

THE LIMITS TO OFFSHORING¹

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Offshoring - why does it matter? Offshoring is the movement of jobs to other countries. While this may raise overall welfare, it means lower employment opportunities and possible lower wages domestically. Offshoring is the major cause for the decline in self-reported work life quality in many countries. For example, in the United States there are six workers that view offshoring negatively for every one worker that sees it as a positive influence (Pew Center 2006). Public policy backlash is likely if a phenomenon is seen as that negative. No less important for the policy debate is how prevalent offshoring is. The implications for public policy can be expected to be quite different depending on whether offshoring will affect 3 million jobs or 30 million in countries such as the United States (Blinder 2007).

It takes lower wages ... and what exactly? Alas, there is no agreement on what makes a job offshoreable. Are jobs that are routine and therefore can be done by computers most susceptible to offshoring (Levy and Murnane 2004)? Perhaps, but computers tend to replace low skilled workers anyway. Also high skilled activities such as tax return preparation might be offshoreable if they can be easily delivered over the internet (Blinder 2007). Moreover, while the classic examples of offshoring to low-wage countries (call centers in India) are well known, what about the sizable offshoring to richer countries (Dell Computers in Ireland)? All told, estimates of the importance of offshoring in terms of the number of affected jobs vary by an order of magnitude, for the U.S., e.g., from 2% to perhaps 40% of the workforce.² And the range of forecasts is even larger.

While it is clear that lower factor costs are the main draw for firms to offshore, the limits to offshoring are not as well understood. Our research stresses the two principal factors.

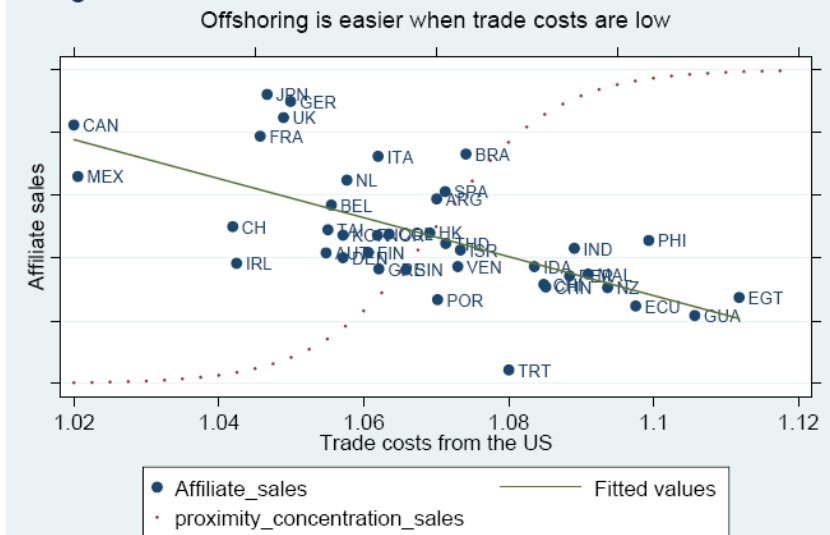
Limit # 1: Geographic distance

A good way to examine offshoring is by considering foreign direct investment, where a domestic company owns a plant in another country.³ Figure 1 presents the size of U.S. FDI into other countries.

² See Blinder (2007) who discusses several influential estimates.

³ Another form of offshoring occurs when a domestic company buys from or sells to a foreign independent company (sometimes called outsourcing). Our main argument presented below applies to this case as well.

Figure 1: US multinational affiliate sales versus trade costs



The figure shows a clear *negative* relationship between the sales of US multinational affiliates and the trade costs (physical and policy barriers) from the US. In addition to the usual gravity finding—larger markets attract more sales—Figure 1 indicates that offshoring is helped by geographic proximity.⁴ Moreover, this pattern holds also at the level of individual companies. That is, Ameri-Cana, a hypothetical US multinational company, sells more in Mexico than it does in Ireland, and Ameri-Cana’s sales in Ireland are larger than those in New Zealand (conditional on host country market size). Why is there more offshoring to nearby countries?

Transferring information is costly

Offshoring frequently requires incurring technology transfer costs because there is a phase of communication involving problem-solving between multinational parent and affiliate to get the technology to ‘work’. Arrow (1969) is an early formulation of this idea. The following illustrates why transfer costs explain that affiliate sales are declining as trade costs are increasing.

Firms’ transfer of technology: disembodied or embodied?

A multinational has two options to serve a foreign country.

1. It can complete a task at home and export it as an intermediate good. In this case the firm’s technology is embodied in the intermediate good, which incurs trade costs.
2. The firm can transfer the required technology (disembodied) to its affiliate, at cost, and the task is completed offshore.

As distance to a foreign market increases, raising trade costs, the multinational firm will want to transfer more tasks to its affiliate. But with either mode, costs are higher than before, implying that the affiliate is smaller and offshoring is lower: a pattern as in Figure 1 emerges. Information on individual U.S. multinational firms strongly supports this idea.

