China's Steroids Model of Growth
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This year marks the 40th anniversary of China's momentous opening up and reform program, launched by Deng Xiaoping in 1978. Over the course of forty years, China has transformed itself from a once economic backwater into the world economy's most connected component. GDP per capita rose by 51-fold, almost a billion people have been lifted out of poverty, and China is fast rising to be the world's leader in cutting-edge technology.

On the eve of the fifth decade into China's economic reforms, it is an opportune moment to reflect upon the successes and failings of China's development path. What is distinctive and different about China's path to prosperity is that it has been accompanied by significant State involvement. State interventions and industrial policies have been the norm rather than the exception. On the surface, ``mobilization economics'' seemed to have produced stellar results: in all but a few decades, China became the world's largest exporter and a manufacturing powerhouse.

But observing the Chinese economy today, it is not without serious macroeconomic challenges: China's debt to GDP ratio is one of the highest in the world, its growth rate has significantly slowed down, total factor productivity growth has fallen to nil in the last decade, and financial risk is mounting. Some of these problems have manifested themselves in the global arena: large trade surpluses, interventions in the exchange rates and excess capacity in steel, gas, and mining. These have given pretexts for trade frictions, currency wars, and a general excuse for politicians to cast aspersions on China. It has come to be accepted that China has displaced workers in industrial countries and induced greater inequality. Whether this reflects unfair practices or simply China's success continues to be a subject of intense debate.

Historical experience has seen a number of instances of big industrial pushes, such as those in the Soviet Union as well as in Singapore, Japan, and Korea. The industrialized world is also not unfamiliar with strong State involvements and active government policies when things needed to be done. Indeed, they did not leave it to the devices of the market to bring about rapid production.

Few would deny that the Chinese government has also been instrumental in driving rapid growth in the period of 1978-2008. Is there something to take away from the Chinese experience for developing countries? Is the growth model one of emulation? In this chapter, I argue that there could be long-term ramifications of industrial policies if they linger around for too long. Like 'steroids', they feel good in the short run, but almost always toxic in the long run. The drawback of such a model is that it puts off the need to unleash an economy's productivity, and over time, to more artificial boosters are needed to keep the cycle going. Moreover, the consequences are not

only confined to domestic issues but can have spillovers that would affect the global economy at large.

Until the last decade, China's industrial push helped accelerate aggregate productivity growth. A large volume of resources flowed from low productivity agriculture sectors to high productivity manufacturing sectors (Brandt, Hsieh, and Zhu 2007). The rapid mobilization of resources including the vast and speedy construction of infrastructure helped the Chinese economy take advantage of scale economies. Explicit and implicit subsidies for the export sector further helped the Chinese economy take off. If domestic demand was too weak, China could produce for the world.

Still, the subsidies needed to come from somewhere. At surface level, the State was behind the big push. But ultimately the resources came from Chinese households. A financial system dominated by State banks controlled most of household saving, and the cap on the deposit rate kept the cost of capital at bay. With a large amount of resources at hand, the State directed its lending to strategic industries and firms, in addition to offering a variety of preferential treatments. But over time, continued State allocation of resources became less and less efficient, exacerbating the misallocation of resources and reducing productivity growth. Under soft budget constraints, the State was able to continue supporting ailing firms, a practice that led to both excess capacity as well as the rise of zombie firms in many sectors. To keep the economy going and to maintain a steady pace of growth, further distortive policies must be put in place. The cycle propels and perpetuates itself.

Thus, despite common perception, the economic challenges in the Chinese economy today are not disparate issues. They are interlinked and interrelated---driven by common roots. The phenomena of slow growth, rising debt, excess capacity, not to mention environmental depredation, are arguably driven to some extent by industrial policies that have lingered for too long. For a long period of time, the State mentality was that industrialization was tantamount to modernization. The wildly optimistic dream of Mao to surpass the United States and the United Kingdom through increasing steel production occasioned the practice of people voluntarily melting kitchen pots and scrapping metal in their backyards.

