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Caught in the Middle? China and the “Middle Income Trap”

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Summary: In this paper, I look at the concept of a “middle income trap” and its validity for China. I find that the fundamental growth drivers for China are becoming exhausted: capital accumulation has reached unsustainable levels and labor contribution is likely to decrease, among other reasons due to demographic shrinking. Innovation, or the “Solow residual”, is the wild card, and is likely to determine China’s growth path going forward.

JEL Codes: E2, F4, O1, O3, O4, O5

Key words: China, middle income trap, production function, Solow residual.

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1. Introduction

The spectacular economic rise of the Peoples Republic of China (PRC) as an economic powerhouse during the last decades is arguably the most important structural change in the world economy since, at least, the end of the Cold War in the late 1980s. From being a very populous but relatively poor country, the PRC has become the second largest economy in the world after the US. According to the IMF World Economy Ranking (2024), its total GDP has reached 17.8 trillion USD. Germany is a distant third with 4.4 trillion USD. In per capita terms, the PRC has also achieved substantial progress in terms of income per capita, although the gap with the US and other G7 countries is still very substantial.

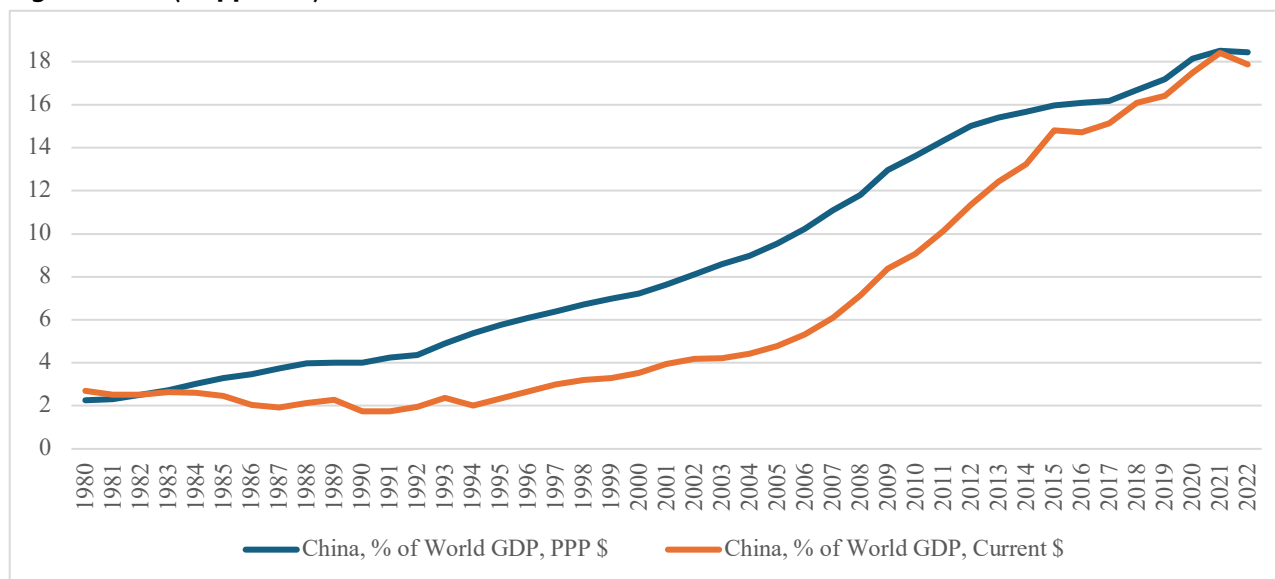
More recently, the growth prospects of the PRC have become subject to an intense discussion. On the one hand, its so-called “middle-income” level in terms of per capita income suggests that the remaining potential to catch-up to advanced economies is still substantial. Moreover, during the last decades, the PRC invested heavily in infrastructure and education, two key factors for economic growth, and has become a major producer and holder of intellectual property rights, with almost 46% of all global patent applications in 2022. On the other hand, the country faces a substantial demographic challenge: its very large real estate sector is in distress, recent trend towards de-globalization is likely to be detrimental for the PRC’s export sector, and the increasingly state-centric and authoritarian policies of its government bring into question some of the very roots of the “China Dream” (Cerdeiro et al, 2023).

In this paper, I assess the validity of the so-called “middle income trap” for China (for earlier studies, see Cai, 2012, Islam, 2017, Zhou & Hu, 2021). It concludes that the future of the PRC is exceptionally uncertain at this stage due to the interlinked trajectories of PRC’s future growth and future (de-)globalization developments and its future domestic political and policy developments. Rather surprisingly, given the obvious importance of this matter, recently there have been very few formal analyses of this subject, a gap that this paper aims to fill by adding both a long-term perspective and the usage of the most recent data available.

2. Back to the Future: China as a global powerhouse

The return of the PRC as a systemically important part of the global economy is by now a well-established fact: with an average real annual GDP growth of 9% since 1980, its economy grew from a paltry 1.7% of the global nominal GDP as recently as 1991 to an estimated 17% of that total in 2023 (a figure that shows a decline from 18.5% in 2021).² The growth acceleration is noticeable, especially from the mid/late 1990s onwards (China became a WTO member in 2001).

