



Importing, exporting, and firm-level employment volatility[☆]



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ABSTRACT

In this paper, we use detailed trade and transactions data for the U.S. manufacturing sector to document a new set of stylized facts on the theoretically ambiguous relationship between the volatility of employment growth and the trade exposure of a firm. We find that, on average, firms that export are less volatile than non-traders, while importers are more volatile. The substantial variation we document across trading firms, in terms of the duration of time and the intensity with which they trade, the number and type of products they trade, and in terms of the number and characteristics of their trading partners, plays an integral role in explaining the robust association between trading and employment volatility. For trading firms, the frequency of trade is negatively associated with employment volatility. Importers with a higher share of imported inputs (especially manufactured imports) and those that source from more countries and from countries with lower per-capita income experience higher levels of volatility. A higher share of exports, fewer number of export destinations and, export destinations that are further away, and with lower average incomes are associated with higher levels of volatility for exporters.

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1. Introduction

Firms are highly heterogeneous in their degree of global engagement. The majority of firms are purely domestic; they serve only the home market and source all their inputs domestically. A number of firms do, however, engage in international trade, importing raw materials and/or intermediate inputs, exporting products, or both.¹ Such globally connected firms are likely to differ from purely domestic firms in terms of both the magnitude and volatility of shocks to which they are exposed, as well as their ability to smooth out shocks through diversification across markets. As a result, workers employed by these firms could experience different levels of volatility compared to workers employed by purely domestic firms.

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¹ About 40% of the U.S. civilian workforce is employed by trading firms, which differ significantly from purely domestic firms in terms of their productivity, size, employment composition, and wages (Bernard et al. (2009)).

In this paper, we ask whether this variation in outcomes for workers at globally engaged firms relative to domestic firms is indeed observed in the data. Specifically, we explore empirically the direction and the magnitude of the association between the exposure to trade and variation in employment volatility at the firm level.² This question is important, as employment volatility at the firm level has significant consequences for workers in terms of the probability and cost of displacement, as well as the associated uncertainty and income risk, each of which has been a major component of the debate on the welfare impacts of globalization.

Theoretically, there are various channels through which exposure to international trade could affect employment volatility at the micro level for firms with different levels of global engagement. Volatility will be higher for exporters relative to non-trading firms if the volatility of shocks is significantly higher in trading partners than in the United States, or if the export activity is inherently volatile (for example, due to shocks to the transport costs or to the exchange rate). Alternately,

² Our focus in this paper is on volatility at the firm level and not on aggregate volatility. While firm-level volatility is an important component of volatility at the aggregate level, an increase in the former, depending on the covariance of shocks across firms, could be associated with a decrease, increase, or no change in the latter.

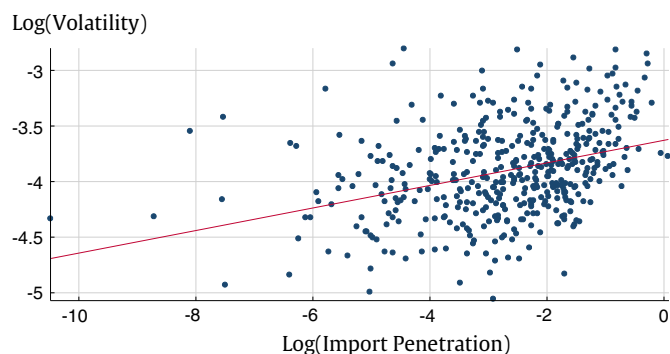


Fig. 1. Industry-level volatility of employment growth rates and import penetration, 1976–2005. Note: Reported values are industry-level volatility of employment growth rates and import penetration, averaged over 1976–2005. The fitted line is: $\text{Log}(\text{Volatility}) = -3.63^{***} + 0.102^{***}\text{Log}(\text{Import Penetration})$.

Source: Own calculations using the NBER Productivity Database and Schott (2008).

firms operating in countries with imperfectly correlated shocks should be in a better position to diversify and smooth out demand shocks in the domestic market.³

The relationship between importing and volatility is similarly ambiguous. A firm that sources inputs from a number of countries can more easily absorb a productivity shock to a particular input by switching to alternate providers compared to a firm that only sources inputs domestically. As a result, a more diversified importing firm would experience lower levels of volatility compared to the firm sourcing its inputs domestically.⁴ Similarly, a negative relationship between importing and volatility is predicted if imported intermediate usage is associated with the complexity of the production process.⁵ Alternately, increased exposure to productivity shocks abroad through the production process would lead to higher employment volatility for an importing firm. Likewise, differences in labor-demand elasticities could also lead to higher employment volatility for workers employed by an importing firm.⁶ The elasticity of labor demand for firms that engage in offshoring by purchasing intermediate inputs from abroad would be higher, as these firms can more easily substitute imported inputs for domestic workers in response to a wage increase at home. As a result, a given productivity shock will lead to larger employment variations at these firms.

