively similar to those obtained for domestic firms, except for the public share variable, probably due to the fact that few foreign firms have formed joint ventures involving government participation.

Concerning the sector- and province-level variables, the major difference between estimation results pertaining to domestic and foreign firms concerns the impact of FDI-related spillovers on wages paid in foreign firms: in sectors characterized with a strong foreign presence, foreign firms pay higher than domestic firms ! Therefore, whatever the channels mediating this spillover effect – knowledge or know-how transfer, or competition –, production workers in domestic firms are unable to profit from them, contrarily to production workers hired by foreign firms.

The second difference with respect to domestic firms concerns the coefficient of the export propensity variable: although its sign is negative, it is not significant at the 10 % level: being in an export-intensive industry does not exert any influence on wage level in foreign firms.

As for *administrative employees*, several differences arise between domestic and foreign firms as to the impact of firm-level variables on wage rates. The positive effect on wages of public ownership vanishes in the case of foreign firms as well as the negative and statistically significant effect of the skill-intensity of the workforce. Finally, the variable introduced for measuring the seniority effect for firms created from 1981 onward in nor more significant at the 10 % for foreign firms - contrarily to the proxy taking the value of 1 for frims created before 1981.

As for the sector-level explanatory variables introduced in the regressions, the major difference with respect to results obtained for domestic firms concerns the FDI-related spillover variable. The coefficient associated with this variable is positive but it is not significant at the 10 % level. In other words, wages paid to administrative workers in domestic firms are influences positively by the foreign presence in their four-digit ISIC industry and this positive effect does not extend to foreign firms.

Estimation results obtained for the remaining sector-level determinants of wage rates of administrative employees in foreign firms are pretty similar to those obtained for domestic firms, except for the sectoral employment gap variable – which is not significant at the 10 % in this case. The same observation is valid for the variables calculated at the region level.

Table 14: Determinants of wages in the Turkish manufacturing industry (GMM-system estimation)

	Production workers				Administrative employees			
	Domestic firms			Foreign firms	Domestic firms			Foreign firms
	1984-2001	1984-2001	1987-2001	1987-2001	1984-2001	1984-2001	1987-2001	1987-2001
Firm level variables								
Lagged wages	0.723***	0.721***	0.486***	0.276***	0.729***	0.729***	0.574***	0.172***
	[0.015]	[0.015]	[0.030]	[0.035]	[0.017]	[0.017]	[0.030]	[0.041]
Labor productivity	0.117***	0.117***	0.102***	0.077***	0.092***	0.092***	0.084***	0.110***
	[0.003]	[0.003]	[0.003]	[0.025]	[0.005]	[0.005]	[0.005]	[0.024]
Public share	0.241***	0.243***	0.332***	-0.091**	0.194***	0.194***	0.152***	-0.073
	[0.015]	[0.016]	[0.018]	[0.035]	[0.014]	[0.014]	[0.013]	[0.048]
Capital intensity			0.027***	0.101***			0.031***	0.110***
			[0.003]	[0.020]			[0.004]	[0.024]
Skilled labor share			0.038**	0.238*			-0.143***	0.102
			[0.018]	[0.135]			[0.042]	[0.181]
Female labor share			-0.062***	-0.221***			0.004	-0.003
			[0.009]	[0.059]			[0.010]	[0.083]
Firm age			0.030***	0.062**			0.021***	0.038
			[0.004]	[0.026]			[0.005]	[0.036]
Pre-1980 dummy			0.061***	0.105***			0.052***	0.141***
			[0.006]	[0.036]			[0.007]	[0.052]
Firm size (number of emp)			0.056***	0.050***			0.089***	0.126***
			[0.006]	[0.014]			[0.008]	[0.020]
Sectoral variables								
Market share of foreign firms	0.018	0.01	0.028	0.207**	0.038*	0.037*	0.071***	0.068
	[0.015]	[0.015]	[0.019]	[0.102]	[0.021]	[0.022]	[0.025]	[0.111]
Wage rate, foreign firms	0.051***	0.042***	0.078***	0.205***	0.040***	0.034***	0.037***	0.238***
	[0.007]	[0.007]	[0.009]	[0.038]	[0.009]	[0.009]	[0.010]	[0.046]

	Production workers		Administrative employees	
	Domestic firms	Foreign firms	Domestic firms	Foreign firms

	1984-2001	1984-2001	1987-2001	1987-2001	1984-2001	1984-2001	1987-2001	1987-2001
Wage rate, domestic firms	0.060***	0.051***	0.088***	0.222***	0.046***	0.040***	0.042***	0.249***
	[0.007]	[0.007]	[0.008]	[0.035]	[0.009]	[0.009]	[0.009]	[0.045]
Import penetration		0.026***	0.044***	0.152**		0.021**	0.061***	0.187*
		[0.007]	[0.011]	[0.069]		[0.010]	[0.013]	[0.108]
Export intensity		-0.036***	-0.038***	-0.123		-0.012	-0.052***	-0.292*
		[0.009]	[0.014]	[0.108]		[0.014]	[0.017]	[0.156]
Sectoral employment gap		0.028	0.016	0.202		0.172***	0.114*	0.324
		[0.042]	[0.038]	[0.187]		[0.066]	[0.061]	[0.244]
Regional variables								
Wage rate, regional, domestic	0.042***	0.040***	0.063***	0.146***	0.067***	0.066***	0.113***	0.210***
	[0.006]	[0.006]	[0.008]	[0.049]	[0.012]	[0.012]	[0.015]	[0.070]
Wage rate, regional, foreign	0.051***	0.050***	0.087***	0.205***	0.066***	0.065***	0.114***	0.278***
	[0.006]	[0.006]	[0.009]	[0.044]	[0.011]	[0.011]	[0.014]	[0.061]
Regional employment gap		-0.045	0	0.025		0.053	0.034	-0.137
		[0.045]	[0.041]	[0.270]		[0.067]	[0.063]	[0.333]
Number of observations	114,541	114,541	104,295	3,656	97,831	97,831	89,486	3,667
Number of firms	19,736	19,736	18,655	659	17,034	17,034	16,034	657
AR(1)	-35.90***	-35.85***	-21.99***	-9.25***	-34.18***	-34.14***	-22.25***	-10.02***
AR(2)	13.38***	13.35***	8.39***	1.01	11.35***	11.34***	7.78***	1.42
AR(3)	0.16	0.17	-0.36	0.24	0.87	0.87	0.06	-0.83
Sargan test	140.6***	140.6***	111.0***	9.5	40.5***	40.4***	27.7***	20.8**

Note: All models include time dummies. GMM instruments are used for lagged wage rate and current productivity (from 2nd to 6th lags of the level variables in difference equation, and the second difference in the level equation). Robust standard errors in brackets
*, ** and *** mean statistically significant at the 10%, 5% and 1% level, respectively.

Conclusion

This report is aimed at analyzing theoretically and offering evidence on FDI-related spillovers in developing countries and especially in a MENA country, Turkey.

We examined the role FDI can play in the industrialization process of developing nations through a multiplicity of channels. The one aspect that has received attention is technology transfer achieved through FDI or rather different types of spillovers accruing from foreign to domestic firms in DCs. These involuntary influences of foreign presence in DC markets on domestic firms' performance may turn out to be positive or negative. The evidence for the two types of spillovers, productivity and wage spillovers, are mixed and depend on the country examined, dataset used and estimation method adopted. The state of the art, examined in detail in this study, calls for carrying out more quantitative analysis pertaining to the impact of FDI on economic activity in DCs.

Turkey is a good case study for students of FDI-related spillovers in developing countries. She recorded a gradual increase in the FDI flows she received after the early 1980s and the FDI stock came to represent over time a substantial part of the activity in the manufacturing industry. A unique database was used here to test for the existence of FDI-related productivity and wage spillovers in the Turkish manufacturing sector: this database was unique not only for the length of the time period it covers – from 1980 to 2001 – but also in terms of the many explanatory variables of these spillovers it enables us to test for.

Our main findings are summarized below.

As for the FDI-related *productivity spillovers*, they seem to exert a negative effect on manufacturing firms at the sector level for the whole manufacturing industry, although this finding must be qualified when several sub-sectors are distinguished in the manufacturing sector – but it remains that at the level of the manufacturing sector as a whole the effect is negative[46]. This points probably to the difficulties domestic firms face when it comes to compete with foreign firms in their industry. However, this negative effect seems to concern mainly small-sized firms since its magnitude diminishes – and disappears after a threshold is reached– with size. Moreover, this positive size effect is observed not only for the whole manufacturing industry but also in all the sub-sectors analyzed. Note that there is evidence for positive spillovers occurring at the province-level but the statistical significance is limited.

What do our findings tell about the existence and direction of wages spillovers arising from foreign presence in the Turkish manufacturing industry?

The first type of wage spillovers, i.e. the one due to the joint effect of competition-induced and knowledge transfer-based spillovers, indicate that (i) as far as production workers are concerned *foreign* not domestic firms benefit from spillovers and (ii) for administrative employees the situation is reversed: domestic firms are the sole recipients of these spillovers. The existence of wage spillovers hence depends – at least in the Turkish case – on the type of workforce taken into consideration.

The second type of spillovers, the one arising from a potential labor-poaching effect due to (higher) wages paid by foreign firms at the sector level, is positive and statistically significant at the 1 % level. A similar statistically significant effect is observed at the province level as well. Wages paid by domestic firms are also introduced as explanatory variables at the sector and province levels, and our estimation results do not point to a significantly different effect of wages according to their domestic or foreign origin.

[46] Aitken and Harrison (1999) obtain a similar result in the case of Venezuela.

Control variables introduced in the regressions enable us to examine other determinants of wage paid by domestic and foreign firms as well.

In the previous chapters of this report we presented evidence on the existence and direction of productivity and wage spillovers related to foreign activity in the Turkish manufacturing industry over the period 1983-2001. Our results suggest that (i) further quantitative studies with post-2001 data should be carried out and (ii) case studies involving foreign firms should be conducted to identify the channels trough which spillovers reported in this report do transit.

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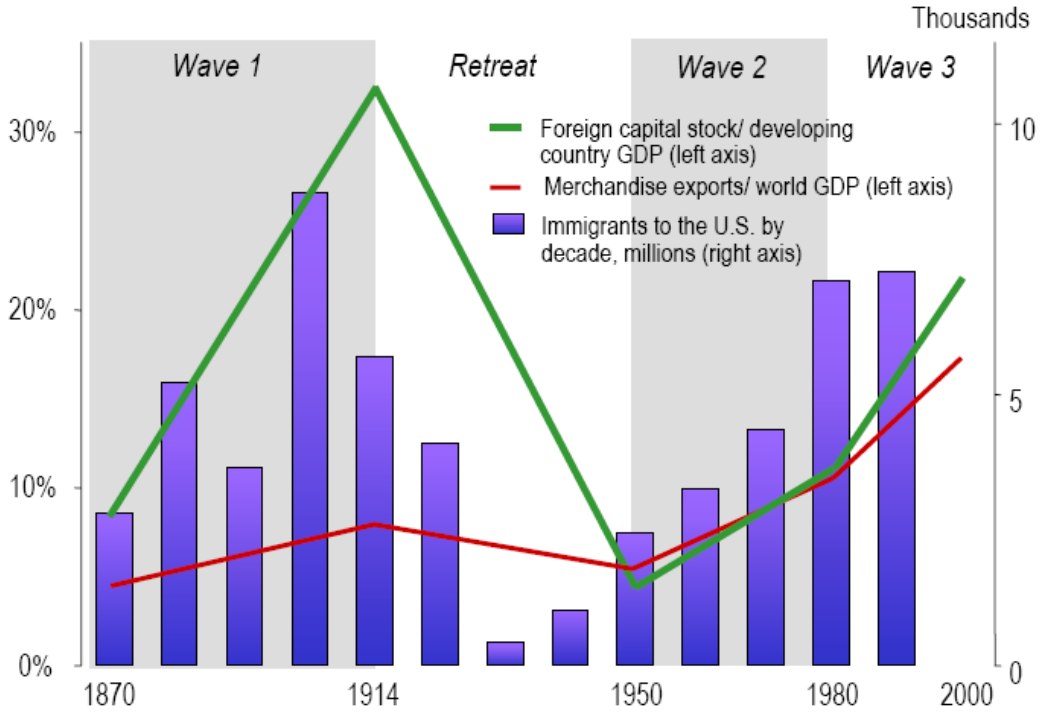
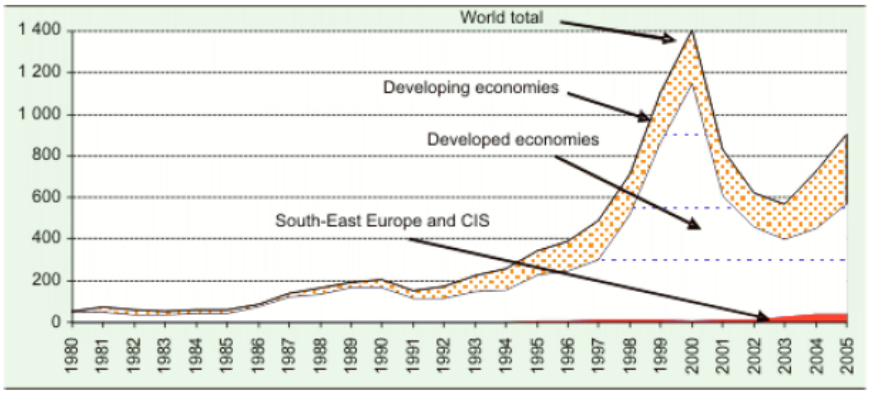
Figure 1: Three Waves of Globalization



