9 Summary and Conclusion

9.1 Research Questions
This paper is among the first to analyze FDI induced productivity and wage spillovers using Turkish firm level data from 2003 to 2010, a period which coincided with significant FDI inflows into the region. This study addresses three interrelated questions. Firstly, we broadly look at the issue of whether foreign presence translates into productivity gains onto the manufacturing sector via horizontal, backward and forward linkages. The empirical model used in this study is derived from endogenous growth theory whereby growth in total factor productivity (TFP) is modeled by the rate of technological progress which in turn is determined by economic policies with respect to trade, foreign direct investment and in-house technology development. The theory also allows us to incorporate the possibility of positive externalities and spillover effects from its international contacts, our exclusive focus being on FDI induced spillovers.

Secondly, a detailed analysis is undertaken to identify whether FDI spillovers are contingent on the underlying characteristics of local and multinational firms. This need stems from the heterogeneity of local (foreign) firms and their differential capacity to absorb (exude) the FDI induced externalities.

Thirdly, we address the question of whether FDI induced productivity gains subsequently translate into changes in the total wage bill in the host country. To empirically test this relationship we employ a dynamic specification of the wage equation derived under the assumption that workers are paid their marginal product.

9.2 Research Findings and Policy Implications
The productivity spillover analysis reveals that horizontal spillovers decrease the productivity of competitor firms while backward and forward linkages serve as a more powerful avenue of technology transfer and hence contribute more significantly in increasing the productivity of manufacturing firms involved in upstream and downstream production activities. These results draw attention to the strengthening of supplier-buyer relationship between local and multinational firms operating in the host country. Moreover our results show that most of the productivity gains attributed to backward spillovers emanate from links with foreign firms operating in other manufacturing sectors whereas in case of forward spillovers much of the
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benefits emanate from foreign-owned service sector firms. Hence the focus should be on strengthening the local supplier base for foreign-owned manufacturing firms operating in the host economy. Similarly the local purchase of services provided by the foreign firms should be encouraged as it provides the most benefits for the local units in terms of productivity gains. We now turn to some general policy recommendations to strengthen the supplier-buyer relationship between local and foreign firms which consequently aims at maximizing the gains from foreign presence.

In the past many developing countries resorted to import restrictions on intermediate goods and local content policy to strengthen backward linkages. Similarly foreign firms invited to operate behind high tariff walls inevitably aimed at strengthening forward linkages as sales were restricted to domestic market. These policies have since been gradually waived off as they were in direct violation to the narrative of free-trade, propagated by World Trade Organization (WTO). Moreover these policies did little in assisting the growth of domestic suppliers and buyers and instead resulted in economic inefficiencies and distortions in terms of technological and managerial deterioration due to decrease in foreign competitive pressures (Ballat, Frank & Shen, 1996). A new approach calls for a market-oriented policy which corrects for market imperfections such as “information gap” between buyers and sellers regarding linkage opportunities and “capacity gap” between the demand put forth by foreign firms and supply capacity of local firms (UNCTAD, 2009).

The strengthening of the supplier-buyer relationship is beneficial for all the parties involved. The host country benefits from vertical linkages as it generates additional economic activity and income, transfers technology and managerial skills, and provides local firms an opportunity to penetrate into the international markets because of their exposure working with multinationals. Similarly foreign affiliates gain from the geographical proximity to local suppliers as it enables them to lower their delivery time, transportation and inventory costs. Moreover the close interaction between the supplier and buyer firms can help resolve matters pertaining to design changes and quality control more effectively (Ballat, Frank & Shen, 1996). Despite these benefits market imperfections result in the process of linkage formation to remain below par. Hence it is important to provide institutional support in terms of financing, technology and management training, which can help align the productive capacity of local manufacturing firms.
with foreign requirements and as a result accelerate the development of vertical linkages. In this regard the involvement of both public and private sector can play a pivotal role. According to Ballat, Frank & Shen (1996) some of the objectives and features of a successful linkage promotion program are outlined as follows. These recommendations are discussed in the context of the empirical results derived with respect to the second component our study.

