Flossbach von Storch
RESEARCH INSTITUTE

MACROECONOMICS 12/11/2019

Reasons for the Demise of Interest: Savings Glut and Secular Stagnation or Central Bank Policy?*

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Abstract

In this paper we compare the Keynesian, neoclassical and Austrian explanations for low interest rates and sluggish growth. From a Keynesian and neoclassical perspective low interest rates are attributed to ageing societies, which save more for the future (global savings glut). Low growth is linked to slowing population growth and a declining marginal efficiency of investment as well as to declining fixed capital investment due to digitalization (secular stagnation). In contrast, from the perspective of Austrian business cycle theory, interest rates were step by step decreased by central banks to stimulate growth. This paralyzed investment and growth in the long term. We show that the ability of banks to extend credit ex nihilo and the need of time to produce capital invalidates the IS identity assumed in the Keynesian theory to hold permanently. Furthermore, we find no empirical evidence for the global savings glut and secular stagnation hypotheses. Instead, low growth can be explained by the emergence of quasi "soft budget constraints" as a result of low interest rates, which reduce the incentive for banks and enterprises to strive for efficiency.

Key words: Mises, Hayek, Keynes, Hansen, Summers, secular stagnation, aging societies, global savings glut, monetary policy, central banks, credit creation.

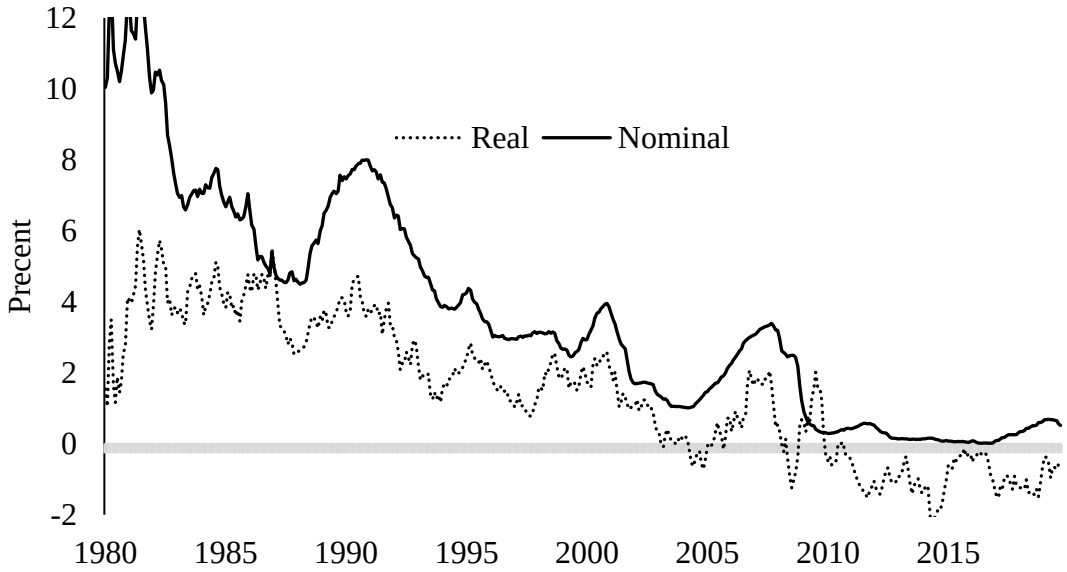
JEL codes: E12, E14, E32, E43.

* We thank Karl-Friedrich Israel for useful comments and Alexander Wagner for excellent research assistance.

1. Introduction

Since the 1980s, slower economic growth in the industrial countries has been accompanied by lower interest rates, with real interest rates turning negative more recently (Figure 1). At the same time, investment, productivity and real growth have continued to slow down. Different schools of thought have provided different theoretical and empirical explanations. Based on Keynes (1936) and Hansen (1939), Bernanke (2005) and Summers (2014) have attributed secularly declining real interest rates to a global savings glut driven by ageing societies, a declining demand for fixed capital investment, and a declining marginal efficiency of fixed capital investment (Gordon 2012). Lukasz and Summers (2019) argue that "*the neutral real rate for the industrial world has trended downward for the last generation and this is best understood in terms of changes in private sector saving and investment propensities*". In this view, by setting the interest rate to or below zero central banks simply adjust to the exogenous forces of the secular stagnation.