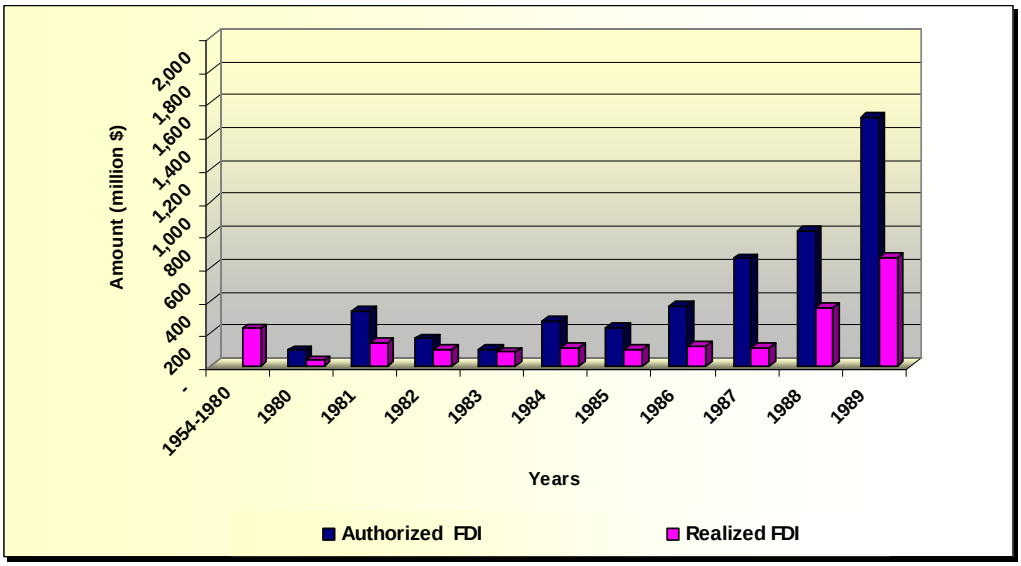
Source: World Bank (2002).

Figure 2: FDI Inflows, global and by group of economies, 1980-2005 (billions of dollars).



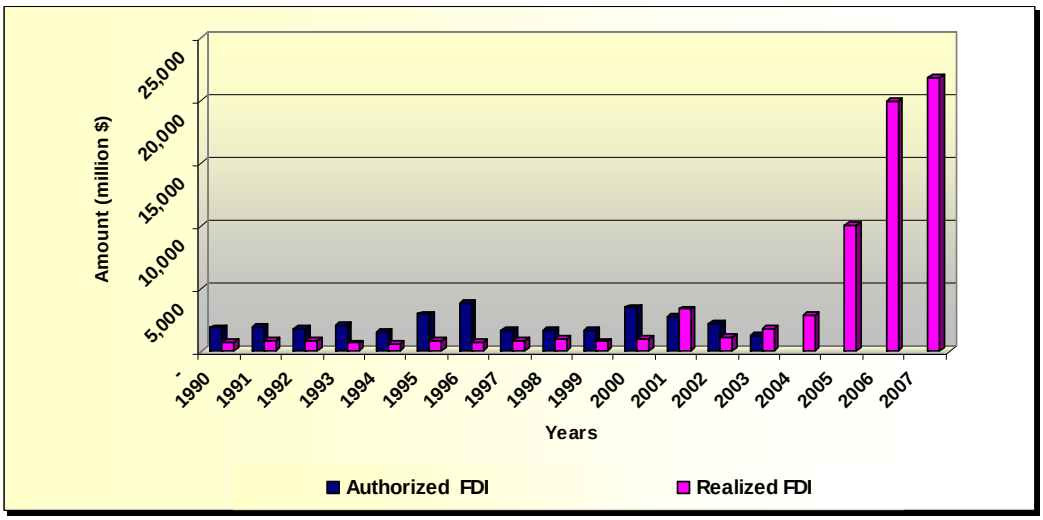
Source: UNCTAD (2006)

Figure 3: Foreign Direct Investment in Turkey: 1954 -1989.



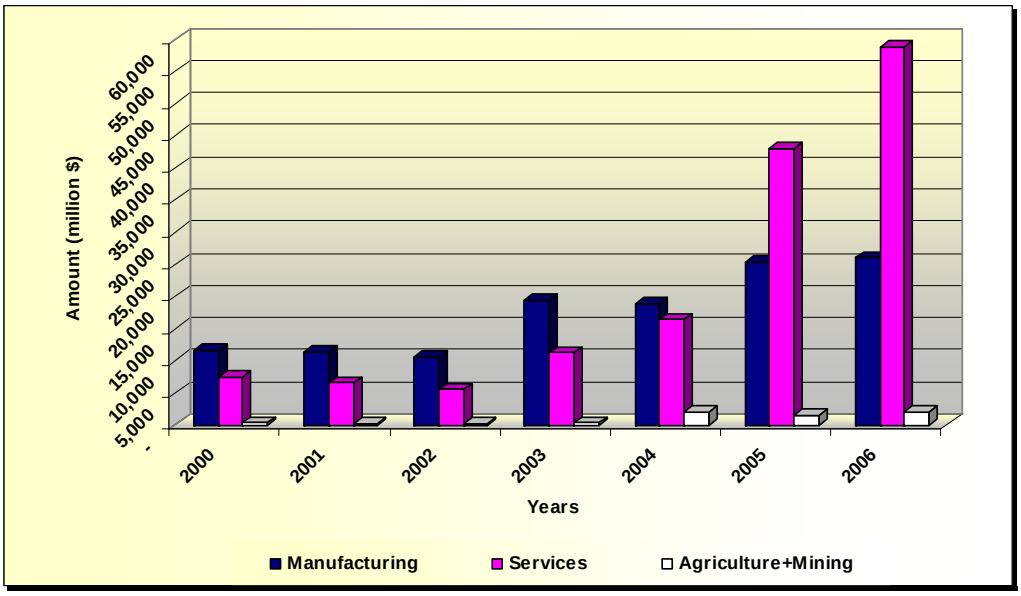
Source: Undersecretariat of Treasury and CBRT.

Figure 4: Foreign Direct Investment in Turkey: 1990-2007



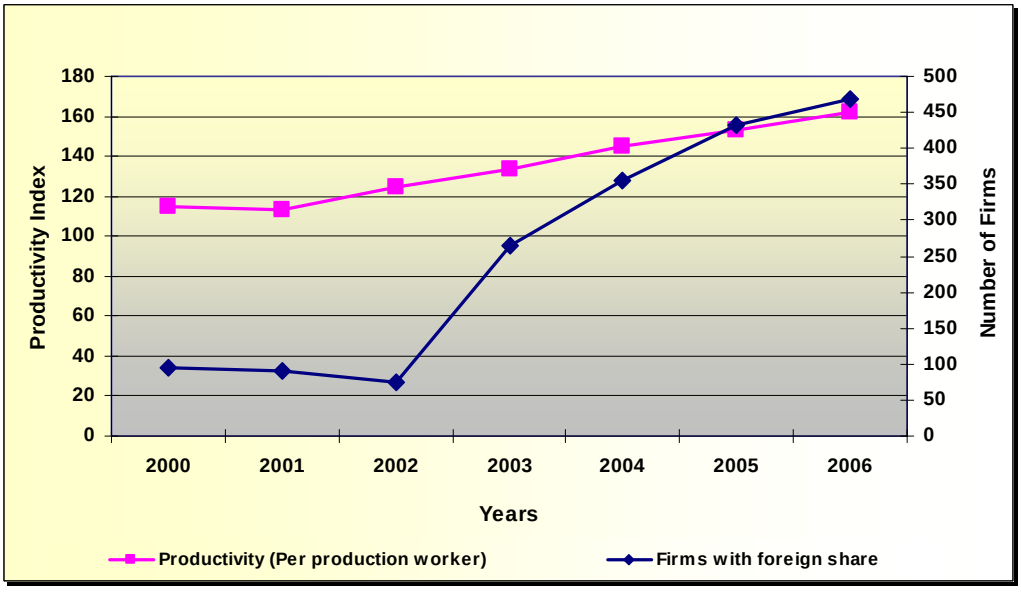
Source: Undersecretariat of Treasury, CBRT.

Figure 5: Sectoral Breakdown of FDI in Turkey.



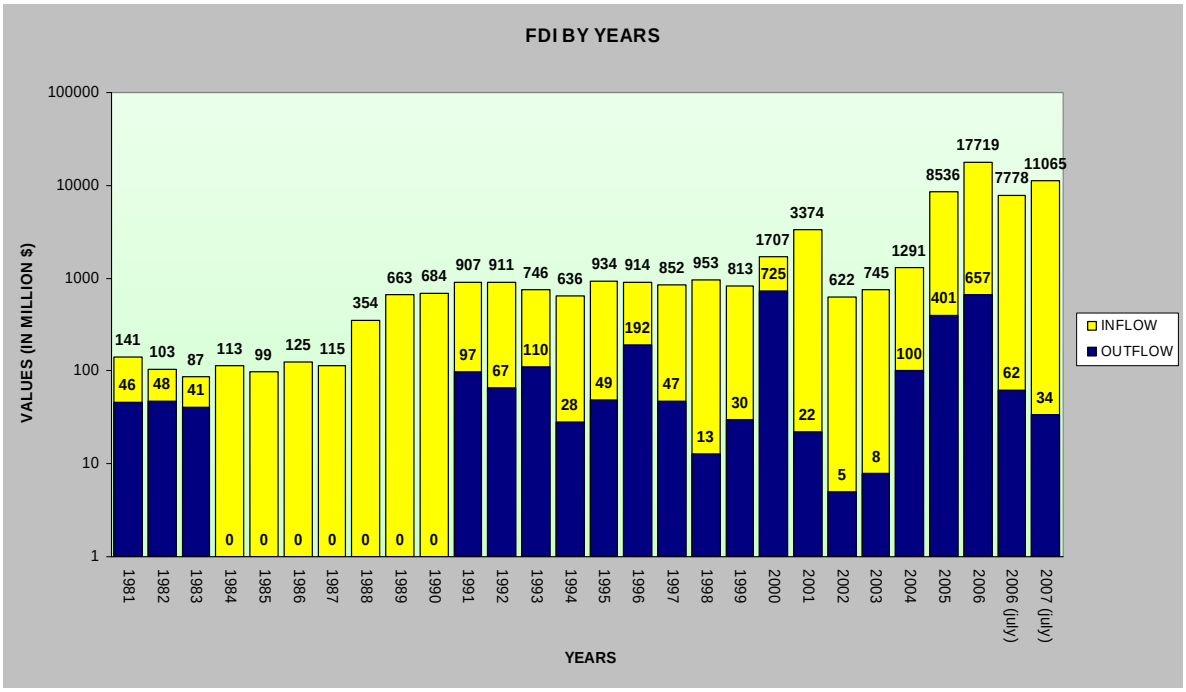
Source: Undersecretariat of Treasury and CBRT.

Figure 6: Productivity and foreign share (number of firms) in the Turkish manufacturing sector



Source: Undersecretariat of Treasury and CBRT.

