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The Geographic Pattern of China's Growth and Convergence within Industry

Françoise Lemoine, Grégoire Mayo, Sandra Poncet & Deniz Ünal

Highlights

- Since the mid-2000s, the center of gravity of China's growth has shifted from the coastline to the inland and regional income gap has ceased to increase.
- This macroeconomic catch-up reflects, with a time lag, the rapid convergence process which has been taking place in China's manufacturing industry since the end of the 1990s.
- The Chinese case confirms the existence of an unconditional and rapid convergence in manufacturing industry.

Abstract

Since the mid-2000s, the center of gravity of China's economic growth has shifted from the coastline to the inland and the gap in GDP per capita between the two areas has narrowed. This macroeconomic catch-up reflects, with a time lag, the convergence process which has been at work in manufacturing industry since the end of the 1990s and suggests that China is becoming increasingly integrated in terms of technological level. This pattern is in line with a process whereby the inland catches up the labor productivity level of the coast thanks to the transfer of technology and capital from these most advanced regions.

Keywords

China, Regional inequality, Manufacturing industry, Convergence, Growth.

JEL

F63, O14, O25, O53, R12.

Working Paper

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RESEARCH AND EXPERTISE ON THE WORLD ECONOMY

The Geographic Pattern of China's Growth and Convergence within Industry

Françoise Lemoine, Grégoire Mayo, Sandra Poncet, Deniz Ünal*

1. Introduction

In China, regional inequality and geographic imbalances go hand in hand as the dividing line between advanced and backward provinces roughly coincides with the dichotomy between coast and inland. This dichotomy has structured China's development process since the 19th century as the center of gravity of the economy has been alternately located in the coast and in the interior.

From the early 1990s to the late 2000s, China's rapid economic growth was associated with widening regional disparities and growing spatial imbalances. A reversal has been underway since recently: regional inequality peaked in the mid-2000s and the center of gravity of the economy has begun to move from the advanced eastern region to the inland.

The paper analyses the regional pattern of economic growth in the long run and focuses on the evolution of manufacturing industry as the main determinant of the recent reversal. It argues that industry has been the driving force underlying regional dynamics and that the recent changes in the regional growth pattern have been driven by the rapid catch up of inland industry.

The analysis is based on data collected by the National Bureau of Statistics (Beijing). We used the long term macroeconomic series (1952-2011) at provincial level published in the Statistical Yearbooks and a database on manufacturing industry detailed at firm level (Industrial enterprise census data) for the years 1997 to 2009[i].

The paper is organized as follows. Section 2 sketches out how the center of gravity of China's economy oscillated between the coast and the interior from the early phase of modernization up to now. Section 3 focuses on manufacturing industry in the 2000s and shows that inland performance, which lagged far behind in the 1990s, is now catching up with that of the coast. Section 4 presents an econometric estimation of the convergence pace in manufacturing industry between 1998 and 2009. Section 5 concludes.

2. The center of gravity of China's economy: history and geography

In a country as vast as China (the fourth largest country in the world by the geographic dimension and the first by the size of population) regional differences are huge. They stem from natural and historical conditions. The extreme diversity of the climate and relief, the large variations in population density, in natural resources and in communication facilities create different conditions for economic development. Regional development has also been shaped by the political power. In the economic strategies that have been followed since the

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founding of the PRC, spatial imbalances and regional disparities have been a crucial concern.

This section analyses the changes in the geographic pattern of China's economy in a long term perspective and argues that the center of gravity has been alternately located in the coastal area (Blue China) and in inland area (Yellow China). The coastline was the engine of the takeoff experienced by the Chinese economy over the past 25 years, but a reversal is currently underway as economic growth in the interior has overtaken that in the coast since the mid-2000s. The income gap between the coast and the interior which had widened during this take-off has narrowed in the past decade. This geographic rebalancing is crucial for China's long-term development and its spatial integration. This tilting of the center of gravity of the economy from the coastline to the center is in line with the transition to a new growth regime, less dependent on world markets.

2.1. The coast/inland dualism

Unlike other countries of similar size, China is not a federal state. It consists of 22 provinces, four municipalities directly linked to the central government and five autonomous regions. Beyond these administrative divisions, there are many geographical, historical or cultural fault lines (North/South, rural/urban, Han/non Han).

A traditionally distinction is made between "China proper" (or "inner China") which consists of the 18 "historical" provinces, densely populated and mostly by Han; and "China peripheral" (or "outer China") composed of border, landlocked regions, more recently integrated in to the Empire, most of them desert or semi-desert and where ethnic minority populations live (Sanjuan, 2007).

Another great dividing line runs between the "Blue China" i.e. the coastal area, open to the outside world, with seaports and merchant traditions; and the "Yellow China" which encompasses the central and western regions, making up a continental area, less advanced economically. Of course this division overlooks the internal heterogeneity of the two areas, which include provinces with different natural, economic, social characteristics. But the economic history of modern China (since the early 19th century) shows that this dichotomy based on geography as well on economy has structured the development process and can usefully shed light on the issues of today's China.

This study refers to the division between the coast and the interior (see the map). The coast includes here seven provinces Fujian, Guangdong, Hainan, Hebei, Jiangsu, Shandong, Zhejiang and three municipalities with provincial level (Beijing, Shanghai, Tianjin). It is home to 38% of the Chinese population on 10% of the territory, and creates about half China's GDP.

The inland area includes all other provinces and can be subdivided into three regions:

- The central region is the biggest one and includes 12 provinces (Anhui, Gansu, Guizhou, Henan, Hubei, Hunan, Jiangxi, Qinghai, Shaanxi, Shanxi, Sichuan and Yunnan) and one municipality (Chongqing). It is home to 46% of the population on 37% of the territory.
- The northeast encompasses three provinces (Liaoning, Jilin and Heilongjiang), with 8% of the population on 8% of the territory.

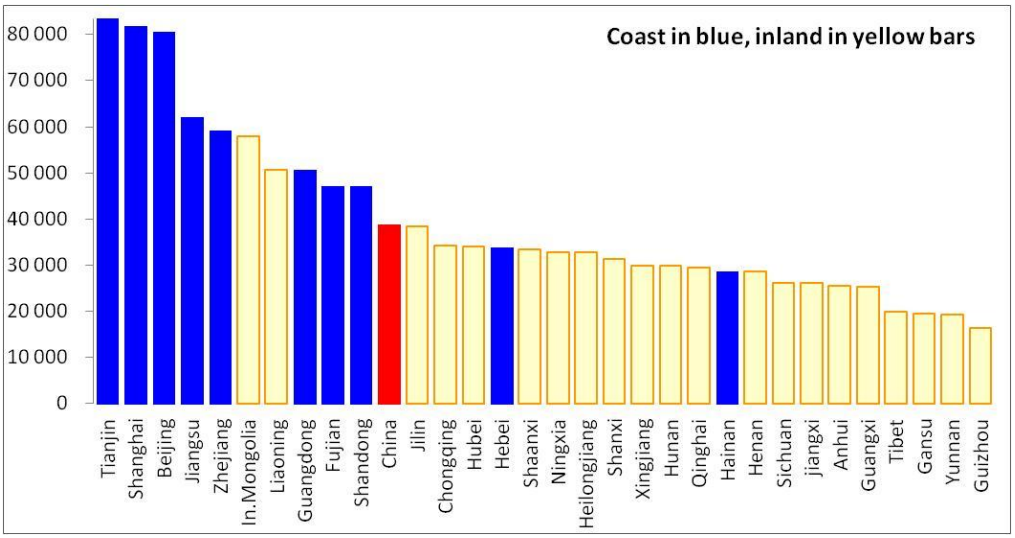
- The periphery/west includes the five border areas which have the status of autonomous regions: Guangxi, Inner Mongolia, Ningxia, Tibet and Xinjiang. It has 8% of the population on 45% of the territory.

This division differs somehow from that currently used by the official authorities[ii].

Map of "Blue" and "Yellow" China

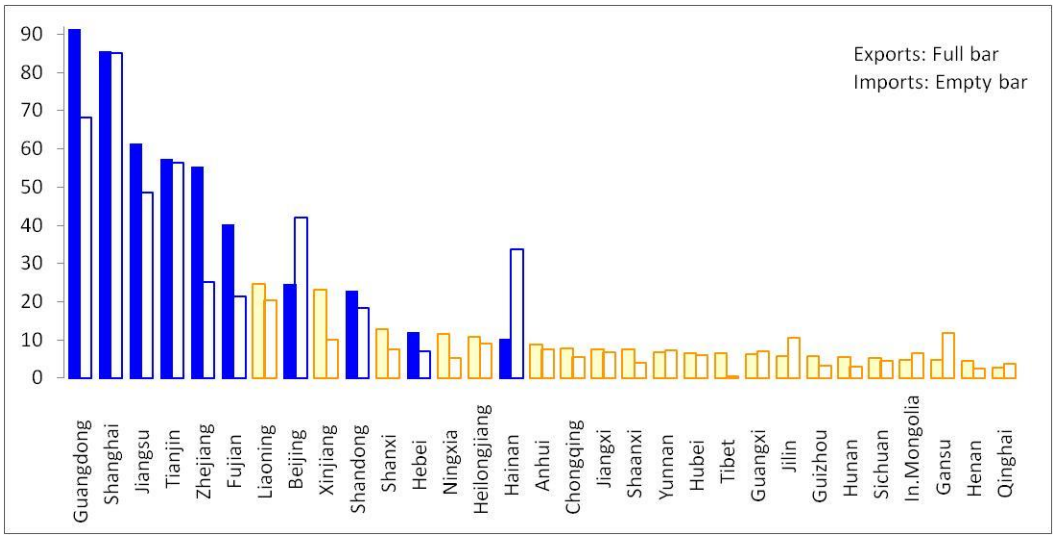
For crude as it be, the distinction between coastal and inland China corresponds to a contrast in the level of development and even more in the degree of openness (Figures 1 and 2). In the coastal area, eight provinces out of ten have an above average GDP per capita; this is the case for only two inland provinces. Coastal economies are also much more outward-oriented than inland economies. In 2007, when China's export orientation peaked (with total exports reaching 36% of GDP, and imports 26%), eight coastal provinces recorded an above national export or import ratio. This was the case for no inland province.

Figure 1
Provincial GDP per capita in Yuan, 2011



Source: National Bureau of Statistics, China statistical yearbook 2012.

Figure 2
Exports and imports as a share of provincial GDP in 2007 (%)



Source: National Bureau of Statistics, China statistical yearbook 2012.

2.2. The advance of coastal cities in early modernization (late 19th-early 20th centuries):

Without going back to the beginnings of Chinese history, it is interesting to give a brief overview of the spatial dimension of China's economy at the initial stage of its modernization (Saw and Wong, 2009).

In the 18th century, China experienced a "Golden Age" as reflected in the unprecedented growth of its population (from 140 to 380 million between 1700 and 1820). In 1820, China

was by far the largest economy in the world. Maddison (2010) estimated that China was then responsible for one third of world production (Western Europe for one fourth).

Contrasting with Japan which began to modernize during the Meiji period (1868-1912), China missed the industrial revolution of the 19th century. For China, this century was a period of decline, marked by stagnant economy, social unrest, weakened Manchu dynasty and foreign aggression. However, as amply shown by Bergère (1989), in the mid-19th century, a modern economic activity had begun to emerge in *coastal cities* (Shanghai, Nanjing, Guangzhou, etc.). Textile and food industries, commerce, modern banks were taking off and their expansion reached a peak between 1912 and 1927. This modern sector was largely (but not entirely) under the control of foreign capitalists who had acquired the right to do business in the open ports since the mid-19th century, thanks to the Unequal Treaties which put an end to the Opium Wars. The activities of these new industrial centers spread in their neighborhood, and especially along the waterways. But their spillover effects remained insufficient to pull the industrialization of the whole country, given the lack of government support to economic modernization. The importance of the modern sector remained marginal, accounting for about 13% the national income in 1933 (Liu and Yeh 1965).

Modernity was concentrated in coastal cities, with Shanghai as the main landmark. In the 1920s, Shanghai accounted for about half of China's foreign trade and industrial output (Giroir, 1999). This openness to foreign influences had historical roots as the coastal area had been as soon as in the 12th and 13th century, the host of a marine economy and of active trading activities with Southeast Asian countries. But the regional differentiation of China's economy and the dualism between the coast and inland date back to this initial phase of modernization (Gipouloux, 2009).

In 1931 Manchuria was invaded by the Japanese who carried an accelerated industrialization drive based on the region's natural resources. Transport infrastructures were developed for routing goods to Japan. The region became one of the most industrialized parts of China, producing 93% of the steel and half of the coal and electric power of the country in 1943 (Giroir, 1999).

The eastern part of China had thus initiated an economic modernization which was fundamentally associated with the presence of foreign powers, with colonial or military penetration. This period's legacy was a radical break between inland China, characterized as rural, bureaucratic and traditional, and maritime China, seen as cosmopolitan, enterprising and open to innovation (Bergère *et al,* 1990).