In addition to the mode and intensity of global engagement, the frequency with which a firm participates in international markets also

matters for the magnitude of employment volatility.⁷ Shifting the source of demand and the structure of production could result in higher levels of volatility for firms that frequently switch from only domestic sales to some exporting and/or to imports from domestic sourcing. Importantly, such frequent switching between domestic and foreign markets (or sources) could itself be an endogenous response to the higher volatility (due to frequent demand and productivity shocks) that these firms face.⁸ Trading firms also differ in terms of the number and type of traded products⁹ and the number¹⁰ and characteristics of trading partners (such as income level, volatility, and covariance with the United States). These differences introduce a significant degree of heterogeneity in terms of the levels of diversification and exposure across trading firms.¹¹

In this paper, we provide a new set of stylized facts on the theoretically ambiguous relationship between employment volatility and the trade exposure of the firm. Instead of testing the predictions of a particular model or highlighting a specific mechanism, we study the association between trade and volatility along multiple dimensions emphasized in the theoretical literature. In our analysis, we use comprehensive data for the U.S. that combines detailed trade and transactions data with longitudinal firm-level data. The detailed information on trading partners, as well as the products traded provided in the linked trade and transactions data, allows us to study in detail the relative contribution of diversification across markets (for final goods) and source countries (for inputs), in terms of number of final products and inputs traded. The distinction is important because shocks can be transmitted through both demand and supply channels for firms, and the magnitude of shocks differs across countries and products. The longitudinal aspect of the data enables us to introduce time series variation into our estimating equations, and to additionally analyze within-firm variation in trade status and volatility through fixed-effects specifications.

Our findings suggest that importers are more volatile, and higher import intensity is associated with higher levels of employment volatility. An importer with average level of import intensity experiences 7% higher levels of employment volatility compared to a non-trader firm. This relationship is mainly driven by firms that switch in and out of importing, and is consistent with higher volatility associated with greater exposure to foreign productivity shocks and, increased substitutability of in-house production with purchases of foreign inputs in response to domestic wage shocks. We find that firms that only export and firms that both export and import, benefit from diversification

³ Vannoorenberghe (2012) models these channels at the firm level and shows this relationship to be non-monotonic, with an export share threshold below which global sales of exporters are less volatile than that of non-exporters due to the diversification effect. Also see Nguyen and Schaur (2010) on transmission of foreign shocks to the domestic markets through the domestic supply of exporting firms. Both of these models emphasize the substitutability of exports and domestic sales due to convex costs. Relatedly, Caselli et al. (2014) emphasize the diversification channel in the context of macroeconomic volatility and openness. They show that country-wide shocks can bring about sufficiently strong diversification benefits to compensate for the effect of increased sectoral specialization due to trade. The sign and size of the effect of openness on volatility depends on the variance and covariance of shocks across countries, the intrinsic volatility of sectors in which the economy specializes, and the covariance among sectoral shocks and between sectoral and country-wide shocks.

⁴ Bergin et al. (2011) make a related point in the context of offshoring, where offshoring insulates both output and employment in the U.S. manufacturing sector against business cycles. While their benchmark model succeeds in generating the greater volatility in the Mexican offshoring sector, it underestimates the degree of employment volatility in the U.S. offshoring sector, which is more volatile than the overall U.S. economy.

⁵ For example, in Koren and Tenreyro (2013), firms using a large variety of inputs are less volatile, as each individual variety matters less in production and firms can offset a shock to a particular variety by adjusting the use of other varieties. See also Krishna and Levchenko (2013), which proposes specialization in less complex (and therefore more volatile) sectors as an explanation for the higher level of output volatility experienced in developing countries. Note that volatility of output modeled in the aforementioned papers and employment volatility need not move in the same direction—the association depends on the elasticity of substitution between imported inputs and in-house production.

⁶ See, for example, Rodrik (1997), Slaughter (2001), and Senses (2010).

⁷ Frequent switching in and out of trading is a commonly observed feature of the data. Eaton et al. (2008) find that roughly half of Colombian exporters did not export during the previous year. Besedes and Prusa (2006) document that more than half of all trade relationships are observed for a single year and approximately 80% are observed for less than five years.

⁸ Békés and Muraközy (2012) show that firms facing uncertainty in terms of their future productivity may endogenously choose between variable- and sunk-cost trade technologies, which can yield an equilibrium outcome of temporary trade for some firms and destinations.

⁹ For example, firms can import raw materials or intermediate production stages that non-importing firms either produce in-house or source from the domestic market. Shocks to inputs that are complements to employment at the firm could have implications for employment volatility that are quite different than shocks to inputs that are substitutes.

¹⁰ Bernard et al. (2011) show that the distribution of exports across products is highly skewed within firms, and product selection accounts for a substantial proportion of the overall variance of exports.

¹¹ Related are the models in international real business cycle literature, which study the relationship between trade and the transmission of shocks between two countries. For example, Burstein et al. (2008), Zlate (2010), and Ng (2010) develop models where productivity shocks that are passed through demand channels either increase or decrease co-movement depending on the structure of the trading relationship. For instance, production sharing (complementarity in production) increases co-movement between trading partners, as production in one country increases demand for intermediates from another. Emphasizing supply channels in the transmission of shocks, Johnson (2012) builds an augmented IRBC model with intermediate inputs that pass productivity shocks downstream and finds much of the relationship between trade and co-movement to be driven by correlated shocks between countries.

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