

# Service Sector Reform and Manufacturing Productivity

Evidence from Indonesia

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## Abstract

This paper examines the extent to which policy restrictions on foreign direct investment in the Indonesian service sector affected the performance of manufacturers over the period 1997–2009. It uses firm-level data on manufacturers' total factor productivity and the OECD's foreign direct investment Regulatory Restrictiveness Index, combined with data from Indonesia's input-output tables regarding the intensity with which manufacturing sectors use services inputs. Controlling for firm-level fixed effects and other relevant policy indicators, it finds, first, that relaxing policies toward foreign direct investment in the service sector was associated with improvements in perceived

performance of the service sector. Second, it finds that this relaxation in service sector foreign direct investment policies accounted for 8 percent of the observed increase in manufacturers' total factor productivity over the period. The total factor productivity gains accrue disproportionately to those firms that are relatively more productive, and that gains are related to the relaxation of restrictions in both the transport and electricity, gas, and water sectors. Total factor productivity gains are associated, in particular, with the relaxation of foreign equity limits, screening, and prior approval requirements, but less so with discriminatory regulations that prevent multinationals from hiring key personnel abroad.

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## **Service Sector Reform and Manufacturing Productivity: Evidence from Indonesia**

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## Introduction

Just as Cinderella was the forgotten sister with great potential, so service sector reform may be the neglected sibling of trade policy. As trade and foreign direct investment (FDI) regimes have become more liberalized in recent decades, tariff reductions and FDI in manufacturing have hogged the limelight while FDI in services has often remained a wallflower. Liberalization efforts have typically focused on manufacturing, whereas policies toward services have tended to be more ambivalent, with restrictions on investment in services being more stringent (Hoekman, 2007). In fact, most restrictions on FDI flows today are in the service sector (UNCTAD, 2004), reflecting the fact that governments – particularly in developing countries – are not willing to allow unrestricted foreign entry into sectors they consider sensitive or strategic.<sup>2</sup>

Openness in the services sector is part and parcel of a comprehensive liberal trade policy. The benefits of liberalizing the services and goods markets can be mutually reinforcing, the full potential of each not being realized without adequate openness in the other.

Increased openness in the services sector not only implies increased foreign presence. It implies, more broadly, a relatively liberalized regime with lower barriers to entry, and the resulting increases in competition, through the interaction of domestic and foreign entrants.

As a result of a more liberalized services sector, it is reasonable to expect an increase in competition, and increased entry, both of domestic and international suppliers of services, which are likely to lead in turn to (i) better and more reliable provision of existing services, (ii) the introduction of new services, and (iii) the reduction of prices in the services sector. While all of these mechanisms are likely to directly impact the economy through output and trade of services, they are also likely to affect the performance of other actors in the economy that rely on services inputs. Unfortunately, little research has been done to gauge the magnitude of the effects of service sector reform on economic performance.

This paper contributes to the literature by providing empirical evidence on one particular channel linking service sector reform with economic performance: the channel that links service sector reforms with manufacturing productivity. We focus on one particular type of reform - affecting the restrictiveness toward FDI in the services sector

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<sup>2</sup> Another reason why governments are usually reluctant to fully liberalize services sectors is that market failures are pervasive in these activities (e.g.: incomplete markets, natural monopolies or asymmetric information issues). For countries with relatively poor regulatory capacity, outright prohibitions of foreign presence may be perceived as the feasible alternative to more sophisticated regulatory reforms.

<sup>3</sup> – and examine data from Indonesia over the period 1997-2009.

Indonesia offers an interesting case. First, Indonesia is one of the largest economies in Asia, currently the world's most dynamic growth pole. Its rapid rate of economic growth achieved during the last ten years suggests that the services sector will continue to grow in importance. Second, while Indonesia is relatively open in terms of trade in goods, restrictions on foreign participation in the services sector (either through trade or through FDI) are pervasive. Third, over the period of our analysis, changes in policy restrictiveness toward FDI in the services sector have been largely driven by commitments that the Government of Indonesia made to the International Monetary Fund (IMF) during the East Asian Crisis in 1997-8, and by other commitments to the WTO and ASEAN. This provides some comfort in the assumption we make in our empirical approach that the policy changes are not a consequence of the performance of manufacturers, but a cause. In other words, that policy changes are largely exogenously determined.

To gauge the effect of restrictiveness toward FDI in services, we combine manufacturing firm-level data, from which we obtain a measure of total factor productivity, with the OECD indicator of policy restrictiveness toward FDI in the services sector weighted by the respective manufacturing sector's reliance on inputs from each services sector, the latter piece of information being gleaned from Indonesian input-output tables. We include a comprehensive set of controls for other channels that may link reforms conducive to liberalization with manufacturing productivity, such as policy restrictiveness toward FDI in the manufacturing sector itself, tariffs on imported intermediate inputs, tariff protection on the same manufacturing sector and the share of output in the sector produced by foreign firms, plus firm-level fixed effects aiming at controlling for unobserved firm heterogeneity, and at capturing time-invariant effects specific to the industry and province wherein which the firms operate.

Our main finding is that, in Indonesia, relaxing policies toward FDI in the service sector was associated with improvements in perceived performance of the service sector, and to an economically meaningful increase in manufacturers' TFP that accounted for about 8 percent of the observed increase over the period. The gains accrue largely to the most productive firms and are related to the relaxation of restrictions in both the transport, and in the electricity, gas & water sectors. TFP gains are associated, in particular, with the relaxation of foreign equity limits, screening and prior approval requirements, but less so with discriminatory regulations against multinationals to hiring key personnel.

This paper adds to the existing evidence on the links between service sector reform and manufacturing productivity, suggesting that substantial gains are yet to be obtained if countries move forward in their liberalization agendas in the service sector.

The remainder of this paper is structured as follows. Section 2 discusses the related literature. Section 3 presents some background of the services sector in Indonesia, discussing in

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<sup>3</sup> It is likely, however, that reforms affecting restrictions to FDI in services will be bundled together with other reforms affecting competition among domestic providers as well (see discussion below about the Telecommunications case in Indonesia). For these reasons, the estimated effects in this paper are likely capturing the effects of overall reform in the services sector on manufacturing performance.

particular the stance of policy reform in the sector. In section 4, we present the data used and the empirical methodology. Section 5 discusses the results and section 6 concludes.

## 2. Related Literature

To date, and to the best of our knowledge, research centering on Indonesia has focused exclusively on the impact of trade and investment liberalization in goods on economic performance. Notable contributions include Amity and Konings (2007), Blalock and Gertler (2008), and Blalock and Simon (2009). The first study examined the differential effects on total factor productivity of lowering tariffs on final goods and lowering tariffs on intermediate goods, finding the latter effect substantially larger, both from an economic and statistical point of view. Blalock and Gertler (2008) found evidence of vertical spillovers from increased FDI in the manufacturing sector. They found strong evidence of total factor productivity gains, greater competition and lower prices among local firms in markets that supply foreign entrants. In a related piece, Blalock and Simon (2009) found that the vertical spillovers from increased FDI in the manufacturing sector in Indonesia accrued disproportionately to firms with greater absorptive capacities.

When zooming out and looking at the international evidence, it is possible to find research on services trade, although, as noted by Hoekman (2006), it is only a small share of the total output in international economics literature, reflecting the scarcity of data on policies and flows. The existing work linking service sector reform and performance focuses on different channels: (i) services reform and economy wide gains, (ii) services reform and service sector performance, (iii) services reform and manufacturing export competitiveness, and the most closely related to our study, (iv) services reform and manufacturing productivity.

Exploring the first channel, Mattoo, Rathindran and Subramanian (2006) look at whether the impact of liberalization of services sectors on output growth is different from that of liberalization of trade in goods. The authors found that countries with open financial and telecom sectors grew faster than other countries. Eschenbach and Hoekman (2006b) used an index of quality of policy for different services sectors in 20 transition economies and found that policy improvements attract FDI, and are associated with the post-1990 growth performance in these economies. Previously, Robinson, Wang and Martin (2002) had used a ten region, eleven sector CGE model to evaluate the impact of service sector liberalization on the world economy, finding that the effects were not only directly on increased services production and trade, but also indirect, by affecting production in other sectors of the economy.

Exploring the second channel, Fink, Mattoo and Rathindran (2003) use data for 86 developing countries during the period 1985-1999 and find that privatization and competition improved performance in the services sectors. Comprehensive reforms, they claim, bring the largest gains, and the sequence of reforms matters. In particular, their results suggest that competition policies should be incorporated simultaneously with privatization.

Fink, Mattoo and Neagu (2005) and Francois, Manchin and Pelkmans Balaoing (2009) focused on the effects of service sector reform on manufacturers' export competitiveness, in particular

looking at reform in the communications-related sectors. The first study used bilateral data on communication costs and trade flows for 107 countries, finding that costs affect trade flows negatively, with the effect being larger for differentiated goods. The second used a panel of Asian countries and found that variations in communications-related infrastructure affected export performance in those countries.

The channel we examine in this paper, linking services sector reform with manufacturing firms' productivity levels has been previously explored in the context of the Czech Republic, Chile and India, and for the Sub-Saharan African (SSA) region. Arnold, Javorcik and Mattoo (2007) used firm-level data for manufacturers in Czech Republic, combined with several indicators of service sector reform, and found sizable effects on productivity of increased foreign entry into services. Arnold, Mattoo and Narciso (2008) focused on Africa, using data from 1000 firms in 10 SSA countries, and found a positive effect of performance of communications, electricity, and financial sectors on manufacturing TFP. Fernandes and Paunov (2008) used firm-level data of Chilean manufacturers combined with FDI stocks in the services sector, and examined the impact of the latter stocks on manufacturing firms' productivity, finding a positive effect of significance both economically and statistically. Interestingly, they also found that those manufacturing firms furthest from the technology frontier had most to gain in terms of productivity improvements as a result of service sector liberalization.

Finally, Arnold, Javorcik, Lipscomb and Mattoo (2010) used data from Indian manufacturing firms and constructed indicators of service sector reform in the same country, and found that potential productivity gains appear to be greatest for reforming those service sectors most closely related to trade: transport, communications and finance. They found effects on foreign firms to be stronger.

### **3. The Service Sector in Indonesia: Some Background Information**

#### **3.1 Trends**

In 2011, the services sector accounted for 53.8% of Indonesian GDP. It has been growing at an average rate of 7.2% per annum since 2001, faster than either the primary or secondary sectors (Figure 1). By early 2012, the services sector accounted for 49.2% of those employed, or 55.4m workers, and created almost 400,000 jobs in the last year alone.

All service sub-sectors have grown strongly and steadily since the turn of the century. While the trade, hotel & restaurant sub-sector remains the largest, accounting for 33% of all services output, since 2000 the transport & communications sector has been the most dynamic, increasing its share of services output from 10.5% to 18.2% (Figure 2). This dynamism is due in large part to the communications sub-sector, annual growth for which peaked at over 30% in 2008.

Services account for some 35% of all intermediate inputs utilized by the productive sectors (Figure 3). As an example, the manufacture of wood products relies on the services sector for 36.9% of all inputs. Roughly a third of this, or 12.8% of total inputs, is accounted for by the transport sector, 11.1% by retail & distribution, and 3.9% by finance & insurance (Figure 4).

Similarly, the manufacture of radios, televisions and communication equipment relies on the service sector for 34.9% of its inputs – of which 8.4% from transport, 10.8% from retail & distribution, and 1.5% from financial & insurance.

These inter-linkages underline the importance of services as inputs for firms across different activities, and the potential economy-wide productivity gains from an improvement in service sector performance. Access to more, better or cheaper services can be expected to improve productivity at Indonesian firms, enabling them to better compete in the global marketplace.

### **3. 2 Policy Restrictiveness in the Service Sector in Indonesia**

Despite the increase in international trade in services, the exposure of service sectors to competition is typically more limited than that for other sectors of the economy, either because the current state of technology does not make particular cross-border trades in the service sector profitable, or because barriers to trade are stricter than in other sectors.<sup>4</sup>

As a consequence, domestic firms are typically captive clients of domestic service providers. In many instances, they may be at the mercy of inefficient public monopolies, or other providers who are not faced with incentives to reduce prices or improve quality. Broad-based, productivity-enhancing service sector reform should then necessarily encompass measures to increase competition, encourage foreign investment, stimulate innovation and ensure judicious regulation.