2.3. The industrialization of interior provinces under Mao (1952-1978)

In 1949, the Communist victory was achieved by inland rural forces and the "civilization of the coast" was therefore denounced as corrupted and subservient to foreign interests.

The development strategy designed by the Communist power in the 1950s imposed a radical break with the previous period in all dimensions of China's economy. The economic strategy put forward the principle of national self-sufficiency in a world deemed as hostile. Economic and commercial ties with the rest of the world were severed, or kept at minimum, even with other communist countries after the Sino-Soviet rupture in 1960.

The central planning of economic development aimed at reducing regional inequality and at balancing the distribution of industrial capacities. Ideological, political, and strategic considerations lay under such priorities. Coastal cities were ostracized because their economic preeminence was inherited from the colonial powers. Moreover, in 1963, the government launched a program for the construction of military-industrial plants in inland provinces (the "third front") out of reach of a possible foreign military aggression. The provinces of Shaanxi, Sichuan and Guizhou benefited from these investments.

During this period, the state budget centralized large financial resources (accounting for 30% of China's GDP in 1978) and financed the bulk of capital investment in industry. There were large financial transfers to backward provinces and massive investment in heavy industry (coal, steel, chemicals) and infrastructures. During the third five-year plan (1966-1970), Shanghai Municipality provided 40% of the state budget revenues, and 71% of state investment was directed to inland provinces (Démurger *et alii,* 2002).

This investment allocation, which favored the poor at the expense of advanced economic regions, was costly in terms of economic growth. Investment in inland areas was less productive and less profitable than in more advanced regions. As Lardy (1980) states "Management has deliberately chosen to sacrifice some economic growth to achieve the improvement of regional economic imbalances".

At the same time, in accordance with the motto of "self-reliance", interregional and interprovincial trade was kept at a minimum level so that the fragmentation of the economy and the lack of regional specialization also dampened economic growth.

During this period, there was no convergence in regional income (Démurger *et alii*, 2002). In 1952, GDP per capita in coastal area was on average 30% higher than in the inner zone and in 1978 it was 50% higher. However, the distribution of industrial production changed in favor of the central region (its share in the industrial GDP increased from 26% to 30%) while the north-east lost ground (with a share falling from 23% to 17%). The industrialization drive resulted in far-reaching changes in the pattern of regional GDP. The progress of industry was especially rapid in the regions initially the least industrialized, i.e. the centre and the periphery, as shown in Table 1.

Table 1
Structure of the regions' GDP by sector, 1952 and 1978 (%)

	Agriculture		Industry		Services		GDP	
	1952	1978	1952	1978	1952	1978	1952	1978
Coast	**49**	**23**	**25**	**57**	**26**	**20**	**100**	**100**
Inland	**59**	**34**	**21**	**48**	**20**	**20**	**100**	**100**
Central	65	34	16	48	20	20	100	100
North-East	36	38	41	43	23	21	100	100
Periphery	68	18	18	67	14	15	100	100
China	**55**	**29**	**23**	**52**	**23**	**20**	**100**	**100**

Source: National Bureau of Statistics, Comprehensive statistical data and materials on 50 years of new China (1999).

2.4. The coastline economic takeoff in the era of globalization

The reforms initiated at the end of 1978 reflected a new mindset. The priority was to maximize growth and accelerate the country's modernization. This required a better use of resources at national level and led to a gradual transition to market mechanisms and to the opening to the outside world. In this new logic, the comparative advantages were to guide regional specializations and the reforms were accompanied by a far-reaching fiscal and economic decentralization up to the mid-1990s.

2.4.1. The opening up of coastal provinces

The new economic policy has awakened the "coastal civilization" (Bergère *et al*, 1990). The coastal provinces were the spearhead of the opening policy. In 1979, three special economic zones (SEZs) were established in Guangdong and Fujian in order to attract foreign direct investment, expected to come firstly from the neighbors, Hong Kong and Taiwan. These SEZ also served to experiment with market mechanisms (price and wage liberalization).

As these innovations proved to have positive effects on local economies (inflows of foreign capital, new commercial and industrial enterprises), they triggered the diffusion of similar policies in other coastal provinces. In 1988, 14 coastal cities were allowed to implement open-door policies and the movement has afterwards spread to the entire coastline (Démurger *et al*, 2002).

At the same time, the five-year plans explicitly set new regional priorities. The 1981-1985 plan gave coastal provinces a leading role in industrial modernization and pushed them to build on their comparative advantages: abundant and cheap labor, geographical proximity to world markets and to foreign financial centers (Lemoine, 1990).

The next plan (1986-1990) advocated the specialization of coastal areas in modern industries, new technology sectors, in the production of consumer goods and in export-oriented industries. The inland was to provide the necessary inputs: agricultural products, raw materials, heavy industrial goods. Given the complementarity existing between the two regions, the coastal development was expected to have ripple effects on the inland regions (Anderson *et alii, 2013*).

In 1988, the Prime Minister Zhao Ziyang announced measures to promote export-oriented industries. The imports of goods for processing and re-exports were to be exempted from customs duty. This laid ground to the development of international subcontracting and assembly operations and to the integration of coastal industries into the international division of labor. It has structured Chinese manufacturing industry and exports for the two following decades (Gaulier *et alii, 2007*).

In the 1990s, economic reforms took momentum and extended to the whole territory. The accession of China to the WTO, at the end of 2001, gave a new impulse to its integration into the world economy. Multinational companies from all over the world have arrived, attracted by the low production costs and by the potential domestic market. In the mid-2000s, the boom in consumer demand in the US and Europe as well as in large emerging economies offered new opportunities of expansion to China's exporting industries.

2.4.2. The great leap eastward

Since 1978 and up to 2005 the coastal provinces registered an accelerated pace of economic growth, driven by manufacturing industries. They exploited their comparative advantages, and developed new industrial specialization thanks to the availability of foreign capital (Berthélemy and Démurger, 2000).

In a first phase, during the 1980s, "new industrial clusters" emerged on the southern part of the coastline, in the provinces of Guangdong (the Pearl River delta), Fujian and Zhejiang. Special economic zones attracted not only foreign investors but also investors from other provinces. Foreign investment created the conditions for mass production and put China in a position to gain competitiveness in international markets. Spilling over the border of SEZs, exporting industries proliferated mobilizing the rural labor force under-employed in agriculture. In the late 1980s almost all of the Hong Kong industry had migrated to Guangdong province, attracted by the low level of wages and of land prices. Enterprises from Taiwan and other Asian countries followed.

In a second phase, in the 1990s the growth center moved northward on the coastline and the old industrial centers (such as Shanghai) began to experience an economic revival as they introduced economic reforms and opening up. Shanghai begun its transformation only in the early 1990s. Since then, its growth has been based mainly on services, while its industrial activities has relocated to the neighboring province of Jiangsu.

A third phase took place in the 2000s, as the internationalization of coastal economies accelerated. In the mid-2000s, external demand boomed and contributed for two to three percentage points of China's annual GDP growth. This export-led growth further accentuated regional polarization as foreign trade remained heavily concentrated in the coastal provinces. In 2007, the coast accounted for 91% of exports and five provinces (Beijing, Shanghai, Jiangsu, Zhejiang and Guangdong) for 72% of exports. The export-driven model of coastal provinces during the 2000s is reflected in the rapid rise of their export to GDP ratios (Table 2).

Table 2
Coast and Inland Region
Openness to Foreign Trade in the 2000s (% of GDP)

	Exports		Imports	
	2000	2007	2000	2007
Coast	35	54	32	42
Inland	6	9	5	7

Source: National Bureau of Statistics, China Statistical Yearbooks 2001 & 2008.

The share of the coast in national GDP increased from 44% in 1978 to 56% in 2006 (Figure 3). Its prominence was even bigger in industry, with more than two-thirds the gross value of industrial output.

Figure 3
Regional distribution of China's GDP (in percent)

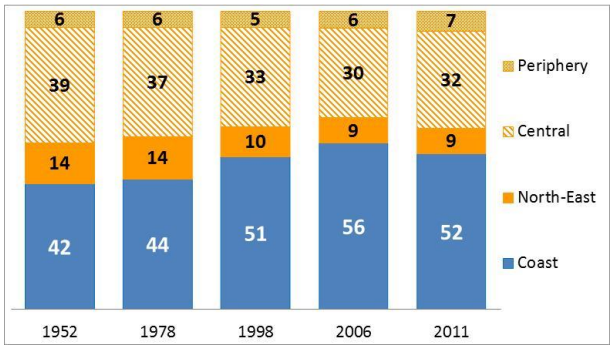
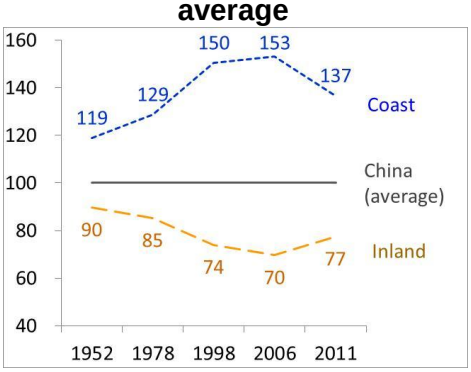


Figure 4
Income gap between coast and inland: GDP per capita in percent of national average



Source: National Bureau of Statistics of the PRC: China Statistical Yearbook, various issues

In the early 2000s, regional disparity and the widening income gap between the coastline and the rest of China were recognized as major issues (Lin *et alii* (2002) and Naughton (2002). These authors attributed the divergence to the pace of the industrialization process in eastern China and to the erosion of the redistribution policy by the central government. From 1978 to 1995, economic and fiscal decentralization led to a relative decline in budget and the government expenses for investment programs collapsed.

In the first half of the 2000s, the fault line between the coast and the rest of China further deepened. In 1978, the GDP per capita was on average 50% higher in the coast than in the interior; in 1998, it was twice higher and in 2006 the ratio reached 2.2 (Figure 4).

2.5. The rebalancing in favor of inland region

Pressures for changes in the spatial dynamics had begun to be felt since the end of the 1990s. Since the mid-2000s external shocks and domestic factors have made the past growth regime unsustainable anymore.

2.5.1. International environment

On the external side, the Asian crisis of 1997-1998 was a first shock which highlighted the vulnerability of the China's economy to the ups and downs of the international environment. Chinese exports stagnated as a result of a weaker demand in Asia and of the devaluation of Asian currencies which threatened the competitiveness of Chinese products.

Ten years later, in 2008, the global crisis interrupted a period of unprecedented expansion of world trade of which China had been a major beneficiary. This second shock was stronger than the first one because the contraction of the international trade was more brutal (world trade went down by 18 % in value in 2009) and because the Chinese economy had become more open.

To cushion the depressive effects, in late 2008 the government launched a vigorous stimulus plan based on massive capital expenditure, most of which was directed to the inland provinces. While the coast was the most directly affected by the crisis, the interior was the main beneficiary of the package (Inomata and Ushida, 2009).

2.5.2. Domestic factors

The polarization of economic development in the coastline and the risk that this geographical imbalance implied for the regional integration of China's economy had become a political concern in the late 1990s. Due to their integration into international production networks, Coastal provinces developed stronger links with world markets than with the rest of China. Poor transport infrastructure in the interior hampered inter-regional trade and encouraged the outward-oriented bias of the coastline.

Regional disparity and the increasing geographic dualism aroused political concern as they were likely to fuel tensions and resentment in poor areas and border provinces.

Policies in favor of a more balanced development dated back to the late 1990s, when the government launched the "Go West policy", a program aimed at enhancing the economic development of the 12 central and western provinces. This encompassed fiscal transfers and tax preferences, measures to induce financial institutions and especially policy banks to increase loans to western regions development.

The reversal in the demographic situation has been another important factor for change. Since 2010, the working age population has ceased to increase and the younger age categories have begun to diminish. The period of surplus labor has come to an end (or will soon do so), and this has altered the situation in the labor market. As early as 2005, local shortages occurred in coastal provinces (Guangdong), where export industries depend heavily on the migrants. The wages of the low skilled workers, which had stagnated for nearly a decade, were too low to attract migrants, all the more as they were excluded from the benefits enjoyed by urban citizens (social security, pensions, housing). Since the late 2000s, the increase in wages has accelerated, reducing the competitiveness of the coastal industries and pushing them to move to central regions where wages are lower (Saw and Wong, 2009). These less industrialized and less urbanized regions have a larger reserve of labor force in rural areas.

Since the mid-2000s, internal factors and external conditions have thus combined to accelerate the economic growth in the inland.

2.5.3. The watershed of the mid-2000s

The weight of inland in China's GDP which declined up to 2005 has increased steadily since and has recovered in 2011 its 1998 level (Figure 4, above). Most of the increase came from central provinces and to a lesser extent from periphery regions.

