

Schnabl, Gunther

**Working Paper**

## China's overinvestment and international trade conflict

CESifo Working Paper, No. 7642

**Provided in Cooperation with:**

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

*Suggested Citation:* Schnabl, Gunther (2019) : China's overinvestment and international trade conflict, CESifo Working Paper, No. 7642, Center for Economic Studies and ifo Institute (CESifo), Munich

This Version is available at:

<https://hdl.handle.net/10419/199002>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# China's overinvestment and international trade conflict

*Gunther Schnabl*

## **Impressum:**

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email [office@cesifo.de](mailto:office@cesifo.de)

Editor: Clemens Fuest

[www.cesifo-group.org/wp](http://www.cesifo-group.org/wp)

An electronic version of the paper may be downloaded

- from the SSRN website: [www.SSRN.com](http://www.SSRN.com)
- from the RePEc website: [www.RePEc.org](http://www.RePEc.org)
- from the CESifo website: [www.CESifo-group.org/wp](http://www.CESifo-group.org/wp)

# China's overinvestment and international trade conflict

## Abstract

For a long time, China's impressive growth performance has been driven by investment and high productivity gains. Based on the recent discussion on possible overcapacities and overinvestment in China, the paper investigates the sustainability of China's investment- and export-driven growth model. It is shown that since the turn of the millennium buoyant capital inflows and low interest rates have been at the roots of overinvestment and misallocation of capital, which necessitated export subsidies to clear markets. The overinvestment boom is argued to have ended around 2014. Since then, the overcapacities have weakened China's bargaining position in the US-Chinese trade conflict and have tempted the Chinese authorities to postpone a restructuring of the Chinese economy by low-interest credit provision. The resulting gradual reemergence of quasi soft budget constraints is seen to undermine China's long-term growth potential.

JEL-Codes: E220, E430, E580, F130.

Keywords: China, investment, overinvestment, trade policy, credit growth, rebalancing, soft budget constraints, zombification.

*Gunther Schnabl*  
*Leipzig University*  
*Institute of Economic Policy*  
*Grimmaische Straße 12*  
*Germany – 04109 Leipzig*  
*schnabl@wifa.uni-leipzig.de*

29.5.2019

I thank Nils Sonnenberg and Tim Sepp for excellent research assistance and the Friedrich August von Hayek Foundation for financial support.

## 1. Introduction

Given an impressive growth performance, the literature has praised China as the new global economic hegemon. Fogel (2007) saw China's GDP per capita hitting 85.000\$ by 2040, with the share in global GDP (40%) dwarfing the U.S. (14%). The Chinese currency has been argued to challenge the leading role of the dollar as an international currency (Prasad 2018). Mosher (2002) sees China on its way to rule Asia and the world. By 2018 the real growth rate of China was with 6.6% substantially above the growth rate of the United States (2.9%) and far beyond Japan as her largest Asian rival (1.1%).

Whereas Chinese growth has remained high compared to the industrialized countries, the momentum has continued to slow down, from 14.2% in 2007 to 6.3% in 2019, with official numbers occasionally being put into question. At the same time vulnerabilities have emerged. Concerns about overcapacities in industrial production (European Chamber 2016) have triggered a discussion about rebalancing the Chinese economy towards domestically-oriented, consumption-based growth (Fukumoto and Muto (2012), Yu (2012), Zhang (2016)).<sup>1</sup> Glaeser et al. (2017) have identified the potential for an unsustainable real estate bubble.

From an international perspective, the Chinese current account surplus, in particular versus the U.S. has been regarded as unfair (Bergsten 2010) and was taken by the U.S. government as a justification to impose punitive tariffs, thereby risking a trade war and putting the international free trade system a risk (Ha and Deng 2019). Given accelerating capital outflows from China, take-overs of enterprises and infrastructure in the industrialized, emerging and developing countries are increasingly understood as economic colonialization. At the same time, the global slow-down of growth makes China's investment in the developing countries and emerging markets increasingly look risky (Page 2019).

To evaluate the growth perspectives of China and the bargaining position in the trade conflict with the United States, the paper scrutinizes from a theoretical perspective the possibility of overinvestment in China. In contrast to previous papers, which have analyzed the role of investment for Chinese growth empirically (Zhang (2003), Wang and Hu (2007), Ahuja and Nabar (2012)), the focus is on the build-up of overcapacities in the industrial sector, their repercussions on growth and the adequate policy response.

---

<sup>1</sup> Zhang (2016) distinguishes four dimensions of rebalancing, i.e. external, internal, environmental and distributional rebalancing. This paper focuses on the first two dimensions.

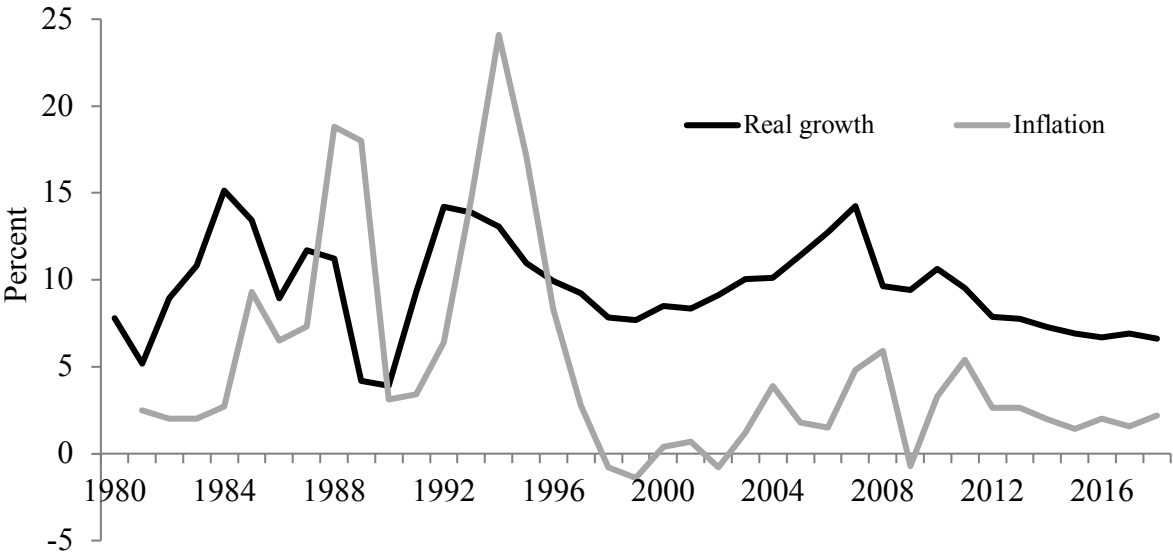
## 2. Investment, Growth and Economic Catch-up

Like Japan and other East Asian countries, the economic catch-up process of China has been based on industrial production and exports to the prosperous markets of the industrialized economies (*export-led growth*). The upgrading of the capital stock and the technological level of industrial production is at the roots of increasing productivity and real wage increases (Solow 1956, Swan 1956, Balassa 1961, Samuelson 1961). Yet, macroeconomic stability and an efficient allocation of capital are pre-requisites for a positive role of investment for growth (McKinnon 1973).

### 2.1. Microeconomic Reforms and Macroeconomic Stabilization

The catch-up process of China is based on market-oriented reforms going back to Deng Xiaoping in the 1970s (Chang 1988). In the first stage in the 1970s and 1980s, agriculture was de-collectivized, private business activity was permitted and foreign direct investment was allowed, while most enterprises remained state-owned. The second stage from the late 1980s was characterized by the privatization of state-owned enterprises and the gradual dismantling of price controls. Despite very extensive liberalization measures the banking sector and many large enterprises remained state-owned.

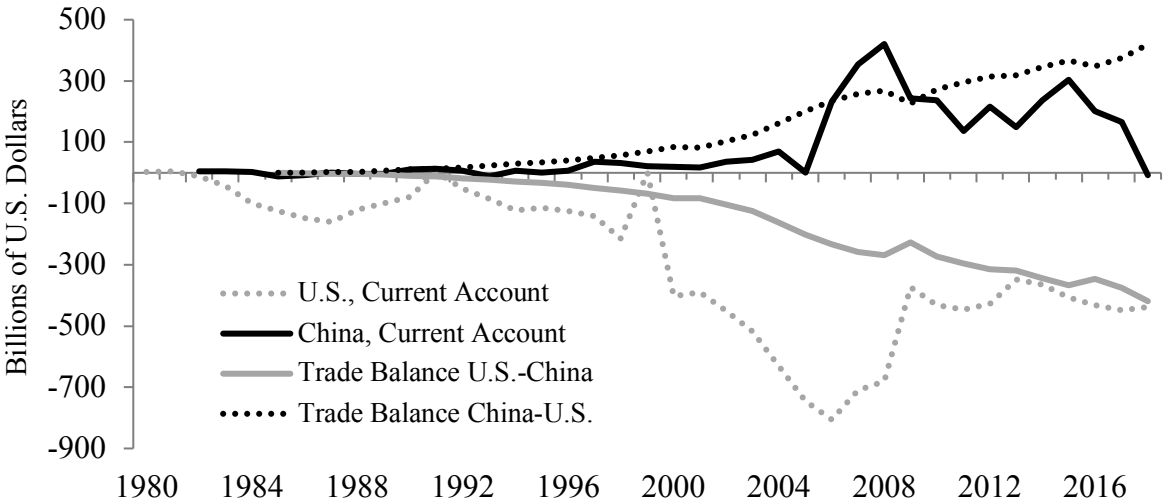
**Fig. 1: China: Real Growth and Consumer Price Inflation**



Source: IMF and World Bank.

In 1994, the Chinese authorities abolished exchange controls on current-account transactions (exporting, importing, interest and dividends) and unified the exchange rate to satisfy the International Monetary Fund’s Article VIII on current account convertibility. These measures exposed the Chinese economy to world markets. By pegging the yuan tightly to the dollar, the price level of world markets was imported, forcing enterprises to adjust prices and quality to the international benchmarks. The dollar peg constituted the basis for a substantial decline in inflation (Fig. 1). With expectations being stabilized, investment was boosted, contributing to high and stable growth (McKinnon and Schnabl 2009).