²The increased global “real” importance of China is not matched by its “financial” one. While the PRC was responsible for 18% of global exports and 13% of global imports in 2022 (ex-intra EU trade, which is a free-trade area) – both figures are around three

Figure 1: The (stoppable?) rise of China's GDP

Source: IMF.

This growth has sharply decelerated since the highs of the late 2010s, from an average of over 10% *p.a.* between 1990 and 2010 to around 6.5% since. This has led to a reduction of the speed of its sharp trajectory of convergence with the U.S. level of GDP per capita, recently plateauing at around 15% of the U.S. nominal GDP per capita.³ The future trajectory of China's growth will have crucial implications for, first, its own population, and secondly, for the world economy at large.

3. Defining a “Middle-Income Trap”

The concept of middle-income trap has been mainly used to describe countries that suffer from a sharp drop in economic dynamism after a successful transition from low- income to middle-income status, preventing them from moving to a higher income level (Gill & Kharas, 2007).⁴ While most of these slowdowns take place in the transition from low- to middle-income, particularly in countries in Latin America, Africa and East Asia, other works have found that the growth slowdowns can happen at different

times their pre-WTO accession level – China's international financial role is quite limited. Based on SWIFT data, the use of China's currency, the renminbi, is minimal, accounting for 3.7% of all global cross-border payments by September 2023, compared with over 70% for the U.S. dollar and the euro combined. Also, the renminbi accounted for around 2.5% of global *allocated* central bank reserve assets by mid-2023, compared with almost 70% for the U.S. Dollar and the euro (Vinhas de Souza & Reiser, 2024).

³Not a uniquely Chinese phenomenon by any means: the convergence of the EU as an aggregate has stalled at around 55% of the US per capita GDP since the 1970s.

⁴For transparency's sake, one of the authors of the seminal reference in this literature is a former World Bank colleague and co-author of the author of this paper.

stages of development, including in high-income economies (for instance, see Vinhas de Souza & Diaz, 2024, who deal with the case of Portugal).

The definition of middle-income traps rests on two key concepts: the notion of middle income and the economic notion of a “trap”. Additionally, one must address the related but theoretically distinct concept of convergence (which refers to a process of transition towards a presumably unique steady-state equilibrium).

In development economics, “traps” are understood as a persistent and stable state of low growth, typically associated with structural features of an economy that lead to a “bad equilibrium”. Escaping from the “trap” requires a policy shock or structural change (in an EU membership context, EU entry can also be seen as a strategy to exit such a “trap”: Vinhas de Souza & Diaz, *ibid*, and Vinhas de Souza et al., 2018).⁵

The basic mechanism of a “middle-income trap” is that economies reach a stage in which production costs rise well above those of comparable economies, while their skills, infrastructure and innovation capacity remain below those of high-income countries (Gill & Kharas, 2015). In other words, as they approach middle-income levels, economies are unable to carry on developing on the grounds of moving labor from agriculture into export-oriented industries, while asymptotically approaching the “technological frontier” and without expanding it further (this is referred to as the “Lewis turning point”: see Lewis, 1954).

Several studies concur that at the core of these middle-income slowdowns is stagnating productivity growth. Eichengreen, Park, & Shin (2014) examine a large panel of countries and conclude that falling productivity explains over 80 percent of the reduction, and Vinhas de Souza & Diaz, *ibid*, reach a similar conclusion for the prolonged growth slowdown in Portugal.

The basic mechanism is therefore the diminishing marginal returns to factor accumulation. As economies develop and factor deepening takes place, productivity gains are increasingly exhausted (Solow, 1956). Beyond this basic mechanism, sectoral misallocation (for example, in the construction sector) due to distorted incentives, the quality of the business and regulatory environment, and, in particular, institutions may limit the capacity for structural change (Acemoglu, Johnson & Robinson, 2005; Vinhas de Souza & Musacchio, 2024). Therefore, analysis links the “middle-income trap” not only to economics, but to political economy and institutional considerations, requiring better business environment and institutional frameworks. As it turns out, the PRC arguably faces most of the constraints described in this paragraph.