The difference in per capita income between the coast and the interior has ceased to increase. The ratio declined to 1.8 in 2011, thus reverting to what it was in 2004, before the phase of export-led growth.

3. The catch up of inland industry in the 2000s

The gap in regional per capita income has narrowed since the mid-2000s and this convergence can be explained by the rapid catch up which has taken place in the manufacturing industry of the backward/inland provinces. The present section focuses on

industry and shows that since the end of the 1990s, the inland industrial performance has improved rapidly, closing the gap with that of the coast in most manufacturing branches.

3.1. A brief survey of literature on the recent regional rebalancing

The studies analyzing regional imbalances and disparities at the macroeconomic level agree on the conclusion that economic reforms since 1978 led to widening regional imbalances between the coast and the inland associated with increased regional disparities between advanced and backward regions. They also find a mitigation of provincial divergence in the mid-2000s. Wei (2009) observes that the increase mobility of capital and labor accentuated the trend towards concentration of economic activities (in particular of industry) in the east up to 2004, which marked a turning point, when regional disparities of GDP per capita have ceased to increase. Industrial production is moving to north and to west as a result of government policies and of rising costs of labor and land in the coast. Industrial productivity and profitability provide evidence of the economic take off of the central region. The author considers that regional development has entered a watershed period and that the latecomers may become economic pace setters. In a similar way, Feng (2009) observes that since 2004 the geometric gravity center of economy has moved from east to west, as growth rates has slowed in the East and increased in the West. The OECD (2010) indicates that inter-provincial inequalities peaked around 2004 and have declined in the following years. Anderson *et alii* (2013) confirm that a regional divergence corresponding to the east/west divide characterized the initial phase of reforms and that the divergence peaked as early as 1994. Since the 2003, the "followers" (mostly inland provinces) have grown faster than the "leaders" (mainly coastal provinces) and productivity levels have begun to converge.

Other studies, using firm-level datasets, show a convergence of industrial labor productivity across regions. The catch-up process of backward regions has taken place since the mid-1990s and has been associated with a spatial diffusion of industry.

Jefferson, Rawski and Zhang (2008) analyze the multifactor productivity gap between four regions (the coast, the center, the north-east and the west), using the manufacturing enterprise census database covering the period 1998-2005. They find that in term of multifactor productivity, the center has caught up with the coast as early as 2005 and that this rapid improvement is mainly explained by the restructuring of SOEs, which is taking place in the interior during this period (and had taken place earlier in the coast). They conclude that the center's higher productivity growth may be temporary. However, they also observe that an extensive diffusion of technology and efficiency has contributed to the convergence of labor productivity.

Deng and Jefferson (2010 and 2011) carry an analysis based on a large and medium industrial enterprise dataset from 1995 to 2004. They consider labor productivity in reference with the international technology frontier (the US). They find that coastal industry reduced its technology gap with the international frontier at an especially rapid pace from 1995 to 2000, but that this gap-growth advantage disappeared in the mid-2000s. From 1995 to 2004, the labor productivity gap between the coastal and interior regions narrowed significantly as the relatively backward inland regions exploited the advantages of backwardness. The larger the initial gap for a given industry-province, the higher the subsequent growth rate of labor productivity. They underline that the coast and the inland follow different growth trajectories: initially the coast benefited from "the advantage of openness" and later on, the inland grew faster due to the "advantage of backwardness". This growth pattern offers China a rare

opportunity simultaneously to reduce income inequality while maintaining a high overall growth rate.

The studies based on firm level data which analyze regional performance in specific manufacturing industries confirm the convergence process and the signs of a westward move. Ruan and Zhang (2010) test whether the flying geese model hypothesis applies to the case of textile industry in China. They refer to the history of US industry when rising labor costs and union density drove manufacturing industries from the mid-west and north-east to the south and west. In the case of China's textile industry, they find that the return on capital and the profit per worker is higher in the central region than in the eastern region since 2006 and that the extreme concentration of this industry in the east has begun to diminish since 2004. The question is whether the lower price of labor and of land in the central region will be a sufficient condition to counter the agglomeration advantage existing in the east. Qu *et alii* (2012) consider China's labor-intensive manufacturing industry from 2004 to 2008 and show that it has become less geographically concentrated in the east. Higher return on assets and profit per capita in inland labor intensive industry might be key factors behind this recent relocation of businesses to the interior regions. With rising labor costs, the labor-intensive manufacturing industry of the eastern region is now facing increasingly significant competitive pressure and is therefore likely to seek new space to grow.

Taking into account this literature, the aim of this section is

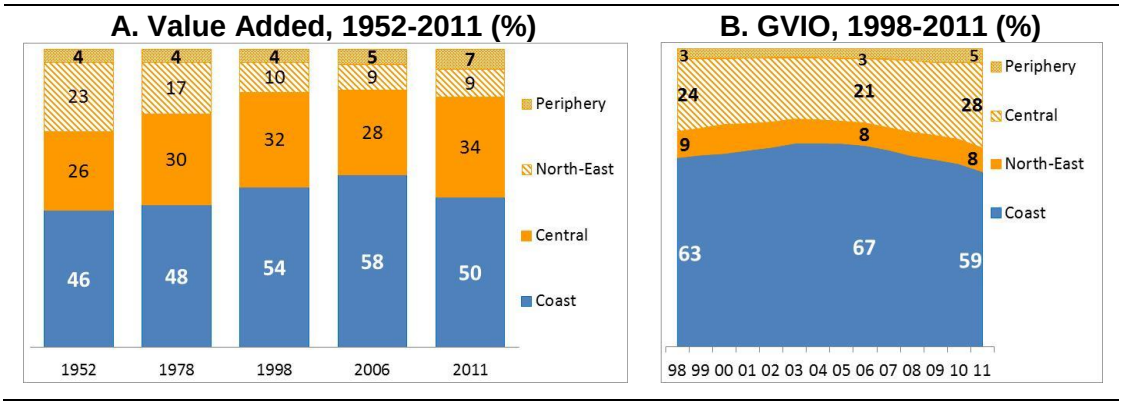
- To compare the inland and the coast industrial performance at the level of distinctive manufacturing branches from 1998 to 2009 and to investigate whether the catch-up process is associated with changes in regional industrial specialization.
- To extend the analysis of the regional industrial pattern to the most recent period and find out whether the disparity between the coastal and the inland performance has continued to narrow up to 2011 and whether the global crisis has reinforced the move to the west of the economic center of gravity.
- To shed some light on the differences in the regional industrial trajectories, especially in terms of openness and ownership pattern.

3.2. Industrialization at the core of regional dynamics

Industry has been the main engine of China's economic development during the Maoist period as well as since 1978. As noted by Naughton (2002), the pace of industrial growth was the most important factor in the evolution of inter-regional disparities.

The geographical distribution of industrial GDP from the early 1950s to nowadays reflects the changing priorities of regional strategies (Figure 5A).

Figure 5
Regional distribution of industrial value added
and of gross value of industrial output (GVIO)



Source: National Bureau of Statistics of the PRC, China Statistical Yearbook, various issues.

During the Maoist period the relative importance of the central region increased (with a share rising from 26% to 30% of industrial value added between 1952 and 1978). The north-east lost part of the importance it had gained in the pre-war period (its weight in the total industrial value-added fell from 23% to 17%), while peripheral areas remained marginal. These trends resulted in a slight decrease of the interior as a whole in China's industrial GDP.

The period 1978-2006 was characterized by the great leap forward of coastal industry. As shown in Figure 5A, in a first phase which runs from 1978 to 1998, both the coast and the central region were the winners of economic reforms, while the north-east continued to lose ground as the restructuring of its large state-owned sector was a difficult process.

In a second phase, from 1998 to 2006, the coastal area expanded its manufacturing activity at an accelerated pace, at the expense of both the central region and the north-east. Its share in industrial GDP reached 59-60% from 2002 to 2006.

Since 2006, the trend has returned and the coastline receded. In 2011, its contribution to China's industrial added value was hardly higher than it was in 1978. The mid-2000s marked a watershed in the spatial pattern of industry. In 2011, the central region has more than recovered the ground lost in the previous period and its contribution to the country's industrial added value weight has never been so high (one third). The northeast has ceased to lose ground.

The distribution of industrial production, measured by the gross value of industrial output (GVIO) of "above-scale" industrial firms, confirms that the years 2005-2006 marked a turning point in the relative positions of the coast and the inland. It is worth noting that the importance of the coast is greater in the GVIO (which includes the value of intermediate products) that in the added value data, because coastal industries include low value-added activities, namely international subcontracting and assembly operations (Figure 5.B).

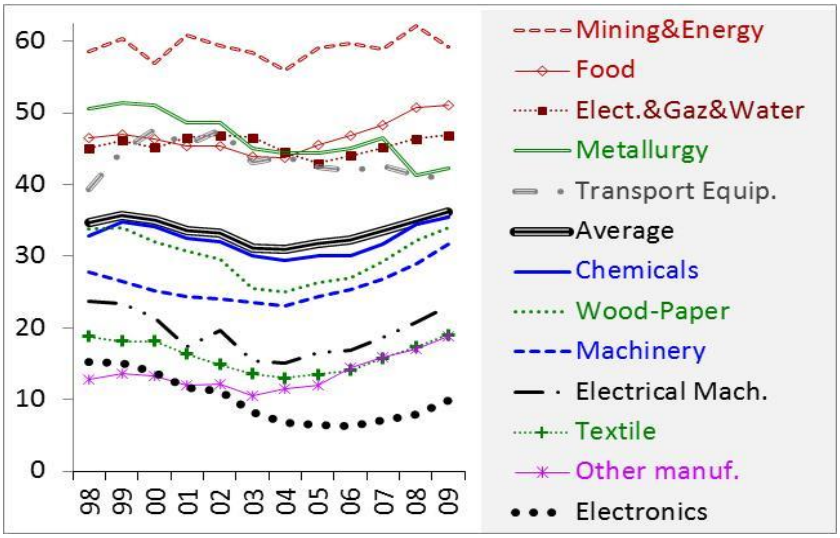
3.3. Trends in regional specialization

The industrial enterprise census data for years from 1998 to 2009 makes it possible to analyze the spatial evolution at the sectoral level and to examine whether the inland industrial catch up has been associated with changes in specialization.

Because of its natural resource endowments, the inland area dominates production in mining and in energy sectors, with 60% of national output. Its contribution to manufacturing output is much lower, but on the rise since the mid-2000s: 35% in 2009 against 31% in 2004.

The contribution of inland to output followed the same pattern in most industrial branches (Figure 6). It contracted from the end of the 1990s to the mid-2000s and increased in the following years (except in transport equipment and metallurgy). In 2009, the inland contribution to industrial output had caught up or exceeded the level it had in 1998 in all industries but two (metallurgy and electronics).

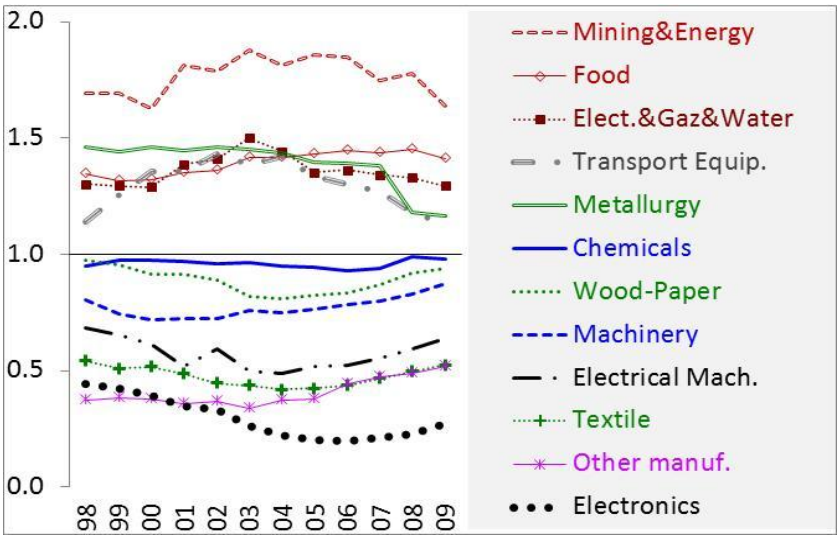
Figure 6
Inland Share in China's Industrial Output by Branch
(in percent of each branch GVIO)



Source: National Bureau of Statistics of the PRC, Industrial enterprise census data.

Regional specialization is measured by an index computed as the weight of a branch in the region's production over the weight of this branch in national production. Inland specialization lies in the energy sector, public utilities (distribution of water, gas and electricity) and in three manufacturing industries, food, metallurgy and transport equipment (Figure 7). The sectoral specialization persist all over the period, but a shift in the intensity of specialization has occurred since the mid-2000s.

Figure 7
Inland Specialization in Industry*



*Notes: Specialization is measured by the ratio: $\left[\frac{Q_i^k}{Q_i^{\sum k}} \Big/ \frac{Q_{China}^k}{Q_{China}^{\sum k}}\right]$ where *i* is the inland region, *Q* the output (*Gross value of industrial output*) and *k* the branch.

Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

During the first half of the 2000s, specialization tended to increase. The indicator shows an upward trend in the industries in which the inland area was initially specialized and a downward trend in those it was not specialized (electronic, textile, electrical equipment). Since the mid-2000s, however, the specialization index has tended to decrease (except in food) meaning that regional industrial structures have begun to converge. In textile, electrical equipment (and to a lesser extent in electronics), the inland has recently begun to reduce its "disadvantage", presumably reflecting the relocation of coastal industries to the interior.

Recent trends thus suggest that the inland area may be on the way to diversify its manufacturing industry and shift away from its traditional specialization pattern.

3.4. Closing the productivity gap

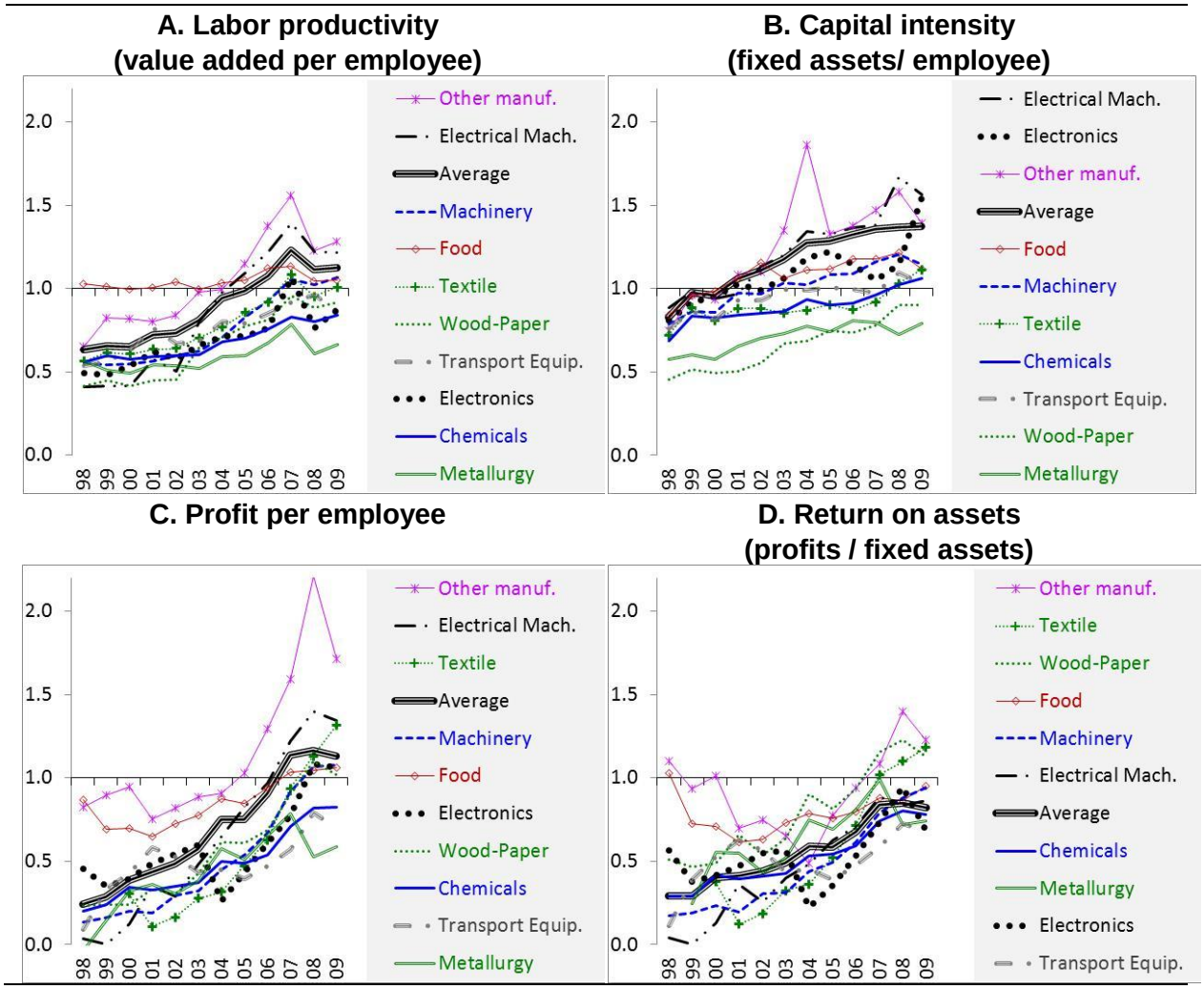
The following analysis focuses on manufacturing industry. Tilting the center of gravity of manufacturing towards the interior may at least partly be explained by the impact of the global crisis and its mechanical effect on the coastal industries. But this is not the full story. The sales in the domestic market (calculated as total sales minus exports) confirms the geographical redeployment, as from 2004 to 2009, the coast share in domestic sales diminished from 64% to 60%.

The performance of inland manufacturing enterprises has improved since the late 1990s and this movement has accelerated since the middle of the past decade.

Figure 8 shows the relative performance of the inland compared to the coast in terms of labor productivity, profitability (profit per employee, profit per unit of fixed assets) and capital

intensity. At the level of the whole manufacturing as well as in individual sectors, there is a rapid catch-up. The inland performance, which started from far behind in 1998, has not only caught up but overtaken that of the coast in several industries.

Figure 8
Competitiveness in Manufacturing Industries: Inland Relative to the Coast (Coast=1)



Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

In 2009, labor productivity was higher in inland than in the coast in manufacturing as a whole, and in five industries: textiles, machinery, electrical machinery, food and miscellaneous industries. A temporary break in inland labor productivity gains occurred in 2008, which can be partly explained by the fact that inland industrial labor force continued to increase while coastal industrial employment was cut.

The inland had also a higher level of profit per employee in 2009 in manufacturing as a whole, and in the five industries with higher labor productivity.

This progress in labor productivity can be explained by the rapid rise of the capital intensity. In manufacturing as a whole and in eight out of ten industries, capital intensity was higher in inland than in the coast in 2009. The rise has been especially remarkable in electronics and electrical machinery, where the capital per employee was respectively 50% and 60% higher

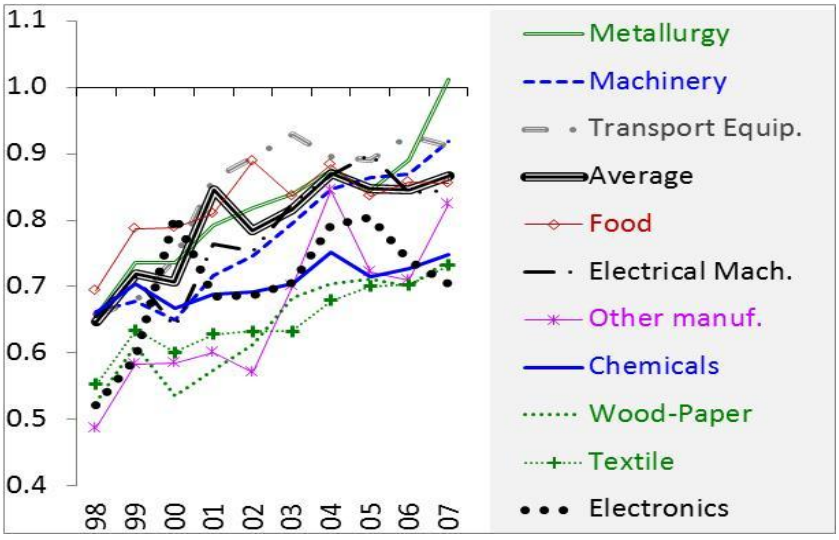
in inland than in the coast in 2009. This suggests that the production of these two industries, which has been up to now heavily concentrated in the coast, will move westward in the years to come. The pattern of investment in fixed assets indicates that the shift of the center of gravity of Chinese manufacturing in inland area is a well-entrenched tendency.

The increase in the capital intensity has been accompanied by a progress in the profitability of the fixed assets (profit/fixed capital), which however has remained, on average, well below that of the coast, excepted in textile, wood-paper and miscellaneous industries (all of which are not capital intensive). This gap does not imply that the investment drive in inland industries has been driven by political considerations and incentives: the profitability of *new* industrial investment in inland may be above that of the coast.

Figure 9 shows that the average salary (wages/ employees) in inland manufacturing which was still far below the coastal level in 1998 has increased much faster since. The more recent available data (2007) indicate that, the wage level in interior provinces was on average still 15% below the coastal level, while the level of labor productivity was already higher, providing evidence of the cost advantage of inland manufacturing industries.

More updated data on average wages are not available, but there is plenty of anecdotal evidence that wages have risen since 2007, in coastal as well as in inland industries. The level of minimum wages has been raised in all provinces, and although the salary of most workers is above this minimum, it gives some insight into the regional wage differentials. The comparison between selected cities in the coastline and the interior shows that the gap still exists. The minimum wage in Chongqing was 60% of that of Shanghai and Guangzhou in 2011.

Figure 9
Wage per Employee in Manufacturing Industries
Inland Relative to the Coast (Coast=1)



Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

The rise in labor costs will continue in the future due to demographic trends and to the urbanization process, which implies the integration of migrant workers into the urban social security system (pensions, health, etc.).

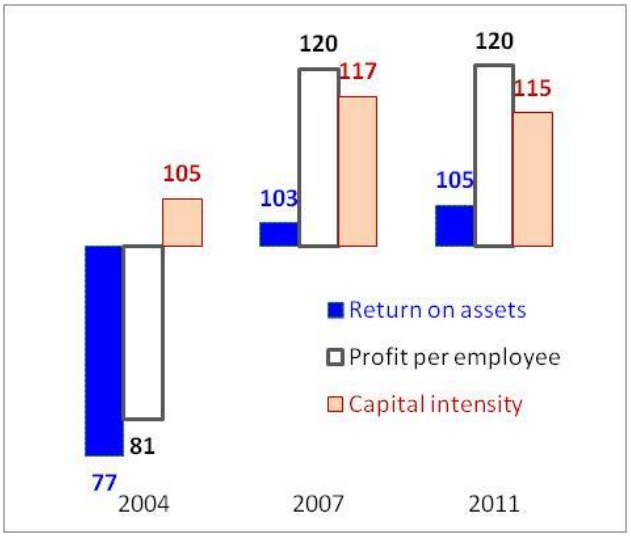
Comparison of labor productivity provides evidence that the coastal area has lost its comparative advantage over the interior in manufacturing. The cost of labor combined with the cost of land will continue to induce manufacturing industries to move from the coastline to inland.

In this context, the coastal area has to build up new specialization in high value added industries and in services. The reform in services sector, i.e. its opening up to private Chinese investors as well as to foreign enterprises is thus of crucial importance for coastal economies. The recent project of "Special economic zone" in Shanghai epitomizes the need for the coastal to find new growth opportunity.

3.5. The global crisis has supported the ongoing changes.

Macroeconomic data for more recent years (drawn from Statistical yearbooks) indicate that inland industry has consolidated its progress in terms of productivity and profitability (Figure 10). Between 2008 and 2011, its share in China's industrial employment, fixed assets and profits continued to increase (Figure 11). In fact, while industrial employment has stagnated in the coast since 2008, it has continued to increase in inland provinces quite steadily up to 2011.

Figure 10
Competitiveness in industry:
inland relative to coast* (coast=100)

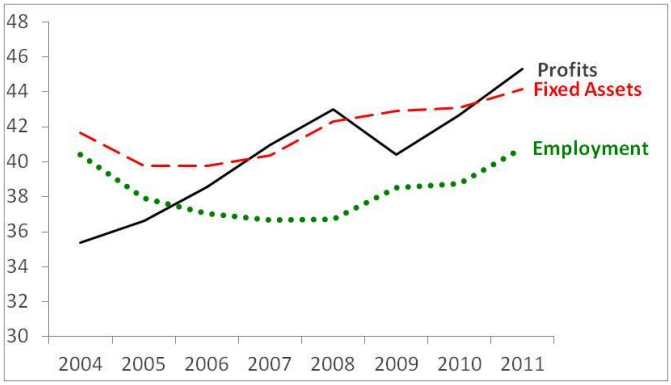


*The comparison concerns industry as a whole (including Mining and energy, public utilities). The ratio thus differs from that In Figure 8D which concerns only manufacturing.

Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

The evolution up to 2011 indicates that the inland industrial catch-up since the late 1990s was not a temporary phenomenon related to the restructuring of SOEs but sustainable trend reflecting new comparative advantages.

Figure 11
Share (%) of inland in total industrial profits, fixed assets and employment (China=100)



Source: National Bureau of Statistics of the PRC, Statistical Yearbook.

3.6. Inland low dependence on foreign markets and capital

However, inland and coastal industries still differ profoundly in their trajectory and namely in their degree of openness to foreign trade and capital.

