



Offshoring and jobs: The myriad channels of influence

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ABSTRACT

Offshoring reallocates jobs inside firms, between firms, and across sectors, affecting the economy-wide unemployment rate. We study these channels in a model with labor market frictions and two sectors—a differentiated-good sector comprising heterogeneous firms that can offshore, and a homogeneous-good sector. A decline in offshoring costs affects intrafirm and intrasectoral reallocation of jobs in the differentiated-good sector through a selection effect, a productivity effect, and a job-relocation effect. The key parameters determining the impact of offshoring on jobs at various margins, as well as on the economy-wide unemployment rate, are the elasticity of substitution between inputs, the elasticity of substitution between varieties of differentiated goods, and the elasticity of demand for differentiated goods as a whole. Changes in search frictions affect unemployment both directly and through their interaction with offshoring.

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1. Introduction

Offshoring refers to the relocation abroad of a part of a firm's production process either within the firm's boundary or through arm's length trade. Since the relocation of the production process goes hand in hand with the relocation of jobs, it gives rise to the fear—fed by media stories—that there are job losses in the country whose firms engage in offshoring.¹ Not only has this caused anxiety among the public at large, but politicians in the U.S. (on both sides of the aisle) and Europe have done fear-mongering regarding offshoring.² This has also given rise to calls to throw sand in the wheels of offshoring to stem job losses. However, this story ignores the various channels through which offshoring affects jobs. Before implicating offshoring as the main source of job losses, we need to understand its overall employment effects and not just the immediate job-relocation effect. This paper constructs a two-sector theoretical model with labor market frictions to identify the channels through which offshoring affects jobs (at the firm and industry levels) and the economy-wide unemployment rate.

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¹ For example, *The Economist* (January 19th, 2013) says: "But offshoring from West to East has also contributed to job losses in rich countries, especially for the less skilled, yet increasingly for the middle classes too... In a survey by NBC News and the Wall Street Journal in 2010, 86% of Americans polled said that offshoring of jobs by local firms to low-wage locations was a leading cause of their country's economic problems."

² The same article in *The Economist* above notes: "Barack Obama's presidential campaign last year repeatedly claimed that his rival, Mitt Romney, had sent thousands of jobs overseas when he was working in private equity. Mr Romney, in turn, attacked Chrysler, a car firm, for planning to make Jeeps in China. France's new Socialist government has appointed a minister, Arnaud Montebourg, to resist 'delocalisation'. Germany's chancellor, Angela Merkel, worries publicly about whether the country will still make cars in 20 years' time."

Our model includes a homogeneous-good sector (which uses only domestic labor) and a differentiated-good sector (which can use both domestic and foreign labor). Firms in the differentiated-good sector are heterogeneous in productivity and use a continuum of intermediate inputs to assemble final goods. The production of each intermediate input can be either offshored or undertaken using domestic labor, but offshoring is subject to fixed and variable costs. In addition, there are search frictions in both sectors affecting the hiring of domestic workers. Workers are mobile across sectors but because of differences in search parameters, unemployment rates and wages differ across sectors. The economy-wide unemployment rate depends on both the sectoral unemployment rates as well as on the share of workers in each sector.

We show that a reduction in the variable cost of offshoring affects intrafirm and intrasectoral employment in the differentiated-good sector through three channels. Following a reduction in the offshoring cost, offshoring firms increase the fraction of inputs they offshore, which reduces their domestic employment. This is the *job-relocation effect* of offshoring. As well, offshoring firms become more productive as a result of lower input costs, which allows them to charge lower prices. If the elasticity of substitution between inputs is smaller than the elasticity of substitution between differentiated-good varieties, the resultant increase in demand for offshoring firms' products translates into higher domestic employment. We call this the *productivity effect* of offshoring on employment. Lastly, as market shares are reallocated from non-offshoring to offshoring firms, the residual demands and gross profits of non-offshoring firms decline; this causes the death of the least productive non-offshoring firms (who are no longer able to cover the fixed costs of production) and a contraction in employment of the rest of them. We refer to this channel as the *selection effect* of offshoring.