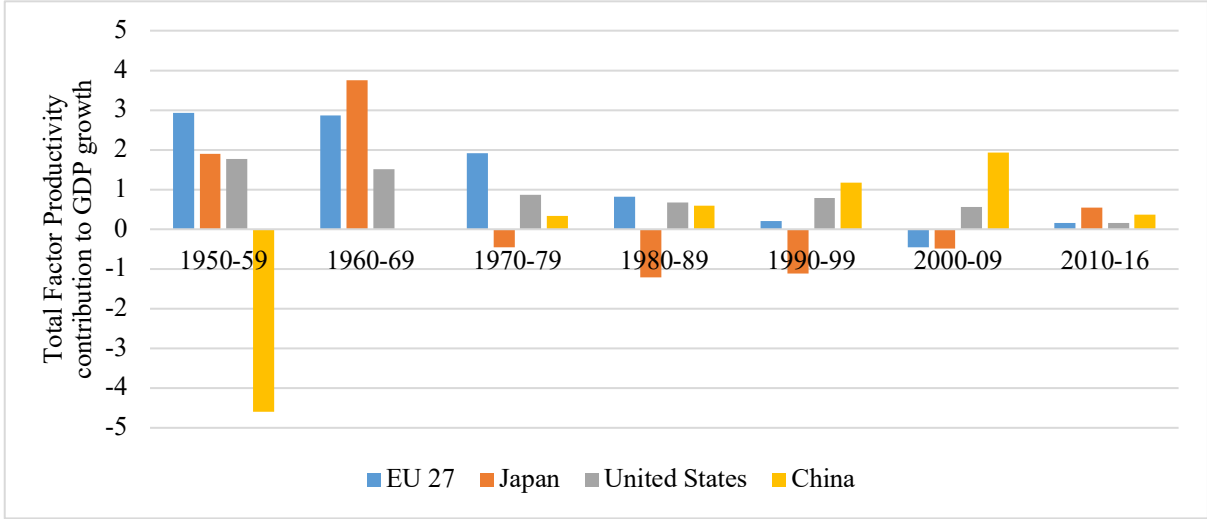
⁵Of course, identifying a middle-income trap also requires a definition of what middle-income is: a commonly used definition is the World Bank division of economies into groups based on per capita gross national income (GNI): see <https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-what-is-the-world-bank-atlas-method>. This “naive” definition bypasses important questions related to the choice of relative versus absolute income, or to setting thresholds to identify the upper and lower bounds of income status, which can affect the conclusions of the studies.

Having said this, what is the actual empirical support for a “middle income trap”? Some works question the existence of a “trap” altogether. For instance, Larson, Loayza & Woolcock (2016), using a sample of 91 countries, find that 41 transitioned to higher income levels during the 1960-2010 period. Of these, 27 were middle-income countries that transitioned from lower middle- to upper middle-income status or from upper middle- to high-income status, with many of the transitions occurring during the 1985-2010 period (albeit their paper finds that countries in Sub-Saharan Africa were notable exceptions to this positive pattern). Im & Rosenblatt (2014), and Bulman, Eden & Nguyen (2014), reach similar conclusions. Additionally, as should be apparent from the previous paragraph, the “trap” literature suffers from a lack of methodological consensus (and a similar lack of consensus on what length of time would constitute a “trap”).

4. Estimating the “trap”: growth accounting for China

Based on the Solow growth model (Solow, *ibid*), growth accounting exercises assess the relative contribution of labor, capital and technology to the economic growth of a country using a so-called Cobb-Douglas production function, given by $Y_t = AK_t^\alpha L_t^{1-\alpha}$, where Y is GDP, and K and L are, respectively, capital and labor stock, and A is total factor productivity (or TFP). Note that since TFP growth is the residual value after the contribution of capital growth has been subtracted from output growth, it is also called the *Solow residual* (since output, capital and labor can be observed, but A cannot, the most basic approach to estimate it is the so-called *residual method*, which assumes that α is equal to the share of capital income in national income).

Figure 2: Total Factor Productivity Growth – Comparison of four large global economies

