Determinants of income shares and the stable middle in post-socialist China

Giorgos Gouzoulis
Reseach Fellow
UCL Institute for Innovation and Public Purpose

Collin Constantine
Senior Teaching Fellow in Economics
School of Oriental and African Studies, University of London

IIPP UCL Institute for Innovation and Public Purpose

WORKING PAPER
WP 2020–03

About the Institute for Innovation and Public Purpose

The UCL Institute for Innovation and Public Purpose (IIPP) aims to develop a new framework for creating, nurturing and evaluating public value in order to achieve economic growth that is more innovation-led, inclusive and sustainable.

We intend this framework to inform the debate about the direction of economic growth and the use of mission-oriented policies to confront social and technological problems. Our work will feed into innovation and industrial policy, financial reform, institutional change, and sustainable development.

A key pillar of IIPP's research is its understanding of markets as outcomes of the interactions between different actors. In this context, public policy should not be seen as simply fixing market failures but also as actively shaping and co-creating markets. Re-focusing and designing public organisations around mission-led, public purpose aims will help tackle the grand challenges facing the 21st century.

IIPP is housed in The Bartlett, a leading global Faculty of the Built Environment at University College London (UCL), with its radical thinking about space, design and sustainability.

This report can be referenced as follows:

Gouzoulis, G. and Constantine, C. (2020). *Determinants of incomes shares and the stable middle in post-socialist China.* UCL Institute for Innovation and Public Purpose, Working Paper Series (IIPP WP 2020-03). Available at: https://www.ucl.ac.uk/bartlett/public-purpose/wp2020-03

Determinants of income shares and the stable middle in post-socialist China

Giorgos Gouzoulis and Collin Constantine

Abstract

This paper offers a historical analysis on how post-Socialist China's transition to a globalised mixed-market economy led to class restructuring and estimates the drivers of its inter-decile income shares over the period 1978-2015 using Piketty et al. (2019)'s dataset. The key negative determinants of the bottom 50 percent are government consumption, trade openness and unemployment rate. The stable middle 40 percent is explained by the positive effects of government consumption, financial liberalisation and public indebtedness that compensate for the adverse effects of trade openness. Further, we find that government consumption, trade openness, and unemployment rate are positive determinants of the top 10 percent. More strikingly, trade openness disproportionately benefits the top 10 percent and this suggests that even China's pragmatic world integration has been partial to business elites. Several policy ideas follow. First, China must overhaul its middle class urban-biased fiscal expenditure and second, the pension system must extend to the entirety of its income distribution. Third, stronger social welfare is required in the context of globalisation.

Keywords: China, IPE, Middle class, Income shares, Globalisation

JEL codes: D31, O11, P24, P26

Acknowledgements: The authors are grateful to Joseph Baines for valuable feedback on an earlier draft of this paper.

1. Introduction

Since the 2008 global financial crisis, there has been a growing interest in the drivers of income inequality. The steep fall in wage shares since the 1980s is a key stylised fact for many advanced (Karabarbounis and Neiman 2014, IMF 2017) and developing economies (Onaran 2009, Stockhammer 2017). The rise of functional income inequality has been accompanied by increasing GINI coefficients (e.g. Daudey and García-Peñalosa 2007, Cecchi and García-Peñalosa 2010; Hushey et al. 2020), growing wage dispersion (e.g. Dell'Aringa and Pagani 2007, Devincieti et al. 2019), and rising top income shares (e.g. Roine et al. 2009, Volscho and Kelly 2012, Flaherty 2015, Huber et al. 2019). The emerging consensus is that trade and financial globalisation along with declining unionisation, lower welfare expenditures, and technological progress are the root causes of growing inequalities. Still, we know too little about the drivers of decile shares in developing countries, particularly in post-socialist economies like China.

China constitutes a unique case study as the only country that transitioned from planned to mixed economy within the last four decades and became a hegemonic force of global capitalism. This transition occurred through drastic reforms that substantially affected class relations and income distribution. A recent study by Yang et al. (2019) explores the composition of the Chinese urban elite – richest five percent of the urban population – and demonstrates that since 1988 it is constituted of highly educated professionals and business owners, whose income is sourced mainly from the private sector. Still, this study overlooks how China's post-socialist transition led to the formation of lower and middle working classes with distinct interests and characteristics.

This article investigates this process of class restructuring through a historicised descriptive analysis of China's inter-decile income shares over the period 1978-2015, and empirically estimates the drivers of each income share using Piketty et al. (2019)'s new dataset. The historical descriptive analysis shows that China's market reforms to an export-oriented mixed-market economy, disproportionately benefited the top 10 percent income share at the expense of the working poor, i.e. the bottom 50 percent income share. Simultaneously, certain reforms related to finance, the pension system, and fiscal policy maintained a relatively stable income share for the middle class, i.e. the middle 40 percent of the income distribution.

Several findings emerge from the econometric analysis. First, the key negative determinants of the bottom 50 percent income share are government consumption, trade openness, and the unemployment rate. Second, like the bottom 50 percent, trade openness decreases the middle 40 percent income share. However, unlike the bottom 50 percent, government consumption, public indebtedness, urbanisation, and wider economic liberalisation have increased and, thus, stabilised the middle 40 percent income share. More specifically, the size effects of public indebtedness and economic liberalisation are approximately equal to the negative effect of trade openness. Third, we find that government consumption, trade openness, and the unemployment rate are positive determinants of the top 10 percent.

The findings of this paper produce several important insights. First, China's hybrid integration into Western globalised capitalism might be partial to one of de Graaff's (2020) 'two faces', i.e. Chinese business elites, or adaptation rather than conflict as in de Graaff et al. (2020)'s framework. This is unsurprising given the collapse of the Maoist social compact (Hung 2008).

Second, our findings support calls for stronger social welfare in China (Xiao 2010) and justify an overhaul of its middle class urban-biased fiscal expenditure. Interestingly, the rise of China in the world economy might strengthen the case for stronger government or refashion the role of the state (Zhu and Pearson 2013). Third, our results reinforce the literature on divided trade unions and how this undermines collective bargaining and increases income inequality (Gore 2014, Gray and Jang 2015). The dividing line between the middle class and bottom 50 percent might be related to weak trade unionism – those on both government and firm-management payrolls (Gore 2014). Data availability prevents us from exploring this channel but this is an obvious area for future work.

The remainder of the article is organised as follows. Section 2 presents our historical scrutiny on how post-Socialist China's transition to a globalised mixed-market economy led to class restructuring and redistribution of income. Section 3 outlines the key hypotheses and our empirical strategy. In section 4, we present and discuss the key findings. Section 5 concludes.

2. Economic reforms and inequality in China since 1978: Winners and losers

Following the end of the Chinese civil war, on September 1949 Mao Zedong declared the establishment of the *People's Republic of China* (PRC) under his leadership as the chairman of the *Chinese Communist Party* (CCP). The Mao era was characterised by major economic reforms within its socialist mode of production, especially regarding its pay system. During this period, China's class structure included the state, cadres[1] and technicians and manual workers. The key element of the early pay system was that workers' earnings were skill-based, while the salaries of cadres and technicians were title-based (Qi 2018, pp. 411-4). Moreover, the first five-year plan (1953-57) placed an emphasis on material incentives for workers (Hoffmann 1967). However, after 1958, the Mao administration abandoned the Soviet pay model of material incentives and adopted a novel approach based on non-material incentives. More specifically, the 1958-76 wage system aimed to constrain material incentives to reduce competition among workers. To complement basic wages, the CCP established a high-benefit system to improve workers' living conditions, instead of relying on a productivity-based bonus system. Dismissals were also banned as a means of increasing job security and work effort. An important rationale of the 1958-76 reforms was to weaken the division of labour within the state-owned firms – blurring the dividing lines between the lower and middle classes – with cadres providing manual labour and workers participating in the management of public firms (Andors 1977; Qi 2018).

