JOBS
WORKING
PAPER
Issue No. 62

What was the Impact of Creating Better Jobs for More People in China's Economic Transformation? What We Know and Questions for Further Investigation

Dino Merotto
Hanchen Jiang

WORLD BANK GROUP
Jobs

WHAT WAS THE IMPACT OF CREATING BETTER JOBS FOR MORE PEOPLE IN CHINA'S ECONOMIC TRANSFORMATION? WHAT WE KNOW AND QUESTIONS FOR FURTHER INVESTIGATION

Dino Merotto

Hanchen Jiang

1818 H Street NW, Washington, DC 20433, USA.
Telephone: 202-473-1000; Internet: www.worldbank.org.

What was the impact of creating better Jobs for more people in China's economic transformation? What we know and questions for further investigation

Dino Merotto and Hanchen Jiang

Abstract

We show that for China the movement of more people into better jobs with higher incomes formed a very important explanation for the country's long-term success in growth and poverty reduction. China's exporting cities created a virtuous cycle of new wage-employment-creating investments by new businesses making new products. The rapid increase in urban labor demand drew hundreds of millions of workers from the rural "traditional" sector to the "modern" sector, providing them with more reliable waged incomes. This dramatically raised the share of waged employment in China's economy and unleashed new middle-class demand for more income-elastic goods and services. Growth in urban wages was moderated by regulated rural to urban labor migration under the Hukou system. This raised returns to capital, which maintained business incentives to re-invest their profits in new goods and services for which new markets were opening. Production of cheaper manufactured goods for the world market was an important catalyst, but domestic demand for services in China has maintained the momentum.

JEL codes: D22; D24; E24; J01; J08; L00; L10; O00; O14; O55 Key words: Employment; wage gaps; labor; labor market; structural transformation; capital deepening; migration; labor demand; labor supply; skills; productivity.

Dino Merotto, World Bank, Washington, DC, dmerotto@worldbank.org;

Hanchen Jiang, Assistant Professor in Economics, University of North Texas .

This study serves as a background paper for a joint CIKD-WB Poverty Study. The authors thank the staffs of the Center for International Knowledge on Development (CIKD) and the China Institute for Income Distribution at Beijing Normal University for sharing data and comments. We also thank Andreas Eberhard, Sebastian Eckardt, John Giles, Jorg Langbein, Maria Ana Lugo, Rinku Murgai, Chiyu Niu, Philip O'Keefe, Martin Raiser, Ian Walker, and Ruslan G. Yemtsov for helpful inputs, comments, and suggestions.

Summary

This brief uses data and analytic techniques from four main sources[1]. The annual macro data come from the Bank's World Development indicators, the Penn World Tables version 10.0[2], and the GGDC/UNU-WIDER Economic Transformation Database[3]. Micro data for the jobs diagnostic are drawn from the China Household Income Project Series (CHIPS) and are processed for 1988, 1995, 2002, 2007, and 2013 using World Bank standardized Jobs Diagnostic tools and techniques, which makes the results, the data and indicators internationally comparable. Results have been processed in aggregate any by module for each year of CHIPS for all three of the survey modules; rural, urban, and migrant. This allows jobs indicators and regression results to be generated with disaggregation for individual characteristics of age, sex, education, and household decile, for urban, rural, and migrant workers.

The line of enquiry follows the World Bank Jobs Group's global findings on jobs and economic transformation,[4] that as countries develop, more workers join the labor force and find employment, workers become more productive in their current job, and move to better, more productive jobs. These transitions to better jobs are highly sensitive to labor demand. Increased labor demand requires private investment in new production activities, new products, and in new locations. This investment creates job opportunities for workers to switch the work they do across occupations or sectors, across locations, and importantly, to move from working for themselves in the capital-shallow "traditional sector", to working for a wage in the capital-deep "modern sector". The benefit of looking at these transitions in the jobs people do and the waged-incomes they receive over the 25-year time frame allowed by CHIPS, is that labor transitions generally take time to manifest. Tracking jobs outcomes over quarter of a century of rapid economic growth allows us to consider how a new generation of young workers that joined the labor market with additional years of schooling have fared from economic transformation, and to look at changing demographics in the labor market.

The benefits of economic growth with labor transitions are well known to economists[5]; learning-on-the-job creates productivity-enhancing experience, the shift from self- to waged employment brings division of labor and economies of scale, and the shift to urban areas in productive cities can bring agglomeration effects. Yet structural change aside, in-depth analysis of trends in labor transitions are under-researched in economic growth and labor market literature. Some movements are harder for workers to make than others, even where there *is* labor demand. For instance, a young worker may lack the right skills to change occupation, may not be able to fund the move to the city, or may lack information about employment opportunities elsewhere. In

---

[1] CHIPs data: https://www.icpsr.umich.edu/web/ICPSR/series/243;
Jobs Diagnostic tools and techniques: http://datatopics.worldbank.org/JobsDiagnostics/jobs-tools.html;
Penn World Tables: https://www.rug.nl/ggdc/productivity/pwt/;
World Development Indicators: https://datacatalog.worldbank.org/dataset/world-development-indicators

[2] Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015), "The Next Generation of the Penn World Table" American Economic Review, 105(10), 3150-3182

[3] See de Vries, G. Arfelt, L. Drees, D. Godemann, M. Hamilton, C. Jessen-Thiesen, B. Ihsan Kaya, A. Kruse, H. Mensah, E. and Woltjer, P. "WIDER Technical Note 2/2021 Economic Transformation Database: content, sources, and methods https://www.wider.unu.edu/project/etd-economic-transformation-database

[4] "Pathways to Better Jobs in IDA Countries": https://openknowledge.worldbank.org/handle/10986/30594

[5] McMillan, Rodrik and Sepulveda (2017) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959091

such situations public policy or investment may be needed to reduce frictions in the labor market. Even where labor transitions are underway, the translation of growth into better waged earnings can be choked off by information gaps, poor labor regulations, poor investment climates, or predatory practices, a lack of skills, etc. So, whereas authors have spotted patterns in development[6] in country cross-section data, there are few countries where the pathway to better jobs can be clearly observed over time.

For China however, we show that the movement of more people into better jobs with higher incomes formed a very important explanation for the country's long-term success in growth and poverty reduction. China consistently created better, urban, waged jobs for more people, drawing on its labor abundance in rural areas and increased demand for goods and services in its cities. Adopting lines of enquiry for examining and explaining growth with both structuralist and neoclassical economic traditions[7], we find that increased earnings and investment in the "modern sector" in China's cities created a virtuous cycle of new investment and employment in new production methods, higher labor incomes, and new demand for more income elastic goods and services. Increased urban labor demand drew abundant labor from the rural "traditional" sector. However, wage growth in urban areas was moderated by rural to urban labor migration. We infer that the moderation of urban wage growth resulting from the increased supply of labor through the Hukou system increased returns to capital in China as labor productivity rose to supply buoyant export and consumer demand. This created the incentive for reinvestment in new goods and services for which new markets were opening. We therefore conclude that capital-deepening increased China's labor productivity, which raised average hourly labor earnings and employment, increasing household consumption demand for higher value goods and services, which created incentives for new investment, thus continuing a virtuous cycle of better jobs for more people with economic transformation. Production of cheaper manufactured goods for the world market was an important catalyst, but domestic demand for services has maintained the momentum.

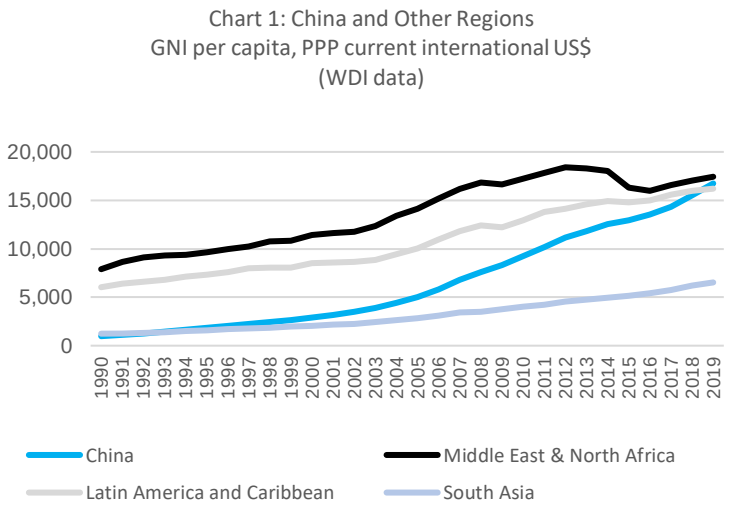
The rest of this note is structured in three parts. Part 1 uses macro-economic and sector aggregates to outline the drivers of China's spectacular growth in production and per capita income, and the mutually supporting importance of demography, physical and human capital accumulation, consumption and net trade, and structural change to China's growth success. Part 2 identifies the pathways to better jobs for Chinese workers during economic transformation, with micro analysis of urbanization, structural change and formal wage employment, illustrating how different types of workers benefited through all three. It concludes by noting the significance of first urban, and then rural, waged employment. Part 3 continues the use of micro data to complete the link between the transformations of Chinese production, employment, and consumption. The section investigates growth in wages, and the importance of the domestic purchasing power that better jobs unleashed for continuing to fuel jobs with economic transformation and reduce inequality in China[8]. Our analysis ends with the CHIP 2013 survey data. More insights can be made when 2018 data are available, but with the macro data available we conclude with observations on important next steps for China on Jobs and economic transformation.

[6] See Kuznets (1973), Chenery and Syrquin (1975), Merotto et al. (2018)
[7] Diao, McMilan and Rodrik (2017) NBER Working Paper 23132, pages 3-11.
[8] Our findings are consistent with those in Sicular, Li, Yue, and Sato (2020)

1. Macro-economic overview: *What key elements of China's economic transformation created better jobs for more people?*

Setting the scene: China's remarkable growth

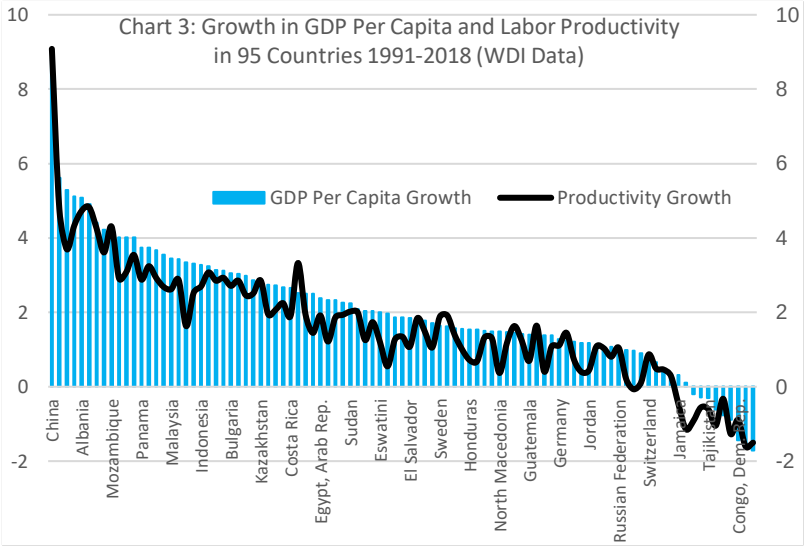
China's rapid growth in per capita income is unprecedented in modern times. In 1990 per capita GNI in China, measured in current international US dollars at purchasing power parity, was less than one sixth of Latin America's average, and was only 80% of South Asia's average (chart 1). By 2019, China had overtaken Latin America and had a per capita income more than 2.5 times that of South Asia. China's per capita gross national income went from 4 percent of the United States in 1990 to 25 percent in 2019.



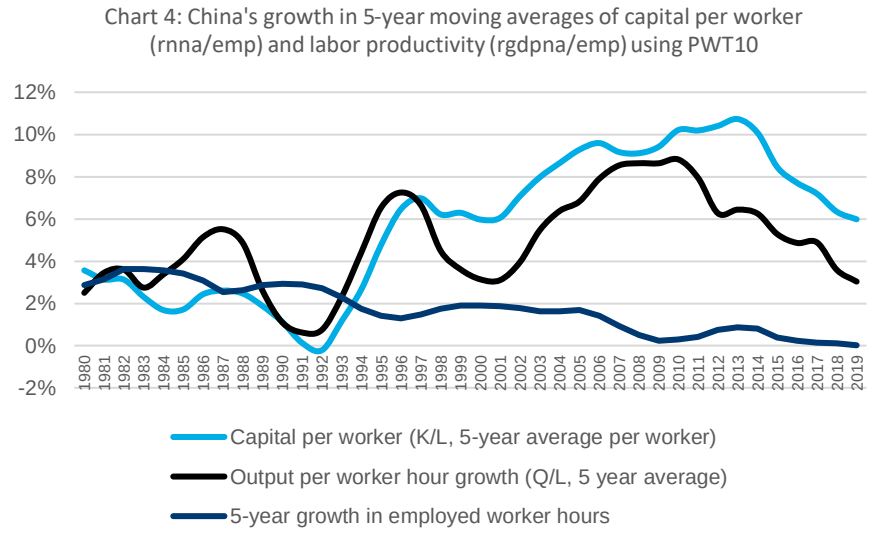
Income per capita grew twice as fast in China as in other developing regions of the World. The acceleration in per capita GNI growth was particularly marked in the decade from 1998-2007, coming off the back of growth in the previous decade after China's market-friendly reforms began in the late 1980s. GNI per capita growth was globally high throughout the 1990s, though it was significantly higher in China. However, a new growth acceleration started in China around 1998, running for almost a decade until 2007, with unprecedented annual growth in per capita income averaging 12 percent through the decade. The world economy, and especially the emerging markets, also grew more strongly during this period of enhanced world trade, low inflation, increasing commodity prices and moderate interest rates. But none grew like China where the sustained growth acceleration resulted in per capita GNI growth that was double that of other regions (chart 2). Consequently, by the GNI Atlas method of classifying countries, China was Low Income in 1990, Lower middle income in 2000, and Upper middle income by 2010: the only country to move up two income categories in this period.