**Fig. 2: China and US: Overall Current Account and Bilateral Trade Balances**



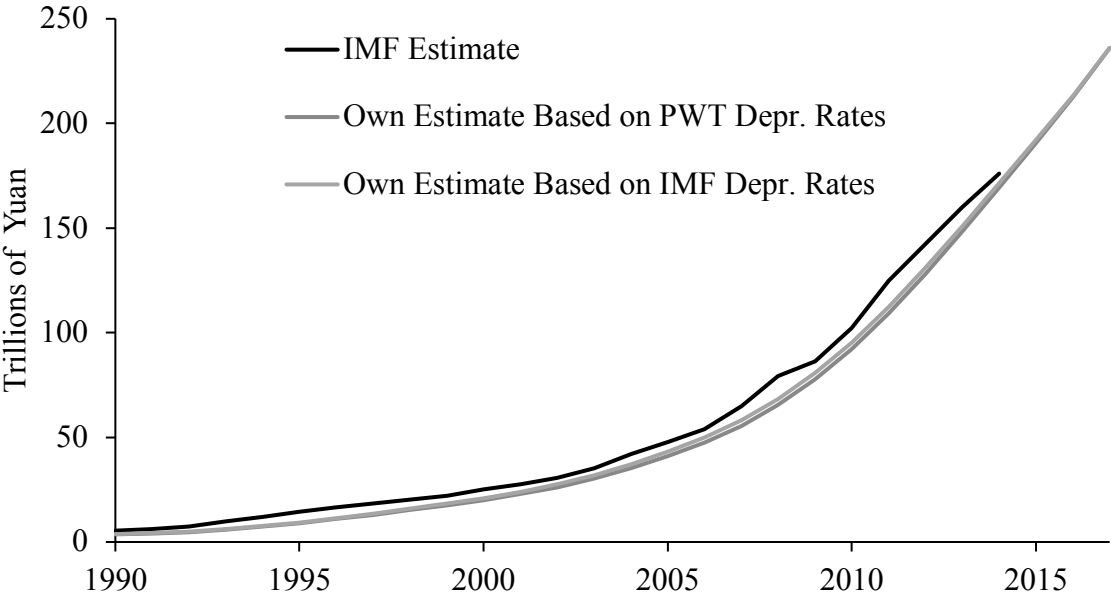
Source: IMF and U.S. Census Bureau.

The hard peg to the dollar reduced the transaction costs for trade with the U.S. and the East Asian neighboring countries, which also kept their exchange rates pegged to the dollar. Like other East Asian countries before, China as the spearhead of a sophisticated East Asian production network embarked on an export-led growth strategy. Growing production capacities could be cleared in the large markets of the industrialized countries. Since the turn of the millennium, trade and current account surpluses emerged, in particular versus the U.S. (Fig. 2).

## 2.2. Domestic and Foreign Capital Accumulation

Investment is crucial for economic development and catch-up for two reasons. First, an increasing capital stock leads to higher productivity, i.e. output per worker (Solow 1956, Swan 1956). Productivity increases are the basis for real wage increases and a higher purchasing power of consumers which stimulates domestic demand. Balassa (1964) and Samuelson (1964) modeled the economic catch-up process in an open economy setting: Productivity gains in the traded goods (industrial) sector allow for real wage increases in the traded goods sector, which are transmitted via the labor mobility to the non-traded goods (service) sector. Non-traded goods prices grow, as in the non-traded goods sector productivity gains are absent or low. Given fixed exchange rates the increase in the price level leads to a real appreciation of the currency, which reflects the catch-up of productivity rather than a loss of competitiveness.

**Figure 3: China: Capital Stock Estimates**



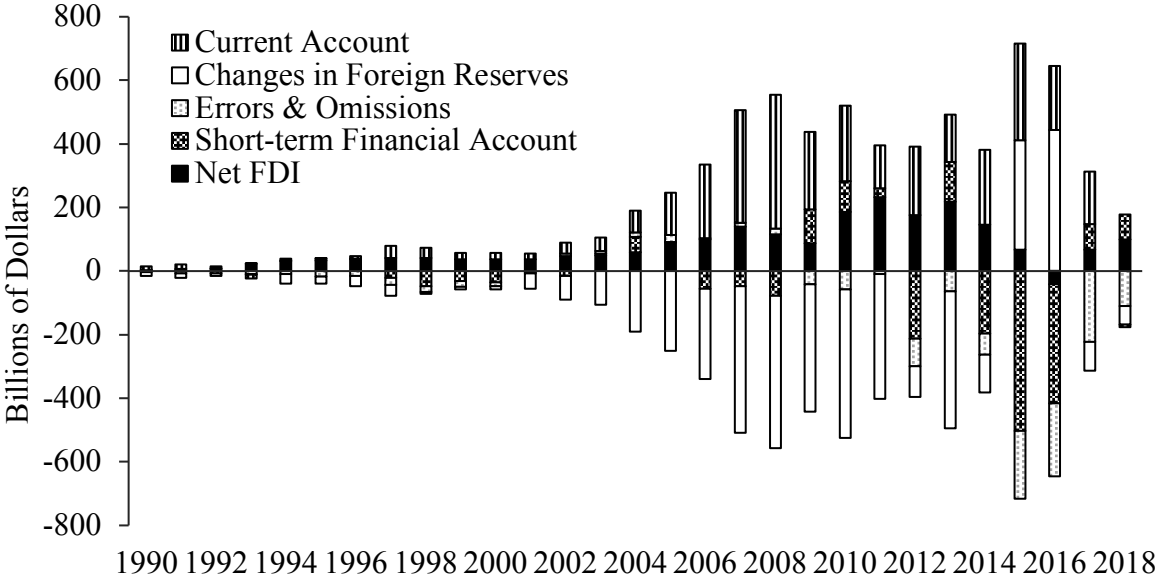
Source: IMF estimate from IMF Investment and Capital Stock Database. Other estimates based on gross fixed capital formation compiled from Penn World Table (PWT) and implied IMF depreciation rates. From 2015-2017 the 2014 depreciation rates were used as proxies.

The capital stock of China has increased substantially since 1980 (Fig. 3). The growth of the capital stock (see section 4.1.) has come along with a growing productivity level and a fast-growing real wage level, bringing millions of Chinese out of poverty. With neoclassical economics assuming that the marginal efficiency of investment declines with a growing capital stock, Solow (1957) argued that long-term growth depends on technological progress. In a financially open economy, the upgrading of the technological level of production is linked to



both domestic capital formation and capital inflows. The high domestic gross savings rate, which increased from 35.2% in the year 2000 to 52.8% in 2008 build the basis for the technological upgrading of the production capacities.

**Fig. 4: China: Balance of Payments**



Source: IMF (WEO).

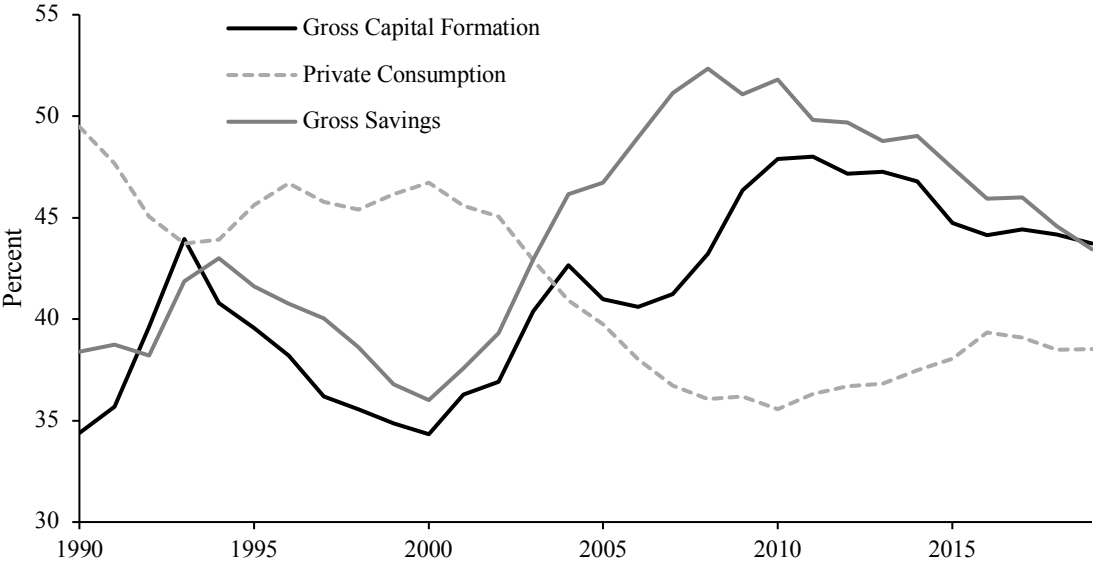
In addition, multinational enterprises of the industrialized countries combined their advanced technologies with the cheap and motivated labor force of China. Foreign direct investment (FDI) to China strongly increased from 2.6 billion dollars in 1990 to 36.9 billion dollars in 1999 (Fig. 4). Between 2001 and 2008 net FDI further increased by 200%. Also, short-term capital inflows to China accelerated, due to interest rate cuts of the industrialized countries: After the bursting of the so-called dotcom bubble, in the U.S. the federal funds rate fell from 6.5% in May 2000 to 1.0% in June 2003. The Bank of Japan kept from 2000 onwards the key interest rate at zero, and moved towards extensive unconventional monetary policy measures, pushing the long-term interest rate further downwards. With a money market rate at around 3%, the interest rate level in China remained substantially higher than in Japan, U.S. and other industrialized countries.

When the Fed was raising interest rates from 2005 to 2008, the People’s Bank of China announced in July 2005 a yearly appreciation of the Chinese yuan against the dollar (upward

crawling peg) by 3% to 6% per year. The predictable speculation gains for converting dollars into yuan (one-way bets), provided a strong incentive for capital inflows to China which therefore continued despite increasing interest rates in the U.S. In the balance of payments statistics (Fig. 4) these speculative capital inflows became mostly visible in the current account instead of the financial account (McKinnon and Schnabl 2012).<sup>2</sup> Hot money inflows may also have been labelled as FDI.

