



Economic Premise

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Nothing to Fear but Fear Itself: Evidence on Imported Intermediates in Indonesia

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The combination of an increasing trade imbalance, concerns about deindustrialization after several years of booming commodity prices, and rising imports of intermediate inputs and capital goods over the last decade has triggered new restrictive trade measures that have been gaining ground in Indonesia. The Indonesian government is concerned about the impacts that an increased reliance on imported inputs may have on domestic jobs and value added. In addition to use of imported intermediates by firms involved in global production networks, firms use these intermediates for various reasons, including value, variety, and quality. Drawing on the findings of recent research, this note examines the characteristics of firms that rely on imported intermediates, and the role of these foreign intermediates on product quality upgrading and product diversification in Indonesia during 1998–2009. After a careful examination of sector- and firm-level data from Indonesian manufacturing, analysis uncovered three important findings: first, that users of imported inputs in Indonesia are exceptional performers. These firms grow faster in terms of output, value added and employment; they are more productive; and they pay higher wages. Second, both the use and the availability of imported inputs have contributed to improved product quality in Indonesian manufacturing. Third, firms' product diversification processes have been boosted by lower tariffs on inputs and by increased usage of imported versions. In light of these results, this note argues that facilitating imports of intermediate inputs is crucial to the performance of the most dynamic firms and that these intermediate imports diversify the Indonesian manufacturing sector while helping firms climb up the value chain.

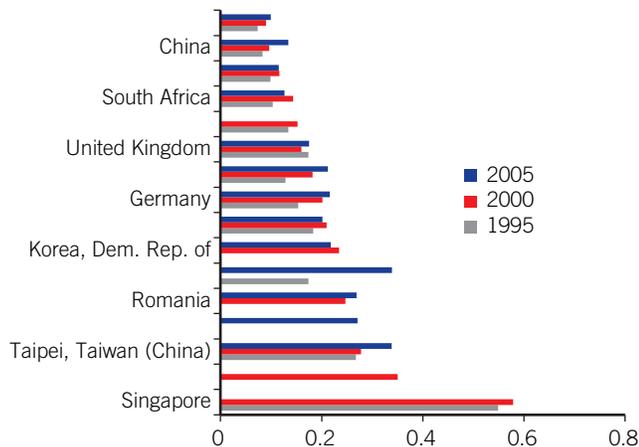
Trends in Usage of Imported Intermediate Inputs

Over the last two decades, the industrialization model has shifted toward the separation of production stages across several locations, accompanied by increased trade in intermediates. Processes of production, from inputs to final goods, have increasingly been fragmented, with each process now carried out wherever the necessary skills and materials are available at competitive costs. Production fragmentation has been facilitated by lower transport costs and technological advances that enable manufacturers to improve productivity by “slicing”

production stages into different locations (Baldwin 2011). This production fragmentation implies establishing international networks in which firms located in different countries produce and trade different components of a single final good. Thus, intermediate goods travel to their final destination by indirect routes (figures 1 and 2).

Increases in imports of intermediates necessary for participation in these international production networks, then, should not pose a threat to the sustainability of the current account, since they are followed by increases in exports. In Indonesia, the importance of international production networks in the increases in imports of intermediates is con-

Figure 1. Increase in Share of Imported Inputs in Production
(ratio of imported inputs to total inputs)



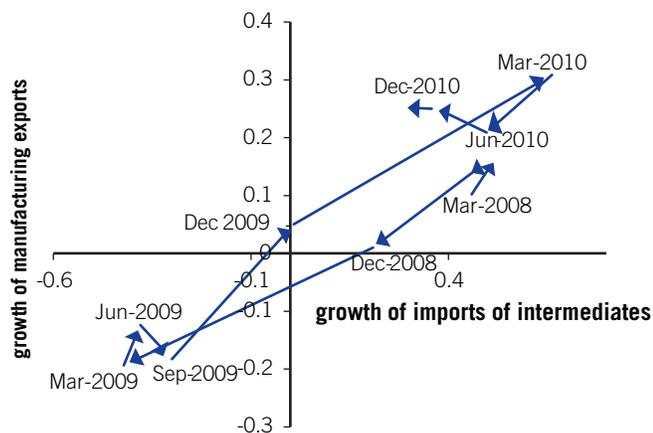
Source: OECD, Input-Output Tables.