There is little disagreement that industrial policies carry with them some benefits. Knowledge externality, agglomeration effects, and increasing returns, for instance, can warrant some degree of State intervention in the beginning. The difficulty is weaning the economy off drugs before they become the economy's lifeline.

A main contribution of this chapter is to use China's experience as a case study to examine the potential long-term consequences of industrial policies. It first provides a broad overview of the type of industrial policies introduced starting from the 1990s. It then illustrates how they have come to cause a diverse set of macroeconomic malaises from which the Chinese economy suffers today. Finally, the chapter closes with a discussion of two sets of thorny policy issues regarding the sustainability of the Chinese development model. One is the cost, the timing, and the controversy over how to phase out the distortionary State interventions, which the chapter documents. The first set of issues are relevant for a number of countries. The second pertains to the international

spillovers that this model brings about. Particularly relevant is the case of China because the success of an export-led model pursued by a country that carries significant global weight will invariably generate large imbalances in the international trading system. I conclude that a successful phasing out of these distortions can benefit not only global economic stability, but also mitigate its own domestic risks and challenges to sustainability.

Economy-wide Industrial Policies

Industrial policies that are targeted toward certain sectors and firms are distinct from those of a more general nature. Those adopted at the economy-wide level in China include 1) suppression of wages; 2) financial repression; 3) subsidized credit for particular firms or sectors; 4) devaluation of the real exchange rate. Many of these policies were widely adopted by other developing countries. Rodrik (2008) provides a systematic study of the effects. Itskhoki and Moll (2018) collate much of the evidence on such policies practiced in Japan, Korea, Taiwan, Malaysia, Singapore, Thailand, and China.

Wage Suppression

Wage suppression can occur when workers have weak bargaining power, when there are bans or restrictions on unions and other forms of organized labor, or when there are explicit upper bounds on nominal and/or real wage growth. There is evidence that many of these patterns featured prominently in East Asian economies. In the case of China, one piece of evidence reflecting wage suppression is that manufacturing wages have lagged behind manufacturing labor productivity, leading to a continuous decline in labor costs.1 Another notable trend is the rapid decline in the wage share--- from 67 percent of GNP in the mid 1980s to 56 percent by 2007. Over this period, net exports as a share of GDP rose by about 10 percentage points.

In a study of the structure of wages in China, Ge and Yang (2014) note that wage growth depends on the wage growth of basic labor and the wage premium in the state sector. Prior to 1994, minimum wage laws didn't even exist.2 It was not until 2004, when the government raised concerns over disadvantaged workers, that new laws were promulgated to raise minimum wages every two years. Many local governments were still able to bypass these rules.3 In addition, there has been extensive suppression of labor rights (Scott, 2008).

Financial Repression and General Subsidization of Credit

[1] See also Du and Qu (2009), who shows that labor productivity outstripped wage growth.
[2] Fang and Lin (2013) document the background and the history of minimum wage regulations in China.
[3] According to Melnicoe (2017), only six provinces raised minimum wages in 2017.

Between 1990 and 2015, the real rates of return on Chinese demand deposits, one-year deposits, and five-year deposits were -3.2 percent, 1.1 percent, and 1.6 percent, respectively.4 The majority of Chinese household savings are held in the form of bank deposits. In contrast, the real rate of return on capital reached an average of 22 percent between 1990 and 2014.5 The significant gap between the return on household wealth and the rate of return in the economy at large is one of the hallmarks of the Chinese financial landscape.

The types of financial repression policies implemented in China include interest-rate controls on bank deposits, controls and regulations on credit allocation, barriers to financial-sector entry, state ownership in the banking sector, and capital account restrictions (see Johansson 2012 and Lardy 2008). The People's Bank of China controls deposit and lending rates, although the latter was recently liberalized. As inflation rose in recent decades, the degree of financial repression naturally intensified. Lardy (2008) estimates that financial repression imposed an implicit tax on households, amounting to $36 billion in 2008, or 4.1 percent of GDP. Corporates are major beneficiaries, as they have enjoyed a low cost of capital owing to cheap deposits. Between 2002 and 2008, the interest rate on one-year loans was a full 8.1 percent lower in real terms than in 2002.

