



Product churning, reallocation, and Chinese export growth[☆]



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ABSTRACT

This paper quantifies the separate contribution of idiosyncratic productivity and demand growth on aggregate Chinese exports. We develop firm, product, market and year-specific measures of productivity and demand. We use these measures to document a number of novel findings that distinguish the growth of Chinese exports. First, we document that changes in demand explain nearly 78–89% of aggregate export growth, while only 11–22% of export growth is determined by productivity growth. Second, our results highlight two mechanisms which contribute significantly to aggregate export growth: the rapid reallocation of market shares towards products with growing demand, and high rates of product exit among low demand products. Investigating the mechanisms underlying these results we find that new exporters suffer demand shocks which are 66% smaller than those observed for incumbent producers in the same product market. By comparison, we find that there is only an 8% difference on average between the productivity of new and incumbent exporters. Repeating our exercise with revenue productivity reveals much smaller differences. This is largely attributed to differential movements in prices and marginal costs.

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1. Introduction

A rich literature considers implications of firm heterogeneity on the growth of aggregate productivity and output. For instance, large cross-country differences in output per worker are often attributed to differences in market share across firms with widely different measures of firm efficiency.¹ Consistent with this finding, differences in firm turnover and product churning across heterogeneous firms have repeatedly been found to play an important role in determining resource allocation and the evolution of industry aggregates (Foster et al., 2001; Melitz and Polanec, 2015). Recently, a number of papers argue that firm survival and growth also depend heavily on other dimensions of firm heterogeneity, such as idiosyncratic demand.² These results induce natural questions regarding the performance of trade aggregates: What is the contribution of idiosyncratic differences across firms and products to export growth? Likewise, since international trade is

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¹ See, for examples.

² Recent examples include and Rivers (2010).

often characterized by a high degree of product turnover, how does the rapid entry and exit of products in export markets influence the evolution of trade flows?

This paper uses detailed data to re-examine product churning, reallocation, and aggregate export growth among Chinese exporters. The astonishing size and scope of Chinese export growth has had substantial economic impacts worldwide. Numerous developing countries have recommitted to export promotion as a key plank within their development platform so as to achieve similar outcomes. Importing countries have concurrently struggled to determine appropriate policy responses to large inflows of Chinese products. For example, [Pierce and Schott \(2016\)](#) argue trade liberalization with China caused significant manufacturing job loss in the US. Similarly, [Autor et al. \(2013\)](#) demonstrate that rising imports from China cause higher unemployment, lower labor force participation, and reduced wages in local US labor markets that are composed of import-competing manufacturing industries. In the latter paper, Chinese productivity growth is posited as a key determinant of export growth across destination countries. Our work examines this hypothesis in detail to determine whether rapid increases in firm-level efficiency have allowed Chinese exporters to expand across markets worldwide. Or rather, was the rapid expansion of Chinese exports, in contrast, demand driven?

Unfortunately, answering these questions is often complicated by a lack of adequate data. Most firm-level data sets report total sales, but do not allow researchers to distinguish between movements in product prices and quantities. [Foster et al. \(2008\)](#) show that revenue based measures of productivity tend to conflate the influence of both physical productivity and prices on US firm-behaviour. Likewise, [Gervais \(2015\)](#) argues that among US manufacturers measured demand-level differences are at least as important in explaining firm-level selection and revenue growth as firm-level productivity. In our context, separately identifying idiosyncratic demand and productivity is crucial for understanding the nature of firm-selection in international markets. Further, although most estimates are based on detailed manufacturing data, these data sets rarely provide any information on the location of sales or the behaviour of manufacturing firms across different export markets. Although numerous analyses study one (the domestic market) or at most a few markets (e.g. domestic vs. export markets), a recent series of papers have begun to highlight differences in firm-behavior across heterogeneous export markets.³ We match customs-level data, which contains detailed information on the price, quantity and export destinations, with Chinese firm-level input and output data we are able to (1) disentangle idiosyncratic productivity and demand among Chinese exporters and (b) investigate the microeconomic determinants of export growth across heterogeneous export markets.

Across all Chinese exporters we find that aggregate demand growth explains 78–89% of total export growth, while productivity growth contributes only 11–22%. Our quantitative findings rely heavily on two key features of our analysis. First, given the data capturing inputs and physical output we develop a product-specific measure of productivity. Measured productivity, as such, reflects variation in the productive efficiency of the firm. Second, using detailed data on exported quantities and prices along with IV methods, we estimate an iso-elastic demand curve and recover a firm-and-product specific demand shock. Our measure of demand is composed of an idiosyncratic component, which is specific to the firm, product, destination and year, and a common component, which reflects broader changes that affect all firms in a given export product market.

We proceed to investigate the nature of demand growth and the firm-level mechanisms that characterize its evolution over time. In particular, we construct a theoretically consistent measure of aggregate demand and decompose its evolution into within-firm, between-firm and product churning components. In this fashion, we characterize the degree to which demand shocks have a uniform impact across Chinese exporters or whether the role of demand growth is driven by idiosyncratic differences across heterogeneous firms.

We find that product churning, and in particular the exit of low demand products, accounts for a quarter of all demand growth, while the reallocation of market share towards high demand firms accounts for an additional 50% of demand growth in export markets. In this sense, our work links research which examines firm responses to trade policy⁴ with studies of export growth by characterizing the relationship between firm-level determinants and aggregate outcomes.

To check the consistency of our findings, we study the magnitude of demand and productivity across heterogeneous exporters and investigate the separate influence they have on firm survival. We find that a 1% increase in demand has twice the impact of a 1% increase in production efficiency on product survival for the typical Chinese exporter. Moreover, we find that while new and exiting producers are moderately less efficient than incumbent firms, the entering and exiting products have measured idiosyncratic demand shocks which are 66% smaller than those of similar incumbent products.

Our approach follows a long tradition which characterizes industries as collections of heterogeneous producers with varying levels of technological efficiency (e.g. [Jovanovic, 1982](#); [Hopenhayn, 1992](#); [Ericson and Pakes, 1995](#); [Melitz, 2003](#); [Asplund and Nocke, 2006](#)). A key feature in each of these models is the strong link between producers' productivity levels and their performance in a given market. Further, endogenous selection mechanisms are often found to drive movements in industry aggregates as market shares are reallocated to more efficient producers. Over time less productive plants decline and exit markets entirely while more efficient plants enter and grow into new markets, encouraging selection-driven aggregate sales growth across markets. As is common, many exporters produce multiple products for multiple destination markets.

³ See [Bernard et al. \(2007\)](#), [Eaton et al. \(2008, 2011\)](#), and [Arkolakis and Muendler \(2013\)](#) for examples of studies which characterize firm entry and growth across diverse countries.

⁴ See, for example, [Trefler \(2004\)](#) and [De Loecker \(2007\)](#), which study the impact of trade liberalization on firm productivity in Canada and Slovenia, respectively. Likewise, [Munch and Schaur \(2016\)](#) study the impact of export promotion on firm-outcomes in Denmark.

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