Since the East Asian crisis, liberalizing reforms have both increased competition and openness to trade and foreign investment across all sectors of the Indonesian economy. Indonesia appears more active in pursuing trade liberalization within ASEAN.<sup>5</sup> The ASEAN Framework Agreement on Services aims to facilitate the free flow of services throughout ASEAN, entailing commitments to progressively reduce all restrictions in five priority sectors – air transport, eASEAN, Healthcare, tourism and logistics. By 2015, ASEAN investors should be allowed to hold up to 70% of the equity in Indonesian firms in these sectors. These targets are subject to some flexibility (15%) in the case of sub-sectors of national sensitivity. Implementation of these targets, moreover, requires domestic legislation, including amendments to both the Negative Investment List and relevant sectoral legislation.

This Negative Investment List (NIL) is probably the most important reference for prospective foreign investors outside Indonesia. It details those sectors from which foreign investment is proscribed, and those sectors that are open, but carry certain restrictions such as location, company size, special permits and foreign equity limits. This list has undergone a number of incarnations. Both before (1994) and after (2000) the East Asian crisis the Negative Investment Lists lacked sufficient meaningful detail. With the landmark Investment Law of 2007, a new List was developed which was supposed to be the single, comprehensive reference point for

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<sup>4</sup> A recent study by Borchert, Gootiiz and Matoo (2012) reveals that the higher the GDP per capita of a country, the lower the services trade restrictions they impose.. Interestingly, when the set of countries is restricted to those in the East Asia Pacific region, the relationship is inverted: countries with higher GDP per capita tend to impose higher restrictions in services trade..

<sup>5</sup> Instead, at GATS it remains less active. The World Bank's GATS Restrictiveness Index, that measures the extent of GATS commitments toward liberalization of a given country, shows Indonesia with a score of 9.52, while the average for East Asia-Pacific is 22.08 (0 indicates no commitments, 100 indicates fully liberalized).



prospective investors. The List underwent significant changes in 2010, imposing more restrictions on foreign investment into the telecommunications sector, for example. On the other hand, several sectors, such as hospital services, underwent greater liberalization at this time.

Cross-country comparisons suggest that restrictiveness towards FDI in services is relatively high in Indonesia. The OECD compiles an FDI Regulatory Restrictiveness Index measuring the openness of 55 economies to FDI. It has been conducted intermittently since 2003, backdated to 1997, and on an annual basis since 2010. It includes four primary components: restrictions on foreign key personnel, equity restrictions, screening and approval requirements, and other operational restrictions (e.g.: land use restrictions).<sup>6</sup> As foreign equity limits are understood to be the most onerous – although certainly not the only – restrictions on FDI, the index is strongly weighted according to these limits. According to the 2012 iteration of the index, Indonesia is the third most restrictive FDI regime of those surveyed, ranking behind only China and Saudi Arabia.

While the Index measures a country's policy stance on FDI, and therefore the focus is placed firmly on discriminatory measures toward foreign investors, the index may also register the impact of non-discriminatory measures that are burdensome to investment regardless of its origin.<sup>7</sup> In this sense, the index may be viewed to a certain extent as a proxy measure for a broad range of policy variables.

In the aftermath of the East Asian crisis, for instance, there was an economic imperative and political support for reforms in Indonesia. One notable example are the 1999 reforms of the Indonesian Telecommunications sector. Such 'big bang' reform processes are not atypical when looking at the international experience; reforms in the Indian service sectors in the 1990s are another example of such 'packaging'.<sup>8</sup> This suggests that the evolution of the indicator may well be indicative of more wide-ranging reforms, of which a changed FDI policy stance is an important part.

The evolution of Indonesia's service sector ratings in the OECD index since 1997 reflects broad based liberalization in the aftermath of the East Asian crisis, as evidenced by the fall in Indonesia's score across all service sectors between the 1997 and 2003 iterations of the Index. There was little real change from 2003 to 2006 (Figure 5).

Between 2007 and 2010 – taking into account the impact of the 2007 Investment Law and the creation of, and amendments to, the Negative Investment List – there was moderate liberalization across most service sectors, significant liberalization in the hotel & restaurant sector, and a significant increase in restrictiveness in the communications sector. No changes in Indonesia's service sector index rating have been registered since 2010.

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<sup>6</sup> For a detailed description of the index see Kalinova et al, 2010.

<sup>7</sup> See OECD Reviews of Regulatory Reform, paragraph 70.

<sup>8</sup> The Indian telecommunications sector offers an example. Arnold et al (2011) report that the National Telecom Policy, announced in 1994 improved the environment for private investment in general. Subsequently, the government opened the long distance sector of the telecom industry to private competition, largely eliminated restrictions on the number of service providers, and relaxed foreign ownership limitations.

### 3.3 FDI Flows into the Service Sector in Indonesia

The relaxation of regulatory restrictions, together with an increasingly attractive domestic market and relatively lower labor costs have contributed to an increase in FDI flows. Having dipped in 2009 with the onset of the global financial crisis, FDI flows have since surged, reaching \$18.9bn USD in 2011. FDI has been strong across all sectors, but particularly in the services sector, which accounted for 40.1% of all inward investment into Indonesia in 2011 (Figure 6).<sup>9</sup>

To a large extent, this has been driven by FDI into the two service sub-sectors that were both the largest and the fastest growing in 2011: Transport & Communications and Trade, Hotel & Restaurant (of which the bulk is accounted for by Wholesale & Retail; Figure 7).

While FDI flows now broadly reflect the size of Indonesia's economy, the country accounting for both 1.2% of world FDI flows and 1.2% of world GDP, it lags far behind regional peers. In 2011, the South East Asia region accounted for 3.1% of global GDP, but 5.3% of global stocks of FDI and 7.6% of global FDI flows.

Cross-country evidence suggests that the statutory restrictions measured in the OECD FDI regulatory restrictiveness index are negatively correlated with FDI stocks (Figure 8).

### 3.4 Liberalization Path in the Indonesian Telecom Sector

Between 1966 and 1998, Indonesia's telecommunications sector was tightly controlled, and reform was incremental. From 1980 onwards, government acted as both regulator and monopoly operator. With investment capital in short supply, however, the government began to allow the incumbents to form strategic alliances with foreign firms as of 1989. Although a degree of competition emerged in the mobile phone sector after partial privatizations in 1995, government remained the dominant player until the East Asian crisis.

In 1998, given the commitments made with the IMF, and the pre-existing commitments arising from Indonesia's joining of the WTO in 1995, avenues for reform opened up across the economy, including in telecommunications. This gave rise to the government's 1999 Blueprint for Telecommunications, and the landmark Telecommunications Act that set out broad based reforms including increased regulatory transparency and an end to the government's triple role as regulator, policymaker and provider.

These reforms were important, but incomplete as Indonesia continued to lag behind regional peers in term of telecom and internet penetration, even if the cellular sector grew substantially, and inadequate infrastructure remained a significant constraint.

With the introduction of the landmark Investment Law in 2007, the sector became significantly more restrictive as foreign equity limits were reduced while several sectors were included on the newly introduced Negative Investment List (NIL). With amendments to the NIL in 2010, restrictions on investment in internet service providers were tightened further with the introduction of a 49% foreign equity limit. Furthermore, in one of the most significant changes to the NIL at this time, foreign investment in cellular towers was completely prohibited.

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<sup>9</sup> Source: BKPM.

The OECD's FDI Regulatory Restrictiveness Index reflects these developments: the Communications sub-index fell significantly from 0.595 to 0.120 between 1997 and 2003 as a result of the 1999 reforms, but increased again to 0.410 between 2006 and 2010 as a result of the increasing restrictiveness described above.

## 4. Data & Methodology

What are the productivity losses that manufacturers face due to policy restrictiveness toward FDI in the service sector? Are some manufacturers more affected than others? If so, what determines these effects? Are there any service sectors for which policy restrictiveness towards FDI has particularly large effects on manufacturers, and are there specific restrictions that matter more than others?

In what follows we first describe the data used to answer these questions, as well as the empirical strategy.

### 4.1 Data

There are four main sources of data used in this paper: (1) Manufacturing census data at the firm-level for about 20,000 firms (the census collects information on those firms that are registered and employ at least 20 workers), (2) OECD FDI regulatory restrictiveness index both for services and for manufacturing, (3) input-output tables constructed by the Indonesian statistical office (BPS), and (4) the World Bank Enterprise Surveys for Indonesia (2003 and 2009)..

From the manufacturing census, TFP was calculated using a multilateral index following Aw, Chen and Roberts (2001). The index is an extension of that derived by Caves et al. (1982), and allows for consistent comparison of TFP in plant-level data with a panel structure.<sup>10</sup> The index expresses each individual plant's output and inputs (capital, labor, materials and energy) as deviations from a single reference point. As the reference point, the index uses a hypothetical plant operating in the base time period (the first year of the data being 1983) and having average input cost shares, average logarithm of inputs and average logarithm of output. The index is calculated separately for each 4-digit ISIC sector.

The key input for our indicator of services sector policy restrictiveness is obtained from the OECD FDI regulatory restrictiveness index, disaggregated by type of restriction and by sector of activity. Input-output data allows us to generate an index of restrictiveness that varies at the level of each manufacturing sector, defined at the 2-digit ISIC 3 disaggregation (a precise description of the method is presented in the subsection that follows).

Data on tariffs were obtained from the TRAINS database of the United Nations, and here again, input-output tables were used to calculate input tariffs and output tariffs.

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<sup>10</sup> We thank Beata Javorcik from sharing the STATA program to calculate this index.

## 4.2 Estimation Strategy

Here we proceed in two stages. First, we describe the methodology to assess the relationship between services sector reform and performance, and second, that used to assess the link between services sector reform and manufacturing productivity.

### 4.2.1. Reform and Perception-Based Performance

For reforms in the services sector to have an effect on manufacturing productivity, a preliminary condition is that these reforms affect somehow the performance of the services sector, either by affecting the quality, availability or price of the services provided in the economy.

Unfortunately, data on services performance in Indonesia are scarce. For this reason, here we use a perception based indicator of services performance. To construct them, we combined data on perceptions from the World Bank Enterprise Survey and on input-output data from BPS, and proceeded in the following steps:

1. We looked at firms' responses to questions on whether electricity, transport or communications were 'no obstacle' to doing business, a minor obstacle, a moderate obstacle, a major obstacle or a very severe obstacle in 2003 and in 2009. Across all three sectors, the proportion of firms reporting 'no obstacle' increased significantly (electricity: 22.3%, telecommunications: 20.8%, transport: 17.8%) between 2003 and 2009. This suggests improved service sector performance.
2. We looked at how the degree of restrictiveness on FDI evolved over this period, relying on the OECD restrictiveness indicator. We found moderate increases in openness in the transport and electricity sectors, while restrictiveness increased after 2007 for the telecommunications sector.
3. Using data from input-output tables we constructed for each manufacturing sub-sector an index of performance of the services sub-sectors from which they sourced inputs, and an index of restrictiveness toward FDI in those same service sub-sectors (see Figure 9, a formal description of the way in which the index is calculated is presented below).
4. We then explored the link between these two indicators, controlling for sector specific effects.

### 4.2.2. Services Reform and Manufacturing Productivity

To assess the impact that restrictive policies towards foreign direct investment in the service sector may have on the performance of the manufacturing sector, we proceed in two stages. First, we use input-output tables to get a sense of the importance that each service sector has for the input costs of each manufacturing sector. The service restrictiveness (*rest*) that each sector in manufacturing faces is calculated as the weighted average of each service sector's OECD restrictiveness index, where the weights are given by the share in the total input bill of a given manufacturing sector 's' accounted for the service 'j'. Formally, we proceed as in equation (1):

$$rest_{s,t} = \sum_{j=1}^J w_{t,s,j} OECDr_{j,t} \quad (1)$$

where ‘rest’ is the *weighted* restrictiveness index faced by manufacturing sector ‘s’ at time t, ‘w’ is the share of the input bill of manufacturing sector ‘s’ accounted for the service sector ‘j’ at time ‘t’, and ‘OECDr’ is the OECD restrictiveness index of the service sector j at time t. The weights obtained from Indonesian input-output tables are available for 1995, 2000, and 2005, disaggregated at the 2 digit level of the 3<sup>rd</sup> revision of the International Standard Industrial Classification (a total of 18 sectors), while the service sector OECD restrictiveness indices used are available for 1997, 2003, 2006, and 2010, and for Electricity, Construction, Distribution, Transport, and Communications.<sup>11</sup>

To establish whether there exists a causal relationship between manufacturing firm performance in Indonesia, and how restrictive policies are toward FDI in the services sectors, in the second stage, we regress the productivity of manufacturing firms on the restrictiveness measure ‘rest’ as calculated above.<sup>12</sup> Formally, we estimate equation (2):

$$\overline{\ln TFP}_{i,t+1,t+2,t+3} = \alpha_i + \alpha_t + \beta rest_{s,t} + X_{s,t} \Pi + \varepsilon_{i,t} \quad (2)$$

where  $\overline{\ln TFP}$  is the average log TFP of firm ‘i’ over the years t+1, t+2 and t+3,  $\alpha_i$  are firm fixed effects, that capture unobserved heterogeneity, such as firm location, size, specificities related to products produced by the firm, and other time-invariant factors that may affect firms’ performance,  $\alpha_t$  are year fixed effects, that capture economy-wide shocks such as technological advances, across-the-board business climate changes and other macro shocks that may affect firms’ performance.<sup>13</sup>

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<sup>11</sup> Data availability constrains us to assume that the input cost shares of manufacturing sectors remain relatively stable around each data point we have available. Then, we match these shares in 1995 with the restrictiveness indicator in 1997, the shares in 2000 with the restrictiveness indicators in 2003, and the shares in 2005 with the restrictiveness indicators for 2006 and 2010. Given that we do not have data on manufacturing TFP beyond 2010, we do not use the available OECD indicators for 2011 and 2012. In any case, there are no changes apparent in those two periods with respect to the previous scores.