Figure 7: FDI flows in the Turkish economy (million dollars)



Source: Undersecretariat of Treasury

Figure 8: Number of firms in the Turkish manufacturing industry, 1982-2001

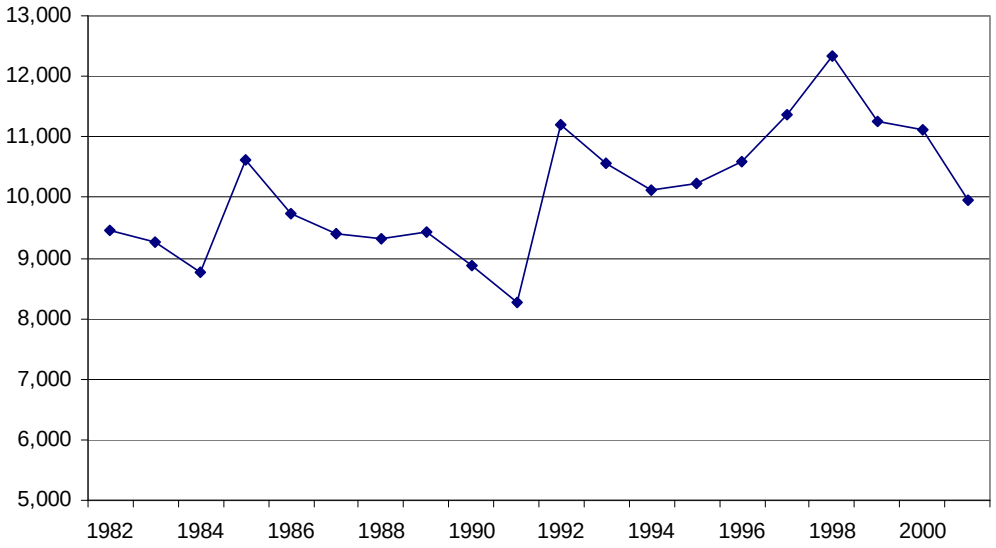


Figure 9: Share of domestic and foreign firms in manufacturing gross output (production), 1980-2001 (%)

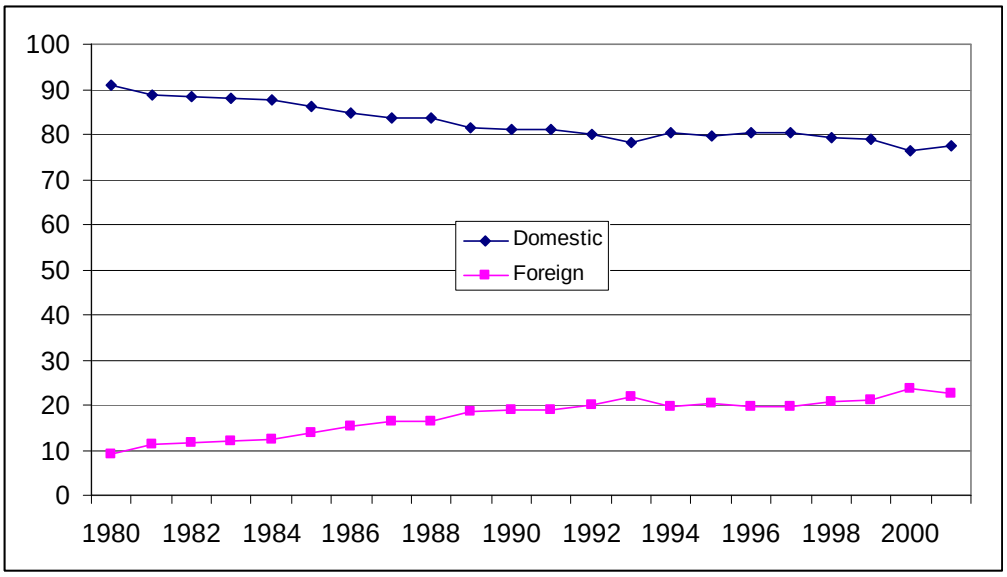


Figure 10: Share of domestic and foreign firms in manufacturing gross output (production) - 1980, 1985, 1990, 1995 and 2000 (%)

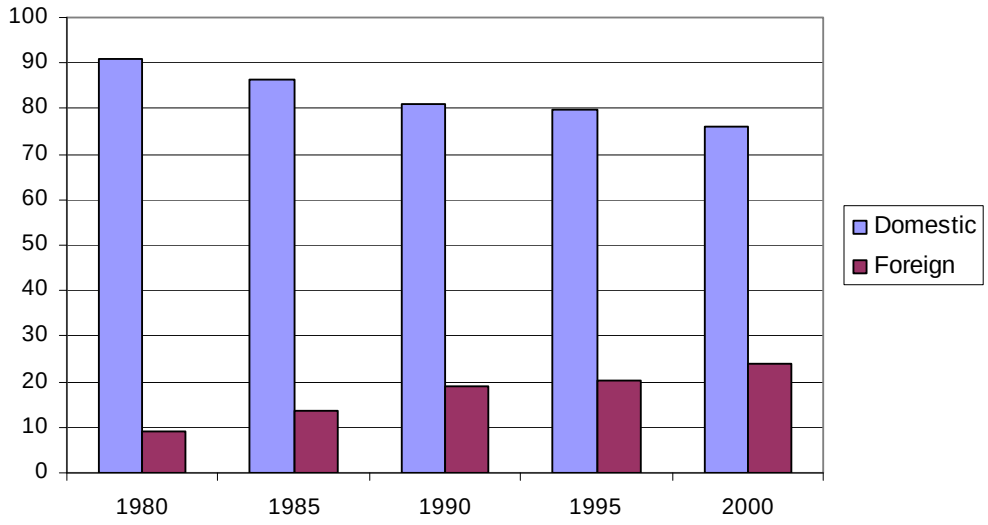


Figure 11: Share of domestic and foreign firms in manufacturing net output (value added), 1980-2001 (%)

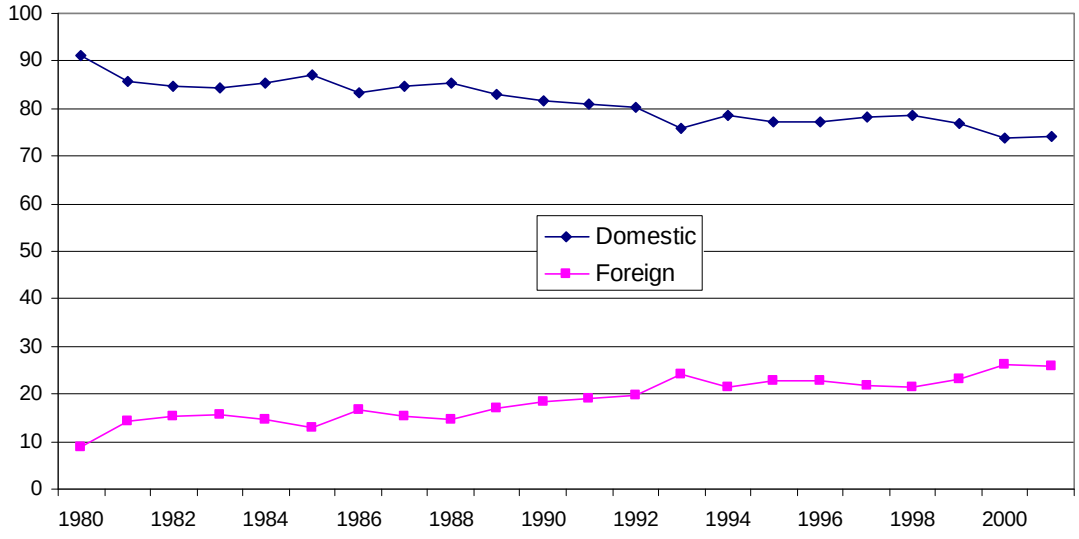


Figure 12: Share of domestic and foreign firms in manufacturing net output (value added) - 1980, 1985, 1990, 1995 and 2000 (%)

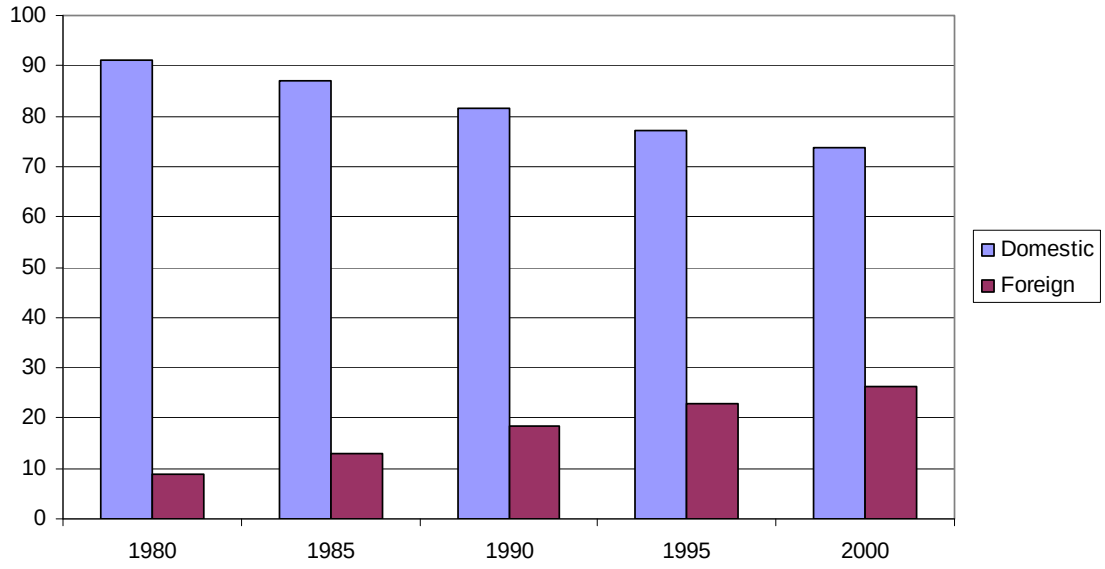


Figure 13: Evolution of the share of domestic and foreign firms in manufacturing employment: all employees, 1980-2001 (%)

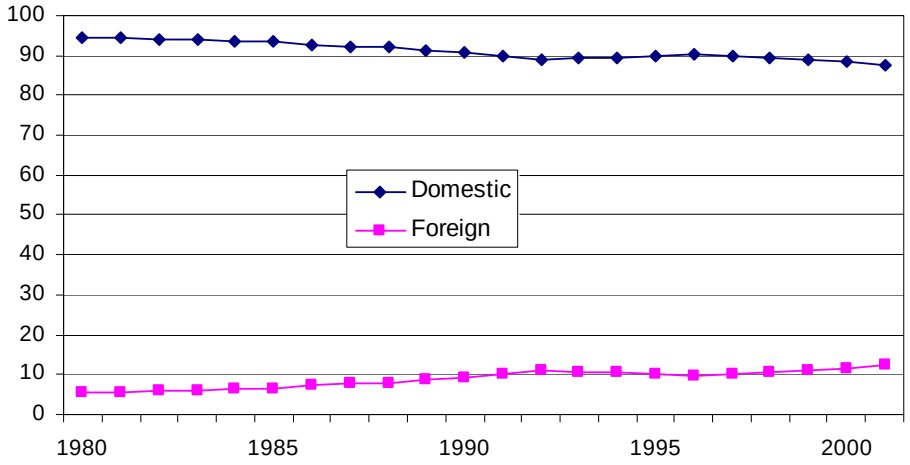


Figure 14: Evolution of the share of domestic and foreign firms in manufacturing employment: all employees, 1980, 1985, 1990, 1995 and 2000 (%)

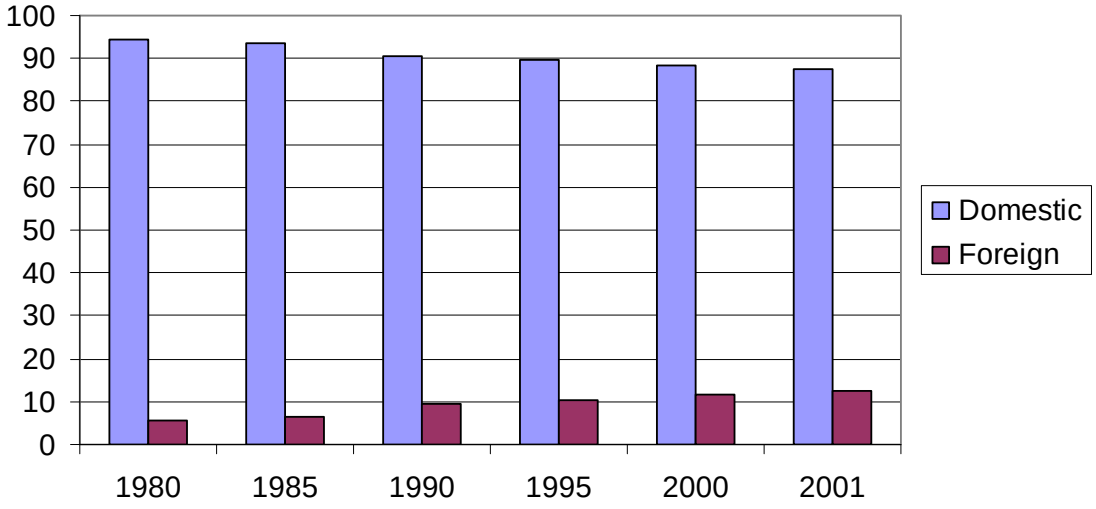


Figure 15: Evolution of the share of domestic and foreign firms in manufacturing employment: production workers, 1980-2001 (%)