Transformations in production, employment and consumption in China were mutually reinforcing, but with consumption growth lagging consumption, savings and investment increased. In the rest of this section, we use aggregate data to look more deeply into the mutually reinforcing effects of household savings, capital accumulation and capital deepening on labor productivity growth, of labor productivity growth in excess of wage growth on returns to capital, and of growth in labor earnings on increased demand for goods and services, all of which we posit drove China's sustained development.

How capital deepening helps explain labor productivity growth



Fast labor productivity growth and structural change characterize China's growth, but productivity is not the whole story. Consistent with the empirical literature on growth and structural change[9], China's growth in real GDP was driven by increases in productivity and changing patterns of employment. Chart 3 shows that throughout the period from 1991 to 2018 GDP per employed person in China rose by considerably more than any other country for which WDI data is available over the period. At 9.1 percent, average labor productivity growth in China was almost double that of Vietnam, which saw the next highest average annual labor productivity growth at 4.8% annually. But in China factor accumulation is a significant part of the productivity growth story.[10]



Impressive trend growth in labor productivity in China was highly correlated with trend growth in capital per worker. Chart 5 shows 5-year average growth rates in capital per person engaged in constant 2017 national prices, growth in real GDP per hour worked at in constant 2017 national prices, and growth in employed worker hours. Growth in worker effort measured by employed person hours (calculated from Penn World Tables 10) rose by an average of around 2 percent annually from 1980. But whereas the number of employed workers continued to rise until 2018, the rise was negligible, and average

[9] Chenery and Syrquin (1984), Restuccia,et al (2008), McMillan, Rodrik, Verduzco-Gallo. (2014), Herrendorf, Rogerson & Valentinyi (2013)

[10] After Easterly and Levine (2002) published their influential paper "It's Not Factor Accumulation" macro economists tended to downplay the importance of new fixed capital investment in spurring innovation in LICs. This despite findings by growth accounting in Bosworth and Collins (2003) "the Empirics of Growth" which showed factor accumulation to be important to growth in under-capitalized LICs. In China the orthodox view has been that TFP has contributed less to growth than in richer countries (Yang, (2020)).

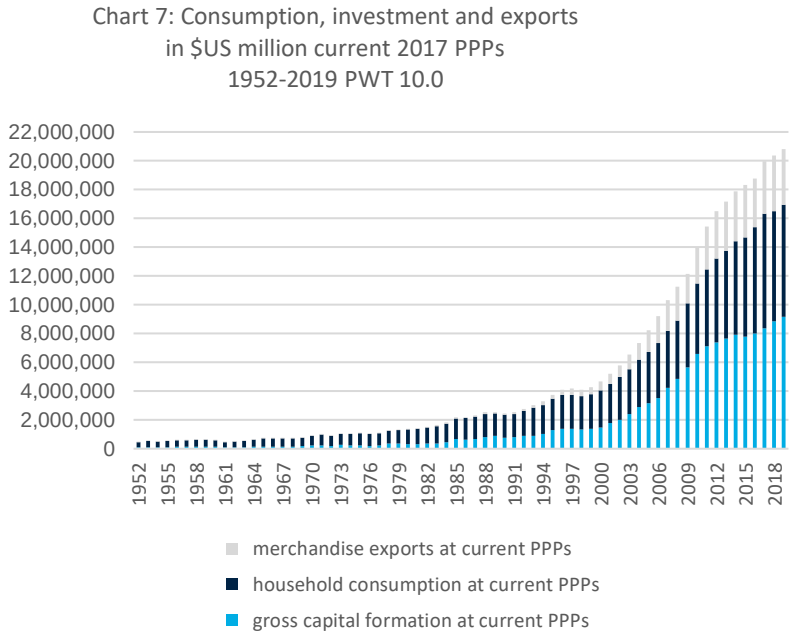
hours worked per employed person flattened out from around 2006. A key driver of productivity per hour worked seems to have been the acceleration in capital deepening. The 5-year average growth in capital per worker increased gradually from just 1 percent in 1993 to 11 percent by 2013. Capital deepening seems highly correlated with the rise in labor productivity. The R-squared between trend capital per engaged person and trend real GDP per hour worked from 1990 until 2017 was 0.73. In fact, labor productivity appears to have been highly sensitive to lagged changes in capital deepening.

How household consumption and wages growing slower than output financed China's capital accumulation

The accumulation of capital was financed from a combination of corporate profits and household savings[11]. Whenever production, labor compensation and consumption grow at different rates, economies generate imbalances. Growth in household consumption in China, whilst rapid, was slower than output since the late 1980s, and the labor compensation share of GDP fell during the period of most rapid capital deepening. Chart 5 shows that 10 year moving average growth in GDP consistently exceeded China's growth in total (household plus public) consumption after 1998. Remarkably, China's imputed ten-year average household marginal propensity to save (MPS[12]) increased from just around 0.1 in 1993 to over 0.5 by 2003, before declining since 2010. Chart 6 shows that trend growth in real GDP exceeded ten-year average Growth in labor compensation[13] until 2015. So, whereas China certainly benefitted from a combination of an increase in foreign savings as exports boomed, from more sophistication in the composition of its exports, and from inflows of FDI[14], domestic savings in China were also rising markedly as labor compensation and household consumption failed to keep up with China's production[15]. Charts 5 and 6 suggest that the rise in household savings would have been accompanied by a rise in corporate profits, because growth in output exceeded growth in labor compensation, signaling increasing the returns to non-labor factors of production, i.e., land and capital[16].

[11] A future version of this paper will estimate returns to capital over time and compare these to China's real interest rates.
[12] Uses PWT v10.0 Estimated by first multiplying GDP in current price $US PPP (cgdpo) by the labor compensation share of GDP in national prices (labsh) to get labor incomes. The MPS is then 1-MPC which is derived by dividing the change in household consumption each year (csh_c * cgdpo) by the change in labor income.
[13] For the sake of convenience, we have assumed that the deflators for GDP and labor costs were identical, so that the nominal and real shares of labor compensation equate.
[14] Gunby, Jin and Reed (2017)
[15] See also Klein, M. and Pettis, M. (2020) "Trade Wars are Class Wars"
[16] Some commentators (e.g. Lardy, 2008) have noted that financial repression (negative real interest rates and directed credit) subsidized costs of capital in China.

In sum, the *quantity* of labor demanded in China was rising from increased demand for goods and services, driven by growing domestic consumption, increased exports, and especially by the boom in investments in buildings and machinery. As chart 6 shows, Growth in labor compensation exceeded growth in private household consumption from 1999, which was nonetheless growing at a globally unprecedented average of 6 percent each year after 1999. Total (private and public) consumption demand in China was doubling every 15-16 years[17], and as we will show, the pattern of demand was shifting, creating fast growing new markets for new goods and services. The relative magnitudes of the changing composition of demand are best captured in chart 7, which shows the current $US 2017 PPP values of total consumption, exports and investment (gross fixed capital formation (GFCF)) for China from 1952-2017, also using data from the Penn World Tables 10.0. By 2007, gross fixed capital formation exceeded private household consumption in China and was twice the value of gross merchandise exports. At current 2017 PPPs, GFCF was 47 percent of GDP in 2011, private consumption was 35 percent and merchandise exports 18 percent.



How changing patterns of demand led to structural change in China's economy

Structural transformation in China's economy was rapid, stimulating new, better job opportunities. The *quality* of jobs in China's economy improved as the composition of Chinese absorption and therefore production and labor demand shifted towards higher value, higher productivity goods and services which require more skilled workers in more sophisticated and diversified organizations to produce them. Production and employment shifts followed the change in demand, first led by exports to the world economy, and then by the demands of consumers in China's domestic economy. In the next section we build the story of jobs and economic transformation for China "from the worker up", using data for individual worker types from the CHIPS project. In part 3 of this note we show how rising labor incomes raised demand for services. Here (charts 8, 9 and 10) we first consider the evolution of the sectoral pattern of production employment, and labor productivity over time in the economy. Second (chart 11), we show how the composition of exports to the rest of the world evolved over time, using trade data. Third, (chart 12), we use consumption surveys to consider how changes in per capita income for Chinese workers changed the structure of Chinese households' demand for goods and services in line with Engel's Law.

[17] PWT 10.0

Industry in China saw the biggest productivity gains, rising as a share of GDP by more than industry's share of employment, whilst services absorbed most of the workers released from agriculture. The first thing to note from chart 8 is that China's development follows the well- documented path of structural change[18] seen historically in developed countries. According to ETD data, agriculture's share of GDP shrank in China between 1990 to 2018 from 34 to just 8 percent, whilst the share of employment fell from 60 to 26 percent[19]. The share of industry in GDP increased from 36 to a peak of 46 percent between 1990 and 2011 before falling back to 40.5 percent in 2018[20], but industry's share of employment rose only from 25 to 34 percent in 2017 and 33 percent in 2018, indicating a big increase in labor productivity in industry. The service sector provided most of the net gain in employment for those joining the labor force and for those who left agriculture. Using ETD data services provided just 15 percent

Chart 9: China employment by sectors of economic activity (Millions) using ETD data

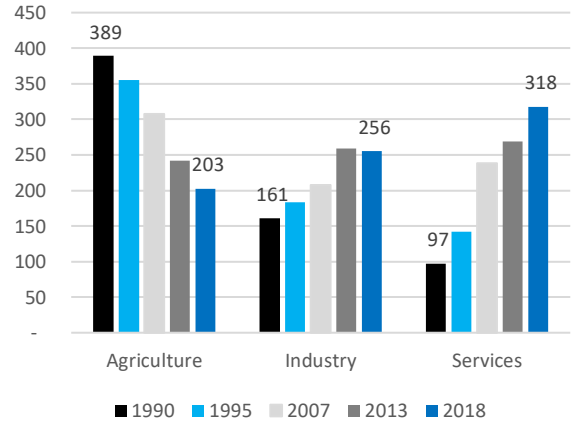
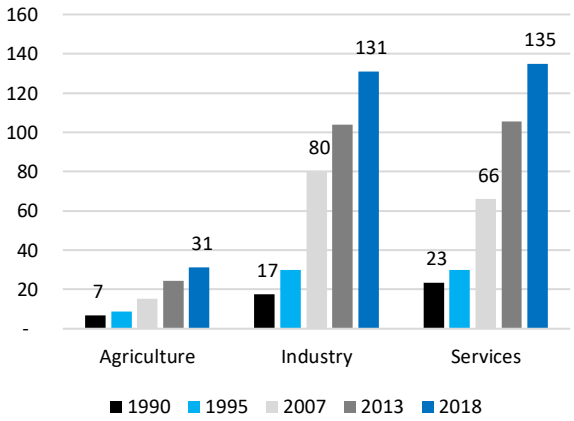


Chart 10: Value Added per Worker by Sector, China (in '000 Yuan 2015, UN/Wider ETD data)

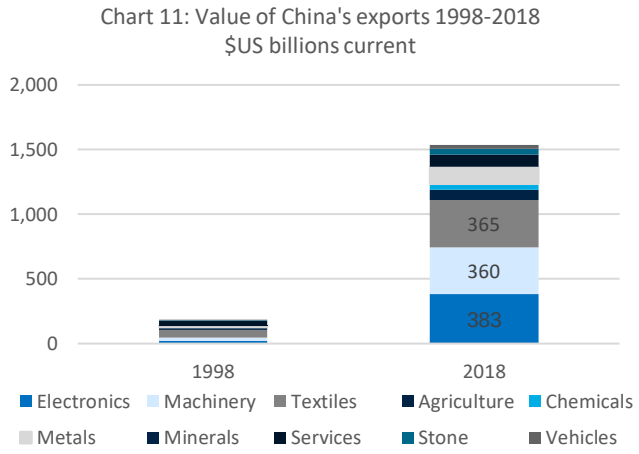


of employment in 1990, compared with 41 percent in 2018[21].[22] Services did not expand commensurately as a share of the economy from 1995-2007, implying service productivity growth below that of industry (in line with Baumol & Bowen (1966)). Services represented 29.4 percent of GDP in 1990, rising to 51.8 percent of GDP in 2018 (ETD). In the second section below, we present micro data findings from the CHIP surveys which suggest that agriculture in China declined by about 213 million workers between 1995 and 2013, almost exactly the increase seen in service jobs. According to CHIP data, industry created around 68 million additional jobs between 1995-2013. Chart 9 using ETD shows a fall in agriculture of 187 million, a rise in services of 220 million jobs. and a rise in industry jobs by 95 million between 1990-2018. As chart 10 shows, labor productivity in industry and services grew almost in synch. By 2018 the productivity of a worker in services was just 3 percent higher than that of a worker in industry. However, from 1990-2007 growth in industry productivity outstripped that of services.