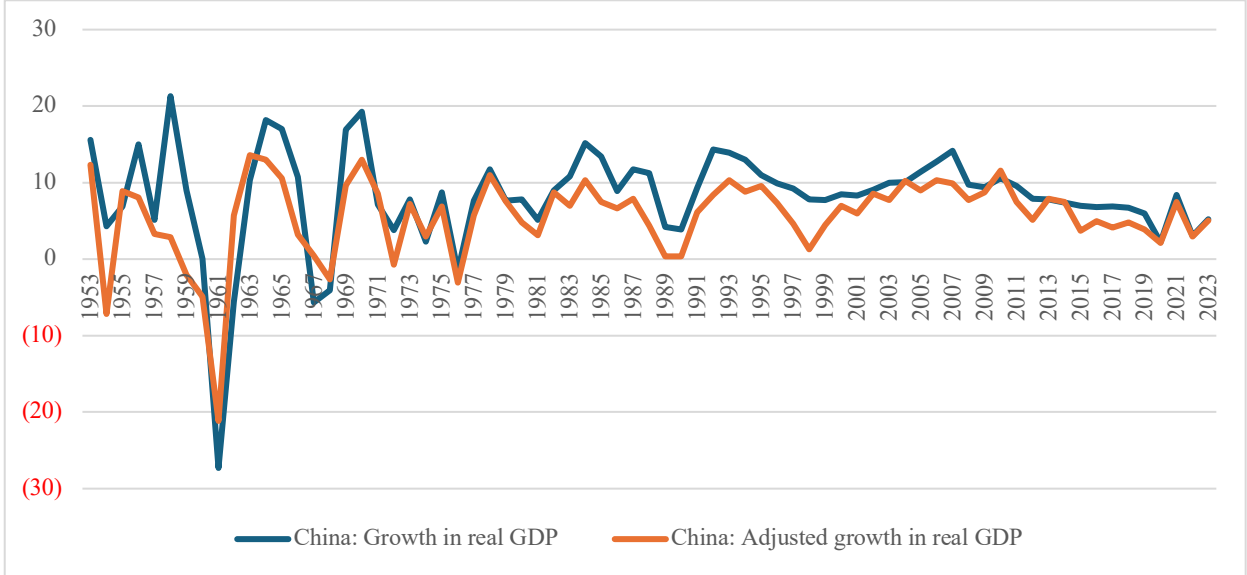


Source: Estimation by the author, based on Conference Board data. Note: The EU27 aggregate represents the EU minus the UK, and with a changing composition depending on EU Member States’ accession, calculated as a weighted average of economic size.

Figure 2 shows that growth of Total Factor Productivity has experienced a cyclical pattern of post-WWII highs that lasted well until the 1960s in the developed economies of the US, EU27 and Japan, followed by divergence afterwards: Japan posted a persistent decrease in TFP, followed by an EU27 deceleration, US TFP growth outpacing that of the EU27 post-1990, but with the EU27 and Japan catching up to the US –to a degree– after 2010 (before the more recent US acceleration).⁶

On the other hand, in Figure 2 China shows a dynamic that seems mostly driven by the catch-up of TFP towards the “technological frontier” represented by the developed economic of the US, EU and Japan. Digging deeper into China’s own long-term growth dynamics (Figure 3), another apparent feature is its volatility, especially in the pre-1990 period: the standard deviation of growth rates pre-2000 is 8, a value that falls by two thirds to 2.7 for the post-2000 sample.

Figure 3: China’s long term real GDP growth rate, 1953-2023



Source: The Conference Board.

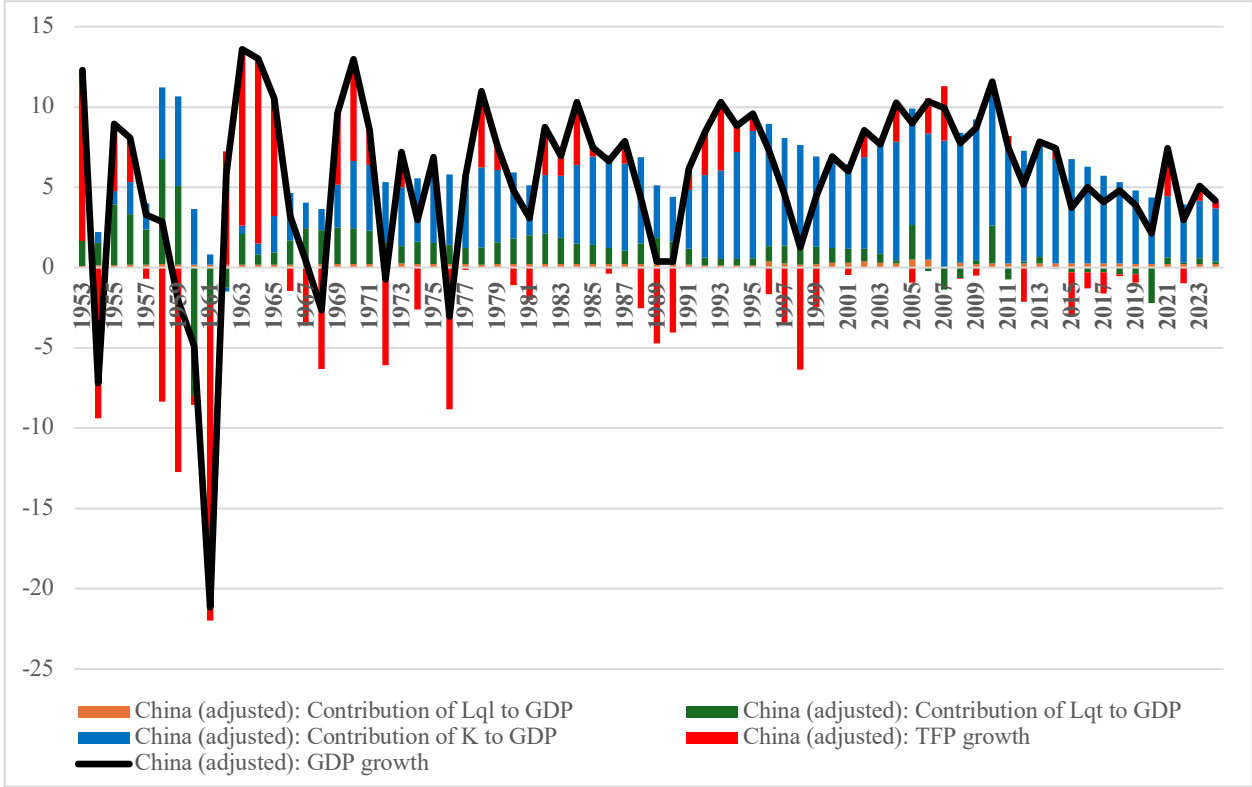
This happens because the PRC was buffeted by a long series of large (mostly) domestic political and policy shocks during the period depicted in Figure 3: from the end of China’s involvement in the Korean War in 1953 to the extreme violence and instability of the “Great Leap Forward”, the forced industrialization and collectivization period from 1958 to 1961, a brief war with India in 1962 (and ongoing border disputes), the political terror, mass purges and killings during the 1966-1976 “Cultural Revolution” (not to mention the PRC’s parallel prolonged shadow involvement in the Vietnam War and its own invasion of Vietnam in 1979), to the massacres and political prosecutions associated with the 1989 Tiananmen Square protests, to a