After Mao's death in 1976, Deng Xiaoping gradually rose to power during the so-called 'Beijing Spring' political liberalisation between 1978-79 (Baum 1996). He became the Chairman of the Central Advisory Commission and the Central Military Commission in the early 1980s. Although Xiaoping was never the general secretary of the CCP, he is widely recognised as the paramount

[1] According to Qi (2018, p. 410): "Before the reform of state-owned enterprises in the mid-1990s, "cadres" in China referred to both government officials and managers in enterprises."

leader of the PRC between 1978 and 1990 (Pye 1993). Xiaoping's rise marked a major turning point, as the CCP relaxed its strict socialist principles and initiated China's transformation into a mixed export-oriented economy. The aim of the post-1978 era was economic growth and the return of material incentives in factories and rural collectives. The CCP gradually opened China to the world economy and permitted the establishment of private firms and the development of private markets (Qi 2019). It is noteworthy that the state raised urban wages to purchase political support for the post-1978 reforms (*ibid.*).

In general, the post-1978 transition of China includes two main historical phases: 1. The 1978-90 early economic liberalisation period and 2. Extensive privatisations after 1990 (e.g. see Meng 2004; Naughton 2007; Bramall 2009). Between 1978 and 1990, state-owned firms dominated the urban economy. Material incentives increased substantially for workers, with bonuses increasing from two percent in 1978 to 20 percent in 1991 (Qi 2019, p. 4). During the first stage of reforms, a 'social contract' between the state and workers was formed: wages were adjusted to labour productivity on an annual basis, in contrast to the less frequent wage adjustments of the Mao era. The new pay system of the pre-1990 period included a substantially low 'basic wage', an additional effort-based 'efficiency wage' and high public benefits (Qi 2018, p. 414-9). Under this pay structure, cadres (including firm managers, i.e. emerging middle/upper-middle class employees) were strengthened relative to manual workers, since the latter relied on the high-benefit system rather than an efficiency wage'. As noted by Qi (2019, p. 4), a 1990 survey shows that cadres earned approximately 12 percent higher salaries than workers.[2] This is indeed a significant change and indicates the early phase of the rise of the Chinese middle class. Notwithstanding the disparity in earnings between workers and cadres, they maintained a working coalition with a unified objective of promoting working class interests (Qi 2018, p. 410). Eventually, the wage bill grew faster than profit and undermined economic growth (*ibid.*).

The political response to the 1989 Tiananmen Square protests and the early 1990s profitability crisis was the mid-1990s reforms, which signalled the start of the second wave of economic liberalisation. During the second reform period (mid-1990s-date), the CCP under Jiang Zemin placed additional emphasis on rapid capital accumulation through deeper market reforms and a sharper division of labour between management (upper and middle classes) and workers. Cadres were eventually transformed into standard business managers (Qi 2018, p. 421), i.e. supervisory employees (or private business owners) with distinct interests as compared to manual workers. This process led to rising earnings inequality within state-owned enterprises, where the new bonus/effort-based pay system rewarded the contribution of managers at the expense of workers. It is imperative to emphasise that the attempt to widen the manager-worker pay gap was officially declared as a policy goal of the government.[3] Employee ownership schemes complemented managers' earnings, with top managers in 2005 owning company shares worth approximately 100 million yuan (Qi 2019, p. 5). In 2011, the average top manager salary

[2] Original source in Qi (2019): Feng, T. and Xu, X. (eds.) (1993). Conditions of the Chinese Workers (in Chinese), Beijing, China Social Science Press.

[3] Original source in Qi (2018): Labor Bureau of Shandong Province (1993). Gongzi Wenjian Xuanbian 1987.7-1993.3 [Selected documents on wages from July 1987 to March 1993]. Jinan: Labor Bureau of Shandong Province.

increased by 337,000 yuan within five years, while the average wage of a manual worker increased by 30,000 yuan within the decade. As a consequence, managers earned an average salary 18 times larger than the average frontline worker (*ibid.*).

According to Li (2018, p. 576), 1995 constitutes a historical turning point for the second reform era in China, since the number of workers employed in state-owned firms started to decline and employment in private and mixed-ownership enterprises increased rapidly reaching 200 million. In 1997 the CCP prioritised economic and price efficiency over social cohesion and had undertaken mass dismissals (*ibid.*). As noted by Qi (2019, p. 6), 30 million workers became unemployed between the mid-1990s and the early 2000s. Furthermore, migration from rural to urban areas increased and expanded urban unemployment, which further decreased the bargaining power of the working poor (Meng 2004; Pakrashi and Frijters 2017). Private firms hired mainly low-wage migrant workers (Li 2018, p. 576), who had no access to public welfare, pensions, and trade unions[4] (Howell and Pringle 2019). Consequently, competition in the labour market increased and the new cost-efficient-oriented approach of the CCP replaced the pre-1990s 'social contract' between workers and the state. This process of population movement led to a clear spatial and economic division: On the one hand, there are affluent middle-class managers/service sector workers and the elites of the big urban centres, and, on the other hand, there are low-income workers of the rural industrial areas (Wan and Zhou 2005; Sicular et al. 2007; Wu and Rao 2017).

Beyond the pay system itself, another important aspect of the post-1990 economic reforms is the fiscal policy, social security and financial development nexus. The fiscal policy regime in the post-Mao era is a unique example of urban-biased government spending (Yang and Zhou 1999). Although 73-76 percent of the population lived in rural areas since the early 1980s, 52-52 percent of public spending was invested in the large urban centres, including exclusive access to childcare and education for urban citizens only (Yang 1999, Howell and Pringle 2019). Fiscal transfers were used to fund urban workers' salaries, while the wages of rural workers were funded through output growth; thus, rural earnings were subject to high inflationary taxes (*ibid.*). Further, rural earnings were subjected to taxes imposed by local governments (Greenfield and Pringle 2002). Simultaneously, in kind income in the form of subsidised housing has been concentrated in urban areas, playing a complementary role for the widening urban-rural income gap (Gustafsson and Shi 1997).

