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Who gains and who loses from China's growth

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Angela Cheptea

(very preliminary, in progress)

Abstract

Emerging countries have been winning large market shares since the early 1990s. Among these, China stands out with the most remarkable performance: it almost tripled its world market share since 1994 reaching 16.1% in 2007. The present paper attempts to identify the countries that have profited the most from this increase in the size of the Chinese market. I use an econometric shift-share methodology, that permits to identify for each trade flow the share of growth arising from the capacity to target the products and markets with the highest increase in demand, and the share due exclusively to exporter's performance.

JEL Classification: F12, F15

Keywords: China, Export Performance, Shift-Share.

1 Introduction

One of the most remarkable features that characterized international trade over the last two decades is the transformation of China into the the world's largest exporter. In the early 1990s Chinese products accounted for about 5% of the world market share; by the end of the 2000s more than one sixth of the value of marchandise traded worldwide originates from China. This impresive market share gain was achieved at the extend of the losses experienced by other exporters, especially the ones from the developed world. However, an important upside of these redistribution of markets is the expansion of the Chinese market. The high growth of Chinese exports has increased the country's import capacity. Nowadays exporting to the Chinese market has become a priority for most countries and large exporting firms. Accordingly, the Chinese market is often referred to as the new driver of the world economy.

But exporting to China can be very different than exporting to tradition trade partners and therefore very challenging. Which countries have profited the most which the less from this increase in the size of the Chinese market? Are the best performers on the Chinese market also the ones that cope the best with the global competition? This paper aims to answer these questions by identifying recent changes in specialization and market shares of leading world exporters.

I use an econometric shift-share analysis that permits to identify for each trade flow the share of growth arising from the capacity to target the products and markets with the highest increase in demand, and the share due exclusively to exporter's performance. In a first step I estimate the true contribution of Chinese import capacity to the growth of world trade. Secondly, for each exporting country I compute the amount of growth that one would observe if all countries were to benefit equally from the increase in Chinese capacity to import. Then I compare these values with the true growth of each country's exports to China.

Another approach is to compare the export performance of each exporting country on the global market to its performance of the Chinese market. For this, apply the shift-share decomposition to all trade flows and then separately for exports to China. The same rationale applies to products allowing to identify the ones that sold the best on the Chinese market.

To do so, it is necessary to rely on very detailed and longitudinal trade data, on an exhaustive basis. To this end, I use a database of international trade at the product level, BACI, developed by Gaulier and Zignago (2010). BACI provides (FOB) reconciled values, as well as unit values (values/quantities), of all international trade flows, at the product level: 5,000 headings from the 6-digit Harmonised System (HS) classification, hereafter HS6.

2 The redistribution of world market shares

Tables 1 and 2 summarise the recent changes in world market shares. I consider all exchanged products, *i.e.* the primary and the manufacturing sectors, with the exception of mineral products, notably oil, as well as some specific and non classified sectors. Intra-EU trade flows are excluded to allow the comparison with other exporters. The first three columns give the market share in 1994, 2000, and 2007. In the three subsequent columns, I observe the percentage point changes in market shares for the whole period and for the two sub-periods (1994-2000 and 2000-2007).

The most remarkable evolution in Table 1 is that, in the sub-period 2000-2007, China has doubled its world market share becoming larger than the US as a super trader. The EU market share has been fairly affected by the ten-point rise of China over the same period. In contrast, Japan and the US lose around 6 percentage points of market shares each.

We now decompose the intensive margin of exports using an econometric shift-share methodology. Our objective is to rely on this decomposition to identify the changes in the determinants of the good resilience of EU market shares in the upper segment of the market.

Table 1: Changes in world market shares 1994-2007

	Market shares, %			Δ in market shares, p.p.		
Exporter	1994	2000	2007	94-07	94-00	00-07
EU 25	19.7	18.1	19.3	-0.34	-1.58	1.23
USA	18.5	18.3	12.5	-5.97	-0.23	-5.74
Japan	14.8	11.7	8.6	-6.23	-3.12	-3.11
China	5.8	8.0	16.1	10.26	2.17	8.09
India	1.0	1.1	1.7	0.61	0.09	0.51
Russia	0.9	1.3	1.5	0.62	0.37	0.25
Brazil	1.5	1.3	1.6	0.10	-0.27	0.37
Canada	5.3	5.5	3.7	-1.54	0.24	-1.78
Mexico	2.0	3.4	2.7	0.73	1.45	-0.72
Korea	3.4	4.0	4.2	0.87	0.67	0.20
Asean	8.4	9.3	8.4	0.05	0.87	-0.82
Turkey	0.7	0.7	1.3	0.58	-0.01	0.59
Mediterranean	1.0	1.3	1.4	0.33	0.25	0.08
Mercosur	0.7	0.6	0.7	0.00	-0.07	0.07
RoW	16.3	15.5	16.3	-0.07	-0.83	0.77