Still, the greatest beneficiary of financial repression has been the government. Importantly, by keeping domestic interest rates (and hence the opportunity cost of money) low, financial repression has lowered the cost of the government's sterilized intervention, deployed extensively to maintain a depreciated, and hence more competitive, exchange rate. As official foreign exchange rate reserves rose steeply in the last few years, the cost of sterilization in order to maintain price stability (and thereby help slow *real* currency appreciation) also increased. By holding down interest rates to reduce the costs of the necessary domestic bond issuance, the government was able to avoid having to appreciate the RMB to counter the pressure of the external current account surplus.

In sum, through financial repression, households were in part subsidizing corporate borrowing and in part subsidizing an undervalued real exchange rate. According to calculations in Lardy (2008), the government captured more than half of the implicit net tax imposed on households through financial repression.

Observing the share of Chinese households' disposable income in national income, one can note a striking result: a prolonged decline from the 1990s to just before the Great Recession in 2008. Whereas household income shares tend to be fairly stable at a higher level in other economies, particularly in advanced economies, that share fell from nearly 70 percent of GDP to below 60 percent (see Figure 1). It is also worth noting that household income categories of all types declines (as a share of GDP) --including investment income and government transfers (Aziz and Cui 2007).

[4] Data come from CEIC and NBS.
[5] Updated calculations based on Bai, Hsieh, and Qian (2004).

Source: CEIC

Targeted Subsidies

The other type of industrial policy comprises those that specifically aim at propping up certain industries and certain firms. These can be tax subsidies, preferential loans, land subsidies, government grants, favorable input prices, or asset transfers to favored firms at prices that are below market value. Since the 1990s, the Chinese government has tried to steer the industrial structure in favour of "heavyweight" industries, such as machinery, automobiles, iron, and steel.

To take one example, the steel industry received about U.S. $27.11 billion worth of energy subsidies between 2000 and 2007.[6] Directly measurable subsidies to China's paper industry reached at least $33.1 billion between 2002 and 2009. In 2009, China overtook the United States to become the biggest car market in the world. This achievement is due in no small part from the large subsidies given to the auto-parts industry---where discernible subsidies between 2001 and 2011 reached at least $27.5 billion. The Chinese government has committed an additional $10.5 billion in subsidies for 2012-2020.

Similarly, there is a wide range of policies that favor exporting firms. Firms exporting the majority of their production enjoy various preferential policies, such as fiscal advantages, softer loans, and priority access to infrastructure and land. These "pure exporter subsidies" resulted in more than a third of manufacturing firms selling 90 percent or more output abroad between 2000 and 2006 (compared with only 0.7 percent in the United States and 1.9 percent in France doing the same).[7]

Unintended Macroeconomic Consequences

[6] Energy subsidies for thermal coal, coking coal, electricity, pulp, and recycled paper over this period reached about $3.05 billion, $12.65 million, $777.78 million, $25 billion, and $1.69 billion, respectively. These figures are taken from Haley and Haley (2013), which conducts an in-depth study of subsidies in Chinese industrial sectors.

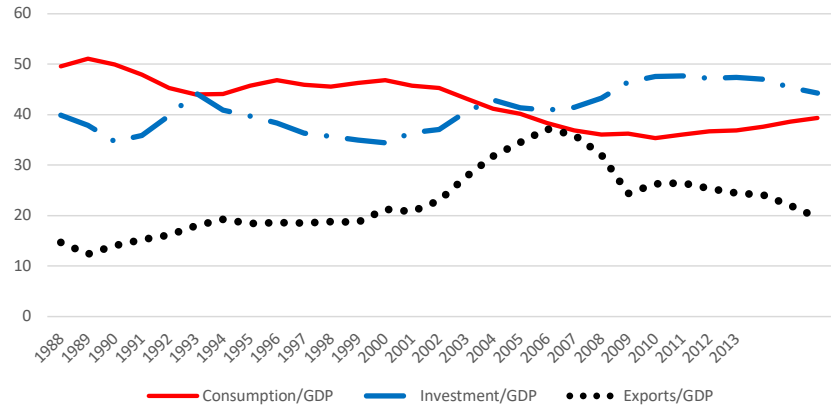
[7] See Defever and Riaño (2014).