Given, that China had at this time comprehensive inward-bound capital controls (Ma and MaCauley 2007), this lucrative speculation opportunity of exchanging dollars into yuan remained restricted to those economic agents, who could make it around the capital controls. Martin and Morrison (2008) suspected hot money inflows to be brought to China by overreporting exports, as export revenues were allowed to be converted from dollar into yuan. Between 2005 and 2008 and between 2010 and 2014, when the yuan crawled predictably upward, the Chinese current account surplus surged (Fig. 2). This implies that exclusively export enterprises made these speculation gains, which facilitated their investment activities.

**Fig. 5: China: Investment and Consumption as Percent of GDP**



Source: IMF (WEO) and National Bureau of Statistics of China.

<sup>2</sup> So-called hot money inflows betting for interest rate differentials and exchange rate changes may also have been hidden in “other investments” of the financial account or in “errors and omissions” (see Bouvatier 2006).

The favourable national and international financing conditions became reflected in a growing share of investment out of GDP (Fig. 5). Fixed capital investment increased from 34.3% of GDP in 2000 to 46.3% in 2008. When China, in the face of the global crisis, moved towards an extensive debt-financed public expenditure program between 2008 and 2010, investment as percent of GDP was further boosted to 47.8% of GDP, slightly declining since then. Thus, investment constituted the main pillar of China's high growth (Fig. 1).

### **3. The Emergence of Overinvestment**

In neoclassical economics, full competition and flexible prices adjust supply and demand at an equilibrium price, with labor markets being cleared at equilibrium wages, which reflect the marginal productivity of labor. In an open economy the divergence of supply and demand is possible due to different time preferences and intertemporal optimization. A country with a low time preference can produce more than domestic aggregate demand (for instance China) and export the surplus production to a country with a high time preference (for instance the U.S.). The current account balances reflect respective net capital flows, with positive (negative) current accounts corresponding to net capital outflows (inflows).

Given free trade and internationally flexible prices, global supply and demand equalize at a common international price level. Overcapacities, i.e. supply exceeding demand, do not exist. Nevertheless, the literature on overinvestment in China is growing, suggesting that in certain sectors of the Chinese economy production capacities have grown beyond demand (e.g. Lian and Chung 2008, Qin and Song 2009, Knight and Ding 2010).

#### **3.1. Overinvestment in Theory**

From a firm perspective within a principal-agent framework, the management aims to maximise its personal income, which is assumed to be dependent on the firm size (Murphy 1995). Also, aiming to reward middle managers through promotion can create a bias towards enlarging the enterprise to supply new positions to supporters (Baker, Gibbs and Holmstrom 1993). Therefore, the management may use free cash flow to increase the firm size by investing more than is necessary to maximize the profit and the value of the firm (Jensen 1987).<sup>3</sup> The expected return

---

<sup>3</sup> Instead of being distributed to firm owners, for instance via dividends and stock repurchases.

of realized investment projects is then lower than the interest rate prevailing in capital markets, which is labelled ‘overinvestment’.

According to Jensen (1987) the probability of low-return investment projects can be reduced by outside capital (rather than equity financing). The disciplining function of capital markets is seen to effectively bond managers to pay out future cash flows (rather than using it for overinvestment), because the shareholder recipients of debt can take the firm into the bankruptcy court if they do not pay interests that is due. Thus, debt reduces the agency costs of free cash flow by reducing the cash flow available for low-return investment projects. From this point of view, the high and growing levels of debt of Chinese corporations (section 4.2.) should have prevented the emergence of significant overinvestment in China.

From a macroeconomic perspective, Mises (1912) and Hayek (1931) explain overinvestment by distorted prices on capital markets. They distinguish four types of interest rates:<sup>4</sup> The capital market interest rate is set by the private banking (financial) sector for credit to households and enterprises. The central bank interest rate is determined by the central bank to guide capital market interest rates as the cost of lending. The natural interest rate equilibrates supply (savings S) and demand (investment I) on domestic capital markets ( $I=S$ ).<sup>5</sup>

An overinvestment boom sets in, when the central bank pushes the capital market rate below the natural interest rate, with the low interest rate signaling higher savings and thereby higher future consumption. Such central bank interest rate cuts can be exogenous, for instance in response to a financial market crisis. In an open economy with exchange rate stabilization against appreciation pressure, interest rate cuts in a large economy issuing an international currency can trigger declining central bank interest rates in countries at the periphery of the world monetary system (Rey 2018).

With private savings too low, additional investment is financed by credit creation of banks ( $I>S$ ). The new investment projects improve the business climate, triggering even more investment. First, investment projects with comparatively high marginal efficiency are realized. In the course of the upswing the marginal efficiency of realized investment projects declines. During

---

<sup>4</sup> For a detailed description of the model see Schnabl (2019).

<sup>5</sup> The natural interest rate is a theoretical concept that cannot be empirically observed. In the models of Mises (1912) and (Hayek (1931) it is the interest rate that does not cause structural distortions in the economy. In contrast, the natural interest rates as defined by Laubach and Williams (2015) is an inflation-neutral interest rate.

the cumulative upswing profits of enterprises and banks increase. The investment boom can be accompanied by growing demand for stocks and real estate, with surging stock and real estate prices possibly becoming delinked from fundamentals.<sup>6</sup>

When idle capacities in the labour market are fully used, wages and prices increase. This, forces the central bank to lift interest rates to contain inflation (Mises 1912, Hayek 1931). The benchmark, at which past and future investment projects are profitable, is raised. Low-return investment projects have to be dismantled, which causes inevitably the economic turnaround. The dismantling of investment projects with low and negative returns is a necessary prerequisite for the economic recovery, because this allows to shift production factors from low-return investment projects to investments with higher return (cleansing effect, Schumpeter 1912). The downswing is aggravated by the central bank, which is now keeping the central bank and capital market interest rates above the natural interest rate.

### **3.2. Overinvestment in China**

In line with the overinvestment theory of Mises (1912) and Hayek (1931) China's investment may have been inflated by capital inflows and too low interest rates for three reasons. First, in 1997/98 the Asian crisis had prompted the People's Bank of China to cut interest rates strongly to stabilize domestic demand (McKinnon and Schnabl 2009) (Fig. 6). After the turn of the millennium – in response to the bursting dotcom bubble – the Federal Reserve Bank strongly cut interest rates and the Bank of Japan moved towards quantitative easing, which boosted capital flows to China. Thus, the interest rate level remained exceptionally low since the turn of the millennium.

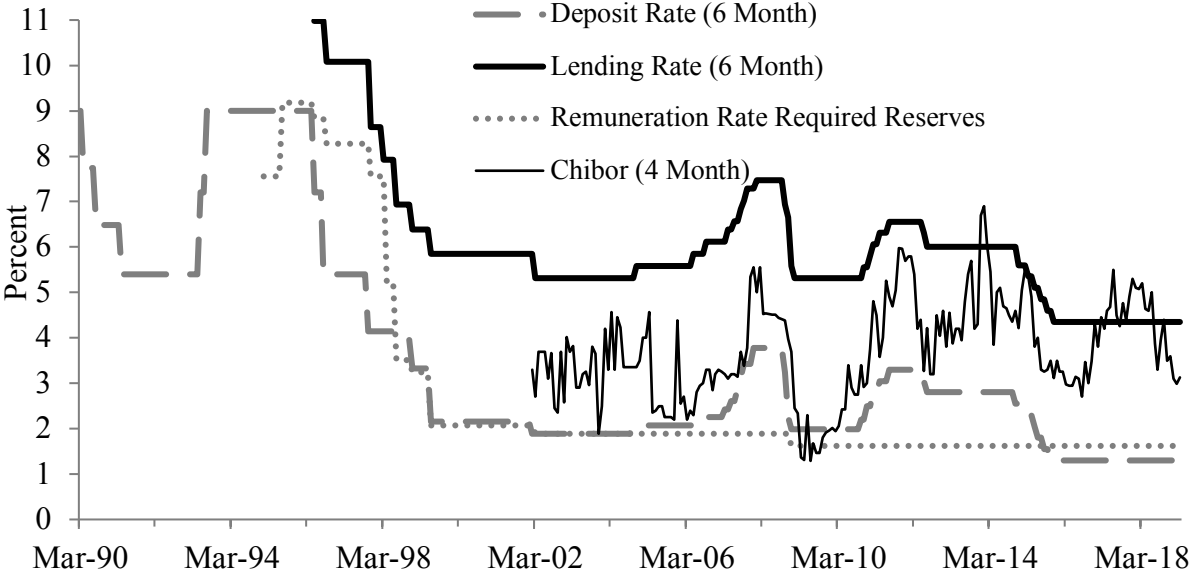
Second, the People's Bank of China maintained a ceiling on lending rates (Feyzioglu, Porter, Takáts 2009), which per se can be seen as evidence that credit rates were kept below the market equilibrium level. Between 2000 and 2008 the average real lending rate of China was with 3.3% only slightly above the U.S. (2.6%) and substantially below the average real growth of 9.1% (US: 2.0%) (Fig. 7). It has further declined since then.

---

<sup>6</sup> In China, in particular real estate prices hiked.

Third, the allocation of capital inflows was directed by the People’s Bank of China via the state-controlled banking sector to specific sectors of the Chinese economy.<sup>7</sup> The accelerating capital inflows would have – given exchange rate stabilization – led to a high degree of monetary expansion and a convergence of the nominal interest rate level towards the U.S. To prevent an overheating like in the Southeast Asian countries prior to the Asian crisis, the People’s Bank of China engaged in extensive sterilization measures. The People’s Bank of China partially absorbed the monetary effects of the huge capital inflows and foreign reserve accumulation by selling central bank bonds and – because of growing costs of this market-based form of sterilization – by increasing the basis for reserve requirements and the reserve requirement ratio.

