



The exchange rate, employment and hours: What firm-level data say[☆]

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ARTICLE INFO

Article history:

Received 6 August 2008

Received in revised form 9 July 2010

Accepted 9 August 2010

JEL classification:

E24

F16

F31

Keywords:

Employment

Exchange rate

Firms' foreign exposure

ABSTRACT

Using a representative panel of manufacturing firms, we estimate the response of job and hours worked to currency swings, showing that it depends primarily on firms' exposure to foreign sales and their reliance on imported inputs. We also show that, for a given international exposure, the response to exchange rate fluctuations is magnified when firms exhibit a lower monopoly power and when they face foreign pressure in the domestic market through import penetration. The degree of substitutability between imported and other inputs and the distribution of workers by type introduce additional degrees of specificity in the employment sensitivity to exchange rate swings. Moreover, we show that episodes of entry and exit in the export market are associated with a heterogeneous employment response depending on the degree of external orientation when the switch of export status occurs.

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1. Introduction

Do exchange rate fluctuations affect employment and decisions about hours worked across firms? While there is a substantial literature on the implications for the real economy of exchange rate swings, and at least some contributions focusing on the effects on labor market variables, there is little evidence at the microeconomic level on the employment and hours response to currency movements. In this paper we investigate this relationship in detail, analyzing the transmission channels at the firm level of an exchange rate shock to jobs and hours worked.

There are at least two major reasons why focusing on firm-level data is particularly appropriate for studying the relationship between employment and exchange rates. First, this level of disaggregation permits a better understanding of the transmission mechanisms at the heart of this relationship, compared to what emerges from more aggregate data.

Second, it allows us to appraise how exchange rate fluctuations can have heterogeneous effects on firms with different characteristics.

In our study we investigate a variety of channels through which the currency value affects firms' labor demand and net employment.¹ Following Campa and Goldberg (2001), we characterize the direction and magnitude of labor response as primarily depending on the producers' external orientation through both exports and imported inputs use. However, unlike their study, we find a statistically significant and non-negligible effect of exchange rate movements on both employment and hours worked. This effect is seen separately on the revenue side, through exposure to foreign sales, and on the cost side, through reliance on imported inputs. It is our belief, one which we support with consistent empirical evidence, that Campa and Goldberg's finding of a low degree of responsiveness of labor input to exchange rate fluctuations, and thus the divergence from our own results, depends on their use of data aggregated at the industry level. Indeed, a large volume of gross job flows has been widely documented also within narrowly defined industries. As a result, an appraisal of the effect of exchange rates on aggregate net employment would easily hide the effects on intra-sector job reallocation (Gourinchas, 1999).

[☆] We wish to thank the editor, Charles Engel, and two anonymous referees for their very helpful suggestions. We are also grateful to Luca De Benedictis, Linda Goldberg, Jean Imbs, David Roodman, Roberto Tedeschi, Andrea Gerali and seminar participants at EIEF, University of Molise, University LUISS "Guido Carli", University of Rome "Tor Vergata", the Italian Treasury Department, the 2009 Workshop at Queen Mary, University of London, the IEA Conference (Istanbul), the Meeting of the CNR Group on International Economics, the 50th Annual meeting of the Italian Economic Association, and the 2009 Workshop at the Luca D'Agliano center, for useful comments. This project was begun while Alberto Pozzolo was with the Research Department of the Bank of Italy. Pietro Cova helped us with Banca d'Italia's effective exchange rates.

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¹ A first set of contributions deals with the influence of exchange rate variations and, in general, international factor prices on net employment, either at aggregate or at industry level (Branson and Love, 1988; Revenga, 1992; Burgess and Knetter, 1998; Goldberg and Tracy, 2000; Campa and Goldberg, 2001). A more recent body of theoretical and empirical research, based on the flow approach to labor markets, investigates instead the impact of the exchange rate on gross job flows and, more generally, on the process of inter- and intra-industry employment reallocation (Gourinchas, 1998, 1999; Klein et al., 2002, 2003).

This is why we analyze the responsiveness of employment and hours worked to exchange rate fluctuations using firm-level panel data obtained from two high-quality sources: the Bank of Italy Survey of Investment in Manufacturing and the Company Accounts Data Service reports. The period we analyze is antecedent to the introduction of the single European currency and provides a very interesting case study, as Italy experienced significant exchange rate oscillations for a developed country, and at the same time was characterized by a high degree of firms' external orientation on both the revenue and cost sides.

From a theoretical point of view, the different channels through which exchange rate variations affect firms' decisions on labor input can be easily described: after an exchange rate swing—let's say a depreciation—the more a firm relies on imported inputs, the larger the increase in its costs, the reduction in marginal profitability, and the ensuing drop in employment and hours worked. At the same time, in the aftermath of a depreciation the higher the firm's external sale exposure—i.e., the share of export revenues in total revenues—the larger the increase in its sales, in marginal profitability and therefore in the use of labor input. Moreover, for an imperfectly competitive firm, market power also affects the relationship. First, through the extent to which firms “pass-through” an exchange rate shock into export prices expressed in foreign currency. Second, through the price elasticity of demand.

