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**Article**

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## FIRMS AND CREDIT CONSTRAINTS ALONG THE GLOBAL VALUE CHAIN: PROCESSING TRADE IN CHINA

KALINA MANOVA<sup>1</sup>

What can we learn from China's experience as a linchpin in the global value chain? This article presents new research showing that financial frictions influence the organisation of production across firm and country boundaries. If you are credit-constrained, you might be stuck in the low value-added stage of the supply chain. Strengthening capital markets might thus be an important prerequisite for moving into higher value-added, more profitable activity. China's experience tells us that liquidity-constrained manufacturers might therefore benefit more from import liberalisation and from the fragmentation of production across borders.

The past 20 years of globalisation have witnessed a dramatic expansion in the fragmentation of production across countries. Firms today can not only trade in final goods, but can also conduct intermediate stages of manufacturing by importing foreign inputs, processing and assembling them into finished products, and re-exporting these to consumers and distributors abroad. While processing trade contributes just 10 percent of EU exports, at over 50 percent it has been a major driving force behind the rapid growth of Chinese exports (Cernat and Pajot 2012).

Global value chains are increasingly capturing the attention of both academics and policymakers because of their potentially wide-ranging implications (see Baldwin and Lopez-Gonzalez 2013). What are their welfare and distributional consequences? Will they reshape optimal trade policy and encourage coordination among nations in light of the stumbling Doha round? How do they af-

<sup>1</sup> Stanford University. An earlier version of this article was published in VoxEU on 13 May 2013.

fect exchange-rate pass-through and the transmission of supply-and-demand shocks across borders?

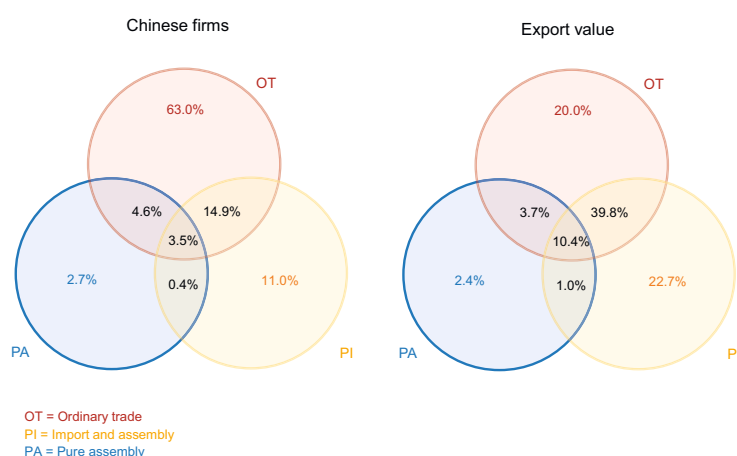
The answers to these questions crucially depend on how companies choose to position themselves along the global value chain and how this decision impacts profitability. In our recent work (Manova and Yu 2012), we examine matched customs and balance-sheet data from China to study these issues. We conclude that international production networks allow more firms to share in the gains from trade – firms that could otherwise not have exported at all. However, limited access to capital restricts manufacturers to low value-added stages of the supply chain and precludes them from pursuing more profitable opportunities.

### **Institutions matter: trade regimes in China**

Two institutional features make China particularly well suited to this analysis. Firstly, since the 1980s, China has formally recognised a processing-trade regime that relieves materials imported for further processing and re-exporting from import duties. To claim this exemption, at the time of importing, firms must show proof of a contractual agreement with a foreign buyer for whom and according to whose specifications they will produce. Intended as a means of export promotion, this policy has been very successful: by 2005, 32.7 percent of exporters conducted processing trade and contributed 54.6 percent to total exports, making China a key link in global supply chains.

Secondly, within the processing regime, Chinese firms choose between two operating modes. Under pure assembly, they only incur the cost of domestic inputs and labour. Their foreign partner provides all foreign inputs at no cost and handles marketing and distribution abroad. Under import-and-assembly, the Chinese company sources and pays for all imported materials, but the arrangement is otherwise the same. The Venn diagrams in Figure 1 break down Chinese exports by trade regime in terms of number of firms and dollar value. Manufacturers clearly choose different ways to participate in international commerce, with about

**Figure 1**  
**Distribution of Chinese firms and export value across trade regimes**



Source: Manova and Yu (2012).

