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Explaining China's Position in the Global Supply Chain

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1. Introduction

A large number of recent research papers on international trade focus on the phenomenon of international production fragmentation, often also called the global supply chain (Jones and Kierzkowski 2001, Deardorff 2005, Yi 2003). This form of global production involves slicing the stages of production thinner and thinner and parceling out each specialized stage to various geographic locations. Given the growing importance of China as an emerging international trading powerhouse, there is now also a small but rapidly evolving literature on the role of China in this global production chain (Athukorala and Yamashita 2006, 2009; Dean, Fung and Wang, 2009; [1] Dean, Lovely and Mora, forthcoming; Koopman, Wang and Wei, 2008; Wang and Wei, forthcoming; Xu and Lu, forthcoming).

A very useful concept in empirically gauging the importance of supply chain-related trade for an economy is the notion of vertical specialization shares (Hummels, Ishii and Yi 2001). The use of vertical specialization shares (VS shares) for measuring the extent of China's participation in the global supply chain is particularly meaningful since China has an unusually large proportion of trade in the form of processing trade: the policy regime whereby inputs can be imported duty free as long as they are used for further assembly and then exported. Two recent papers, Dean, Fung and Wang (DFW) (2009) and Koopman, Wang and Wei (KWW) (2008) utilize this concept of VS shares to study the characteristics of Chinese exports. These papers find IT related products, such as electronic computers, telecommunication equipment, cultural and office equipment, telecommunication equipment, and computer peripheral equipment, to be among China's most vertically specialized exports.

Sectoral VS shares give us some indication of how far up China is along the global value chain for various industries. A high VS share indicates that a substantial amount of the content comes from abroad, suggesting that China is mainly engaged in final stages of assembly. A low VS share indicates that a larger degree of the production process is being done within China. This could mean some technological constraint on the degree of

[1] Dean, Fung and Wang (2009) is a revised version of the earlier working paper, Judith M. Dean, K.C. Fung and Zhi Wang, "How Vertically Specialized is Chinese Trade?" USITC Working Paper No. 2008-09-D. (2008). http://www.usitc.gov/research_and_analysis/staff_products.htm#2008.

fragmentation in the industry, or that China is producing more of the stages of production than simply final assembly. The evidence shown in DFW indicates that VS shares vary extensively across Chinese industries.

But what explains China's position in the global supply chain across these industries? Antras (2005) posits that when a firm considers offshoring part of its production, two industry characteristics play important roles in the decision: research and development (R &D) spending and relative wages. If the product is new, and research and development (R&D) accounts for a large share of the costs of production, then due to contract incompleteness, transnational offshoring may not take place. Savings through offshoring the low-tech stages of production are likely to be outweighed by the risk of low-quality, low-tech inputs. As the product matures, and more stages of production are standardized, this risk diminishes compared to the cost-savings from relatively cheaper labor inputs abroad. The ability to reduce risk by producing offshore in an affiliate firm increases the likelihood of offshoring.

In this paper we make use of Antras' theoretical model and the DFW estimates of industrial VS shares to explain China's position in the global supply chain. We adapt the Antras model to a cross-section of industries at a single point in time, and econometrically test the role of R&D intensity and relative wages in determining VS share. A cursory examination of the data reveals patterns quite contrary to Antras' predictions. However, using a simple two-stage econometric model, we find strong evidence that in relatively R&D-intensive industries, there is less offshoring to China, and very high foreign content in Chinese processing exports. As R & D intensity falls, Chinese industries undertake more processing trade, and that processing trade has lower foreign content, suggesting that more of the stages of production take place in China. We also find that offshoring increases, for all R&D intensities, if Chinese processing trade is conducted by foreign-invested firms (FIEs).

The rest of the paper will be organized as follows: in the next section, we discuss several papers that are relevant to our analysis.. We examine the model by Antras (2005) in more detail in section 3, and use it to explore the VS share data in section 4. Section 5 presents the econometric analysis and results, with extensions in section VI. The last section concludes.

2. Literature and Background

Vertical specialization refers to the proportion of imported intermediate goods contained in an economy's exports. Imported intermediate goods are used in successive rounds of production in an economy, often in combination with other domestically produced inputs. Measuring the extent of production fragmentation requires the use of the economy's input-output tables, to capture the uses of imported intermediates in various rounds of production--the "cumulative use" of imported inputs.[2] It also requires accurate identification of imported intermediates under both types of processing trade: "processing and assembly," under which inputs are imported but remain under the foreign party's control; "processing with imported inputs," under which the ownership of the inputs is given to the producers in China.

DFW (2009) combine the use of processing import and export data with the use of input-output tables to measure the VS shares of Chinese trade for two years, 1997 and 2002.[3] To capture the additional complications arising from different intensities of imported inputs in processing and non-processing trade, the DFW study also measures VS shares using the separate inferred input-output tables for processing and non-processing trade developed in the KWW study.[4] Figures 1 and 2 reproduce a sample of DFW's VS share estimates using both methods (denoted non-split and split, respectively) for Chinese merchandise exports in 2002.[5]

As shown in figure 1, the highest VS shares, under either method, are largely in IT-related products: electronic computers, cultural and office equipment, telecommunications equipment, computer peripheral equipment, electronic elements and devices, radio, TV and other communications equipment. High VS shares indicate very little Chinese content, and

[2] Specifically, we use the Leontief inverse matrix to capture the total, cumulative use of imported intermediates in the production of exports.
[3] 1997 and 2002 are the two latest years when the benchmark Chinese input-output tables were available.
[4] Koopman, Wang and Wei (2008) use an algorithm to split the official input-output tables into two tables, one for processing trade and one for non-processing trade.
[5] Figure 1 and 2 are taken from Figures 5a and 5b from Dean, Fung and Wang (2008).

suggest that China is actually at the low-tech assembly end of the supply chain. But there are large differences in the positions of the supply chain across sectors. Over all industries exporting merchandise, DFW find split VS shares ranging from 4.3% to 95.4%. In Figure 2, DFW highlight the distinction between VS shares for processing and normal exports. They find a correlation of 0.89 between an industry's VS share and the share of processing exports in that industry's total exports. Thus, industries heavily involved in processing exports typically have very high foreign content in their exports.