Source: Author' calculations using BACI values (current USD) of exchanged goods. Oil and intra-EU trade are excluded. The change in market shares is given in percentage points (p.p.).

Table 2: Changes in Chinese market shares 1994-2007

	Market shares, %			Δ in market shares, p.p.		
Exporter	1994	2000	2007	94-07	94-00	00-07
EU 25	17.53	14.93	16.25	-1.28	1.33	-2.60
USA	10.87	11.14	10.36	-0.50	-0.77	0.27
Japan	20.38	18.99	16.84	-3.55	-2.15	-1.40
India	0.24	0.52	0.86	0.61	0.34	0.27
Russia	2.97	2.62	1.36	-1.61	-1.26	-0.35
Brazil	0.88	0.50	1.01	0.14	0.51	-0.38
Canada	1.80	1.82	1.34	-0.46	-0.48	0.02
Mexico	0.11	0.21	0.35	0.25	0.14	0.11
Korea	6.46	10.32	12.17	5.71	1.85	3.86
Asean	5.38	9.34	11.10	5.71	1.75	3.96
Turkey	0.49	0.06	0.08	-0.41	0.02	-0.43
Mediterranean	0.19	0.31	0.41	0.22	0.09	0.13
Mercosur	0.41	0.58	0.82	0.41	0.23	0.18
RoW	32.29	28.66	27.05	-5.24	-1.60	-3.63

Source: Author's calculations using BACI values (current USD) of exchanged goods. Oil and intra-EU trade are excluded. The change in market shares is given in percentage points (p.p.).

3 An econometric shift-share analysis of exports growth

This section presents an econometric *shift-share decomposition of export growth* that identifies for each exporter the contributions to the intensive margin of trade: export composition (by product and destination) versus competitiveness. Accordingly, export growth for each country is broken down into three components: a geographic composition effect, a sectoral composition effect and a performance effect (section 3). Countries have limited influence on the composition effects, which result from the growth of their markets, given the initial geographical and sectoral orientation of their exports. In contrast, the performance effect captures the degree to which the exporting country has been able to gain (or lose) market shares: this is the true competitiveness effect. In section 3.2 a similar decomposition is performed separately for exports to the Chinese market.

The shift-share decomposition identity was first proposed by Maddison (1952) and was extensively used afterwards. Although employed mainly in regional studies on economic and employment growth, this method has been successfully extended to trade issues. Instead of following this traditional decomposition, we adopt an econometric approach, taking benefit of the data disaggregation. In addition, in order to capture variations across time, we focus on the sum of annual growths of each trade flow rather than on the increase in its value between the first and last year of the considered period. Therefore, our method is constrained by the observation of the same flow in two consecutive years, a necessary to compute annual growth rates. Accordingly we stick to intensive margin of trade.

The definition of the intensive margin adopted here is more inclusive than the one used in the former section. We define the intensive margin as the increase in the value of flows existing *in any two consecutive years* from 1994 to 2007: growth computation is not restricted to flows present in 1994 and 2007. We exclude flows below USD 10,000 and those concerning micro-states. The 3,639,317 flows that satisfy these conditions account for a trade growth of bn USD 5,463. This figure does not include trade flows created (bn USD 346) or disappeared (bn USD 213) throughout the period.

3.1 Application to the global market

In the field of international trade, the traditional shift-share analysis aims to measure the contribution of countries' geographical and sectoral specialisation to the growth of their exports. Since shift-share analysis is performed on exports growth, only the intensive margin of trade is explained. The method simply aims at computing the contribution of the initial geographical and sectoral composition of exports to changes in market shares. The remaining part of the change is pure performance (*i.e.* competitiveness).