firming by the close relationship between the growth of imports of intermediates and the growth of manufacturing exports, as shown in figure 3.¹ When exporters anticipate increases in demand for their output, the demand for intermediates increases—domestic and imported versions. And the reverse is also true, of course. Figure 3 focuses on 2008–10, a period of turbulent trade flows, and shows this close link. The sharp deceleration of manufacturing exports in the last quarter of 2008 came with a sharp deceleration of imports of intermediates. In fact, from March 2009 to September 2009, when manufacturing exports actually fell, imports of intermediates also fell dramatically.²

Imported Intermediates and Performance

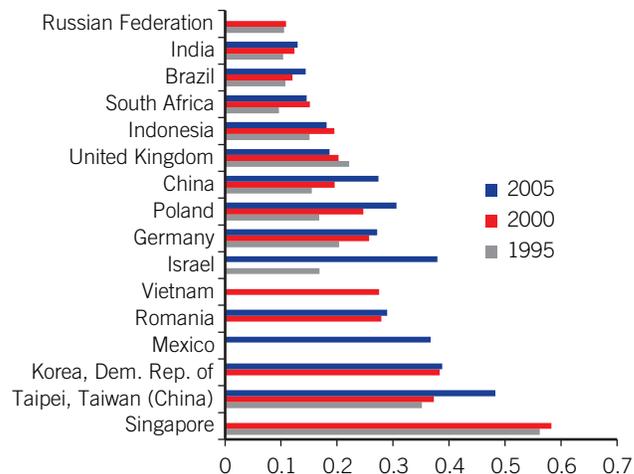
Manufacturers benefit from having access to varied, inexpensive, and good quality intermediates. Indonesia is no exception. The flexibility to import intermediate inputs,

Figure 3. Strong Relationship between Export Growth and Growth of Intermediate Imports during Trade Collapse in 2009



Source: Authors' calculations, based on the Indonesian Statistical Office (BPS).

Figure 2. Increasing Imported Components in Countries' Exports
(imports content of exports)



Source: OECD, Input-Output Tables.

thus widening their availability, is vital for both Indonesian and foreign firms serving the domestic market. For domestic firms, access to high-quality and a variety of intermediates can help firms create products that will enable them to seize growth opportunities in an economy where consumption by the middle class is rising quickly. For foreign firms, access to imported intermediates helps them maintain the quality and specifications of their products, thereby strengthening Indonesia's ability to attract more foreign direct investment.

Amiti and Konings (2007), for example, looked at Indonesian manufacturing census data from 1990–2001, and found that a 10 percentage point fall in input tariffs led to a productivity gain of 12 percent through learning, quality, and variety effects. This gain was found to be at least twice as high as the gains from reducing output tariffs, which may arise via tougher competition effects.

Goldberg et al. (2010) show that expansion in the number of products produced by Indian manufacturing firms during the 1990s was in part a direct consequence of cheaper, more varied, and better quality imported inputs. Tariff reductions lowered prices and increased volumes of existing imports, but they also meant access to new types of intermediate inputs from the rest of the world. These new inputs, in turn, resulted in an increase in the number of products manufactured by firms, or "firms' product scope," which explained nearly a quarter of manufacturing output growth. The lower price of intermediates due to trade liberalization represented a boon for domestic firms, as their costs fell. Firms could then use their cost savings to cover the fixed costs of entering new product lines. In addition, having access to higher quality intermediate inputs and capital goods helped ease technological constraints.