<sup>12</sup> Our approach follows that of Arnold, Javorcik and Mattoo (2011).

<sup>13</sup> TFP is measured using a multilateral index as suggested by Aw, Chen and Roberts (2001).

Given that we allow for a lagged effect of restrictiveness in services on manufacturing TFP, we have three overlapping periods on which the model is estimated. In the first period, the matching data are the restrictiveness index for 1997 with firms' productivity averages for 1998, 1999 and 2000. In the second, the restrictiveness index for 2003 with firms' productivity averages for 2004, 2005 and 2006. In the third, the restrictiveness for 2006 with firms' productivity averages for 2007, 2008 and 2009.

The X vector includes controls for other factors related to integration with the global marketplace that may affect performance.<sup>14</sup>

- (1) Policy restrictiveness in upstream manufacturing sectors, as this may also affect a firm's TFP in addition to that in service sectors. Here, we rely on the OECD restrictiveness indices for manufacturing, and weight them in the same way as in 'rest', using input-output coefficients.
- (2) The level of tariff protection in upstream manufacturing sectors (again weighted by the input-output coefficients).
- (3) The degree of competition faced by firms, proxied by (a) the level of tariff protection and (b) the share of output produced by foreign firms operating in the same sector (which in turn also captures potential horizontal spillover effects).

We consider five variations of our baseline specification above, to obtain answers to the following specific questions:

- (1) Is the effect of 'rest' on firm's TFP different for domestic and for foreign firms? For this, we estimate equation (2) on the subset of domestic firms only, following Arnold et al (2011).
- (2) Is 'policy restrictiveness' capturing the effect of restraining FDI flows from coming in? To answer this, we replace 'rest' with FDI flows in equation (2).
- (3) Are the effects of 'rest' on firms' TFP the same for firms at the bottom, at the middle, or at the top of the TFP distribution? To answer this question, we interact the 'rest' variable with dummies for firms in the top 25% and bottom 25% of the distribution of TFP.
- (4) Given a firm's position in the productivity distribution, are gains due to relaxation of restrictiveness in the services sector different for firms that produce more sophisticated goods, for those that make research and development investments, or for those that train their workers? We measure product sophistication using unit values of the firm's main product defined at 9-digit in the ISIC 3 classification, relative to the median unit value in the same sector (defined at 5-digits of the ISIC 3 classification)). For research and development investments, we define a dummy that takes value 1 when the firm has a research and development unit, zero otherwise, and similarly with training of workers, by defining a dummy taking value 1 when the firm declares expenditure in workers' training, and zero otherwise.<sup>15</sup>
- (5) Is restrictiveness in specific service sectors particularly relevant for manufacturing performance? For this, in equation (2), we replace the aggregate 'rest' indicator with sector-specific indicators.

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<sup>14</sup> Standard errors in the estimation are adjusted to allow for correlation between observations belonging to the same industry in the same year, given that the variables of interest are defined at the sector level while the dependent variable is defined at the firm level.

<sup>15</sup> Data on R&D units and workers' training are only available for 2006, so we are forced to assume time invariance in these characteristics.

- (6) Are specific forms of restrictiveness more relevant than others for manufacturing firms' performance? To answer this question we replace the aggregate 'rest' indicator with restriction-specific indicators in equation (2).

## 5. Results

### 5.1 Reform and Perception-Based Performance

The firm-level data available from the World Bank Enterprise survey suggest that in the Indonesian service sector, foreign firms are larger than domestic firms. While 23 percent of foreign firms in the service sector have more than 100 employees, only 1 percent of domestic firms do. In addition, foreign firms tend to use better technologies and more sophisticated processes, as suggested by the fact that they are four times as likely to have international certifications than domestic firms within the same size class.

The performance of service sectors, as measured by the perceptions of their users, is negatively related to how restrictive they are toward FDI. We found that a one percent improvement in service sector performance as perceived by manufacturers was associated with a one percent reduction in the degree of restrictiveness toward FDI in those service sectors, as measured by the OECD restrictiveness index (see Figure 10, for visual inspection of the evolution of the two indicators).

Formally, we regress the index of restrictiveness on the perception based performance index, using a fixed effect model, which allows us to control for time-invariant sector specific factors that affect the perceptions of services performance. The point estimate for the elasticity of performance with respect to restrictiveness is -0.9, and significant at 1 percent. We cannot reject the hypothesis of the effect being different from -1.

The experience in freight and logistics services in Indonesia provides a concrete example of the link between policy restrictiveness and performance. If services related to freight and logistics services, for example, remain sheltered from foreign investment and competition, costs may remain high and service quality poor. This undermines the capacity of the private sector to benefit from business opportunities involving long-distance shipping logistics costs in Indonesia are estimated to be nearly double those in South Korea, and nearly three times those in Japan. Costs are significantly greater than in even neighboring comparator countries. For example, it costs \$750 to transport a container from Cikarang to Tanjung Priok on the island of Java, but only \$450 between Pasir Gudang and Tanjung Pelepas in Malaysia, a roughly similar distance (see Figures 11 & 12). These costs include road transport costs, warehousing and port handling charges.

Differences in terms of openness and competition in Indonesia play a role in explaining these differences:

Until recently, road freight was open only to domestic firms in Indonesia. One effect of these restrictions on competition relates to the lack of investment and the resulting poor quality of equipment, which is estimated to cause losses that, according to anecdotal evidence can account for about 7% of all transported merchandise. In Malaysia, road freight is relatively more

open, even allowing full foreign ownership if services rendered include technologies, vehicles and expertise not available in Malaysia.

Port handling charges are substantially higher in Indonesia than in Malaysia. Whereas a monopoly operates the terminals in Tanjung Priok (Indonesia), and cargo handling is closed to foreign ownership, several firms (foreign and domestic) compete in Tanjung Pelepas (Malaysia), driving costs down and improving the quality of services there.

## 5.2 Baseline

Post-Asian crisis reforms in the services sector in Indonesia have contributed to increased productivity of its manufacturing firms, adding roughly 0.4 percentage points to annual average productivity growth, over the period 1997-2009. With Indonesian manufacturing plants having increased productivity by almost 43 percent over the period, and the total effect of relaxing restrictive policies toward the services sector being close to 3.5 percent (as depicted in Figure 13), our results suggest that these reforms accounted for about 8 percent of this total (see columns (1) to (5) of Table 1). The estimated size of the impact of service sector reform for the Indonesian case is in line with that reported by Fernandes and Paunov (2012) for the case of Chile, where reforms in the service sector accounted for about 5 percent of total productivity growth over the period 1992-2004.

To give a sense of the relevance of this result, a numerical exercise is useful. If Indonesia were to match policies of service sector reform champions, the productivity gains for manufacturing firms would be in the order of 5 percent, instead of the 3.5 percent registered due to the reforms. In 1997, South Korea ranked second after China in terms of FDI regulatory restrictiveness according to the OECD indicator, suggesting a more restrictive environment than the one prevalent in Indonesia at the time. By 2010, South Korea had become significantly more open to FDI, falling to tenth place in the rankings. This was achieved by substantially reducing statutory restrictions on both the establishment and operations of foreign firms, resulting in a reduction of Korea's score from 0.532 in 1997 to 0.143 in 2010 (compared to Indonesia's 0.311). Brazil, another emerging giant in the world economy like Indonesia, offers an interesting comparison. Matching Brazil's level of restrictiveness is estimated to lead to TFP gains in the order of 6 percent, on average.

Overall, policy restrictiveness toward foreign firms in the service sector seems to be a clearer determinant of manufacturing performance than actual FDI flows in services. If instead of considering the OECD restrictiveness indicator, we look at the effect that actual FDI flows into the services sector have had on manufacturers' TFP, we see that even if the effects are positive, they are not well determined (for the full set of results see columns (6) to (10) in Table 1 of the Appendix). Three factors may drive this apparent discrepancy in the results:

First, even if the OECD restrictiveness indicator is designed for FDI barriers, it likely captures the overall policy reform stance, which will have a stronger effect on service quality than policies targeting FDI exclusively.



Second, a restrictive environment toward FDI may affect how incumbent foreign plants behave in the economy. A relatively more hostile environment may induce more defensive strategies, with less interaction with domestic plants, and lower levels of investment and innovation.

Third, FDI stocks are more likely to affect the performance of upstream service sectors than FDI flows. Unfortunately, disaggregated data on FDI stocks for the services sectors are unavailable for Indonesia. Flows are, for these purposes, imperfect proxies for stocks as they are “lumpy”.<sup>16</sup>

## 5.3 Identifying Winners

### 5.3.1 Domestic Versus Foreign

Domestic and foreign manufacturing plants benefit alike from reform in the services sector, as can be seen in Table 2 and in Figure 14. This is important from a policy perspective, as it suggests that local firms can benefit from further reform as much as foreign firms in Indonesia. This is not always the case: reform may allow the entry of foreign service providers, which may have stronger links with foreign manufacturing plants, and whose local presence could provide greater benefits to foreign-owned than to domestic plants in manufacturing. India is an example where gains accruing to foreign manufacturing plants were about 12 percent greater than those accruing to domestic ones, as reported by Arnold et al (2010).

### 5.3.2. How Productive You Are Matters, and Other Determinants of Impact

The marginal return to service sector reform is higher among the best performers. The spillover effect from reduced restrictiveness in the service sector over the last 15 years was not homogeneous across manufacturing firms. Our analysis suggests that the spillover effect of service sector reform on manufacturers increases with firms' TFP. In fact, among all firms in manufacturing, the least productive 25 percent did not benefit from service sector reform, while the gains accruing to the most productive 25 percent were about double in size than those accruing to the firms in the central part of the distribution. However, this difference between the top 25% and the central 50% is not well determined from a statistical point of view. These firms are relatively more productive, they tend to add more value per unit of output, generate foreign exchange in export markets, and create better-paid jobs than less productive firms.

Interestingly, Fernandes and Paunov (2012) find the opposite for the case of service sector reform in Chile: manufacturing firms that were furthest away from the technological frontier tended to benefit most. Similar to these authors, but in the context of the diffusion of technology induced by FDI in manufacturing, for the case of Indonesia, Blalock and Gertler (2009) find that firms that have a small technology gap (meaning that they are close to the international best-practice frontier), benefit less from FDI spillovers.

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<sup>16</sup> Other studies, such as that of Fernandes and Paunov (2012) have constructed stocks from flows using the permanent inventory method. However, in the case of Chile they had a long series that allowed tracing flows back, almost until their origin. This is not the case for Indonesia, where disaggregated services sector FDI flows are available only since the mid-1990s.

Given the contrast with the literature, we went further to investigate whether, given a firm's position in the TFP distribution, (i) the level of sophistication of its products, (ii) whether the firm had a research and development unit, and (iii) whether it trains workers affect the extent to which it gains from service sector reform.

Results are reported in Table 3b, and suggest that controlling for the firm's position in the distribution of TFP, firms that produce more sophisticated goods, firms that do research and development, and firms that train their workers are less affected by FDI restrictions in the services sector. This result is discomfiting and calls for further research.

One plausible explanation is that firms producing sophisticated goods, that have R&D units and value trained workers enough to be willing to pay for their training, will also be able to devise strategies to circumvent restrictions to services inputs in the first place, by, for example, obtaining services from the best performers, whose prices may not be affordable to other manufacturers. A caveat is in order here. If this is driving our results, the interpretation should not be one of causation, but rather of incidental association between the marginal return of service sector reform and the sophistication of products, and the capacities to invest in R&D and train workers.