This method has been extensively used in competitiveness studies. Laursen (1999), Wörz (2003) or Alcántara Escolano and Blanes Cristóbal (2000) are some examples of papers using the structural decomposition to analyse export performances at the country level.[1]

[1]The origin of the shift-share method in regional studies explains its more generalised application to sub-national level data. Markusen et al. (1991) use a shift-share decomposition and estimate the shares of employment growth for export and import penetration in nine US regions. Hayward and Erickson (1995) have extended this model, applying it to the North American Free Trade Area. Gazel and Schwer (1998)

Departing from this traditional analysis, we rely here on a shift-share methodology based on econometrics, proposed by Cheptea et al. (2005) and Cheptea et al. (2010), which is a further development of Jayet (1993) weighted variance analysis of growth rates. As Cheptea et al. (2010), the growth rate of country i's exports is computed here as the logarithm of the Törnqvist index of its exports of each product k to each partner j:

$$d\ln X_i^t \left[= \ln\left(\frac{X_i^t}{X_i^{t-1}}\right)\right] = \sum_{jk}\left[\frac{1}{2}\left(\frac{X_{ijk}^t}{X_i^t}+\frac{X_{ijk}^{t-1}}{X_i^{t-1}}\right)\ln\left(\frac{X_{ijk}^t}{X_{ijk}^{t-1}}\right)\right] = \sum_{jk}\frac{w_{ijk}^t}{w_i^t}\, d\ln X_{ijk}^t, \quad (1)$$

where X represents the value of exports and w^t denotes the average weight of a flow in world trade in years $t-1$ and t: $w_{ijk}^t = \frac{1}{2}\left(\frac{X_{ijk}^{t-1}}{X^{t-1}}+\frac{X_{ijk}^t}{X^t}\right)$ and $w_i^t = \frac{1}{2}\left(\frac{X_i^{t-1}}{X^{t-1}}+\frac{X_i^t}{X^t}\right)$.

To compute country-level structural and performance effects, we first explain the growth rate of each individual trade flow (from each exporter to each importer for a given product and a year) with weighted (by w_{ijk}^t) OLS with exporter (i), importer (j), and product (k) fixed effects:

$$d\ln X_{ijk}^t = intercept^t + \alpha_i^t + \beta_j^t + \gamma_k^t + \varepsilon_{ijk}^t. \quad (2)$$

β_j^t and γ_k^t capture the contribution of the average geographic and product structure in year t to the annual growth rate of exports between $t-1$ and t, α_i^t is the amount of growth in t that can be attributed to the export performance of country i, and $intercept^t$ is a constant term. The above decomposition is done for each year between 1995 and 2007 and a total of thirteen annual effects for each exporter, importer and product are estimated.[2]

Combining equations (1) and (2), we can express the overall growth of country i exports in terms of the three types of effects mentioned above:

$$d\ln X_i^t = intercept^t + \alpha_i^t + \sum_j \frac{w_{ij}^t}{w_i^t}\,\beta_j^t + \sum_k \frac{w_{ik}^t}{w_i^t}\,\gamma_k^t. \quad (3)$$

Let hats indicate OLS-estimated coefficients in (2). When estimating (2), one individual for each set of fixed effects has to be removed because of collinearity. Therefore, $\hat{\alpha}_i^t$ is a measure of country i's 'pure' exports growth relatively to the omitted country. A measure of country i effect independent of the choice of the omitted country is given by the *least square mean* (hereafter *LSMEAN*), obtained by adding the intercept and the weighted mean of partner and product effects to the estimated effect:

$$LSMEAN_i^t = \hat{\alpha}_i^t + \hat{intercept}^t + \sum_j w_j^t\,\hat{\beta}_j^t + \sum_k w_k^t\,\hat{\gamma}_k^t. \quad (4)$$

For similar reasons, we normalize the estimated importer and product effects. The new values are obtained by subtracting the weighted average of estimated effects from the parameters estimated originally: $\tilde{\beta}_j^t = \hat{\beta}_j^t - \sum_j w_j^t\hat{\beta}_j^t$ and $\tilde{\gamma}_k^t = \hat{\gamma}_k^t - \sum_k w_k^t\hat{\gamma}_k^t$. Note that with these notations (2) becomes $d\ln X_{ijk}^t = LSMEAN_i^t + \tilde{\beta}_j^t + \tilde{\gamma}_k^t + \varepsilon_{ijk}^t$. The decomposition

study the growth of international exports of the US states by focusing on demand conditions.

[2]Data on 1994 flows serve as base year for 1994-1995 growth rates.