**Fig. 6: China: Interest Rate Structure**



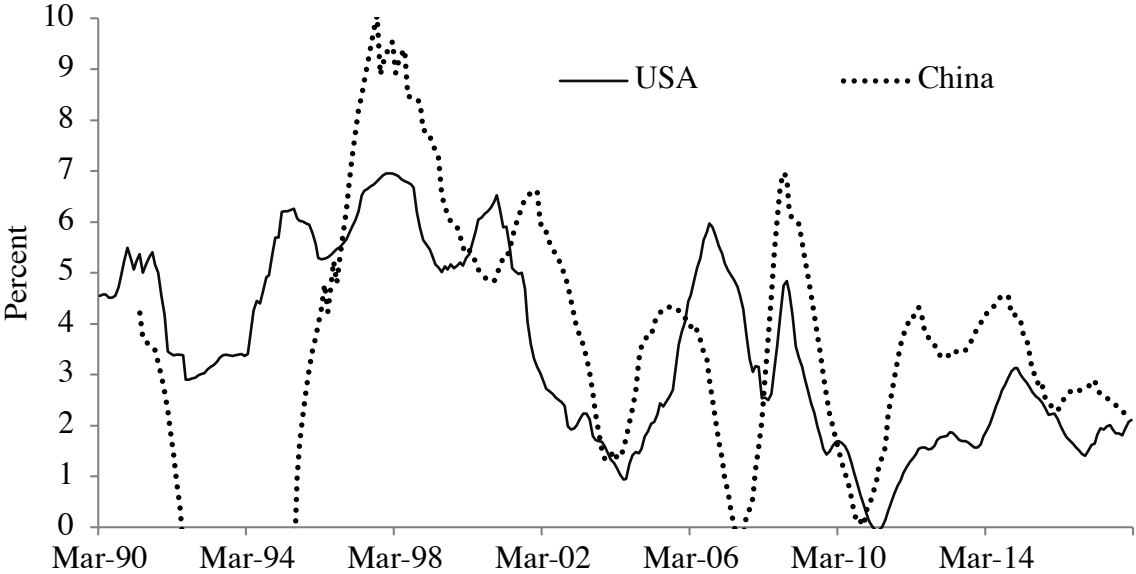
Source: IMF.

By keeping the remuneration rate for required reserves low (Fig. 6), i.e. mostly negative in real terms, sterilization costs were minimized, shifting the burden of sterilization to the state-controlled banking sector. Theoretically, the banking sector can roll the burden over to households (via lower deposit rates) and/or enterprises (via higher lending rates), with the latter channel, however, having been restricted by the ceiling on lending rates.<sup>8</sup> The consequence of

<sup>7</sup> See McKinnon and Schnabl (2012) for details.  
<sup>8</sup> The consequence of low and negative real deposit rates is that deposits are withdrawn from banks to be transferred to the shadow banking sector, which is able to pay higher deposit rates and charge higher credit rates. This was for instance the case in the real estate sector, where strong price increase expectations persisted and a real estate boom evolved. The real estate boom seems to have cooled down recently.

a credit rate below the market rate is an excess demand for credit. This surplus demand has put the Chinese authorities into the position to direct credit into specific sectors of the economy via so-called “window guidance” as previously practised in Japan (Hamada and Horiuchi 1987). Overinvestment is likely to be made in these sectors, which benefitted from such preferential capital allocation.

**Figure 7: China and USA: Real Lending Rates**



Source: National Bureau of Statistics of China and U.S. Census Bureau.

Credit can be assumed to have been predominantly funnelled into the construction industry (inter alia via large infrastructure projects) and the labour-intensive industrial sectors, in particular to large, export-oriented and state-owned enterprises (McKinnon and Schnabl 2012). The benefit for the government has been that the economic catch-up process was boosted and jobs were created. This process constituted, however, a restriction on domestic consumption, with gross savings increasing respectively. As a result, consumption as a share of GDP declined from 46.8% in 2000 to 36.7% by 2012 (Fig. 5). Whereas at the turn of the millennium consumption as share of GDP was much larger than investment as share out of GDP, investment and consumption have moved into opposite directions.<sup>9</sup>

<sup>9</sup> Note that in Fig. 5 the gap between domestic savings and investment can be seen as being equivalent to net capital inflows.

#### **4. The Economic Policy Response to Overinvestment**

During the upswing – with overcapacities being created and consumption being depressed – policy makers have to ensure that the resulting overproduction is cleared. In the view of the monetary overinvestment theories (Mises 1912, Hayek 1931), after the turn-around the dismantling of overinvestment would lead to unemployment until production factors are shifted to new, higher-return investment projects. If the policy-makers aim to postpone the restructuring process, they will conserve distorted economic structures, thereby paralysing long-term growth.

##### **4.1. The Trade Policy Channel to Clear Overcapacities**

As Chinese growth became increasingly tilted towards investment, domestic consumption was unable to keep track with the growing capacities. This implied that overcapacities had to be cleared on the international market (export-led growth). In the early years of the Chinese current account surplus, when the yuan remained tightly pegged to the dollar, the price level in the international market was given for Chinese producers. Given the assumption of a low marginal efficiency of investment, to clear overcapacities in the international market, the government had to keep artificially the prices of Chinese goods under the international equilibrium prices. Yet, under the provisions of the World Trade Organisation – which China joined in 2001 – direct subsidies for exports are forbidden.

The Chinese authorities provided indirect subsidies via real exchange rate stabilization, which was achieved by low-cost credit allocation, provision of opportunities for one-way bets and real wage restraints. Given nominal exchange rate stabilization against appreciation pressure, as it prevailed in China between 1994 and 2014, the monetary expansion resulting from rapid foreign reserve accumulation would have led to a strong growth in monetary base, credit, prices and wages. As observed in Thailand, South Korea, Malaysia and Philippines previous to the Asian crisis, the price and wage increases resulting from unsterilized foreign exchange intervention would have led to a real appreciation of the currency, the gradual loss of international competitiveness, growing current account deficits, rising foreign-currency denominated international debt and a growing likelihood of balance of payments crisis.<sup>10</sup>

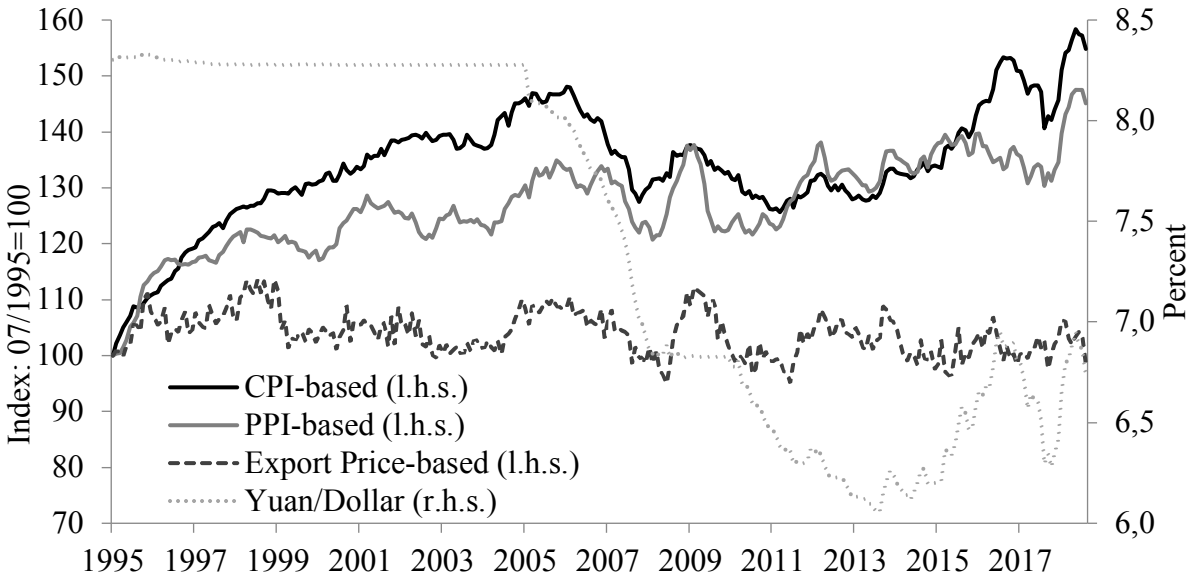
---

<sup>10</sup> Corsetti, Pesenti and Roubini (1999) provide a model of the Asian crisis: Domestic (foreign) debtors (creditors) make overinvestment possible by overborrowing (overlending), as they anticipate the bail-out of domestic financial institutions in the crisis.



In China, with this lesson being learned, a substantial part of the monetary expansion resulting from the foreign reserve accumulation was neutralized (see 3.2). Fig. 8 shows that since 1995 the real exchange rate against the dollar was – despite some fluctuations – widely unchanged if calculated based on export prices. The producer price-based real exchange rate slightly depreciated over time, as U.S. producer prices rose much faster than Chinese producer prices. This is the case although the high relative productivity gains of China versus the U.S. would have implied a real appreciation of the yuan against the dollar. Even during the period of hot money inflows between 2000 and 2014 the export price-based and producer price-based real exchange rates of the yuan against the dollar did not appreciate.

**Fig. 8: Nominal and Real Exchange Rate of the Chinese Yuan (against the Dollar)**



Source: IMF and own calculations. Declining lines are equivalent to nominal and real appreciation respectively. CPI=consumer price index. PPI=producer price index.