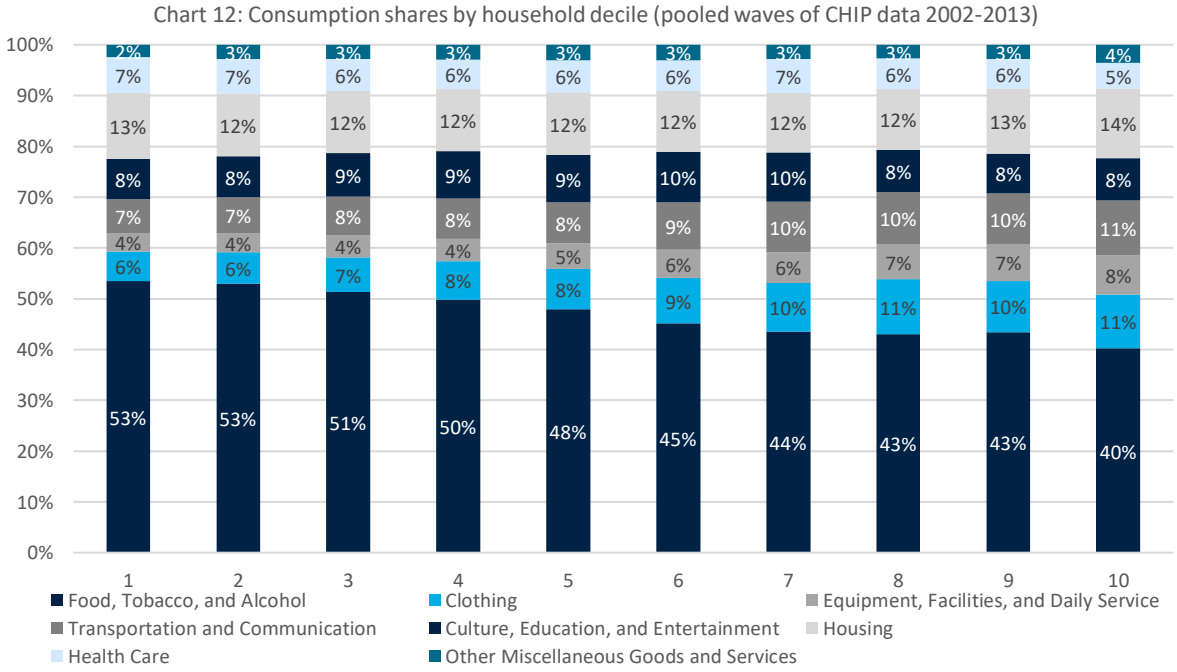
[18] Kuznets 1957; Chenery 1960; Chenery and Taylor 1968
[19] As we shall see in the next section, household survey data from CHIPS suggest the share of labor in agriculture is lower, but that the fall in employment in agriculture was of the same magnitude, from 53 percent in 1988 to 16 percent in 2013.
[20] WDI data
[21] Using CHIPs, the shares for services were 22.5 percent of employment in 1988 and 53.7 percent in 2013.
[22] UN COMTRADE and IMF Direction of Trade data

In 1990 the labor productivity of a worker in industry was 75% that of a worker in services on average. By 2007 it was average industry labor productivity was 21% higher than a worker in services. As we shall see in part 2, after 2007 as the rural economy shed labor, the average wage of rural workers started to slowly converge with towards those in urban areas.

Within industry, a significant increase in labor demand and in labor productivity came from construction and manufacturing, particularly the rapid growth in exports of electronics, textiles and machinery. As chart 11 shows, China's exports of these product groups grew by $US 1 trillion between 1998-2018. Along with metal products for export, these product categories accounted for five sixths of China's $US 1.35 trillion increase in exports over the 20-year period. Service exports in contrast are estimated at $US 96 billion in 2018, only 4 percent of the increase in China's exports during this period. This suggests that the big increase in labor demand seen in the service sector in China came from the increased demand for services in the domestic economy, not from exports. Furthermore, as we shall see in part 2, the main increase in employment in industry came from the construction industry, fueled by the major increases in public and private investment noted in charts 4 and 7.



Within services, the growth in demand came increasingly from growth in the domestic economy. Services represented an estimated 47 percent of GDP in 2018 (WDI data), with most of this supplying the Chinese market. And services were already 52 percent of employment in 2013 (CHIP data) with little exported. We saw that labor productivity growth was higher in

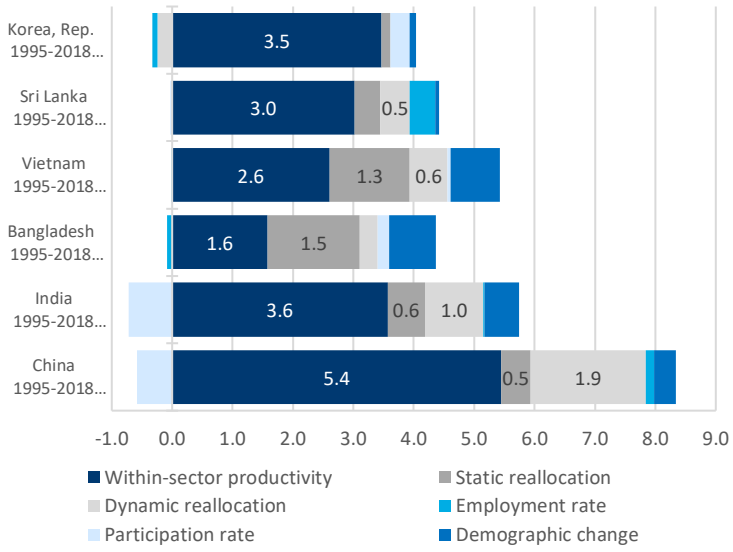


industry, but this means that the employment elasticity of services was higher than industry. Furthermore, chart 12 (using pooled CHIP survey data for 2002, 2007 and 2013 waves) shows that the share of services in consumer demand in China is higher for those in higher income deciles. Services are just around 40-41 percent of consumption for those in the bottom 40 percent of household incomes but rises to 51 percent in the top decile. Given that that per capita gross national incomes in China increased almost seven-fold from 1995-2013, and consumption increased 250 percent in real terms, we can expect that even with the high marginal propensity to save that the demand for services would have at least tripled.

There is scope for much faster growth in consumer demand to propel growth in services in China in future. In Upper Middle-Income and High-Income Counties, health, education, entertainment, transport and communication, housing and other services make up between 70—80 percent of private household consumption. Importantly, as productivity and wages in China continue to grow with the tightening labor market (see sections 2 and 3), if China can encourage consumers to spend more of their incomes (for instance by improving the replacement income from more reliable pensions systems) then the domestic market for services should increasingly fuel growth in both production and labor incomes. This however, would require deep reforms to the financial sector.

Which sectors drove structural change in China?

Chart 13: Decomposition of Growth in per capita value added (%), by Country



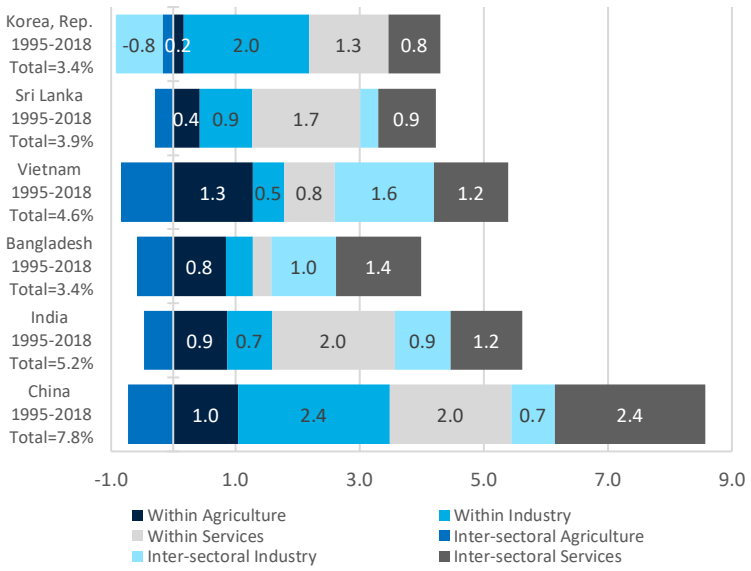
Decompositions of per capita income growth in China for the period 1995-2013 show that the biggest gains came from labor productivity increases *within* sectors, although China's growth also benefited from structural change. Chart 13 shows the results of a Shapley decomposition[23] of per capita GDP for China combining WDI data for real GDP with sectoral employment shares derived from CHIPS data. The results are then compared with decompositions for the Republic of Korea, Sri Lanka, Vietnam, Bangladesh and India which were amongst the fastest growing developing economies in the world over the period 1991-2018. Consistent with chart 3, labor productivity within sectors was the biggest driver of per capita income, although structural change added 1.8 percentage points to per capita income growth in China, matching the contribution of structural change in poorer Bangladesh and India[24]. For China, uncharacteristically, the "dynamic component" of structural change contributed as much to growth in per capita GDP as the static component. Usually the dynamic component is smaller,

[23] For methodology see Shorrocks (2013) and de Vries, Timmer and de Vries (2015)
[24] This is important. Merotto et at (2018) notes that structural change generally contributes more to growth in poorer countries.

especially in LICs and LMICs, because in most developing countries, average labor productivity in receiving sectors declines as more labor moves in[25].

Whereas average labor productivity was growing in all sectors, and workers were flowing disproportionately into services, it was industry that contributed most significantly to overall labor productivity growth. Chart 14 presents a decomposition of the labor productivity component of per capita income by sectors. It shows that for China more than any other fast-growing country, industry was an important driver of growth. Isolating within industry productivity from the productivity gain arising from workers moving into industry from lower productivity sectors, we see that just under half of the 7.8 percent growth in labor productivity from 1995-2018 came from industry. That growth in industry in an economy generates spillover effects in growth for the transport and communications, business services and financial sectors is well-established. Therefore, industry's contribution to jobs and economic transformation in China will have come from productivity gains as industries invested, and in the direct and indirect jobs created.

Chart 14: Contribution of change in productivity (value added per worker, %) by Country and Major Sector



2. How did workers benefit through better jobs outcomes from China's economic transformation?

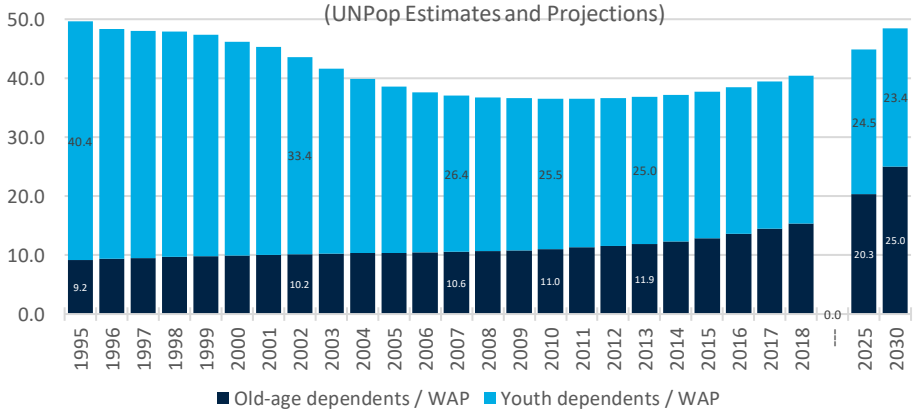
Economies grow when more workers more workers join the labor force and find work, when they become more productive in their current job, and when workers move to better, more productive jobs in new sectors, occupations, locations, working for a wage not for themselves. These transitions can take a generation or more, and so they can be hard to spot in slower growing countries, or those with episodic growth. But in China where economic growth was both rapid and persistent, these transitions are clearly visible in household survey data for individual workers. In this section we analyze these transitions in employment, disaggregating by worker characteristics using individual worker data from all five surveys under the China Household Income Project (CHIP[26]). China benefitted strongly from the three main channels of urbanization, diversification and formalization of jobs with its economic transformation. Before showing this, we first we take a closer look at growth in China's labor supply and skills.

[25] de Vries, Timmer and de Vries (2015), op cit.
[26] http://www.ciidbnu.org/chip/index.asp?lang=EN the surveys cover 25 years from 1988 when reforms began, through to 2013, covering 1995, 2002, 2007 in between.

How did the supply of labor and skills change, and what challenges lie ahead?

China now faces an aging workforce. Chart 13 showed that from 1995-2013, a demographic dividend added 6 percentage points per annum on average to per capita income growth. However, dependency in China reached its lowest level in 2010 at 36 percent of the working age population (chart 15). Youth dependency in China is forecast[27] to continue to fall, and old age dependency to continue to rise, so that by 2030 China will have more elderly dependents (25 percent of the working age population) than children (23.4 percent). By 2050 on current trends, dependency in China will reach 67.3 percent of the population, which is above the projected US level of 63.7 percent by 2050. With average working hours declining (a trend observed in all countries as they develop to UMIC), and with the end of the demographic dividend arising from falling dependency, China will need to look to increase labor force participation and increase the quality of workers to accumulate human capital in the economy in future. There is scope for both, especially as labor conditions and wages improve.