25 percent active in multiple export regimes. What is the reason for this variation in trade strategies?

### The attractions and drawbacks of processing trade

We show that performance varies systematically across companies undertaking different activities. Profits, profitability (profit-to-sales ratio) and value added fall as producers orient exports from ordinary towards processing trade, and from import-and-assembly towards pure assembly.<sup>2</sup> Increasing the share of ordinary trade in export revenues by 40 percent (one standard deviation) is associated with 6 percent higher profits and 4.3 percent extra value added. These numbers reach 10 percent and 8.5 percent for a comparable decline in the share of pure assembly in processing exports.

These patterns suggest that capturing larger segments of the global value chain is more profitable than specialising in fewer, lower value-added stages. Some binding constraint must therefore restrict certain producers to processing trade.

We posit that limited access to external financing presents an important obstacle to firms' expansion along the supply chain. Pure assembly demands less working capital than import-and-assembly because of the different payment terms for foreign inputs. Ordinary ex-

<sup>2</sup> Results based on regressions with province and industry fixed effects, such that identification comes from the variation across firms within narrow segments of the economy. We also condition on firm size and ownership type.

porters require the most liquidity since they oversee production and distribution from beginning to end and sell under their own brand name. They thus bear the cost of import duties and marketing abroad in addition to the expense on domestic and imported inputs. While more profitable than processing trade, ordinary trade thus imposes a substantially heavier burden on the limited financial resources available to a company.

### Financial constraints and firms' global-value-chain position

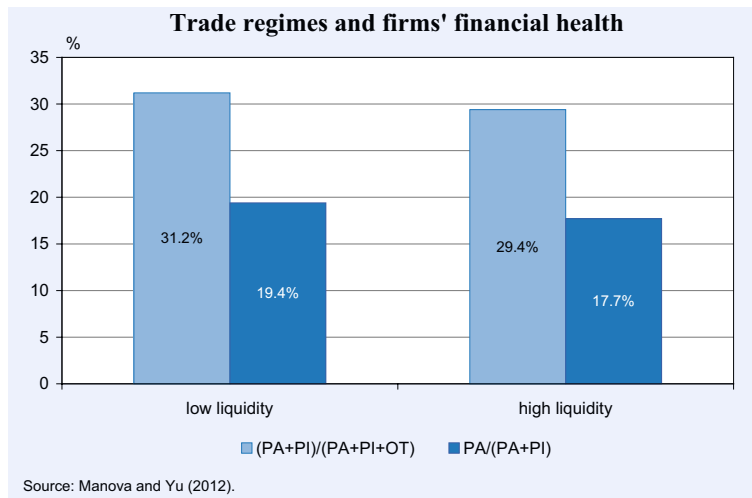
Manufacturers routinely rely on outside capital to meet upfront costs that cannot be covered out of retained earnings or cash flows from operations. Exporters, however, are even more dependent on external funding because they face additional trade-related expenses and greater transaction risk. In addition, cross-border shipping and delivery takes 30–90 days longer than domestic orders (Djankov *et al.* 2010). A very active market thus exists for the financing and insurance of international commerce, with as much as 90 percent of world trade estimated to depend on trade finance (Auboin 2009).

Credit constraints have indeed been shown to severely impede firms' export activity and distort aggregate trade, especially during crisis episodes (Berman and Héricourt 2010; Minetti and Zhu 2011; Iacovone and Zavacka 2009; Amiti and Weinstein 2011). Credit tightening during the financial turmoil of 2008/09 was a key driver behind the collapse in international trade (Bricongne *et al.* 2012; Chor and Manova 2012).

Given this evidence and the difference in liquidity needs across trade regimes in China, we investigate how credit conditions influence Chinese firms' export strategies. Exploiting multiple sources of variation in the data to establish causality, we consistently find that financial frictions force companies into the less profitable processing mode, and the least attractive pure-assembly regime in particular.

Our *first* result is that exporters with more liquid capital and less short-run debt pursue more ordinary trade

Figure 2



than processing trade, and more import-and-assembly than pure assembly.<sup>3</sup> Figure 2 illustrates the average export composition of firms with liquidity in the top and bottom half of the distribution. The impact of financial health appears unrelated to firm size, productivity and ownership structure (private vs. state, domestic vs. foreign).