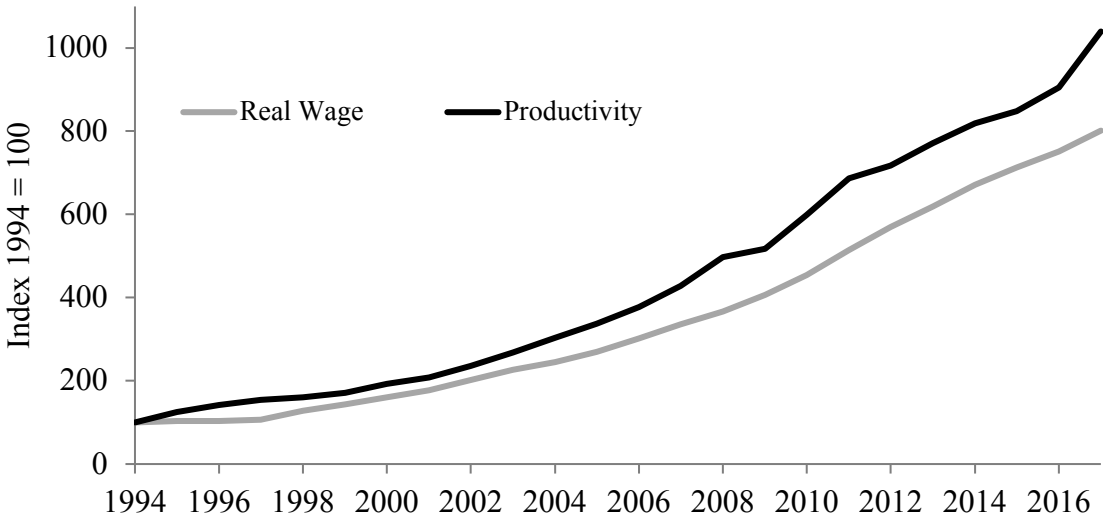
There are three channels, which allowed the Chinese enterprises to keep export price increases contained, despite faster growing wages than in the U.S. First, Chinese enterprises profited from the benign global financing conditions, which were distributed by Chinese authorities unevenly between consumers and enterprises as well as between enterprises of different size and ownership (section 3.2.). The low interest rate subsidies originated both in the US, due to the declining interest rate level, and in China, due to the ceiling on credit rates.<sup>11</sup> Second, real wage

<sup>11</sup> McKinnon and Schnabl (2012) argue that the increasingly expansionary monetary policy in the U.S. can be seen as a subsidy for the politically influential U.S. financial sector, as financial markets were inflated and

increases did not keep track with the productivity increases (Fig. 9) as it would be suggested by neoclassical theory. This real wage repression constituted a second significant subsidy for enterprises, which could be used to keep prices low.

Third, between 2005 and 2012 the predictable gradual appreciation of the yuan against the dollar provided a subsidy for the export enterprises, which were able to raise funds at a substantially lower interest rate in the U.S. and realized speculative profits by converting dollars into yuan (see 2.1.). The gradual appreciation of the yuan against the dollar reduced the value of foreign-currency liabilities in the yuan-based balance sheets of Chinese export enterprises, thereby boosting equity. Growing dollar liabilities of the private sector were hedged by growing dollar assets of the public sector (i.e. foreign reserves), which took over the revaluation losses of foreign assets in the face of the gradual appreciation. Since 2014, the depreciation of the yuan inflated the foreign liabilities in the balance sheets of enterprises (see 4.2.). By softening the depreciation of yuan against the dollar the People’s Bank of China mediated this risk.

**Fig. 9: China: Productivity and Real Wage Levels**



Source: National Bureau of Statistics of China. Labor productivity calculated as value-added of the secondary industry per employed in the secondary industry. Real wages are measured based on the number of employees in manufacturing.

---

speculation opportunities were created. The capital exports to China generated profitable business opportunities for the U.S. financial sector, as dollars had to be converted into yuan, dollars had to be purchased by the People’s Bank of China and invested in dollar assets (such as U.S. government bonds). In China, the labor-intensive industrial sector was promoted, which can be seen to be in the interest of the communist Chinese government. The respective negative impact on the U.S. industrial sector can be seen as negative side effect of large windfall profits in the U.S. financial sector, which are matched by a strongly repressed financial sector in China and a buoyant Chinese industry.

From a welfare perspective, the subsidy-based real exchange rate stabilization is equivalent to a transfer of welfare from China to the trading partners. Chinese export enterprises gained, because overall demand for their products increased as inputs of production (i.e. capital and labor) were subsidized. Chinese consumers lost as the growing foreign demand can be assumed to have *ceteris paribus* pushed up the domestic price level. The gap between the foreign and the border price level times the size of the exports is equivalent to the cost of the subsidy for the public, turning the overall welfare effect negative for China as a whole. These costs have been shifted to Chinese households via real wage repression (i.e. lower real wage increases than productivity gains) and financial repression (i.e. low or negative real interest rates).

In the trading partner countries of China, consumers have been profiting from low prices, whereas industrial producers faced harsh competition from Chinese competitors. The overall welfare effect can be assumed to be positive, as consumers are a larger group than workers in industries competing with China. Nevertheless, complaints about lost jobs and wage pressure in the industrial sector have been constituting the breeding ground for dissatisfaction of voters in traditional U.S. industrial areas. The Chinese trade surplus (Fig. 2) and complaints about Chinese unfair trade practices (see Cline 2005, Bergsten 2010),<sup>12</sup> seemed to prompt president Trump to retaliatory measures against China.

The trade conflict under U.S. president Trump, as it evolved since 2017 reflects in the light of China's overinvestment the unequal bargaining position between China and the US. With Chinese exports to the U.S. being much larger (540 billion dollars, 2018) than U.S. exports to China (120 billion dollars, 2018) (Fig. 2), the U.S. had a larger scope to impose punitive tariffs. Given a high degree of overcapacities in the industrial sector, China remained dependent on exporting the surplus production, with the U.S. being the most important target market. Imposing tariffs on imports from China involved the threat that overcapacities would become even more imminent, with the dismantling causing large-scale unemployment. This implies that

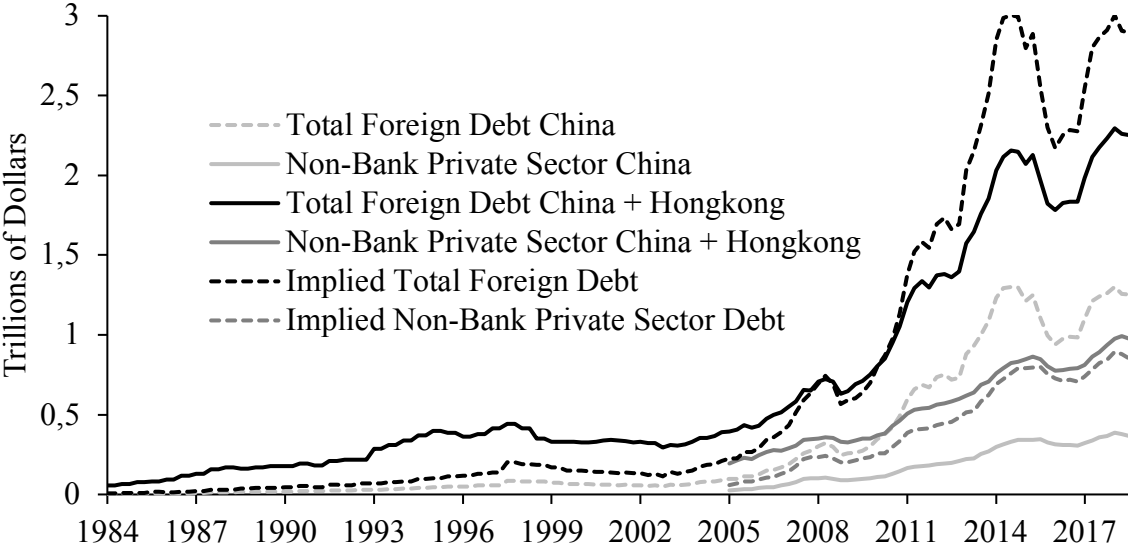
---

<sup>12</sup> McKinnon (2013) has analyzed the political economy of the trade imbalance between East Asia and the United States, arguing that since the 1980s the U.S. have actively continued to use the exchange rate of the dollar against the Asian currencies to achieve concessions in trade conflicts by exerting dollar depreciation pressure. For instance, in the 1990s Japanese car producers were urged to shift production sites from Japan to the U.S., continuously increasing the local content. Any persistent appreciation of the East Asian currencies against the dollar is equivalent to the devaluation of U.S. debt and East Asian assets. From this point of view, the persistent trade deficits (surpluses) of the U.S. (of the East Asian countries) are more a transfer of wealth in favor of the U.S. rather than an East Asian credit to the US, which will be repaid in the future. In this context the asymmetric currency denomination of international liabilities and assets plays an important role, as international debt (assets) of the United States (China) is denominated in domestic (foreign) currency (McKinnon and Schnabl 2009).

China’s overinvestment has strengthened the bargaining position of the U.S. in the trade conflict.

For this reason, the U.S. punitive tariffs, as imposed since spring 2018 led to substantial reductions of the border prices of Chinese goods rather than causing a substantial increase of prices in the US. Zoller-Rydzek and Felbermayr (2018) show that the U.S. punitive tariffs on 50% of imports from China became shifted to about 75% to Chinese producers in form of lower yuan border prices. Chinese export enterprises reduced border prices for their products by 20.5%, whereas U.S. consumer prices for Chinese products only increased by 4.5%. This response pattern corresponds to the Japanese export industry in the face of the 50% appreciation of the Japanese yen against the dollar after the Plaza Agreement: Japanese export enterprises substantially cut border prices and profit margins to maintain the market share in the U.S. (and other industrialized countries) (Mann 1986, Marston 1990).

**Fig. 10: Estimation of Foreign Debt of China’s Non-Financial Sector**



Source: BIS. Implied foreign debt calculated based on private sector estimates such as Olsen (2018) and Balding (2019).

Also the depreciation of the yuan against the dollar (Fig. 8), which was triggered by the reversal of private capital flows out of China since 2014 compensated Chinese enterprises for U.S. tariffs on Chinese exports. The downside is that any yuan depreciation inflates dollar denominated debt of China in domestic currency. Fig. 10 provides an estimate based on official

BIS data, which acknowledges that international debt of Chinese corporations may have been also raised via Hong Kong and other financial centers. Depending on the approximation methodology the debt of corporations ranges from 0.36 trillion dollars (non-bank private sector debt of China only) to 0.85 trillion dollars (corporate debt implied from private sector estimations, also raised via Hongkong and offshore centers). With the Fed raising interest rates since 2015, and therefore the yuan depreciating, Chinese enterprises faced a significant interest and revaluation risk of foreign debt (Maliszewski et al. 2016).