Chart 15: Dependency Ratios % Working Age Population
(UNPop Estimates and Projections)



Labor force participation has been declining, especially for women, which is normal for a country developing from LIC to UMIC. Chart 16 using data from the CHIP surveys shows that the share of working age people who were out of the labor force rose from 8 percent in 1988 to 27 percent by 2013. Global research by the World Bank's Jobs Group[28] suggests this is normal for a country developing from Low Income to Middle Income. As economies grow and create better waged jobs, women tend to withdraw from the labor force to undertake home based work

Chart 16: Labor Force Participation - Total
(% of working age, CHIP data)

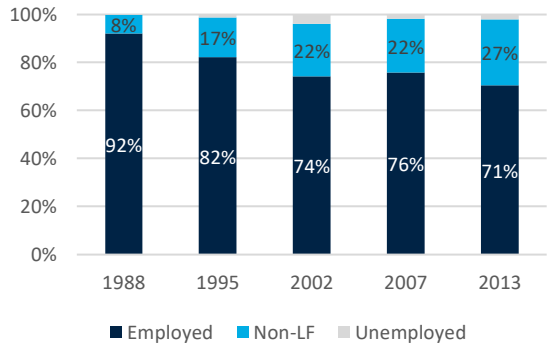
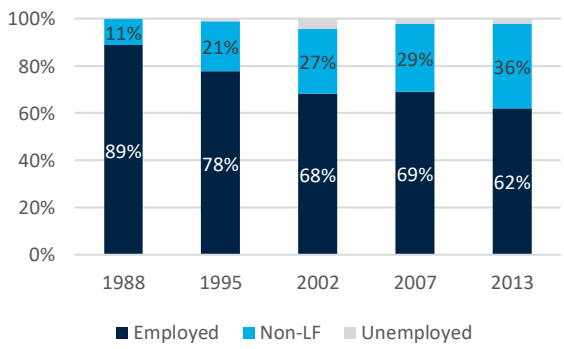


Chart 17: Female Labor Force Participation
(% of working age population, CHIP data)



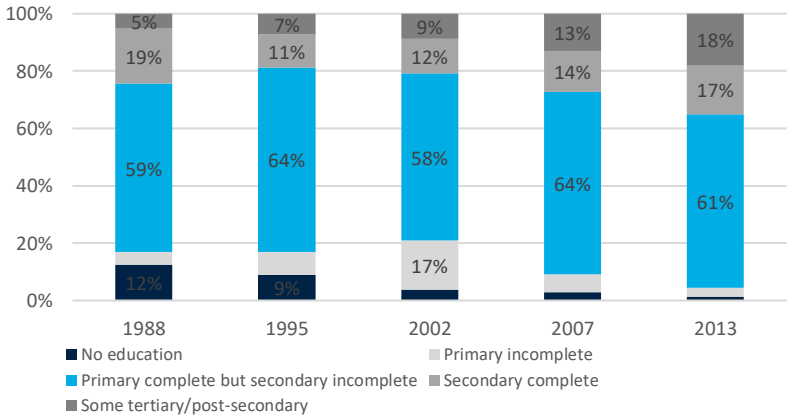
[27] UNPop forecast assuming medium range fertility estimates for China.

[28] Merotto et al (2018) https://www.worldbank.org/en/topic/jobsanddevelopment/publication/pathways-to-better-jobs-in-ida-countries

and care giving in preference to undignified, unsafe and manual work which is more commonplace in LICs. China has seen this same phenomenon. Chart 17 shows that the share of women out of the labor force increased from 11 to 36 percent from 1988 to 2013. The proportion of men out of the labor force has been less than half of this, at between 16-19 percent since 2002. Unemployment remained *very low* throughout, at just 2 percent. It was 2.7 percent in urban areas in 2013 compared to just 1.5 percent in rural. The share of workers not in the labor force is also higher in urban (29 percent) than in rural areas (25 percent), though the increase in rural areas has been more dramatic, rising from just 5 percent in 1988.

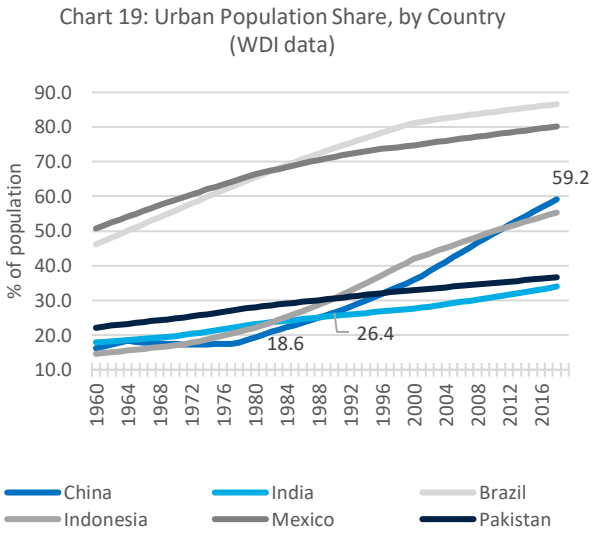
Though starting to age gradually, the Chinese workforce has become better educated over time. This means that human capital has been accumulating along with the marked improvement in capital- deepening. Combining data sets from PWT9.1 and CHIP surveys, we estimate that there was an increase in the number of people employed with secondary education or higher of 92 million between 1988 and 2013 from , an annualized increase over the 25-year period of 3.84 percent, with 65.5 million of those having some tertiary/post-secondary education. Taken together with an average annual growth in the real capital stock of 10 percent per year, this annual growth of 3.8 percent in skilled employees would also have been an important driver of labor productivity growth. It is significant that the capital stock grew faster than the stock of skilled labor. With comparative advantage dependent upon a country's relative accumulation of physical and human capital, China's increase in capital depth has served to increase its comparative advantage in more complex, higher value production. Looking forward, as China's economy grows in relation to the global economy, it should also expect to meet a greater share of its booming `middle-class' consumer demand for goods and services domestically.

Chart 18: Share of employed by education level attained
(Authors' calculations using CHIP data)

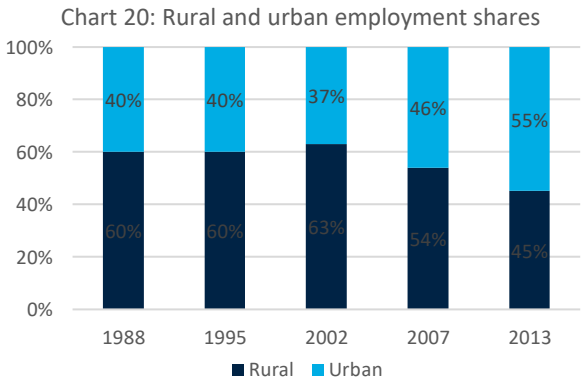


China's urbanization has been rapid and will continue, bringing younger workers of all skill levels to cities

The gradual move of labor out of agriculture observed in section 1 was mirrored by the rise in urbanization in China. We look at the share of the urban population using UNPop data reproduced in the World Development Indicators[29] (chart 19), and then use the CHIP survey data to analyze the urban and rural shares of employment (chart 20)[30]. Chart 19 shows the estimated share of the urban population more than doubled from 26.4 percent in 1990 to 59.2 percent in 2018. With the population growing, this meant an addition of about 528 million people to urban areas over the period. Some authors (e.g., Chan (2008)) have estimated that 80 percent of the growth in urban areas (around 20 million people per year) can be attributed to rural-urban migration, facilitated by the Hukou[31] system. In part 3 we look separately at migrant, rural and urban workers. [32]



Around 190 million new jobs were created in China's cities between 1998 and 2013. Consistent with the urban population estimates, CHIP survey data suggests that by 2014 around 55 percent of jobs were in urban areas, compared with 40 percent in 1998 (chart 20). Taking these percentages and the estimates of persons engaged from PWT 9.1 used in the earlier macro analysis, suggests that there were around 246 million urban jobs in China in 1988 compared with 423 million in 2013. Given the importance of rural to urban migration in China's economy, a CHIP survey module on migrants was added in the 2002 survey, which we use later in this note to contrast the characteristics and earnings of migrants from those workers classified as rural and urban.



[29] https://data.worldbank.org/country/china
[30] The reliability of the CHIP surveys depends upon the sampling frame. For more details see Kong (2010).
[31] The Hukou system – set up in 1958 – is a registration system in which people are registered according to their place of birth. For migrants it represents an internal passport system, allowing those registered as rural workers to migrate to urban areas with residency rights.
[32] The importance of internal migration led the CHIP survey team to add a migrant module to the CHIP surveys from 2002. A migrant is an urban based worker whose Hukou registration is in a rural location. We use that module below to differentiate migrant jobs and monthly waged earnings.

Migration of younger workers to the urban areas has compounded natural aging in rapidly reducing the youthful share of the rural employed. Chart 21 shows that between

Chart 21: Rural employment by age category (axis starts at 50%)

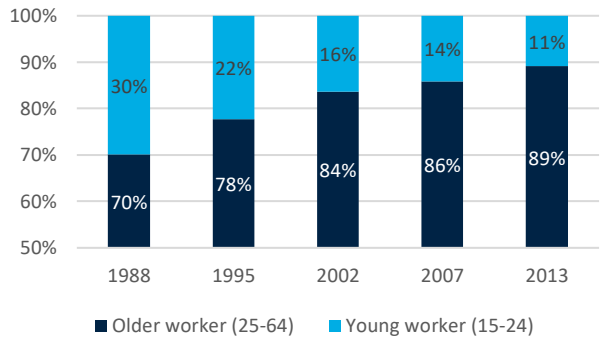
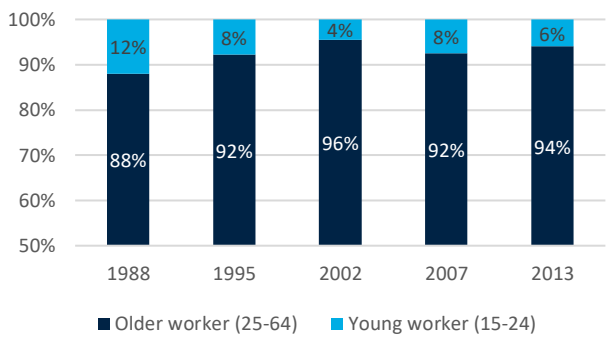


Chart 22: Urban employment by age category (axis starts at 50%)



1988 and 2015 the youth share of rural employment fell from 30 percent to 11 percent. This is still more youthful than the urban share of 6 percent in 2013, but as chart 22 shows, the urban share of youth in employment is broadly unchanged despite China's economy aging. This contrast between rural and urban youth employment suggests that some share of the migrant population was below 25 years of age. Indeed, the migrant module of CHIPS suggests that in 2007 a third of employed migrants were 15-24 years old compared to 13.4 percent for the economy as a whole.

The transformation of China's urban economy created job opportunities for workers of *all* education levels. Whereas the average education of those employed was rising in China, and around 80 percent of those with secondary education and above in China have consistently been working in urban areas (chart 22), the proportion of those emloyed in urban areas with *less than* secondary education also increased. It rose from 25 percent in 2002 to 42 percent in

Chart 23: Urban and rural shares of employed persons with less than secondary education (Authors' calculations using CHIP data)

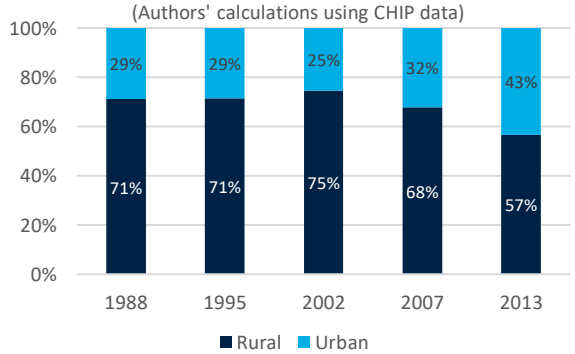
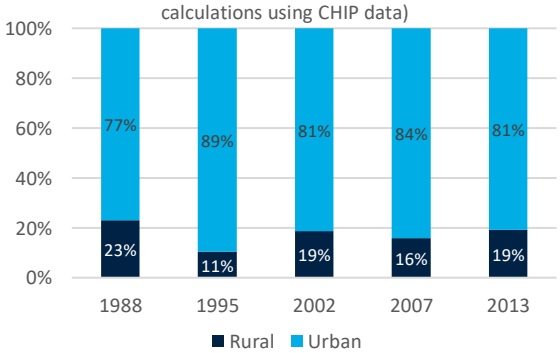
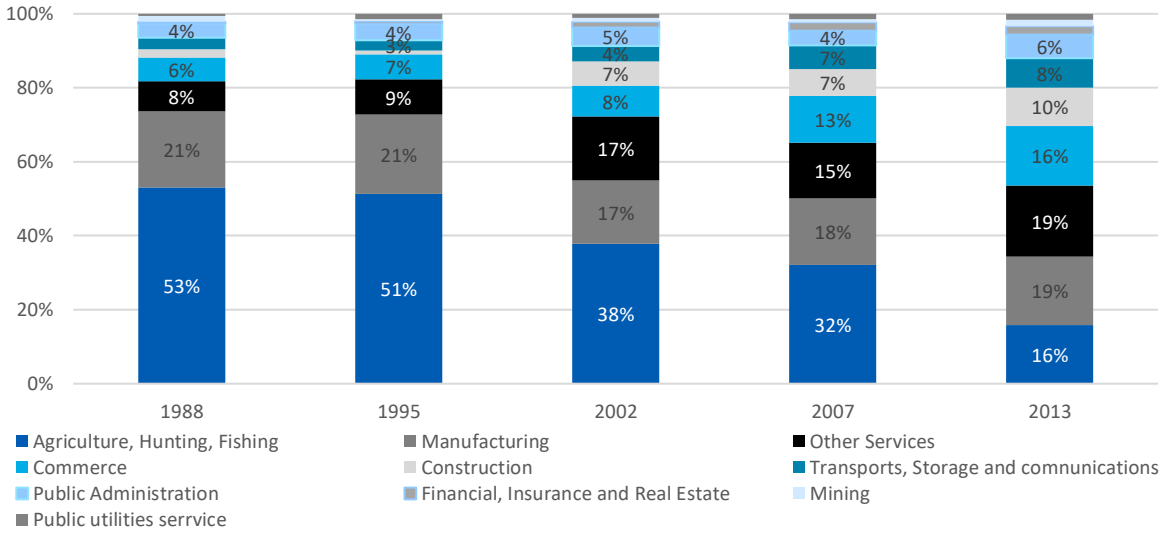


Chart 24: Urban and rural share of employed persons withmore than secondary and above (Authors' calculations using CHIP data)



2013 (chart 23), indicating that the pattern of urban growth in China was not only creating jobs for those with secondary schooling. China's growth was intensive in the skills that the labor force *already had*, a point we return to in part 3 when looking at probabilities of waged employment, and returns to education, and when we come to consider patterns of employment across consumption deciles.