**Linkage Promotion Programs: Objectives and Characteristics**

1. *Technology development*

   It has been widely recognized that technology assistance increases the competitiveness of local supplier firms and also increases the ability of local buyers to assimilate the benefits embodied in the products and services being purchased from foreign firms. In short, a lower technology gap between local and foreign firms translates into greater productivity gains for local firms from FDI induced backward and forward spillovers. Although our results with reference to technology gap (Table 8.9) does not explicitly support the claim that backward and forward linkages are affected by technology differential between local and foreign firms but our results do show that most of the vertical spillovers originate from majority-owned and domestic market-oriented foreign firms (Table 8.4 & Table 8.5). This offers some indirect evidence that intermediate goods produced by local firms are not compatible with the requirements of fully-owned or export-orientated foreign firms because of their high quality requirements. These foreign firms have high criteria when it comes to quality control, delivery time, flexibility and speed in delivering changes in product design and production levels, and when it comes to long term commitment from local supplier firms. Similarly sale of products by fully-owned or export-oriented foreign firms does not contribute in increasing the productivity levels of local buyers as these products are again deemed incompatible for local use. These results point towards the fact that productivity gains from backward and forward linkages can be magnified if local suppliers and buyers can improve upon their technology and meet the requirements put forth by majority-owned and export-oriented foreign firms. Thus the scope of strengthening of supplier-buyer relationship should be expanded to merely attracting more of domestic market-oriented and majority-owned foreign firms and additionally focus on improving local standards to cater to the more demanding foreign firms which constitute fully-owned and export-oriented foreign firms.
In this regard the government can set up a central institution which closely works with academia, non-profit and private technical consulting firms which can shepherd the advances in technology in the economy. The technical services provided by such an institute can range from testing of materials, calibration of measurement equipment’s, repairs, trouble-shooting services, advice with respect to design changes, etc. which may be too expensive for local firms to undertake themselves. Moreover the identification of the technical deficiencies in the local firms needs to be a collaborative exercise whereby the foreign firms should play an important role in the identification process while local firms should show commitment to undertake the proposed changes. The long term success of these projects depends upon the quality of technical services being provided and also on the financial viability of the agencies providing such services. For this purpose, although some of the basic services can be provided free of charge, others can be offered by the government at a subsidized rate whereas more specialized services can be offered on fee basis.

2. *Management training*

Another closely related mechanism which can further narrow the capacity-gap between local and foreign firms is by offering management and marketing training to local firms. Our empirical results reveal that small and medium sized enterprises (SMEs) accrue greater benefits from backward linkages than large sized supplier firms (Table 8.7). Since SMEs are often known to have strong engineering background but lack expertise in management and marketing skills the government and private institutions can step in and fill this gap by offering wide range of management courses and training activities (Battat et al., 1996). As a result the SMEs can benefit more from increased FDI induced spillovers. The information about the current management practices can also be disseminated through libraries, conferences, seminars and consultation. The training activities which have been a core part of linkage promotion programs have achieved great success in enabling local firms to install and implement new systems which are aligned with the standards of international quality certifications. For these training programs, again cost sharing is important as it ensures that local firms take these activities seriously.

3. *Financial Assistance*

Technology and management upgrading is expensive and requires financial assistance for its successful implementation. For this reason, foreign firms offering technological assistance to the
local firms are often confined to the area of quality control while more investment intensive technology transfer programs such as upgrading of production processes of local firms are less common for the foreign firms to undertake on their own. Hence it is important to coordinate the inception of technical and managerial upgrading programs with the availability of sufficient funds to implement them. In this regard the government can play an important role in building strong capital markets (Alfaro et al., 200941). However as a short-run solution for raising funds many countries have resorted to special directives to commercial banks to reserve some percentage of their loans for small and medium local enterprises. These programs are designed only for promising enterprises which show the commitment and the ability to compete more successfully in the market place.

4. Visibility of Assistance Programs

The technical, management and financial assistance programs need to be promoted effectively to make them more visible to all the parties involved. The multinationals should know how and where to seek institutional support for identifying their potential suppliers and buyers in the host market and to successfully develop subcontracting arrangements. Similarly the local firms should be aware of how and where to get assistance in case they are committed to join the ranks of being suppliers or buyers to the foreign firms.

5. Development of Industrial clusters

Our empirical results show that regional proximity matters for backward spillovers whereas forward spillovers are prominent only at the national level (Table 8.11). This implies that backward linkages can be fostered by encouraging industrial clusters and development of important intermediate sectors in its periphery. This regional proximity decreases delivery time, transportation cost and allows improved monitoring by foreign firms of their local suppliers. This

41 Alfaro et al. (2009) adds the role of financial markets as the missing link between foreign direct investment and formation of backward linkages in promoting growth in the host economy. In a setting of a small open economy, the inclusion of foreign firms and a well-functioning financial market allows endogenous technological progress via increasing the intermediate product diversity. In order for a firm to cater to the input demand of foreign firms, entrepreneurs must develop new variety of intermediate goods which requires upfront cost. A well-developed financial market decreases credit constrains for entrepreneurs thereby increasing the variety of inputs which consequently increases linkages and potential for spillovers between foreign and local supplier firms.
subcontracting relationship between local suppliers and foreign firms can in turn translate into greater technology spillovers for the local firms.

6. Development of a collaborative strategy

The success of the linkage promotion program depends upon the close collaboration between local firms, in particular the supplier firms and the foreign firms. The institutional framework needs to be designed in a manner that brings together foreign and local firms under one umbrella while government plays the role of providing organizational and financial support. The foreign firms can play a key role in identifying their prospective suppliers and buyers and in identifying their respective strengths and weaknesses. The foreign firms can then work with these selected firms and help upgrade these local businesses by assisting transfer of technology and developing their manpower and operational skills. In return, the local suppliers are expected to provide goods at competitive prices and quality whereas local buyers are expected to develop long-term buyer relationship with foreign firms. In this setting the government acts as a broker, facilitator and matchmaker to enable both the parties to benefit from this arrangement. The success of the program depends upon the quality and level of commitment of selected local firms and on the incentive given to the foreign firms to enter into such an arrangement in the first place. Moreover these programs should firstly be initiated for sectors which traditionally exhibit high backward and forward linkages and sectors in which the economy has a comparative advantage. The development of the program for these select sectors can serve as a pilot test which can then be expanded more broadly across different sectors.