Figure 1: Nominal and Real Short-term Interest Rates in US, Japan and Germany



Source: IMF. Arithmetic mean. Real interest rates calculated based on official consumer price inflation statistics with hedonic price measurement.

In contrast, from the point of view of Austrian economic theory according to Mises (1912) and Hayek (1931), human beings strive to achieve their goals rather earlier than later and therefore have a positive time preference. This makes negative interest rates under free market conditions impossible (Mises 1940). This proposition is in line with the finding of Homer and Sylla (2005)

that through most of economic history real interest rates were positive. In this spirit, based on the monetary overinvestment theories of Mises (1912) and Hayek (1931) and in line with Borio and White (2004) and White (2006), Schnabl (2019) has argued that the gradual decline of interest rates in the industrialized countries has been due to asymmetric monetary policies: Strong interest rate cuts during crisis were not followed by respective interest rate increases during the post-crisis recovery.

The question of whether the gradual decline of real and nominal interest rates in the industrialized countries (and the rest of the world) is due to structural (i.e. predetermined) developments as suggested inter alia by Keynes (1936), Hansen (1939) and Summers (2014), or due to discretionary policy decisions made by central banks, is crucial for the economic policy agenda. The Keynesian interpretation justifies further interest rate cuts even below zero[1] as well as fiscal expansion. In contrast, given the Austrian interpretation, only the exit from low and negative interest rate policies can reanimate economic activity. In this paper we compare the two approaches and derive policy implications.

2. The Keynesian and Neoclassical Interpretation of Low-Interest Rates and Growth

The close relationship between declining nominal and real interest rates and declining (productivity) growth is in the Keynesian and neoclassical view due to exogenous factors, which affect supply and demand on the capital market, thereby pushing the real interest rate downwards. In the spirit of Hansen (1939), Bernanke (2005) attributes a savings glut to the aging of societies. People are seen to save more for the future, thereby increasing the supply of loanable funds on capital markets. A decline of profitable investment opportunities is seen to reduce the demand for loanable funds (Summers 2014).

2.1. Savings Glut, Secular Stagnation and the Keynesian Natural Interest Rate

After the turn of the millennium, following the sharp interest rate cuts of the US Federal Reserve in response to the bursting of the dotcom bubble, Bernanke (2005) attributed an increasing US current account deficit (i.e. growing net capital inflows to the US) and the decline of world interest rates to factors outside the US: „*A global saving glut (...) helps to explain both the increase in the US current account deficit and the relatively low level of long-term real interest*

[1] Agarwal and Kimball (2019) from the IMF have compiled a guide for central banks how to enable deep negative interest rates to fight recessions.

rates in the world today." Bernanke (2005) argued that ageing populations in a number of industrial countries and several emerging market economies such as China had shifted these countries from net borrowers on international capital markets to net lenders, thereby inflating net capital flows to the US.

According to Bernanke (2005) East Asian countries were accumulating foreign reserves to boost the competitiveness of their exports and as war chests against balance of payments crises.[2] Bernanke (2005) also observed increasing US dollar revenues of oil and raw material exporting countries due to rising oil prices, which were invested to a large extend in US dollar assets. Pre-subprime crisis pull factors attracting capital flows to the US were fast productivity growth, strong property rights, and a robust regulatory environment.

After the outbreak of the subprime crisis, which cumulated in a global financial crisis in 2008 and prompted the Federal Reserve (and other large central banks) to cut interest rates to zero, Summers (2014) provided a comprehensive framework to explain a global decline of nominal and real interest rates from a capital market perspective. On the supply side of the capital market, based on Hansen (1939)[3] and Bernanke (2005), Summers (2014) linked low birth rates in industrialized countries to growing savings, because ageing societies were supposed to save more for the future.[4] He associated growing income inequality with a declining (increasing) marginal propensity to consume (save) of large parts of the populations.[5] Following Bernanke (2005), a continuing reserve accumulation in emerging market economies was identified as reason for increasing demand for safe assets in the US.[6]

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2 In 1997/98, the Asian crisis, which had been caused by large net capital inflows, overinvestment and current account deficits, had put an abrupt end to the economic miracle in a set of Southeast Asian countries (Corsetti et al. 1999).

3 In the 1930s, Hansen (1939) had argued that low growth was caused by slowing population growth and limited scope for technological innovation, which he had dubbed "secular stagnation".