Chart 25: Sectoral shifts in employment



Urbanization brought better, higher productivity jobs for youth in industry and services

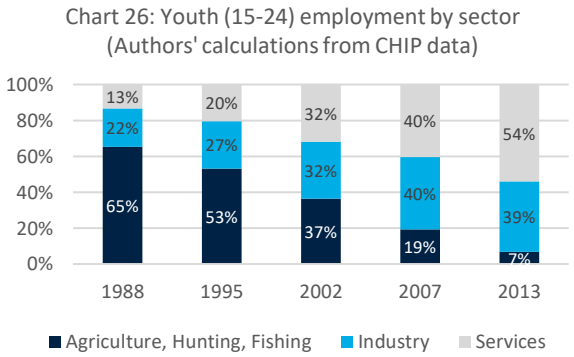
With the urban transformation came the diversification of jobs into industry and especially into services. Charts 9 and 10 already showed how the sectoral patterns of GDP and employment changed in China across 3 sectors. Chart 25 shows a more detailed breakdown into 10 sectors. Perhaps surprisingly, given the significant rise in China's world market share during a period of substantial increases in global trade[33], the share of labor in manufacturing in China fell from 1998 to 2013, from 21 percent to 19 percent. This still represents an increase of over 30 million jobs over 25 years (equivalent to the entire populations of Greece, Portugal and Sweden combined)[34]. As the share of agriculture contracted from 53 percent of employment in 1998 to just 16 percent in 2013, the biggest increases in employment were seen in `other services'[35] (eleven percentage points), commerce (ten), construction (eight), and transport (five percentage points) respectively. So, whereas the boom in exports of manufactures to global markets certainly stimulated the economic growth of China's cities, it is important to note that *the jobs* that came with *economic transformation* came in construction and service sectors.

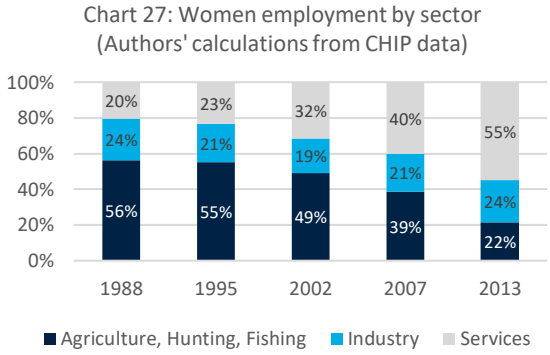
[33] China's share of the world market in garments increased from 15 to 35 percent from 1998 to 2013, in electronics from 5.4 to 27 percent, and in machinery from 4.75 to 19 percent. (Harvard Growth Lab, Atlas of Economic Complexity: https://atlas.cid.harvard.edu/countries/43/market-share

[34] UNPop data

[35] These include ISIC 4 categories R,S,T,U and so include entertainment, arts, music and culture, domestic services, other services and external agencies.

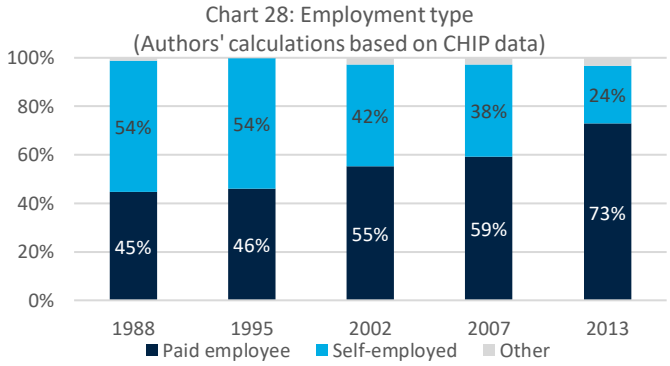
Younger workers and men were more likely to shift into industry, whilst younger women found work in services as the agriculture sector and rural areas shed labor. Charts 26 and



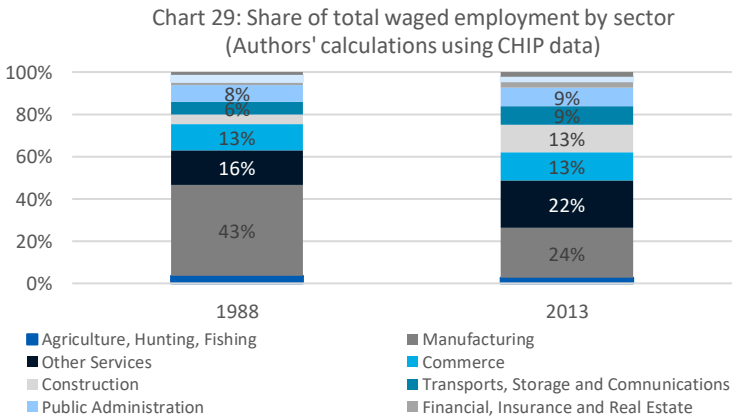


27 show that the share of youth in industry increased from 22 to 39 percent from 1998 to 2013 (for men the increase was 12 percentage points), whilst the share of youth in services rose even more significantly by 41 percentage points. Women in services increased by 35 percentage points from 20 to 55 percent, whilst for men the increase in services was 25 percentage points, from 22 to 47 percent. For the whole economy the share of services rose from 22 to 52 percent of employment driven by other services and commerce (where women make up 55 percent of jobs), and for industry from 25 to 32, driven as we saw by construction (where men held 86 percent of jobs in 2013).

<u>Better formal private sector waged work is the key to China's better jobs success and waged work is spreading to rural China</u>

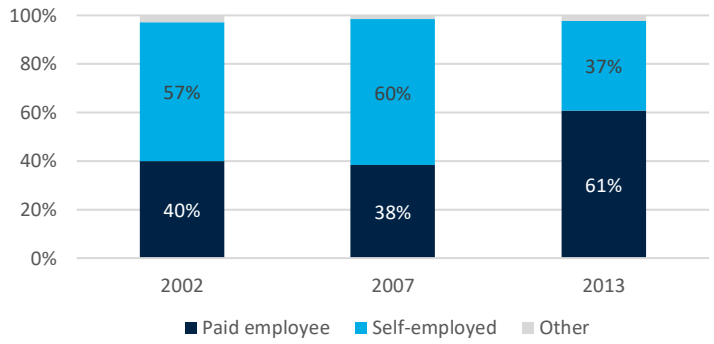


As industry and service employment expanded, more workers were able to find waged employment in the growing economy. In chart 6 we saw the close relationship between labor compensation, household consumption and savings. In chart 12 we briefly considered the changing pattern of consumption. Chart 28 meanwhile shows that waged employment increased from 45 percent of total employment in 1988 to 73 percent in 2013, an estimated increase of some 205 million waged jobs. Chart 29 provides more sectoral detail of the structure of waged employment. It shows that as waged employment was increasing in China, other services, commerce, construction, and transport and communications were expanding in share. The



share of manufacturing in waged employment almost halved from 43 to 24 percent. So again, employment gains were enjoyed outside of manufacturing, even if it was the catalyst for growth and productivity.

Chart 30: Share of waged employment for rural workers
(Authors' calculations using CHIP data)



The shift into waged employment started with urbanization, but between 2007-2013 it happened in rural areas also. Waged employment for urban workers was around 90 percent of total employment throughout, and around three quarters of employed migrants were waged. However, as chart 30 shows, the increase in waged work was also significant in rural areas, rising from 38 percent in 2007 to 61 percent by 2013.

The shift into waged employment happened for all worker categories, especially younger workers and women. For youth, the share of workers in paid employment increased rapidly from 58 percent in 2002 to 89 percent in 2013. For women it increased from 44 to 69 percent. Waged employment was higher in urban areas (at around 90 percent throughout) and for those employed workers with completed secondary (over 89 percent) and post-secondary education (over 95 percent). However, a positive development since 2007 seems to have been the spread of jobs and economic transformation to those with lower levels of education, and those in rural areas. For those with no education the waged share almost doubled from 13 to 26 percent between 2007 and 2013. For those with incomplete secondary education it increased from 26 to 43 percent.

Chart 31: Paid employment shares by worker categories
(Authors' calculations using CHIP data)

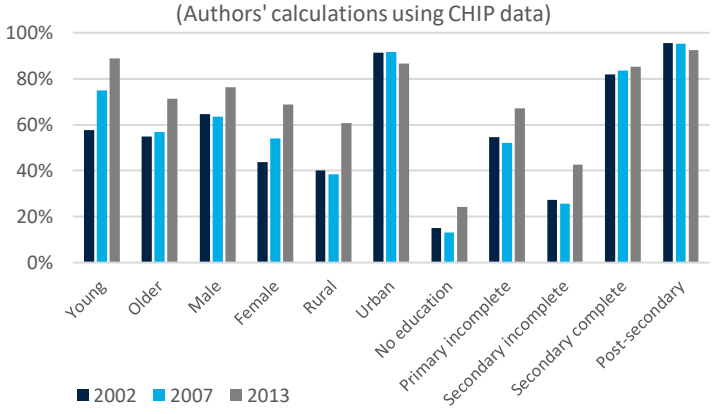
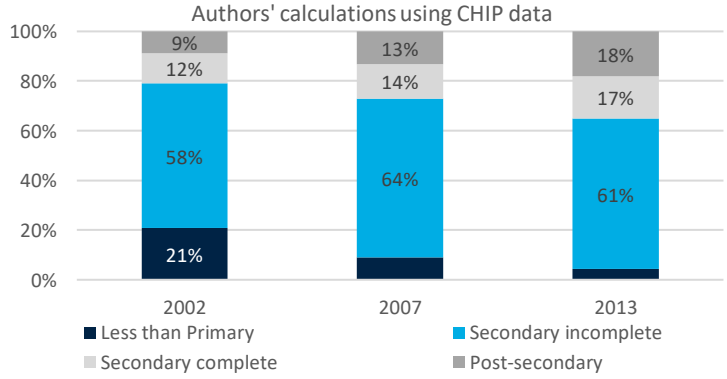


Chart 32: Education composition of employed workers
Authors' calculations using CHIP data



Meanwhile the education of those employed was also increasing, and education was increasing for employed people in all consumption deciles. Chart 32 shows that between 2002 and 2013, the share of those employed with secondary education and above increased from 21 to 35 percent, with the share with post-secondary doubling from 9 to 18 percent (rising from just 5 percent in

1988). The share of those employed with less than completed primary education fell from 21 percent to just 4 percent in 2013. Charts 33 and 34 show the education level for consumption deciles in the CHIP data for 2002 and 2017 respectively. These data show that even for the lowest three deciles, the share with less than completed primary education halved. Given the age structure of the population, these results are quite surprising and may point to retraining programs.