Evidence on the firm's choice to offshore production is found in Feenstra and Hanson (2005). They present a rich model that tests some of the elements of property rights theory as well as the Chinese incentive system framework. In their model, a multinational firm has already decided to set up an export-processing plant in a relatively low-wage country. The firm faces the problem of reducing costs by offshoring vs. providing sufficient incentives to the processing plant to produce a high quality input. The multinational has two tools at her/his disposal to maximize the joint surplus from the supply-chain arrangement: control over the inputs and ownership of the firm. Feenstra and Hanson apply this model to China, using the share of processing trade accounted for by each possible factory control/input control pair to represent the probability that a particular contractual arrangement is chosen. Comparing these shares in China's total processing exports over the period 1997–2002, they found that multinational firms tended to split ownership of the factories and input control. The most common arrangement was to have the foreigner own the factory (an affiliate firm) and the Chinese control the inputs (processing with imported inputs).

Some additional evidence on contractual arrangements in global supply chains is found in Dean, Lovely and Mora (2009). These authors apply the Feenstra-Hanson analysis to US-China and Japan-China processing trade. They found that in 1996, the two most common arrangements for processing exports to the U.S. were foreign-owned factories with Chinese control over inputs (66%) and Chinese owned factories with foreign control over inputs (25%). For Japan, these figures were 56.% and 17.8% , respectively. By 2007 the foreign factory control/Chinese input control arrangement accounted for almost 75% of the processing exports from China to the US and China to Japan. There was also a growing share of foreign factory control/foreign input control (processing and assembly). Delving deeper, Dean, Lovely and Mora found that the choice of foreign factory ownership was also important. For processing exports to both the US and Japan, more than 50% came from *wholly-owned* foreign factories with Chinese control over the inputs. However, processing exports to Japan were somewhat more likely to come from *wholly-owned* foreign factories with foreign control over the inputs, than those to the US.

3. Product Cycle of Offshoring

Antras (2005) proposes a theory of international offshoring that will motivate our econometric work. In this model, a product is produced by combining a high-tech input and a low-tech input. The high-tech input is produced in the North (e.g., the US), which has a comparative advantage in R&D intensive goods. The low-tech input can either be produced in the North or the South (e.g., China). With relatively lower wages in China, the low-tech input would normally be produced in China. However, Antras introduces contractual incompleteness, which limits the initial degree of production fragmentation. With increased standardization of the product, the production of low-tech input will then be shifted to the South. As will be discussed below, relative wages and the characteristics of the industries at the moment of the decision are among the factors that determine the extent of international production sharing. Foreign direct investment is also important, since foreign control over the factory can ameliorate the risk generated by incomplete contracts.

Antras makes the standard assumption that there is only contract incompleteness when the North chooses to locate the production of the low-tech input in China. Contract incompleteness occurs because the northern research center cannot guarantee that the southern manufacturing center will produce a good quality intermediate good. This results in underinvestment in both inputs. If the product is new, and thus uses the high-tech input intensively, this distortion becomes more severe if the research and development center has lower bargaining power over the joint surplus. Conversely, if the product uses the low-tech input intensively, then the distortion is more severe if the southern manufacturing plant has lower bargaining power. As the product becomes more standardized, it becomes more intensive in the use of the low-tech input. There is a critical level of this intensity such that the relative wage advantage of the South overcomes the risk of a low-quality input. Thus, the low-tech input will be produced in China if:

$$A(z) \equiv [(1-\alpha)/ (1-\alpha(ø (1-z) + (1- ø)z)]^{(1-\alpha)/ \alpha z} [ø^{-(1-z)/z}/ (1-ø)] \leq w^N/w^S \quad (1)$$

where a high z denotes more intensive use of low-tech input, ø is the bargaining power of the research center manager, 1/α is the constant markup over marginal cost, w^N is the wage in the North (US) and w^S is the wage in the South (China).

This scenario is illustrated Antras' figure 2, reproduced here in figure 3. For new goods in which R&D constitutes a high proportion of the value of output (low z), the relative profitability of producing the low-tech input in the North will outweigh any cost advantage from engaging in assembly in the South: $A(z) > w^N/w^S$. Thus, initially, there will be no fragmentation of production. The low-tech and high-tech inputs will be produced in the North. As the good becomes more standardized, the low-tech input accounts for a growing proportion of the value of the product. When $A(z) < w^N/w^S$, the firm gains more from splitting production shifting production of the low-tech input to China.

If the Northern research manager has the option to produce the low-tech input in China in its own subsidiary firm, this is likely to induce fragmentation to the South earlier in the maturation process. Vertical integration will make the manager of the manufacturing plant in China an employee of the North. This increases (reduces) the incentive of the research center manager (manufacturing plant manager) to invest, since the Northern manager can fire the southern manager if she/he refuses to trade after sunk costs are made. Antras assumes that if the manager is fired, a fraction 1-δ of the low-tech input will be lost. The manager in the North now will have to choose the manufacturing location and ownership structure. It turns out that the profits of the Northern research center are higher as a multinational if

$$A_M(z) \equiv [(1-\alpha)/ (1-(1/2\alpha)(1+ \delta^\alpha (1-2z))]^{(1-\alpha)/ \alpha z} [2/[(1+ \delta^\alpha)^{(1-z)}(1- \delta^\alpha)^2]^{1/2} \leq w^N/w^S \quad (2)$$

where the other parameters are the same as in (1). With (2), the North would prefer to offshore to China in the form of a multinational. There is a further choice for the Northern research center, i.e. to have China produce the low-tech input either via an integrated firm (multinational) or via an independent assembler in China. If $A_M(z) < A(z)$, assembly will be done by U.S. affiliate. If $A_M(z) > A(z)$, the low-tech input will be produced by an independent firm in China instead.