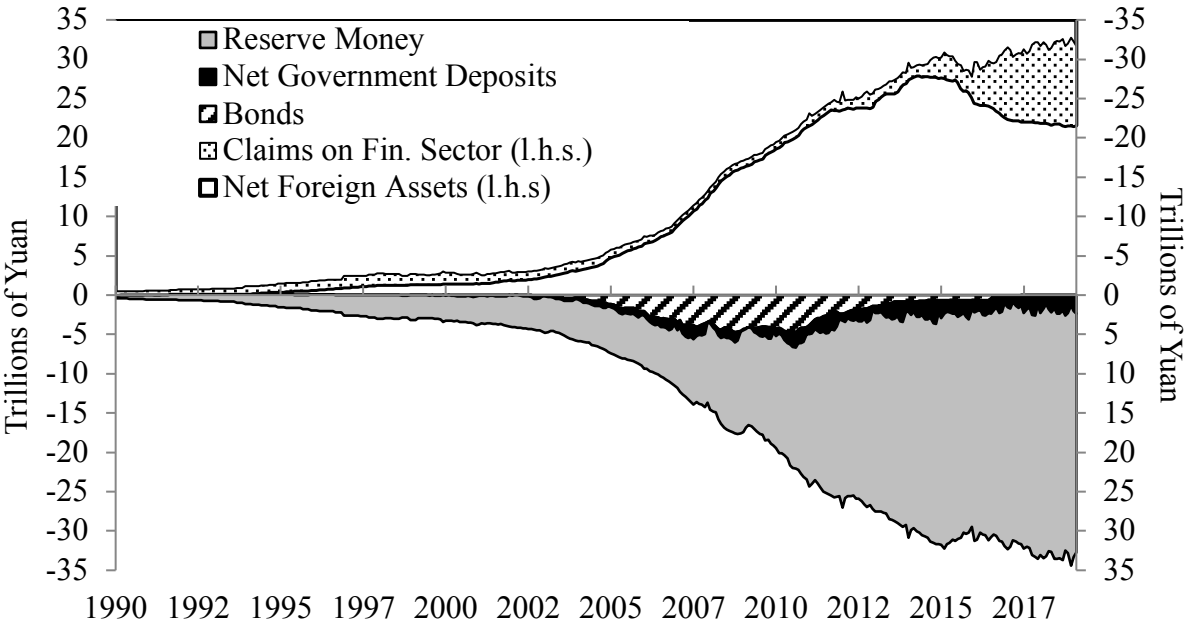
#### **4.2. Credit Expansion as Response to Overinvestment**

There are four indications that the overinvestment boom in China had ended by 2014. First, short-term net capital inflows turned into outflows with the yuan getting under depreciation pressure (Fig. 8). Second, inward-bound capital controls were relaxed, whereas outward-bound capital controls were tightened (McKinnon and Schnabl 2014). Third, steering against the depreciation pressure, the People's Bank of China lost a substantial amount of reserves (Fig 5). Forth, investment as a share of GDP (Fig. 5) and real GDP growth (Fig. 1) continued to decline.

In the monetary overinvestment theory, the end of the overinvestment boom constitutes the turning points towards the dismantling of low-return investment projects, as the central bank keeps the interest rate (too) high. This process can be prevented by promptly cutting interest rates in the face of crisis, as proposed by Bernanke (2000, 2014) and practiced since the late 1980 by an increasing number of central banks in the industrialized countries (Schnabl 2019). By sharp key interest rate cuts and unconventional monetary policy measures a financial collapse, a deep recession and hiking unemployment can be prevented. The pressure to dismantle low-return overinvestment is relieved.

In China, from 2014 onwards, interest rates were cut and central bank credit to commercial banks was extended, which constitutes a fundamental change in the monetary policy pattern. Between 2000 and 2014 the balance sheet of the People's Bank of China was mainly responsive to international monetary conditions, the building-up of foreign reserves in the face of low interest rates in the industrialized countries and buoyant capital inflows (Fig. 10). The resulting strong expansion of foreign reserves and the monetary base was partially sterilized (section 3.2). McKinnon and Schnabl (2014) characterize the distortions in the capital market caused by non-market-based sterilization measures as externally imposed financial repression.

**Fig. 11: People’s Bank of China Balance Sheet**



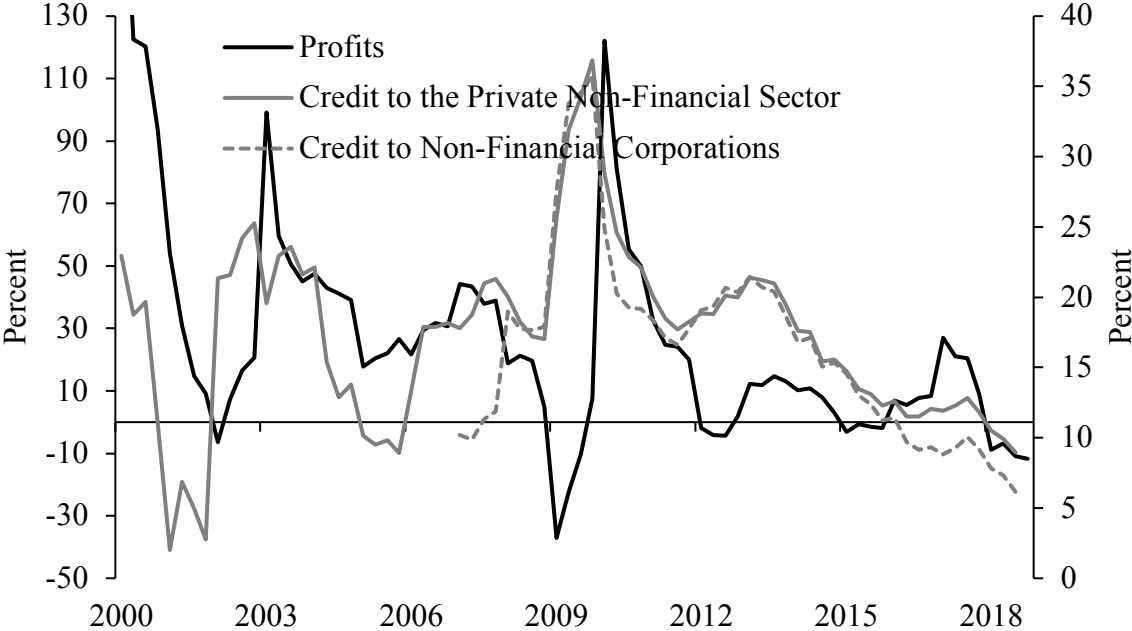
Source: IMF.

When since 2014 capital outflows were reducing the foreign reserve holdings of the People’s Bank of China (Fig. 10), this should have prompted a shortening of the central bank balance sheet and thereby a monetary tightening and interest rate increases. However, the potential monetary contraction was overcompensated by an expansion of central bank credit to the Chinese banking system (Fig. 11). Thus, the monetary policy pattern of the People’s Bank of China became resembling the crisis response patterns of the central banks of major industrialized countries.

The extension of central bank credit to Chinese banks became the basis for the extension of credit via state-controlled banks to Chinese enterprises, with credit provision becoming a policy tool to maintain the profitability of enterprises with still high overcapacities. As in China credit growth has been leading the changes of profits of Chinese enterprises (Fig. 12), the credit policy of the People’s Bank of China can be seen as an alternative way of subsidizing enterprises. While in the first phase of credit provision, mainly infrastructure projects and export-oriented enterprises were the main recipients, from 2019 onwards new regulation aimed to stimulate credit provision also to small and medium enterprises (Reuters 2019). Credit to households, for

instance via credit cards, is extended. A targeted stimulus of government expenditure and tax cuts aims to promote consumption of goods and services.

**Fig. 12: Changes in Credit Provision and Profits of Enterprises**



Source: BIS Credit Statistics and National Bureau of Statistics of China. Year-over-year changes vs. previous year quarter.

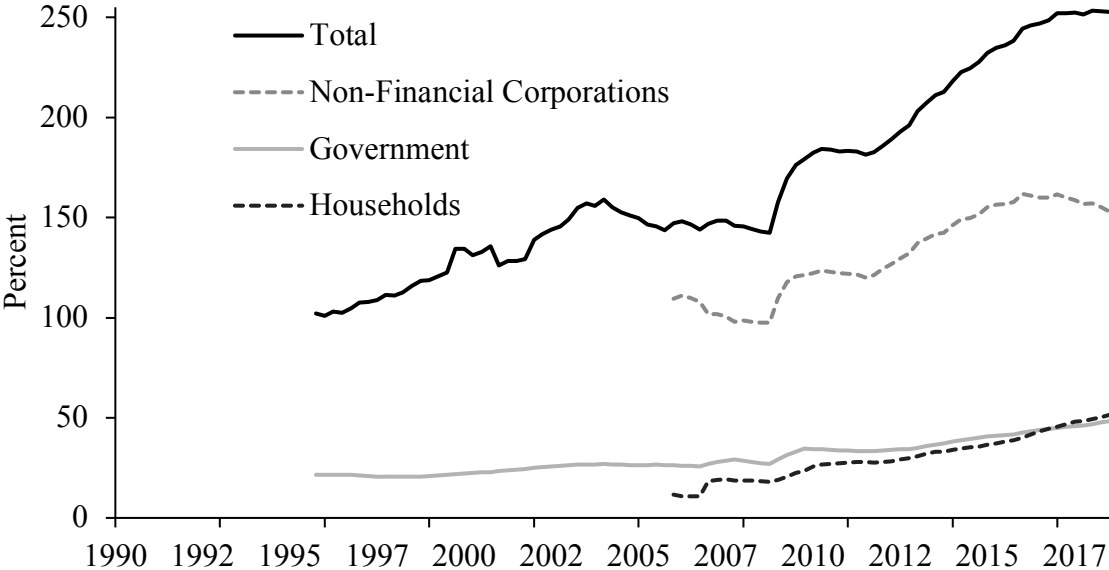
The upshot is, that corporate debt in China hiked from 93% in 2008 when the global financial crisis broke out and the government launched a large credit-financed expenditure program, to 155% of GDP by 2018 (Fig. 12), as lending to enterprises was extended and additional fiscal stimulus packages were put on track. The growing credit provision to the Chinese enterprise sector came along with a cut of the lending rate from 6.3% by 2012 to 4.3% by early 2019 (Fig. 5), pushing the real lending rate to about 2% (Fig. 7).