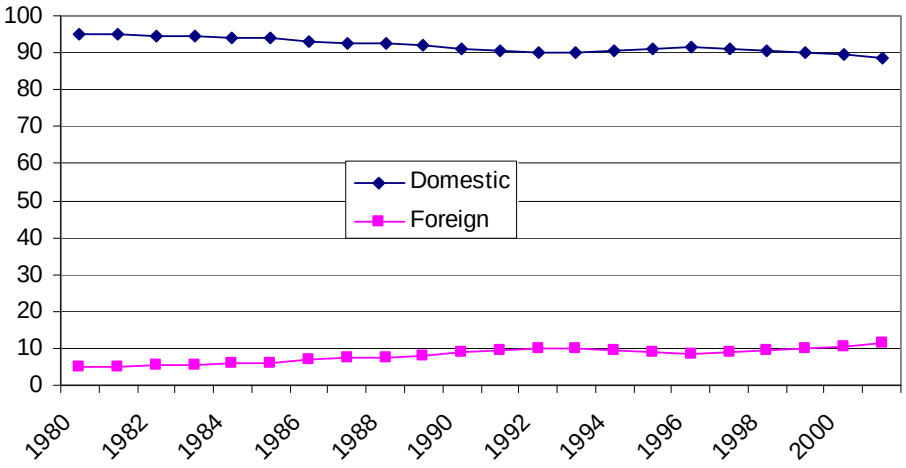


Figure 16: Evolution of the share of domestic and foreign firms in manufacturing employment: production workers, 1980, 1985, 1990, 1995 and 2000 (%)

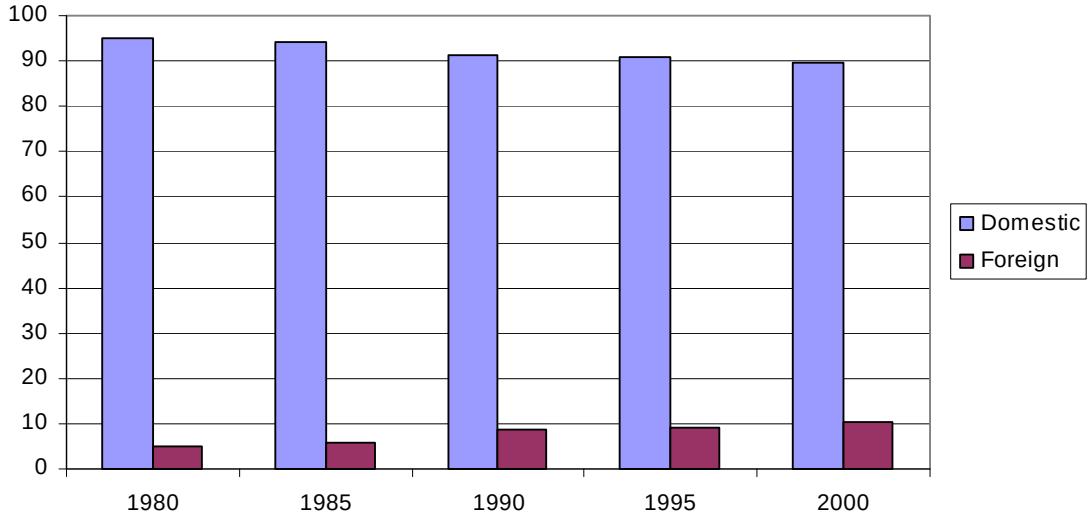


Figure 17: Evolution of the share of domestic and foreign firms in manufacturing employment: administrative employees, 1980-2001 (%)

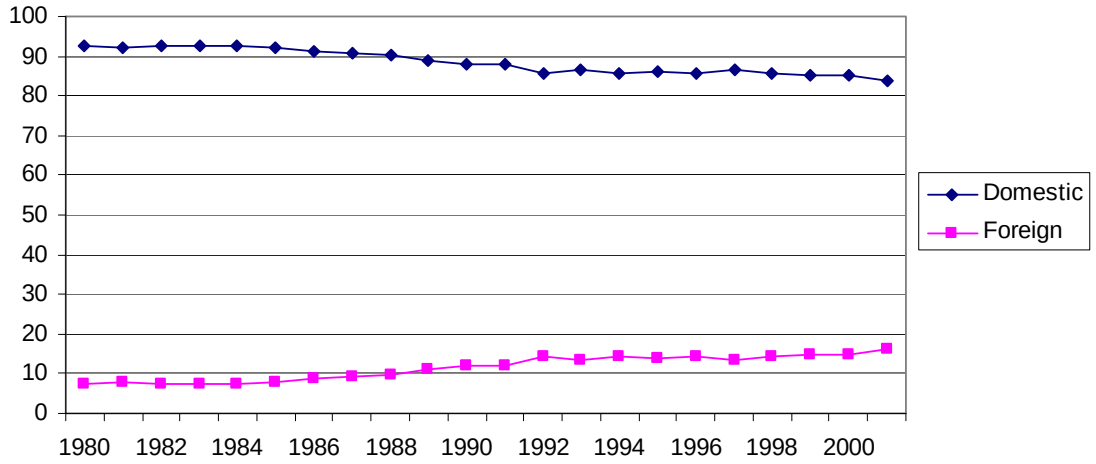


Figure 18: Evolution of the share of domestic and foreign firms in manufacturing employment: administrative employees, 1980, 1985, 1990, 1995 and 2000 (%)

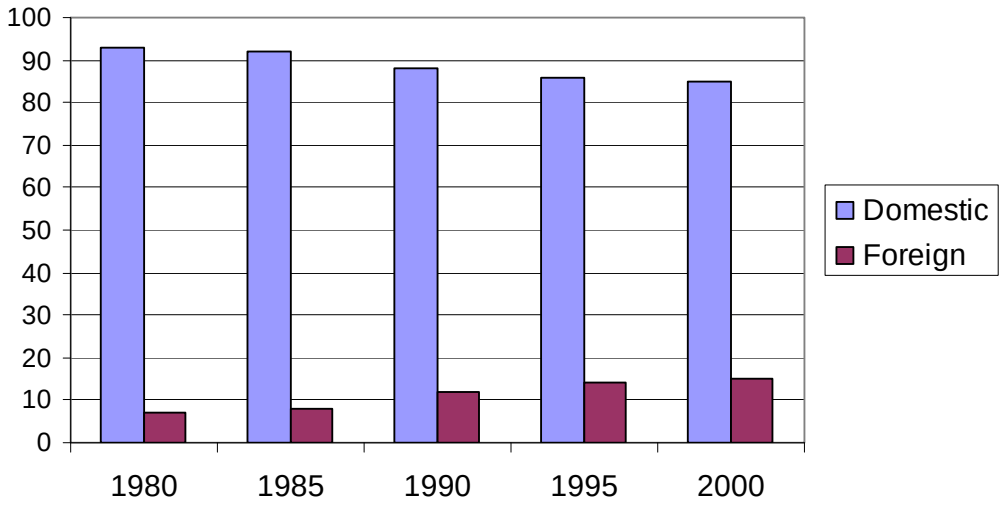


Figure 19: Evolution of the share of domestic and majority-owned foreign firms in manufacturing employment: all employees, 1980-2001 (%)

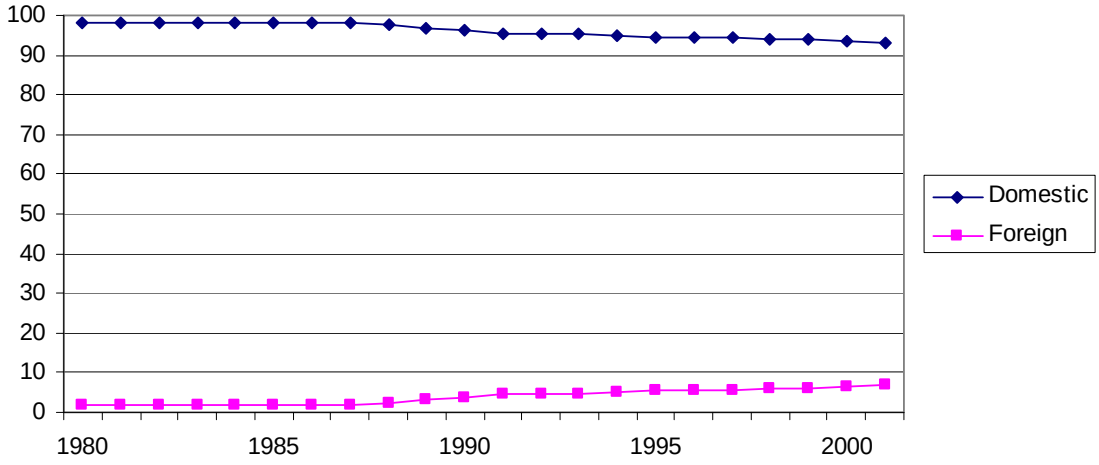


Figure 20: Evolution of the share of domestic and majority-owned foreign firms in manufacturing employment: all employees, 1980, 1985, 1990, 1995 and 2000 (%)

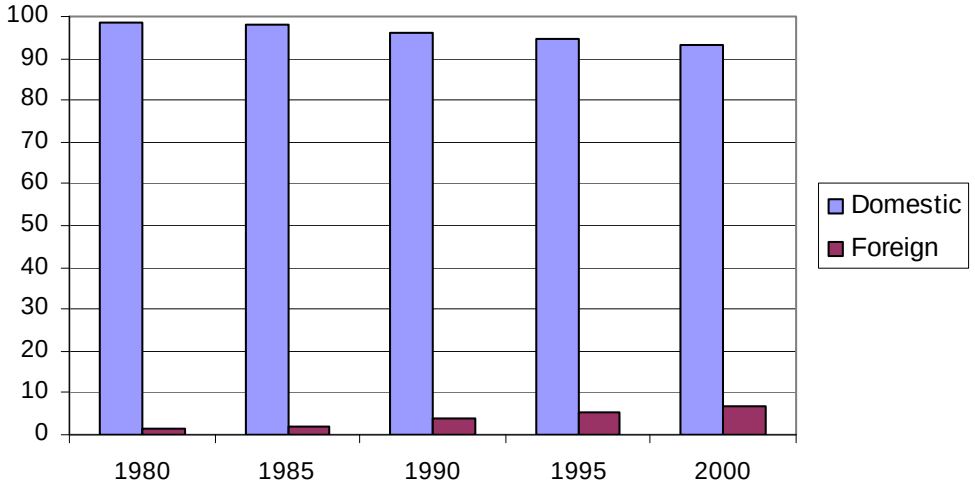


Figure 21: Evolution of the share of domestic and majority-owned foreign firms in manufacturing employment: production workers, 1980-2001 (%)