#### **5.4 Effects from Reform in Specific Services Sectors**

Transport and electricity gas & water appear to be the service sectors for which reform most benefits manufacturers. When we disaggregate the restrictiveness indicator for different subsectors, substantial differences in the size of the effects on manufacturing performance emerge. In the Electricity, Gas & Water sector, a 10 percent reduction in the restrictiveness index for the sector would yield productivity increases of about a quarter of a percentage point. These sectors are likely to be more directly related to manufacturing activities.

#### **5.5 Effects from Relaxing Specific Restrictions**

In Table 5 we report the results from estimating equation (1) using restriction specific indicators of policy restrictiveness. There are four types of restrictions: (i) restrictions to foreign ownership in terms of % of equity allowed, (ii) screening and prior approval requirements, (iii) restrictions to hiring of key personnel, and (iv) other operational restrictions to foreign firms. Our results suggests that restrictions to foreign ownership, screening and prior approval requirements and other restrictions to the operation of foreign firms matter for manufacturer's performance, while restrictions to hiring key personnel do not exert any statistically significant effect on the TFP of manufacturing firms.

### **6. Conclusions**

The services sector plays an important role in any economy, as a direct creator of value added and jobs, and its role becomes increasingly salient as the country develops. Indirectly, the sector plays a fundamental role in relation to the overall economy: it provides inputs into production that facilitate transactions through space (transport, telecommunications) or time

(financial services). In fact, evidence increasingly suggests that service sector reform is a major potential source of gains in economic performance, including manufacturing productivity and the coordination of activities between and within firms. Efficient, low cost and high quality services generate economy-wide benefits. This is because goods production requires efficient services such as transport and logistics, telecommunications, business services, etcetera.

This paper explored for the Indonesian case, the role that service sector reforms, particularly in the form of reduced restrictions on FDI, played in the evolution of firms' productivity in the manufacturing sector. We first constructed a service sector restrictiveness index for each manufacturing sub-sector by weighting the OECD restrictiveness index for FDI in the services sector in Indonesia with the intensities with which manufacturers relied on inputs from services sub-sectors – obtained from input-output tables. Then, we combined that restrictiveness index with firm-level data for over 20,000 Indonesian manufacturers, over the period 1997-2009, to understand the extent to which changes in service sector restrictiveness affected manufacturers' TFP, and to shed light on which service sectors are particularly important for manufacturing productivity, which types of restrictions are particularly disruptive, and which types of firms are particularly harmed by these restrictions.

Our results reveal that the effects of service sector reform on Indonesian manufacturers' productivity are economically meaningful. The changes in restrictiveness toward FDI that took place during the period under study explain about 8 percent of overall TFP growth in Indonesian manufacturing during the same period while the productivity gains were largely similar for domestic and foreign owned firms.

The gains do not accrue equally to all firms, however. More productive firms tended to benefit more from service sector reforms than less productive firms, although, controlling for the firm's position in the distribution of TFP, those that carried out research and development investments, trained their workers, or produced more sophisticated goods tended to gain less from reform (because, perhaps, some sort of selection mechanism made them circumvent the existent restrictions in the first place).

Finally, not all reforms are equal. Specific service sectors, such as transport, and electricity, gas & water are particularly relevant for manufacturing performance, while it is restrictions related to foreign equity limits, screening and prior approval requirements, and other restrictions related to operations of foreign firms that have the greatest impact, those relating to the hiring of key personnel were not so relevant.

From these results, some policy recommendations emerge:

Service sector reforms that reduce barriers to FDI – such as reducing equity limits on foreign ownership, reducing the burden of discriminatory screening procedures or, more generally, any discriminatory business regulation that introduces a bias against foreign firms – are likely to stimulate investments in the sector, which will in turn contribute to (i) improved services infrastructure, (ii) increased competition, and (iii) improved quality of services provided. From the evidence, the transport and logistics sector seems to be a priority to concentrate on. Although policy priority should be on adding infrastructure capacity, regulatory reform can also

help boost competition and innovation. In fact, in Indonesia, the road freight sector, for example, could benefit substantially from reducing restrictions on foreign participation, which would bring the sector into line with those of comparator countries, such as Malaysia, thus better positioning local firms to produce at competitive prices.

Although in this paper we report evidence suggesting downstream vertical spillovers from service sector reform on manufacturing performance, it is likely not only that manufacturers benefit, but also that service users across the economy also benefit. It is known from the literature that these spillovers tend to increase with the amount of interaction between foreign and domestic firms. To maximize the positive spillovers, the government could consider incentivizing interaction between foreign service providers and domestic firms, either those that use their services or that supply inputs to them. One option would be for the government to substitute restrictions on foreign ownership with requirements for new foreign entrants to undertake, for example, explicit supplier development programs.

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Table 1: Baseline Model.

VARIABLES	(1) TFP	(2) TFP	(3) TFP	(4) TFP	(5) TFP	(6) TFP	(7) TFP	(8) TFP	(9) TFP	(10) TFP
Policy Restrictiveness in Services FDI	-0.903*	-0.940*	-0.981**	-0.982**	-0.851*					
	(0.493)	(0.513)	(0.433)	(0.435)	(0.432)					
Policy Restrictiveness in Manufacturing FDI		-1.288*	-0.255	-0.255	-0.248		-1.195	-0.162	-0.163	-0.155
		(0.749)	(0.718)	(0.718)	(0.754)		(0.763)	(0.684)	(0.685)	(0.732)
Tariffs on Inputs (Effective)			-0.00759*	-0.00759*	-0.00717			-0.00754*	-0.00759*	-0.00722
			(0.00436)	(0.00441)	(0.00501)			(0.00437)	(0.00443)	(0.00501)
% of Output by Foreign Firms in the Sector				1.50e-05	-0.000151				-0.000152	-0.000297
				(0.000424)	(0.000395)				(0.000427)	(0.000400)
Output Tariffs (Effective)					-0.000758					-0.000725
					(0.00339)					(0.00351)
FDI Flows in the Service Sector						-0.124	2.817	3.338	3.307	3.556
						(0.127)	(3.735)	(3.077)	(3.097)	(3.212)
Constant	0.336***	0.382***	0.393***	0.393***	0.389***	0.0954***	0.284***	0.288***	0.291***	0.299***
	(0.0437)	(0.0558)	(0.0479)	(0.0489)	(0.0471)	(0.0130)	(0.0317)	(0.0308)	(0.0343)	(0.0351)
Observations	40,336	40,336	40,336	40,336	40,208	164,908	40,336	40,336	40,336	40,208
Firm-level Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard Errors	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year	Clustered ISIC 2/Year
R-squared	0.026	0.027	0.029	0.029	0.029	0.026	0.026	0.028	0.028	0.029
Number of id	25,492	25,492	25,492	25,492	25,425	29,456	25,492	25,492	25,492	25,425

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \*

p<0.1

Table 2: Differences between Foreign and Domestic Firms

VARIABLES	(1) TFP	(2) TFP	(3) TFP	(4) TFP	(5) TFP	(6) TFP	(7) TFP	(8) TFP	(9) TFP
Policy Restrictiveness in Services FDI	-0.851*	-0.783*	-0.820*	-0.842*					
	(0.432)	(0.445)	(0.428)	(0.431)					
Restrictiveness * Dummy Foreign			-0.223						
			(0.651)						
Dummy Foreign			0.0707						
			(0.0636)						
Policy Restrictiveness in Manufacturing FDI	-0.248	-0.527	-0.233	-0.243	-0.219	-0.222	-0.161	-0.282	-0.326
	(0.754)	(0.862)	(0.754)	(0.753)	(0.721)	(0.724)	(0.742)	(0.715)	(0.654)
Tariffs on Inputs (Effective)	-0.00717	-0.00754	-0.00721	-0.00719	-0.00710	-0.00708	-0.00685	-0.00695	-0.00886*
	(0.00501)	(0.00516)	(0.00502)	(0.00502)	(0.00503)	(0.00506)	(0.00507)	(0.00507)	(0.00521)
% of Output by Foreign Firms in the Sector	-0.000151	-0.000624*	-0.000171	-0.000165	-0.000282	-0.000325	-0.000309	-0.000257	-0.000293
	(0.00039)	(0.00037)	(0.00034)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Output Tariffs (Effective)	-0.000758	-0.000972	-0.000774	-0.000767	-0.000904	-0.00100	-0.00107	-0.00139	-0.000969
	(0.00339)	(0.00359)	(0.00338)	(0.00338)	(0.00353)	(0.00356)	(0.00350)	(0.00358)	(0.00356)
Restrictiveness * % Foreign Own.				-0.000575					
				(0.00776)					
Percent Owned (Foreign)				0.000364	0.000189	0.000160	0.000867	0.000541	0.000308
				(0.000795)	(0.000432)	(0.0005)	(0.0007)	(0.0005)	(0.0008)
Rest in Communications					-5.970				
					(6.558)				
Rest in Commun*% Foreign Own.					0.172				
					(0.151)				
Rest in Construction						-9.161			
						(11.65)			
Rest in Const* % Foreign Own.						0.335			
						(0.393)			
Rest in Distribution							-0.173		



Rest in Distri* % Foreign Own.							(0.494)		
							-0.0114		
							(0.0145)		
Rest in EGW									-11.79**
									(4.838)
Rest in EGW* % Foreign Own.									-0.0644
									(0.0835)
Rest in Transport									-2.259**
									(0.915)
Rest in Transport * % Foreign Own.									0.00103
									(0.0246)
Constant	0.389***	0.380***	0.383***	0.387***	0.317***	0.322***	0.317***	0.357***	0.384***
	(0.0471)	(0.0483)	(0.0471)	(0.0471)	(0.0315)	(0.0342)	(0.0326)	(0.0353)	(0.0405)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard Errors	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
	ISIC2/Year	ISIC2/Year	ISIC2/Year	ISIC2/Year	ISIC2/Year	ISIC2/Yea	ISIC2/Yea	ISIC2/Yea	ISIC2/Yea
						r	r	r	r
Observations	40,208	37,387	40,208	40,208	40,208	40,208	40,208	40,208	40,208
R-squared	0.029	0.032	0.030	0.029	0.029	0.029	0.029	0.030	0.030
Number of id	25,425	23,888	25,425	25,425	25,425	25,425	25,425	25,425	25,425

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3: Effects by Location in the Productivity Distribution

Dep Var: TFP Index	(1)	(2)	(3)	(4)	(5)	(6)
Policy Restrictiveness in Services FDI	-1.113** (0.554)					
Restrictiveness*Top 25%	-1.005 (0.762)					
Restrictiveness*Bottom 25%	1.169* (0.659)					
Bottom 25% Dummy	-0.168** (0.0745)	-0.0694*** (0.0229)	-0.0419** (0.0177)	-0.0757 (0.0605)	-0.0503*** (0.0158)	-0.0595* (0.0356)
Top 25% Dummy	-0.00834 (0.0738)	-0.104*** (0.0326)	-0.0879** (0.0346)	-0.152** (0.0595)	-0.0709* (0.0380)	-0.0587 (0.0525)
Policy Restrictiveness in Manufacturing FDI	-0.120 (0.807)	-0.123 (0.748)	-0.131 (0.737)	-0.0411 (0.763)	-0.223 (0.736)	-0.236 (0.680)
Tariffs on Inputs (Effective)	-0.00850* (0.00487)	-0.00816* (0.00483)	-0.00785 (0.00492)	-0.00796 (0.00502)	-0.00735 (0.00482)	-0.0104** (0.00506)
% of Output by Foreign Firms in the Sector	-9.35e-05 (0.0004)	-0.000238 (0.0004)	-0.000267 (0.0004)	-0.000323 (0.0004)	-0.000217 (0.0004)	-0.000240 (0.0004)
Output Tariffs (Effective)	-0.000311 (0.00365)	-0.000230 (0.00360)	-0.000663 (0.00368)	-0.00107 (0.00366)	-0.00101 (0.00373)	-0.000375 (0.00373)
Communications Rest		-10.61 (7.940)				
Rest Communications*Top25		-5.123 (12.93)				
Rest Communications*Bottom25		20.51* (11.97)				
Construction Rest			-4.484 (17.24)			
Rest Construction*Top25			-32.72 (32.69)			
Rest Construction*Bottom25			2.109 (18.53)			
Distribution Rest				-0.723 (0.872)		
Rest Distribution*Top25				0.830 (0.875)		

Rest Distribution*Bottom25				0.759		
				(0.958)		
Electricity Rest					-9.053*	
					(5.250)	
Rest Electricity*Top25					-12.00	
					(7.732)	
Rest Electricity*Bottom25					2.858	
					(3.929)	
Transport Rest						-2.273**
						(0.896)
Rest Transport*Top25						-2.140
						(2.157)
Rest Transport*Bottom25						0.596
						(1.274)
Constant	0.493***	0.397***	0.387***	0.419***	0.416***	0.459***
	(0.0671)	(0.0342)	(0.0368)	(0.0641)	(0.0399)	(0.0436)
Observations	40,208	40,208	40,208	40,208	40,208	40,208
R-squared	0.034	0.033	0.033	0.033	0.035	0.035
Number of id	25,425	25,425	25,425	25,425	25,425	25,425