⁶The post-1990 divergence happened on the back of a much faster deployment of new Information and Communication Technology (ICT), i.e. diffusion of this type of technological innovation in the US.

period of greater stability, to the economic liberalization and international integration policies that lasted from the 1990s until the ongoing progressive reassertion of centralized and authoritarian government policies. It is an economy and society that have become more closed, with confrontational stances towards external partners since Xi Jinping’s rise to power in 2012. This later period is associated with the current growth slowdown.

Another important point of the graph is the frequent concerns about the reliability of Chinese data. Notably, data concerning stocks of capital and labor are necessary to perform the growth accounting exercises using the production function described above. As the available series are simply not consistent with headline GDP figures, an “adjusted” GDP series is produced which is consistent with its underlying components (for a comprehensive description of its’ construction, see Wu, 2014). This adjustment procedure does not significantly affect the volatility of the series (the pre-2000 data is still much more volatile than the one after that year), but it affects levels: not only are the average levels of GDP growth noticeably lower with the adjusted series (5.6% p.a., as opposed to 8.1%), but the difference pre- and post-2000 is noticeable (it hardly exists for the non-adjusted series, while for the adjusted series the average value is almost 2 p.p. *per annum* higher). The adjusted series is the one used in the growth decomposition exercise in Figure 4.

Figure 4: A growth decomposition exercise for China, 1953-2024*



Source: Estimation by the author, based on Conference Board data. *: 2024 values are estimates.

The most striking feature of the data in Figure 4 is the overwhelming importance of capital accumulation for growth: more than 81% of the total growth observed during the period comes from capital deepening, over 20% from labor (quantity, 16%, quality, 4%), while TFP is, on average, negative, at almost -2%. Table 1 breaks this down by decade.

China's overreliance on investment for sustaining growth, with well over 40% of GDP being invested annually – remarkably, this value is still below the PRC's huge savings rate of almost 50% of GDP (Figure 5) - is widely known, and this is demonstrated by the data above: from less than 60% in 1950s, investment was responsible for over 100% of growth in the 2010s

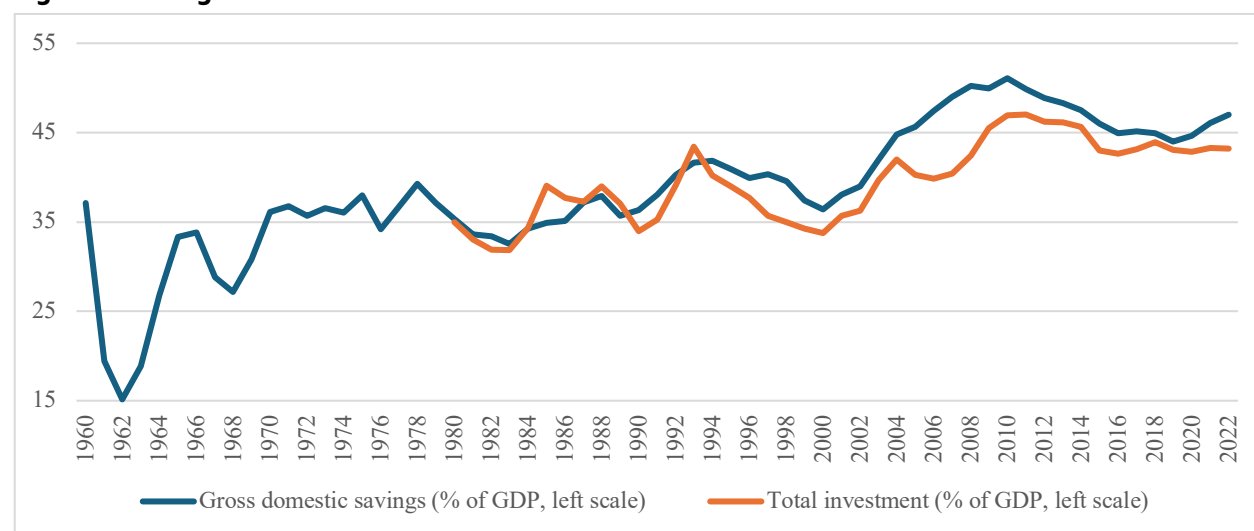
Table 1: Average growth decomposition for China per decade, 1953-2024*