Antras' figure 4 illustrates this scenario, reproduced here as figure 4. Again, the main determinant of fragmentation is the degree of the standardization of the product in relation to the relative wage in the north. When the good is relatively new, all stages of production stay in the North (US). However, since the risk of low-quality low-tech inputs is reduced by producing as a multinational affiliate, fragmentation can potentially begin earlier if $A_M(z) > A(z) = w^N/w^S$. Thus, there will be a wider range of z over which offshoring to China takes place, but initially this will take the done through a foreign affiliate. Finally, when the good is further standardized, production will be shifted to an independent unaffiliated Chinese firm.

III. Examining the VS Share in Chinese Exports through Antras' Lens

Antras' model yields several testable hypotheses regarding variation in offshoring. Assume that a cross-section of industries at a point in time will generally mimic the offshoring pattern of a single good over its maturation. Then the Antras' model would suggest that:

i. Offshoring increases as the "high-tech intensity" of the product falls relative to the wage in the north.

ii. For a given level of high-tech intensity, offshoring increases as the relative wage in the north rises.

iii. For a given level of high-tech intensity, the possibility of offshoring through a foreign affiliate increases with the amount of offshoring.

iv. As the high tech intensity of the product diminishes, offshoring will be done less through foreign affiliates and more through independent southern firms.

To consider the usefulness of this model in explaining the vertical specialization in Chinese exports, we begin by examining the relation between northern high-tech intensities, relative wages, and Chinese VS share. We use the split VS share estimates from DFW, data on Chinese industry characteristics, such as employment and wages, from the NBS Industrial Enterprise Survey, and trade data from China Customs. These data are then concorded to ISIC Revision 3 at the 4-digit level.[6] To proxy the high-tech intensity of northern industries, we use US 2002 R & D expenditures as a percent of output (current value) in each sector, from the OECD.[7]

To keep things simple, assume that the relative profitability of producing completely in the US versus offshoring to China is proportional to R&D intensity. Figure 5 plots US R&D intensity and the US wage relative to the Chinese wage in each of the 113 industries for which we have R&D intensity data.[8] The Chinese 2002 average wage is calculated as average payroll divided by average employment in each 4-digit industry. The US average wage is calculated as average wages and salaries divided by average number of employees in each 4-digit industry, using data again from UNIDO INDSTAT Data[9] Figure 5 bears a strong resemblance to Antras' graph presented in figure 3.

In our sample, all industries show some level of processing exports. Thus, we expect to see processing even for industries in the highest RD intensities (to the left of the gridline showing the intersection of the two curves). However, based on Antras' model, we expect that processing trade, and thus VS share, would rise as RD intensity falls with respect to relative wages. In figure 6 we show Chinese 2002 VS shares, as well as R&D intensity and relative wages. The results are not encouraging. The highest VS shares appear to be in industries with the highest R&D intensity, such as medical and precision instruments. While there is a little evidence that VS shares rise as R&D intensity falls to the left of the gridline,

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[6] The VS share data are originally in input-output classification, while the enterprise data are in 2002 Chinese standard industrial classification (CSIC). One official concordance maps the IO classification to the 2002 Chinese standard industrial classification (CSIC), and another official concordance maps the CSIC 4-digit classification to ISIC Revision 3 data. The trade data are originally in HS 8-digit, and are mapped to ISIC using a concordance from WITS.
[7] Data are from OECD STAN R&D Expenditure in Industry (ISIC Rev. 3) ANBERD ed2009, http://stats.oecd.org/Index.aspx?DataSetCode=ANBERD_REV3.
[8] Where 4-digit data on RD expenditures were not available, 3-digit or 2-digit data were used.
[9] Wages and salaries data: http://data.un.org/Data.aspx?d=UNIDO&f=tableCode%3a05 . Number of employees data: http://data.un.org/Data.aspx?q=employees&d=UNIDO&f=tableCode%3a04. US wage and salary data were only available for 2004. These were converted to Yuan using the average market exchange rate from IMF's IFS database. We assume that the distribution of US 2004 wages across industries is sufficiently similar to the 2002 distribution that it will not bias the 2002 relative wage variable.

this pattern is short-lived and does not appear in any consistent way once R&D intensity falls below the relative wage.

However, recall that the vertical specialization in Chinese exports from a particular industry ($VSshare_i$) will depend upon (1) the extent of processing exports in that industry ($PXshare_i$), and (2) the foreign content in those processing exports ($PVSShare_i$), i.e.,

$$VSshare_i = f(PXshare_i, PVSshare_i) \tag{3}$$

where $f_1 > 0$ and $f_2 > 0$. Antras' model suggests that $PXshare_i$ is negatively related to R&D intensity ($RDInt_i$), controlling for the relative wage ($RelWage_i$). Thus,

$$PXshare_i = g(RDInt_i, RelWage_i, RDInt_i * PXshare_i^{FIE}) \tag{4}$$

where $g_1 < 0$ and $g_2 > 0$. The option of carrying out offshoring via a foreign-invested enterprise ($PXshare_i^{FIE}$) means that firms are more likely to engage in offshoring regardless of R&D intensity, because ownership of the firm in the south again helps increase quality control ($g_3 > 0$). In contrast, $PVSShare_i$ is positively related to $RDInt_i$. As R& D intensity rises, northern firms reduce their risk by producing most of the product in the north (high foreign content), and only offshoring some assembly or packaging activities. Thus,

$$PVSshare_i = h(RDInt_i, RelWage_i) \tag{5}$$

where $h_1 > 0$. However, $h_2 < 0$, since a higher relative wage raises the incentive to offshore more of the product to the south.