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3b: Controlling for Characteristics

Dep Var: TFP Index	(1)	(2)	(3)	(4)
Policy Restrictiveness in Services FDI	-1.119**	-1.378**	-1.393**	-1.308**
	(0.552)	(0.610)	(0.585)	(0.522)
Restrictiveness*Top 25%	-0.964	-0.889	-0.932	-1.092
	(0.761)	(0.787)	(0.789)	(0.763)
Restrictiveness*Bottom 25%	1.157*	1.102	1.109	1.154*
	(0.659)	(0.750)	(0.748)	(0.660)
Bottom 25% Dummy	-0.167**	-0.166*	-0.166*	-0.166**
	(0.0745)	(0.0833)	(0.0832)	(0.0748)
Top 25% Dummy	-0.0119	-0.0202	-0.0159	6.24e-05
	(0.0737)	(0.0751)	(0.0756)	(0.0739)

Interaction Rest*Rel.U Values	5.19e-07**			
	(2.32e-07)			
Interaction Rest*R&D		1.494**		
		(0.591)		
Interaction Rest*Training			1.311***	
			(0.367)	
Interaction Rest*RD&Training				1.206***
				(0.365)
Policy Restrictiveness in Manufacturing FDI	-0.134	-0.531	-0.512	-0.208
	(0.807)	(0.870)	(0.866)	(0.789)
Tariffs on Inputs (Effective)	-0.00852*	-0.00943*	-0.00948*	-0.00834*
	(0.00490)	(0.00525)	(0.00530)	(0.00490)
% of Output by Foreign Firms in the Sector	-0.000106	-9.80e-06	-2.29e-05	-0.000105
	(0.000390)	(0.000398)	(0.000397)	(0.000389)
Output Tariffs (Effective)	-0.000222	0.000818	0.000777	-0.000253
	(0.00366)	(0.00412)	(0.00412)	(0.00365)
Constant	0.494***	0.413***	0.410***	0.502***
	(0.0669)	(0.0824)	(0.0811)	(0.0636)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Standard Errors	Clustered ISIC2/Year	Clustered ISIC2/Year	Clustered ISIC2/Year	Clustered ISIC2/Year
Observations	40,083	33,385	33,385	40,208
R-squared	0.034	0.037	0.037	0.035
Number of id	25,317	19,647	19,647	25,425
Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1				
*** p<0.01, ** p<0.05, * p<0.1				

Table 4: Results by Sector

Dep Var: TFP Index	(1)	(2)	(3)	(4)	(5)
Communications rest1	-4.606 (6.090)				
Construction rest1		-7.871 (11.85)			
Distribution rest1			-0.250 (0.486)		
Electricity rest1				-12.36** (4.893)	
Transport rest1					-2.258** (0.912)
Policy Restrictiveness in Manufacturing FDI	-0.187 (0.723)	-0.206 (0.722)	-0.167 (0.740)	-0.300 (0.710)	-0.328 (0.649)
Tariffs on Inputs (Effective)	-0.00707 (0.00504)	-0.00705 (0.00506)	-0.00683 (0.00506)	-0.00695 (0.00506)	-0.00885* (0.00520)
% of Output by Foreign Firms in the Sector	-0.000264 (0.000388)	-0.000300 (0.000381)	-0.000305 (0.000402)	-0.000240 (0.000393)	-0.000279 (0.000385)
Output Tariffs (Effective)	-0.000905 (0.00354)	-0.00100 (0.00356)	-0.00105 (0.00350)	-0.00138 (0.00359)	-0.000960 (0.00356)
Constant	0.316*** (0.0310)	0.322*** (0.0340)	0.322*** (0.0325)	0.361*** (0.0352)	0.386*** (0.0400)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Standard Errors	Clustered ISIC2/Year	Clustered ISIC2/Year	Clustered ISIC2/Year	Clustered ISIC2/Year	Clustered ISIC2/Year
Observations	40,208	40,208	40,208	40,208	40,208
R-squared	0.029	0.029	0.029	0.030	0.030
Number of id	25,425	25,425	25,425	25,425	25,425

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

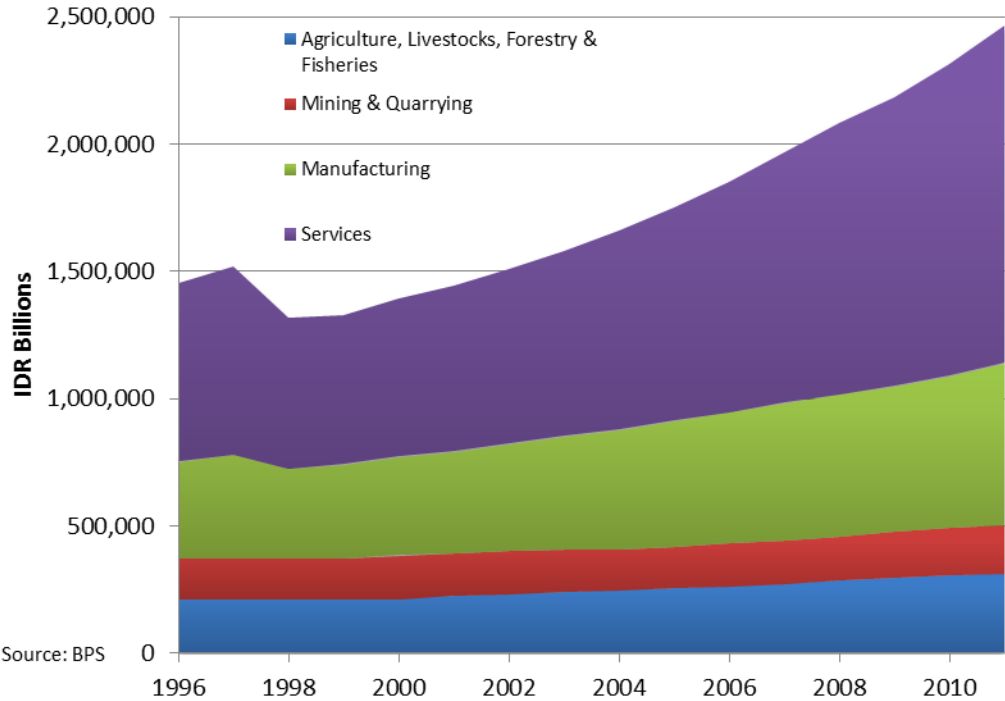
Table 5: Results by Type of Restriction

	(1)	(2)	(3)	(4)	(5)
Dep Var TFP Index					
Foreign equity restrictions	-0.975*				-0.384
	(0.497)				(2.152)
Screening and prior approval requirements		-21.64**			-6.043
		(8.706)			(23.24)
Rules for hiring key personnel			-6.410		12.27
			(4.705)		(17.82)
Other restrictions on the operations				-19.27*	-35.96
				(11.24)	(30.99)
Policy Restrictiveness in Manufacturing FDI	-0.242	-0.206	-0.222	-0.250	-0.264
	(0.762)	(0.748)	(0.723)	(0.717)	(0.726)
Tariffs on Inputs (Effective)	-0.00713	-0.00821	-0.00710	-0.00705	-0.00724
	(0.00501)	(0.00516)	(0.00503)	(0.00504)	(0.00520)
% of Output by Foreign Firms in the Sector	-0.000151	-0.000154	-0.000236	-0.000215	-0.000176
	(0.000394)	(0.000394)	(0.000404)	(0.000403)	(0.000373)
Output Tariffs (Effective)	-0.000775	-0.000366	-0.00105	-0.000919	-0.000540
	(0.00339)	(0.00367)	(0.00340)	(0.00342)	(0.00368)
Constant	0.383***	0.314***	0.393***	0.419***	0.386***
	(0.0448)	(0.0309)	(0.0624)	(0.0665)	(0.0753)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Standard Errors	Clustered	Clustered	Clustered	Clustered	Clustered
	ISIC2/Year	ISIC2/Year	ISIC2/Year	ISIC2/Year	ISIC2/Year
Observations	40,208	40,208	40,208	40,208	40,208
R-squared	0.029	0.029	0.029	0.030	0.030
Number of id	25,425	25,425	25,425	25,425	25,425

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Figure 1: Indonesian GDP at constant 2000 prices.**



**Figure 2: Service sector value added at constant 2000 prices.**

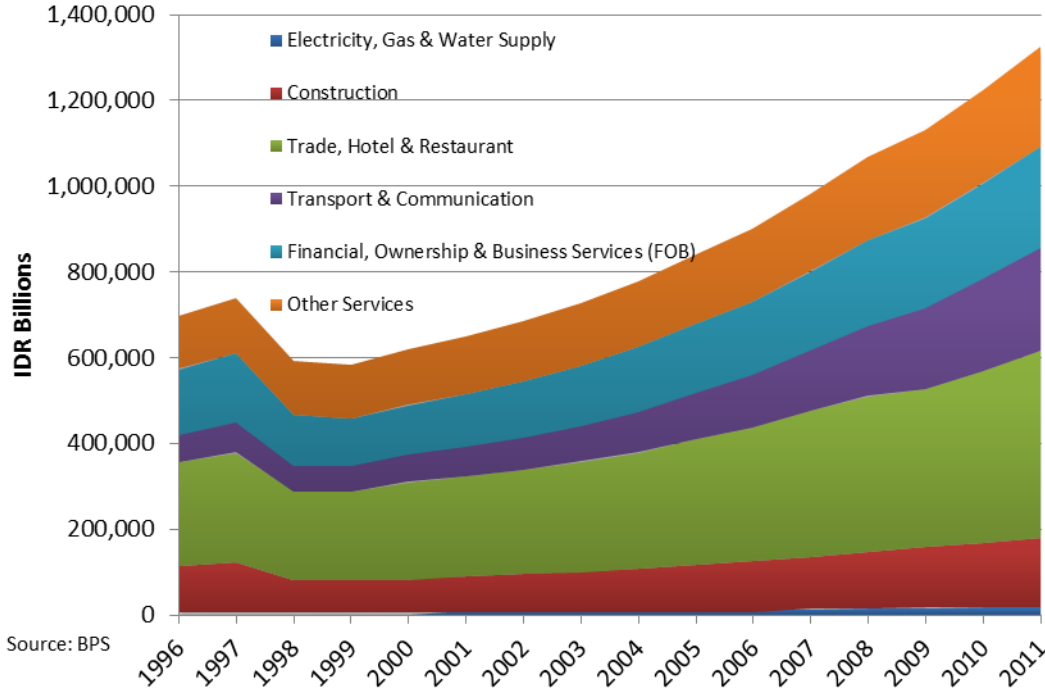
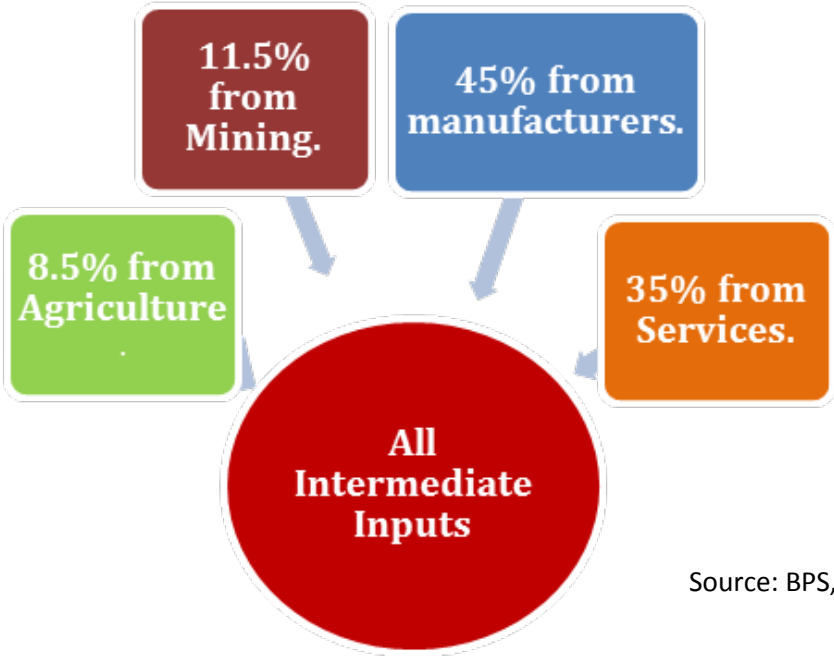


