

Use of Foreign Intermediate Inputs in Developing Countries: Determinants and Effects

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Theory suggests a number of channels through which the use of foreign inputs could contribute to overall economic development and firm performance. However, empirical work on the use of foreign inputs, its determinants and effects is lacking. Using firm-level data from Enterprise Surveys (ES) on developing countries, this note highlights the extent to which firms rely on foreign inputs, how the reliance varies with country and firm characteristics and the impact of foreign inputs on firm productivity. Results show that the use of foreign inputs is common among private firms and especially so among the relatively large firms and firms in countries that are smaller in size and have lower import costs. Foreign inputs also have a beneficial effect on firm productivity.

Introduction

Recent empirical evidence suggests that the use of foreign inputs may be important for the growth and development of both firms and the wider economy (Amiti and Konings 2007; Bernard et al. 2007; Seker 2012; Vogel and Wagner 2010). This could be because imported inputs are of higher quality due to embedded foreign technology, and certain other foreign or domestic inputs may be imperfect substitutes (Halpern et al. 2009; Gibson and Graciano 2011).¹ However, this body of work is still in its infancy and most of the attention has been focused on exports of goods and services rather than imports of intermediate inputs.

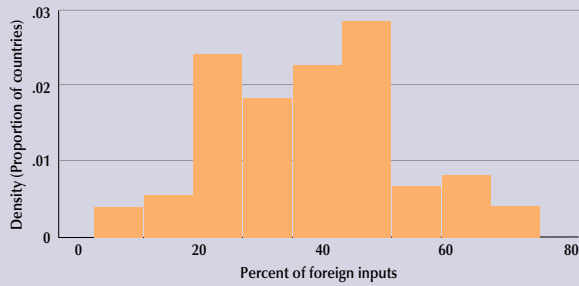
This note highlights important findings on the use of imported intermediate inputs by private firms in developing countries. All the findings are based on firm-level data collected by the World Bank's Enterprise Surveys. These surveys are conducted regularly using a standard methodology and questionnaire across countries and aim to be representative of the non-agricultural private sector of the economies. In one question firms were asked what percentage of their total material inputs and supplies during the last year were of foreign origin (henceforth, imports or foreign inputs). This note uses the firms' response to this question to document the size of imports across countries,

how imports depend on firm and country characteristics, and how the intensity of imports depends on trade policy. The likely impact of these imports on productivity is also discussed. Due to data availability, throughout the note the sample is restricted to manufacturing firms. The number of countries covered varies and is specified below.

Some descriptive statistics

All results in this section are based on 87 countries for which data are available on imports. Averaged across countries, about 61 percent of the firms use imported inputs. In contrast, only 27 percent of the firms in the sample export (directly or indirectly) some or all of their final output. The proportion of firms using foreign inputs ranges between a low of 5 percent (Indonesia) and a high of 100 percent (Samoa). Across countries, the average level of imports (as a percentage of firm's total inputs) equals 37 percent with a low of 2 percent in Indonesia and 74 percent in Albania. In contrast, exports as a percentage of firm's total sales equal only 12 percent. Restricting the sample to only those firms that use foreign inputs, the average level of imports rises to 60 percent; while the corresponding figure for exports is only 42 percent. The distribution of imports across countries is illustrated in figure 1.

Figure 1 There is substantial variation in the use of foreign inputs across countries



Source: Enterprise Surveys
 Note: The X-axis measures the percentage of firm's material inputs and supplies that are of foreign origin (average values at the country level).