Whereas credit expansion in the face of crisis helps to prevent a deeper downturn in the short term (see e.g. Koo, 2005), from the point of view of Mises (1912) and Hayek (1931) growth is paralyzed in the long-term. The reason is that low-return investment projects are conserved and the shift of production factors into investment projects with higher marginal efficiency is prevented.<sup>13</sup> Investment projects with a low marginal efficiency, which would have become dismantled during the recession remain alive, with Schumpeter’s (1912) “cleansing effect”

<sup>13</sup> Summers (2014) regards the slowing productivity growth in major industrialized countries as exogenous and thereby being delinked from monetary policy.

being set out.

**Fig. 12: China: Debt by Sector (Percent of GDP)**



Source: BIS Credit Statistics. Including domestic and foreign debt.

**4.3. Long-term Growth Effects of Subsidized Credit Expansion**

According to Hayek (1931), the interest rate has an allocation and signaling function. For instance, given a lending rate of – say – 5% investment projects with an expected return of more than 5% would be financed. Credit applications for investment projects with an expected return of less than 5% would be declined. With a continuously falling lending rate, the average return of financed investment projects falls as well. In addition, under normal market conditions a higher interest rate would be charged on investment projects with higher risk, thereby discouraging investment with a high probability of default. With the interest rate being depressed by central banks, this signaling function is undermined. The probability of risky investment projects with low or negative expected return is increasing.

Given the extensive credit expansion, China is prone to gradually slip into financial repression as described by McKinnon (1973) and Shaw (1973) for Asian, Latin American and Central and Eastern European countries in the 1950s and 1960s. By then, set of policies such as expansionary monetary policy, domestic bank regulation, high reserve requirements, interest rate ceilings, price inflation, foreign exchange restrictions and capital controls was used to



extract cheap credit from the financial systems, which was directed into pre-specified key sectors of the economy.

In China, externally imposed financial repression – as it prevailed between 2000 and 2014 due to buoyant hot money inflows – has turned into internally imposed financial repression since 2014 (McKinnon and Schnabl 2014). Funds are mostly funneled into the export-oriented industries and large domestic infrastructure projects. In addition, publicly-led foreign infrastructure projects – the so-called One Belt One Road Initiative – aim at securing alternative export markets in the long-term.

A quasi-centrally planned allocation of credit, which is widely independent from efficiency criteria faces a higher likelihood of financing low- or negative-return investment projects. With job creation being the dominant motive, also the average marginal efficiency of infra-structure projects can be expected to decline. Previous literature has identified a similar process for Japan, where the overinvestment boom has ended in the late 1980s and has triggered an increasingly loose monetary policy of the Bank of Japan (Ueda 1992). The government has run large debt-financed investment projects. The central bank has bought large amounts of government bonds and continued to extend low-interest credit to commercial banks, which continued to provide low-interest credit to private enterprises.

To prevent bank runs, Japanese commercial banks have tended to disguise their bad loans by prolonging loans for low-return investment without adequate mark-ups for risk. This process is characterized by Sekine, Kobayashi, and Saita (2003) as forbearance lending. Peek and Rosengreen (2005) have linked the Bank of Japan's zero interest rate policy with a misallocation of capital in low-return investment projects, thereby impeding innovation and high-return investment. Caballero, Hoshi and Kashyab (2008) have created the notion of zombie lending, which has depressed restructuring in Japan. The profits of healthy firms are reduced, as their market entry and investment are discouraged.<sup>14</sup>

---

<sup>14</sup> Acharya et al. (2018) show for the euro area that unconventional monetary policy measures have helped euro area banks to extend credit to unproductive enterprises. Adalet McGowan et al. (2017) show that a growing share of zombie enterprises are having a negative impact on productivity growth in Europe.

With now China embarking on a similar low interest rate path, it seems to follow Japan (Schnbl 2017). The market forces, which have been unchained by earlier reforms since Deng Xiaoping are threatened to be paralyzed. From a microeconomic perspective “X-inefficiency” (Leibenstein 1966) emerges: If enterprises expect that quasi-unconditional credit will be continued, their pursuit of innovation and cost savings will be discouraged. On a macroeconomic level the budget constraint for the whole economy is softened, as described by Kornai (1986) for the former central and eastern European planning economies: To prevent unemployment, non-profitable enterprises were kept alive by low-cost credit from the state-owned banking sector. The consequence was a lasting stagnation and gradual decay of the capital stock and the infrastructure.

Meanwhile, also for China a discussion concerning the zombification of the corporate sector has emerged, with a focus on large state-owned enterprises. He (2016) argues that there are many zombie enterprises, which are kept alive by continuous credit support from banks and governments. He defines zombie enterprises as enterprises losing money and borrowing below market interest rates, with borrowing the more, the more they lose. He sees them clustered in highly indebted industries with overcapacities such iron, steel, aluminum, and cement. The threat of hiking unemployment and the potential loss of tax revenues are seen as the greatest impediments to a restructuring.

Shen and Chen (2017) provide based on Chinese firm-level data evidence in favor of overcapacities in the manufacturing sector between 2011 and 2013, with a focus being identified in the heavy chemical sector and state-owned enterprises. Tan, Huang and Woo (2016) show that after 2005 public investment sustained the performance of zombie firms at the cost of more efficient firms, thereby depressing industrial output. Quian and Xu (1998) had argued that in the former communist countries the lack of commitment of the responsible bureaucracies to hard financial constraints interfered with the screening ability concerning profitable investment projects. China is likely to return towards lower productivity gains, which will put a restraint on long-term growth, disturbing the economic catch-up process.

## **5. Outlook**

With far-reaching market-oriented reforms and comprehensive macroeconomic stabilization measures China has unchained an impressive growth performance, which had since the 1990s

significant positive spill-over effects on growth in industrialized countries. Due to a high savings rate and buoyant capital inflows from the industrialized countries investment has been the main driver of Chinese growth, transforming China into a hub of East Asian and global industrial production. In particular, since the outbreak of the global financial crisis in the year 2008 China has fulfilled a prominent role for stabilizing the global economy both due to its high growth momentum and large credit-financed fiscal spending programs.

Unlike Japan, the investment and export-driven catch-up process has occurred in an environment of continuously declining interest rates in the industrialized countries, which have generated the risk of overinvestment, i.e. investment with low or negative marginal returns. With the interest rate falling below growth, the return of investment could only be augmented by leveraging via debt. The hidden subsidies have been shifted to the Chinese households via negative real deposit rates, high real estate prices and real wage increases below productivity increases.

It has been shown based on the monetary overinvestment theory that investment with low marginal efficiency induced by benign financing conditions is likely to become a drag on long-term growth as already experienced in Japan. As China's economic catch-up process is not yet terminated, with GDP capita remaining far below the industrialized countries, the cementation of distorted economic structures undermines China's catch-up process. Therefore, the reconstitution of the allocation and signalling function of the interest is recommended.

For this purpose the interest rate has to be gradually lifted, the banking sector has to be exposed to efficiency constraints, with credit allocation decisions being strongly based on the profitability of the investment projects. As the monetary tightening would cause growing capital inflows from the low-interest rate industrialized countries, China would have to restore inward-bound capital controls. China is large enough to isolate its capital market from the world capital market without disturbing competition too much. Domestically-driven growth could be created, which would – if inflation is kept low – strengthen the yuan and its international role.

China would have to allow for a temporary adjustment recession and the resulting unemployment. Yet, because the potential for economic catch-up is still large and the labor force is highly motivated, this adjustment process can be expected to be comparatively short. With resources being shifted to more productive uses, growing real wages would allow for a

more consumption-based growth model. China would be less dependent on exports, which would strengthen its bargaining position in international trade negotiations. With real wages growing, the satisfaction of the Chinese people further grows. China could return to its role as global growth engine with positive spill-over effects on the low-growth industrialized countries.

## References

- Acharya, V. V., Eisert, T., Eufinger, C., and Hirsch, C. W., 2019. Whatever it Takes: The Real Effects of Unconventional Monetary Policy. *Review of Economics and Statistics* <https://doi.org/10.1093/rfs/hhz005>.
- Adalet McGowan, M., Andrews, D. and Millot, V., 2017. The Walking Dead: Zombie Firms and Productivity Performance in OECD Countries. *OECD Economics Department Working Paper No. 1372*.
- Ahuja, A., and Malhar N., 2012. Investment-Led Growth in China: Global Spillovers. *IMF Working Paper WP/12/267*.
- Baker, G., Gibbs, M., and Holmstrom, B., 1993. Hierarchies and Compensation: a Case Study. *European Economic Review*, Vol. 37 (2-3), pp. 366-378.
- Balassa, B., 1964. The Purchasing Power Parity Doctrine: A Reappraisal. *Journal of Political Economy*, Vol. 72, pp. 584-596.
- Balding, C., 2019. China Has a Dangerous Dollar Debt Addiction. *Bloomberg Online*, 6.1.2019.
- Bergsten, F., 2010. Correcting the Chinese Exchange Rate: An Action Plan. *Testimony before the Committee on Ways and Means, U.S. House of Representatives*, U.S. House of Representatives, Washington D.C., 24.3.2010.
- Bernanke, B., 2000. Japanese Monetary Policy: A Case of Self-induced Paralysis?. in M. Ryoichi and A. Posen, eds, *Japan's Financial Crisis and Its Parallels to U.S. Experience*, Washington, DC: Institute for International Economics, pp. 149–166.
- Bernanke, B., 2014. The Federal Reserve: Looking Back, Looking Forward. *Speech at the Annual Meeting of the American Economic Association*, Philadelphia, 3.1.2014.
- Bouvatier, V., 2006. Hot Money Inflows in China: How the People's Bank of China Took up the Challenge. *Centre d'Economie de la Sorbonne. Cahiers Economique*.
- Caballero, R., Hoshi, T., and Kashyap, A., 2008. Zombie Lending and Depressed Restructuring in Japan. *American Economic Review*, Vol. 98 (5), pp. 1943–1977.
- Chang, D., 1988. China under Deng Xiaoping: Political and Economic Reform. *St. Martin's Press*, New York.