New Evidence from Indonesia

Rahardja and Varela (2013) explore the links between the use and availability of imported intermediates and different aspects of the industrialization process in Indonesia during the last decade. Three datasets combined helped shed light on their investigation. First, Indonesian manufacturing census data traces all registered manufacturing firms in Indonesia with 20 or more employees, on average, containing information for about 20,000 firms per year for 1998–2009. The census data contain information on usage of imported intermediates, on the main products produced by each firm at the 9-digit ISIC (International Standard Industry Classification) level, and on the prices firms obtain in the market for these products. The second valuable source of data are the input-output tables constructed by the Indonesian statistical office (BPS). Finally, Indonesian tariff data are obtained from the TRAINS dataset of the World Bank.

Tariffs on intermediates faced by each manufacturing sector were calculated as a weighted average of each product-level tariff, where the weights are given by the share of that product (input) in the total input bill of the manufacturing sector.

Three specific questions were asked by Rahardja and Varela (2013):

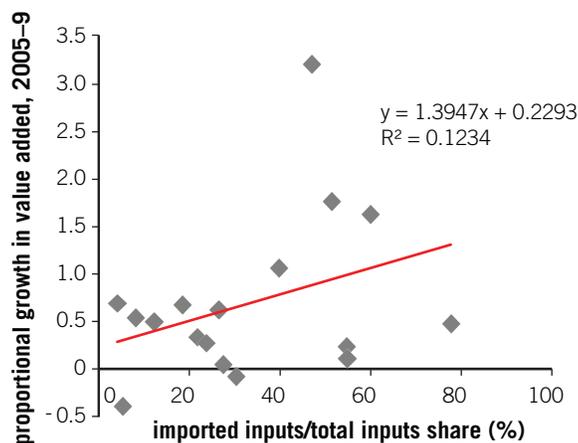
- i. What are the characteristics of users of imported inputs?
- ii. What role has the availability and use of imported inputs played in quality upgrading at the firm level?
- ii. What role has the availability and use of imported inputs played in product diversification at the firm level?

There are three important facts to consider when investigating these questions.

Fact 1: Users of Imported Intermediates in Indonesia Are Exceptional Performers

One concern is whether the increased use of imported intermediates will result in less value added domestically, or cause

Figure 4. Sectors That Import More Inputs Expand More



Source: World Bank staff, based on BPS data.

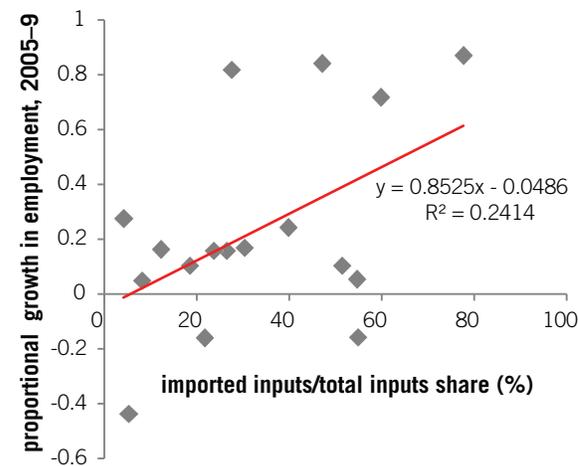
a contraction in domestic input-producing sectors. However, firms that can access imported inputs have faster rates of growth for output, value added, and employment. Comparing firms that use imported inputs with those that do not, within narrowly defined sectors, those in the former group tend to display a better growth performance than those in the latter group in terms of output, value added, and employment creation (figures 4 and 5). Thus, the use of imported inputs is not associated with job destruction, but rather with job creation.

Jobs created by firms importing intermediate inputs pay higher wages. The rapid employment growth exhibited by firms that use imported inputs is very good news for Indonesians searching for quality jobs. The real wage premium obtained by a worker in a firm that sources 10 percent of its inputs from abroad is about 3.7 percent. Why can firms that use foreign intermediates afford to pay, on average, higher wages?