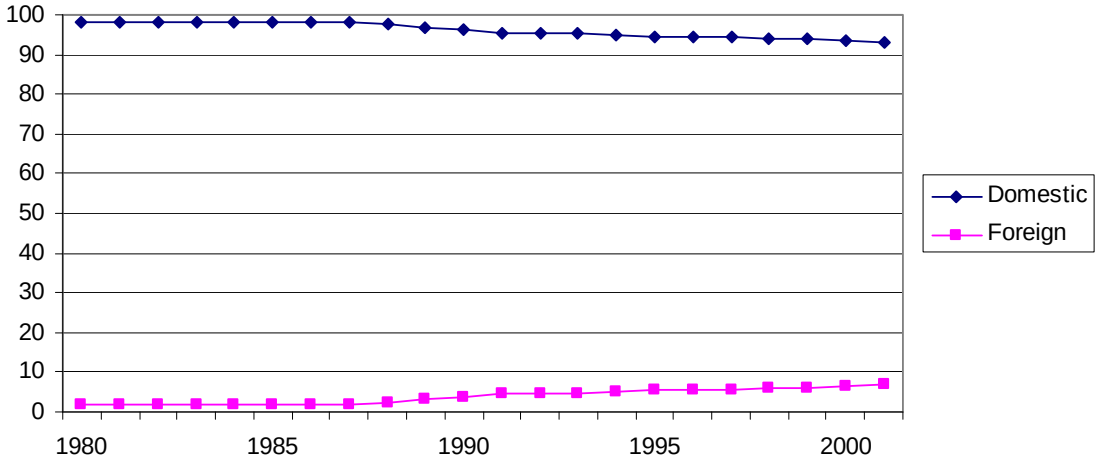


Figure 22: Evolution of the share of domestic and majority-owned foreign firms in manufacturing employment: production workers, 1980, 1985, 1990, 1995 and 2000 (%)

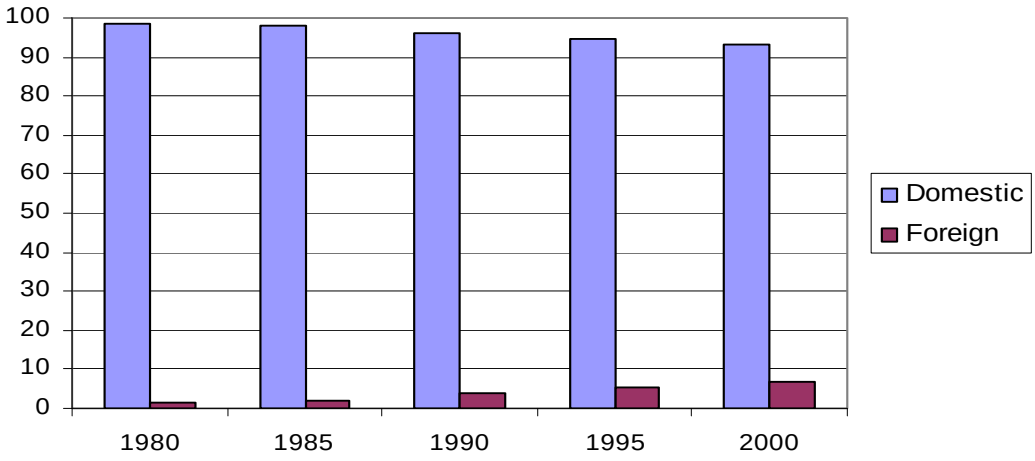


Figure 23: Evolution of the share of domestic and majority-owned foreign firms in manufacturing employment: administrative employees, 1980-2001 (%)

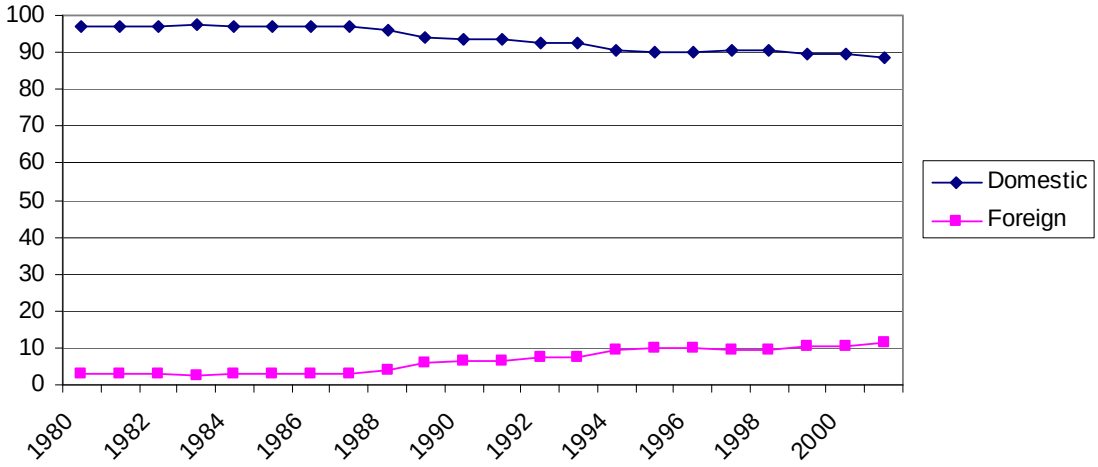


Figure 24: Evolution of the share of domestic and majority-owned foreign firms in manufacturing employment: administrative employees, 1980, 1985, 1990, 1995 and 2000 (%)

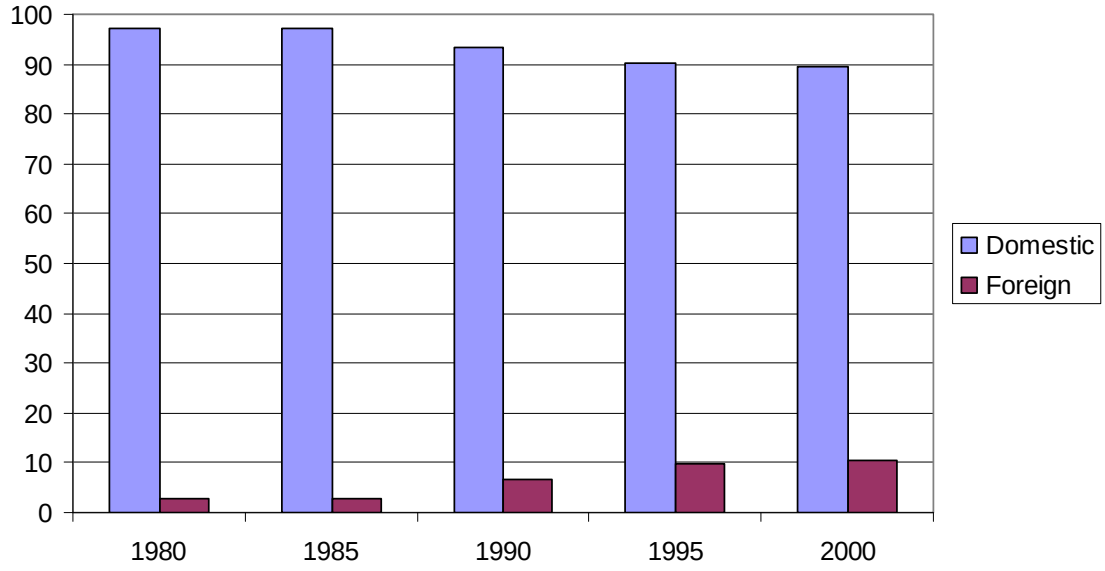


Figure 25: Share of domestic and foreign manufacturing firms in wages paid to production workers, 1980-2001 (%)

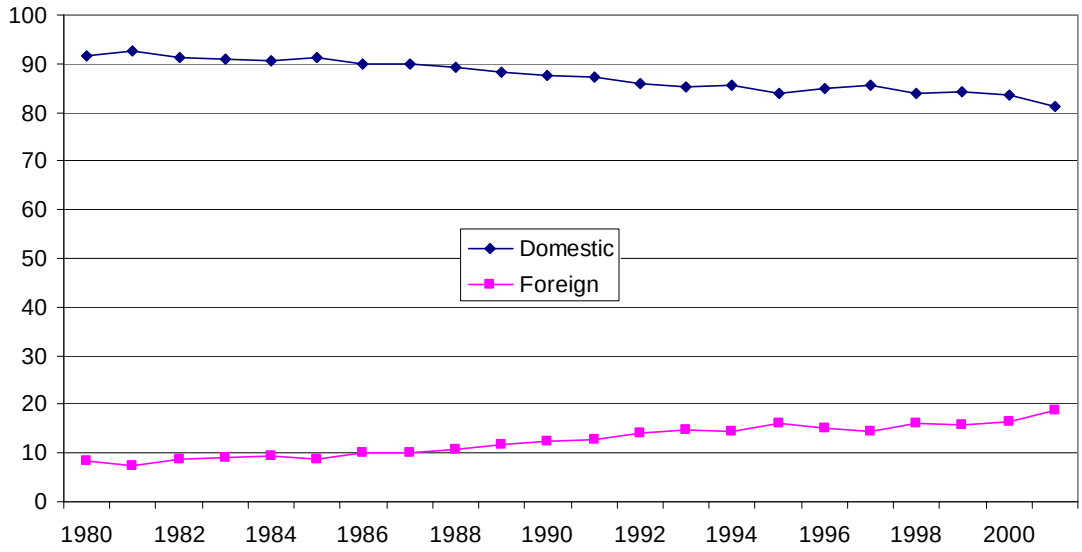


Figure 26: Share of domestic and foreign manufacturing firms in wages paid to production workers, 1980, 1985, 1990, 1995 and 2000 (%)

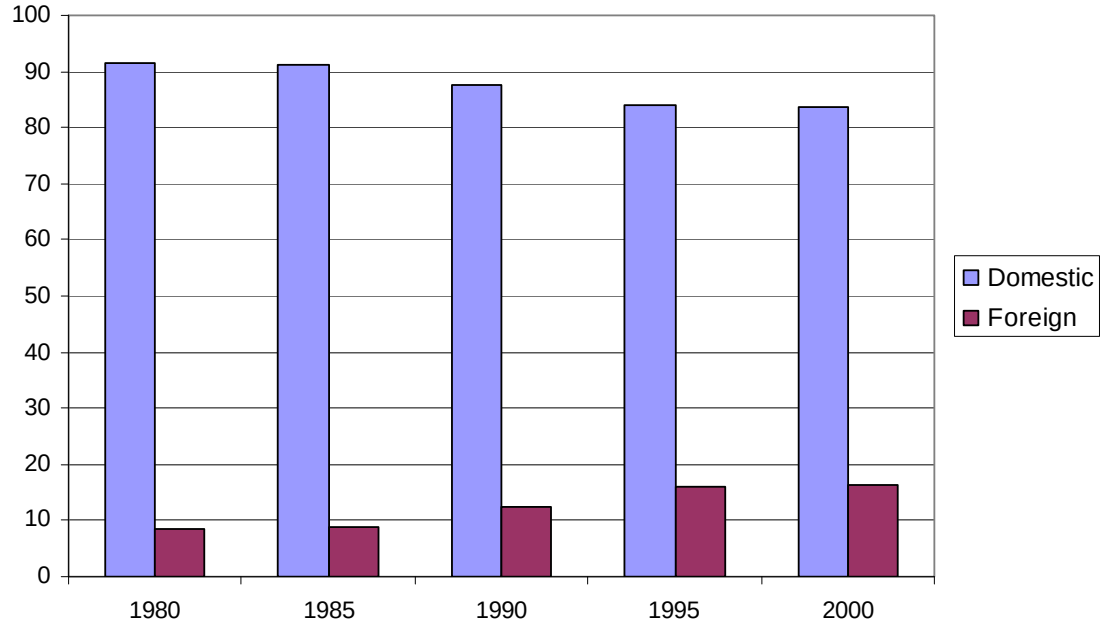


Figure 27: Share of domestic and foreign manufacturing firms in wages paid to administrative employees, 1980-2001 (%)

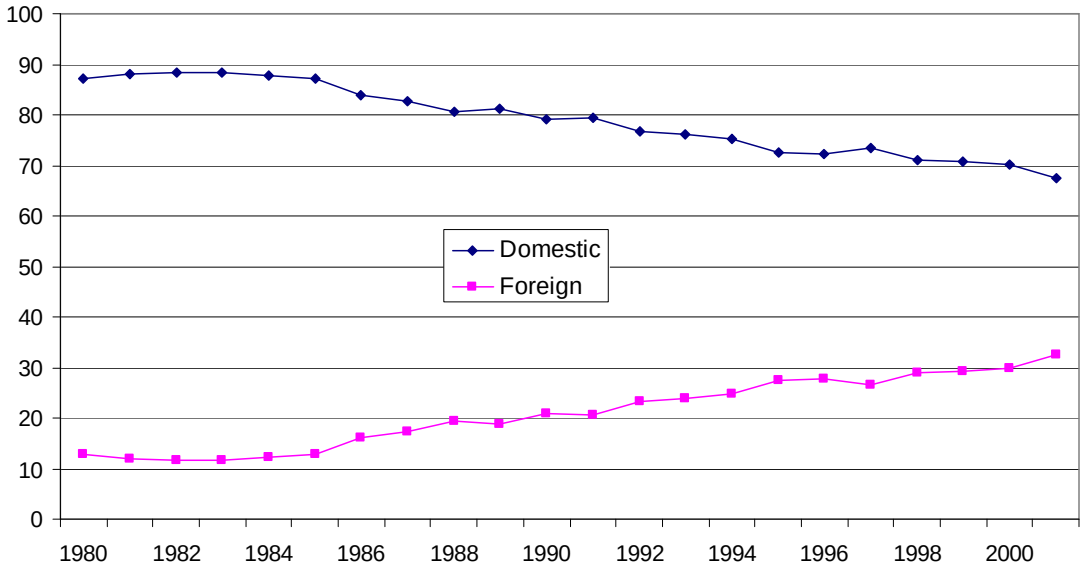


Figure 28: Share of domestic and foreign manufacturing firms in wages paid to administrative employees, 1980, 1985, 1990, 1995 and 2000 (%)