Imports and income level

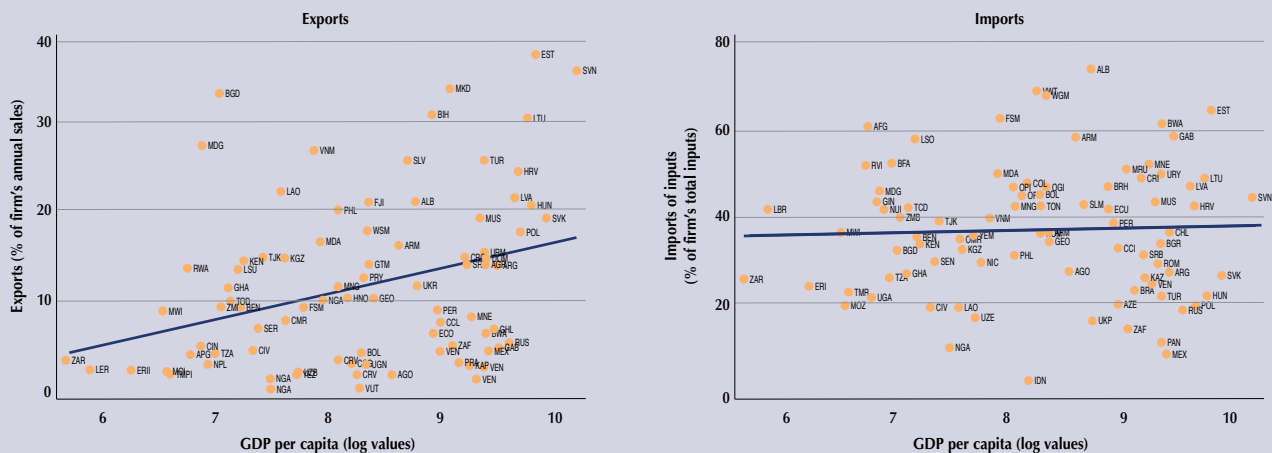
A number of studies show that international trade (exports plus imports as a proportion of the country's total income) and income level (GDP per capita) are positively correlated, i.e., richer countries tend to trade more than poor countries. Examining imports separately from total trade, however, could give a different picture: for example, one possibility is that poor countries face greater shortages of critical material inputs which forces firms to import. Hence, the net effect of economic development on imports may turn out to be insignificant or it could go in either direction.

The ES data confirm that while exports and income level show a sharp positive correlation across countries, imports and income are poorly correlated (figure 2). One could stretch this logic and suggest that other factors such as civil conflicts—that have been shown to have a large effect on exports—may impact imports differently. One possibility is that civil conflicts may increase the reliance on foreign markets leading to more exports and imports. On the other hand, civil conflicts may cripple a country's competitiveness and therefore lead to a loss of export markets. In contrast, a loss of competitiveness in a country's economic subsector could lead to increased demand for foreign imports of that subsector. Preliminary results from work in progress seem to suggest that these factors may be at play causing exports to decline much more than imports following civil conflict. In short, a separate analysis for imports and exports is needed.

Imports and country size

Several studies have examined the consequences of country size for various factors, but especially for exports and total trade (see Rose 2006 for an overview). However, the relationship between imported intermediate inputs specifically and country size has largely been neglected. The assumption is that a small market size prevents the exploitation of economies of scale, forcing the relatively small countries to trade internationally (Alesina and Wacziarg 1998). Understanding the country size and trade relationship is important, especially for economic growth in small countries.

Figure 2 Exports of final products rise with income level but imports of inputs are uncorrelated with income level



Source: Enterprise Surveys; World Development Indicators, World Bank.
 Note: GDP per capita values on the horizontal axis are PPP adjusted, at constant 2005 International Dollars and for the year prior to the year covered by Enterprise Survey.

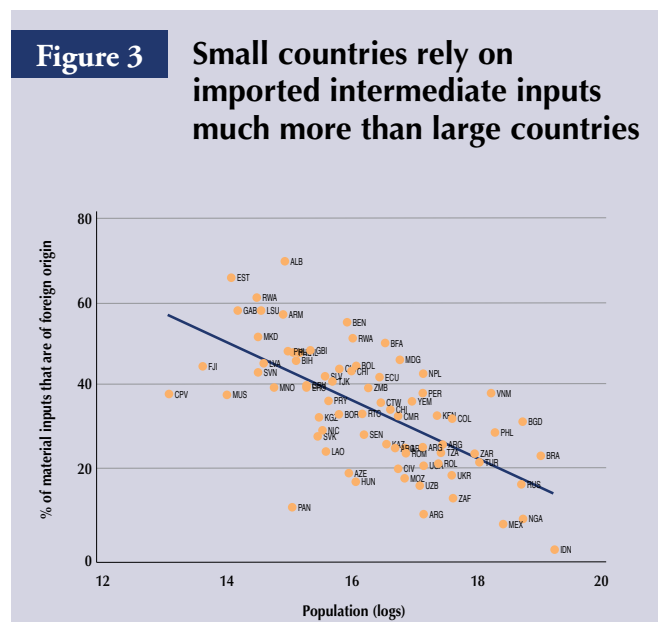
Using the ES data for 19,040 manufacturing firms in 76 developing countries and measuring country size by total population, Amin and Islam (2014) find that small countries rely on imported inputs much more than large countries (figure 3). This holds at the extensive margin—percentage of firms using imported inputs—as well as along the intensive margin—percentage of material inputs of foreign origin. Intriguingly, the magnitude of the relationship between country size and the use of imported inputs is comparable to the results for exports. To get a sense of the magnitudes involved, according to the most conservative estimates reported by the study, a one standard deviation increase in country-size is associated with an 8.1 percentage point decrease in the probability of a firm using imported inputs and a move from the smallest to the largest country in the sample is associated with a 36 percentage point decrease in the probability of a firm using imported inputs. These are economically large changes given that on average 61 percent of firms in the sample use imported inputs. Depending on the controls used, a one standard deviation increase in country size is associated with a decrease in foreign inputs (as a percentage of all inputs used by a firm) between 9.4 to 10.8 percentage points. The corresponding change when we move from the smallest to the largest country in the sample is a decrease of 41.6 to 47.8 percentage points. These are economically large changes given that on average 37.1 percent of the firm’s inputs are imported. Comparing the relationship of exports of final goods and imports of inputs to country size and controlling for a large number