Our *second* result is that firms adjust their trade strategy across sectors and choose more processing trade, especially pure assembly, in sectors that are financially more vulnerable.<sup>4</sup> For technological reasons innate to the manufacturing process and exogenous to individual firms, industries vary in their working-capital requirements in the short run, in their reliance on external capital for long-run investments, and in their ability to raise outside finance using collateralisable assets (Rajan and Zingales 1998; Claessens and Laeven 2003; Kroszner, Laeven and Klingebiel 2007).<sup>5</sup> Exporters thus carefully allocate their limited financial resources across sectors and trade regimes to maximise total profits: in industries that need little outside finance, they optimally pursue ordinary trade despite the higher upfront costs; while the opposite is true of industries that rely heav-

<sup>3</sup> Results based on the same specification as in footnote 4. Liquidity = (current assets – current liabilities) / total assets, leverage = short-term debt / current assets.

<sup>4</sup> Results based on specifications with firm fixed effects, such that identification comes from the variation across sectors within multi-sector firms.

<sup>5</sup> These are proxied respectively by the inventories-to-sales ratio, the share of capital expenditure not financed from cash flows, and plant, property and equipment as a share of total book-value assets.

ily on external capital. Figure 3 reports the average export composition for sectors with financial dependence in the top and bottom half of the distribution.

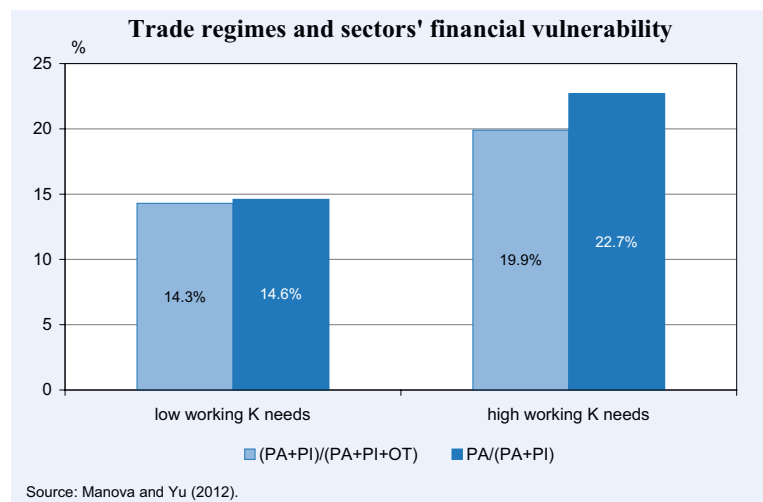
Our *final* result is that the trade-regime choice by exporters is more sensitive to firms' financial health and to sectors' financial vulnerability when the exporter is located in a province with weaker financial markets and when the foreign buyer is in a country with stronger financial markets. In other words, it takes two to tango: constrained exporters select the

less profitable trade regimes with lower liquidity needs when they have less access to capital domestically, but their foreign buyer can more easily secure financing.

## Conclusions

Our results suggest that financial frictions influence the organisation of production across firm and country boundaries. Credit-constrained firms, and financially underdeveloped countries as a whole, might be stuck at low value-added stages of the supply chain and unable to pursue more attractive opportunities. Strengthening capital markets might thus be an important prerequisite for moving into higher value-added, more profitable activities. Our back-of-the-envelope calculations indicate that these effects can be sizeable. Improving all firms' financial health to that of the least constrained firm in our sample could in-

Figure 3



crease aggregate Chinese profits by 5.5 billion RMB (1.3 percent) and real value added by 15.2 billion RMB (0.7 percent), although these are probably lower bounds. A promising direction for future research is the potential for companies and entire economies to grow over time by starting with processing trade restricted to few assembly tasks and gradually expanding along the supply chain into more profitable activities.

Our findings also highlight the differential effects of trade policy and global value chains across heterogeneous firms. China's processing regime allows producers that would have otherwise been unable to pursue any cross-border operations to share in the gains from trade. Liquidity-constrained manufacturers may therefore stand to benefit more from import liberalisation and from the fragmentation of production across borders. Imperfect financial markets might thus justify some degree of government intervention in the regulation of international trade.

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