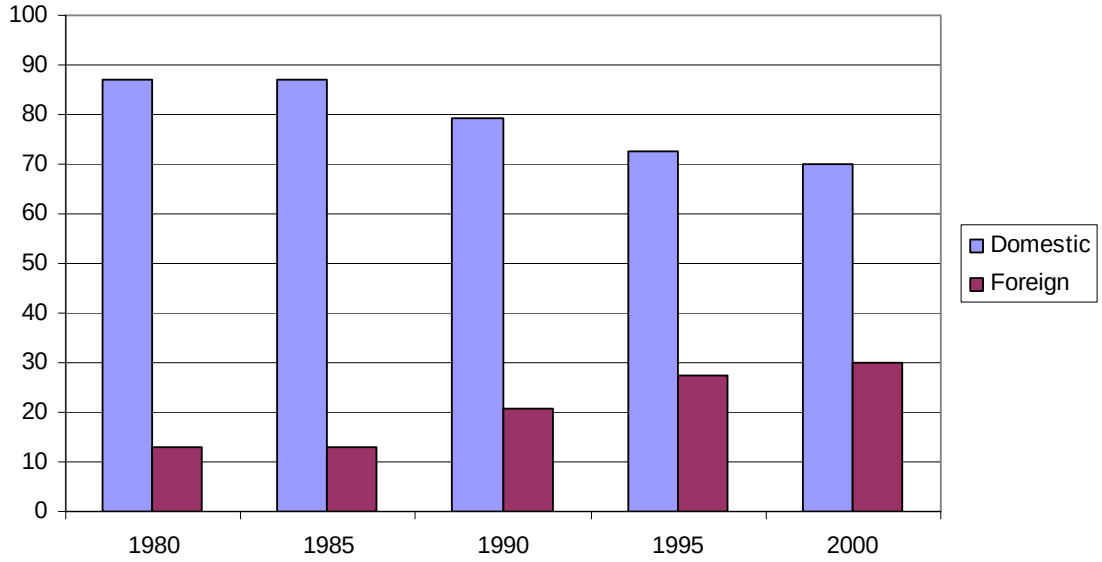


Figure 29: Evolution of nominal wage rates in domestic and foreign firms in the Turkish manufacturing sector, 1980-2001 (domestic firms = 100)

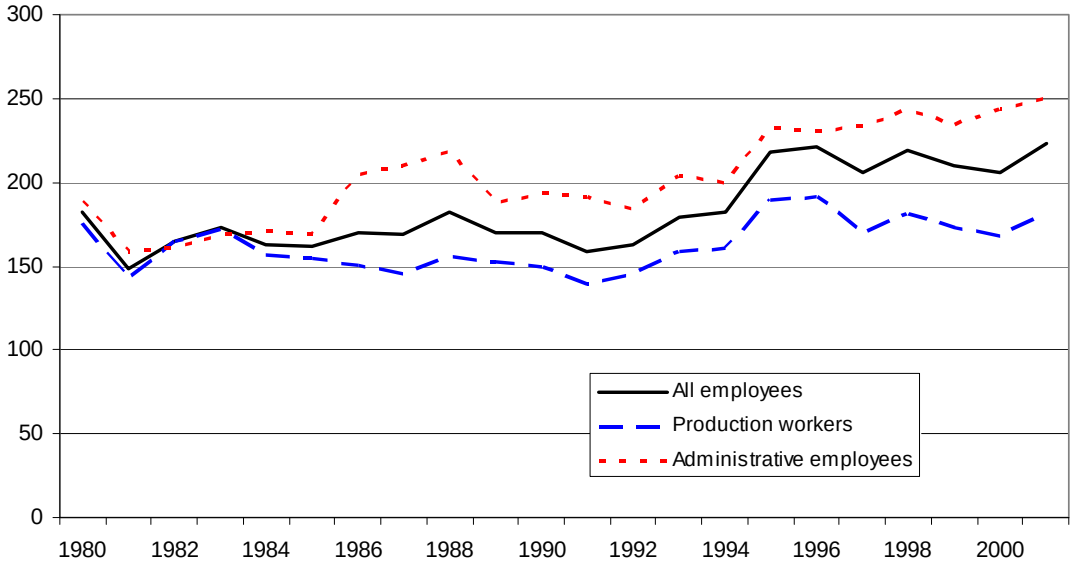
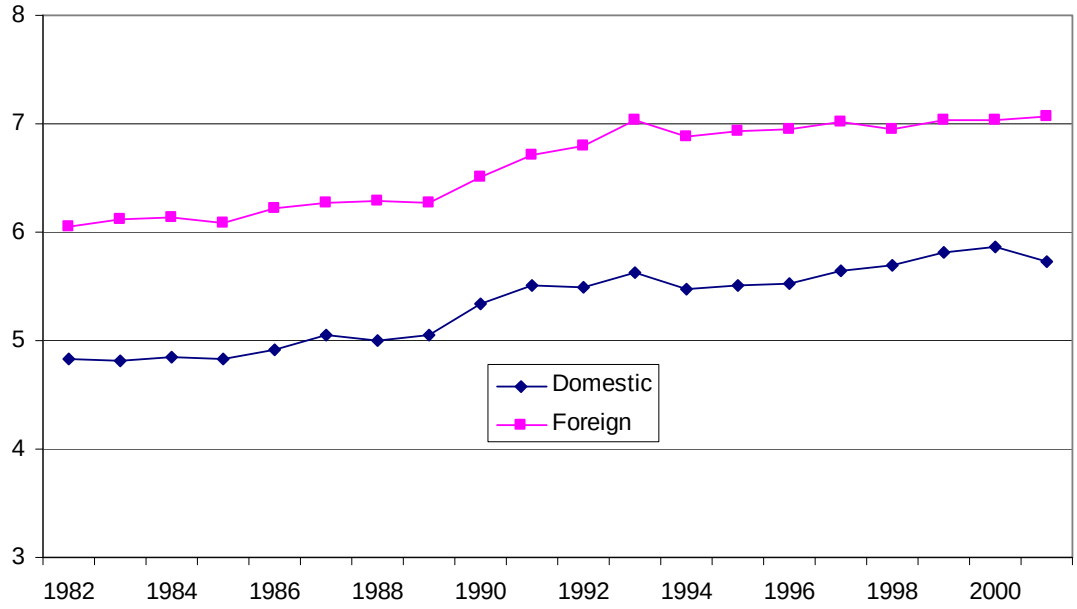


Figure 30: Evolution of real labor productivity in domestic and foreign firms in the Turkish manufacturing sector , 1982-2001*



* Real labor productivity at the firm-level is calculated as the logarithm of per capita value-added divided by the sector-level output deflator.

Figure 31: Share of skilled workforce amongst production workers in domestic and foreign firms in the Turkish manufacturing sector, 1986-2001 (%)

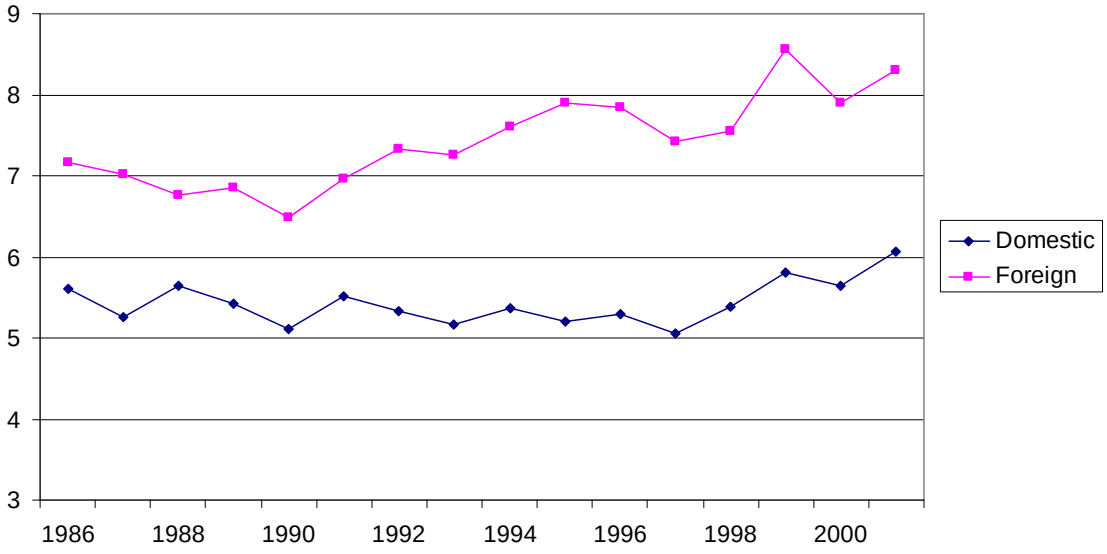


Figure 32: Share of skilled workforce amongst administrative employees in domestic and foreign firms in the Turkish manufacturing sector, 1986-2001 (%)

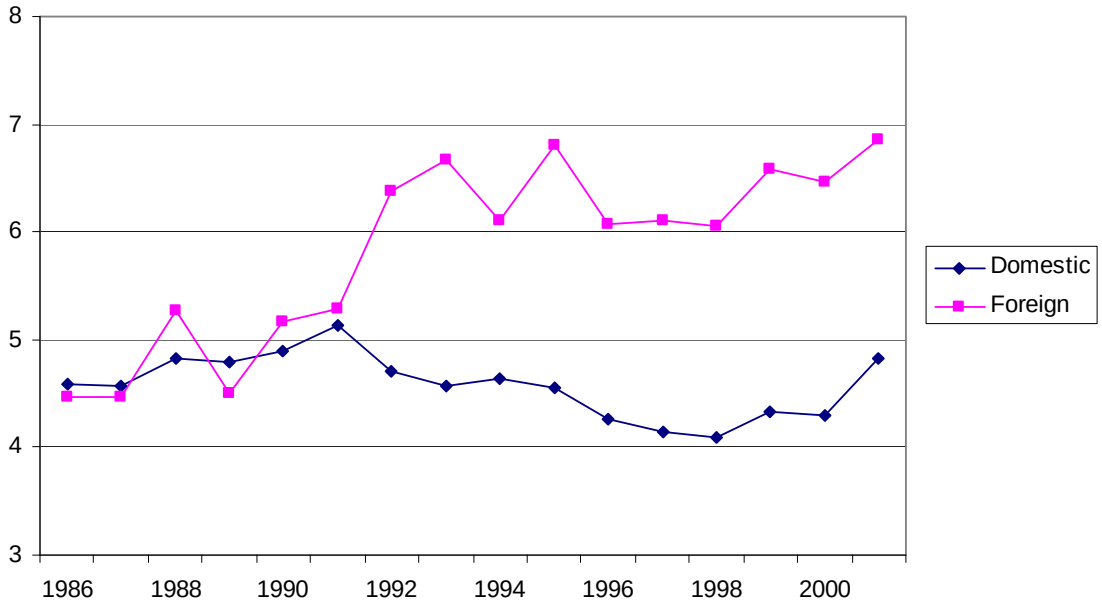


Table 15: Summary of Findings of Econometric Studies of Productivity Spillovers

	CROSS-SECTION		PANEL	
	Industry-level data	Micro data	Industry-level data	Micro data
Developing countries	5 (+), 1 (?)	4 (+), 2(?)	1 (?)	1(+), 2(-), 3(?)
Transition economies	1 (+)	---	---	5 (-), 1 (+)
Developed countries	3 (+)	1 (+)	1 (+)	8 (?), 4 (+)

(+): indicates a positive and statistically significant coefficient on the foreign presence variable
(-): indicates a negative and statistically significant coefficient on the foreign presence variable
(?): indicates statistically insignificant coefficients on the foreign presence variable

Table 16: Cross Border M&As, by Region/Economy of Seller/Purchaser: 2003-2005 (Number of deals).