How can development policies of the type described above fit with the trends observed in China in the last few decades? And how does a vicious cycle of misallocation propel itself?

China has seen an unusually low consumption to GDP ratio. Right before the Great Recession in 2008, the consumption share of GDP was only 35 percent, having declined by 10 percentage points since the 1990s. The low consumption share contrasts not only with the much higher share observed in advanced countries such as the United States (71 percent), but also with other high-saving Asian economies such as Japan (55 percent) and Korea (53 percent), as well as with the similarly poorer and large economy of India (57 percent). The flip side was a dramatic increase in the aggregate saving rate. Though all components of national saving—corporate and government --- helped, households saving contributed the most, as it rose from 15 percent of household income in 1990 to 30 percent by 2008.

High household saving (or weak household consumption) can result from a falling share of household income in GDP, and/or an actual rise in the household saving rate. Figure 1 shows that the household income share has declined precipitously in the last few decades, by about 10 percentage points. Thus, by holding down household income via the dual strategy of financial repression and wage suppression, China's industrial policies have given rise to overall weaker consumption dynamics.

Figure 2: China: GDP Composition



Source : WDI

A key aspect of financial repression is that a substantial share of household saving falls under the control of the government. By controlling these resources, the government is afforded substantial leeway in funnelling lending toward favoured sectors and well-connected firms.

Where does this lending go? A substantial portion of the loans was apportioned to industrial goods and manufacturing, as well as to infrastructure. [8] Lending also flowed into large and usually

[8] Prior to 2009, bank loans to finance investment in the heavy-industry sectors accounted for 7.1 percent of GDP, compared with 1.3 percent for the light sectors (e.g., education, health care, and scientific research). Even

inefficient state-owned enterprises (SOEs) rather than productive, private firms.[9] Worthy of note is that the divergence in the productivity levels of state and non-state firms over the course of this period was momentous. In 1978, the TFP levels of state and non-state firms in manufacturing industries were about the same; but by 2004, private firms' TFP level was 80 percent higher (Brandt et al. 2007, 2015). The upshot is that severe credit misallocation crowds out resources for private firms, and that, in turn, lowers aggregate returns and productivity.[10] In fact, both the average rate of return to capital and TFP growth have fallen sharply in recent decades (Figure 3 and 4).

In addition, various forms of "soft budget constraints" for SOEs further worsen the misallocation problem and reduce credit efficiency. State banks keep afloat many ailing SOES and unprofitable projects that have already suffered enormous capital losses – Allen, Qian, Zhang, and Zhao (2012) and Walter and Howie (2012). Part of the reason is that creditors expect the SOEs to be bailed out regardless of their financial status, and thus, are willing to continue extending them credit at costs substantially lower than what private firms with similar or better prospects can obtain. The incentive of these privileged firms is therefore to build up financial leverage. Another motivation behind soft budget constraintis that once sunk costs have been incurred, there is a familiar temptation to "evergreen" and pour in even more resources in the hope of turning around unprofitable and untenable projects.

It is thus not difficult to understand how the process of financial extraction determining the supply side of financial resource allocation, coupled with soft budget constraints that feed the demand side of financial resource allocation, can jointly increase distortions; and how such distortions reduce investment efficiency in China. The lower the return to capital (and those returns have indeed come down substantially in recent years – see Figure 3), the more the government needs to continue to pump money into the system. The economy's momentum is effectively sustained on steroids.