In the empirical analysis we also single out four additional firm-specific features that are potentially relevant for characterizing the exchange rate–labor input link at the firm level. First, we consider the degree of import penetration in the domestic market where the firm operates. In industries where imports account for a large share of total demand, firms with a higher dependence on domestic revenues are more exposed to foreign competition and therefore to the effects of exchange rate swings. In other words, if import penetration is high in a given industry, then a currency appreciation would severely reduce the competitiveness of domestic firms, even more so for firms with a high internal orientation of their sales. Second, we consider the degree of substitutability in the production function between imported and domestically produced inputs. If technological features or market constraints prevent imported inputs from being substituted with other inputs, then an exchange rate swing is likely to have a more pronounced impact on employment and hours worked, as firms profitability will be more deeply affected by the external shock. Further, we study whether the job and hours response to currency movements may depend on the distribution of workers by type of job within each firm (i.e., blue- vs. white-collar). This would clearly be the case if the firm's ability to adjust its labor force hinged on the type of workers it employs. Finally, and perhaps more importantly in light of the substantial microeconomic heterogeneity among firms in the decision to export (see, for example, Bernard et al., 2007), we investigate whether differences in firms' export status lead to a degree of specificity in the employment response. In so doing, we explicitly distinguish between firms that are currently exporting, non-exporters, and firms that switch export status, from non-exporter to exporter and from exporter to non-exporter.

The remainder of the paper is organized as follows: Section 2 presents the theoretical background of our analysis and the empirical specification; Section 3 describes the data used; Section 4 documents the empirical results from the baseline specification, and Section 5 provides some further characterizations of the link between exchange rate and labor variables. Section 6 concludes. Appendix A presents a simple model providing a theoretical background for our empirical analysis.

2. Theoretical background and empirical specification

The mechanisms through which exchange rate variations affect employment levels can be ascertained in a simple framework, where labor demand is obtained from the first order conditions for a firm's profit maximization in an imperfectly competitive market and labor supply is assumed to be a simple function of wages and aggregate

demand conditions (Campa and Goldberg, 2001). Exchange rate variations affect labor demand through the changes induced in the firm's marginal revenue product of labor via both the cost and the revenue channels. The effect on the cost side depends on a number of firm-specific characteristics, most notably its reliance upon imported inputs and the elasticity of substitution between these inputs and domestically produced substitutes. The effect on the revenue side depends primarily on the share of export revenues with respect to total revenues, the firm's market power in the product market, and the degree of exchange rate pass-through into export prices expressed in the foreign currency.

As is shown in Appendix A, the elasticity of equilibrium employment, \tilde{L} , with respect to the exchange rate is given by:

$$\frac{\Delta \tilde{L}}{\Delta e} \frac{e}{\tilde{L}} = \frac{1}{\bar{\mu}\beta} \left[(1-\chi)\eta_{p,e} - \chi(1-\eta_{p^*,e}) + \alpha(1-\eta_{s^*,e}) \right] \frac{a_1}{1+a_1}, \quad (1)$$

where e is the level of the exchange rate, expressed as the number of foreign currency units per domestic currency unit (so that a decrease in the exchange rate amounts to a depreciation); $\chi \in [0, 1]$ is the share of sales on foreign markets in total sales; $\alpha \in [0, 1]$ is the share of production costs on imported inputs in total costs; $\bar{\mu}$ is the average value of the mark-up in the home and foreign markets; β is the share of labor costs over total revenues; $\eta_{p,e} \in [-1, 0]$ and $\eta_{p^*,e} \in [0, 1]$ are the elasticities of, respectively, domestic and foreign prices with respect to the exchange rate (i.e., the pass-through elasticities); $\eta_{s^*,e} \in [0, 1]$ is the elasticity of foreign input prices with respect to the exchange rate; a_1 is a parameter describing the wage elasticity of labor supply.

2.1. The propagation mechanism

Eq. (1) provides a number of testable insights into the mechanisms underlying the employment response to exchange rate variations. A first implication is that a firm's external orientation towards international markets is pivotal in shaping the direction and size of the effect on employment and hours worked of exchange rate swings. The transmission of exchange rate movements is seen through its effects on the marginal revenue product of labor and, therefore, on profits. It is important to emphasize that the expression $(1-\chi)\eta_{p,e} - \chi(1-\eta_{p^*,e})$ in the previous equations is clearly non-positive, given that $\chi \in [0, 1]$, $\eta_{p,e} \in [-1, 0]$ and $\eta_{p^*,e} \in [0, 1]$. Therefore, an exchange rate depreciation (i.e., a decrease in e) has a positive effect on employment through the revenue channel. Moreover, the higher the share of foreign sales in total sales, χ , the stronger the increase in employment induced by an exchange rate depreciation.² By contrast, the expression $\alpha(1-\eta_{s^*,e})$ is non-negative, since $\eta_{s^*,e} \in [0, 1]$, indicating that the same depreciation has a negative effect on employment through the cost channel. By the same token, the higher a firm's reliance on imported inputs relative to total input purchases, α , the more sizeable the employment decrease following an exchange rate depreciation.

In addition to these basic elements characterizing a firm's orientation to foreign markets, two important supplementary features affect the sign and size of the exchange rate elasticity of employment and hours worked. The first deals with the degree of exchange rate pass-through that may influence the employment sensitivity to currency swings. The pass-through elasticity in the foreign market, $\eta_{p^*,e}$ —ranging from zero (no pass-through) to one (complete pass-through)—measures how willing the firm is to change the prices set in the foreign market as a result of exchange rate variations. It is clear from Eq. (1) that the lower the pass-through of exchange rate into foreign-currency export prices, $\eta_{p^*,e}$, the stronger the employment

² A necessary and sufficient condition for the “magnification” effect of foreign exposure to hold is that the sum of the (absolute values of) exchange rate pass-through elasticities be less than one (i.e., $|\eta_{p,e}| + \eta_{p^*,e} < 1$).

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