Region/economy	Sales (in the country of target firm)			Purchases (in the home country of the acquiring firm)		
	2003	2004	2005	2003	2004	2005
World	4.562	5.113	6.134	4.562	5.113	6.134
Developed Countries	3.328	3.741	4.52	3.778	4.255	5.062
Developing Countries	1.045	1.251	1.376	710	817	994
Turkey	11	18	23	3	4	8
South-East Europe and CIS	189	121	238	74	41	78

Source: UNCTAD (2006).

Table 17: Greenfield FDI Projects: by Investor/Destination Region 2003-2005: (Number).

	World as destination			World as source		
	2003	2004	2005	2003	2004	2005
Partner region/economy	By source			By destination		
World	9.348	9.927	9.488	9.348	9.927	9.488
Developed Countries	7.735	8.443	8.057	3.867	4.144	3.981
Developing Countries	1.44	1.294	1.243	4.467	4.806	4.296
Turkey	105	62	57	69	66	62
South-East Europe and CIS	173	190	188	1.014	977	1.211

Source: (UNCTAD) 2006.

Table 18: Predominant Motivation Factors and Modes of Delivery

	Greenfield Investments	Mergers and acquisitions (M&As)
Resource-seeking FDI	Yes	Rare
Market-seeking FDI	Yes	Yes
Efficiency-seeking FDI	Rare	Yes
Strategic-asset seeking FDI	Rare	Yes

Source: OECD (2002).

Table 19: Selected Host Country Determinants of FDI.

Overall Policy Framework	**Business Facilitation**
-Economic and political stability	-Administrative procedures
-Rules regarding entry and operations of TNCs	-FDI promotion (e.g. Facilitation services)
-Bi- and multilateral agreements on FDI	-FDI incentives (subsidies)
-Privatization policy	
Economic Determinants*	
*Differentiated by major motivations of FDI	
Relating to Resource-seeking FDI	**Relating to Market-seeking FDI**
-Raw materials	-Market size
-Complementary factors of production (labour)	-Market growth
-Physical infrastructure	-Regional integration
Relating to Efficiency-seeking FDI	
-Productivity-adjusted labour costs	
-Sufficiently skilled labour	
-Business-related services	
-Trade policy	

Source: UNCTAD (1998).

Table 20: Summary of Findings of Econometric Studies of Wage Spillovers

	CROSS-SECTION		PANEL	
	Industry-level data	**Micro data**	**Industry-level data**	**Micro data**
Developing countries	---	---	2 (-)	1 (+)
Transition economies	---	---	---	---
Developed countries	1 (+)	---	2 (?)	---

(+): indicates a positive and statistically significant coefficient on the foreign presence variable
(-): indicates a negative and statistically significant coefficient on the foreign presence variable
(?): indicates statistically insignificant coefficients on the foreign presence variable

Table 21: FDI by Geographical Destination

2002			2003		
Rank	**Country**	**FDI amount**	**Rank**	**Country**	**FDI amount**
1	USA	74.4	1	China	53.5
2	Germany	53.5	2	USA	53.1
3	China	52.7	3	France	42.5
4	France	49	4	Belgium	33.4
5	Spain	39.2	5	Germany	29.2
6	Ireland	29.3	6	Spain	25.9
7	Netherlands	25	7	Ireland	22.8
8	UK	24	8	Netherlands	21.7
9	Canada	22.2	9	UK	16.8
10	Mexico	18.3	10	Switzerland	16.5
53	Turkey	1.1	53	Turkey	1.8
	World Total	617.7		World Total	557.9
2004			**2005**		
Rank	**Country**	**FDI amount**	**Rank**	**Country**	**FDI amount**
1	USA	122.4	1	UK	164.5
2	China	60.6	2	USA	99.4
3	UK	56.2	3	China	72.4
4	Australia	42.4	4	France	63.6
5	Belgium	42	5	Netherlands	43.6
6	Hong Kong	34	6	Hong Kong	35.9
7	France	31.4	7	Canada	33.8
8	Spain	24.8	8	Germany	32.7
9	Mexico	18.7	9	Belgium	23.7
10	Brazil	18.1	10	Spain	23
37	Turkey	2.8	22	Turkey	9.7
	World Total	710.8		World Total	916.3

Source: UNCTAD (2006).

Table 22: Matrix of Inward FDI Performance and Potential, 2004*.

	High FDI Performance	Low FDI Performance
	Front-runners	**Below potential**
High FDI Potential	Australia, Bahamas, Bahrain, Belgium, Botswana, Brunei Darussalam, Bulgaria, Chile, China, Croatia, Cyprus, Czech Republic, Dominican Republic, Estonia, Finland, Hong Kong(China), Hungary, Iceland, Ireland, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Luxembourg, Malaysia, Malta, Netherlands, New Zealand, Panama, Poland, Portugal, Qatar, Singapore, Slovakia, Slovenia, Spain, Sweden, Trinidad and Tobago and United Arab Emirates.	Algeria, Argentina, Austria, Belarus, Brazil, Canada, Denmark, France, Germany, Greece, Islamic Republic of Iran, Israel, Italy, Japan, Kuwait, Libyan Arab Jamahiriya, Mexico, Norway, Oman, Philippines, Republic of Korea, Russian Federation, Saudi Arabia, Switzerland, Taiwan Province of China, Thailand, Tunisia, **Turkey**, Ukraine, United Kingdom and United States.
	Above potential	**Under-performers**
Low FDI Potential	Albania, Angola, Armenia, Azerbaijan, Bolivia, Congo, Costa Rica, Ecuador, Ethiopia, Gabon, Gambia, Georgia, Guyana, Honduras, Jamaica, Kyrgyzstan, Mali, Mongolia, Morocco, Mozambique, Namibia, Nicaragua, Nigeria, Republic of Moldova, Romania, Sudan, Tajikistan, Uganda, United Republic of Tanzania, Viet Nam and Zambia.	Bangladesh, Benin, Burkina Faso, Cameroon, Colombia, Cote d'Ivoire, Democratic Republic of the Congo, Egypt, El Salvador, Ghana, Guatemala, Guinea, Haiti, India, Indonesia, Kenya, Madagascar, Malawi, Myanmar, Nepal, Niger, Pakistan, Papua New Guinea, Paraguay, Peru, Rwanda, Senegal, Sierra Leone, South Africa, Sri Lanka, Suriname, Syrian Arab Republic, TFYR of Macedonia, Togo, Uruguay, Uzbekistan, Venezuela, Yemen and Zimbabwe.

***** Three-year average for 2002-2004. Because of unavailability of data on FDI potential for 2005, the data for 2004 have been used.
Source: UNCTAD (2006).

Table 23: The Share of Turkey in the Global FDI Inflows

In Percentages	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Developing Countries/ World	43	30	23	18	27	23	30	38	33	29
Turkey/ World	0.17	0.14	0.07	0.08	0.4	0.15	0.1	0.4	1.03	1.5
Turkey/ Developing Countries	0.43	0.5	0.35	0.41	1.5	0.66	0.33	1.02	1.03	5.3

Source: Candemir (2007) and UNCTAD- World Investment Report 2007.

Table 24: International Direct Investment Inflows (million US$)

	2003	2004	2005	2006	January- August 2006	January- August 2007
International Direct Investment Total (Net)	**1.752**	**2.883**	**10.027**	**19.982**	**12.908**	**13.904**
International Direct Investment Capital	**754**	**1.540**	**8.186**	**17.060**	**10.820**	**12.315**
Equity Investment (Net)	**737**	**1.191**	**8.135**	**17.052**	**10.831**	**12.029**
Inflow	745	1.291	8.536	17.709	10.893	12.086
Liquidation Outflow	-8	-100	-401	-657	-62	-57
Intra Company Loans*	**17**	**349**	**51**	**8**	**11**	**286**
Real Estate (Net)	**998**	**1.343**	**1.841**	**2.922**	**2.088**	**1.589**

* Loans which companies with foreign capital take from foreign patners ** Provisional Data, Source: Central Bank of Republic of Turkey (The extended Table is on Appendix Table A4)

Table 25: FDI flows in the Turkish Economy - for Selected Years (in million dollars)

Years	Inflows	Outflows	NET
1981	141	46	95
1990	684	0	684
1995	934	49	885
2002	622	5	617
2003	745	8	737
2004	1.291	100	1.191
2005	8.536	401	8.135
2006	17.719	657	17.062

Source: Undersecretariat of Treasury

Table 26: Five top entries to Turkey

Firm which is sold	Purchaser Firm	Purchaser's Country	% of share	Amount of FDI (million dollars)
Telsim	Vodafone	Netherlands	100.0	4.690
Denizbank	Dexia Bank	Belgium	98.9	3.221
Finansbank	Nat. bank of Greece	Greece	80.4	2.774
Türk Telekom	Ojer Telecom	Lebanon	40.6	1.500
Petrol Ofisi	OMV	Austria	34.0	1.054
TOTAL				13.239

Source: Undersecretariat of Treasury- Annual FDI Report , 2006

Table 27: Breakdown of FDI According to Countries (million US$)

TRIES	2005	2006	January- August	
			2006	2007
EU Countries	5.003	14.586	9.933	7.125
Germany	391	366	270	587
France	2.107	444	337	66
Netherlands	383	5.122	4.903	2.021
England	165	635	378	492
Italy	692	209	36	63
Other EU	1.265	7.810	4.009	3.896
Non- EU European Countries	1.650	84	72	222
African Countries	3	32	14	3
USA	88	851	449	3.581
Canada	26	121	115	8
Middle and South America and the Caribbean	8	33	22	484
Asia	1.756	1.946	280	637
Gulf Countries	1.675	1.791	245	100
Near and Middle East	3	124	25	175
Other Asian Countries	78	31	9	362
Australia	1	108	--	26
Unclassified	1	7	7	--
TOTAL	**8.536**	**17.769**	**10.893**	**12.086**

Source: Undersecretariat of Treasury – FDI Monthly Review, October 2007

Table 28: Breakdown of Foreign Companies Operating in Turkey According to Home Countries (number of companies)

COUNTRIES	2003	2004	2005	2006	January- August		1954- 2007 August (cumulative)
					2006	2007	
EU Countries	468	1.067	1.684	2.088	1.371	1.399	9.606
Germany	153	383	509	600	381	380	3.007
Netherlands	73	142	214	276	182	170	1.359
England	67	144	341	487	302	299	1.719
Other EU	175	398	620	725	506	550	3.521
Non- EU European Countries	144	283	349	396	256	330	2.134
African Countries	30	44	61	42	31	33	297
USA	61	108	118	144	85	90	911
Canada	8	12	14	26	13	19	107
Middle and South America and the Caribbean	5	12	17	10	8	15	105
Near and Middle East	270	380	415	438	296	346	2.942
Azerbaijan	38	61	63	87	56	74	418
Iraq	40	54	64	78	52	73	477
Iran	109	131	126	112	81	70	877
Other	83	134	162	161	107	129	1.170
Other Asian Countries	112	166	177	180	109	208	1.177
China	46	58	34	27	11	36	302
South Korea	15	19	18	13	8	15	130
Other	51	89	125	140	90	157	745
Other Countries	15	35	24	52	45	24	228
TOTAL	**1.105**	**2.095**	**2.845**	**3.350**	**2.201**	**2.445**	**17.400**

*Undersecretariat of Treasury – FDI Monthly Review September 2007 (Appendix Table A8)

Table 29: Breakdown of Companies with Foreign Capital by Country with Respect to the Size of Equity Capital:

Countries	2007(January- August)				
	<50.000$	50.000$ - 200.000$	200.000$- 500.000$	>500.000$	Total
Eu Countries (25)	**819**	**365**	**92**	**123**	**1.399**
Germany	211	113	29	27	380
Netherlands	104	31	12	23	170
United Kingdom	182	84	18	15	299
Diğer AB Ülkeleri	322	137	33	58	550
Other European Countries (Non-EU)	**185**	**95**	**31**	**19**	**330**
North African Countries	**9**	**10**	**0**	**1**	**20**
Other African Countries	**6**	**6**	**1**	**0**	**13**
North America	**60**	**15**	**7**	**8**	**90**
USA	49	9	7	6	71
Canada	**11**	**6**	**0**	**2**	**19**
Middle and South America, Caribbeans	**13**	**0**	**0**	**2**	**15**
Near and Middle East	**160**	**121**	**32**	**33**	**346**
Azerbaijcan	33	29	6	6	74
Iraq	35	28	9	1	73
Iran	36	24	6	4	70
Others	56	40	11	22	129
Other Asian Countries	**107**	**58**	**19**	**24**	**208**
Other Countries	12	5	3	4	24
Total	**1.371**	**675**	**185**	**214**	**2.445**