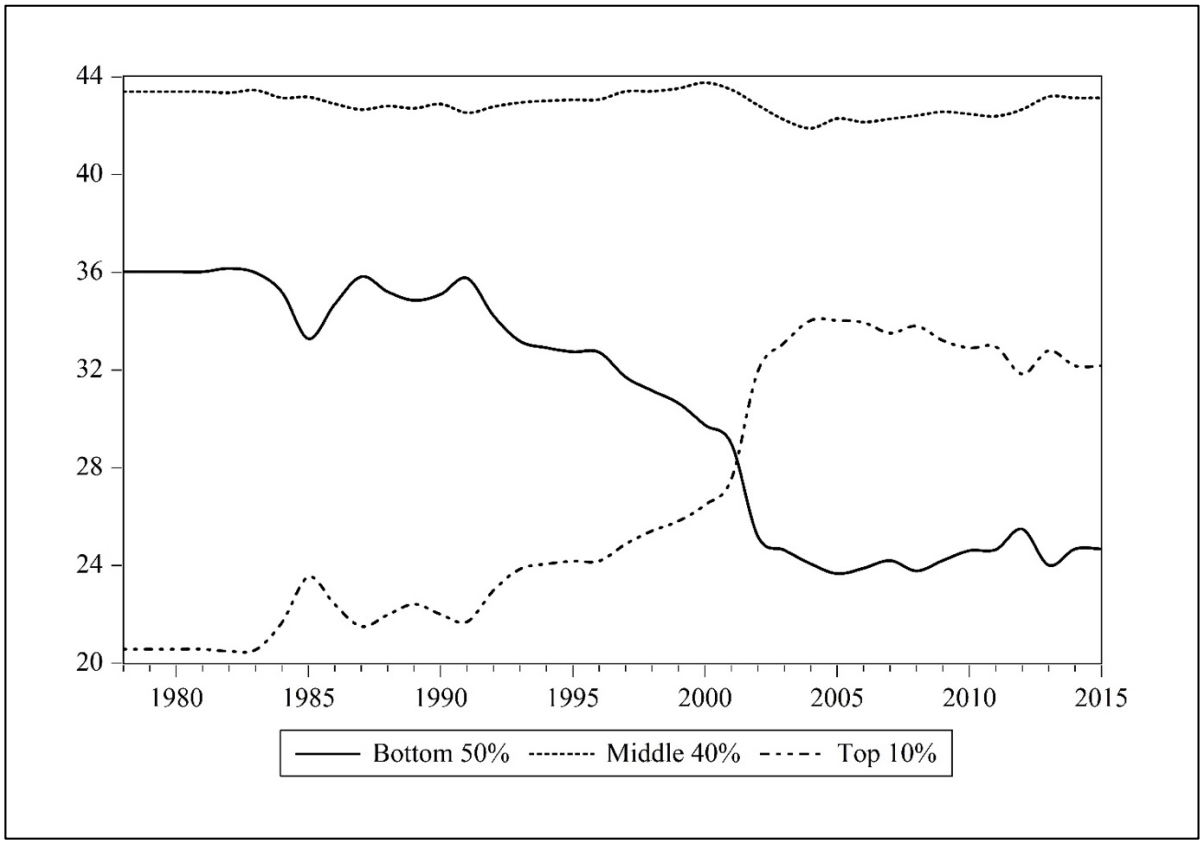
At the same time, the pension system reform of the 1990s further deepened the divide between the emerging urban middle class and the lower working class. In 1998, the Chinese Ministry of Labour and Social Security decided to link pension contributions to long-term government bonds (Béland and Yu 2004), due to the increasing deficits of the pension funds. The official guidelines of this plan required 80 percent of the accumulated funds of urban workers to be invested in government bonds and the remaining 20 percent in bank deposits (Feldstein 1999). As a result,

[4] Gore (2014) explains that Chinese trade unions were too partisan along the lines of government or firm-management to engage in collective bargaining in the interest of workers. However, as noted by Gray and Jang (2015), the 2010 strikes have ignited collective bargaining in the interest of Chinese labour and can potentially restructure the labour movement.

the pension reform of the post-Mao era led to some financial development through the creation of pension assets, which were connected to public indebtedness and the middle class.

Given this historical overview, we are interested in the distributional effects of the post-Mao reforms for the top decile share, the middle class and the bottom 50 percent of the income distribution. Although there is no standard statistical definition of the "middle class", recent evidence shows that during the reform era, the Chinese middle class is represented by approximately 40 percent of the population (see China Power 2019). Therefore, we follow the standard bottom 50, middle 40, top ten income share classification, which is widely used in the relevant macroeconomic history studies on inequality (e.g. see Garbinti et al. 2018; Bartels 2019; Chancel and Piketty 2019; Piketty et al. 2019).

Figure 1: Inter-decile income shares (% GDP) - China, 1978-2015



Source: Piketty et al. (2019)

Figure 1 plots the income shares of the bottom 50 percent, the middle 40 percent and the top 10 percent in China between 1978 and 2012. The series are sourced from Piketty et al. (2019). In the first ten years of China's transition from a state-owned to a mixed economy, the middle 40 percent earned approximately 44 percent of national income, while the bottom 50 percent earned 36 to 33 percent of same. During this period, the top 10 percent of the income distribution earned 21 to 24 percent of national income. Indeed, this is consistent with the stylised facts for the first stage of reforms presented above, which suggest that the mild liberalisation process imposed by the CCP until the early 1990s, were not particularly redistributive among the three key social groups. However, after 1991, the situation changed dramatically for the bottom 50 and the top 10 percent income shares – see Figure 1.

A steep decline in the bottom 50 percent income share from 36 percent in 1978 to approximately 24 percent in 2004 was accompanied by an equal increase in the income share of the top 10 decile. More specifically, the top 10 percent income share rose from less than 22 percent in 1991 to around 34 percent in 2003. This major shift coincides with the mass dismissals and the rise of private businesses since the mid/late-1990s, and the accession of China to the World Trade Organisation in 2001 (see Wan et al. 2007). This 'new normal' was maintained during the Hu Jintao era as well as in the early years of the Xi Jinping era. Remarkably, the middle-income share remained relatively stable between 42 and 43 percent during the period under consideration. This stability potentially illustrates that the loss of middle-class income due to wage competition was counterbalanced by financial development and urban-biased fiscal policy. Although some attempts to close the rural-urban social provision gap have been made, these have been limited so far (Duckett 2020).

3. Estimating the determinants of China's inter-decile ratios

The next step in our analysis is to estimate the drivers of the three main decile ratios in China since 1978. To do so, we model the determinants of the bottom 50 per cent, the middle 40 per cent, and the top 10 per cent income shares over the period 1978-2015 using a single-equation approach. This empirical strategy can shed light on the channels through which income is redistributed from the bottom 50 per cent to the top 10 per cent and identify the key factors that explain the stable income share for the Chinese middle class. A growing number of empirical studies within the income distribution literature also employ the single-equation approach, where the Unrestricted Error-Correction Model (UECM) is the most common strategy. For example, Kristal (2010) and Bengtsson (2014) utilised this approach for their panel-based papers, while Flaherty and Riain (2019) is a time series-based inequality study.

The UECM specification, developed by Sargan (1964) and Davidson et al. (1978), includes both the long-run (level) and the short-run (first-differenced) effects of the independent variables. Prerequisites for the application of this methodology are that all variables must be stationary at either levels or first differences and that a long-run, cointegrating relationship between the

dependent and explanatory variables must exist. Both requirements are satisfied for our sample.[5] The key advantage of the UECM approach is that it corrects for serial correlation unlike the standard OLS methodology, and thus, yields efficient estimates of the coefficients.

We use the same econometric specification for all three income shares since our aim is to examine how China's transition from a centrally planned to mixed economy affects income distribution among the bottom 50 percent, the middle 40 percent and the top 10 percent. More specifically, we follow Roine et al. (2009)'s study on the determinants of top and bottom income shares and estimate how changes in government expenditure, financial development and trade globalisation affect Chinese top, middle and bottom income shares since 1978.

3.1 Baseline specification

Our baseline econometric specification is the following:

$$\Delta(Income\ Share)_t = \beta_0 + \beta_1 Income\ Share_{t-1} + \beta_2 Government\ Consumption_{t-1} +$$
$$\beta_3 Terms\ of\ Trade_{t-1} + \beta_4 Trade\ Openness + \beta_5 Private\ Debt_{t-1} + \sum_{n=1}^{N} \theta_n \Delta x + \varepsilon_t$$

where the terms β_0 and ε_t are the constant and the error terms respectively. Following the common strategy in the literature, the long-run coefficients are in lagged form to prevent simultaneity issues and capture the direction of causality more accurately. The vector x includes the short-run (first-differenced) coefficients of the main explanatory variables and of the growth rate. The latter is included as a control for the effects of economic fluctuations. Given data limitations, our estimations cover the period between 1980 and 2015 for all three income shares.

Starting from the baseline specification, *Government Consumption* (final expenditure excluding military spending as a share of GDP) is included as a proxy for welfare spending and public investment. In an egalitarian system, government spending aims to reduce inequalities and provide necessary goods and services to the less privileged citizens. However, it is not unlikely that legislation can impose discrimination and only permit fiscal policy to benefit certain groups.