	1953-59	1960-69	1970-79	1980-89	1990-99	2000-09	2010-19	2020-24	1953-24
GDP	3.7	2.7	5.9	6.1	6.1	8.5	6.1	4.4	5.4
LqI	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2
Lqt	3.4	(0.0)	1.4	1.4	0.8	0.3	0.0	(0.3)	0.9
K	2.2	1.6	4.4	4.5	5.8	7.0	6.3	3.7	4.4
TFP	(1.9)	1.0	(0.1)	(0.1)	(0.7)	0.8	(0.5)	0.7	(0.1)
K % of total	57.7	57.6	73.7	74.2	94.4	82.6	103.7	85.0	78.6

Source: Estimation by the author, based on Conference Board data. *: 2024 values are estimates.

As a matter of fact, from the years of the “Global Financial Crisis” (2008-09) onwards, a contribution of investment –including in unproductive activities like housing– to total growth in China above 100% becomes almost commonplace. This is not only unsustainable, but it leads to crises: for example, the Chinese housing bubble has already begun to unwind.

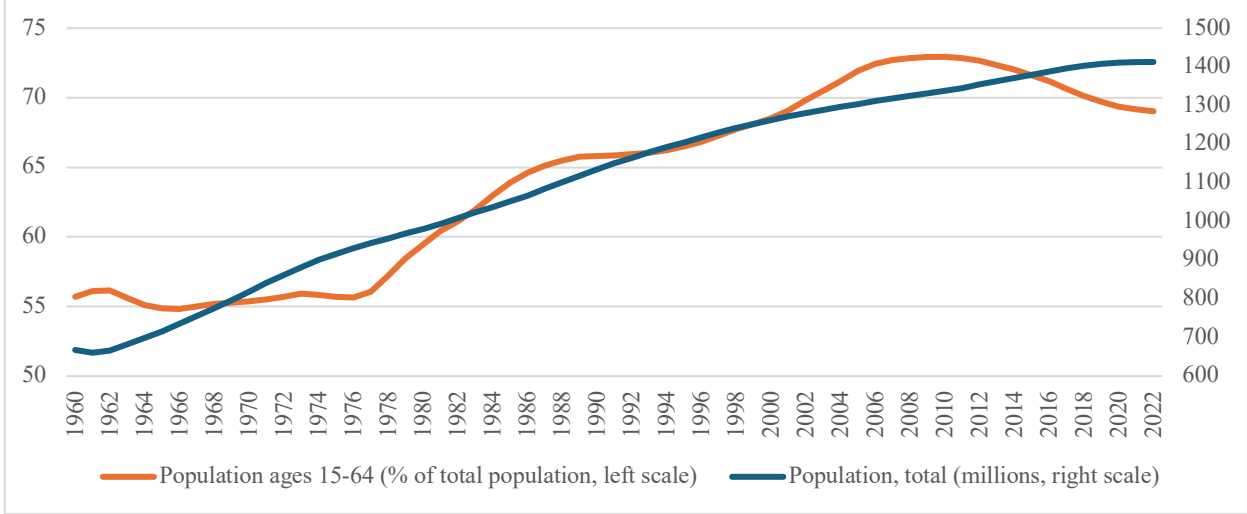
Figure 5: Savings and Investment in China



Source: IMF and World Bank.

China’s ongoing demographic transition (the overall population shrinking in China started in 2022; India is now the most populous country on earth, not China, while its active population peaked already in 2011) also implies that there are limits to the contribution of labor quantity to growth (Figure 6).

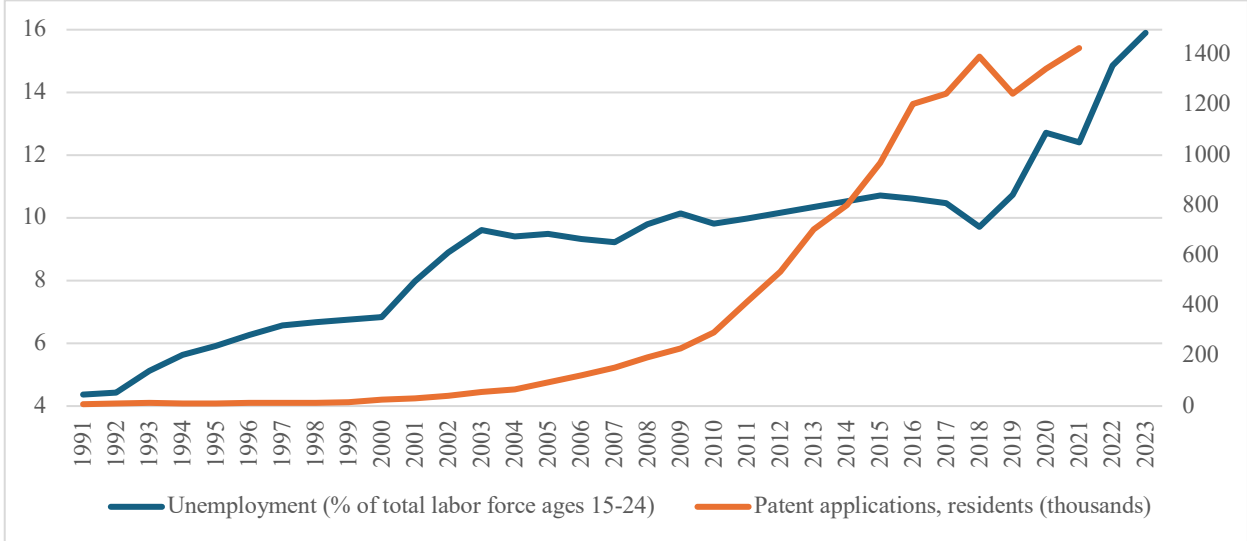
Figure 6: Demographic Transition in China