Chart 33: Education levels by consumption decile, 2002 (CHIPS data) Chart 34: Education levels by consumption decile, 2013

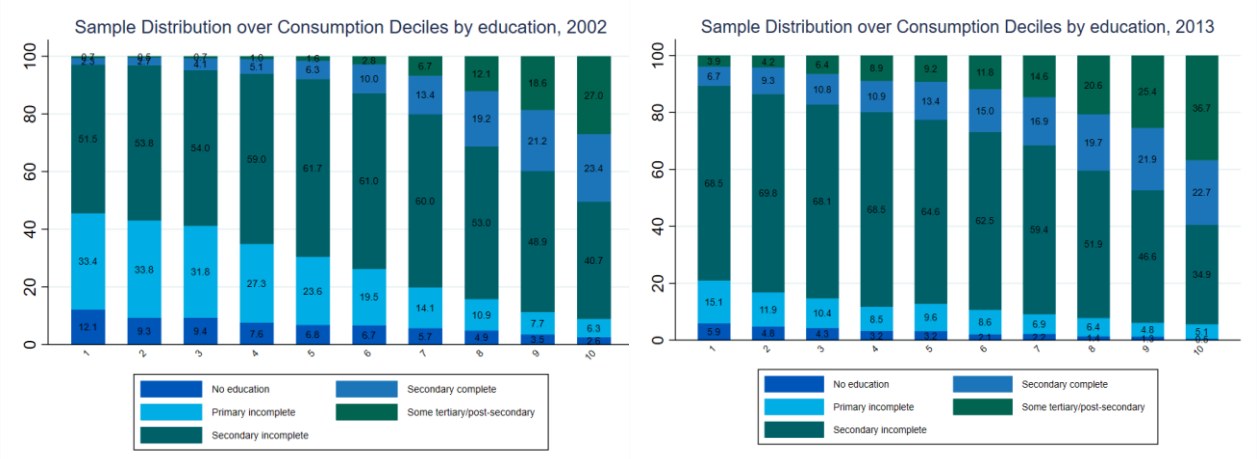
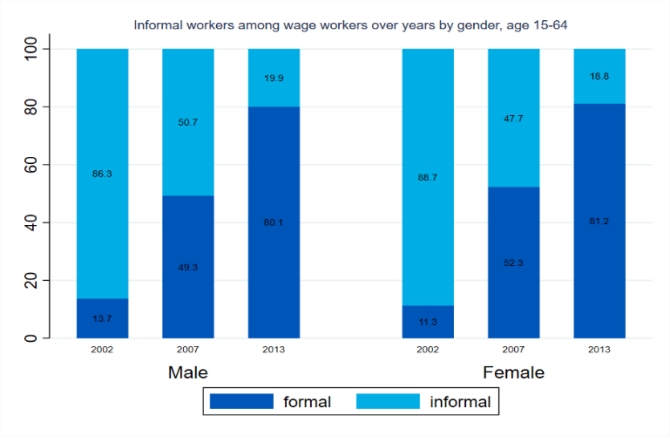


Chart 35: Formal and informal shares of waged employment (CHIPS data)



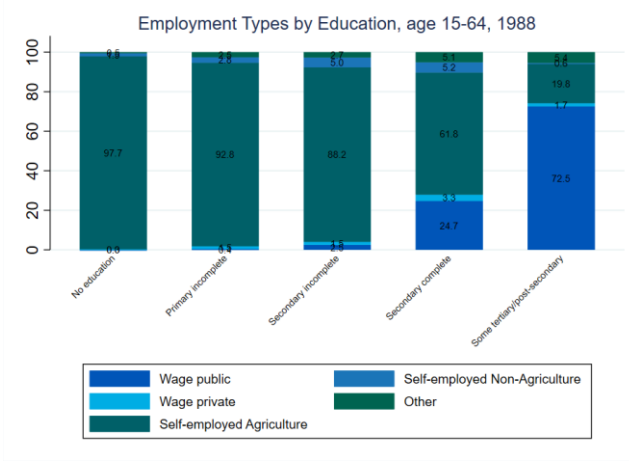
The shift into waged employment seems to have happened in the formal sector, not through an increase in informality. The question of whether a worker had a formal contract of work is one of the least well answered questions in most labor surveys[36], and that is also the case with CHIP surveys. Nonetheless for those who answered in China, the results point to a significant increase in formality over the period 2002 to 2011, for both men and women (chart 35), young and old, and after 2007 the rural as well as urban employed.

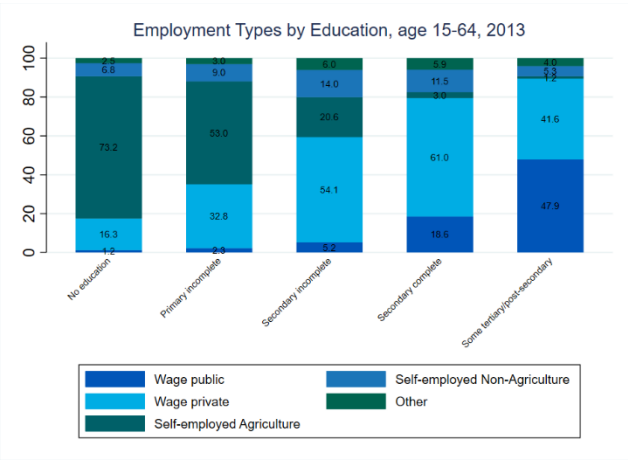
Finally, the shift was into *private* formal waged employment. Charts 36 and 37 demonstrate this important fact with CHIP survey results for 1988, around the time that market-oriented reforms outside of the agriculture sector were implemented. The transformation out of self-employment in agriculture into private waged work is clear, even for those with lower levels of education who by 2013 were most of the workers remaining in agriculture. In common with global findings, the public sector continued to draw a large share of those with some tertiary education (teachers, health workers and officials fall into this category), but nevertheless, the

[36] Global experience suggests that for self-employed and rural communities where work contracts are rarer, there is typically a higher non-response, leading to possible upward bias in the data on formality.

share of better educated workers in private waged jobs also increased significantly from just 1.7 in 1988 to 42 percent by 2013.

Chart 36: Employment type by education levels 2002 (CHIPS data) Chart 37: Employment type education levels 2013

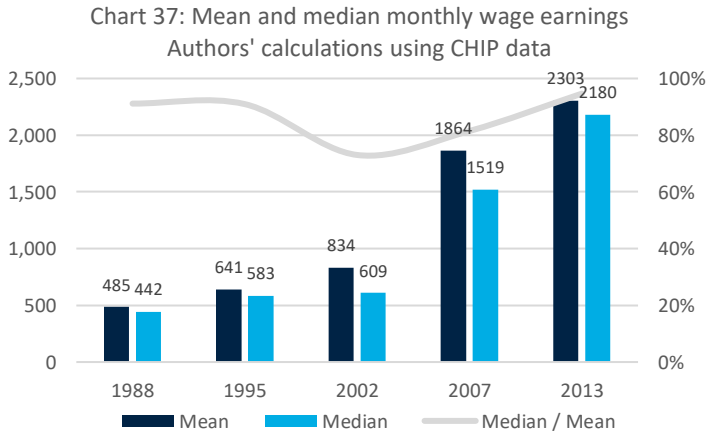




3. Pulling it all together: how have China's labor incomes from waged jobs transformed the economy and what can China expect in future?

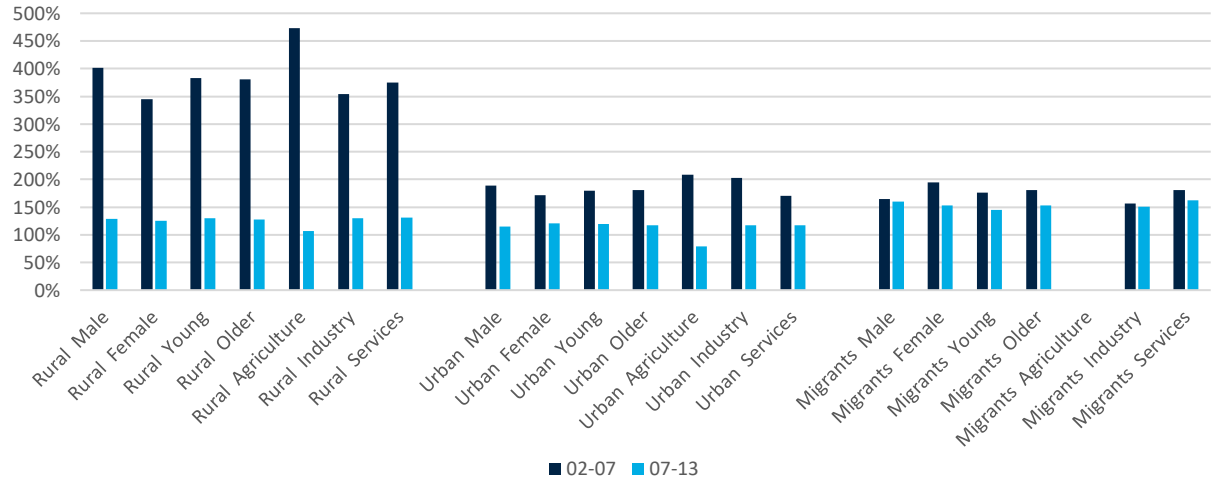
<u>Migration, a good match between the waged jobs China created and the education level of workers, and wage growth have each helped improve earnings equality since 2002</u>

Median monthly wages more than tripled from 2002-2017, rising faster than the average monthly wage. Along with the increase in the number and share of waged employment, the dramatic productivity gains observed in charts 4, 10 and 14 in the macro section of this note permitted significant and widespread wage increases for workers. Chart 37 shows mean and median monthly wages for waged workers in all sectors for 1988-2013 in real 2010 local currency values. Real wages grew by 172 percent on average between 1988 and 2013. The median real wage grew by 133 percent. However, this accelerated dramatically from 2002 to 2013, and the median monthly wage grew faster than the mean. From 2002 to 2013 the median more than tripled, growing by 358 percent whilst real mean monthly wage earnings increased by 276 percent.



The impact of rural to urban migration seems to have been central to China's success, stymying wage growth in urban areas and accelerating rural economic transformation. Taking the growth in average monthly wage earnings for urban, rural and migrant workers in turn from the three modules of CHIP data for the growth acceleration from 2002-2013 yields

Chart 38: Growth in monthly wage earnings 2002-2013
(Authors' calculations using CHIP data modules for rural vs migrant vs urban workers, waged only)



quite spectacular results. Whereas wages for urban waged workers doubled on average (increasing by 211 percent in real terms), the wages for waged migrants rose by 275 percent. Those for rural waged workers however increased by an astonishing 517 percent, with the biggest increases happening between 2002-2007 and accruing to men, farm workers and youth.

Wages remained higher in urban areas than rural, but rural to urban migration seems to have supplied the demand for urban waged workers, dampened the real increase in labor costs to urban hiring firms, and narrowed wage gaps through the rapid growth period

Chart 39: Off-farm wage differentials between migrant wages and those in rural and urban

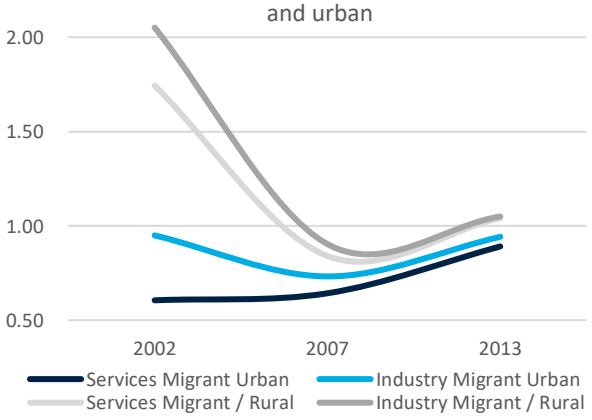
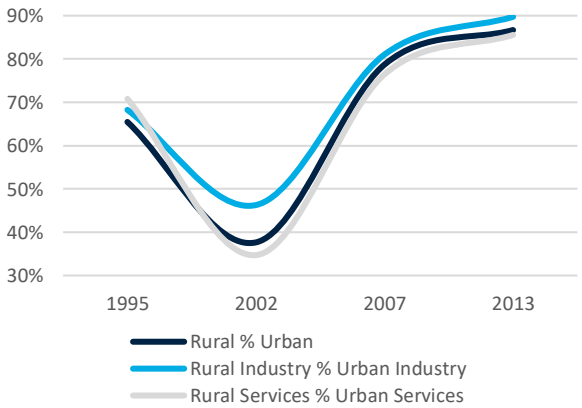


Chart 40: Rural monthly off-farm wage earnings as % or urban



from 2002-2013. Chart 39 shows the differentials between urban and rural workers' monthly wage earnings and those of migrant workers in both services and industry. Migrant wages were significantly below those of urban workers throughout, and so would have dampened the rise of wages for urban low skilled workers. But between 2002 and 2007 the flow of migrants from rural areas seems to have been associated with a narrowing of the premium enjoyed by migrant

waged workers over rural workers in services and industry, suggesting that the flow to urban areas also tightened rural labor markets. This is also suggested by the reduction in the premium enjoyed by urban over rural workers in chart 40.

Hukou status significantly affects migrants' welfare. In China the Hukou registration system is determined by the person's place of birth. Therefore, most of the 160 million rural-to-urban migrants[37] have agricultural hukou status. Rural-to-urban migrant workers with agriculture hukou are unable to obtain public services in the urban area where they work unless they change to an urban hukou, a process that can entail significant difficulties. This leaves them vulnerable to shocks and is generally regarded as negatively affecting their welfare[38]. Recent reforms in some cities[39] have allowed workers who have been working for 2 years or more and who have a residence in in a rural town within the same Province as the city in which they work, to convert to urban Hukou.

Compared to urban workers, migrants are still younger, less well schooled, more likely to be working and to work longer hours, but the gaps have narrowed. Table 1 shows that by 2013 female migrants were still 3.8 years younger than urban workers on average, and male migrants were five years younger. In 2002 they were seven years younger. They had two years less schooling in 2013, compared to 3.5 fewer for women and 2.2 for men in 2002. Most markedly migrants worked about 5 hours per work more than urban workers in 2013, whereas in 2002 they worked an incredible 22 to 25 hours more.