Fact 2: Access to Imported Intermediates Helped Indonesian Manufacturers Move Up the Quality Ladder

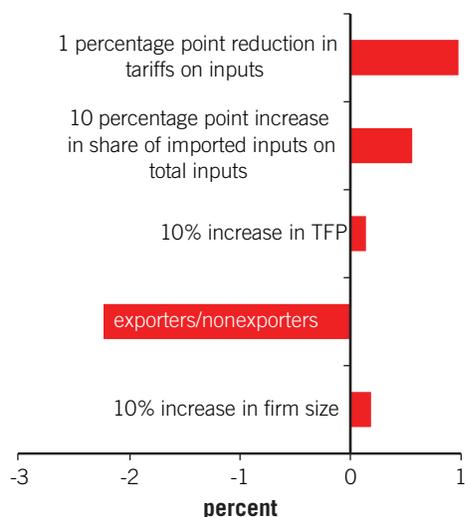
To examine the role of increased access to imported intermediates on product quality, this analysis assumes that a firm produces a high-quality product when the weighted average of the unit values corresponding to a firm's three main products (defined at the 9-digit ISIC level of disaggregation) is above the median of the weighted average of the unit values of the same narrowly defined sector (defined at the 5-digit ISIC level of disaggregation). Such a disaggregation means that the within-group variation in unit values is more likely to be related to the degree of differentiation of the product or its quality content than to substantial differ-

Figure 5. Sectors That Import More Inputs Generate More Employment



Source: World Bank staff based, on BPS data.

Figure 6. Effects of Selected Variables on the Probability of Producing High-Quality Products



Source: World Bank staff, based on Industrial Census data, BPS.
 Note: Estimated effects from a probability model of imported inputs' use and availability (and controls) on relative product quality.

ences in specification, cost structures, and so forth. The 5-digit level includes specific activities such as “manufacture of batteries” (code 31400) or “manufacturing of biscuits” (code 15413).³

Two channels may link imported intermediates with product quality upgrading. The first is the actual use of an imported input that may embody higher technology content than a domestic version, or that may enable the relaxing of a technological constraint that was preventing a firm from improving its production process. The second channel is the increased availability of inputs in the market that arise from lower trading costs (lower tariffs or lower transport costs), which may in turn induce manufacturers of domestic versions of inputs to improve their quality or reduce their prices.

Effect of increased use of imported inputs

Careful data analysis reveals that, in Indonesia, increasing the usage of such inputs by 20 percentage points makes it about 1 percent more likely that better quality goods will be produced.⁴ Although the effect is statistically significant, its size is modest from an economic point of view. In addition, a 20 percentage point increase in the usage of imported intermediates is a very extreme change, given that about 70 percent of firms do not use foreign inputs, and for only 15 percent of firms, foreign inputs account for more than one fifth of total inputs (figure 5).

Effect of increased availability of imported inputs

To capture the effect of availability of imported inputs, the variable that captures the use of imported inputs is substituted for the weighted average of input tariffs that manufacturing sectors face, disaggregated at the 2-digit ISIC level. Methodologically, using tariffs is attractive because they are

less likely to be subject to endogeneity than the actual usage of foreign inputs, for example, if there is a third factor, uncontrolled for, that affects both the quality of the product and the decision to import inputs, such as time-varying entrepreneurial characteristics of the firm. In addition, as already mentioned, they also capture the disciplining effect that they may have on quality and price of domestic inputs via pro-competition effects. At the same time, it should be noted that this approach underplays the role of cumbersome nontariff measures, such as nonautomatic import permits and preshipment inspections, on which no systematic data were found.

Maintaining low import restrictions on imported intermediates has a substantially greater impact on the likelihood of producing better quality products than the actual usage of imported inputs. Input tariff reductions not only make more varied, cheaper, and better quality inputs available from foreign markets, but they also incentivize quality improvements and price reductions in domestic versions by adding competitive pressures. In fact, evidence suggests that a reduction in input tariffs by 1 percentage point, from, say, the median level of 3.5, to 2.5 percent, would increase the probability of producing high-quality products by almost 1 percent. This relatively larger effect hints at some pro-competition effects that lower input tariffs may have on the price and quality levels of domestically produced inputs, which, in turn, affect the quality of the final goods produced by Indonesian firms.

