Offshoring, competition and productivity (growth) in Dutch manufacturing and service industries

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Extended abstract

Output growth, as a source of productivity growth, is usually determined, or at least can be attributed, to various factors of production that are used as inputs in the production process. In a growth accounting framework, the most common drivers to output growth are capital, labour, intermediate inputs, technology and total factor productivity (TFP) growth. TFP growth, referred to as the Solow residual, measures the change of output that can be explained by all other factors that are not explicitly subsumed in the production process. In a study based on annual EUKLEMS data of three small European countries: Austria, Belgium and the Netherlands, Kegels et al. (2008) show that the average annual output growth rate (measured in value-added GDP) has increased over the period 1970-2005. However, the growth performance was noticeably lower from 1995-2005 than from 1970-1995. Looking at sources of productivity growth, this slowdown in productivity growth has been primarily caused by more labour (hours worked) intensive growth merely caused by lower levels of unemployment and higher participation rates.

An important issue in an increasingly global economic environment is also to identify whether international linkages of the production process can be an important contributor of productivity. Offshoring is typically thought to improve productivity by increasing the efficiency with which inputs are used (Olsen, 2006). For instance, manufacturers might offshore core or non-core functions to foreign contractors with greater expertise in these areas (Erickcek et al., 2003). A recent survey on international sourcing for a selected number of countries (Denmark, Sweden, Finland, Norway and the Netherlands) suggest that cost savings, as an efficiency seeking factor, is the key driver for sourcing production or support functions abroad; more than half the enterprises in these countries assessed this motivation factor as very important compared to around 40% of the enterprises in Finland and Denmark (Statistics Denmark, 2008). The data also reveal that reductions on labour costs appear to be the most important ones. In this respect, it is expected that when manufacturers engage in off-shoring activities, it merely substitutes imported materials or service inputs for its own labour and other inputs. Available evidence for the U.S., suggest that indeed faster growth rates of imported intermediates offset the negative contributions of capital and labor volume growths (Houseman, 2007). While reinforcing these concerns about the labour displacement implications, a better matching of the labor supply may also increase the efficiency of domestic inputs used. Yet, some other implications of offshoring can be analyzed at the level of aggregation. Since we are merely concerned about the impact of off-shoring on TFPG, it is also interesting to look into movements of imports of intermediate goods and TFP and their contribution to output growth whereby for instance, TFPG speed ups exhibit parallel increases with the growth of intermediate goods and services.

How do imports of intermediate goods and services influence productivity growth? For a small open economy such as the Netherlands, do price-cost margins exert an important role in this influence?

Which other patterns can be identified? These are the main questions that are addressed in the paper, however, there are some potential issues, related to measurement and methodological issues, that need further investigation. Our objectives are to explore these issues.

In this paper, we address a variety of issues .

The first problem is a fundamental methodological issue concerning the measurement of productivity growth. Studies that look at the empirical evidence on "offshoring" determinants of productivity growth usually assume a neoclassical framework whereby a number of important aspects that might contribute to productivity growth might be overlooked. To be in conformity with ongoing research, we find that the assumption of perfect competition is violated for many Dutch industries. We therefore propose a new index approach that measures productivity growth allowing for (time-varying) and sector-specific markups. Hence the productivity approach that we adopt in this paper eliminates any possible bias in the relationship between intermediate imports, off-shoring and productivity.

Second, in a growth accounting framework, we distinguish the intermediate inputs' source of growth component between purchased intermediates on the domestic market and those imported from foreign countries. Through such an exercise, one can derive to what extent the growth rate of intermediate imports improves productivity and how it increases the efficiency with which the other inputs are used. At the level of industry, the sector source of intermediate inputs that are imported from abroad provide an accurate indication on the extent that production processes are internationally fragmented (see the work of Grossman, Rossi-Hansberg, 2006, OECD, 2008 and Houseman, 2007 for recent applications). In a second but more popular framework, most of the studies simply establish a relationship between offshoring and TFP growth. The concept "off-shoring" then becomes an indicator (expressed in a ratio) that primarily includes the imported intermediate inputs in its measurement.

The third issue is conceptually and relates to a broad definition of offshoring. According to the OECD definition (OECD, 2007), "offshoring" relates to activities where the production of goods or services are partially or totally transferred abroad to affiliated (within the same enterprise group) or non-affiliated enterprises. While there is a range of indicators that can be used to measure "off-shoring", each of them with a specific economic meaning, the empirical literature identifies two types of indicators: (i) those constructed from the intermediate imports and (ii) those based on vertical specialization. Vertical specialization refers to the splitting of production processes into separate parts, which are subsequently relocated in different locations. We consider four indicators. The first set of indicators are calculated on the basis of intermediate imports over total intermediate costs. The second set of indicators can be measured as the share of intermediate imports used in the production of exports. The difference between the two sets of indicators is that the former merely looks at the imports side while the latter also takes into account the export side. The data using symmetric input-output tables for the period 1988-2005 is released by Statistics Netherlands. The tables distinguishes the imported and domestic content of inter-industry transactions of goods and services, which allows us to quantify the extent of intermediate and service off-shoring on the part of manufacturing and service industries.

Fourth, we ask whether offshoring increases productivity indirectly through the mechanism of markups. This testable hypothesis is also found in Kim (2000) where it is empirically suggested that

TFP growth is primarily caused by lower markups. Increased competition in the import market has some impact, but overall Kim argues that it was not the major force. We adopt a similar empirical approach where the interaction between markups and offshoring indicators is allowed in the model. Although, one shortcoming in this paper, which we address, is that the assumption of a time-constant and industry-homogenous markups is made.

In addition, we establish an alternative structural model which disentangles the impact of off-shoring on markups and the impact of markups on productivity in a two-stage structural model. While the competition-productivity relationship is well established in the empirical literature (e.g., Nickell. 1996), the markups-offshoring relationship fits the relative small strand of empirical literature that investigates the "imports-to-market-discipline" (IMD) hypothesis. Supported by the empirical literature (e.g., Levinsohn, 1993), the IMD hypothesis confirms that increased import competition (mainly due to increased trade liberalization) results into a more competitive pressure. One source of ambiguity in this hypothesis is the broad concept of imports whereby no distinction is made between intermediate and final goods. This ambiguity is further explored by Egger and Egger (2004), Amiti and Konings (2005) and Abraham et al. (2006) and also addressed in this paper. These three studies provide robust evidence that intermediate imports have a positive influence on markups because "imported intermediates lower total costs and thus increase the markup, all else equal" (Amiti and Konings, 2005).