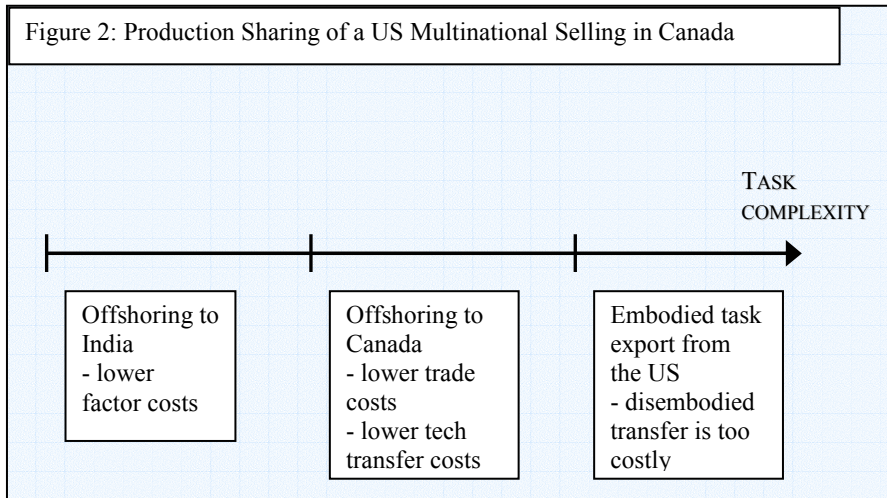
⁴ Affiliate sales in Figure 1 are divided by domestic sales to ensure data confidentiality. This also adjusts for productivity differences across firms.

Offshoring requires complementary inputs from home

What is the key difference between our framework, giving a *negative* relationship between trade costs and affiliate sales, and the traditional exports-versus-FDI analysis resulting in a *positive* correlation? The latter is included in Figure 1 as well in the form of the (smoothed) proximity-concentration prediction of Brainard (1997). In contrast, we obtain a negative correlation because technology cannot be transferred to affiliates at zero cost. More generally, geography imposes a limit to offshoring because tasks that a firm can better complete at home are often complementary to those that it can offshore.

Limit # 2: Technological complexity

Offshoring and trade often result from firms that spread their production networks across countries. There are many individual intermediate goods that each may be either produced domestically or in various countries abroad, after which they are combined at the point of final consumption. Figure 2 shows a typical sourcing strategy in our theory. Here, we have a US multinational firm (headquarters in the US) that is selling a final product in Canada, and the intermediates are sourced from India, Canada, and the United States.



Offshoring costs have both country- and task-based characteristics

There are two reasons why the technological complexity of intermediates imposes a limit to the extent of offshoring

1. The offshoring host economy has a limited absorptive capacity to manage complex technology.
2. More technologically complex tasks are harder to offshore because they require more problem-solving communication between the multinational parent and affiliate's workers.

A country's absorptive capacity for offshored production might be low due to a lack of infrastructure, as well as skilled labor. At the same time, labor endowments may in fact matter less than the ease with which the information to complete a task as such can be

transferred (the correlation of skill requirements and offshorability is weak). In Figure 2, therefore, we focus directly on tasks, which are ordered left to right from easiest- to hardest-to-transfer.

Offshoring patterns

Relatively low factor costs in India are the main reason why the US multinational will complete the least-complex tasks there (Figure 2). For task complexity in the middle range, Canada will be the optimal location of production. Technology transfer costs to Canada are likely lower than to India (more web servers per capita, less travel costs for face-to-face interaction). Completing tasks in Canada also saves on intermediate trade costs since Canada is the location of final consumption. Finally, tasks for which the required information is most difficult to transfer will be completed at the headquarters in the US and then exported. This means that the low-wage offshoring advantage of poorer countries can be reduced or even overturned by lower costs of technology transfer.

Some evidence

First of all, most of the R&D of multinational firms is done at the headquarter (parent) company, which supports the idea that the most complex tasks are completed in the headquarters (see Figure 2). Moreover, data on individual US multinational firms confirms that offshoring in highly complex industries (measured by headquarter R&D intensity) is much more difficult than for the typical industry (about 33% lower). Another implication of this framework, related to Figure 2, is that the tasks embodied in headquarter exports are more and more technologically complex for destinations further and further away from the headquarter country. Detailed information on the skill- and occupation-content of US exports strongly supports this result.

The bottomline

Current and future trends in offshoring will be best understood by considering both what makes offshoring attractive (lower factor costs) and what are the major limits to it (technology transfer costs as well as trade costs). Which jobs in which industries will be most heavily affected depends not only on whether and how fast factor prices are converging, but perhaps more importantly on the race between technology transfer versus trade costs.

This is based on the discussion paper “Global Production and Trade in the Knowledge Economy”, CEPR DP 7175, by the authors.

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