Table 1 examines these hypotheses using industries grouped by US R&D intensity. At the top end are firms that spend on average more than 20% of the value of output on R & D. At the lowest end are firms that spend on average less than 0.5% on R & D. Industries to the left of the gridline in figures 5 and 6 are shaded in grey. Column 3 shows that average $VSshare_i$ rises as average R&D falls for the top two R&D-intensive groups. But, in all other groups, $VSshare_i$ falls with $RDInt_i$.—the opposite of the prediction from Antras' model. In column 5 we see that in fact that R&D-intensive industry groups have the highest levels of $PXshare_i$.

The predictions that the most R&D-intensive industries will have the highest $PVSShare_{i.}$ (the highest foreign content) is evident in column 4 of table 3. China produces only the last link in the global chain in these industries--a small portion of the value of the product. There is little evidence that the R&D-intensive industries conduct more processing through FIEs (column 6), nor that they choose a wholly-owned subsidiary ("fully-funded enterprise," or FFE) more often than the other industry groups (column 7). But column 8 does show some evidence that R&D-intensive firms preserve control over their offshored inputs by relying more on the "processing and assembly" customs regime than other industry groups.

IV. An econometric investigation

If we treat the decision to engage in offshoring and the decision regarding how much of the product to produce offshore as a simultaneous one, we can insert equations (4) and (5) into (3) to yield:

$$VSshare_i = a_0 lnRDInt_i + a_1 lnRelWage_i + a_2 lnRDInt_i * PXshare_i^{FIE} \quad (6)$$

where ln indicates natural log and $PXshare_i^{FIE}$ is measured as the proportion of processing exports conducted by FIEs in China.[10] Since the signs on $lnRDInt_i$ and on $lnRelWage_i$ are opposite in equations (4) and (5), the net result is not predictable *a priori*. We first estimate (6) using GLS, including industry fixed effects (defined at the two-digit level) and robust standard errors corrected for industry clustering.

The first column in table 2 shows results for equation (3), confirming our expectation that VS Share is a positive function both of $PXshare_i$ .and $PVSShare_{i.}$ These results suggest that the $VSshare_i$ in Chinese exports responds much more to an increase in the foreign content of processing exports than to an increase in the share of processing exports in an industry. The second column in table 2 shows the results for equation (6). Here we find strong evidence supporting Antras' predictions. $VSshare_i$ is strongly negatively related to the R&D

[10] Chinese customs data do not report the parent firm's country of origin. Thus, we cannot measure the share of an industry's processing exports by US FIEs, but only the share of an industry's processing exports by FIEs from all source countries.

intensity of the industry. The more R&D-intensive the industry, the less vertical specialization in Chinese exports in that industry. In addition, interacting R&D intensity with the share of processing trade carried out by FIEs increases $VSshare_i$. Thus, the ability to carry out offshoring via a subsidiary in China increases the vertical specialization in Chinese exports even for the most RD-intensive industries. Contrary to expectations, the relative wage has no significant impact on VS share.

Because equations (4) and (5) have opposing signs on the key variables of interest, we consider a two-stage decision process. Suppose the firm first decides how much processing to undertake and then decides how much foreign content will be in the offshored product—i.e., the stages produced at home vs. those offshored. Then we would estimate:

First stage: $$PXshare_i = g(RDInt_i, RelWage_i, RDInt_i * PXshare_i^{FIE})$$

Second Stage: $$VSshare_i = b_0 lnRDInt_i + b_1 lnRelWage_i + b_2 PXshare_i . \quad (7)$$

using instrumental variables. $PXshare_i^{FIE}$ is the instrument used to identify the system. The first stage expression is simply equation (4) and the instrumented $PXshare_i$ appears in the second stage.

Table 3 shows the results of this two-stage estimation, again including robust standard errors corrected for clustering in both stages, and industry fixed effects in the first stage. Comparing the results in the two columns we see clearly the opposing signs on R&D intensity. A 1 percent increase in $RDInt_i$ <u>reduces</u> the share of processing exports in an industry by about 18 percentage points (column 1). This, in turn, <u>reduces</u> $VSshare_i$ by about 0.56*18, or about 10.1 percentage points (column 2). However, the same 1 percent increase in $RDInt_i$ <u>raises</u> $VSshare_i$ directly by about 2.3 percentage points (column 2) because it raises the foreign content of processing exports. Note that these two effects together imply that China's role in the global supply chain *falls* as the R&D-intensity of an industry rises. The first effect reduces the extent of processing exports done in China, and the second effect raises the foreign content of the processing exports that are done in China, making it more likely that Chinese production will be in the final, lower-tech stages of the production process.

The results for the relative wage in both columns of table 3 are the opposite of what we would have expected given our model. This may be due to the fact that the wage itself is endogenous, and is a function of both R&D intensity and the ownership of the firm doing the offshoring. In addition, as we noted earlier, there are in reality several ways in which northern firms can reduce the risk of offshoring. We have yet to incorporate the firms' ability to retain control over the inputs via choosing the Chinese processing and assembly customs regime. Nor have we incorporated the firms' ability to choose offshoring via a wholly-owned subsidiary, joint venture, or an independent Chinese firm. These extensions will be explored next.

V. Extensions (to be completed)

VI. Conclusions (to be completed)

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Figure 1. Vertical Specialization of Chinese Merchandise Exports by Sector, 2002: Non-Split and Split Methods