Source: IMF and World Bank.

At the same time, very high levels of youth unemployment above 16% (Figure 7) –and with graduate youth unemployment estimated at around a 25%– may suggest decreasing returns to the accumulation of labor quality (or at least to the accumulation of certain types of higher education, similarly to what is observed in other economies, including developed ones).

Figure 7: Youth Unemployment and Patents in China



Source: World Bank.

The wild card for growth is therefore TFP (e.g., innovation, in Romer, 1990, formulation). While overall TFP contribution to growth in China has been historically variable and largely disappointing, given increased investment in R&D, manifest in the truly geometric growing number of Chinese patents (Figure 7), one would assume there is a potential to a growth upside from it. This said, a more closed PRC, with R&D investment increasingly directed to security and defense-linked activities may suggest more limited growth effects from innovation in such a setting.

Does all this therefore amount to a “middle income trap”? After all, China’s medium-term forecast suggests growth above 4% p.a., which is a far cry from the above 10% of the 2010s but somewhat above the developing economies aggregate –albeit considerably below that of India, the other emerging giant, which also shows that China’s growth deceleration is not necessarily shared by other developing economies– and in any case still much higher than in developed economies (to say nothing of historical norms).⁷ Thus the answer to the “trap” question rests on the future trajectory of TFP (which is, after all, the very core of the “trap” hypotheses). Luckily, TFP happens to be a variable amenable to policy choices.

Also, regardless of the analytical soundness or empirical relevance of the “middle income trap” concept, it may be useful to focus on and shape policy discussions around the challenges faced by middle-income countries, hopefully leading to more effective policies, given that when factor accumulation growth reaches a decreasing return to scale state, economies must switch to a growth strategy based on innovation and productivity improvement (Larson, Loayza & Woolcock, *ibid*). However, the perspective or fear of being stuck in a “trap” can alternatively lead to a “doubling down” on previous strategies, namely growth based on factor accumulation: China may have indeed fallen into this particular “trap”, as demonstrated by its investment (over)reliance.

4. Conclusion

China had a truly remarkable growth run since it adopted in the 1990s a market and international integration-led development strategy. This paper has contributed to the literature by providing a unique long-term analysis of macro growth determinants in China, using also the most recent data available. It concludes that the natural exhaustion of the previous factor accumulation led strategy, compounded by a

⁷Namely, it is important to stress the historical uniqueness of the experience the global economy has had since the beginning of the industrial revolution in the early 19th century (the neoclassical production function above implicitly assumes that growth is what needs explanation, not “non-growth”). Maddison (2001) estimates that during the millennium between the birth of Christ and the year 1000, while the world population grew by around 17%, per capita income grew by 0% (and actually fell during prolonged periods of time). From the year 1000 to 1820 per capita income increased by about 50 per cent –a compounded rate of 0.0005% *pa*, and population by 400%. However, from 1820 to 2018 per capita income rose by more than 1,300%, and population by more than seven times.

sharp reversal of earlier successful market and international integration policies, led to a growth slowdown, albeit to still relatively high levels.

A development strategy that recognizes the need for a different model, while still prioritizing market mechanisms and international integration as tools to support an innovation-led growth path, would be a promising way to avoid different “traps”. For example, a PRC that has greater domestic financial depth and diversity and is more financially integrated in the world would reduce the level of overinvestment and unproductive bubbles like the one in the real estate sector. The bubble arises from the lack of investment opportunities for Chinese households and the direction of capital flows to innovative activities at the global technological frontier (World Bank, 2013).⁸

The paper also sheds some light on the possible pros and cons of a so-called global “de-risking” strategy. Such de-risking, often used as a synonym for reducing economic interlinkages with the PRC, would on the one hand achieve just that, reducing the risks arising from negative developments in China, like those related to the growth slowdown. On the other hand, it is useful to keep in mind that (positive) real China shocks played an important cushioning role during the GFC, including for the EU (Vinhas de Souza & Martin, *ibid*). In this sense, de-risking may be counterproductive, given that it reduces geographic risk-diversification. Moreover, de-risking in and of itself is likely to reduce global trade, investment and growth.