Table 1: Characteristics of migrants and urban workers

	Female			Male		
	2002	2007	2013	2002	2007	2013
Migrant						
Age	33.6	34.1	38.4	35.0	33.7	37.4
Employment Rate	92%	95%	95%	97%	99%	98%
Labor Force Participation Rate	76%	83%	67%	97%	95%	89%
Weekly Hours of Work	67.0	57.8	49.6	65.8	59.5	49.9
Years of Schooling	7.6	8.8	9.1	9.0	9.5	9.7
Urban						
Age	41.3	42.2	42.2	42.0	42.4	42.4
Employment Rate	86%	92%	95%	91%	95%	97%
Labor Force Participation Rate	68%	59%	62%	82%	77%	79%
Weekly Hours of Work	42.4	43.2	44.3	43.7	44.4	45.1
Years of Schooling	10.5	11.1	11.1	11.2	11.8	11.6

Authors' calculations using CHIP data

Migrants' wage gaps have also narrowed. Table 2 presents the real hourly wages for urban and migrant workers from the CHIPS of 2002, 2007 and 2013. For nearly all worker categories the migrant wage gap widened between 2002 and 2013 only to narrow again by 2013. Two

[37] according to the National Bureau of Statistics

[38] See Bengoa, M. and Rick, C. (2019) "*Chinese Hukou Policy and Rural-to-Urban Migrants' Health: Evidence from Matching Methods*", Eastern Economic Journal (2020) 46:224–259, and Chan, K W., and Buckingham, W. (2008) "*Is China abolishing the hukou system?*" The China Quarterly 195: 582–606.

[39] See Huang, Y. (2014) *"The continuity and changes of the hukou system since the 1990s: A critical review"* In Urban China in the new era: Market reforms, ed. Z. Cheng et al., 25–43. Berlin: Springer

categories stand out. For younger workers (15-25 years) the gaps had almost closed by 2013, with a 71 percent increase in real wages for migrant youth from 2007-2013. For those with secondary education the gaps also nearly closed, with migrant workers with secondary education seeing an 80 percent real increase in wages from 2007-2013. Whilst most remarkably, for the smaller number of remaining workers with primary education, migrants in 2013 earned a wage premium over urban primary educated workers and saw their real wages more than double from 2007-2013. These findings of dramatic wage improvements for lower skilled workers are consistent with China having passed the "Lewis Tipping Point" between 2007 and 2013.

Table 2: Hourly real wages for urban workers and migrants by age, sex, industry and education

	Urban			Migrant		
	2002	2007	2013	2002	2007	2013
Age 15-24	4.12	7.55	9.46	3.46	5.15	8.82
Age 25-34	5.76	11.5	13.35	3.36	6.14	11.55
Age 35-64	7.03	11.11	13.62	3.13	5.27	10.55
Male	6.98	12.5	14.55	3.89	6.07	11.94
Female	6.09	9.19	11.63	2.56	4.67	8.94
Industry	5.69	10.66	13.02	4.27	6.11	10.21
Services	7.12	11.19	13.42	2.87	5.12	11.01
Primary or Less	3.92	9.63	7.84	2.4	4.08	9.65
Secondary	5.86	9.19	11.19	3.32	5.55	10.03
Post-secondary	8.63	14.07	17.22	4.87	8.81	15.32

Authors' calculations using CHIP data

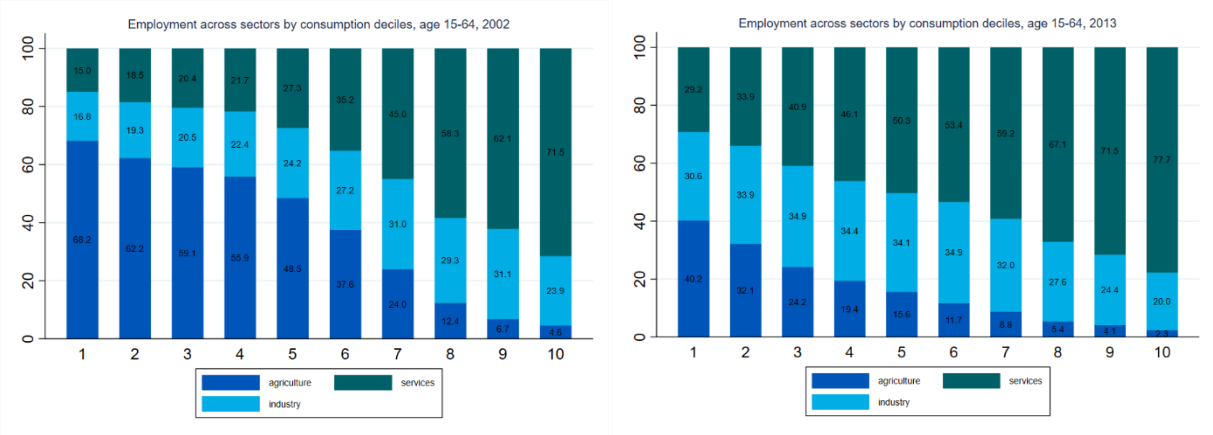
Whereas hukou status historically had a negative effect on workers' urban wages after adjusting for other factors, by 2013 the effect had declined. Annex 1 presents the results of wage regressions that explore the impact of agriculture hukou status on wages in the thriving urban labor market. The results show that in 2002 a migrant with agriculture hukou registration earned 57.2 percent less adjusting for other factors. By 2007 this had fallen to 37.5 percent, and by 2013 the coefficient is positive though statistically insignificant.

These results suggest that further liberalization of the hukou system would be welfare enhancing and may even help the labor market to clear. The results in annex 1 seem to suggest that the hukou registration is no longer suppressing wages in urban China, and that wages in industry – where a good share of migrants find work – have been rising sharply after 2002, but especially after 2007. If more migrants are needed in industry, then further relaxing hukou may be helpful. But the narrowing of wage gaps between urban and migrant workers – especially for low skilled workers with lower education workers – suggests that hukou restriction is no longer significantly suppressing wages, and so removing it would not significantly affect the profitability of China's firms and may have other beneficial effects on welfare and social protection.

The shift from self- to wage employment in China was dramatic and combined with the associated increases in labor productivity, it was a major factor in China's economic success. With workers leaving self-employment in agriculture for waged work in services and industry, and with young workers increasingly joining the labor force in waged jobs, the new

waged jobs created between 1988 and 2013 exceeded the increase in total employment in the economy. This shift to waged work happened whilst the number of new entrants to the labor force annually was declining: (i) first, because the share of women of working age who were actively seeking work was declining, a normal stage in middle income countries before wage increases make it attractive for families to pay for child care and re-enter the workforce (chart 17); (ii) second because the gradual aging of the population meant the number of new entrants had slowed down (chart 4 shows that by 2010 total hours worked was no longer growing). Looking at this another way, for every additional new job created in China's economy between 1988 and 2013, there was a new *waged job* opening.

Chart 41: Sector of employment by decile 2002 (CHIPS data) Chart 42: Sector of employment by decile 2013



Better waged Jobs for more people were good for the poor.

Economic transformation reached the poor through labor incomes from better jobs. The gains from investing in human and physical capital whilst creating better jobs for more people in China have gradually been shared across rural areas, regions and income groups. Charts 33 and 34 already showed that education increased for all deciles. Charts 41 and 42 show that between 2002 and 2013 even workers in the lowest consumption decile moved out of agriculture, with the share declining from 68 to 40 percent. Chart 27 shows that although the mean wage grew faster than the median from 1988 to 2002, between 2002 and 2013 median wages were growing faster than the mean. Finally charts 39 and 40 show that wage gaps between rural workers, migrants and urban workers were converging after 2002, suggesting that the creation of urban and eventually rural waged jobs was tightening rural labor markets and consequently raising the labor returns to poorer rural workers.

China's growing labor demand matched the human capital of the Chinese workforce

Growth was intensive in the sorts of human capital that China was building. The improvements in education outcomes in China were rapid, and yet unlike many countries in Latin America, the Middle East and North Africa, and Eastern Europe[40], returns to education did not decline appreciably as human capital was built. In the early stages of reform, in 1995, we estimate using Mincerian returns to education adjusting for worker characteristics, location, sector and occupation, that having some tertiary education increased labor incomes by only 18

[40] See (i) Melianova, E. Parandekar, S. Patrinos, H. Volgin, A. (2020) on Russia, (ii) World Bank (2020, forthcoming) 'Economic transformation for jobs: Reaping the economic dividend of youth and women in MENA, and (iii) Manacorda, Sanchez-Paramo & Schady (2010) on Latin and America.

percent compared to having no education. By 2002 this was 70 percent, and it remained at 66 percent in 2013 even though the supply of people with some tertiary education grew rapidly. The same is true for workers with some secondary education; there was no increment to having completed secondary education in 1995 compared to no education. By 2007 as growth had accelerated, the incremental return compared to no education was 57 percent, and in 2013 it was still 45 percent despite the increase in schooling. Interestingly though, the increment over skilled agricultural work of industry and services jobs, which was actually negative in 1995 has been maintained at around 40 percent since 2020, though the incremental returns to occupations such as clerical worker, manager, technician and professional have declined slightly relative to skilled agricultural workers. This tends to suggest that whereas there is no glut of education in the Chinese labor market given the jobs it has created, nor are skills shortages for specific occupations creating bottlenecks.

Better educated workers in industry and services became more likely to benefit from waged employment, whether young or older, male or female, rural or urban. Annex 2 using CHIP data shows the results of probit multiple regressions of the probability of finding waged employment over time in the form of average marginal effects. Compared to men, women were 4 percent less likely to find waged work in 2003 than men, but as growth accelerated, in 2007 and 2013 they were between 10 and 13 percent more likely to find a waged job. The age variable gives a negligible average marginal increase with years, suggesting that whether young or older, workers were able to find waged work with equal likelihood. In 1995 rural workers were initially 34 percent less likely to find waged work than workers in urban areas, however by 2013 they were 3 percent *more* likely, indicating that waged employment had also spread to rural areas as the labor market tightened. Workers in industry and services were between 65 and 85 percent more likely to be in a waged job than workers in agriculture, and those in services were between 36 and 67 percent more likely to be waged – largely because even though waged employment in the agriculture sector was rising, it is common for around 40 percent of farmers in all countries to remain self-employed[41]. The clearest result that emerges from these probit regressions on waves of the CHIP data is that workers with more education became gradually more likely to find waged work relative to the declining number of workers with no education. Those with completed secondary education who were 7.5 percent more likely to have a waged job in 1995 were 15 percent more likely by 2013. Those with some tertiary were also twice as likely as in 1995, with their probability relative to those with no education rising from 11 to 22 percent more likely. These stable and moderate results also point to growth being intensive in the (increasingly well educated) human capital that China built.

Consistent with global findings and gender literature, married and female workers became less likely to participate in the labor force as good waged jobs for other family members became better available. Annex 3 presents probabilities of labor force participation from logit multiple regressions using average marginal effects. The results are unremarkable, they show that female workers became less likely to participate on the labor market than men. In 1995 they were 10 percent less likely, rising to 18 percent in 2013. Consistent with global experience in countries as they transition to middle income with increased waged employment, married workers went from 6 percent to 12 percent less likely to participate in the labor market. As the workforce ages and dependency rises, it will be important for China to attract women

[41] Merotto et al (2018).

back into the workforce with higher wages in better jobs, and to improve the availability and affordability of childcare for working mothers. The same pattern of declining labor force participation appears with a lag for rural workers: in 1995 they were 13 percent more likely than urban workers to actively seek work. By 2013 this had fallen to 8.6 percent more likely, consistent with the later improvement in rural wages and waged employment.

The significance for productivity growth of workers shifting from self-employment in agriculture to urban waged work, with higher levels of basic education at a period of rapid capital deepening is worth re-emphasizing. China's economy benefited from *all of the labor transitions* we identified in opening; agglomeration effects, economies of scale in industry, the productivity gains embedded in new capital investment which raised workers' access to machinery and equipment, from accumulation human and physical capital, from a demographic dividend, and from the division of labor and diversification of occupations which comes from working in a more complex business rather than as a sole trader.

Jobs Group, World Bank

September 23rd 2020

For final version end-October:

Insert more detailed section on labor income, macro sources of demand growth, income elasticity of demand and Engels curves

Jobs created China's economic transformation.

This massive increase in waged work: x number of migrants working in industry with an average increase in wages of YY. XX new urban waged workers earning YY in services, even with the high propensity to save added XX in purchasing power domestically.

Export demand increased by XX million simultaneously.

Profits were held high (insert returns to capital estimates from using PWT).

Even agriculture productivity accelerated, and the rural economy finally was transformed.

Consumption and production moved up the value chain quickly with adaptations and new fast changing investment.

Insert a section with econometric analysis of wages for wage workers, adjusting for worker characteristics and with fixed effects in order to investigate hypotheses about how the rural/urban labor market functioned.

Insert a ***forward look*** – what will future jobs look like in China and what reform areas will require faster progress? Addressing global imbalances, pensions and aging, labor regulations and Hukou restrictions (can we get 2018 CHIP results?)

Annex 1: Wage Regression Results for Determinants of Urban Wages

The basic model used is an OLS semi-log regression.

$$\log(\text{hourly real wage}) = \text{constant} + \alpha(\text{Gender}) + \beta(\text{Age}) + \gamma(\text{Experience (Age Squared)}) + \delta(\text{marital status}) + \varepsilon(\text{Han ethnicity}) + \epsilon(\text{years of schooling}) + \theta(\text{hukou dummies}) + \mu(\text{industry}).$$

Following hukou reforms, a new category of hukou status "resident hukou" was added to the 2013 CHIPS questionnaire, creating a sub-classification within the migrant group with agriculture hukou. For 2013 the dummy variable "resident hukou" is therefore added.

Adding the highest level of education reached instead of average years of schooling does not materially affect the significance of other variables. Here we therefore present the results with only the average number of years schooling.