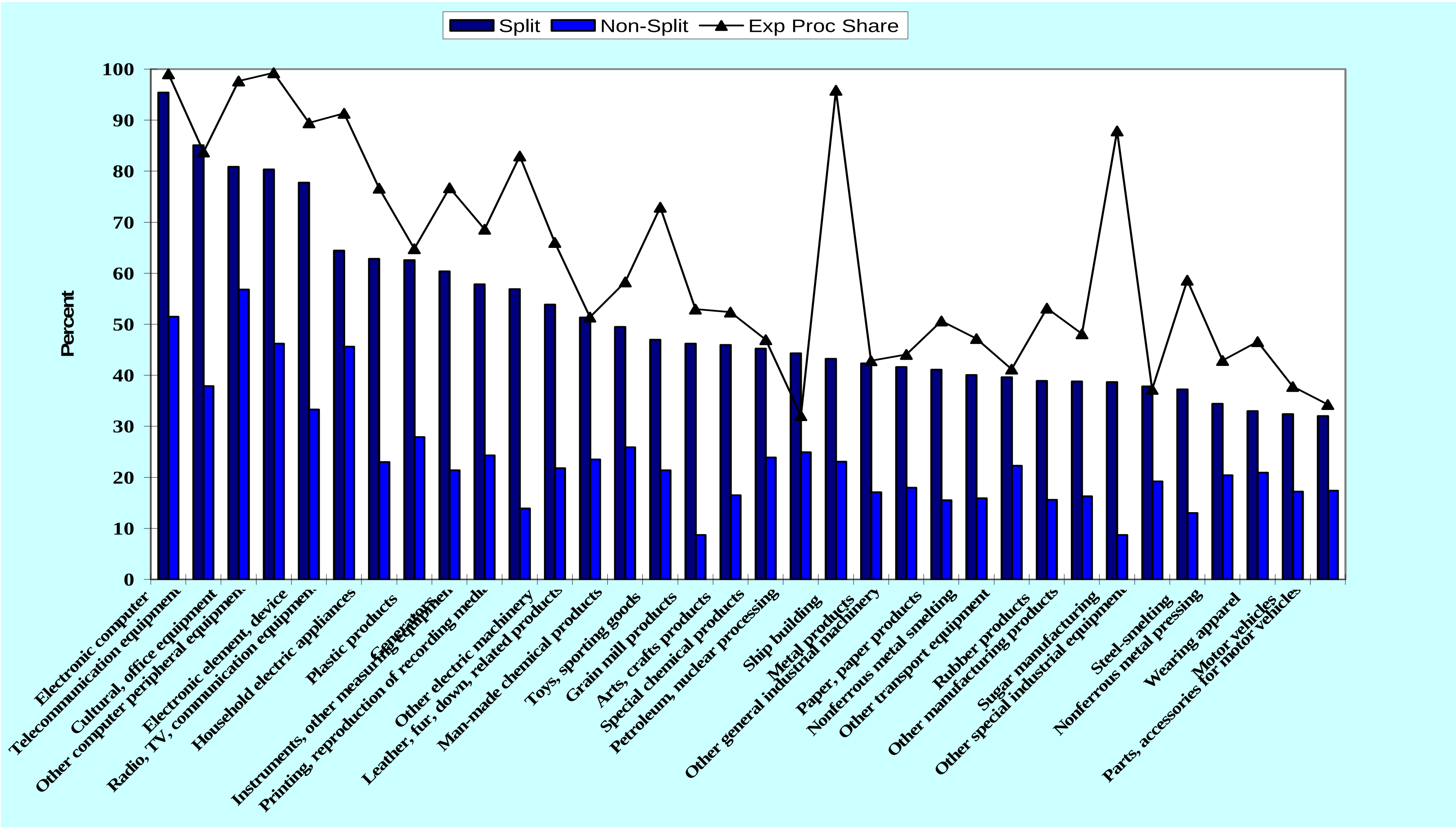


Figure 2. Vertical Specialization of Chinese Merchandise Exports by Sector and Trade Regime, 2002: Split Method