To account for the distributional effects of trade globalisation, we incorporate two explanatory variables: the *Terms of Trade* (Net export unit value index over the import unit value index) and *Trade Openness* (exports plus imports as a share of GDP). Rising terms of trade can have ambiguous effects on distribution: 1. Higher export prices due to strong global demand can lead to wage growth and 2. Higher terms of trade due to rising wage costs can coerce export-oriented firms to cut wages to maintain price competitiveness. In the latter case, we expect the wage-squeeze to target those workers who are more easily substituted, i.e. unskilled labour. In our context, this means that trade globalisation is likely to produce adverse effects for the bottom

[5] To test for cointegration, we run the ADF unit root test for the residuals of the stationary regression between the dependent variable and the explanatory variables. Indeed, the residuals are I(0), thus, there is a cointegrating relationship.

income share as opposed to the middle class and top incomes. This hypothesis follows the theoretical work by Rodrik (1997), who emphasises that trade globalisation disproportionally benefits the more *mobile* factor of production, i.e. capital, as opposed to the more *abundant* factor input advanced by Stolper-Samuelson (1941). China's top income earners and its middle class are likely to be the dominant owners of capital and thereby, the primary beneficiaries of trade globalisation. The impact of Trade Openness is included as the standard proxy of the degree of world integration, which is incorporated in most studies on the distributional effects of globalisation. We expect a similarly negative effect on the bottom 50 per cent of China's income share.

The final explanatory variable of the baseline specification is related to the degree of financial development. Given data limitations, we choose to proxy this channel through *Private Debt* (domestic credit provided by the financial sector as a share of GDP). The recent report by the Institute of International Finance (IIF) highlights that Chinese household and corporate debt has reached over 300 percent of GDP (Reuters 2019) and we expect this to have significant distributional effects. Studies like Froud et al. (2002), Langley (2007), and Wood (2017) claim that household indebtedness and the fear of debt default increases workers' loss aversion, which makes them more likely to accept lower wages. Moreover, as firms become more indebted, Froud et al. (2000) and Thompson (2003) argue that cutting wages is relied upon as a means to improve firms' financial position. We expect these negative effects to be particularly pronounced for the bottom 50 per cent of the income distribution.

Theoretical works by Claessens and Perotti (2005) and Greenwood and Jovanovic (1990) support our expectations of rising inequality and indebtedness. For example, Greenwood and Jovanovic postulate that inequality and financial development are non-linearly related. They contend that inequality increases and falls during the early and late stages of financial development respectively. The principal channel relates to differential access by income group at each stage of financial development. While China has made significant progress in its financial market reforms, we posit that its development is not so advanced as to raise the income shares of the bottom 50 per cent and middle class.

As reported in the appendix all variables used in this study are integrated of order zero or one. Furthermore, we estimate the stationary regression between the wage share and the main explanatory variables and find that its residuals are stationary, thus, a cointegrating relationship exists.

3.2 Robustness estimations

Beyond the baseline specification, we estimate six additional specifications to evaluate the robustness of our main findings but also to test some secondary hypotheses. In the second specification, we introduce the *Unemployment Rate* (percentage of the labour force) as a proxy for labour market competitiveness. We expect this factor to produce substantial negative effects for the bottom 50 per cent of the income distribution, as low-skilled workers face a greater threat of substitution.

In the third specification, we incorporate *Public Debt* (percentage of GDP) as a proxy indicator for asset-driven redistribution towards bondholders – largely top income earners and the middle class. As Streeck (2014) and Hager (2014, 2015) contend, governments' dependence on its bondholders affords the latter policy influence to tax wage income. In specification four, we incorporate *Urbanisation* (Urban population as a percentage of total population) to evaluate the distributional impact of urbanisation following Lewis (1954). Although Lewisian rural-urban migration does not account for a middle class, we expect rural migrants to occupy urban middle-class status. Further, the wage premium earned by urban Chinese is anticipated to asymmetrically benefit the middle class as compared to the bottom 50 and top 10 per cent of the income distribution.

Specification five includes the *KOF Index* (Gygli et al. 2019) as a proxy measure of socio-economic and political globalisation. This indicator allows us to assess whether wider institutional reforms in China matter for the distribution of its income (Carter 2007; Dreher and Gaston 2008; Bergh and Nilsson 2010).[6] In specification six, we incorporate an additional control factor to account for the labour-saving and skill-biased distributional effects of technology. Due to the absence of data on capital intensity or Information, Communications and Technology (ICT) expenditure in China, we follow Roine et al. (2009) and approximate this channel through the *Agricultural value-added Share of GDP*. In specification seven, we replace *Private Debt* with the *Financial Development Index* of the IMF. This choice provides an alternative specification for testing whether financial liberalisation disproportionally benefits top incomes and the middle class as opposed to the working poor.

In the appendix, we experiment with the *Nominal Exchange Rate* (official exchange rate; LCU per US$, period average) to account for the impact of nominal depreciations/devaluations and a time dummy for China's participation in the WTO since 2001. None of these experimentations undermines the main results. See Appendix for data sources.

[6] Ideally, one would also test for the effects of democracy through the Polity Score (e.g. see Hushey et al. 2020), but for China this indicator appears to have no variation between 1978 and 2015.

4. Econometric results

4.1 Drivers of the bottom 50 percent

Our econometric estimations identify two striking determinants of the bottom 50 percent of China's income distribution. First, *Government Consumption* decreases its income share and the long-run coefficient is statistically significant at the five/ten percent levels in all seven specifications. Second, *Trade Openness* has a negative long-run impact on the bottom half of the income distribution. In specifications (1), (2), (3), and (6), the coefficient of trade openness is statistically significant at the five percent level, whilst in (5), it is statistically significant at the ten percent level. Beyond the two main findings, the *Unemployment Rate* has a long-run negative effect on the bottom 50 percent income share and is statistically significant at the five percent level. *Private Debt* also exhibits negative effects but without being statistically significant. Finally, the control variables of *Public Debt*, *Urbanisation*, the *KOF Index*, the *Agricultural Share*, and *Financial Development* all have negative effects on the bottom 50 percent income share but are statistically insignificant.

These results provide several interesting insights on the economic interests of the Chinese working class. First, trade globalisation has left behind the bottom half of China's income distribution. It is worth noting that the magnitude of its effect is consistently larger than other control variables. This demonstrates that the distributional woes of globalisation, particularly for bottom incomes, are not exclusively confined to Western Europe or the industrial mid-west in the United States (OECD 2011). Second, unsurprisingly, we find robust evidence that unemployment disproportionately affects low-skilled workers as they can be replaced more easily. Third, government consumption widens the income gap between the bottom half of China's income distribution and the rest. This result is consistent with the historical analysis of the anti-egalitarian fiscal strategy of the CCP since 1978, which advantaged the middle class at the expense of the lower working class.

Table 1: Determinants of the bottom 50 percent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Long-run Coefficients							
Bottom 50% $_{t-1}$	-1.549**	-3.359***	-2.868**	-2.467***	-1.751**	-1.427*	-0.602
Government Consumption $_{t-1}$	-0.464**	-0.564**	-0.470*	-0.424**	-0.423*	-0.448*	-0.610**
Terms of Trade $_{t-1}$	-0.077	0.705	0.173	0.328	-0.142	-0.251	-0.030
Trade Openness $_{t-1}$	-1.330**	-1.720**	-1.868**	-0.571	-1.369*	-1.528**	-0.559
Private Debt $_{t-1}$	-0.326	-0.252	-0.541	0.567	-0.328	-0.838	
Unemployment Rate $_{t-1}$		-1.203**					
Public Debt $_{t-1}$			-0.503				
Urbanisation $_{t-1}$				-0.627			
KOF Index $_{t-1}$					-0.176		
Agricultural Share $_{t-1}$						-0.715	
Financial Development $_{t-1}$							-0.055
R^2	0.50	0.59	0.58	0.60	0.51	0.51	0.36
BG	0.69	0.31	0.01	0.81	0.38	0.67	0.75
Harvey	0.02	0.16	0.22	0.12	0.07	0.15	0.02
Observations	35	31	35	35	35	35	35

Notes: Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively. The dependent variable is the Bottom 50% income share in first differences. The coefficients reported are standardised by multiplying the obtained coefficient with the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable. Values for specification tests are p-values. BG (Breusch-Godfrey) test at first lag. Constant terms and short-run (first-differenced) coefficients are included in the estimations, but not reported.