3.6.1. Export orientation

Inland industrial production is almost entirely sold in the domestic market (Figure 12A). The share of exports is very small compared to the coast, stable at around 6% in the 2000s, declining to 4% in 2009 following the global crisis. The corresponding figures for the coastal industry stand around 20%-25% in the 2000s, falling to 18% in 2009.

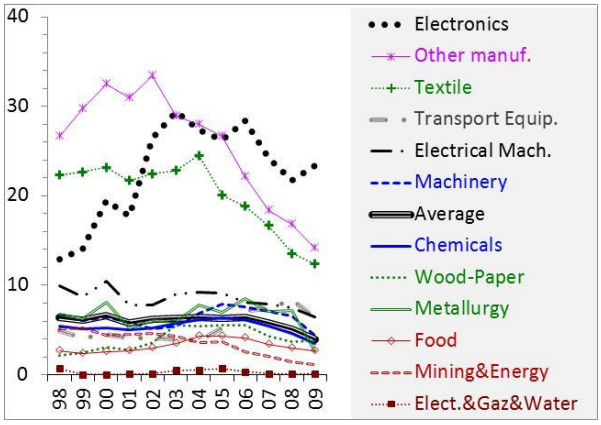
This contrast is not the result of different specialization but characterizes all manufacturing industries. In electronics, textile and miscellaneous manufacturing, the inland took advantage of the expansion of external demand in the mid-2000s. But even in its heyday, the dependence on world markets was about half that in the coast (Figure 12B).

Inland industry contributes only marginally to China's exports. Its average contribution decreased between 1998 and 2011 (from 13.5% to 11%) and increased only in the industries related to natural resources (food, wood, paper). However, these ratios measure only "direct" exports to foreign markets and the actual contribution of the interior is somewhat larger as inland industries have an indirect part in Chinese exports through their sales of intermediate products to coastal exporting firms (Meng *et alii, 2013*).

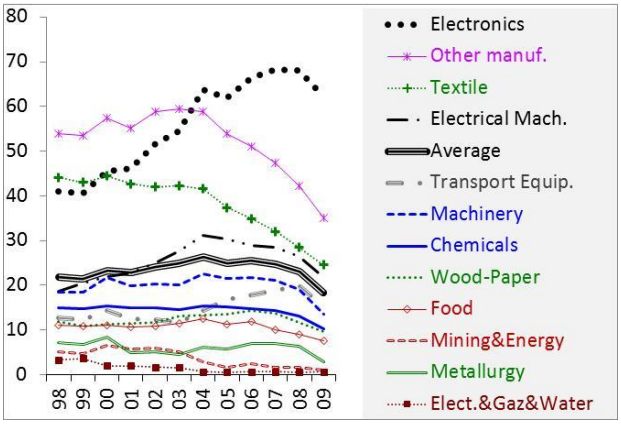
Figure 12
Foreign Trade: Inland and Coastal Manufacturing Industries Compared

A. Exports as a Share of Branch Output (%)

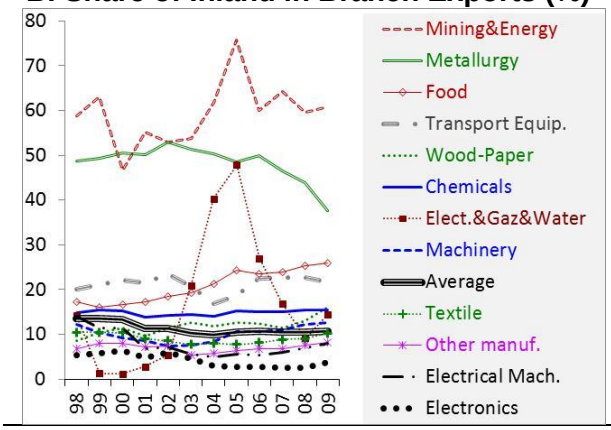
Inland



Coast



B. Share of Inland in Branch Exports (%)



Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

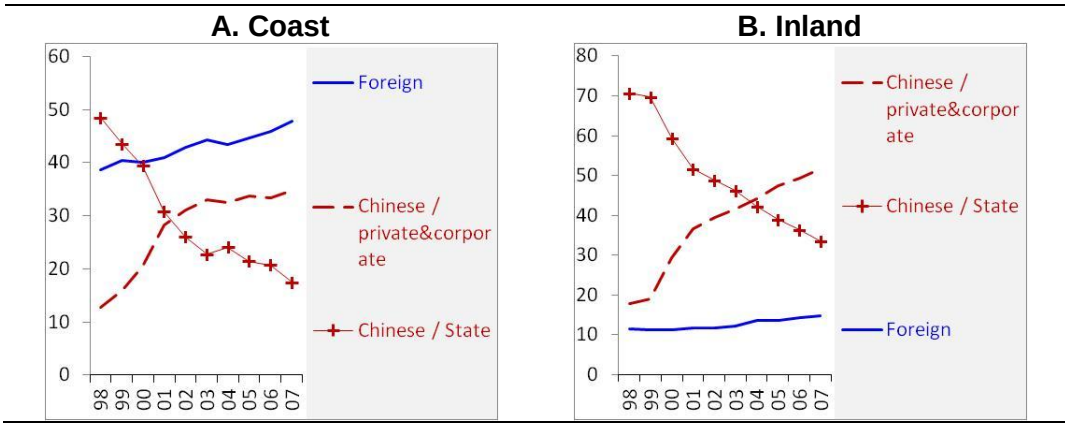
3.6.2. Who owns the industrial capital?

The ownership pattern is also different. Figure 13 shows that the far-reaching changes which have taken place in the ownership of industrial capital have led to different regional patterns.

The restructuration and the privatization process since 1997 led to the collapse of state-controlled firms as owners of industrial capital (Figure 13). In both areas, they now hold a relatively small share of industrial capital, but this share is still twice larger in the interior (34%) than on the coast (17%).

Symmetrically, the importance of industrial capital held by "companies" ("corporations") and private firms has soared. In the late 2000s, the major difference between the coast and the interior stands in the importance of foreign-invested enterprises (i.e. wholly or partly funded by investors from Hongkong and Taiwan and by other foreign investors). They hold 48% of industrial capital in the coast but only 15% in the interior. Local corporate and private investors have by far the most important share of inland industrial capital (52% in 2007), while the first place is held by foreign funded firms in the coastal industry.

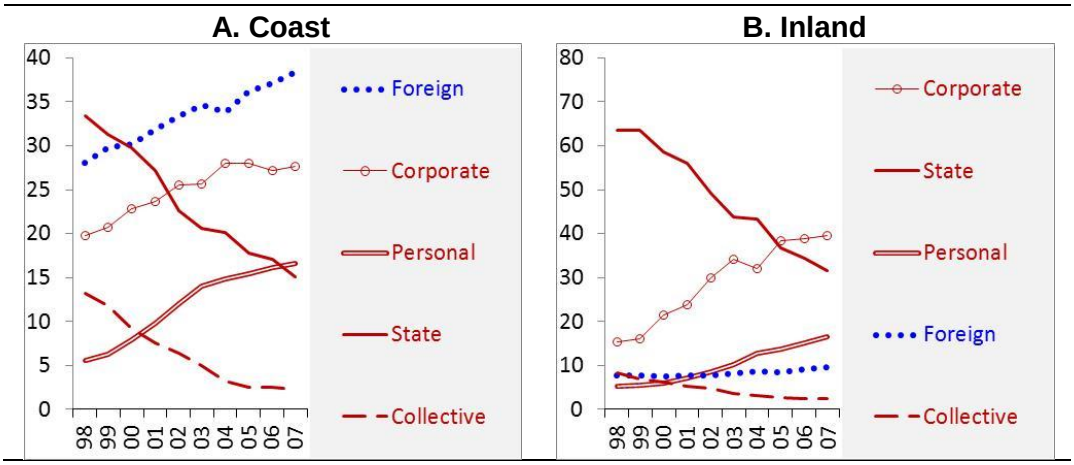
Figure 13
Breakdown of industrial capital by type of firms, in inland and coastal regions 1998-2007 (in percent of the region's industrial capital)



Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

It is useful to consider who ultimately owns the industrial capital (a "company" may still have the majority of its capital owned by the state, and foreign capital may hold a relatively small share of a joint-venture). Figure 14 illustrates the prime importance of foreign capital (including Hong Kong and Taiwan) in coastal industry. In the inland industry, corporate capital has just overtaken State capital and foreign capital has barely increased and remained marginal in 2007 (10%). Chinese enterprises have been the main driver of the interior strong performance in the past decade.

Figure 14
Breakdown of industrial capital by ownership, in inland and coastal regions 1998-2007 (in percent of the region's industrial capital)



Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

4. Convergence in China's manufacturing sector

This section proposes an estimation of productivity growth to analyze the process of convergence in industrial labor productivity across China. Our focus on manufacturing is deliberate. As discussed above, the literature on income disparities across China's provinces suggests that there has been (absolute) divergence in per capita incomes from 1978 up to

recently (Jian, et al., 1996; Chen and Fleisher, 1996; Li, et al., 1998; Jones et al., 2003). A recent analysis by Rodrik (2013) however suggests that strong convergence forces may operate in manufacturing industries even when economies as a whole fail to exhibit unconditional convergence, i.e. a systematic propensity of lagging behind countries to catch-up with richer ones irrespective of their characteristics. Rodrik suggests that in manufacturing activities intrinsic forces allow firms with lower than average productivity to catch-up with the most productive ones, hence displaying larger growth rates.

Our empirical approach relies on prefecture level data to estimate the speed at which labor productivities catch-up in the manufacturing sector in China. We are hence able to determine whether convergence coefficients vary between the various geographic regions. We also propose some preliminary examination of what factors appear to facilitate the convergence process. We look notably at the role of firm ownership and qualification.

4.1. Empirical specification

Following Rodrik (2013), we assume labor productivity growth in an industry *i* in a location *j* in period *t* to be a function of both location-specific conditions and a convergence effect. The convergence effect is set to be proportional to the gap between each industry's initial productivity and its frontier technology. The latter is hence specific to the industry *i* and common to all locations represented by D_{it} in the following expression of the growth of nominal labor productivity:

$$Growth\_y_{ijt} = \beta \ ln \ y_{ijt} + D_j + D_{it} + \varepsilon_{ijt}$$

where D_j is a dummy variable that stands in for all time- and industry-invariant location-specific factors. The error term ε_{ijt} is assumed uncorrelated with other explanatory variables and captures all other idiosyncratic influences on labor productivity growth.

The empirical strategy is hence to regress the growth of labor productivity in nominal terms on the initial level of labor productivity, a set of industry/time period fixed effects (D_{it}) and prefecture fixed effects (D_j).

The coefficient of interest is that on β. Unconditional convergence is tested when estimating the equation without location fixed effects (D_j). Findings of a negative and significant β will suggest unconditional convergence. In turn when local-specific conditions are controlled for by these fixed effects, the estimate of β will be a measure of conditional convergence.

4.2. Data

The dependent variable is the (compound annual) growth rate of labor productivity with labor productivity for 3-digit manufacturing industries. Labor productivity is computed dividing nominal value added by employment. The original firm-level dataset (NBS) is aggregated up to the 163 3-digit GBT sectors and to the prefecture-level. The regressors are the log of initial labor productivity and a host of fixed effects, depending on the specification. Each regression is run first without and then with prefecture dummies. Then we add controls built in the spirit of those found in the macro literature. We introduce proxies for capital intensity, export outward-orientation, size and the importance of the public and foreign sector. They are computed at the industry-prefecture level from the NBS census. Capital intensity is measured as the ratio of fixed assets per worker. Outward orientation is the ratio of exports over

industrial sales. The importance of share ownership is computed dividing the output emanating from state-owned firms by the total output for each prefecture-industry pair. The role of foreign capital is apprehended following the same logic but looking at the output from foreign firms.

4.3. Regression results

4.3.1. Benchmark results

Table 3 reports the results when running over a pure cross-section for the period 1999-2009. In that case industry × time period fixed effects are reduced to industry fixed effects. Column 1 is the baseline result in absence of prefecture-level dummies. The coefficient of unconditional convergence ("beta") is very large – 9 percent per year. This figure is three times higher than the value between 2-3 percent found in a cross-country analysis of Rodrik (2013). This is consistent with the greater economic homogeneity and easier technology diffusion within China than across different countries. Also our estimates are based on a much more disaggregated classification of industries. Rodrik's benchmark results correspond to a breakdown of 23 2-digit industries. He notes that more disaggregated specifications generally yielding somewhat higher estimates. A convergence rate of 9 percent implies that industries that are, say, a fifth of the way to the technology frontier experience a convergence boost in their labor productivity growth of 14 percentage points per annum (0.09 × ln(5)). It also means that it takes 8 years for the laggards to cut by half their distance to the leaders.

Column 2 adds prefecture fixed effects. The coefficient on the initial productivity remains globally unaffected suggesting that the rate of conditional convergence is roughly similar to that of unconditional convergence.