The most significant results from econometric analysis are that:

- having an agricultural hukou declined in its negative effect on wage determination from 2002 to 2007. And by 2013 the sign was positive, though the effect is no longer statistically significant.
- The negative coefficient remained for agriculture non-resident hukou but turned positive for resident hukou in 2013.
- The coefficient for industry turned positive and significant by 2013 – suggesting that migrants were not only still needed, but where they worked in industry (which about a third of them did) they earned 24 percent *more* per hour in real terms than workers with urban hukou.
- The female wage gap in urban China widened from 2002 through 2007 and again between 2007 and 2013.

Age and experience increased in their positive effects on wages determination, and the number of years of schooling maintained its importance throughout, reiterating that the Chinese economy continued to find good waged jobs for better educated workers even as the average years of education in the economy increased.

These results seem to suggest that the hukou registration is no longer suppressing wages in urban China, and that wages in industry – where a good share of migrants work – have been rising sharply after 2002, but especially after 2007. If more migrants are needed in industry, then further relaxing hukou may be helpful. But the narrowing of wage gaps between urban and migrant workers – especially for low skilled workers with lower education workers – suggests that hukou restriction is no longer having a significant labor market effect.

Annex 2: Probability of having waged vs non-waged employment

(Probit regression results in average marginal effects relative to single urban males with no education)

	1995	2002	2007	2013
	All-Sample	All-Sample	All-Sample	All-Sample
Individual age	0.000	0.008***	-0.004***	-0.008***
	(0.00)	(0.00)	(0.00)	(0.00)
Age Squared	-0.000	-0.000***	0.000***	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)
Male	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Female	0.002	-0.043***	0.010***	0.013**
	(0.00)	(0.00)	(0.00)	(0.01)
Single	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Ever Married	-0.013***	-0.084***	-0.054***	-0.077***
	(0.00)	(0.01)	(0.01)	(0.01)
Urban	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Rural	-0.338***	-0.024***	-0.064***	-0.033***
	(0.01)	(0.01)	(0.01)	(0.01)
No education	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Primary incomplete	0.012*	0.044***	0.021	0.069**
	(0.01)	(0.02)	(0.02)	(0.03)
Secondary incomplete	0.024***	0.084***	0.079***	0.080***
	(0.01)	(0.02)	(0.02)	(0.03)
Secondary complete	0.074***	0.159***	0.141***	0.148***
	(0.01)	(0.02)	(0.02)	(0.03)
Some tertiary/post-secondary	0.111***	0.270***	0.205***	0.220***
	(0.02)	(0.02)	(0.02)	(0.03)
agriculture	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
industry	0.647***	0.775***	0.848***	0.734***
	(0.01)	(0.01)	(0.01)	(0.01)
services	0.385***	0.637***	0.665***	0.560***
	(0.01)	(0.01)	(0.01)	(0.01)
Size of Household	0.001	-0.003	0.005***	0.005*
	(0.00)	(0.00)	(0.00)	(0.00)
Number of children	-0.007***	0.002	-0.025***	-0.034***
	(0.00)	(0.00)	(0.00)	(0.01)
Number of youth	-0.004**	0.001	-0.013***	-0.014***
	(0.00)	(0.00)	(0.00)	(0.00)
Number of elderly	-0.001	0.009*	0.010**	0.009
	(0.00)	(0.00)	(0.00)	(0.01)

[4]South Central China	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
	1995	2002	2007	2013
All-Sample	All-Sample	All-Sample	All-Sample	-0.001
	(0.00)	(0.01)	(0.00)	(0.01)
[5]Southwest China	0.002	0.037***	-0.015***	-0.010
	(0.00)	(0.01)	(0.00)	(0.01)
[1]North China	0.027***	0.001	-0.060***	0.047***
	(0.00)	(0.01)	(0.01)	(0.01)
[6]Northwest China	0.007	0.004		0.018*
	(0.00)	(0.01)		(0.01)
[2]Northeast China	0.015***	0.024***		0.017
	(0.00)	(0.01)		(0.01)
Observations	31785	34491	33654	30821
Standard errors in parentheses				
="* p<0.1	** p<0.05	** p<0.05	** p<0.05	** p<0.05

Annex 3 Probability of participating in the labor market

(Logit regression results in average marginal effects relative to single urban males with no education)

	1995	2002	2007	2013
Logit regression results	mlogit_lstatus_AME1	mlogit_lstatus_AME1	mlogit_lstatus_AME1	mlogit_lstatus_AME1
Individual age	0.056***	0.064***	0.058***	0.066***
	(59.69)	(60.01)	(54.66)	(63.94)
Age Squared	-0.001***	-0.001***	-0.001***	-0.001***
	(-67.59)	(-65.61)	(-63.87)	(-74.34)
Male	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Female	-0.097***	-0.124***	-0.144***	-0.177***
	(-30.32)	(-35.37)	(-40.47)	(-47.07)
Single	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Ever Married	0.055***	0.059***	0.101***	0.123***
	(6.85)	(6.73)	(11.18)	(13.44)
Urban	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Rural	0.130***	0.194***	0.218***	0.086***
	(27.86)	(38.48)	(46.81)	(21.03)
No education	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Primary incomplete	0.016*	0.070***	-0.020*	0.009
	(1.72)	(6.50)	(-1.70)	(0.57)
Secondary incomplete	0.036***	0.055***	-0.031***	-0.015
	(5.07)	(5.42)	(-3.00)	(-1.09)
Secondary complete	0.056***	0.092***	-0.000	0.001
	(6.84)	(8.35)	(-0.03)	(0.07)
Some tertiary/post-secondary	0.088***	0.111***	0.014	0.032**
	(10.25)	(9.56)	(1.24)	(2.20)
Size of Household	0.004	-0.003	-0.039***	-0.004
	(1.60)	(-1.26)	(-18.41)	(-1.56)
Number of children	-0.000	0.012***	0.054***	-0.013***
	(-0.07)	(2.77)	(11.57)	(-2.92)
Number of youth	0.004	0.005*	0.017***	-0.001
	(1.40)	(1.68)	(5.55)	(-0.19)
Number of elderly	-0.002	-0.001	0.002	-0.008*
	(-0.53)	(-0.20)	(0.33)	(-1.84)
[4]South Central China	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
[3]East China	0.023***	-0.018***	-0.010**	0.014***
	(5.42)	(-3.80)	(-2.40)	(3.02)
[5]Southwest China	0.027***	0.021***	0.037***	-0.008

	(5.89)	(4.31)	(8.29)	(-1.51)
[1]North China	-0.040***	-0.095***	-0.063***	-0.068***
	(-7.39)	(-14.84)	(-6.11)	(-8.30)
[6]Northwest China	-0.043***	-0.048***		-0.067***
	(-6.06)	(-5.83)		(-6.08)
[2]Northeast China	-0.019***	-0.041***		-0.062***
	(-3.01)	(-5.83)		(-6.82)
Observations	39553	47647	42892	44856
t statistics in parentheses				
="* p<0.1	** p<0.05			
		** p<0.05	** p<0.05	** p<0.05

Bibliography

Baumol, W J. & Bowen, W G. (1966). Performing Arts, The Economic Dilemma: a study of problems common to theater, opera, music, and dance. Cambridge, Mass.: M.I.T. Press. ISBN 0262520117.

Bosworth, B.P. and Collins, S.M. The Empirics of Growth: An Update, Brookings Papers on Economic Activity, 2003, No.2

Cai, Fang (1996). "An Economic Analysis for Labor Migration and Mobility". China Social Sciences Quarterly. Spring: 120–135.

Chenery, H.B. (1960). Patterns of Industrial Growth the American Economic Review, Vol. 50, No. 4 (Sep., 1960), pp. 624- 654

Chenery, H.B. and Taylor, L. (1968) Development Patterns among Countries and over Time. Review of Economics and Statistics, 50, 391-416.

Chenery, H.B. & Syrquin, M. (1975) Patterns of development 1950-1970 (English). A World Bank research publication Washington, D.C.

de Vries G., M. Timmer, and de Vries K. (2015) Structural Transformation in Africa: Static Gains, Dynamic Losses, The Journal of Development Studies, 51:6, 674-688, DOI: 10.1080/00220388.2014.997222

Diao, X. McMillan, M. & Rodrik, D. (2017) “The Recent Growth Boom in Developing Economies: A Structural-Change Perspective”, IFPRI

Easterly, W. and Levine, R. (2002) It's Not Factor Accumulation: Stylized Facts and Growth Models, The World Bank Economic Review Vol. 15, No. 2 (2001),

Gunby, P. Jin, Y. and Reed, R. (2017) “Did FDI Really Cause Chinese Economic Growth? A Meta-Analysis” World Development, Vol. 90, pp. 242–255

Herrendorf, B. Rogerson, R. and Valentinyi, Á. (2013) “Growth And Structural Transformation”, NBER Working Paper 18996, http://www.nber.org/papers/w18996

Klein, M. and Pettis, M. (2020) “Trade Wars are Class Wars”

Kuznets, S. (1973). Modern Economic Growth: Findings and Reflections. The American Economic Review, 63, 247–258.

Lardy, N. (2008) Financial Repression in China, Policy Brief Number 8, Peterson Institute for International Economics

McMillan, M., D. Rodrik, and I. Verduzco-Gallo. (2014). “Globalization, Structural Change, and Productivity Growth, with an Update on Africa.” World Development 63: 11–32

McMillan, M. Rodrik, D. and Sepúlveda, C. (2017) Structural Change, Fundamentals, and Growth A Framework and Case Studies

Manacorda, M., Sanchez-Paramo, C., & Schady, N. (2010). Changes in Returns to Education in Latin America: The Role of Demand And Supply of Skills. Industrial and Labor Relations Review, 63(2), 307-326.

Melianova, E. Parandekar, S. Patrinos, H. Volgin, A. (2020) Returns to Education in the Russian Federation: Some New Estimates, Policy Research Working Paper 9387, September 2020

Merotto, D. Weber, M. Aterido, R (2018). Pathways to Better Jobs in IDA Countries: Findings from Jobs Diagnostics. Jobs Series No. 14. World Bank, Washington, DC. © World Bank.

Restuccia, D. Yang, D. and Zhu, X. (2008) “Agriculture and aggregate productivity: A quantitative cross-country analysis”, Journal of Monetary Economics, Volume 55, Issue 2, March 2008, Pages 234-250

Shorrocks, A. F. (2013). Decomposition procedures for distributional analysis: a unified framework based on the Shapley value. The Journal of Economic Inequality. March 2013, Volume 11, Issue 1, pp 99-126

Tao Kong, S. (2010): Rural-Urban Migration in China: Survey Design and Implementation. in Xin Meng, Chris Manning, Li Shi and Tadjuddin Noer Effendi: "The Great Migration: Rural-Urban Migration in China and Indonesia", Edward Elgar

Wing Chan, K. (2012): Migration and development in China: trends, geography and current issues, Migration and Development, 1:2, 187-205

Yang, Y. (2020) China’s Economic Growth in Retrospect, chapter 2 in China 2049: Economic Challenges of a Rising Global Power, edited by David Dollar, Yiping Huang, Yang Ya, Brookings Institute.

Zhu, Nong (2002). "The Impacts of Income Gaps on Migration Decisions in China". China Economic Review. 13 (2–3): 213–230. doi:10.1016/s1043-951x(02)00074-3.

Most Recent Jobs Working Papers:

61. Opportunities for Youth and Women's Participation in Ghana's Labor-Intensive Public Works Program (2021)
Dadzie, Christabel E. and Ofei-Aboagye, Esther.

60. How Did the Covid-19 Crisis Affect Different Types of Workers in The Developing World? (2021)
Maurice Kugler, Mariana Viollaz, Daniel Duque, Isis Gaddis, David Newhouse, Amparo Palacios-Lopez and Michael Weber.

59. Determinantes Del Crecimiento De La Demanda Laboral Y De La Productividad Del Sector Privado (Spanish) (2021)
Mariana Vijil

58. The Early Labor Market Impacts of Covid-19 In Developing Countries: Evidence from High-Frequency Phone Surveys (2021)
Melanie Khamis, Daniel Prinz, David Newhouse, Amparo Palacios-Lopez, Utz Pape and Michael Weber

57. Empirical Evidence on Firm Growth and Jobs in Developing Countries (2020)
Johanne Buba, Alvaro Gonzalez and Anam Rizvi

56. Promoting Female Labor Force Participation (2020)
Svetlana Pimkina and Luciana de La Flor

55. Structural Transformation and Labor Market Performance In Ghana (2020)
Mpumelelo Nxumalo and Dhushyanth Raju

54. Just Coal Transition in Western Macedonia, Greece-Insights from the Labor Market (2020)
Luc Christiaensen and Céline Ferré

53. Insights from Surveys on Business and Enterprises in South Sudan: Jobs, Recovery, and Peacebuilding in Urban South Sudan – Technical Report IV (2020)
Arden Finn and Jan von der Goltz

52. Job Outcomes in The Towns Of South Sudan: Jobs, Recovery, And Peacebuilding In Urban South Sudan – Technical Report III (2020)
Jan von der Goltz, Mira Saidi, Augustino Ting Mayai, and Melissa Williams.

Click here for full Jobs Paper Series

Address: 1776 G St, NW, Washington, DC 20006
Website: http://www.worldbank.org/en/topic/jobsanddevelopment
Twitter: @WBG_Jobs
Blog: https://blogs.worldbank.org/jobs/