4.2 Drivers of the middle 40 percent

Our findings show that *Government Consumption* has a positive effect on the income share of the middle 40 percent but the long-run coefficients are statistically insignificant in six out of seven specifications. The exception is specification (3), where it is statistically significant at the ten percent level. *Trade Openness* exhibits a consistently negative effect on the middle 40 percent, as in the case of the bottom 50 percent income share. However, in contrast to the bottom half of the income distribution, the statistical significance varies. In specifications (1), (2) and (4), the long-term coefficient of trade openness is insignificant, while it is statistically significant either at the ten or the five percent level for the remaining specifications. Interestingly, the effects of the *Terms of Trade* produce opposing results, i.e. positive in all seven specifications, but only statistically significant at the one and five percent levels in specifications (5) and (7) respectively.

The more striking findings for the middle 40 percent income share are found in the robustness estimations. Public Debt and Urbanisation exhibit strong positive effects, which are statistically significant at the five and one percent levels respectively. The KOF Index and Financial Development also increase the income share of the middle 40 percent and both coefficients are statistically significant at the ten percent level. The Unemployment Rate and the Agricultural Share produce negative effects but neither coefficient is statistically significant.

The results demonstrate that the middle 40 and bottom 50 percent of the income distribution both experience falling income shares due to trade globalisation, but this is where their similarity ends. The evidence suggests that government consumption; public indebtedness, urbanisation and wider economic liberalisation (measured by the KOF Index) have stabilised the middle 40 percent income share. Specifically, the size effects of public indebtedness and economic liberalisation are approximately equal to the negative effect of trade openness, which can explain the relative stability of the middle 40 percent income share. Further, the positive impacts of public debt and financial development imply that the Chinese middle class has become part of the rentier/bondholding class during the post-Mao era. Moreover, unlike the bottom half of the income distribution, there are trivial disciplinary effects of unemployment on the middle class. These results make a strong case that the Chinese middle class might have a larger political and economic stake in the China model that can delay democratic reforms and redistributive policy to the working poor.

Table 2: Determinants of the middle 40 percent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Long-run Coefficients							
Middle 40% $_{t-1}$	-0.960**	-0.857*	-1.970**	-1.224***	-1.216**	-0.917*	-1.034**
Government Consumption $_{t-1}$	0.142	0.173	0.943*	0.790***	0.237	0.040	0.214
Terms of Trade $_{t-1}$	0.471	0.575	0.248	1.351***	0.438	0.426	0.912**
Trade Openness $_{t-1}$	-0.917	-0.369	-2.001**	0.144	-2.239**	-1.461*	-0.718*
Private Debt $_{t-1}$	0.692	0.882	-0.759	-1.500**	-0.653	-0.171	
Unemployment Rate t-1		-0.576					
Public Debt $_{t-1}$			2.053**				
Urbanisation $_{t-1}$				4.076***			
KOF Index $_{t-1}$					2.444*		
Agricultural Share $_{t-1}$						-1.415	
Financial Development $_{t-1}$							0.985*
R^2	0.41	0.45	0.57	0.77	0.51	0.48	0.46
BG	0.25	0.17	0.13	0.42	0.23	0.44	0.62
Harvey	0.04	0.94	0.94	0.55	0.74	0.54	0.12
Observations	35	31	35	35	35	35	35

Notes: Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively. The dependent variable is the Middle 40% income share in first differences. The coefficients reported are standardised by multiplying the obtained coefficient with the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable. Values for specification tests are p-values. BG (Breusch-Godfrey) test at first lag. Constant terms and short-run (first-differenced) coefficients are included in the estimations, but not reported.

4.3 Drivers of the top 10 percent

In this sub-section, we present the drivers of the top 10 percent income share. *Government Consumption* exhibits a consistently positive effect on the income share of the top 10 percent. Its long-run coefficients are statistically significant at the five percent level in specification (7) and at the ten percent level in specifications (2) and (4). Unlike the results for the bottom 50 and middle 40 percent income shares, *Trade Openness* is found to increase the top 10 percent in all seven specifications. Its long-run coefficients are statistically significant at the five percent level in specifications (1), (2), (3), and (6). Moreover, the effect of the *Unemployment Rate* is large and positive and its coefficient is statistically significant at the five percent level. The effects of *Public Debt* and *Agricultural Share* are positive but none of the coefficients are statistically significant and their size effects are substantially smaller than those of *Trade Openness* and *Unemployment*.

These findings in conjunction with the previous results provide four main conclusions. First, fiscal policy has redistributed income mainly from the bottom to the top half of China's income distribution. Second, the export-oriented nature of the Chinese economy since 1978 has benefited the top decile share at the expense of the bottom 90 percent of its income distribution. This is a striking result – China's integration into the world economy has exclusively benefited the richest Chinese. Third, unemployment allows the top decile share – owners of firms – to extract income from the low-skilled bottom 50 percent as opposed to the middle class. Fourth, financial deepening and public indebtedness does not produce substantial benefits to the top decile share as compared to the middle class.

Table 3: Determinants of the top 10 percent

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Long-run Coefficients							
Top 10% $_{t-1}$	-1.511*	-3.559***	-2.526*	-2.454***	-1.711	-1.520*	-0.591
Government Consumption $_{t-1}$	0.384	0.401*	0.317	0.228	0.337	0.408	0.555**
Terms of Trade $_{t-1}$	-0.050	-0.935**	-0.187	-0.624**	0.067	0.094	-0.125
Trade Openness $_{t-1}$	1.281**	1.893**	1.761**	0.334	1.461	1.687**	0.510
Private Debt $_{t-1}$	0.222	0.060	0.504	-0.297	0.391	0.895	
Unemployment Rate t-1		1.268**					
Public Debt $_{t-1}$			0.253				
Urbanisation $_{t-1}$				-0.163			
KOF Index $_{t-1}$					-0.104		
Agricultural Share $_{t-1}$						0.971	
Financial Development $_{t-1}$							-0.083
R^2	0.49	0.61	0.58	0.64	0.54	0.52	0.39
BG	0.42	0.09	0.00	0.30	0.21	0.50	0.60
Harvey	0.12	0.07	0.12	0.21	0.14	0.02	0.03
Observations	35	31	35	35	35	35	35

Notes: Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively. The dependent variable is the Top 10% income share in first differences. The coefficients reported are standardised by multiplying the obtained coefficient with the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable. Values for specification tests are p-values. BG (Breusch-Godfrey) test at first lag. Constant terms and short-run (first-differenced) coefficients are included in the estimations, but not reported.

5. Conclusion

This paper empirically estimates the key drivers of China's inter-decile income shares, namely, the bottom 50 percent, middle 40 percent and the top 10 percent. We test the dominant hypotheses that relate to government expenditure, globalisation/openness, financial development, urbanisation, public debt and unemployment – and how they affect Chinese income distribution since 1978. Our work is made possible by the recently released dataset on China's pre-tax income distribution (Piketty et al. 2019). In our view, this work is a natural extension of Piketty et al. (2019), which looks at the broad changes in the Chinese income distribution. We are particularly interested in explaining three key stylised facts: 1. The stable income share of the middle 40 percent, 2. Rising income share for the top 10 percent and 3. Falling income share for the bottom 50 percent of the income distribution.