As for the implications for other developing countries, or their subgroups, like the so-called BRICS⁹ (a disparate group of economies with somewhat limited common interlinkages beyond those with the PRC), reduction in Chinese growth could naturally curtail their global relevance, but only as long as it is not replaced by other emerging economies, and notably that of India. Conversely, a sustainable enhanced Indian performance, if anything, would actually make the BRICS and the developing countries in general less of a one-sided bet dependent largely on China’s performance, and therefore make diversifying away from China a more natural and advantageous strategy. This is a very important subject for future research.

⁸This author was one of the co-authors of the financial integration section of this paper, which is conceptually linked to the so-called “Washington Consensus” literature, a set of combined policies of structural reform and global integration seen as having welfare-improving effects. Unusually for World Bank analytical papers, this was also a work co-written in uniquely close cooperation with (earlier) Chinese Governments.

⁹The BRICS are an intergovernmental organization comprising Brazil, Russia, India, China and South Africa (the acronym is made up of the initials of those countries), which, as of 2024, also includes Iran, Egypt, Ethiopia, and the United Arab Emirates.

References

Acemoglu, D., Johnson, S. and Robinson, J., (2005), “Institutions as a Fundamental Cause of Long-Run Growth”, in *Handbook of Economic Growth*, Amsterdam, pp. 384-473.

Bulman, D., Eden, M. and Nguyen, H., (2014), “Transitioning from Low-Income Growth to High Income Growth: Is There a Middle Income Trap?”, Policy Research Working Paper No. 7104. World Bank, Washington DC.

Cerdeiro, D., Estefania-Flores, J., Kamali, P., Kothari, S., Muir, D., Redl, C. and Xin, W., (2023), “How Will Trend Growth in China Impact the Rest of Asia?”, in *Regional Economic Outlook for Asia and the Pacific*, pp. 24:33, IMF.

Cai, F. (2012), “Is There a ‘Middle-income Trap’? Theories, Experiences and Relevance to China”, *China & World Economy*, 20(1), 49–61.

Zhou, S. and Hu, A. (2021), “China: Surpassing the “Middle Income Trap”, Palgrave Macmillan, UK.

Eichengreen, B., Park, D. and Shin, K. (2014), “Growth Slowdowns Redux”, *Japan and the World Economy* 32: 65-84.

Gill, I. and Kharas, H., (2007), “An East Asian Renaissance: Ideas for Economic Growth”, World Bank, Washington DC.

Gill, I. and Kharas, H., (2015), “Middle-Income Trap Turns Ten”, World Bank Policy Research Working Papers.

Im, F. and Rosenblatt, D., (2014) “Middle-Income Traps: A Conceptual and Empirical Survey”, Policy Research Working Paper No. 6594, World Bank, Washington DC.

Islam, S., (2017), “Will Inequality Lead China to the Middle Income Trap?”, DESA Working Paper No. 142.

Larson, G., Loayza, N. and Woolcock, M., (2016), “The Middle-Income Trap: Myth or Reality?”, World Bank Research and Policy Briefs No. 104230.

Lewis, A., (1954), “Economic Development with Unlimited Supplies of Labor”, *The Manchester School*, 22(2), 139–191.

Maddison, A., (2001), “The World Economy: A Millennial Perspective”, OECD.

Romer, P. (1990), “Endogenous Technological Change.” *Journal of Political Economy* 98: S71-S102.

Solow, R., (1956), “A Contribution to the Theory of Economic Growth”, *Quarterly Journal of Economics*, 70(1): 65-94.

Vinhas de Souza, L. and Diaz, D., (2024), “Crescimento e Convergência em Portugal: Experiência Histórica e Políticas a Nível Nacional e Metropolitano”, Position Paper n. 5/24, SEDES, Lisbon, Portugal.

Vinhas de Souza, L. and Musacchio, A. (2024), “A Noite dos Mortos-Vivos: O Retorno de Políticas Industriais”, in *Conjuntura Econômica*, 78(3):22-27, FGV/IBRE.

Vinhas de Souza, L. and Martin, R. (2024), “Geeconomic Diversification and Changes in Shock Transmission: the rise of China”, *forthcoming*, summer 2024.

Vinhas de Souza, L, Dreute, O., Isaila, V. and Frie, J-M. (2018), “Reviving convergence: making EU member states fit for joining the euro area”, in E. Nowotny, D. Ritzberger-Grünwald and H. Schuberth (eds), *Structural Reforms for Growth and Cohesion: Lessons and Challenges for CESEE Countries and a Modern Europe*, Edward Elgar.

World Bank, (2013) “China 2030. Building a Modern, Harmonious, and Creative High-Income Society”, World Bank, Washington DC and Development Research Center of the State Council, The People’s Republic of China.

Wu, H. (2014), “China’s Growth and Productivity Performance Debate Revisited – Accounting for China’s Sources of Growth with a New Data Set”, *The Conference Board Working Paper Series*.