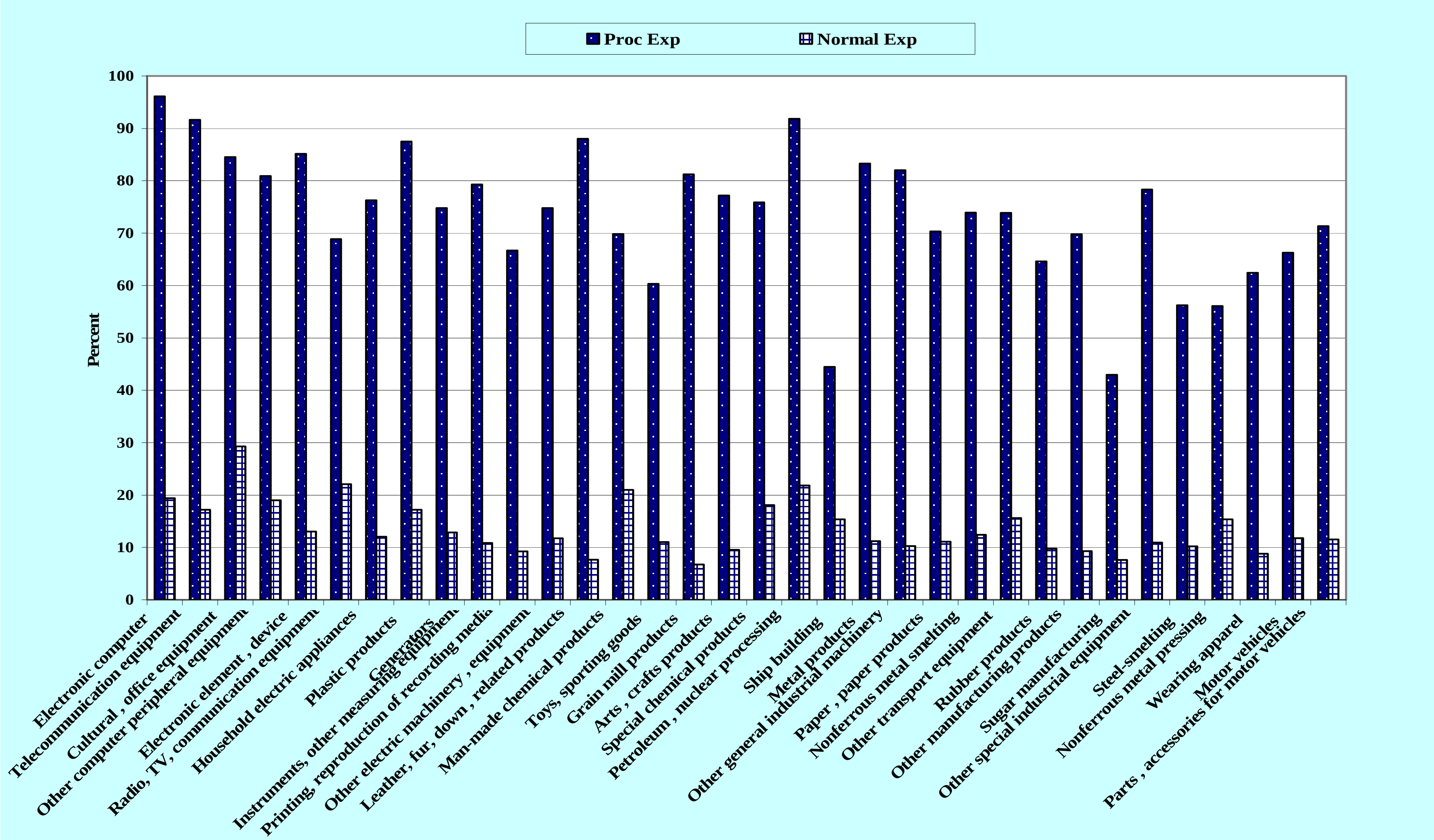
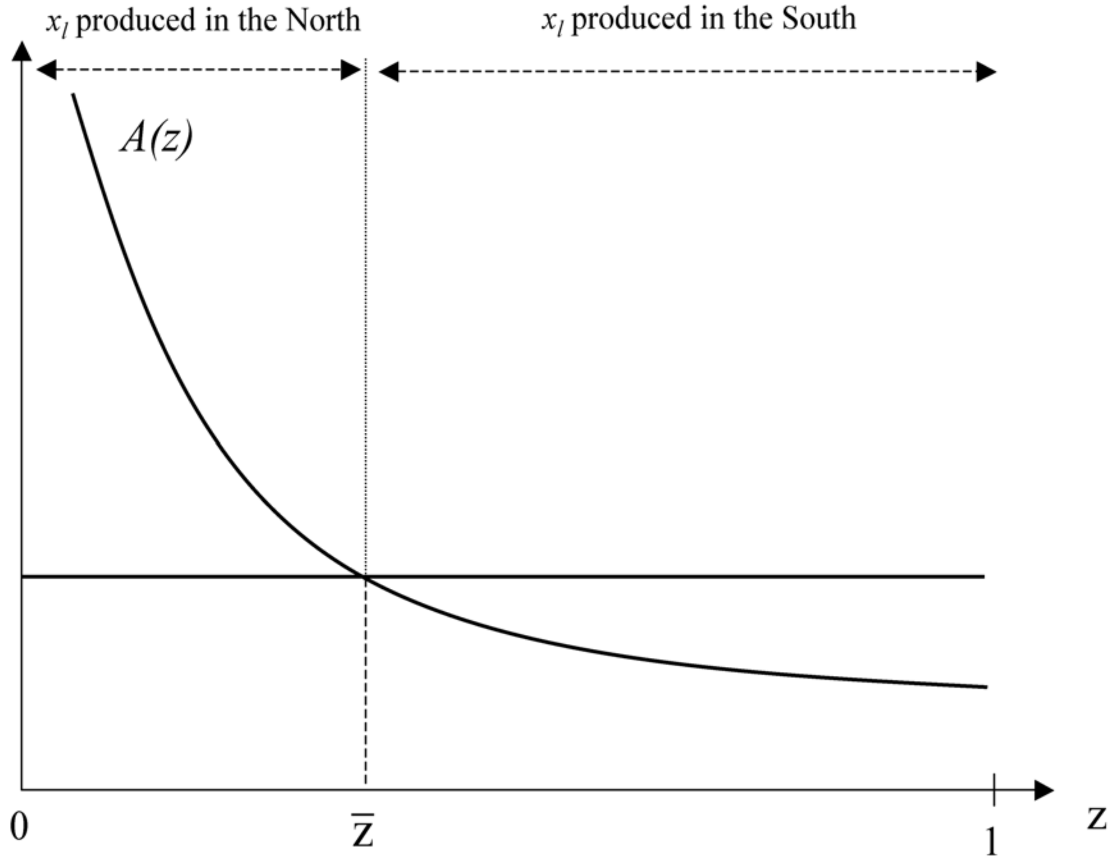
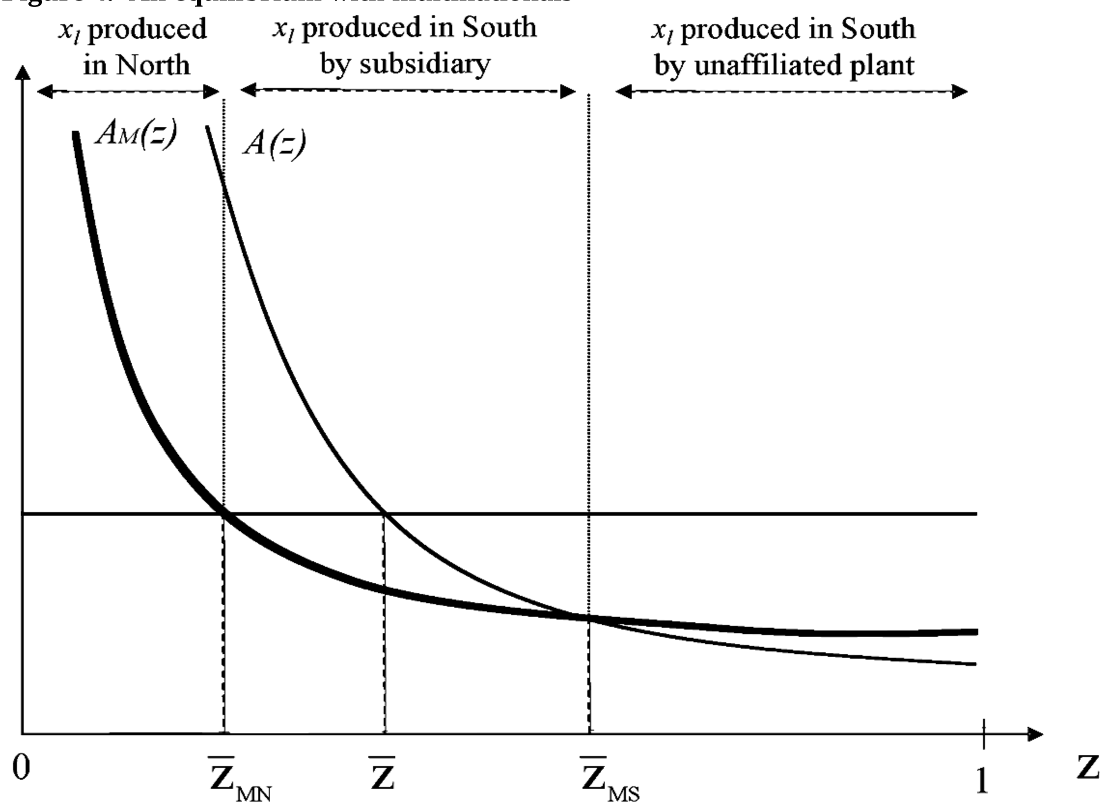