This work derives three key results. First, government consumption lowers the income share of the bottom half of the income distribution as compared to the middle 40 percent and top 10 percent income shares. This finding is consistent with our historical analysis of the Communist Party's anti-egalitarian fiscal strategy since 1978, which advantaged the urban and upper classes. One striking conclusion from this result is that bigger and welfarist governments are not necessarily egalitarian – poorly designed consumption expenditures can also increase inequality. Second, trade openness increases the income share of the top 10 percent at the expense of the bottom 90 percent of the income distribution. This result demonstrates that the adverse distributional effects of globalisation are not unique to advanced countries. Third, public indebtedness, urbanisation and wider economic liberalisation have stabilised the middle 40 percent income share, with insignificant effects for the remainder of the income distribution. The effects of public debt and financial development position the Chinese middle class as rentiers and entrench their political and economic stake in the China model, thereby, delaying democratic demands (e.g. Johnston 2004, Chen and Lu 2011, Miao 2016, Qin 2020).

What do these results imply for policy? Two ideas emerge. First, the urban-biased nature of government spending must be overhauled to refocus on the wider geographical and income distributions. This is particularly important given the adverse distributional effects of openness on the bottom 90 percent of the income distribution. Rodrik (1998) has explained that more openness requires bigger governments to compensate for adverse employment and distributional effects. Second, the Chinese pension system must be reformed to cover the entirety of its income distribution, rather than focus on the upper half. Presently, pensions are a middle-class endeavour, where 80 percent of the accumulated funds of urban workers must be invested in government bonds (Feldstein 1999). The pension system, like fiscal consumption expenditures has been badly designed and thus, increased income inequality.

Finally, our results have several implications for theories of democratisation. Many theoretical models of political transitions are based on two agents, for example, Acemoglu and Robinson (2001). However, based on our results, a third-middle class group/agent may serve as the ultimate arbiter on the direction and pace of political reforms. While a united working class had underpinned some historical cases of democratic reforms, there are several modern lines of

division that can undermine working class cohesion as the China case aptly demonstrates. We hope our work will stimulate new research on political transitions using three agent models.

References

Acemoglu, D. and Robinson, J. (2001). 'A Theory of political transitions,' *The American Economic Review,* 91(4):938-963.

Andors, S. (1977). *China's Industrial Revolution: Politics, Planning, and Management, 1949 to the Present*. New York: Pantheon.

Baum, R. (1996). *Burying Mao: Chinese politics in the age of Deng Xiaoping*. New Jersey: Princeton University Press.

Béland, D. and Yu, K.M. (2004). A long financial march: pension reform in China. *Journal of Social Policy*, 33(2), 267-288.

Bengtsson, E. (2014). Do unions redistribute income from capital to labour? Union density and wage shares since 1960. *Industrial Relations Journal,* 45: 389-408.

Bergh, A. and Nilsson, T. (2010). Do liberalization and globalization increase income inequality? *European Journal of Political Economy*, 26(4), 488-505.

Bramall, C. (2009). *Chinese Economic Development*. New York: Routledge.

Carter, J.R. (2007). An empirical note on economic freedom and income inequality. *Public Choice*, 130(1-2), 163-77.

Checchi, D. and García-Peñalosa, C. (2010). Labour market institutions and the personal distribution of income in the OECD. *Economica*, 77(307), 413-450.

Chen, J. and Lu, C. (2011). Democratization and the middle class in China: The middle class's attitudes toward democracy. *Political Research Quarterly*, 64(3): 705-19.

China Power (2019). "How well-off is China's middle class?" China Power, April 26, 2017. Updated May 29, 2019. Accessed April 3, 2020. https://chinapower.csis.org/china-middle-class/

Claessens, S. and Perotti, E. (2007). Finance and inequality: Channels and evidence. *Journal of Comparative Economics*, 35(4), 748-73.

Cobham, A. and Sumner, A. (2013). Is it all about the tails? The Palma measure of income inequality. *CGD Working Paper 343, Center for Global Development*, Washington, DC.

Cobham, A., Schlögl, L., and Sumner, A. (2016). Inequality and the tails: the Palma proposition and ratio. *Global Policy*, 7(1), 25-36.

Daudey, E. and García-Peñalosa, C. (2007). The personal and the factor distributions of income in a cross-section of countries. *Journal of Development Studies*, 43(5), 812-829.

Davidson, J.E., Hendry, D.F., Srba, F., and Yeo, S. (1978). Econometric modelling of the aggregate time-series relationship between consumers' expenditure and income in the United Kingdom. *The Economic Journal*, 88(352), 661-92.

Dell'Aringa, C. and Pagani, L. (2007). 'Collective bargaining and wage dispersion in Europe'. *British Journal of Industrial Relations*, 45(1): 29-54.

Devicienti, F., Fanfani, B., and Maida, A. (2019). 'Collective bargaining and the evolution of wage inequality in Italy'. *British Journal of Industrial Relations*, 57(2): 377-407.

Dreher, A. and Gaston, N. (2008). Has globalization increased inequality? *Review of International Economics*, 16(3), 516-536.

Duckett, J. (2020). Neoliberalism, Authoritarian Politics and Social Policy in China. *Development and Change*. https://doi.org/10.1111/dech.12568

Feldstein, M. (1999). Social security pension reform in China. *China Economic Review*, 10(2), 99-107.

Flaherty, E. (2015). Top incomes under finance-driven capitalism, 1990–2010: Power resources and regulatory orders. *Socio-Economic Review*, 13 (3), 417-47.

Flaherty, E. and Riain, S.Ó. (2019). Labour's declining share of national income in Ireland and Denmark: the national specificities of structural change. *Socio-Economic Review*, https://doi.org/10.1093/ser/mwy047

Froud, J., Haslam, C., Johal, S. and Williams, K. (2000). Restructuring for shareholder value and its implications for labour. *Cambridge Journal of Economics*, 24(6): 771-97.

Froud, J., Johal, S. and Williams, K. (2002). Financialisation and the coupon pool. *Capital & Class*, 26: 119–51.

Gore, L. (2014). Labour management as development of the integrated developmental state in China, *New Political Economy,* 19(2):302-327.

Gray, K. and Jang, Y. (2015). Labour unrest in the global political economy: The case of China's 2020 strike wave, *New Political Economy,* 20(4):594-613.

Greenfield, G. and Pringle, T. (2002). 'The challenge of wage arrears in China.' In Velasco, M.S. (Ed.) *Paying attention to wages*. Geneva: ILO.

Greenwood, J. and Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy*, 98(5, Part 1), 1076-107.

Gustafsson, B. and Shi, L. (1997). Types of Income and Inequality in China at the End of the 1980s. *Review of Income and Wealth*, 43(2), 211-226.

Gygli, S., Haelg, F., Potrafke, N., and Sturm, J.E. (2019). The KOF Globalisation Index–revisited. *Review of International Organizations*, 14(3), 543-74.

Hoffmann, C. (1967). *Work Incentive Practices and Policies in the People's Republic of China 1953-1965*. Albany: SUNY Press.

Howell, J. and Pringle, T. (2019). Shades of authoritarianism and state–labour relations in China. *British Journal of Industrial Relations*, 57(2): 223-46.

Huber, E., Huo, J., and Stephens, J.D. (2019). Power, policy, and top income shares. *Socio-Economic Review*, 17(2), 231-53.

Hung, H. (2008). Rise of China and the global overaccumulation crisis, *Review of International Political Economy,* 15(2):149-179.

Hussey, A. J., Jetter, M., and McWilliam, D. (2020). The Fundamental Determinants of Economic Inequality in Average Income Across Countries: The Declining Role of Political Institutions. *Review of Income and Wealth*, www.doi.org/10.1111/roiw.12459

IMF (2017). 'Understanding the Downward Trend in Labor Income Shares'. *World Economic Outlook*. Washington, DC: IMF.