Column 3 further adds the squared term of the initial productivity to test for non-linearity of β. The squared term turns out to be positive and rather small in magnitude suggesting that the convergence boost in labor productivity growth does not increase indefinitely. It reaches a maximum value of 34 percentage points for industries which labor productivity is 26 times lower than the technology frontier. Moreover it does not drop rapidly as labor productivity catch-ups with the frontier confirming strong convergence forces.

Table 3
Baseline specification: cross-section of Chinese prefectures (1999-2009)

Explained variable	Annual growth rate of labor productivity (industry-prefecture) 1999-2009 decade		
	(1) Unconditional convergence	(2) Conditional convergence	(3) With square productivity
log initial productivity	-0.090***	-0.094***	-0.105***
	(0.001)	(0.001)	(0.002)
log initial productivity square			0.002***
			(0.000)
Capital Intensity		0.003***	0.002***
		(0.001)	(0.001)
Size (number of employee)		0.000	0.001
		(0.000)	(0.000)
Export on sales		-0.017***	-0.016***
		(0.003)	(0.003)
Share of public production		0.000	0.000
		(0.002)	(0.002)
Share of foreign production		0.004	0.003
		(0.003)	(0.003)
prefecture fixed effects	No	Yes	Yes
industry fixed effects	Yes	Yes	Yes
Observations	19,024	18,987	18,987
R-squared	0.619	0.655	0.656
Number of prefecture	336	336	336

Note: Heteroskedasticity-robust standard errors are reported in parentheses. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels. Control variables (capital intensity, size, export on sales, production shares) are measured as average over the period.

Table 4 reports the results based on the panel specification. It pools data for three 3-year periods (1998-2002, 2002-2005, and 2005-2008). The magnitude of the convergence coefficient, capturing the average yearly convergence speed, roughly doubles suggesting stronger convergence forces in the short run. However the main message remains: Chinese manufacturing industries exhibit strong unconditional convergence in labor productivity. Comparison of beta coefficients in columns 1 and 2 confirms that the speed of unconditional convergence is similar to that of conditional convergence. Column 3 looks at parameter heterogeneity across the three time periods and shows that convergence forces are stronger after 2002 than before. The speed of convergence remains however similar in the last two sub-periods (2002-5 and 2005-8).

Our finding of powerful convergence in Chinese manufacturing stands in sharp contrast with the growing inter-regional growth disparities measured in the literature over the period. It confirms Rodrik's message obtained on cross-country analysis that strong convergence forces may operate in manufacturing industries even when economies as a whole diverge. The Chinese case illustrates well the main reasons why manufacturing convergence does not translate into aggregate convergence.

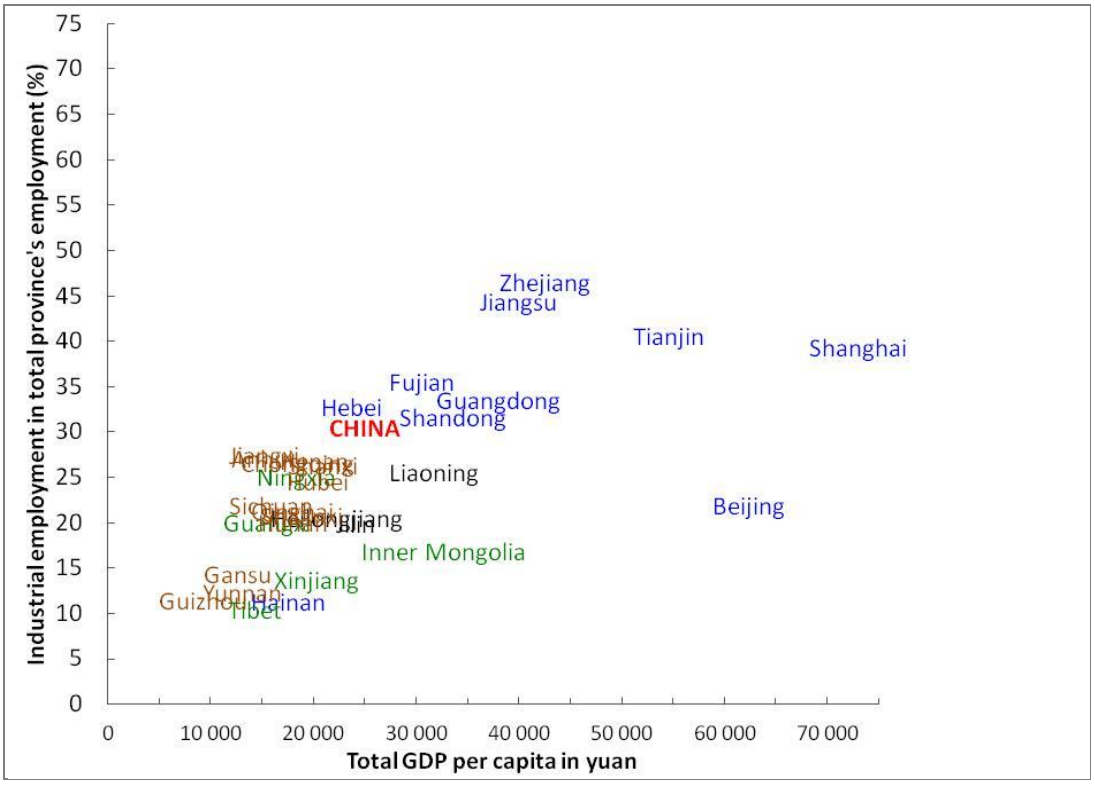
The main explanations proposed by Rodrik is that non-manufacturing activities (contrary to manufacturing) do not exhibit unconditional convergence and that the share of employment in manufacturing is low in the poorest economies and typically rising over the course of development. China fits this pattern. Industrial employment accounts for on average 27%, but is much lower in poorer locations (14% in Xinjiang and 17% in Inner Mongolia) than in the richer ones (reaching more than 40% in the Jiangsu-Zhejiang-Shanghai area), as shown in Figure 15 below. This gives the latter a growth boost, but depresses the contribution of manufacturing to overall productivity growth in the less developed locations. As, the share of industrial employment increased over the period, its impact on overall convergence has become more discernible.

Table 4
Panel specification of Chinese prefectures: three -year sub-periods
(1999-2002, 2002-05, 2005-08)

Explained variable	Annual growth rate of labor productivity (industry-prefecture)		
	(1)	(2)	(3)
	Unconditional	Conditional	Interacting year with initial labor productivity
log initial productivity (common 1999-2008)	-0.182***	-0.219***	-0.187***
	(0.003)	(0.002)	(0.004)
log initial productivity * period 2002-2005			-0.055***
			(0.004)
log initial productivity * period 2005-2008			-0.049***
			(0.004)
Capital Intensity		0.019***	0.021***
		(0.002)	(0.002)
Size (number of employee)		0.005***	0.005***
		(0.001)	(0.001)
Export on sales		-0.049***	-0.052***
		(0.006)	(0.006)
Share of public production		-0.037***	-0.034***
		(0.004)	(0.004)
Share of foreign production		0.013***	0.012**
		(0.005)	(0.005)
prefecture fixed effects	No	Yes	Yes
industry fixed effects	Yes	Yes	Yes
period fixed effects	Yes	Yes	Yes
Observations	59,439	59,361	59,361
R-squared	0.310	0.367	0.373
Number of prefecture	339	339	339

Note: Heteroskedasticity-robust standard errors are reported in parentheses. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels. Control variables (capital intensity, size, export on sales, production shares) are measured as average over the various sub-periods.

Figure 15
Share of manufacturing employment and GDP per capita by province (2008)



Source: National Bureau of Statistics of the PRC, Statistical Yearbook.

4.3.2. Heterogeneity across geographic zones

We use two complementary approaches to verify that the process of convergence is at work across the whole Chinese territory.

First we check that β-convergence also exists within Chinese provinces. Our regressions so far were pooling information at the city level for all provinces. It could be a possibility that our finding of convergence over time holds only for a sub-set of provinces or that labor productivity converges between provinces but diverges within provinces. To improve the estimation fit labor productivity is computed at the county level[1] (instead of the prefecture level). We estimate the individual convergence coefficients on a province-by-province basis for each of the 24 provinces that have a sufficient number of (county) sub-locations.

[1] Counties correspond to the geographical level just below the prefectures: there are between 50 and 150 counties by province. Given the low number of counties, we do not consider intra-provincial convergence for the following provinces: Hainan, Tibet, Ningxia, Beijing, Tianjin, Jiangsu, Chongqing.

Table 5
Convergence speed at the province level:
cross-section for the 1999-2009 period

Code	Province	Number of counties	Beta coefficient	Significance
13	Hebei	167	-0.093	***
14	Shanxi	47	-0.093	***
15	Nei Mongol	55	-0.099	***
21	Liaoning	100	-0.098	***
22	Jilin	57	-0.097	***
23	Heilongjiang	110	-0.095	***
32	Jiangsu	92	-0.094	***
33	Zhejiang	74	-0.093	***
34	Anhui	87	-0.093	***
35	Fujian	70	-0.097	***
36	Jiangxi	51	-0.089	***
37	Shandong	123	-0.091	***
41	Henan	134	-0.092	***
42	Hubei	96	-0.093	***
43	Hunan	116	-0.095	***
44	Guangdong	101	-0.093	***
45	Guangxi	54	-0.100	***
51	Sichuan	127	-0.093	***
52	Guizhou	79	-0.089	***
53	Yunnan	77	-0.092	***
61	Shaanxi	57	-0.096	***
62	Gansu	32	-0.100	***
63	Qinghai	21	-0.093	***
65	Xinjiang	66	-0.090	***

Note: These coefficients are obtained by running pure cross-section regressions for each province separately (at the county level) including sector fixed effects. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels.

They are obtained from regressing, separately for each province, the growth rate of an industry's labor productivity against its initial level across all counties and industries in cross-section for the 1999-2009 period. Regressions include the same controls as in Table 3 as well as sector fixed effects at 2 digit level.[2] Beta coefficients are shown in Table 5. There is very little evidence of parameter heterogeneity across provinces as the beta coefficient only varies between 9 and 10 percent.

Second, we use our benchmark sample as the prefecture level and allow the initial productivity term to vary by regions. We use the regional division into 4 groups: coast, interior, north-east and west. As shown in Table 6, convergence forces are stronger in the central and north-eastern regions. The speed of convergence in the most backward western area by contrast does not appear to be significantly different than the most advanced Coastal area when capital intensity and export orientation are controlled for suggesting that western

[2] The 3 digit level used in the previous regressions appears to be too detailed for this specification.

locations have more difficulties to catch-up than less peripheral areas. This would be in line with the issue of limited absorption capacity in the poorest locations.

Table 6
Regional heterogeneity in the baseline specification: cross-section 1999-2009

Explained variable :	Annual growth rate of labor productivity (industry-prefecture)	
log initial productivity	-0.090***	-0.091***
	(0.001)	(0.001)
log initial productivity x Western area	-0.006**	-0.001
	(0.003)	(0.002)
log initial productivity x Central area	-0.005***	-0.004***
	(0.002)	(0.002)
log initial productivity x North-eastern area	-0.006***	-0.005**
	(0.002)	(0.002)
Capital Intensity		0.002***
		(0.001)
Size (number of employee)		0.000
		(0.000)
Export on sales		-0.017***
		(0.003)
Share of public production		0.000
		(0.002)
Share of foreign production		0.004
		(0.002)
prefecture fixed effects	Yes	Yes
industry fixed effects	Yes	Yes
Observations	18,986	18,986
Number of prefecture	336	336
R-squared	0.655	0.655

Note: Heteroskedasticity-robust standard errors are reported in parentheses. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels. Control variables (capital intensity, size, export on sales, production shares) are measured as average over the period.

4.3.3. Investigating the drivers of convergence

Our investigation of the factors susceptible to be conducive to convergence exploits successively the heterogeneity across industries and across firm-type.

Table 7 shows the individual convergence coefficients estimated on an industry-by-industry basis for each of our 2-digit industries. Regressions are run separately for each industry. The growth rate of an industry's labor productivity between 1999 and 2009 is regressed on its initial level across all prefectures added the same controls as in Table 3. The tobacco sector stands as the only exception in our findings of rapid β-convergence. This highly-regulated sector has an average labor productivity 10 times higher than the manufacturing average. This anomaly which derives both from very low labor intensity and high and administratively set prices may be at the root of the absence of convergence dynamics in this sector. The convergence speed measured in the remaining manufacturing sectors stands in a narrow range, between 6.7% in basic chemicals and 10 % for non-ferrous metals.

Table 8 explores two potential drivers of the sectoral differences in productivity convergence: skill level of employees and R&D intensity. In 2004 the NBS survey breaks down employment depending on the education level of employees. Four categories are proposed postgraduate, undergraduate, college, high school and below. We compute the share of employees with at least college education for each 3-digit industry and categorize them into 3 groups: low, middle and high. In column 1 of Table 8 we allow the beta coefficient to be different for the latter two categories compared to the average. Column 2 introduces similar interactive terms based on the ratio of R&D over value-added. Information on R&D is only available for 2005, 2006 and 2007. We compute the average R&D over VA ratios at the 3-digit level over the three years and use them to split the sectors into three groups.