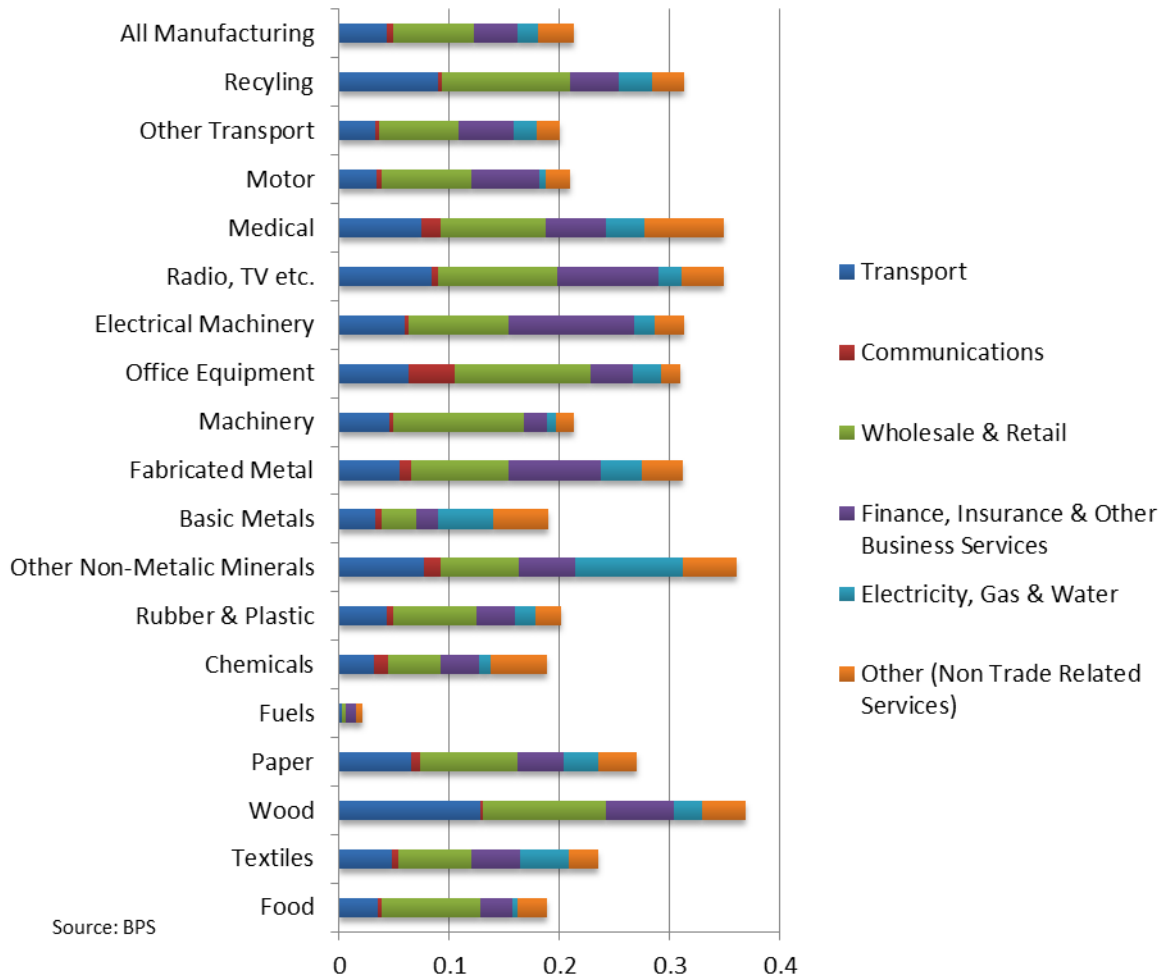
Figure 3: Linkages in Indonesia's productive sectors (Source: BPS, 2005).



Source: BPS, 2005

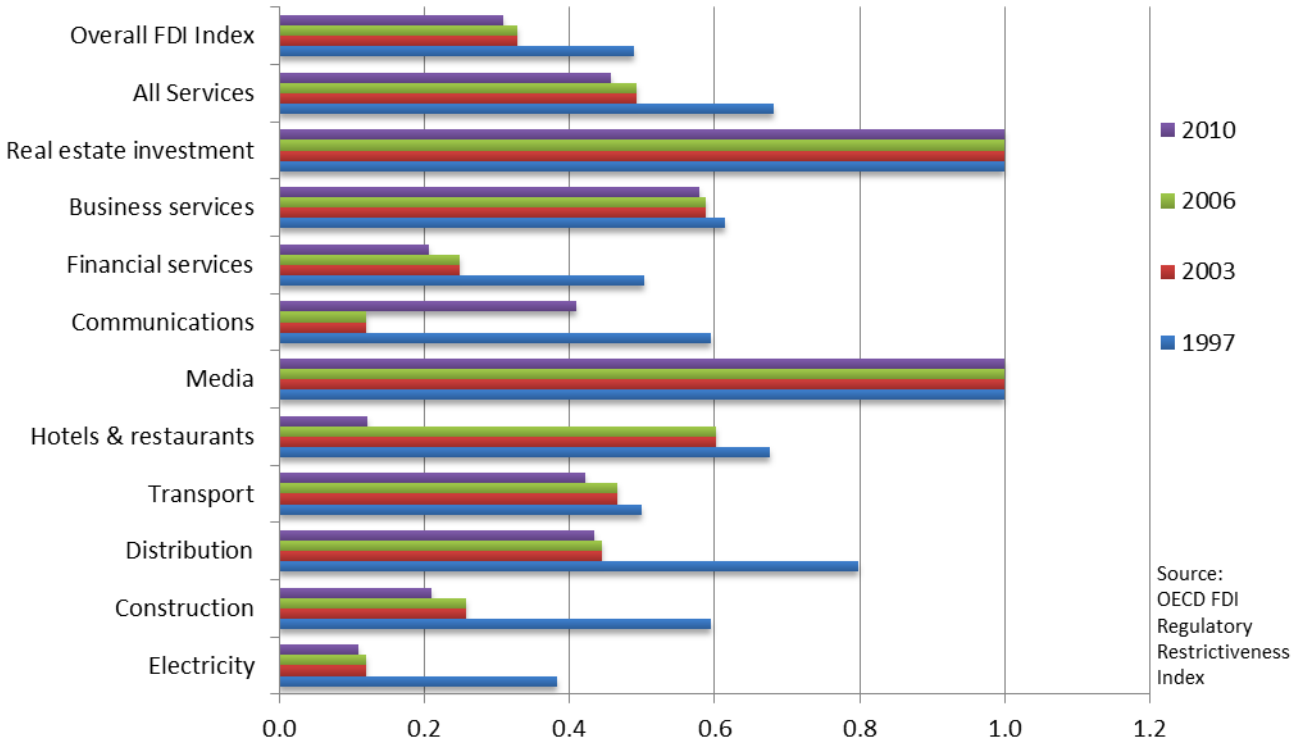


**Figure 4: Variation of service usage intensities across manufacturing sectors.**

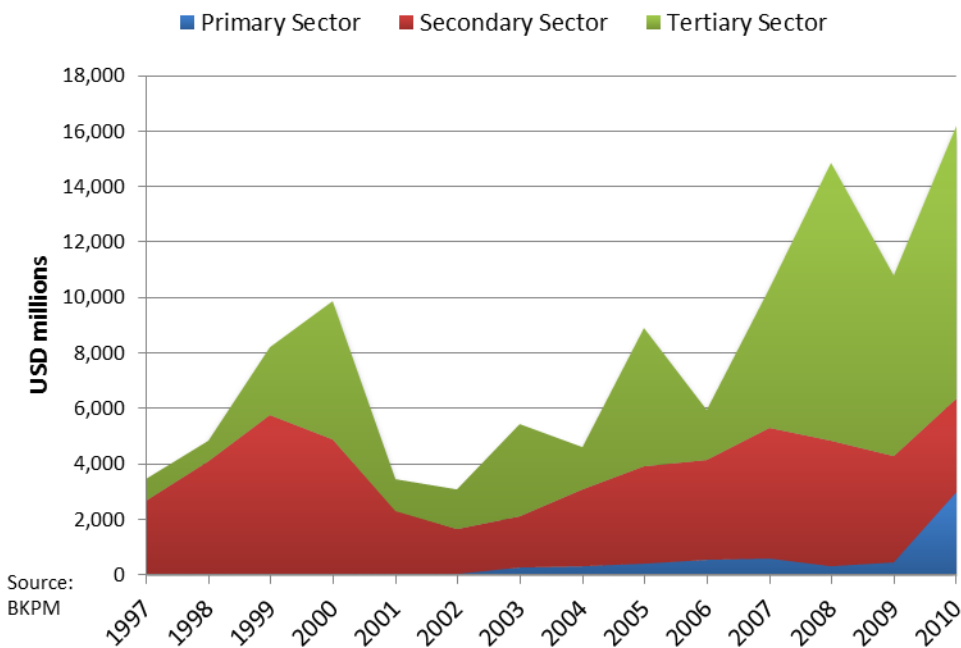


Source: BPS

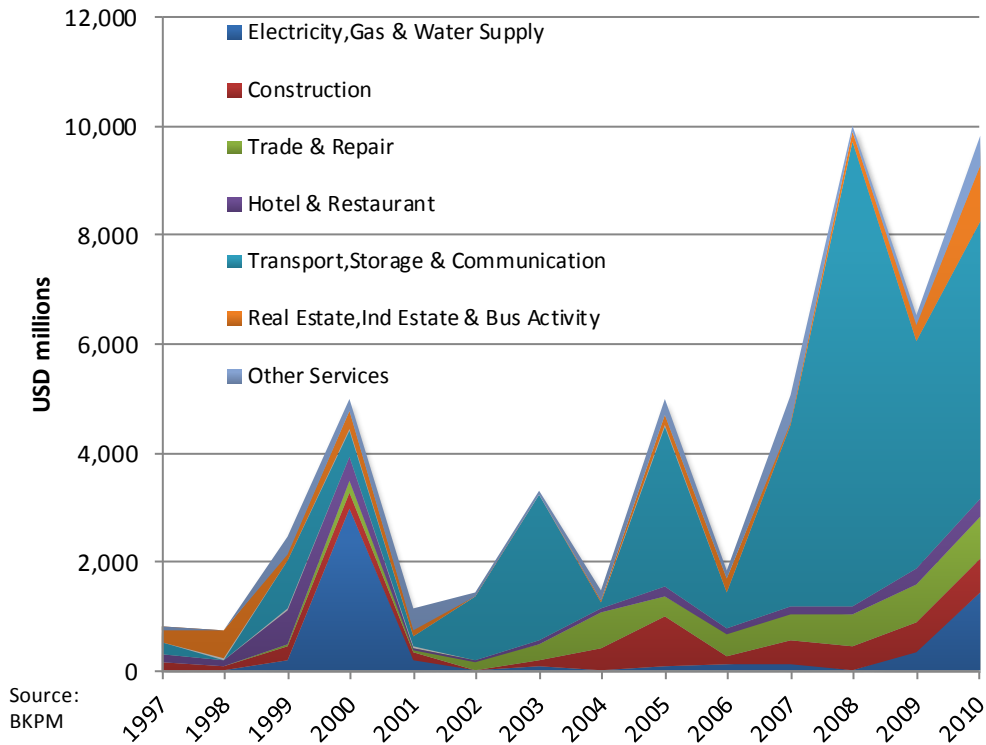
**Figure 5: Evolution of Indonesia's Services FDI Regulatory Restrictiveness; 1 = completely closed, 0 = completely open.**