4 Keynes (1936) distinguishes eight savings motives from an individual perspective: preference for private profit (i.e. interest), intertemporal substitution motive, life-cycle motive due to decreasing income after retirement, precautionary motive, independence motive, enterprise motive, bequest motive, and avarice motive. The theory of a savings glut in an aging society randomly picks out the life-cycle motive and applies it to the entire society. Von Weizsäcker (2014) transferred the concept of Summers (2014) to Germany and demanded an expansionary fiscal policy to lift interest rates. Meanwhile, the pressure on German fiscal policy to become more expansionary to increase the inflation rate (and thereby to allow the ECB to lift the interest rate) is growing.

5 Keynes (1936) argued that the growth of income over time had increased the savings rate of the society, leading to a structural rise of savings over investment.

6 As the Fed strongly cut interest rates in response to the burst of the dotcom bubble after the year 2000, capital flows to East Asia accelerated. With the East Asian countries stabilizing their exchange rates against the dollar, the accumulation of dollar reserves and thereby the purchases of US government bonds strongly increased (see McKinnon and Schnabl 2012).

On the demand side of global capital markets, Summers (2014) linked a shrinking demand for fixed capital investment to changes in technology, with IT-related companies being assumed to have a lower demand for capital. Like Bernanke (2005) and Gordon (2012) Summers (2014) argued that the potential of innovations to increase productivity has structurally declined. The resulting decline in the demand for capital goods was supposed to have come along with declining prices for capital goods, therefore leading to a further decline in nominal investment. As household savings rise, they drag down, in the view of Summers (2014), expected aggregate demand and corporate investments, which induces higher corporate savings.[7] Given increasing savings and declining investments derived from these exogenously set "stylized facts", the savings curve in a neoclassical capital market setting shifts to the right and the investment curve shifts to the left. The equilibrium (or natural/neutral) interest rate falls, possibly below zero.[8]

In practice, the natural or neutral interest is not observable and can only be derived from structural models. Compilations of natural interest rates are based on the notion of Wicksell (1898) that the natural interest rate keeps prices stable and output at its potential (see Woodford (2003)).[9] Laubach and Williams (2015) as well as Rachel and Summers (2019) define the natural or neutral interest rate as the real short-term interest rate, which is consistent with the economy operating at its full potential without upward or downward pressure on consumer price inflation. Gourinchas and Rey (2019) see a structural decline of consumption-wealth-ratios as proxy for a declining natural interest rate.

Laubach and Williams (2015) as well as Rachel and Summers (2019) derive the output gap from a Keynesian IS-curve,[10] with inflation being determined by the level of unemployment, i.e. the Phillips curve. Given a negative output gap and declining (measured)[11] consumer price

[7] Which can be also seen as cash hoarding.

[8] In the neoclassical theory it is assumed that the real interest rate is equivalent to marginal productivity of capital, which equilibrates supply and demand on capital markets. Thus, the market equilibrium interest rate is determined by the marginal utility of exchanging present goods against future goods (supply on capital markets) and the marginal return on capital (demand on capital markets). However, only the latter can be empirically observed.

[9] Wicksell's (1898) natural rate ensures price stability (zero inflation). In contrast, the notion of the natural rate by Laubach and Williams (2015) as well as Rachel and Summers (2015) ensure a stable rate of price inflation (for example 2%). The notion of Wicksell (1898) is narrower. It would coincide only when the target for the stable price inflation rate is 0%.

[10] The IS-curve represents all equilibrium combinations of the real interest rate i and the real income Y at which the goods market is ceteris paribus in equilibrium.

[11] Meanwhile, a discussion has emerged, if officially measured inflation rates are understated or overstated. A core point in this discussion is, how changes in quality of goods should be incorporated in inflation measurement (hedonic price measurement). Whereas one side argues that quality improvements are not

inflation their compiled natural or neutral interest rate declines since the 1980s. The decline accelerates since the 2007/2008 global financial crisis, turning negative recently. This trend is confirmed by the estimations of Jordá and Taylor (2019), who argue that half of the trend is due to structural factors such as productivity growth and demography and half of the trend is due to central banks.

To derive policy implications, Laubach and Williams (2015) insert the derived natural interest rate into the Taylor (1993) rule. The original Taylor rule assumes a real interest rate of 2%, which was constant and close to the – by then – observed long-term US growth rate of 2.2%. Given an assumed inflation target of 2%[12], this implied at the time a long-term equilibrium or nominal natural interest rate of 4%, which was equivalent to the inflation target, if inflation and output were at target levels.[13] By inserting their implied declining natural interest rate into the Taylor rule, Laubach and Williams (2015) derive the policy recommendation to gradually decrease the key policy interest rate towards or even below zero. If the natural interest rate falls, the policy maker has to cut the nominal interest rate to achieve the inflation target.