Johnston, A.I. (2004). Chinese middle class attitudes towards international affairs: nascent liberalization? *The China Quarterly*, 179: 603-28.

Karabarbounis, L. and Neiman, B. (2014). The global decline of the labor share. *Quarterly Journal of Economics*, 129(1), 61-103.

Kristal, T. (2010). Good times, bad times: Postwar labor's share of national income in capitalist democracies. *American Sociological Review,* 75: 729-63.

Langley, P. (2007). Uncertain Subjects of Anglo-American Financialization. *Cultural Critique*, 65: 67-91.

Lazonick, W. and O'Sullivan, M. (2000). Maximizing shareholder value: A new ideology for corporate governance. *Economy and Society*, 29: 13-35.

Lewis, A. (1954). Economic Development and the Unlimited Supplies of Labour. *The Manchester School,* 22(2):139-191.

Li, P. (2018). China's Class Structure: Changes, Problems, and Policy Suggestions-A Study of Class Development since 1978. *International Critical Thought*, 8(4), 574-95.

Lin, K.H. and Tomaskovic-Devey, D. (2013). Financialization and US income inequality, 1970–2008. *American Journal of Sociology*, 118(5), 1284-329.

Meng, X. (2004). Economic restructuring and income inequality in urban China. *Review of Income and Wealth*, 50(3), 357-379.

Miao, Y. (2016). The Paradox of the Middle Class Attitudes in China: Democracy, Social Stability and Reform. *Journal of Current Chinese Affairs*, 45(1): 169-90.

Minsky, H.P. (1986). *Stabilizing An Unstable Economy*. New Haven: Yale University Press.

Nana de Graaff (2020). China Inc. goes global. Transnational and national networks of China's globalizing business elite, *Review of International Political Economy,* 27(2):208-233.

Nana de Graaff, Brink, T. and Parmar, I. (2020). China's rise in a liberal world in transition – introduction to the FORUM, *Review of International Political Economy,* 27(2):191-207.

Naughton, B. (2007). *The Chinese Economy: Transformation and Growth*. Cambridge, MA: MIT Press.

OECD. (2011). 'Divided we stand: why inequality keeps rising', *OECD Publishing*, Paris.

Pakrashi, D. and Frijters, P. (2017). Migration and discrimination in urban China: a decomposition approach. *Review of Income and Wealth*, 63(4), 821-840.

Piketty, T. (2014). *Capital in the 21st Century*. Cambridge, MA: Harvard University Press.

Piketty, T. (2020). *Capital and Ideology*. Cambridge, MA: Harvard University Press.

Piketty, T., Yang, L., and Zucman, G. (2019). Capital accumulation, private property, and rising inequality in China, 1978–2015. *American Economic Review*, 109(7), 2469-96.

Pye, L.W. (1993). An introductory profile: Deng Xiaoping and China's political culture. *The China Quarterly*, 135, 412-43.

Qi, H. (2018). "Distribution according to work": an historical analysis of the incentive system in China's state-owned sector. *Review of Radical Political Economics*, 50(2), 409-426.

Qi, H. (2019). Power relations and the labour share of income in China. *Cambridge Journal of Economics*. https://doi.org/10.1093/cje/bez054

Qin, G. (2020). Liberal or Conservative? The Differentiated Political Values of the Middle Class in Contemporary China. *The China Quarterly*, doi.org/10.1017/S0305741020000296

Reuters (2019). China's debt tops 300% of GDP, now 15% of global total: IIF. *Reuters*, July 18, 2019. Retrieved from https://www.reuters.com/article/us-china-economy-debt/chinas-debt-tops-300-of-gdp-now-15-of-global-total-iif-idUSKCN1UD0KD

Rodrik, D. (1997). *Has Globalization Gone Too Far?* Washington, DC: Institute for International Economics.

Rodrik, D. (1998). 'Why do more open economies have Bigger Governments?', *Journal of Political Economy,* 106(5):997-1032.

Roine, J., Vlachos, J. and Waldenström, D. (2009). 'The long-run determinants of inequality: What can we learn from top income data?' *Journal of Public Economics,* 93: 974-88.

Sargan, J.D. (1964) Wages and prices in the U.K.: a study in econometric methodology, in P.E. Hart *et al.* (Eds) *Econometric Analysis for National Planning*, London: Butterworth.

Sicular, T., Ximing, Y., Gustafsson, B., and Shi, L. (2007). The urban–rural income gap and inequality in China. *Review of Income and Wealth*, 53(1), 93-126.

Stockhammer, E. (2017). 'Determinants of the wage share: A panel analysis of advanced and developing economies'. *British Journal of Industrial Relations*, 55: 3-33.

Stolper, W.F. and Samuelson, P.A. (1941). Protection and real wages. *Review of Economic Studies*, 9(1): 58-73.

Sun, L. (2019). The structure and sustainability of China's debt. *Cambridge Journal of Economics*, 43(3), 695-715.

Thompson, P. (2003). Disconnected capitalism: or why employers can't keep their side of the bargain. *Work, Employment and Society*, 17(2): 359–78.

Volscho, T.W. and Kelly, N.J. (2012). The rise of the superrich: Power resources, taxes, financial markets, and the dynamics of the top 1 percent, 1949 to 2008. *American Sociological Review,* 77 (5), 679.

Wan, G. and Zhou, Z. (2005). Income inequality in rural China: Regression-based decomposition using household data. *Review of Development Economics*, 9(1), 107-120.

Wan, G., Lu, M., and Chen, Z. (2007). Globalization and regional income inequality: empirical evidence from within China. *Review of Income and Wealth*, 53(1), 35-59.

Wood, J.D.G. (2017). The effects of the distribution of mortgage credit on the wage share: Varieties of residential capitalism compared. *Comparative European Politics*, 15: 819-47.

Wu, D. and Rao, P. (2017). Urbanization and income inequality in China: An empirical investigation at provincial level. *Social Indicators Research*, 131(1), 189-214.

Xiao, W. (2010). The risks of globalization and China's long-term response, *Academic Monthly*, 42(1):11-66.

Yang, D.T. (1999). Urban-biased policies and rising income inequality in China. *American Economic Review*, 89(2), 306-10.

Yang, D.T. and Zhou, H. (1999). Rural-Urban Disparity and Sectoral Labour Allocation in China. *Journal of Development Studies*, 35(3), 105-33.

Yang, L., Novokmet, F., and Milanovic, B. (2019). From workers to capitalists in less than two generations: A study of Chinese urban elite transformation between 1988 and 2013. *WID.world Working Paper* No. 2019/10.

Zhu, T. and Pearson, M. (2013). Globalization and the role of the state: Reflections on Chinese international and comparative political economy scholarship, *Review of International Political Economy,* 20(6):1215-1243.

Appendix A

Table A1: Descriptive statistics and unit root tests

	Mean	Max.	Min.	Std. Dev.	ADF Levels	ADF 1st Differences	Observations
Bottom 50%	30.00	36.00	24.00	4.97	0.04	0.00	38
Middle 40%	43.00	44.00	42.00	0.45	0.61	0.00	38
Top 10%	27.00	34.00	20.00	5.23	0.98	0.00	38
Growth Rate	9.50	15.14	3.91	2.689	0.40	0.00	41
Government Consumption	13.96	16.63	12.46	0.934	0.73	0.00	41
Terms of Trade	95.76	120.24	79.05	10.618	0.20	0.00	39
Trade Openness	35.72	64.48	9.65	14.726	0.78	0.00	41
Private Debt	113.13	218.31	37.87	47.001	1.00	0.00	41
Unemployment Rate	3.34	4.90	1.80	0.863	0.28	0.00	39
Public Debt	20.16	42.92	0.97	12.421	0.98	0.00	32
Urbanisation	35.9	59.15	17.90	12.76	0.09	N/A	41
KOF Index	47.29	65.11	25.69	14.382	0.72	0.00	40
Agricultural Share	18.14	32.79	7.19	8.460	0.00	N/A	41
Financial Development	0.41	0.65	0.00	0.139	0.06	0.00	38
Nominal Exchange Rate	5.82	8.62	1.50	2.400	0.86	0.00	41

Notes: The dependent variables come from WID, the Financial Development Index and the Public Debt ratio from IMF, the KOF Index from Gygli et al. (2019), and the rest indicators from the World Bank database.