Figure 3. China: The Aggregate Return to Capital

Commented [OM1]: You could also cite the later update paper by Brandt from the November 2015 SF Fed Asia-Pacific policy conference. They have published a conference volume.

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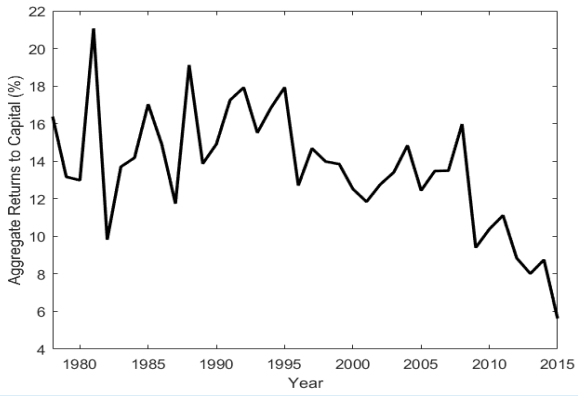
Also relevant is the 2016 BPEA paper by Hsieh and co-authors.

more important is the asymmetry of credit allocation in the immediate stimulus response to the Global Financial Crisis: the increase in heavy loans as a percent of GDP (from 7.1 percent in 2008Q4 to 9.4 percent in 2009Q4) was three times as large as that of light loans (from 1.3 percent to 2.1 percent over the same period). A majority of the increase in heavy loans was channelled into real estate, as the ratio of real estate loans to GDP rose to 4.2 percent during 2009-2010, which was close to half of the ratio of total heavy loans to GDP.

[9] Allen, Qian, Qian (2005) show that most private businesses have been excluded from the formal credit channels, and that private investment was primarily financed by firms' own savings. Anzoategui, Chivakul, and Maliszewski (2015) also document that a number of firms enjoy privileged access to credit when creditors presume that they are implicitly supported by the government. There is evidence that SOEs have enjoyed better access to finance than their private counterparts, even after controlling for industry and individual firm characteristics. Bai, Lu, and Tian (2016) provide evidence that relatively smaller firms have lower leverage, face higher interest rates, and operate with higher marginal products of capital

[10] In addition, Huang et al. (2016) provide evidence of "local crowding-out." When local debt as a share of GDP quadrupled between 2006 and 2013, banks curtailed funding to private domestic firms in order to underwrite the debt issued by the local governments. This effectively forced a reduction in private investment.



Source: NBS

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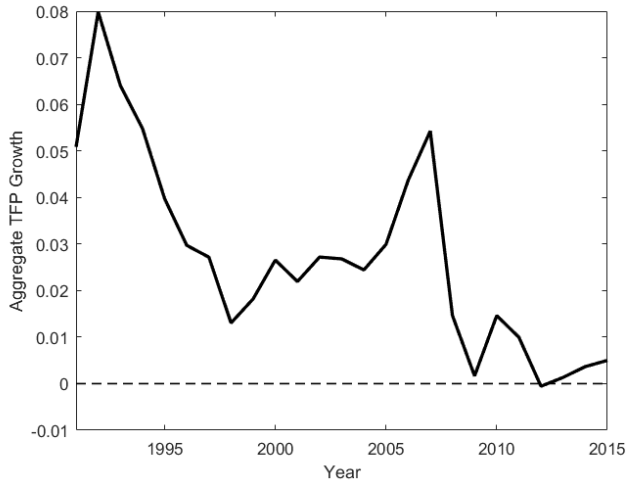
It is thus also easy to grasp how the rise of zombie companies and the problem of overcapacity can come about. Caliendo, Parro, and Tsyvinski (2016) show that the sectors in which the distortions described above have increased the most are exactly the ones that suffer from excess capacity. Among zombie firms—firms that stay in operation because of subsidies in the form of continual bank loans and/or in the form of overpriced projects bankrolled by the state--the highest proportion in 2007 appeared in the industrial and manufacturing sectors (See Tan, Huang, and Woo 2016).[11] Thus, industrial policies both at the macro and micro levels have contributed in no small part to today's low productivity and to the malaises of many industrial and state-owned firms.