Figure 3. Location Choices of the low-tech input x_l



Source: Antras 2005

Figure 4. An equilibrium with multinationals



Source: Antras 2005

Figure 5: US R&D Intensity and US-China Relative Wages, 2002

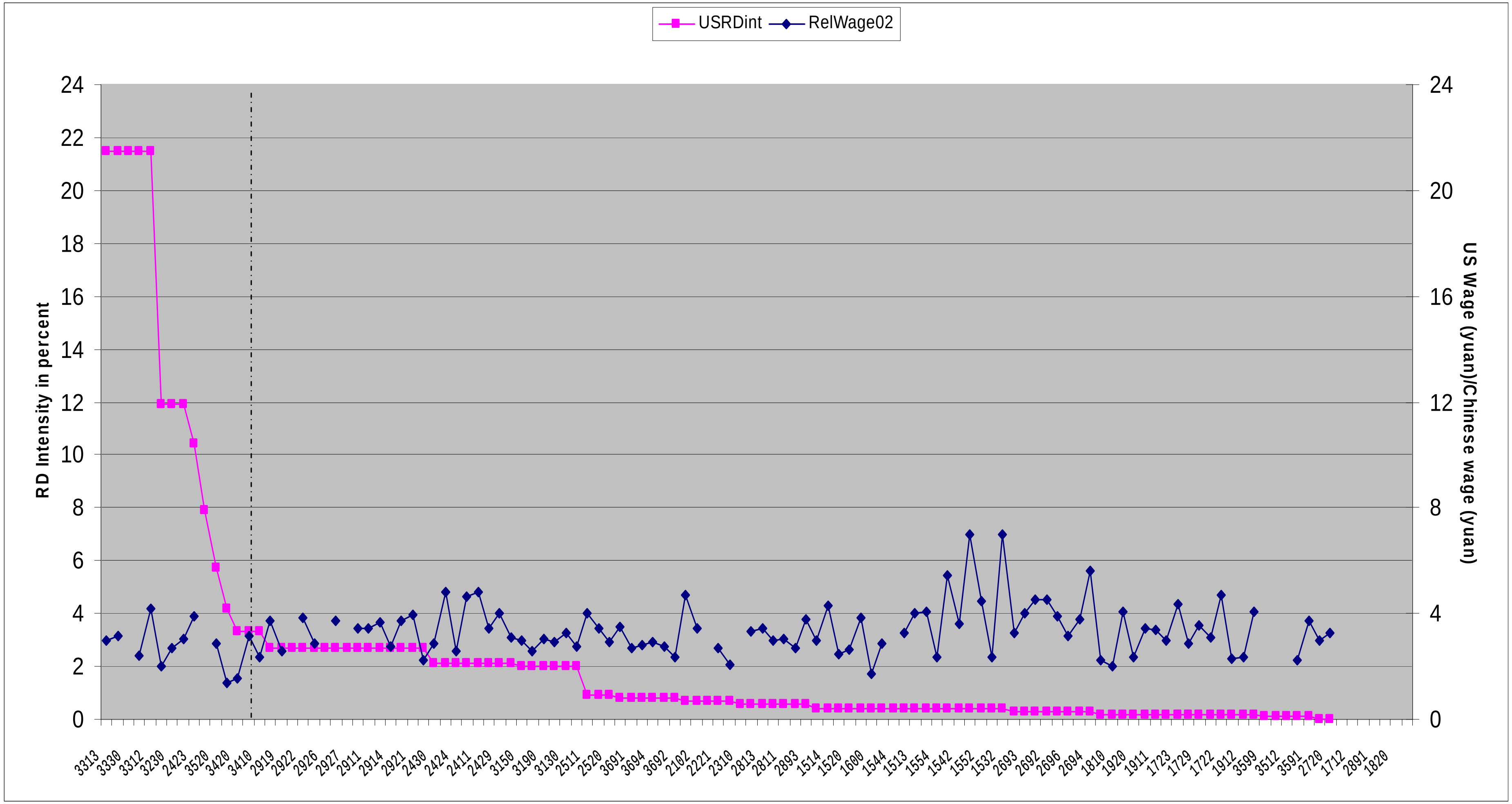


Figure 6: VS Share in Chinese Exports by Sector, 2002

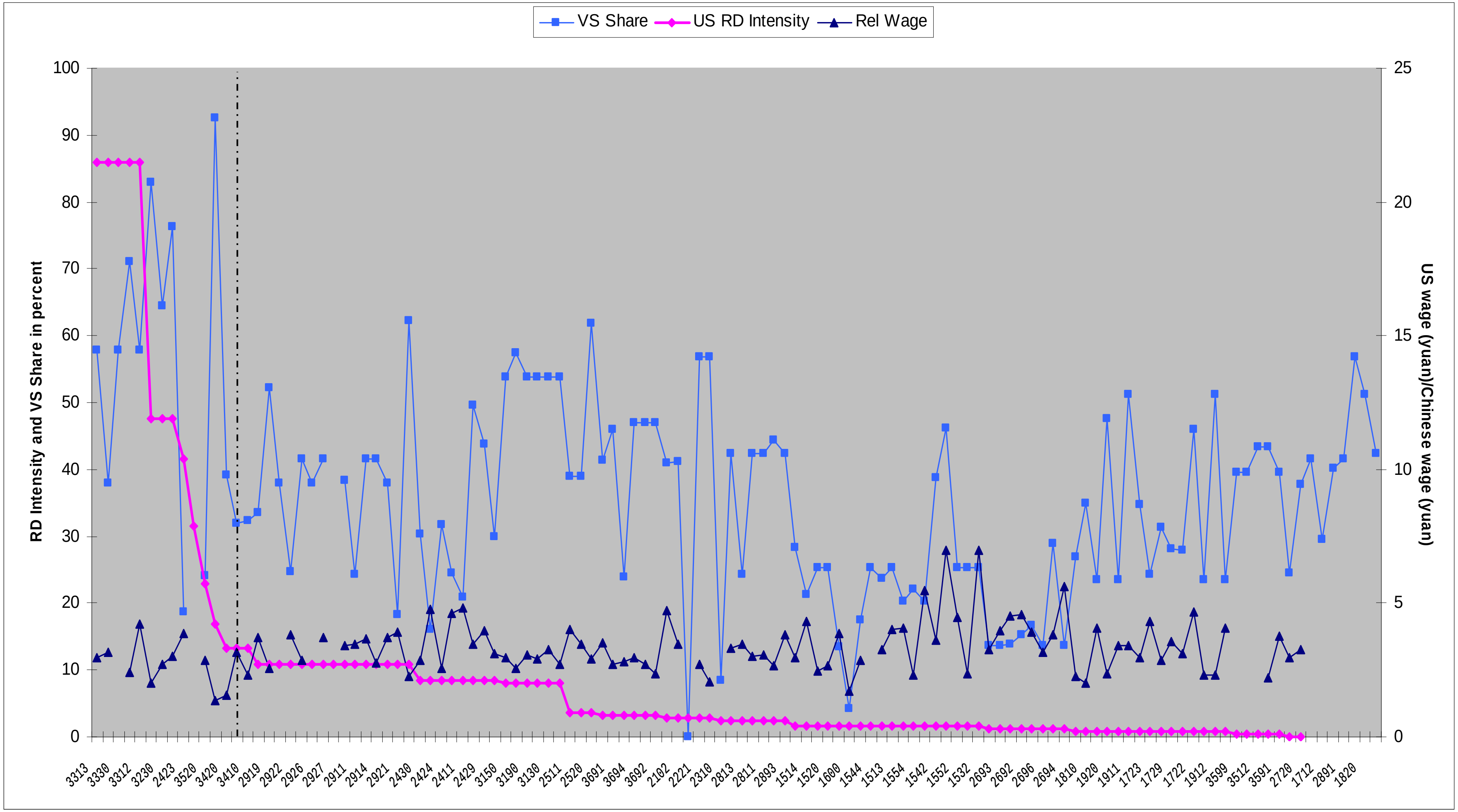


Table 1. Sector Descriptive Statistics by RD Intensity (mean values), 2002

Sectors Grouped by RD Intensity	**(1) US RD Intensity**	**(2) Relative Wage**	**(3) VS Share**	**(4) Processing VS Share**	**(5) Processing Export Share**	**(6) FIE Share of Processing Exports**	**(7) FFE Share of FIE Processing Exports**	**(8) P & A Share of Processing Exports**
>20%	**21.50**	3.19	56.47	79.72	0.71	0.71	0.24	0.29
10-20%	**10.80**	2.91	60.61	76.76	0.61	0.69	0.60	0.23
4-8%	**3.96**	2.25	44.02	75.22	0.52	0.70	0.34	0.08
1-3%	**2.39**	3.37	39.55	72.59	0.40	0.70	0.35	0.15
<1%	**0.42**	3.44	31.34	66.57	0.38	0.68	0.40	0.22
All Sectors	2.47	3.33	36.17	69.44	0.42	0.69	0.39	0.20

Table 2. The Determinants of VS Share in Chinese 2002 Exports, by Sector