A reduction in offshoring costs affects the number of firms as well. In addition to the low-productivity non-offshoring firms that die, the number of entrants may increase or decrease depending on the elasticity of demand for differentiated goods. As the aggregate price in the differentiated-good sector declines following the reduction in offshoring costs, consumers reallocate expenditure from the homogeneous-good sector to the differentiated-good sector. The higher the elasticity of demand for differentiated goods, the higher the increase in expenditure on differentiated goods, and the more likely it is that the number of entrants and producing firms in the differentiated-good sector increases.

The net effect of a reduction in offshoring costs on employment in the differentiated-good sector can be decomposed into its extensive and intensive margin components. The *extensive margin of employment* refers to changes in employment due to births and deaths of firms, while the *intensive margin of employment* refers to changes in employment due to expansions and contractions of existing firms. We show that the net effect at the extensive margin crucially depends on the elasticity of demand for differentiated goods, while the net effect at the intensive margin crucially depends on the elasticity of substitution between inputs on the one hand, and the elasticity of substitution between differentiated-good varieties on the other.

Generally speaking, a low value of the elasticity of substitution between inputs (e.g., complementarity between offshored inputs and domestic labor) or a high value of elasticity of substitution between differentiated-good varieties is more conducive to net job creation for firms in the differentiated-good sector. Similarly, a high value of the elasticity of demand for differentiated goods, which implies a greater increase in the demand for differentiated goods following a reduction in offshoring costs, is more likely to lead to net job creation in the differentiated-good sector. Even though our model has a single differentiated-good sector with offshoring firms, its insights can be easily extended to a setting with multiple offshoring sectors. In particular, our results suggest that the impact of offshoring on employment will differ across sectors and will depend crucially on the (sectoral-level) elasticity parameters discussed above.

How these employment changes affect the economy-wide unemployment rate depends on two factors: the degree of search frictions in each sector and the change in the composition of the workforce. If the degree of search frictions is higher in the differentiated-good sector, then the unemployment rate is higher there as well. Now, if in response to a reduction in the cost of offshoring there is a decline in employment in the differentiated-good sector—so that workers move to the (lower unemployment) homogeneous-good sector—then the economy-wide unemployment rate decreases. In the opposite case where workers move to the differentiated-good sector, the economy-wide unemployment rate increases.

Irrespective of its impact on unemployment, offshoring always increases the welfare of the representative consumer. Intuitively, offshoring always leads to productivity improvements for the economy, which shows up in the form of a decline in the differentiated-good price index and, consequently, in an increase in welfare. Given our simplifying assumption of a representative household which diversifies away labor income risk, everyone gains from offshoring. However, this result needs to be treated with caution because in reality labor income risks are unlikely to be diversified away completely, and therefore, unemployed individuals are necessarily worse off than employed individuals; if offshoring increases unemployment, it necessarily makes some people—the newly unemployed—worse off.

Our model also allows us to study the implications of changes in search frictions and contrast them with the implications of a change in the offshoring cost. For example, a decrease in search frictions in the differentiated-good sector makes it cheaper to hire domestic labor in that sector and hence offshoring declines. Therefore, the impact on firm-level employment is similar to that of an increase in the cost of offshoring, with one difference: there is an additional positive effect on the domestic employment of all firms because the marginal cost of production for all differentiated-good firms declines. Regarding the economy-wide unemployment rate, there are two forces at work. While the composition of the labor force matters (as was the case when the offshoring cost changed), now the unemployment rate in the differentiated-good sector declines as well, which contributes to a reduction in the economy-wide unemployment rate. Interestingly, a reduction in search frictions in the homogeneous-good sector increases the outside option of workers in the differentiated-good sector, making it more expensive for differentiated-good firms to hire domestic labor. This increases offshoring and thus, the implications for employment are the opposite of those for a decrease in search frictions in the differentiated-good sector.

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