2.2. The Keynesian-Neoclassical Framework

In the seminal Keynesian framework, consumption is determined by real income (Y), with the propensity to consume declining over time (as in Keynes 1936). Bernanke (2005) and Summers

sufficiently incorporated in hedonic price measurement (Feldstein 2017), others see declining quality to be overlooked (Komlos 2018, Kitov 2012, Linz and Eckert 2002). Furthermore, the question arises, if asset price inflation (for instance for owner-occupied housing) should be included in inflation measurement, as monetary policy is increasingly transmitted to financial markets rather than goods markets (Schnabl 2015a).

[12] Note that different central banks use different measures of inflation for monetary policy making. „*The FOMC noted in its statement that the Committee judges that inflation at the rate of 2 percent as measured by the annual change in the* ***price index for personal consumption expenditures****, or PCE) is most consistent over the longer run with the Federal Reserve's statutory mandate*." (Board of Governors of the Federal Reserve System (2019). Market participants claim that the Fed is targeting core PCE, as it aims to stabilize inflation "over the long run". The European Central Bank aims to keep the percent change rate of the Harmonized Consumer Prices Index at "*close to but less than 2%*" in the medium term. It is unclear if the ECB is targeting headline or core inflation. An increasing number of commentators think that the ECB targets core inflation rather than headline inflation as in the past. The reason is that in cases when headline inflation was close to 2%, while core inflation was substantially below 2%, ECB representatives claimed to have missed the target. More generally, the ECB (2016) claims that "*many central banks, including the ECB, monitor a wide range of underlying inflation measures, which abstract from short-term volatility, to gauge inflationary trends. In addition to HICP inflation excluding energy and food, the ECB monitors various exclusion-based measures and model-based measures of inflation, as well as developments in long-term inflation expectations.*" The Bank of Japan (2013) "*sets the "price stability target" at 2 percent in terms of the year-on-year rate of change in the consumer price index (CPI) – a main price index*."

[13] The Taylor rule is $i = r^* + \pi^* + 0.5(\pi - \pi^*) + 0.5(y - y^*)$ with i being the nominal (central bank target) interest rate, r* being the real interest rate (assumed to be constant in the long term), π being the inflation rate and y being real output. π * marks the inflation target and y* the trend output.

(2014) argue that the propensity to consume (propensity to save) declines (increases), when the population is aging and the working age population is shrinking:

$$C = k(D)Y \tag{1}$$

where C denotes real consumption, k the marginal propensity to consume, D the ageing (shrinking) of the (working age) population and Y the real GDP, with D>0 and $\frac{dk}{dD} < 0$.

Real investment I is a function of the real interest rate i:

$$I = I(i) \tag{2}$$

Investment increases, when the interest rates falls ($\frac{dI}{di} < 0$).

The price level P is a function of the economy-wide capacity utilization (output gap), measured by the ratio between actual real GDP (Y) and potential real GDP (Y^{pot}).

$$P = P\left(\frac{Y}{Y^{pot}}\right) \tag{3}$$

Prices rise when real output grows above potential $\frac{dP}{d(\frac{Y}{Ypot})} > 0$.

Real GDP in a closed economy is the sum of consumption and investment:

$$Y = C + I \tag{4}$$

Inserting (1) and (2) in (4) and solving for Y yields:

$$Y = \frac{I(i)}{(1-k(D))} \tag{5}$$

Substituting (5) into (3) gives:

$$P = P(\frac{\frac{I(i)}{(1-k(D))}}{Y^{pot}}) \tag{6}$$

In this framework, if a society is ageing, the propensity to consume k decreases. The price level and output fall. To compensate this effect, a central bank pursuing an inflation target needs to decrease the real interest rate to increase investment, output and thereby the price level again, as explained by Laubach and Williams (2015) as well as by Rachel and Summers (2019).

Interest rate cuts are necessary to maintain the inflation target and an equilibrium in the goods market.