(7) can then be re-written as:

$$d \ln X_i^t = LSMEAN_i^t + \sum_j \frac{w_{ij}^t}{w_i^t} \tilde{\beta}_j^t + \sum_k \frac{w_{ik}^t}{w_i^t} \tilde{\gamma}_k^t. \quad (5)$$

The first element of (5) represents the *exports performance* of country i. The last two terms reflect the contribution of its exports structure by partner and product to the overall growth of its exports. We refer to them as the *geographic* and *sectoral structure* effects.

We decompose, thus, the growth of each country's exports into three terms: an exporter (performance) effect, a geographic structure effect which depends on the destination of exports, and a sectoral effect that varies with the sectoral composition of exports. The decomposition of exports growth is done separately for each year. Note that the sum of annual growth rates yields the change in the value of exports between the first and last year of the period. Therefore, results for the entire 1994-2007 period are obtained by summing up the different effects across years.

Table 3: Shift-share decomposition of the percent changes in world market shares, *all products*, 1994-2007

	Market share	Contribution of:		
	% Δ	Performance	Structure effects	
			Geographic	Sectoral
EU 25	-0.9	-18.3	9.4	8.0
USA	-37.9	-49.2	3.9	7.5
Japan	-54.7	-65.5	-2.4	13.3
China	105.9	152.2	-20.3	-26.0
India	48.2	71.2	1.1	-24.1
Russia	32.0	-11.2	31.5	11.7
Brazil	11.7	33.6	-3.2	-18.8
Canada	-32.6	-17.5	-19.6	4.4
Mexico	36.9	53.6	-20.1	3.3
Korea	26.6	19.9	4.0	2.7
Asean	3.8	18.6	-9.3	-5.4
Turkey	62.0	77.9	11.4	-27.3
Mediterranean	17.8	25.4	1.3	-8.8
Mercosur	-2.3	13.7	11.6	-27.6
RoW	-7.5	-8.0	6.9	-6.4

Source: Authors' calculations. The estimation is performed at the 2-digit level of the HS and explain the annual growth of all trade flows existing in any two consecutive years in the period 1994-2007, the effect for the entire period is equal to the sum of annual effects.

3.2 Application to the Chinese market

This section presents the decomposition of market shares for a single importer, China. As previously, we have:

$$d \ln X_{Ji}^t \left[= \ln \left(\frac{X_{iJ}^t}{X_{iJ}^{t-1}} \right) \right] = \sum_k \frac{w_{iJk}^t}{w_i^t} \, d \ln X_{iJk}^t, \tag{6}$$

where J stands for China. Applying the same rationale, we can express the overall growth of country i exports to China in terms of an *export performance* and a *sectoral structure* effect:

$$d \ln X_{iJ}^t = intercept^t + \alpha_{iJ}^t + \sum_k \frac{w_{iJk}^t}{w_i^t} \, \gamma_k^t. \tag{7}$$

and

$$d \ln X_{iJ}^t = LSMEAN_{iJ}^t + + \sum_k \frac{w_{iJk}^t}{w_i^t} \, \tilde{\gamma}_k^t. \tag{8}$$

Exporting countries have no influence on structural effects affecting their exports. These effects result from the growth in destination markets, given the sectoral composition of exports. In contrast, the performance effect is a true competitiveness effect. It indicates

Table 4: Shift-share decomposition of the percent changes in Chinese market shares, *all products*, 1994-2007

	Market share	Contribution of:	
	% Δ	Performance	Sectoral structure effect
EU 25	-10.7	-14.4	3.6
USA	-5.3	-9.4	4.1
Japan	-20.3	-25.0	4.7
India	140.3	149.8	-9.5
Russia	-83.7	-51.5	-32.2
Brazil	28.6	44.6	-16.0
Canada	-21.7	-13.5	-8.2
Mexico	135.7	141.1	-5.4
Korea	64.5	69.4	-4.9
Asean	77.3	85.2	-7.9
Turkey	-249.9	-196.4	-53.5
Mediterranean	42.5	47.9	-5.4
Mercosur	101.8	115.0	-13.2
RoW	-17.4	-19.7	2.3

Source: Authors' calculations. The estimation is performed at the 2-digit level of the HS and explain the annual growth of all trade flows existing in any two consecutive years in the period 1994-2007, the effect for the entire period is equal to the sum of annual effects.

the degree to which the exporting country was able to gain or lose market shares, after controlling for composition effects.