Identifying the deeper roots underneath such a range of interrelated economic and financial developments goes far beyond mere theoretical interest. This identification ultimately shapes policy design and response. For example, what could the Chinese government choose to do to deal with zombie companies? It could continue to roll over the debt of insolvent borrowers— evergreening as practiced in Japan in the 1990s—or give these companies preferential treatment, such as awarding them large-scale projects, disbursing long-term loans, or lowering the interest rates they pay.[12] However, by tackling directly the *symptoms*, rather than addressing underlying deeper distortions, the problems can be exacerbated. Importantly, one must see these issues not as wholly separate events driven by independent causes, but as parts of a systemic whole.

Figure 4. China: TFP growth

[11] For example, 15 percent of firms in water, gas, petroleum, chemical fibers, and mining sectors qualified as zombie firms.

[12] See Tan et al. (2016) for examples. They use firm-level data for the period of 2004-2007 to show that government investment tended to favor zombie companies, and that the performance of non-zombie firms was, in turn, inhibited.



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A Vicious Cycle: How to Escape?

The unified framework proposed in this chapter to explain China's economic challenges highlights the potential long-term consequences of industrial policies that stick around for too long. Clearly, the above discussion puts at center stage one particular privilege of the Chinese government—the unparalleled ability of the State to steer the financial system to serve intended policies. Whether it is the ability to extract resources, control interest rates, or direct lending, the Chinese government's power is unparalleled. This is precisely why these industrial policies have been deeper, longer, and had more far-reaching effects than in other nations. The flip side is that the policies' damage can be more dramatic.

The "blessing" of central control of the economy's commanding heights turns into a curse when the economy is cast into a vicious economic circle: lackluster consumption coming from a suppressed household sector means that the government needs to rely on investment to keep up the pace of growth. Over time, the return on projects falls and productivity slows down. Compelled by the need to deliver growth, the government has to devise ever more distortionary policies ---as recently manifested by the continuous injection of liquidity into the economy, the temptation to inflate the housing sector, and to foster activities through shadow banking.[13] Not surprisingly, debt levels and M2/GDP ratios in China are among the highest in the world today.

[13] Shadow banking usually refers to credit intermediation that happens in an environment where prudential regulatory standards are applied to a significantly lpwer degree than for regular banks engaged in similar activities. In China, the size of wealth management products (best understood as an asset-backed term deposit and a narrow measure of the size of shadow banking activities) grew from about 1 to 2 percent of GDP in 2006 and 2007 to 25 percent by 2014. A broader measure of shadow banking is the growth in trust and entrusted loans. These products grew from 5 percent of GDP in 2007 to 25 percent of GDP in 2014.

Of course, one must acknowledge that a strong State capable of encouraging savings even if it doesn't always allocate them productively is still better than one that discourages savings accumulation. One can imagine a far worse scenario of an economy wherein resources are diverted for conspicuous consumption of the elites, typically leaked out as luxury goods are imported from abroad; and where insufficient domestic saving hinders domestic investment and increases reliance on less stable varieties of foreign capital inflows. This scenario -- typical of many lower-income countries – can undermine growth and increase financial instability.

That said, in the case of China, a natural question arises: how does one break out of the vicious circle? How does one get off steroids before toxicity wreaks havoc, perhaps with permanent damage? And how does one come off artificial performance enhancers in a way that avoids huge disruptions and pain? Perhaps the reason why the Chinese government has found it so difficult to "rebalance" the economy—with recent efforts making some problems arguably worse[14]-- is that its interpretation of the root causes of the imbalances is somewhat misconceived. Is the imbalance in the economy really one of under-consumption and over-investment? Or is the imbalance merely a manifested symptom of some deeper distortions that reflect an imbalance between households and governments, the private sector and the State?