- Cline, W., 2005. The Case for a New Plaza Agreement. *Policy Briefs in International Economics PB05-4*. Institute for International Economics, Washington D.C.
- Corsetti, G., Pesenti, P., and Roubini, N., 1999. Paper Tigers? A model of the Asian Crisis. *European Economic Review*, Vol. 43, pp. 1211-1236.
- European Chamber, 2016. *Overcapacity in China: An Impediment to the Party's Reform Agenda*. European Union Chamber of Commerce in China, Beijing. Available from: <http://www.europeanchamber.com.cn>.
- Feyzioglu, T., Porter, N., and N., Takáts, E., 2009. Interest Rate Liberalization in China. *IMF Working Papers* 09/171.
- Fogel, R., 2007. Capitalism and Democracy in 2040: Forecasts and Speculations. *NBER Working Paper* 13184.
- Fukumoto, T., and Muto, I., 2012. Rebalancing China's Economic Growth: Some Insights from Japan's Experience. *China & World Economy*, Vol. 20 (1), pp. 62–82.
- Glaeser, E., Huang, W., Ma, Y., and Shleifer, A., 2017. A Real Estate Boom with Chinese Characteristics. *Journal of Economic Perspectives*, Vol. 31 (1), pp. 93-116.
- Hamada, K., and Horiuchi, A., 1987. The Political Economy of the Financial Market. In Yamamura, K. and Yasuba, Y. (Eds.), *The Political Economy of Japan, The Domestic Transformation*, Stanford, pp. 223-260.
- Hayek, F. A., 1931. Prices and Production. *August M. Kelly*, New York.
- Ha, J., and Deng, Y., 2019. The China-US Trade Conflict and Its Impact. In: US-China Economic Relations: From Conflict to Solutions. *Peterson Institute for International Economics Briefing*, pp. 17-40.
- He, F., 2016. Dealing with Zombie Enterprises in China. *East Asia Forum*, 20.11.2016.
- Koo, R., 2003. Balance Sheet Recession: Japan's Struggle with Uncharted Economics and its Global Implications. *Wiley and Sons*.
- Jensen, M., 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review*, Vol. 76 (2), pp. 323-329.
- Knight, J., and Ding, S., 2010. Why Does China Invest So Much?. *Asian Economic Papers*, Vol. 9 (3), pp. 87-117.
- Kornai, J., 1986. The Soft Budget Constraint. *Kyklos*, Vol. 39 (1), pp. 3-30.
- Laubach, T., and Williams, J., 2015. Measuring the Natural Rate of Interest Redux. *Federal Reserve Bank of San Francisco Working Paper* 2015-16.
- Leibenstein, H., 1966. Allocative Efficiency vs. „X-Efficiency“. *American Economic Review*, Vol. 56 (3), pp. 392-415.

- Lian, Y., and Chung, C., 2008. Are Chinese Listed Firms Over-investing?, Available at: <http://dx.doi.org/10.2139/ssrn.1296462>
- Ma, G. N., Ivan, R., and Kelly, G., 2016. A Rebalancing Chinese Economy: Challenges and International Implications. *Australian Centre for Financial Studies*, Melbourne.
- Ma, G., and McCauley, R., 2007. Do China's Capital Controls Still Bind?. Implications for Monetary Autonomy and Capital Liberalisation. *BIS Working Papers* 233.
- Maliszewski, W., Arsanalp, S., Caparusso, J., Garrido, J., Guo, S., Kang, J. S., Lam, R., Law, D., Liao, W., Rendak, N., Wingender, P., Yu, J., and Zhang, L., 2016. Resolving China's Corporate Debt Problem. *IMF Working Paper* 16/203.
- Mann, C., 1986. Prices, Profit Margins and Exchange Rates. *Federal Reserve Bulletin*, Vol. 72 (6), pp. 366-379.
- Marston, R., 1990. Pricing to Market in Japanese Manufacturing. *Journal of International Economics*, Vol. 29, pp. 217-236.
- Martin, M., and Morrison, W., 2008. China's "Hot Money" Problems. *CRS Report for Congress*, Washington, D.C.
- Maskin, E., and Xu, C., 2001. Soft Budget Constraint Theories: From Centralization to the Market. *Economics of Transition*, Vol. 9 (1), pp. 1-27.
- McKinnon, R., 1973. Money and Capital in Economic Development. *The Brookings Institution*, Washington D.C.
- McKinnon, R., and Schnabl, G., 2009. The Case for Stabilizing China's Exchange Rate: Setting the Stage for Fiscal Expansion. *China & World Economy*, Vol. 17 (1), pp. 1-32.
- McKinnon, R., and Schnabl, G., 2012. China and its Dollar Exchange Rate. A Worldwide Stabilizing Influence?. *The World Economy*, Vol. 35 (6), pp. 667-693.
- McKinnon, R., and Schnabl, G., 2014. China's Exchange Rate and Financial Repression: The Conflicted Emergence of the Renminbi as an International Currency. *China & World Economy*, Vol. 22 (3), pp. 1-34.
- Mises, L. von, 1912. Die Theorie des Geldes und der Umlaufmittel, Leipzig: *Duncker und Humblot*.
- Mosher, S., 2002. Hegemon: China's Plan to Dominate Asia and the World. *Encounter Books*, New York.
- Murphy, K., 1985. Corporate Performance and Managerial Remuneration: An Empirical Analysis. *Journal of Accounting and Economics*, Vol. 7, pp. 11-42.
- Olsen, K., 2018. Brace for corporate defaults as Chinese firms with dollar debts are 'under increasing pressure'. *CNBC Online*, 18.11.2018.

- Qian, Y. Y., and Xu, C. G., 1998. Innovation and Bureaucracy under Soft and Hard Budget Constraints. *Review of Economic Studies*, Vol. 65 (1), pp. 151–64.
- Qin, D., and Song, H., 2009. Sources of investment inefficiency: The case of fixed-asset investment in China. *Journal of Development Economics*, Vol. 90, pp. 94-105.
- Page, J., 2019. China Counts the Costs of Its Big Bet on Venezuela. *Wall Street Journal Online*, 1.2.2019.
- Peek, J., and, Rosengren, E. S., 2005. Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan. *American Economic Review*, Vol. 95 (4), pp. 1144-1166.
- Prasad, E., 2018. Gaining Currency: The Rise of the Renminbi, *Oxford University Press*, Oxford.
- Rey, H., 2018. Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence. *NBER Working Paper 21162*.
- Reuters, 2019. China to Step up Bank Reserve Ratio Cuts to Help Small Firms. *Reuters Business News* 7.4.2019.
- Samuelson, P., 1964. Theoretical Notes on Trade Problems. *Review of Economics and Statistics*, Vol. 46, pp. 145-154.
- Schnabl, G., 2019. Central Banking and Crisis Management from the Perspective of Austrian Business Cycle Theory. *CESifo Working Paper 6179*. Forthcoming in Mayes, D., Siklos, P., Sturm, J. (Eds.), *Handbook The Economics of Central Banking 2019*, Oxford University Press, Oxford, pp. 551-584.
- Schumpeter, J., 1912. *The Theory of Economic Development*. Cambridge, Massachusetts.
- Sekine, T., Kobayashi, K., and Saita, Y., 2003. Forbearance lending: The case of Japanese firms. *Bank of Japan Institute for Monetary and Economic Studies*, Vol. 21 (2), pp. 69–92.
- Shaw, E.S., 1973. *Financial Deepening in Economic Development*. Oxford University Press, Oxford.
- Shen, G., and Chen, B., 2016. Zombie Firms and Over-Capacity in Chinese Manufacturing. *China Economic Review*, Vol. 44, pp. 327-342.
- Solow, R., 1956. A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, Vol. 70 (1), pp. 65–94.
- Solow, R., 1957. Technical Change and the Aggregate Production Function. *Review of Economics and Statistics*, Vol. 39 (2), pp. 312–320.
- Swan, T. W., 1956. Economic Growth and Capital Accumulation. *Economic Record*, Vol. 32 (2), pp. 334–361.
- Summers, L., 2014. U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound. *Business Economics*, Vol. 49 (2), No. 2, pp. 65–73.

- Tan, Y., Huang, Y., and Woo, W. T., 2016. Zombie Firms and the Crowding Out of Private Investment in China. *Asian Economic Papers* 15 (3), pp. 32-55.
- Ueda, K., 2012. Deleveraging and Monetary Policy: Japan since the 1990s and the United States since 2007. *The Journal of Economic Perspectives*, Vol. 26 (3), pp. 177–201.
- Yu, Y. D., 2012. Rebalancing the Chinese Economy? *Oxford Review of Economic Policy* 28(3), pp. 551-568.
- Wang, Y. H., and Hu, A. G., 2007. Multiple Forces Driving China's Economic Development: A New Analytic Framework. *China & World Economy*, Vol. 15 (3), pp. 103–120.
- Zhang, J., 2003. Investment, investment efficiency, and economic growth in China. *Journal of Asian Economics*, Vol. 14, pp. 713-734.
- Zhang, L. M., 2016. Rebalancing in China—Progress and Prospects. *IMF Working Papers* WP/16.183.
- Zoller-Rydzek, B., and Felbermayr, G., 2018. Wer bezahlt Trump's Handelskrieg mit China? *ifo-Schnelldienst*, Vol. 71 (22) , pp. 30-35.