of variables, a one standard deviation increase in country size is associated with a decrease in the percentage of firm’s sales that are exported by 3.5 percentage points—or about 0.27 times the average value of exports to sales ratio. The corresponding result for foreign inputs (as percentage of all inputs) is a decrease of 10.8 percentage points—or about 0.30 times the average value of foreign inputs to all inputs ratio. Thus, exports and imports respond to country size to a roughly similar degree.

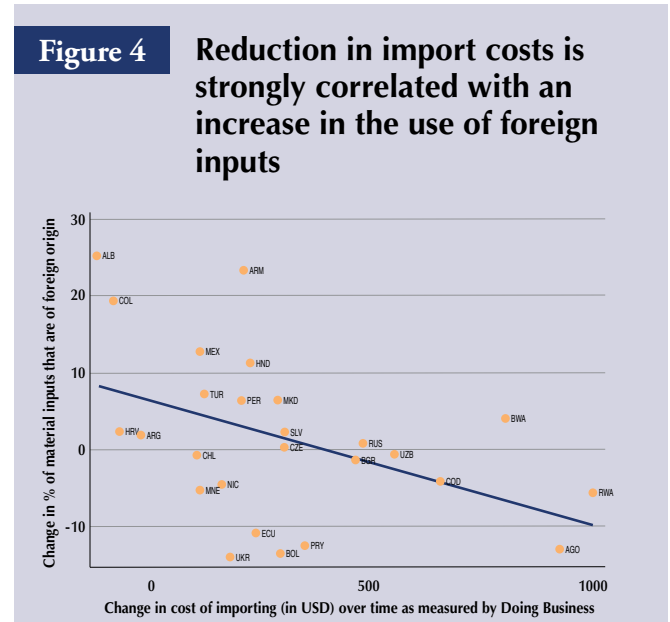
Imports and cost of importing

Using a repeated cross section of manufacturing firms across 26 developing countries with available data, Amin and Islam (2013) analyze how the percentage of a firm’s material inputs that are of foreign origin varies with the cost of importing as measured by the World Bank’s *Doing Business* project. The study finds that there exists a statistically significant and economically large negative relationship between the cost of imports and foreign inputs (figure 4). For example, Rwanda saw the largest increase in import cost over time in the sample—the cost of importing a standardized container increased between 2006 and 2011 from \$4000 to \$4990. And, according to the estimates provided in the study, this increase in import costs is associated with a decrease in the use of foreign inputs by 16 percentage points—a large effect given that Rwanda’s import level in 2006 was 52 percent.

The study also finds that the relationship between imports and the cost of importing is non-linear, i.e., the reduction



Source: Amin and Islam (2014).