The policies discussed so far focus on strengthening the supplier-buyer relationship. Some of these policies can be simultaneously used to decrease the negative impact of horizontal spillovers in the economy. Since this negative impact mostly arises because of the adverse competitive pressures exerted by foreign firms this can be mitigated to some extent by increasing the absorptive capacity of local firms. This paper acknowledges the heterogeneity of local firms and their differential ability to benefit from productivity spillover effects. As far as horizontal spillovers are concerned our empirical results reveal that decrease in technology gap between local firms and their industrial leader minimizes the adverse effects from foreign competition in the same sector (Table 8.9). Therefore upgrading of technology and management skills as proposed earlier on, can also help ward off some of the negative effects due to horizontal
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spillovers. We thus suggest a shift in policy which merely focuses on increasing the volume of FDI inflows to a policy aimed at increasing the absorptive capacity of local firms to maximize the benefits from foreign presence. Moreover our results support the notion that local firms with high export and import orientation are better at combatting competition from multinationals (Table 8.8). This shows that liberalization policies actually increase the competitiveness of local manufacturing firms thereby making them well-equipped to work alongside multinationals in the host economy. Another one of our findings support the development of industrial clusters. Local firms located close to their foreign counterparts are unaffected from horizontal linkages as technology spillovers tapped due to geographical proximity may be sufficient to counter the adverse competition effect. Since the adverse effects due to horizontal spillovers are only significant at the national level this altogether strengthens the case for promoting industrial clusters (Table 8.11).

The policy implications derived from this study includes launching an effective linkage promotion program to further the positive productivity impacts arising from backward and forward linkages. Some of these policies overlap with the steps which can be taken to simultaneously minimize the negative impact arising from horizontal linkages. The need to strengthen these linkages goes beyond productivity spillovers as its impact extends onto the total wages in the economy. The empirical results obtained verify that both intra- and inter-industry spillovers contribute in increasing the wage bill of a firm (Table 8.12). Since for a developing economy, wages are a vital source of income any increase would be followed by welfare gains\textsuperscript{42} for the economy thereby strengthening the case for encouraging FDI inflows. Even if the overall increase in the wage bill is attributed to changes in the skilled-unskilled composition of workers, the rising wage inequality can still lead to welfare improvement as individuals adjust their education and labor supply decisions in the long run (Heathcote, Storesletten & Violante, 2010).

9.3 Future Research

The econometric findings presented in this study offers a composite impact of foreign presence onto the productivity of host country firms but falls short of identifying the exact channel or mechanism via which spillovers occur. The size and the extent of intra-industrial spillovers may

\textsuperscript{42} Welfare is jointly determined by consumption and leisure and since wages are positively related to consumption expenditures but negatively to leisure hours the underlying assumption behind increase in welfare is that the consumption effect dominates the leisure effect as a result of increase in wages. For developing countries this is likely to be the case.
differ with respect to the source funneling this change, the contenders being the demonstration effect, competition effect and labor mobility. A similar remark can be made for inter-industrial linkages, as our results fail to identify whether the positive productivity gains are attributed to voluntary technology transfer by foreign buyer (supplier) firms to local suppliers (buyers), or due to improvements initiated by local firms to meet foreign standards, or induced by changes in the market size of upstream and downstream industries due to foreign entry. In order to isolate the effects generated by different channels, our study can be complemented by case study of few firms or field study covering various firms and administering self-styled questionnaires to decipher what causes these spillovers or lack of it (Sönmez & Pamukçu, 2011; Hamida, 2007).

According to Barrios et al. (2011), measurement matters when it comes to deriving spillover effects from backward and forward linkages. The conventionally used industrial-based measures of backward linkages are based on the restrictive assumption that the input demand of foreign firms is proportionate to the foreign production share in that sector (see footnote 17, p.61). Moreover this implies that input sourcing behavior is constant for foreign firms operating within the same broad category of an economic sector and is constant across foreign firm with different nationalities. A revised measure would entail measuring these linkage variables at more disintegrated levels, both sector and nationality-wise. For example, the I/O table for Turkey is available only at 2-digit industrial classification therefore restricting our industrial based measures of horizontal and vertical linkages to 2-digit industrial classification rather than finer categories such as 3- or 4-digit industrial classifications. An even better approach would be to strive for plant based measures of linkages. However all these recommendations call for either more refined firm level data or availability of more disintegrated I/O tables. These alternative measures need to be compared and contrasted with our current measures of linkages to endorse the robustness of our results.

As far as the wage spillover analysis is concerned it would be interesting to analyze the impact of foreign presence separately onto the wages of skilled and unskilled workers. This would allow us to address a more pertinent question as to whether FDI induces changes in wage inequality in the host country. An evaluation of which category of workers benefit from FDI would enable us to determine whether the policy stance of increasing FDI inflows coincides with transmitting the
benefits onto the desired category of workers, which in most cases are assumed to be the unskilled workers.