Table 7
Sectoral heterogeneity in the baseline specification: cross-section 1999-2009

GBT Code		Number of prefectures	Beta coefficient	Significance
13	Food Processing	328	-0.078	***
14	Food Products	304	-0.099	***
15	Beverages	314	-0.088	***
16	Tobacco	83	-0.023	n.s.
17	Textiles	288	-0.080	***
18	Wearing, Footwear & Caps	227	-0.087	***
19	Leather, Fur & Feather	185	-0.085	***
20	Wood	249	-0.089	***
21	Furniture	178	-0.087	***
22	Paper	270	-0.078	***
23	Printing	257	-0.086	***
24	Culture & Sport	138	-0.086	***
26	Basic Chemicals	314	-0.067	***
27	Pharmaceuticals	292	-0.093	***
28	Chemical Fibers	116	-0.077	***
29	Rubber	202	-0.084	***
30	Plastics	287	-0.089	***
31	Non-metal Mineral	332	-0.071	***
32	Ferrous Metals	259	-0.085	***
33	Non-ferrous Metals	244	-0.100	***
34	Metal Products	272	-0.083	***
35	Machinery	290	-0.086	***
36	Special Machinery	283	-0.090	***
37	Transport Equipment	276	-0.079	***
39	Electrical Machinery	261	-0.089	***
40	Telecomm. & Computers	199	-0.098	***
41	Measuring Instruments	165	0.094	***

Note: These coefficients are obtained by running pure cross-section regressions for each sector separately (at the prefecture level) including prefecture fixed effects. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels.

The two columns report a positive interactive term for the sectors with higher qualification of employees and with higher R&D intensity. They hence suggest that convergence forces are

stronger in sectors with low qualification and R&D. This somewhat surprising result may reflect the fact that sectors that are closer to the local comparative advantages converge faster. Indeed in China sectors with lower qualification or R&D may be more likely to benefit from spillovers and exploit the backwardness advantages. By contrast, sectors in the higher end of the qualification or R&D spectrum may have more limited links with the local productive structure and thus may be in a less favorable position to capitalize on the existing productive knowledge. This result would be in line with findings in the context of China that consistency with the local productive structure yields positive spillovers, such as knowledge externalities and economies of scale and scope (Poncet and Starosta de Waldemar, 2013). Also they are in line with Cai et al. (2011) who find that policy interventions in favor of low skill-intensive or R and D intensive sectors were associated with higher productivity levels and growth rates.

Table 8
Sectoral convergence and R&D and skill intensity: cross-section
1999-2009

Explained variable :	Annual growth rate of labor productivity (industry-prefecture)	
	1	2
log initial productivity	-0.096***	-0.096***
	(0.001)	(0.001)
log initial productivity x high R&D	0.004***	
	(0.002)	
log initial productivity x medium R&D	0.002*	
	(0.001)	
log initial productivity x high qualification		0.005***
		(0.002)
log initial productivity x medium qualification		0.002
		(0.001)
Capital Intensity	0.003***	0.003***
	(0.001)	(0.001)
Size (number of employee)	0.000	0.000
	(0.000)	(0.000)
Export on sales	-0.017***	-0.017***
	(0.003)	(0.003)
Share of public production	0.000	0.000
	(0.002)	(0.002)
Share of foreign production	0.004	0.004*
	(0.002)	(0.003)
prefecture fixed effects	Yes	Yes
industry fixed effects	Yes	Yes
Observations	18,986	18,986
R-squared	0.655	0.655
Number of prefecture	336	336

Note: Heteroskedasticity-robust standard errors are reported in parentheses. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels. Control variables (capital intensity, size, export on sales, production shares) are measured as average over the period.

We now exploit the information on the ownership structure of firms in the census data to determine whether convergence forces vary across firm-types. We distinguish between three categories of firms: domestic state-owned, domestic private and foreign owned. Column 1 of Table 9 allows the speed of convergence to differ depending on the three firm types. The positive and significant coefficients on the interactive terms for public and foreign firms indicate that convergence forces are stronger for private firms. This result is confirmed when splitting the sample according to the three groups. Higher beta coefficient is found for private firms.

Lower convergence speed for state-owned activities may relate to the well-documented inefficiency and lack of incentives in the public sector in China. It is interesting to note that the foreign capital is not associated with a faster speed of convergence of Chinese prefectures. This result is in line with growing evidence of fewer spillover gains emanating from foreign activities (Poncet and Starosta de Waldemar, 2013; Hale and Long, 2011).

Table 9
Firm ownership and convergence: cross-section 1999-2009

Explained variable	Annual growth rate of labor productivity (industry-prefecture)			
	(1) Interacting base productivity with firms type	(2) Only public firms	(3) Only private firms	(4) Only foreign firms
log initial productivity	-0.097***	-0.088***	-0.095***	-0.093***
	(0.001)	(0.002)	(0.001)	(0.001)
log initial productivity x public type	0.009***			
	(0.002)			
log initial productivity x foreign type	0.010***			
	(0.002)			
Capital Intensity	0.004***	0.005***	0.002***	0.005***
	(0.001)	(0.002)	(0.001)	(0.001)
Size (number of employee)	0.001*	0.001	0.001	0.004***
	(0.000)	(0.001)	(0.001)	(0.001)
Export on sales	-0.014***	-0.010	-0.007**	-0.016***
	(0.003)	(0.009)	(0.003)	(0.004)
Prefecture fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	20,550	5,436	10,172	4,942
R-squared	0.581	0.424	0.702	0.614
Number of prefecture	332	323	325	264

Note: Heteroskedasticity-robust standard errors are reported in parentheses. ***, ** and * respectively denote significance at the 1%, 5% and 10% levels. Control variables (capital intensity, size, export on sales, production shares) are measured as average over the period.

5. Conclusions

The paper shows that China has entered a new phase in its growth trajectory in the 2000s. There has been a spatial rebalancing of economic growth in favor of the interior and the gap in GDP per capita between the coast and inland has narrowed. This macroeconomic catch-

up reflects, with a time lag, the convergence process which has been at work in manufacturing industry since the end of the 1990s.

The Chinese case exemplifies Rodrik's finding of an unconditional convergence in manufacturing industry, i.e. a systematic propensity of .lagging behind countries to catch-up with richer ones irrespective of their characteristics. It also highlights how the "flying geese" model operates within a vast country with still large regional disparities. It suggests that inland industry has been catching up the labor productivity level of the coastal industry, thanks to the transfer of technology and capital from these most advanced regions. China is thus becoming increasingly integrated in terms of technological level.

The industrialization of the inner regions opens up new prospects for the Chinese development. Relying mainly on domestic market and capital, inland industrial pattern is in line with the transition to a growth model less dependent on global markets. However, this inland industrialization drive will have to be made compatible with the new priority of promoting consumption over investment and of protecting the environment.

The advanced coastal regions are losing their comparative advantage in labor intensive industries and have now to build up new specialization in high value-added industry and services. The opening of the services sector to Chinese private investors as well as foreign companies becomes crucial for coastal economies. The recent "special economic zone" opened in Shanghai embodies the need for the coast to find new growth opportunities.

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Appendices

Appendix 1 The database

Harmonization and adjustments

The Industrial enterprises census database provides data at firm level and covers all state-owned and non-state-owned industrial enterprises with annual sales above 5 million Yuan.

We made the following harmonization and adjustment in the data set.

The industry codes changed in 2003, and we connected the old codes with the new ones using the concordance file proposed by Zheng Wang (http://zhengwang.weebly.com/research.html; Excel File: 3-digit Chinese GB/T industry codes consistent before and after 2003).

There were changes in the prefecture codes assigned to the same firm during the all period. These codes have been converted into the relevant ones. For the four municipalities which have a provincial rank (Beijing, Chongqing, Shanghai and Tianjin), we have merged the different prefectures' codes because they were not relevant for our convergence analysis.

There is no data for value-added value in the database for the following years: 2001, 2004, 2008, 2009. For 2001 and 2004, we have the data for the Gross value of industrial output (GVIO) and the intermediate input. So we calculated the value added by subtracting the input to the output. For 2008 and 2009, we had data only for GVIO. Considering that the ratio value added/output by industry is quite steady over time, we have calculated the average ratio on 2006-2007 and applied this ratio to estimate the value added by industry in 2008 and 2009.

For 2000, 2008 and 2009, the data concern only the average number of employees. But the difference between this variable and the total number of employee at industry level is minimal for the other when the comparison can be made.

In our dataset, some variables take abnormal values (excessively low or high) which is likely to be due to unit problems (e.g. 1000 Yuan instead of 10000). In order to correct this, we dropped the following firms:

- Those with negative fixed assets
- The very small firms (i.e. with less than 8 workers) because their accountability system is presumably not reliable enough. These firms don't fill generally the criterion of at least 5 million Yuan annual sales.
- The firms which record a ratio of value added/sales which is negative or above 1.

The following session presents the representativeness of the two databases, i.e. the initial database and the new one which excludes the above mentioned firms.

Representativeness

Our database includes all state-owned and non-state-owned industrial enterprises with annual sales above 5 million Yuan. In principle, the aggregated data should be identically with the data published in China's statistical yearbooks (CSY). In order to measure the representativeness of our database, we compared the two statistical data sets by year, region, industry and firm type.

First, we compare the initial database with the CSY data to capture the general representativeness of our database (Table A.1). We compared four variables: the number of firms, the output value (in current prices), the industrial value added and employment (this variable is not exactly the same in the CSY which give the annual average of employees; however the differences between these two variables are small).

Table A.1
Old database representativeness by year

Year	Firm number	Output Value	Value Added	Employment
1998	100	100	100	91
1999	100	100	100	100
2000	100	100	100	97
2001	99	99	99	97
2002	100	100	100	100
2003	99	99	99	98
2004	100	100	104	101
2005	100	100	100	101
2006	100	100	100	100
2007	100	100	100	101
2008	97	95		96
2009	100	100		100
2009*	94	96		96

*2009 excluding firms without a code (6.2% of the firms in our database in 2009 have no code nor region).

Table A.1 presents the discrepancy for the four variables between the initial data set and the CSYs (ratio: the value of the variable in the initial dataset/the corresponding variable in the CSY).

On the one hand, our database seems to represent quite well the number of firms with an annual sales income of over 5 million Yuan, especially during the period from 1998 to 2007 (we lose 1.3% of the firms in 2001 and 2003). Concerning industrial employment the representativeness of the data set is less clear mainly because of the differences in the definition of the variables; but, except in 1998, the gap does not vary that much.

On the other hand, the two last years of our database show a less good coverage. The second line of the year 2009 represents our database without the firms which do not have a code or a region and which will not be used in our convergence analysis (Section 4).

However we still have a good coverage in terms of all variables (around 95% of CSD's values for all variables).

We have checked the representativeness of the data set at the level of province, industry and category of types. Due to space limitation, the tables are not shown here but the following observations stand out.

The coverage is the best at the level of firm category, less good at the level of provinces, and the worst at the level of industry. The main issues are the following:

- In 2001 and 2008, the number of firms is under-reported in Nonferrous metal industries (including the Smelting and Pressing of Non-ferrous Metals industry which represents 4.5% of firms present in our database for other years) and the number of firms is over-reported in recycling industry.
- The codes of Logging and Transport of Timber and Bamboo industry has changed after 2002 and we have included it in sector Wood-Paper. In the same way, Recycling and Disposal of Waste is present in the database only since 2003 and we have included it in Other manufacturing).
- In 2003, there is no data for the Tibet (Xizang) province, and half of the firms for Yunnan and Shaanxi provinces are missing.
- In 2008 and 2009, the data set shows a better coverage for Coastal and North-East region provinces that for the Central and Western provinces.
- The data set over-represents Cooperative firms in 2009.

The above comparison concerns the representativeness of the initial database. The representativeness of the new data base (without the firms we have excluded) is presented in Table A.2.

Table A.2
New database representativeness by year

Year	Firm number	Output Value	VA	Employment
1998	85	92	95	84
1999	91	97	99	95
2000	89	96	97	95
2001	92	97	97	94
2002	94	98	99	97
2003	95	98	97	96
2004	95	98	101	98
2005	97	98	99	98
2006	97	98	99	98
2007	97	98	98	99
2008	96	94		96
2009	99	100		100
2009*	93	96		95

*2009 without firms without a code (6.2% of the firms in our database in 2009 have no code, nor regions).