4 Global vs. Chinese market shares

Table 5: Export performance on the global and Chinese markets, 1994-2007

	Share of the market		Difference
	global	Chinese	
USA	174.56	62.00	112.6
Japan	159.59	48.76	110.8
India	320.21	169.20	151.0
Russia	96.19	96.72	-0.5
Brazil	208.44	124.49	83.9
Canada	158.13	86.08	72.0
Mexico	315.53	162.16	153.4
Korea	244.41	125.67	118.7
Turkey	-70.00	184.56	-254.6

Source: Authors' calculations. The estimation is performed at the 2-digit level of the HS and explain the annual growth of all trade flows existing in any two consecutive years in the period 1994-2007, the effect for the entire period is equal to the sum of annual effects.

Table 6: Export performance on the global and Chinese markets, 1994-2007

	Share of the market		Difference
	global	Chinese	
USA	170.48	60.14	110.3
Japan	154.85	43.86	111.0
China	0.00	261.57	
India	329.70	180.55	149.2
Russia	128.42	98.14	30.3
Brazil	224.46	143.00	81.5
Canada	166.33	91.90	74.4
Mexico	320.96	162.99	158.0
Korea	249.32	129.32	120.0
Asean	0.00	0.00	
Turkey	-16.54	187.34	-203.9

Source: Authors' calculations. The estimation is performed at the 2-digit level of the HS and explain the annual growth of all trade flows existing in any two consecutive years in the period 1994-2007, the effect for the entire period is equal to the sum of annual effects.

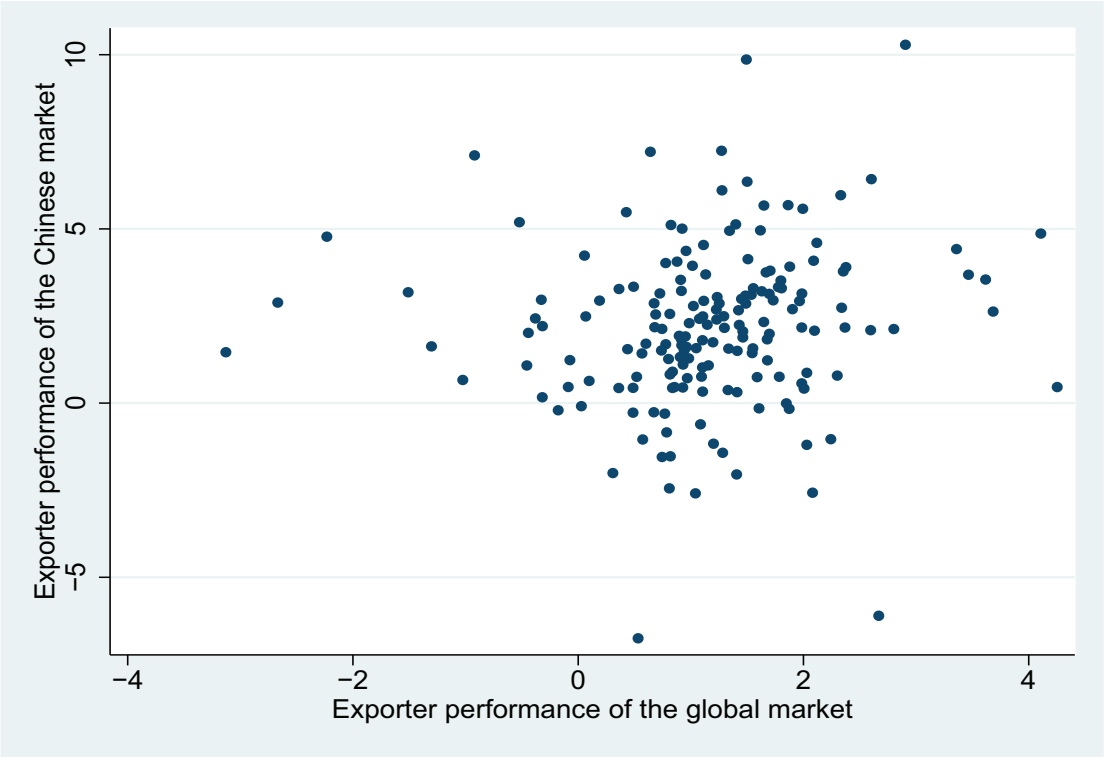

Figure 1: Export performance on the global and Chinese markets, 1994-2007

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