The IS model abstracts from the supply side as potential output is assumed to be given exogenously. It can be augmented, however, by adding a neoclassical element in the form of a production function, where potential output is dependent on the capital stock K:

$$Y^{pot} = Y^{pot}(K) \tag{8}$$

with the change in the capital stock being equivalent to investment ($\Delta K = I$).[14] Assuming profit maximization, the marginal product of capital equals its real return r:

$$r = \frac{\Delta Y^{pot}}{\Delta K} = \frac{\Delta Y^{pot}}{I} \tag{9}$$

An investment project would usually only be financed, when the real return is expected to be larger than the real interest rate on credit (i). Therefore, it is assumed that r is a linear function of the real interest rate or, conversely:

$$i = a\,\frac{\Delta Y^{pot}}{I} \tag{10}$$

where a is a parameter with $0 < a < 1$.

In this setting, in an ageing population the propensity to consume k falls, thereby boosting savings (as S = Y – C). The resulting decline in demand and output prompts the central bank to reduce i. At the same time, investment and productivity growth decline, which could lower r as argued by Summers (2014) and Gordon (2012).[15]

3. The Austrian Overinvestment Framework and the Role of the Financial Sector

The overinvestment theory by Mises (1912) and Hayek (1931) argues that an interest rate set below the natural interest rate causes an economic upswing, which turns into an economic

[14] For parsimony, we abstract from the depreciation of the capital stock.

[15] Note, however, that lower interest rates as a result of a savings glut (Summers 2014) conflict with the explanation of low interest rates as a result of slowing productivity growth (Gordon 2012). Summers (2014) assumes that the decline of output is due to increasing savings and declining consumption. This implies from the demand side a decline of output below potential output and therefore deflationary pressure. Gordon (2012) assumes a decline of potential output below output. This implies from the supply side growing inflationary pressure.

downswing when interest rates are lifted to contain inflation. The unsustainable boom is transmitted via credit creation of the banking sector. If interest rates are strongly cut in response to the downswing, distorted economic structures are conserved, which leads to persistently low growth.

3.1. The Austrian Overinvestment Framework

In the Austrian overinvestment framework (Mises 1912, Hayek 1931), a boom is triggered when the central bank sets the interest rate below the natural interest rate.[16] The natural interest rate is the interest rate, where savings are equivalent to investment (I=S). Initially, there are no structural distortions in the economy. An interest rate set by the central bank below the natural interest rate signals higher present savings and as a result higher consumption in the future. This provides an incentive to increase capacities for the production of consumption goods.

According to Böhm von Bawerk (1884) and Mises (1940), the interest rate is a measure for time preference, with finitely living people assigning greater value to goods and services today than goods and services available at a future point of time.[17] The borrowing of funds to produce capital goods requires the payment of interest as a compensation for the present consumption foregone on the part of the lender (agio). According to Böhm von Bawerk's (1884) concept of roundaboutness, this positive interest rate payment is possible, if the time-consuming move to a more capital-intensive production process allows a higher production in the future. If a roundabout would not deliver a more productive production process, people would not engage in time-consuming roundabouts of producing the capital goods required for an increase of consumption in the future.[18]

Before consumer goods can be produced, capital goods have to be produced. Whereas a high interest rate is an impediment for many investment projects with comparatively low expected return, a low interest rate stimulates investment, as the costs of roundabouts decline. In the overinvestment theory, if some enterprises start to invest in response to a lower interest rate, they need inputs from other enterprises, which extend their production capacities as well.

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16 For details see Schnabl (2019a).

17 Therefore, in the view of Austrian economists, the interest rate has to be always positive, because it always requires time to achieve a certain objective and this time is always scarce for mortal men.

18 But they could hoard products for future consumption if needed.

A cumulative upswing sets in, which is financed by credit creation of banks.[19] This allows real investment (I) to exceed temporarily real savings (S). Banks create additional credit to keep interest rates aligned with the central bank interest rate. In the first phase of the upswing, when not the full labor force is used, wages do not increase. The profits of banks and enterprises grow, which is reflected in rising stock prices.[20] When unemployment has declined to a low level, the negotiating power of labor unions is strengthened and wages rise. Enterprises have to lift prices to cover their costs, which pushes up inflation. When rising inflation forces the central bank to lift interest rates, the benchmark for the profitability of past and future investment projects is raised.

Given higher financing costs, incomplete investment projects have to be abandoned, and new investment projects become unprofitable. A cumulative downswing evolves. During the downswing – according to the monetary overinvestment theory – the central bank keeps the credit rate via the central bank interest rate above the natural interest rate, which falls as investment declines. As the central bank interest rate is kept above the natural interest rate, the downturn is aggravated. As unemployment grows, wages and prices fall. The dismantling of investment projects with low profitability as well as falling wages and prices are seen as pre-requisites for the economic recovery. The downswing entails a *cleansing effect* (Schumpeter (1912), as resources can be shifted to higher return investment projects.