These results suggest that the availability and use of imported intermediates do contribute to firms' improved performance and quality upgrading, even if, generally, it is better performing firms that are best able to access and afford such intermediates. While firm productivity and growth may impact on the intensity with which firms use imported inputs, it is unlikely that the productivity or growth of firms affects changes in tariffs. Moreover, many of the changes in the tariff regime in Indonesia were part of the structural reforms undertaken after the East Asian crisis, as part of the negotiations with multilateral financial institutions, adding to the validity of a causal relationship between imported intermediates and product quality.

Fact 3: Use of Imported Intermediates Has Helped Indonesian Manufacturers Diversify Their Production Bundle

Recent research shows that economic development is associated with production diversification, at least during initial stages.⁵ Through diversification, countries can reduce vulnerabilities to price or demand shocks, and build a wider set of capabilities. The acquisition of production capabilities for an increasing range of goods is an important source of knowledge spillovers and can be key to growth and development (Hausmann, Hwang, and Rodrik 2005).

In Indonesia, increased availability of imported intermediates has played an important role in facilitating product diversification.⁶ Three channels are explored by Rahardja and Varela (2013):

- i. Increased use of imported intermediates could facilitate product diversification, since imported inputs may relax technological constraints to diversify, or make it profitable to do so.
- ii. Increased availability of imported intermediates may trigger pro-competition effects, inducing cost reductions and quality improvements among domestic versions of intermediates, given a certain usage of imported intermediates.
- iii. Increased *varieties* of imported intermediates could facilitate product diversification.

Increases in firms' use of imported intermediates have been systematically associated with increases in product variety. Results from the econometric analysis suggest that a 10 percentage point increase in the share of imported intermediates on total inputs is associated with an increase in varieties produced by 1.22 percent (figure 7).

Given firms' use of imported intermediates, reduced input tariffs help to further increase the number of varieties produced. This provides some evidence that the channels outlined in (i) or (ii) that operate through lower prices of imported intermediates or pro-competitive effects that lower input tariffs may have on the costs and quality of domestic versions of intermediates are active and play a role linking the availability of imported inputs and product diversification. In fact, a 1 percentage point reduction in input tariffs induces a 1.22

percent increase in a firm's product scope, above and beyond any effect induced by the actual usage of foreign inputs.

Increased variety of imported intermediates has no clear effect on firms' product diversification. Once input tariffs and usage levels of imported inputs are included in the regression analysis, the effect of imported intermediates' variety is insignificant. One explanation for this may be that, over the period considered, firms had already determined their set of input requirements, rather than accommodating new varieties.

Interestingly, results also suggest that greater effective protection facilitated product diversification. If developing new products is costly, tariff protection at the output level increases the effective protection rate of that particular output. This may act as an incentive, enabling existing firms to appropriate extra profits and finance the costs of discovering and developing new products. Given the known distortions associated with tariffs, and the fact that what is an "output" for some firms is an "input" for others, this result suggests that policy makers should consider alternative ways of tackling the market failures associated with product diversification rather than employing tariff protection.⁷

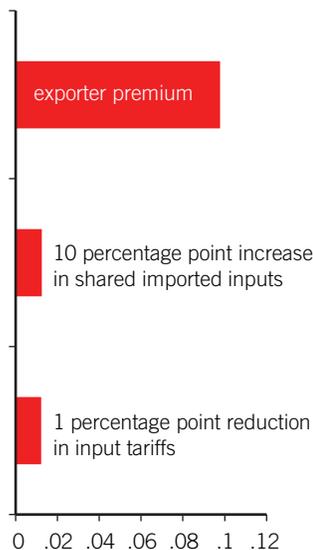
Conclusion

The availability and use of imported intermediates among manufacturers in Indonesia has resulted in greater output growth, greater growth in value added, higher productivity, and, consequently, more and better paid jobs. Imported intermediates have also been linked to quality improvements in domestic inputs and with the widening of firms' product scope, thus contributing to the diversification of the Indonesian economy.