Table A2: Further robustness checks

Dependent Variable:	Bottom 50%			Middle 40%			Top 10%		
	(8)	(9)	(10)	(8)	(9)	(10)	(8)	(9)	(10)
Long-run Coefficients									
Dependent Variable $_{t-1}$	-2.02**	-1.61**	-2.41***	-1.10**	-0.81*	-0.77	-2.12**	-1.83**	-2.59***
Government Consumption $_{t-1}$	-0.56**	-0.68***	-0.47**	0.19	0.11	0.04	0.45*	0.53**	0.29
Terms of Trade $_{t-1}$	-0.23		-0.14	0.45		0. 34	0.08		-0.00
Trade Openness $_{t-1}$	-1.91**	-1.60**	-1.38	-1.31	-1.13	-0.45	1.93**	1.74**	1.45**
Private Debt $_{t-1}$	-0.64	-0.29	-0.25**	0.79	0.39	0.89	0.59	0.40	0.08
Nominal Exchange Rate $_{t-1}$	0.44	0.33		0.14	0.28		-0.45	-0.42	
WTO Dummy			-1.02**			-0.67			1.22***
R^2	0.52	0.52	0.58	0.43	0.43	0.47	0.53	0.51	0.64
BG	0.60	0.60	0.14	0.17	0.17	0.36	0.25	0.49	0.03
Harvey	0.01	0.01	0.19	0.06	0.06	0.30	0.01	0.30	0.07
Observations	35	35	35	35	35	35	35	35	35

Notes: Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively. The dependent variable is the relevant income share in first differences. The coefficients reported are standardised by multiplying the obtained coefficient with the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable. Values for specification tests are p-values. BG (Breusch-Godfrey) test at first lag. Constant terms and short-run (first-differenced) coefficients are included in the estimations, but not reported.

The IIPP Working Paper and Policy Report series

IIPP WP 2017-01 Mission-Oriented innovation policy: Challenges and opportunities. Mariana Mazzucato

IIPP WP 2017-02 Thinking about technology policy: 'Market Failures' versus 'Innovation systems'. Richard R Nelson

IIPP WP 2017-03 Technological capacity in the public sector: the Case of Estonia. Veiko Lember, Rainer Kattel, Piret Tõnurist

IIPP WP 2017-04 Rethinking value in health Innovation: From mystification towards prescriptions. Mariana Mazzucato, Victor Roy

IIPP WP 2017-05 Patient strategic finance: Opportunities for state investment banks in the UK. Mariana Mazzucato, Laurie Macfarlane

IIPP WP 2018-01 State investment banks and patient finance: An international comparison. Laurie Macfarlane, Mariana Mazzucato

IIPP WP 2018-02 Putting austerity to bed: Technical progress, aggregate demand and the supermultiplier. Matteo Deleidi, Mariana Mazzucato

IIPP WP 2018-03 The bit and the rainforest: Towards the evolutionary theory of policy capacity. Erkki Karo, Rainer Kattel

IIPP WP 2018-04 Financing green growth. Semieniuk Gregor, Mariana Mazzucato

IIPP WP 2018-05 Mission-oriented innovation policy and dynamic capabilities in the public sector. Rainer Kattel, Mariana Mazzucato

IIPP WP 2018-06 The economics of change: Policy and appraisal for missions, market shaping and public purpose. Rainer Kattel, Mariana Mazzucato, Josh Ryan-Collins, Simon Sharpe

IIPP WP 2018-07 Movements with missions make markets. Charles Leadbeater

IIPP WP 2018-08 Bringing the helicopter to ground: A historical review of fiscal-monetary coordination to support economic growth in the 20th century. Josh Ryan-Collins, Frank van Lerven

IIPP WP 2018-09 Estonia's digital transformation: Mission mystique and the hiding hand. Rainer Kattel, Ines Mergel

IIPP WP 2018-10 The people's prescription: Re-imagining health innovation to deliver public health. UCL Institute for Innovation and Public Purpose, Stop Aids, Just Treatment, Global Justice Now

IIPP WP 2018-11 Credit where it's due: A historical, theoretical and empirical review of credit guidance policies in the 20th century. Dirk Bezemer, Josh Ryan-Collins, Frank van Lerven and Lu Zhang

IIPP WP 2019-01 Supermultiplier, innovation and the ecosystem: A stock-flow dynamic model. Matteo Deleidi, Riccardo Pariboni, Marco Veronese Passarella

IIPP WP 2019-02 A mission-oriented framework for the Scottish National Investment Bank. Mariana Mazzucato, Laurie Macfarlane

IIPP WP 2019-03 A framework for mission-oriented innovation policy roadmapping for the SDGs. Mariana Mazzucato, Laurie Macfarlane

IIPP WP 2019-04 A Mission-Oriented UK Industrial Strategy. UCL Commission for Mission-Oriented Innovation and Industrial Strategy (MOIIS)

IIPP WP 2019-05 Putting value creation back into 'public value': From market fixing to market shaping. Mariana Mazzucato, Josh Ryan-Collins

IIPP WP 2019-06 The macroeconomic impact of government innovation policies: A quantitative assessment. Matteo Deleidi, Vicenzo De Lipsis, Mariana Mazzucato, Josh Ryan-Collins, Paolo Agnolucci

IIPP WP 2019-07 Financial and legal barriers to the creation and operation of a British national investment bank. Rob Calvert Jump, Natalya Naqvi

IIPP WP 2019-08 Public investment fiscal multipliers: An empirical assessment for European countries. Matteo Deleidi, Francesca Iafrate, Enrico Sergio Levrero

IIPP WP 2019-09 Socialising the risks and rewards of public investments: Economic, policy and legal issues. Andrea Laplane, Mariana Mazzucato

IIPP WP 2019-10 Neither crowding in nor out: Public direct investment mobilising private investment into renewable electricity projects. Matteo Deleidi, Mariana Mazzucato, Gregor Semieniuk

IIPP WP 2019-11 Social structures of accumulation in Greece, 1980-2014. Angeliki Papadopoulou, Giorgos Gouzoulis

IIPP WP 2019-12 Innovation bureaucracies: How agile stability creates the entrepreneurial state. Rainer Kattel, Wolfgang Drechsler, Erkki Karo

IIPP WP 2019-12 Innovation bureaucracies: How agile stability creates the entrepreneurial state. Rainer Kattel, Wolfgang Drechsler, Erkki Karo

IIPP WP 2019-13 Climate-related financial policy in a world of radical uncertainty: Towards a precautionary approach. Hugues Chenet, Josh Ryan-Collins, Frank van Lerven

IIPP WP 2020-01 The public economy: Understanding government as a producer. June Sekera

IIPP WP 2020-02 The entrepreneurial (welfare) state? Tackling social issues through challenge prizes. Ville Takala, Emma Nordbäck and Tuukka Toivonen

IIPP WP 2020-03 Determinants of income shares and the stable middle in post-socialist China. Giorgos Gouzoulis and Collin Constantine

All Working Papers are available to download at the Institute for Innovation and Public Purpose website: ucl.ac.uk/iipp

ucl.ac.uk/iipp

@IIPP_UCL

UCL Institute for Innovation and Public Purpose
Gower Street, London, WC1E 6BT

General enquiries:
iipp-research@ucl.ac.uk
Tel: +44 (0)20 3108 6961