Source: Undersecretariat of Treasury

Table 30: Sectoral Distribution of FDI Inflows (million US$)

Sectors	2003	2004	2005	2006	January- August	
					2006	2007
Agriculture, Hunting and Forestry	**1**	**4**	**5**	**5**	**0**	**0**
Fishing	**0**	**2**	**2**	**1**	**0**	**3**
Mining and Quarrying	**14**	**75**	**40**	**122**	**70**	**318**
Manufacturing	**448**	**214**	**788**	**1.867**	**1.070**	**2.576**
Food Products and Beverages	249	78	68	607	575	253
Textiles	8	14	183	27	15	32
Chemicals and Chemical Products	9	39	174	602	250	851
Machinery and Equipment n.e.c.	17	8	13	54	51	24
Electrical Machinery and Apparatus	4	2	13	53	41	75
Motor Vehicles, Trailers and Semi-trailers	145	35	106	63	45	63
Other Manufacturing	14	38	227	458	93	1.278
Electricity, Gas and Water Supply	**86**	**69**	**4**	**112**	**111**	**537**
Construction	**8**	**23**	**80**	**293**	**149**	**242**
Wholesale and Retail Trade	**92**	**103**	**68**	**1.167**	**1.124**	**79**
Hotels and Restaurants	**4**	**1**	**42**	**23**	**12**	**12**
Transport, Storage and Communications	**2**	**639**	**3.285**	**6.700**	**4.876**	**461**
Financial Intermediation	**51**	**69**	**4.016**	**6.957**	**3.187**	**7.384**
Real Estate, Renting and Business Activities	**6**	**3**	**29**	**93**	**56**	**446**
Health and Social Work	**23**	**53**	**74**	**265**	**162**	**17**
Other Community, Social and Personal Activities	**10**	**36**	**86**	**104**	**76**	**11**
Total	**745**	**1.291**	**8.536**	**17.709**	**10.893**	**12.086**

Provisional Data- August 2007;
Source: Undersecreteriat of Treasury.

Table 31: Sectoral Distribution of FDI Inflows (number of companies)

Sectors	2003	2004	2005	2006	January- August		1954-2007/August
					2006	2007	Total
Agriculture, Hunting and Forestry	**27**	**33**	**40**	**39**	**29**	**41**	**268**
Mining and Quarrying	**11**	**32**	**50**	**43**	**30**	**51**	**284**
Manufacturing	**267**	**369**	**456**	**459**	**293**	**339**	**3.317**
Food Products and Beverages	20	51	43	40	28	25	331
Textiles	63	58	78	53	31	33	429
Chemicals and Chemical Products	29	50	40	45	28	38	373
Machinery and equipment n.e.c.	19	25	30	47	31	32	257
Motor Vehicles, Trailers and Semi-trailers	16	18	21	14	11	14	209
Other Manufacturing	120	167	244	260	164	197	1.718
Electricity, Gas and Water Supply	**10**	**14**	**12**	**45**	**29**	**32**	**181**
Construction	**30**	**136**	**348**	**434**	**292**	**334**	**1.487**
Wholesale and Retail Trade	**434**	**888**	**792**	**862**	**562**	**550**	**5.491**
Hotels and Restaurants	**60**	**78**	**180**	**226**	**160**	**136**	**1.288**
Transport, Storage and Communications	**95**	**219**	**260**	**285**	**200**	**220**	**1.497**
Real Estate, Renting and Business Activities	**90**	**230**	**520**	**724**	**455**	**591**	**2.533**
Other Community, Social and Personal Activities	**81**	**96**	**187**	**233**	**150**	**151**	**1.054**
Total	**1.105**	**2.095**	**2.845**	**3.350**	**2.201**	**2.445**	**17.400**

Provisional Data- August 2007;
Source: Undersecreteriat of Treasury

Table 32: FDI Inflows according to Technology-based Classifications of Manufacturing Industries - OECD and SPO Definitions (million US$)

Sectors	OECD C.	SPO C.	2002	2003	2004	2005	2006	January- August	
								2006	2007
Food Products and Beverages	*LOW- TECH*	*CONSUMPTION GOODS*	14	249	78	68	607	575	253
Textiles	*LOW- TECH*	*CONSUMPTION GOODS*	10	8	14	183	27	15	32
Chemicals and Chemical Products	*MEDIUM- HIGH-TECH MEDIUM-LOW-TECH*	*INTERMEDIARY GOODS*	9	9	39	174	602	250	851
Machinery and Equipment n.e.c.	*MEDIUM- HIGH-TECH*	*INVESTMENT GOODS*	13	17	8	13	54	51	24
Electrical Machinery and Apparatus	*MEDIUM- HIGH-TECH*	*INVESTMENT GOODS*	2	4	2	13	53	41	75
Motor Vehicles, Trailers and Semi-trailers	*MEDIUM- HIGH-TECH*	*INVESTMENT GOODS*	33	145	35	106	63	45	63
Other Manufacturing			19	14	38	227	458	93	1.278

Source: www.oecd.org, www.dpt.gov.tr , Undersecretariat of Treasury

Table 33: Number of Foreign Companies according to Technology-based Classifications of Manufacturing Industries - OECD and SPO Definitions

Sectors	OECD C.	SPO C.	2005	2006	January- August	
					2006	2007
Food Products and Beverages	*LOW- TECH*	*CONSUMPTION GOODS*	43	40	28	25
Textiles	*LOW- TECH*	*CONSUMPTION GOODS*	78	53	31	33
Chemicals and Chemical Products	*MEDIUM- HIGH-TECH MEDIUM-LOW-TECH*	*INTERMEDIARY GOODS*	40	45	28	38
Machinery and Equipment n.e.c.	*MEDIUM- HIGH-TECH*	*INVESTMENT GOODS*	30	47	31	32
Motor Vehicles, Trailers and Semi-trailers	*MEDIUM- HIGH-TECH*	*INVESTMENT GOODS*	21	14	11	14
Other Manufacturing			244	260	164	197

Source: Undersecretariat of Treasury

Table 34: Papers on Productivity Spillovers.

Papers on Productivity Spillovers

Author	Period	Data	Data Resource	Aggregation Level	Estimation Method	Dependent variables	Independent variables	Result
						Productivity of domestic firms (labour productivity)	1.Foreign Share 2.Capital-labour ratio of domestic firms 3.Scale 4.Herfindahl Index 5.Annual Hours worked per employee 6.Labour quality	Foreign Share variable has positive and insignificant coefficient estimates.
Aslanoğlu (2000)	1993	Cross-section	Istanbul Chamber of Commerce (ISO) Annual Reports on 500 largest firms	Firm-level	OLS	Efficiency Index (the ratio of average productivity in an industry to the average of highest productivity size in the related industry)	1.Foreign Share 2.Technology 3.Market Growth 4.Herfindahl Index 5.Rate of Profit	The sign of the coefficient is positive and is statistically significant at the 0.05 level
						1.Domestic Firm's Productivity Growth 2.Change in Technology Gap 3.Growth of Domestic Firms Market Share	Technology Gap (the ratio of average productivity in foreign firms to the average productivity of domestic firms)	1. There is no significant correlation between technology gap and productivity growth of domestic firms. 2. Significant correlations (downward oriented parabola) 3. The estimation results gave neither a negative sign nor a statistically significant coefficient.

Table 20: Papers on Productivity Spillovers. (Cont'd)

Papers on Productivity Spillovers

Author	Period	Data	Data Resource	Aggregation Level	Estimation Method	Dependent variables	Independent variables	Result
Lenger & Taymaz (2004)	1983 -2000	Long itudi nal	State Institute of Statistics (SIS)	Industry-level	Arellano-Bond type of GMM estimation	Labour productivity	1.Market share 2.Effects of foreign market share on the different ownership and size categories 3.Wages per employee 4.Capital-labour ratio 5.Labour 6.Energy 7.Input	Negative significant spillover effect at 5% level.
Lenger & Taymaz (2006)	1995 -2000	Panel	SIS (Innovation Surveys and Annual Surveys of Manufacturin g Industries)	Firm-level	OLS (Binary Choice Model for Innovativeness and Technology transfer)	Innovativeness Technology transfer	1.Labour turnover in foreign firms 2.Market Share of foreign firms 3.Regional foreign R&D intensity 4.Sectoral foreign R&D intensity 5.Market share of foreign firms in supplier ind. 6.Market share of foreign firms in user ind.	Positive significant labour spillovers for innovativeness at 1% level. No significant effect of labour spillovers on technology transfer. No significant effect of labour spillovers on technology transfer. No significant effect of labour spillovers on technology transfer. Significant vertical spillovers for innovativeness in high-tech industries, but with a mixed outcome.

Table 19: Papers on Productivity Spillovers. (Cont'd)

Papers on Productivity Spillovers

Author	Period	Data	Data Resource	Aggregation Level	Estimation Method	Dependent variables	Independent variables	Result
Ayvaz, Baldemir & Ürüt (2006)	2001	Cross-section	Istanbul Chamber of Commerce (ISO) Annual Reports on 500 largest firms	Firm-level	Binary Choice Model ANOVA	Labour productivity	1.Capital Intensity 2.Dummy var. for domestic firms 3.Dummy var. for foreign firms	Positive significant spillover effect at 1% level.
Yılmaz & Özler (2004)	1990-1996	Panel	State Institute of Statistics (SIS) Industrial Analysis Database	Plant-level	OLS	Total Factor Productivity	1.Labour 2.Material Inputs 3.Energy 4.Capital 5.Backard linkages 6.Forward linkages 7.Horizontal linkages	Positive significant spillovers related with backward linkages at 5% level.
Bertinelli, Pamukçu & Strobl (2006)	1983-1994	Panel	SIS (Annual Surveys of Manufacturing Industries)	Firm-level	OLS & fixed effect methods	Total Factor Productivity	1. Foreign Share variables 2.Skill level 3.Market Share 4.Scale 5.Import Penetration 6.CR4 or Herfindahl Index 7.Relative Productivity	Negative spillover effect

Table 35: Variable definitions and mean values, 1983-2001

			Domestic	Foreign
Firm level variables				
Wage rate		Log labor cost per employee		
Production workers			3.304	5.096
Administrative employees			3.642	5.697
Labor productivity		Log valued added per employee	4.588	6.820
Public share		Share of public ownership (percent)	0.045	0.055
Capital intensity		Log real capital stock per employee	5.384	6.948
Skilled labor share		Share of skilled employees		
Production workers			0.054	0.076
Administrative employees			0.046	0.060
Female labor share		Share of female employees		
Production workers			0.170	0.187
Administrative employees			0.259	0.260
Firm age		Log firm age	1.736	1.898
Pre-1980 dummy		Dummy variable (1 for firms established before 1981)	0.384	0.414
Firm size (number of emp)		Log number of employees	3.646	5.113
	Sectoral variables (ISIC 4-digit level)			
Market share of foreign firms	+	Share of foreign firms in sectoral output	0.109	0.233
Wage rate, foreign firms	+	Average sectoral log wages of foreign firms		
Production workers			0.403	0.906
Administrative employees			0.544	1.206
Wage rate, domestic firms	+	Average sectoral log wages of domestic firms		
Production workers			3.500	4.053
Administrative employees			3.845	4.245
Import penetration		Imports/Domestic output+imports ratio	0.167	0.217
Export intensity		Exports/Domestic output+exports ratio	0.191	0.175
Sectoral employment gap		Percentage deviation from sectoral employment trend	0.001	0.000
Regional variables (province level)				
Wage rate, regional, foreign	+	Average regional log wages of domestic firms		
Production workers			0.463	0.712
Administrative employees			0.781	1.118
Wage rate, regional, domestic	+	Average regional log wages of foreign firms		
Production workers			3.588	4.239
Administrative employees			3.799	4.392
Regional employment gap		Percentage deviation from sectoral employment trend	0.001	0.000

+ These variables for a firm are calculated by using the data for all other firms, and weighted by the employment share of foreign and domestic firms.