Dependent var: VS Share	Equation (3) GLS	Equation (6) GLS
Processing VS Share	0.21** (4.72)	
Processing Export Share	0.44** (4.38)	
ln US R&D Intensity		-8.26** (-3.61)
ln Relative Wage		-3.96 (-0.54)
ln US RD Intensity * FIE Share of Processing Exports		9.28** (2.87)
Constant	-11.75 (-1.65)	28.67** (3.10)
Industry effects	yes	yes
Clustering	yes	yes
Obs	112	100
R^2	0.87	0.80
Root MSE	6.75	8.39

** and * indicate significance at the 1% and 5% levels, respectively.

Table 3. The Determinants of VS Share in Chinese 2002 Exports: Two Stage Decision

	(6) IV First Stage (t-statistics)	(6) IV Second Stage (z-statistics)
Dependent Variable	*Processing Export Share*	*VS Share*
ln US R&D Intensity	-18.21** (-4.49)	2.32* (2.36)
ln Relative Wage	-31.44** (-3.09)	3.46 (0.56)
ln US RD Intensity * FIE Share of Processing Exports	26.38* (2.47)	-
Instrument: Processing Export Share	-	0.56** (7.68)
Constant	0.70** (4.97)	9.46 (1.00)
Industry Effects		
Clustering		
Obs	*100*	*100*
R^2	*0.67*	*0.48*
F-statistic	*27.22***	*-*
Root MSE	*0.17*	*11.77*
Wald X^2	*-*	*118.60***

** and * indicate significance at the 1% and 5% levels, respectively.