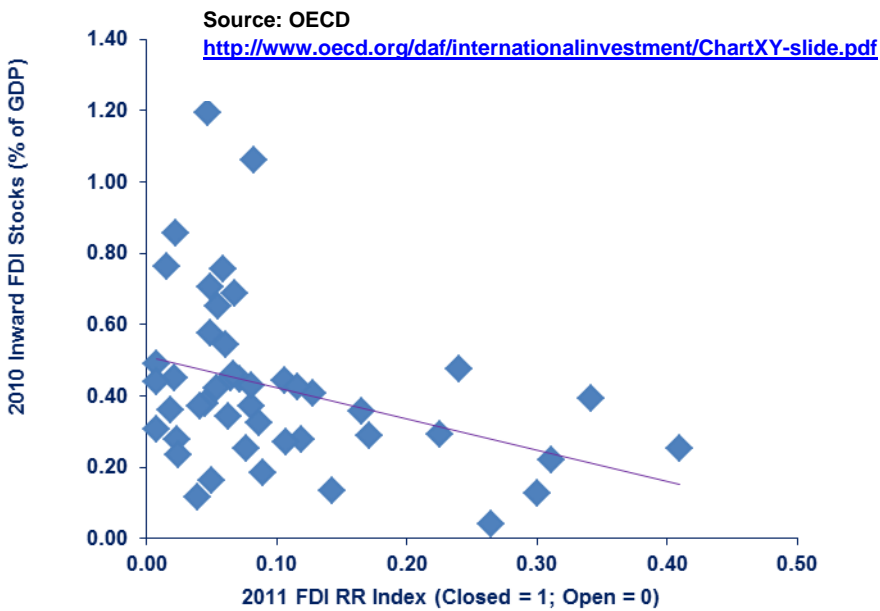
**Figure 6: Inward FDI by sector.**



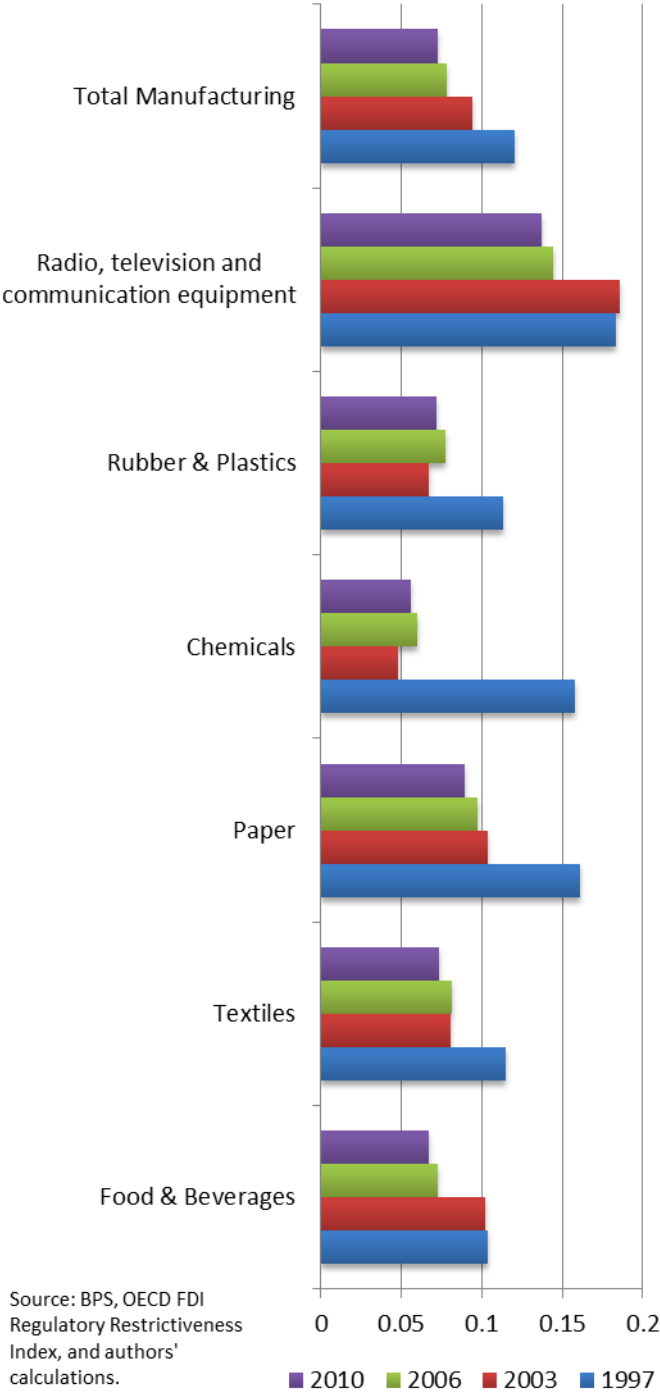
**Figure 7: Inward FDI by service sub-sector.**



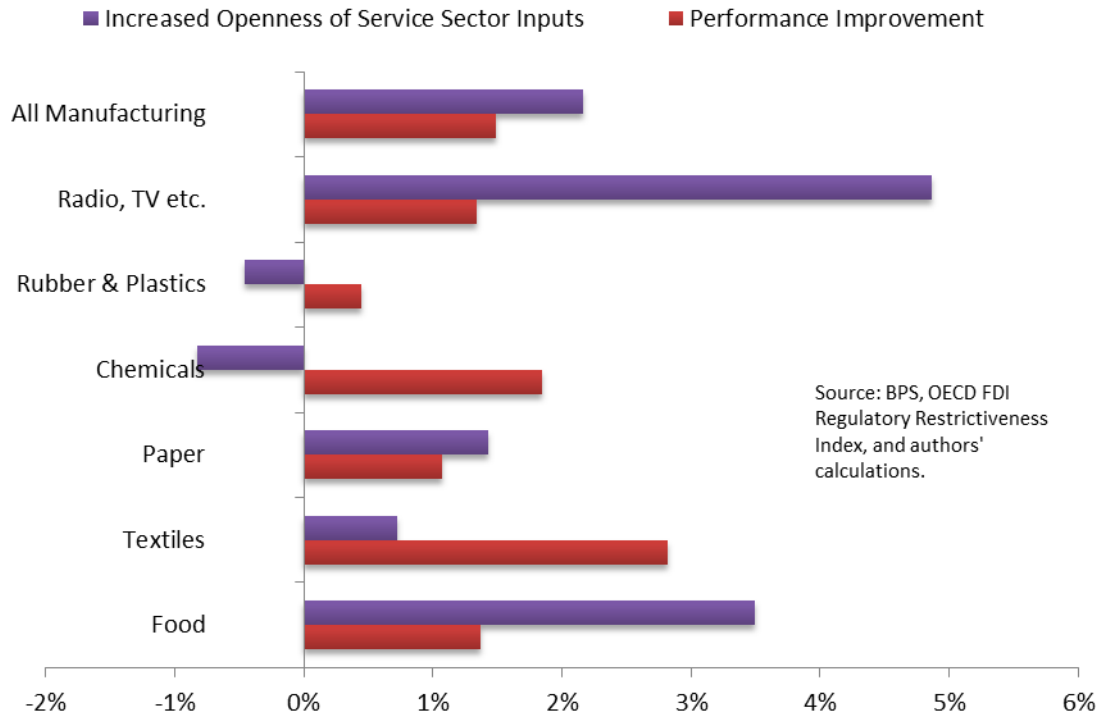
**Figure 8: More open economies receive more FDI.**



**Figure 9: Evolution in weighted restrictiveness on FDI in upstream service sectors faced by manufacturing sub-sectors.**



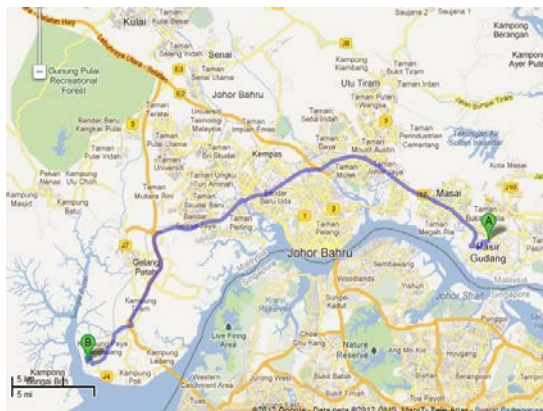
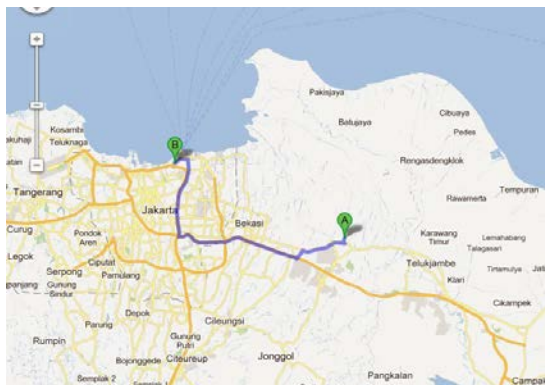
**Figure 10: Relationship between service sector performance and FDI restrictiveness in that sector; percentage change.**



**Figures 11 & 12: An example of comparative freight costs in Indonesia and Malaysia.**

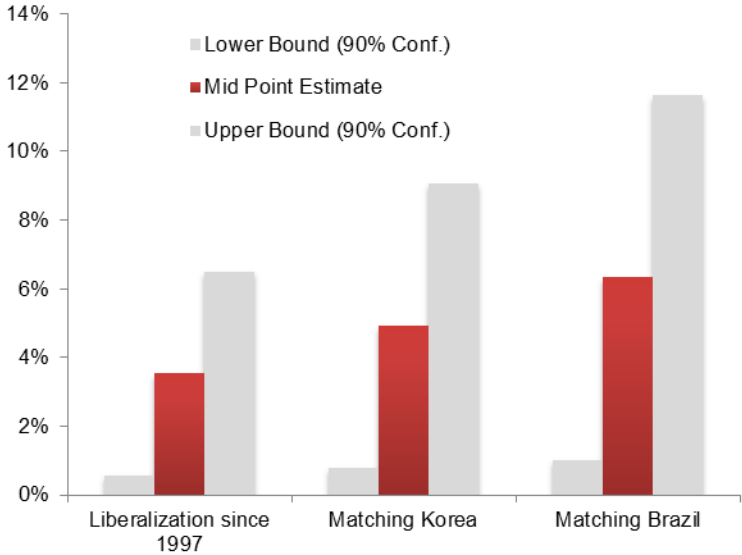
**Cikarang to Tanjung Priok (Indonesia)**  
 Truck Distance: 55.4 Km, Logistics costs: US\$750

**Pasir Gudang to Tanjung Pelepas (Malaysia)**  
 Truck Distance: 56.4 Km  
 Logistics costs US\$450



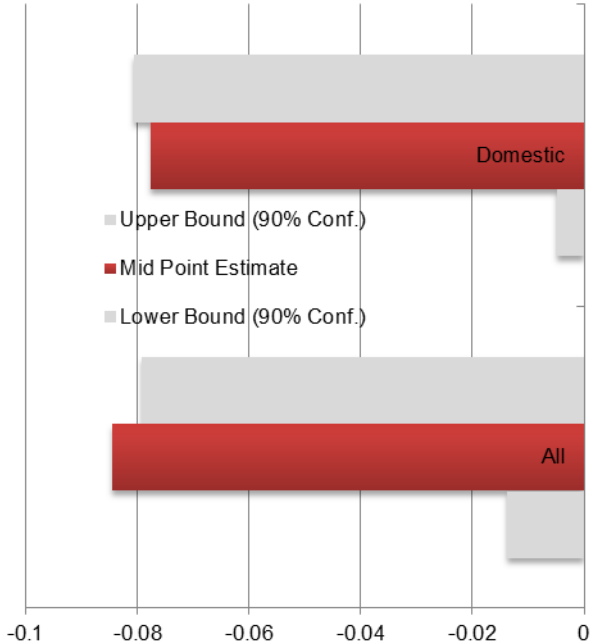
Source: World Bank staff, Google Maps

**Figure 13: Estimated effects of service sector liberalization on Total Factor Productivity, and some simulations.** The red bars indicate the point estimates of the induced effects; the grey bars show the lower and upper bounds of 90% confidence intervals.



Source: authors' calculations

**Figure 14: Comparative impact of a 1 percent reduction in service sector FDI policy restrictiveness index on manufacturing TFP, by ownership.**



Source: authors' calculations

## Appendix 1: List of restrictions in the services and manufacturing sectors included in the OECD Restrictiveness Index.