Imported intermediates can improve production processes if they add to the pool of available inputs from which domestic firms can choose. Firms then have access to a better variety of intermediates with better value for the money. It may be the case that, in certain instances, better-performing firms are those that are able to access and afford imported intermediate inputs, rather than those imported intermediates themselves being drivers of superior performance. Nevertheless, what is clear from this analysis is that imposing restrictions on the use of imported intermediates will hurt the best-performing firms most. This may have negative sector- and economywide knock-on effects in terms of productivity, and ultimately job creation and wages.

The use of imported intermediates has not been associated with a decline in manufacturing in Indonesia. On the contrary, it may be a sign that manufacturing is shifting away from resource-based and low value-added production and into more sophisticated production processes in which manufacturers tend to specialize in certain parts of the overall production stages.

Figure 7. Effects of Selected Variables on the Firms' Product Scope



Source: World Bank staff, based on Industrial Census data, BPS.
 Note: Estimated effects from fixed effects model of imported inputs use, availability, and variety (and controls) on product diversification.

The increasing importance of global production networks and reductions in trade costs suggest that reliance on foreign intermediates will increase in emerging economies such as Indonesia. The challenge is to make the most of this opportunity and to ensure that firms do not end up locked into the lower end of processing and assembling activities that require limited knowledge content, but instead climb up the quality ladder into design and branding.

To reap the maximum economic benefits, policy makers can help ensure that imported intermediates and capital goods continue to be accessible to firms. Changes in the international structure of production have increased the costs of protectionism. Trade barriers are likely to negatively affect the competitiveness of domestic producers rather than protect them. Measures that restrict firms' access to imported intermediates, in fact, act as a tax on domestic value added. In addition, nontariff measures such as delays in customs' pre-clearance stages for imported intermediates can add inventory costs and cause severe disruptions in the functioning of the production network, with potential consequences on firms' location decisions, and therefore on value added, job creation, and poverty reduction.

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Notes

1. In fact, the correlation between the growth of manufacturing exports and the growth of imports of intermediates over this period is 91 percent.
2. Similarly, an analysis of 2010–12 shows that the deceleration in exports happens at the same time as a deceleration of imports of intermediates. If one focuses on the relationship between intermediate imports and manufacturing value added, instead of exports, the links are also strong, but operate with substantial lags.
3. The probability of a firm, I , at time t , producing goods with quality above the median of a sector, s , is explained by the size of the firm, proxied by the log of the number of employees, the log of the firm's total factor productivity, its exporting sta-

tus, the ownership structure (foreign/domestic), and the share of imported inputs on total inputs. The model includes sector-fixed effects (at the 5-digit ISIC level) to absorb any time-invariant sector determinant of unit values, and year dummies to control for macroshocks that affect unit values across the board.

4. Other factors, such as the size of the firm and its productivity levels, positively affect the probability of producing high-quality products. Results suggest that exporters seem to produce, on average, products with unit values about 2.24 percent below those produced by nonexporting firms with similar characteristics.

5. See, for example, Imbs and Wacziarg (2003) or Hesse (2009).

6. The analysis follows Goldberg et al. (2010) quite closely. The authors analyzed the role that imported intermediate inputs had on domestic product growth in India over 1987–97, and found that lower input tariffs accounted for, on average, 31 percent of the new products introduced by Indian firms.

7. Data also reveal that larger firms and exporters tend to produce more varieties than smaller and nonexporting firms, as expected. Exporters, for example, produce 10 percent more varieties than nonexporters, on average, while a firm that is 10 percent larger than average tends to produce 1.7 percent more varieties than average.

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