Table A.2 shows that we lose from 1% to 15% of the firms, depending of the year, compared with the CSY. The loss is smaller for the other variables (less than 5%, in general, for output, value added and employment); mainly because we dropped small firms (i.e. the ones with

less than 8 workers). Moreover, it is likely that the firms which show abnormal values (of fixed asset, value added or sales) are the small ones. The representativeness of our new database is lower during the first years of our sample and improves in more recent years. Lastly, in 2008 and 2009, the representativeness of the new data set is not very different from the initial data set.

To sum up, the initial database provides data which are, in general, quite close to that of the China Statistical Yearbooks, with some exceptions (for a particular industry, province and year). The revised database, which excludes the small firms and the firms showing abnormal variable values, is also relatively close to the CSY. Except for 1998, more than 90% of our four main variables (number of firms, value added, output and employment) are covered.

Appendix 2 Aggregation and classifications

We have aggregated the firm-level data by industry, by category of firms and by region.

Classification by industry

Table A.3
China: Breakdown by sector of industrial value added, employment and exports, 2009

GB/T		VA	Employees	Exports
	MINING & ENERGY	**13.3**	**9.7**	**0.8**
06	Mining and Washing of Coal	5.1	5.7	0.1
07	Extraction of Petroleum and Natural Gas	3.4	1.2	0.2
08	Mining and Processing of Ferrous Metal Ores	1.0	0.6	0.0
09	Mining and Processing of Non-Ferrous Metal Ores	0.7	0.6	0.0
10	Mining and Processing of Nonmetal Ores	0.5	0.6	0.0
11	Mining of Other Ores	0.0	0.0	0.0
25	Processing of Petroleum, Coking, Processing of Nuclear Fuel	2.5	1.0	0.5
	MANUFACTURING	**78.8**	**86.4**	**99.0**
	Food products	**10.6**	**7.3**	**3.5**
13	Processing of Food from Agricultural Products	4.7	3.8	2.4
14	Manufacture of Foods	1.8	1.8	0.9
15	Manufacture of Beverages	1.7	1.4	0.2
16	Manufacture of Tobacco	2.4	0.2	0.0
	Textiles	**6.9**	**15.0**	**12.4**
17	Manufacture of Textile	3.8	7.0	5.2
18	Manufacture of Textile Wearing Apparel, Footwear, & Caps	1.9	5.1	4.4
19	Manufacture of Leather, Fur, Feather and Related Products	1.2	2.9	2.8
	Wood & Paper industries	**3.1**	**4.1**	**1.8**
20	Processing of Timber, Manuf. Wood, Bamboo, Rattan, Palm & Straw Products	1.0	1.5	0.8
22	Manufacture of Furniture	1.4	1.7	0.6
23	Manufacture of Paper and Paper Products	0.6	0.9	0.4
	Chemicals	**16.4**	**17.1**	**9.9**
26	Manufacture of Raw Chemical Materials and Chemical Products	6.3	5.0	3.2
27	Manufacture of Medicines	2.1	1.8	1.0
28	Manufacture of Chemical Fibers	0.5	0.5	0.4
29	Manufacture of Rubber	0.8	1.1	1.2
30	Manufacture of Plastics	1.8	2.9	2.4
31	Manufacture of Non-metallic Mineral Products	4.9	5.8	1.7
	Metallurgy	**10.5**	**5.7**	**2.5**
32	Smelting and Pressing of Ferrous Metals	7.3	3.7	1.4
33	Smelting and Pressing of Non-ferrous Metals	3.3	2.1	1.1
	Machinery	**10.4**	**12.5**	**8.9**
34	Manufacture of Metal Products	2.7	3.6	3.0
35	Manufacture of General Purpose Machinery	4.8	5.5	3.8
36	Manufacture of Special Purpose Machinery	3.0	3.3	2.1
39	**Electrical Machinery**	**5.4**	**6.1**	**8.5**
	Electronics	**6.8**	**8.8**	**39.7**
40	Manuf. of Communication Equipment, Computers & Oth. Electronic Equipment	5.9	7.5	37.3
41	Manuf. of Measuring Instr. & Machinery for Cultural Activity & Office Work	0.9	1.3	2.4
	Transport Equipment	**6.6**	**5.7**	**6.7**
372	Manufacture of automobiles	4.6	3.5	1.9
376	Manufacture of aerospace vehicles	0.2	0.4	0.3
37x	Other transport equipment	1.8	1.8	4.5
	Other manufacturing industries	**2.0**	**4.2**	**5.1**
21	Manufacture of Furniture	0.6	1.1	1.4
24	Manufacture of Articles For Culture, Education and Sport Activity	0.4	1.4	1.8
42	Manufacture of Artwork and Other Manufacturing	0.8	1.6	1.9
43	Recycling and Disposal of Waste	0.2	0.2	0.0
	ELECTRICITY, GAZ & WATER	**7.8**	**3.9**	**0.2**
44	Production and Distribution of Electric Power and Heat Power	7.2	3.2	0.1
45	Production and Distribution of Gas	0.3	0.2	0.0
46	Production and Distribution of Water	0.3	0.5	0.0
	TOTAL INDUSTRY	**100.0**	**100.0**	**100.0**

Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

Classification by category of firm and type of ownership

Table A.4
China: breakdown of industrial capital by category of firms and type of ownership 2007 (% total)

		Type of capital ownership						
Code	**Category of firm**	State	Collective	Corporate	Personal	HMT	Foreign	Total
	Public firms	**13.5**	**0.9**	**8.7**	**0.3**	**0.1**	**0.1**	**23.7**
110	SOE (State owned enterprise)	9.0	0.1	5.5	0.1	0.0	0.0	14.7
120	Collective-owned enterprise	0.0	0.8	0.3	0.1	0.0	0.0	1.2
141	State cooperative enterprise	0.1	0.0	0.1	0.0	0.0	0.0	0.2
142	Collective cooperative enterprise	0.0	0.0	0.0	0.0	0.0	0.0	0.0
143	State and collective cooperative enterprise	0.0	0.0	0.0	0.0	0.0	0.0	0.0
151	State-owned limited liability Co.	4.4	0.1	2.8	0.1	0.0	0.0	7.4
	Private & corporate firms	**6.4**	**1.1**	**17.7**	**15.3**	**0.3**	**0.4**	**41.2**
130	Equity joint venture	0.0	0.1	0.3	0.2	0.0	0.0	0.6
149	Other cooperative enterprise	0.0	0.0	0.1	0.0	0.0	0.0	0.1
159	Other limited liability Co.	2.7	0.7	8.9	3.7	0.1	0.2	16.3
171	Private wholly owned enterprise	0.0	0.0	0.6	1.3	0.0	0.0	2.0
172	Private partnership enterprise	0.0	0.0	0.1	0.3	0.0	0.0	0.4
173	Private limited liability company	0.0	0.1	3.4	7.5	0.0	0.1	11.1
174	Private Co., Ltd	0.0	0.0	0.3	0.6	0.0	0.0	0.9
190	Other domestic enterprise	0.0	0.0	0.3	0.1	0.0	0.0	0.3
160	Share-holding Co, Ltd	3.6	0.2	3.7	1.7	0.1	0.1	9.5
	Firms with foreign capital	**1.5**	**0.3**	**5.8**	**0.9**	**9.5**	**17.1**	**35.2**
	Hong Kong, Macao, Taiwan (HMT)	**0.5**	**0.1**	**1.9**	**0.4**	**9.1**	**0.3**	**12.4**
210	HMT equity joint venture	0.3	0.1	1.4	0.3	1.9	0.2	4.1
220	HMT cooperative venture	0.1	0.0	0.1	0.0	0.4	0.0	0.6
230	HMT wholly owned enterprise	0.0	0.0	0.2	0.0	6.7	0.1	7.1
240	HMT invested Co., Ltd	0.1	0.0	0.2	0.1	0.2	0.0	0.6
	Other foreign firms	**1.1**	**0.2**	**3.9**	**0.5**	**0.4**	**16.8**	**22.8**
310	Foreign equity joint venture	0.9	0.2	3.0	0.4	0.2	4.8	9.5
320	Foreign cooperative venture	0.0	0.0	0.2	0.0	0.0	0.5	0.9
330	Foreign wholly owned enterprise	0.0	0.0	0.4	0.0	0.1	10.9	11.4
340	Foreign invested Co., Ltd	0.1	0.0	0.3	0.1	0.0	0.5	1.0
	All firms	**21.4**	**2.4**	**32.2**	**16.6**	**9.8**	**17.5**	**100.0**

Source: National Bureau of Statistics of the PRC, Manufacturing enterprise census data.

Classification by region

Table A.5
China's population by region and provinces, 2011

Code		Total population		Urban population		Rural population	
		10 000 persons	% of total	10 000 persons	% of region	10 000 persons	% of region
	CHINA	**134 041**	**100.0**	**69 312**	**51.7**	**64 730**	**48.3**
	COAST	**51 063**	**38.1**	**31 022**	**60.8**	**20 041**	**39.2**
11	Beijing	2 019	1.5	1 740	86.2	279	13.8
35	Fujian	3 720	2.8	2 161	58.1	1 559	41.9
44	Guangdong	10 505	7.8	6 986	66.5	3 519	33.5
46	Hainan	877	0.7	443	50.5	434	49.5
13	Hebei	7 241	5.4	3 302	45.6	3 939	54.4
32	Jiangsu	7 899	5.9	4 889	61.9	3 010	38.1
37	Shandong	9 637	7.2	4 910	51.0	4 727	49.1
31	Shanghai	2 347	1.8	2 096	89.3	251	10.7
12	Tianjin	1 355	1.0	1 091	80.5	264	19.5
33	Zhejiang	5 463	4.1	3 403	62.3	2 060	37.7
	INLAND	**82 979**	**61.9**	**38 290**	**46.1**	**44 688**	**53.9**
	North-East	**10 966**	**8.2**	**6 442**	**58.7**	**4 525**	**41.3**
21	Liaoning	4 383	3.3	2 807	64.1	1 576	36.0
22	Jilin	2 749	2.1	1 468	53.4	1 281	46.6
23	Heilongjiang	3 834	2.9	2 166	56.5	1 668	43.5
	Center	**61 734**	**46.1**	**27 153**	**44.0**	**34 581**	**56.0**
34	Anhui	5 968	4.5	2 674	44.8	3 294	55.2
50	Chongqing	2 919	2.2	1 606	55.0	1 313	45.0
62	Gansu	2 564	1.9	953	37.2	1 611	62.9
52	Guizhou	3 469	2.6	1 213	35.0	2 256	65.0
41	Henan	9 388	7.0	3 809	40.6	5 579	59.4
42	Hubei	5 758	4.3	2 984	51.8	2 774	48.2
43	Hunan	6 596	4.9	2 975	45.1	3 621	54.9
36	Jiangxi	4 488	3.3	2 051	45.7	2 437	54.3
63	Qinghai	568	0.4	263	46.2	305	53.8
61	Shaanxi	3 743	2.8	1 770	47.3	1 973	52.7
14	Shanxi	3 593	2.7	1 785	49.7	1 808	50.3
51	Sichuan	8 050	6.0	3 367	41.8	4 683	58.2
53	Yunnan	4 631	3.5	1 704	36.8	2 927	63.2
	West/Periphery	**10 278**	**7.7**	**4 695**	**45.7**	**5 582**	**54.3**
45	Guangxi	4 645	3.5	1 942	41.8	2 703	58.2
15	Inner Mongolia	2 482	1.9	1 405	56.6	1 077	43.4
64	Ningxia	639	0.5	318	49.8	321	50.2
54	Xizang	303	0.2	69	22.7	234	77.3
65	Xinjiang	2 209	1.6	962	43.5	1 247	56.5

Source: National Bureau of Statistics, China statistical yearbook 2012.

[i] Our database includes all state-owned and non-state-owned industrial enterprises with annual sales over 5 million Yuan (often referred as the "above-scale" industrial firms). These data come from annual surveys conducted by the National Bureau of Statistics (NBS). Industry is defined here to include mining, manufacturing and public utilities.

[ii] Since 1949, the Chinese government has had various definitions of economic regions, depending on the distinctive priorities of its development strategy (Wei, 2009). Since the 11th plan (2006-2010), the basic framework for regional development policy distinguishes four economic regions. The coastal (eastern) area has the same geographical limits (10 provinces) as in our classification; the north-east also (3 provinces); but the center area encompasses only six provinces (Shanxi, Anhui, Jiangsu, Henan, Hubei, Hunan) while the Western Region is greater than in our classification and encompasses 12 provinces (Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang).

Abstract

Since the mid-2000s, the center of gravity of China's economic growth has shifted from the coastline to the inland and the gap in GDP per capita between the two areas has narrowed. This macroeconomic catch-up reflects, with a time lag, the convergence process which has been at work in manufacturing industry since the end of the 1990s and suggests that China is becoming increasingly integrated in terms of technological level. This pattern is in line with a process whereby the inland catches up the labor productivity level of the coast thanks to the transfer of technology and capital from these most advanced regions.

Keywords

China, Regional inequality, Manufacturing industry, Convergence, Growth.

JEL

F63, O14, O25, O53, R12.

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