### Types of Restrictions:

*I - Equity restrictions*

*III - Key personnel*

*II - Screening & Approval*

*IV - Other restrictions*

### Sectoral

<i>Year</i>	<i>Sectors</i>	<i>Sub-sectors</i>	<i>Measure</i>	<i>Justifications / comments</i>
1997	Manufacturing	Transport equipment	I	Air transport equipment only in joint-venture with ITPN
1997	Electricity	Electricity generation	I	Joint venture requirement existed in 1995. In 2000 it was 95%, as it was in 2010. Assume that the same minimum applied before 2000.
1997	Electricity	Electricity distribution	I	JV requirement has always existed. In 2000 it was 95%, as it was in 2010. Assume that the same minimum applied before 2000. It also applies to distribution
1997	Construction		I	Foreign construction firms are only permitted to be subcontractors or advisors to local firms in areas where the government believes that a local firm is unable to do the work.
1997	Distribution	Wholesale	I	Foreign firms and foreign-controlled firms are not allowed to distribute in Indonesia unless they produce there (and even then only at the wholesale level).
1997	Distribution	Retail	I	All retail distribution must be handled by Indonesian firms.
1997	Transport	Surface	I	95% foreign equity limit in toll road business; 49% in goods transport. Railways: since 1994, private (incl FDI) participation allowed up to 95%, with PT KA the SOE holding the rest for specific projects.
1997	Transport	Maritime	I	Coastal trade is reserved to for Indonesian flag vessels. 95% FDI is allowed in international shipping ventures.
1997	Transport	Air	I	1994 Neg List allowed for first time up to 95% foreign ownership (although GOI stated in TPR that it is of the opinion that national airlines are to be effectively controlled and substantially owned by nationals). Cabotage and commercial cargo services reserved to nationals.
1997	Hotels & restaurants		I	Since 1994, Indonesian equity requirement limited to 49%. In the least tourism-developed areas, foreigners may hold 100%. FDI only in 3-5 star hotels and resorts.
1997	Hotels & restaurants		IV	Foreigners may face higher capital requirement than Indo investors.
1997	Media	Broadcast	I	No FDI in broadcasting
1997	Media	Other media	I	No FDI in newspapers and magazines and operation of cinemas

1997	Telecoms	Fixed telecoms	I	FDI only allowed through revenue sharing arrangement with SOE monopolists. Concessions were awarded to private consortia, including foreign firms, to operate fixed line services on a monopoly basis in all regions except Greater Jakarta and E Java. No restrictions exist on foreign operators entering the market, but foreign equity in JVs is limited to 35%.
1997	Telecoms	Mobile telecoms	I	Same as for fixed telecoms
1997	Financial services	Banking	I	Foreign banks entry: FDI<85% for greenfield and FDI<49% for acquisitions of listed banks.
1997	Financial services	Banking	IV	Restrictions on number of branches outside of Jakarta.
1997	Financial services	Insurance	I	Foreign insurance companies: FDI<80% for greenfield and FDI<40% for acquisitions of listed firms.
1997	Financial services	Insurance	IV	Higher capital requirements for foreign insurance firms
1997	Financial services	Other financial services	I	Other financial companies: FDI<85% for greenfield and FDI<49% for acquisitions of listed firms. No FDI in pension funds
1997	Financial services	Other financial services	IV	Higher capital requirements for foreign firms in other financial services
1997	Business services	Legal	I	Foreign law firms must establish a joint venture with a local firm.
1997	Business services	Legal	III	Only Indonesian citizens may practice law. All lawyers must hold Indo citizenship and a local law degree.
1997	Business services	Accounting & audit	I	Foreign accounting firms must operate through technical assistance arrangements with local firms.
1997	Business services	Accounting & audit	III	Citizenship is required for licensing an accountant.
1997	Business services	Architectural	I	55% foreign equity limit for non-small scale projects
1997	Business services	Engineering	I	55% foreign equity limit for non-small scale projects
1997	Real estate investment		I	Foreign individuals cannot own property in Indonesia but can have leases for 20 yrs extendable for another 20 yrs. No FDI in real estate brokers -- fee or contract based.

2006	Electricity	Electricity generation	I	power plants, generation and transmission 95% (even if PLN has a monopoly on distrib in all areas where it operates).
2006	Electricity	Electricity distribution	I	power plants, generation and transmission 95% (even if PLN has a monopoly on distrib in all areas where it operates).
2006	Construction		I	55% foreign equity limit for non-small scale projects
2006	Distribution	Wholesale	I	Since 1998, 100% foreign equity allowed in distribution/retail but must involve local SME partner although not necessarily through equity stake.
2006	Distribution	Retail	I	Since 1998, 100% foreign equity allowed in distribution/retail but must involve local SME partner although not necessarily through equity stake. FDI allowed only in largescale retail.
2006	Transport	Surface	I	95% foreign equity limit in toll road business; 49% in goods transport. Railways: since 1994, private (incl FDI) participation allowed up to 95%, with PT KA the SOE holding the rest for specific projects.
2006	Transport	Maritime	I	95% foreign equity limit in international shipping, inter-island transportation is reserved to Indonesians, unless there is insufficient local capacity.
2006	Transport	Air	I	Foreign operators of scheduled domestic services restricted to 49%. Bilateral agreements govern international air services and prohibit cabotage.



2006	Hotels & restaurants		I	Since 1994, Indonesian equity requirement limited to 49%. In the least tourism-developed areas, foreigners may hold 100%. FDI only in 3-5 star hotels and resorts.
2006	Media	Broadcast	I	No FDI in broadcasting
2006	Media	Other media	I	No FDI in newspapers and magazines and operation of cinemas
2006	Telecoms	Fixed telecoms	I	95% foreign equity limit in telecoms, up up from 49% in 2000.
2006	Telecoms	Mobile telecoms	I	95% foreign equity limit in telecoms, up up from 49% in 2000.
2006	Financial services	Banking	I	99% foreign equity limit in foreign exchange and non-foreign exchange banks 99%
2006	Financial services	Insurance	I	80% foreign equity limit in insurance
2006	Financial services	Insurance	IV	Foreign insurance branches are not allowed.
2006	Financial services	Other financial services	I	Greenfield: Non-leasing financing limited to 85% (100% for acquisition), venture capital 80% (100% for acquisition), pension funds (0%).
2006	Financial services	Other financial services	IV	Minimum capital requirements twice as high for joint-ventures
2006	Business services	Legal	I	Foreign law firms must establish a joint venture with a local firm.
2006	Business services	Legal	III	Only Indonesian citizens may practice law. All lawyers must hold Indo citizenship and a local law degree.
2006	Business services	Accounting & audit	I	Foreign firms cannot practice under their own names, although "in association with" is permissible. Foreign accounting firms must operate through technical assistance arrangements with local firms. Foreign agents and auditors may act only as consultants and cannot sign audit reports.
2006	Business services	Accounting & audit	III	Licensed accountants must be Indonesian citizens.
2006	Business services	Architectural	I	55% foreign equity limit for non-small scale projects
2006	Business services	Engineering	I	55% foreign equity limit for non-small scale projects
2006	Real estate investment		I	Foreign individuals cannot own property in Indonesia but can have leases for 20 yrs extendable for another 20 yrs. No FDI in real estate brokers -- fee or contract based.
2010	Business services	Accounting & audit	I	Joint venture requirement
2010	Business services	Architectural	I	55% foreign equity limit for non-small scale projects
2010	Business services	Engineering	I	55% foreign equity limit for non-small scale projects
2010	Telecoms	Fixed telecoms	I	49% foreign equity limit
2010	Telecoms	Mobile telecoms	I	65% foreign equity limit
2010	Financial services	Banking	I	99% foreign equity limit in foreign exchange and non-foreign exchange banks 99%
2010	Financial services	Insurance	I	80% foreign equity limit in insurance
2010	Financial services	Other financial services	I	85% foreign equity limit in non-leasing financing, but 100% allowed for acquisition; 80% foreign equity limit in venture capital 80%, and 100% allowed for acquisition; no foreign equity allowed in pension.
2010	Business services	Legal	I	Foreign law firms must establish a joint venture with a local firm.
2010	Business services	Legal	III	Only Indonesian citizens may practice law. All lawyers must hold Indo citizenship and a local law degree.
2010	Real estate investment		I	Foreign individuals cannot own property in Indonesia but can have leases for 20 yrs extendable for another 20 yrs. No FDI in real estate brokers -- fee or contract based.
2010	Business services	Accounting & audit	III	Licensed accountants must be Indonesian citizens.

2011	Business services	Accounting & audit	I	Joint venture requirement
2011	Business services	Architectural	I	55% foreign equity limit for non-small scale projects
2011	Business services	Engineering	I	55% foreign equity limit for non-small scale projects
2011	Telecoms	Fixed telecoms	I	49% foreign equity limit
2011	Telecoms	Mobile telecoms	I	65% foreign equity limit
2011	Financial services	Banking	I	99% foreign equity limit in foreign exchange and non-foreign exchange banks 99%
2011	Financial services	Insurance	I	80% foreign equity limit in insurance
2011	Financial services	Other financial services	I	85% foreign equity limit in non-leasing financing, but 100% allowed for acquisition; 80% foreign equity limit in venture capital 80%, and 100% allowed for acquisition; no foreign equity allowed in pension.
2011	Business services	Legal	I	Foreign law firms must establish a joint venture with a local firm.
2011	Business services	Legal	III	Only Indonesian citizens may practice law. All lawyers must hold Indo citizenship and a local law degree.
2011	Real estate investment		I	Foreign individuals cannot own property in Indonesia but can have leases for 20 yrs extendable for another 20 yrs. No FDI in real estate brokers -- fee or contract based.
2011	Business services	Accounting & audit	III	Licensed accountants must be Indonesian citizens.
2012	Business services	Accounting & audit	I	Joint venture requirement
2012	Business services	Architectural	I	55% foreign equity limit for non-small scale projects
2012	Business services	Engineering	I	55% foreign equity limit for non-small scale projects
2012	Telecoms	Fixed telecoms	I	49% foreign equity limit
2012	Telecoms	Mobile telecoms	I	65% foreign equity limit
2012	Financial services	Banking	I	The Presidential Decree issued in May 2012 introduces a new foreign shareholding limit to banking institutions of 40%, down from 99%. Ownership can exceed 40% with the approval of Bank Indonesia if financial institutions exhibit high standards of financial health and corporate governance, and agree to allow 20% of the target bank's shares to be publically available within five years
2012	Financial services	Banking	II	The Presidential Decree issued in May 2012 introduces a new foreign shareholding limit to banking institutions of 40%, down from 99%. Ownership can exceed 40% with the approval of Bank Indonesia if financial institutions exhibit high standards of financial health and corporate governance, and agree to allow 20% of the target bank's shares to be publically available within five year
2012	Financial services	Insurance	I	80% foreign equity limit in insurance
2012	Financial services	Other financial services	I	85% foreign equity limit in non-leasing financing, but 100% allowed for acquisition; 80% foreign equity limit in venture capital 80%, and 100% allowed for acquisition; no foreign equity allowed in pension.
2012	Business services	Legal	I	Foreign law firms must establish a joint venture with a local firm.
2012	Business services	Legal	III	Only Indonesian citizens may practice law. All lawyers must hold Indo citizenship and a local law degree.
2012	Real estate investment		I	Foreign individuals cannot own property in Indonesia but can have leases for 20 yrs extendable for another 20 yrs. No FDI in real estate brokers -- fee or contract based.
2012	Business services	Accounting & audit	III	Licensed accountants must be Indonesian citizens.

## Trans-sectoral

### TRANS-SECTORAL

<i>Year</i>	<i>Country</i>	<i>Measure</i>	<i>Content</i>
1997	Indonesia	II	BKPM requires presidential signature for approvals (eliminated in 1999).
1997	Indonesia	III	Foreign Investment Law 1/1967 requires foreign enterprises to meet their manpower needs with Indonesian citizens. There are limits to expatriate employment to those occupations which cannot be filled by Indonesians. The Personnel Director must be Indonesian, but all others may be foreign.
1997	Indonesia	IV	A fully foreign-owned company must sell a nominal (5%) stake to a local investor within 15 years.
1997	Indonesia	IV	Foreigners may not own land but may receive long-term leases for business purposes
2003	Indonesia	III	BKPM approves expatriate employment in foreign companies based on economic needs test. Personnel Director must be Indonesian.
2003	Indonesia	IV	A fully foreign-owned company must sell a nominal (5%) stake to a local investor within 15 years.
2003	Indonesia	IV	Foreigners may not own land but may receive long-term leases (99 years) for business purposes
2006	Indonesia	III	Foreign Investment Law 1/1967 requires foreign enterprises to meet their manpower needs with Indonesian citizens. There are limits to expatriate employment to those occupations which cannot be filled by Indonesians. The Personnel Director must be Indonesian, but all others may be foreign.
2006	Indonesia	IV	Foreigners may not own land but may receive long-term leases for business purposes
2006	Indonesia	IV	A fully foreign-owned company must sell a nominal (5%) stake to a local investor within 15 years. Removed in the 2007 Investment Law.
2010	Indonesia	IV	Foreigners may not own land but may receive long-term leases (99 years) for business purposes
2010	Indonesia	III	BKPM approves expatriate employment in foreign companies based on economic needs test. Personnel Director must be Indonesian.
2011	Indonesia	IV	Foreigners may not own land but may receive long-term leases (99 years) for business purposes
2011	Indonesia	III	Manpower Act 13/2003: BKPM approves expatriate employment in foreign companies based on econ. needs test. Personnel Director must be Indonesian.
2012	Indonesia	IV	Foreigners may not own land but may receive long-term leases (99 years) for business purposes
2012	Indonesia	III	Manpower Act 13/2003: BKPM approves expatriate employment in foreign companies based on econ. needs test. Personnel Director must be Indonesian.

Source: OECD