Of course, weeding out the distortions is the most direct way to steer the country toward a more efficient, innovation-driven, service-oriented economy. But removing distortions or unwinding habitual policies may be difficult, either because that task most likely requires a short-term slowdown in growth that is inadmissible for the government, or because various interest groups may block certain reforms that would harm their interests.

Under these circumstances, there is a case to be made for raising household consumption. The reason is that higher household consumption can naturally push the economy toward a more efficient equilibrium. First, raising household consumption means a reduction in the financial resources that can be extracted by the government. Second, rising consumption means greater demand for private firms' goods and services. Thus, higher consumption can drive resources toward the more productive private firms—particularly when the financial system cannot do the job. The recent rapid rise in productivity growth in the service sectors and the emergence of some of the most technologically advanced and innovative companies--- fuelled by consumption growth---is testimony to its importance above and beyond its direct impact on growth.

Of course, another advantage of higher consumption is that it would likely raise imports, especially from advanced economies, thereby helping to diffuse current trade tensions. Allowing higher household consumption would benefit consumers most if accompanied by import liberalization that expanded the array of products available to buy.

One may then wonder whether policy changes can actually stimulate consumption in a meaningful way. Recent evidence suggests that they can, and that China's high saving rate is not just a reflection of immutable consumption habits or culture. The high saving rate is likely a consequence of financial system's inadequacies and inefficiencies, the enforcement of the one-child policy (Chouckmhane, Coeurdacier, and Jin 2017), and the rise in housing prices.

[14] Since the RMB 4 trillion stimulus package implemented in 2009, the allocation of resources has deteriorated and productivity growth has slowed down even further (see Song and Xiong 2017).

All of these developments are linked to policy. One obvious policy innovation would be to raise transfers to households, reducing the imbalance between households, corporates, and the government. These policies, however, may be politically infeasible. Another way, ironically, is to prop up housing prices and make people feel richer (the wealth effect). Higher house prices raise issues of financial stability, however.

Perhaps a more plausible action for the Chinese government to undertake in the current juncture is to roll back household credit constraints. Chinese households are severely credit-constrained, compared to either their East Asian or American counterparts.[15] By allowing the young in particular to borrow—whether it is to buy large durables, invest in education, or purchase housing--will boost consumption and reduce saving. The recent emergence of large numbers of peer-to-peer lending platforms and the race by banks to rapidly expand their credit card business in the face of rising competition both point to the implicit, unmet demand for household borrowing. In support of this idea, Coeurdacier, Guibaud and Jin (2015) use micro data to show that tight household credit constraints are an important factor behind the high household saving rate in China.

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China's case demonstrates the fact that a large economy in pursuit of its own domestic industrial policies can have large spillovers onto the global economy. While it is true that Chinese manufacturing production has displaced some workers in the advanced economies (Autor, Dorn, and Hansen 2013), it is also true that Chinese consumers have been subsidizing American and European consumers with cheap exports, somewhat to the Chinese' own detriment. The model has also created large external imbalances, though they have started to come down in the last decade; but trade frictions and international tensions are only rising, particularly when the global economic growth is still tepid. In the past forty years we have seen an influx of toys, furniture and apparel onto European and American shores. The same might be true for electric cars in the next ten years. This would only work if on top of demanding Chinese goods, Chinese consumers are increasing their imports from abroad.

The remarkable achievements of the Chinese growth story may have come at a cost—one only beginning to be exposed over time. While there is little dispute that industrial policies may deliver desirable benefits, how these industrial policies are enacted and when to phase them out are topics that deserve more serious contemplation. Indeed, the question of whether the Chinese growth model is a successful one that is worthy of emulation by other developing countries remains open. Maybe this question will only be put to rest when and if China successfully manages a structural transition. A "miracle" has yet to be established.

[15] See Coeurdacier, Guibaud and Jin (2015) for a discussion. For example, the mortgage debt for a typical American household was around 87% of GDP in 2008, compared to the 11% in China (data from BIS and China National Bureau of Statistics). Also, as of 2011, around 62% of Americans (of ages> 15) had credit cards, in contrast to 11% in China.

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