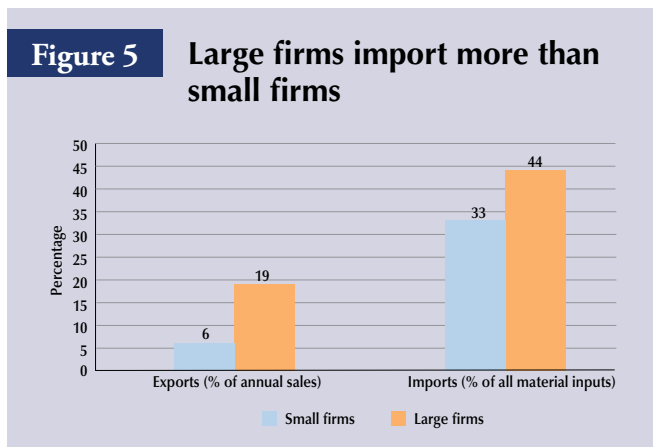
Source: Amin and Islam (2013).

in import costs leads to a larger percentage point increase in the use of foreign inputs at the margin when the import cost is lower than higher. Hence, even countries with relatively low import costs could enjoy the potential gains from the use of foreign inputs from further reductions in the cost to import. The magnitude of the effect is on the order of a 16 to 21 percentage point decline from an increase of \$1,000 (per container) cost to import.

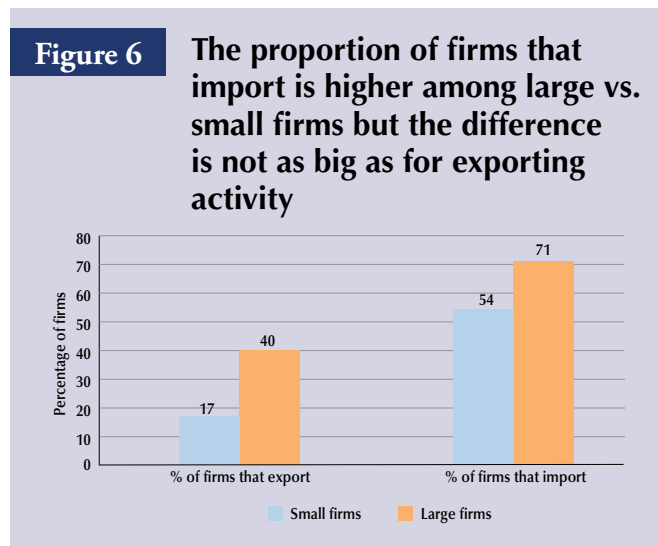
Large vs. small firms

A large body of work in the trade literature examines the relationship between firm size, innovation, and trade flows (Zoltan and Audretsch 1987, Wagner 2002). In general, these studies focus on exports and find that exporting activity is mainly restricted to large firms. One explanation is that large firms can more easily overcome fixed export costs (Chaney 2008). Given this finding, it is important to verify that the relationship between firm size and exports holds for imports as well.

Using the sample of manufacturing firms across 83 developing countries for which data are available, we find that not only do large firms report a larger exports to sales ratio than small firms (19% for large firms compared with 6% for small firms), but large firms also report imports as 44 percent of all material inputs, compared with 33 percent for small firms. Note that large firms are defined as those firms with 100+ full-time employees whereas small firms are those with 5-19 full-time employees. However, the gap in imports between small and large firms is smaller than the gap in exports (figure 5). These results between large and small firms also hold in the extensive margin in that a greater percentage of large firms in the sample export and import than small firms, and the gap between large and small firms is bigger for exports than imports (figure 6).



Source: Enterprise Surveys (various years).



Source: Enterprise Surveys (various years).

Imports and firm productivity

Using firm-level data from the Enterprise Surveys in 2002, 2005, 2006, and 2008, Seker (2012) investigates whether firms with foreign exposure grow faster than domestic firms. The analysis divides the sample of 16,722 manufacturing firms into four distinct groups: two-way traders, exporters-only, importers-only, and non-traders. The empirical analysis shows that two-way traders grow the fastest and innovate more than any other group of firms. The exporters-only group comes second. The findings suggest that heterogeneity exists among exporters in terms of performance. Specifically, firms who also import intermediate products are the most productive, implying complementarity between the two aspects of trade. In terms of employment growth, two-way traders grow almost 3.5 percent faster than non-traders; and exporters-only firms grow 2.2 percent faster. This growth premium over non-traders is slightly lower for the importers-only firms at 1.1 percent.

Conclusion

Theory suggests a number of channels through which imported intermediate inputs could contribute to overall economic development and firm performance. However, the empirical literature is only beginning to analyze these imports in terms of their determinants and effects. Based on firm-level data, this note highlights some findings on the use of foreign inputs across countries, its determinants such as country size, trade policy and firm-size and its effect on firm performance. These findings should motivate more work in these areas.

Notes

1. For a literature review, see for example Wagner (2012).

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