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Revisiting the employment impact of offshoring

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ABSTRACT

The productivity gains due to offshoring may, in part, accrue to workers. This paper estimates the magnitude of these gains and compares it to the magnitude of employment loss due to worker displacement. A model based on the production task framework from Grossman and Rossi-Hansberg (2008) is used to demonstrate that the effect of offshoring depends on the intensity of use of these tasks and, ultimately, impacts domestic employment through three channels: a direct displacement effect, which negatively impacts employment; an output effect generated by the productivity gains from offshoring, which reorganizes and increases aggregate production in the economy and impacts domestic employment positively; and a substitution effect among factors and tasks, which has an ambiguous effect. Using the model's structure as a roadmap and applying it to detailed U.S. manufacturing sector data over 2001–2007, results from GMM 3SLS regressions provide overall support for the structure and predictions of the tasks model of offshoring. In particular, the economic magnitude of the productivity gains is found to have been important.

1. Introduction

Recent trade theory has demonstrated that firms' offshoring activities may generate gains for low-skill domestic workers by increasing the productivity of firms that use these workers intensively. However, the theory also highlights the more intuitive, and commonly emphasized fact, that some of these workers are likely to be displaced in the process and will have to "re-tool" in order to adjust to the changing demand for skills by firms. The seminal paper in this recent literature is Grossman and Rossi-Hansberg (GRH, 2008), who focus on the wage effects of offshoring and show that the equilibrium wage of low-skill domestic workers may go up or down due to offshoring, depending on the relative sizes of the productivity gains, the extent of displacement of workers and, also, depending on the size of the country in world markets.

The ambiguity present in equilibrium in the GRH (2008) model suggests that an empirical approach that is carefully motivated by the theory may help shed light on the economic magnitudes of these channels. This is the primary subject of this paper, and continues a line of recent research that attempts to disentangle the labor market effects of offshoring. Importantly, some previous work has estimated the employment impact of offshoring while explicitly conditioning on the channels through which the productivity gains of offshoring may operate, thereby producing estimates that are downward biased, as I discuss further below. Thus, a key contribution of the paper is to relax these empirical constraints.

As a first step, I explore the implications of the GRH (2008) framework in a two-factor, two-sector model. Here I focus on the impact of offshoring on both the employment and the wage of low-skill domestic workers, decomposing the demand for labor into three channels: a direct displacement effect, which negatively impacts employment; an output effect generated

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by the productivity gains from offshoring, which reorganizes and increases aggregate production in the economy and impacts domestic employment positively; and a substitution effect among factors and tasks, which has an ambiguous effect. In bringing the theory to data I focus solely on the employment impact of offshoring, conditional on factor prices.[1] I argue that the channels through which offshoring impacts employment are simultaneously determined and endogenous to offshoring activity and, as a result, I estimate their magnitudes via a GMM 3SLS specification using data on U.S. offshoring activities and workers over the period 2001–2007. The results suggest that, conditional on changes in factor prices, both the displacement of U.S. workers and the employment gains have non-trivial economic magnitudes, such that *on net* the effect on workers has been negligible.

The theory also predicts that certain types of production activities, or tasks, are more easily moved offshore. As a result, firms that use these tasks relatively intensively should offshore more workers and reap larger productivity gains. In order to characterize production activities according to their "offshorability" I draw from a recent literature—mainly Blinder (2009) and Levy and Murnane (2006a,b)—that discusses the features that determine the relative ease with which production tasks can be performed at a distance. I find that these determinants are important in predicting which jobs will be moved offshore and, as a result, which firms will reap the productivity gains.

This paper sits within a recent literature that approaches the question of trade in intermediates from the standpoint of production tasks. The theoretical literature on trade in tasks, which owes much to previous work on trade in intermediates,[2] has recently been energized by GRH (2008), and has spawned several general equilibrium model extensions. Empirical tests which focus on production tasks in the context of offshoring include Jensen and Kletzer (forthcoming), Ottaviano et al. (2013), Becker et al. (2013), Blinder (2009), Harrison and McMillan (2008), Ehrl (2013) and Ebenstein et al. (2010).

Harrison and McMillan (2008) is quite closely related to this paper. In that paper, the authors adopt several empirical specifications and data on U.S. multinationals and their affiliates in order to explore the effect of affiliate employment (their measure of offshoring) on U.S. domestic employment.[3] However, the regression specifications they adopt condition on either output prices or output, whereas the approach in this paper is to allow for potential effects of offshoring via these channels. As we will see, conditioning on these channels leads to an estimate reflecting only the direct displacement of workers due to offshoring, which likely leads to an overestimate of the negative employment effect.

Other papers have also attempted to estimate the employment impact of offshoring while disentangling the channels through which offshoring may operate. Also similar to this paper are Becker et al. (2013), who estimate the net employment effect of vertical FDI while accounting for changing market shares across firms; Hummels et al. (forthcoming), who estimate the effects of offshoring while allowing for productivity effects to mitigate employment and wage declines; and Moser et al. (2009) who find that offshoring is associated with higher levels of employment, productivity and larger market shares among German firms. Other relevant research includes Desai et al. (2009) who find that offshoring by U.S. multinationals leads to increased employment and wages at home; Debaere et al. (forthcoming) who find that offshoring to low-income destinations reduces home employment while offshoring to high-income countries has no domestic employment effect; and Kramarz (2008) who finds a domestic employment loss due to offshoring. With respect to the pure productivity effects of offshoring, Gorg et al. (2007) find positive productivity effects for current exporters, and no productivity effects for non-exporters. In general, the findings from these studies are mixed, with most estimating rather small effects of offshoring on domestic employment, whether positive or negative.

Finally, other empirical work which utilizes production tasks in alternative (non-trade) frameworks include Peri and Sparber (2009), who draw conclusions regarding the impact of immigrants on native workers using the same O*NET dataset used here; Autor et al. (2003) who use a precursor to the O*NET in order to characterize the effects of computer adoption on wages; Autor and Dorn (2013) who tie the task-content of different labor markets to subsequent patterns of wage and employment polarization; and Spitz-Oener (2006) who uses firm-level data from Germany and finds that production tasks are becoming more complex over time, particularly in industries which rapidly adopted computers. The wide range of studies exploring the determinants of changes in the nature of work in industrialized countries illustrates that there are a variety of forces at play in the economy which alter the distribution of workplace tasks. This suggests that a clear and testable theoretical roadmap is needed and for this reason the next section derives a structural specification to then bring to the data.

The paper is organized as follows. Section 2 presents a model of labor demand under offshoring based on GRH (2008). Section 3 describes the data and variables to be used. Section 4 implements an empirical approach in order to explore the impact of offshoring on relative task use and employment. Section 5 concludes.

[1] There is, of course, a large literature that is focused on the wage impact of offshoring. The empirical methods and data required to estimate the wage impact are very different than what are required for estimation of the employment effects, and so the wage impact is not explored here. See Feenstra and Hanson (1999) for the effect of offshoring on wages across industries. I therefore set aside estimation of the substitution effect, which arises due to changes in factor prices, and focus on estimates of the other two channels that the model highlights, conditional on factor prices. This is discussed further below.

[2] Many of the results emphasized in the task-based theory exist in similar forms throughout the literature. For example, see Jones and Kierzkowski (1990) and Feenstra and Hanson (1999).

[3] The main results are a negative impact on U.S. workers due to offshoring to low-income countries and a small, positive impact due to offshoring to high-income countries.