3.2. Transmission via the Financial Sector

In the Keynesian model the central bank steers the money market interest rate directly via expanding the money supply, which is transmitted via the LM-curve[21]. There are neither banks nor capital markets. In contrast, the Austrian model includes a banking sector, which transmits the interest rate policy of the central bank to banks' credit rates and credit extension. Investment

[19] Ohlin (1937) argued in his loanable funds theory that nominal investment can be financed either by nominal planned household savings S or by credit creation of banks (ΔC): $I^n = S^n + \Delta C$. This implies that private banks can increase the money supply (ΔM) by providing credit (ΔC). To grant a credit to an enterprise or a household, the bank does not necessarily need to collect deposits from savers. By providing a loan, the bank enlarges its claims on the private sector on the asset side of the balance sheet. When the credit is transferred to the debtors' bank account, the deposits of the bank increase on the liability side of the balance sheet. With the interest rate being determined by credit supply and demand, an exogenous extension of credit reduces the equilibrium interest rate.

[20] Hayek (1931) also acknowledges that during an upswing stock and real estate prices can become delinked from fundamentals as speculation sets in.

[21] The LM-curve represents all combinations of the real interest rate i and real output Y at which the money market is in equilibrium. An equilibrium in the money market implies that money supply (M) equals money demand (L), which is equivalent to liquidity preference. According to Keynes' (1936) concept of liquidity preference, the interest is a monetary phenomenon, determined by supply and demand for money.

can increase the fixed capital stock (non-financial investment, e.g. machinery for producing consumer or investment goods) or financial assets.

To model the role of banks in financing investment we rewrite the relationship between nominal savings and nominal investment as

$$P^{nf} * I^{nf} + P^{f} * I^{f} = S^{n} + \Delta C \quad (11)$$

The term P^{nf} denotes the price for real non-financial investment goods I^{nf} (fixed capital investment) and P^{f} the price for real financial investments I^{f} such as stocks. S^n is equivalent to planned (nominal) savings out of existing money, ΔC is the credit (and money) creation of banks.[22] We assume that I^{nf}, I^{f} and ΔC are all negative functions of the interest rate i. If the interest rate falls, non-financial and financial investments grow and additional credit is created domestically. Planned savings are assumed to increase (fall), when the bank interest i increases (falls).

The prices of non-financial investments and financial investments are assumed to depend positively on investment activity. If more is invested, the prices of the real and financial investment goods rise:

$$P^{nf} = P^{nf}(I^{nf}) \text{ with } \quad \delta P^{nf}/\delta I^{nf}>0 \quad (12)$$

$$P^{f} = P^{f}(I^{f}) \quad \text{with } \delta P^{f}/\delta I^{f}>0 \quad (13)$$

If the bank interest rate i declines, planned savings decrease. Non-financial investment and financial investment increase, with the additional demand for funding covered by credit creation of domestic banks ($\Delta C>0$). The presence of banks allows the funding of non-financial and financial investment not only from existing planned savings but also from credit (i.e. new money) created by the banks. Nominal investment can temporarily be larger than saving:

$$P^{nf} * I^{nf} + P^{f} * I^{f} > S^{n} \quad (14)$$

[22] Money is created by banks through credit expansion. See also the loanable funds theory of Ohlin (1937). In a financially open economy, financial and non-financial investment can also be financed by net foreign lending.

During the upswing non-financial investment grows as low interest rates set by central banks signal higher present savings and thereby higher future consumption (Mises 1912, Hayek 1931). Resources are redirected from the production of consumer goods to the production of capital goods.[23] Alternatively, financial investment increases. As deposit rates are low, consumers have an incentive to withdraw deposits from banks and buy stocks of enterprises and banks, whose profits are increasing during the upswing. If stock prices are expected to rise further, speculation may set in, with the valuation of stocks becoming delinked from their fundamentals. A credit boom evolves, with prices of non-financial and financial investment rising. The speculative boom may also attract additional funds from abroad, as observed during the 2003 to 2007 US subprime boom and the boom in the southern European countries during the same time period.

When rising wages force enterprises to lift prices, the central bank targeting goods price inflation is forced to increase the central bank interest rate. Given higher interest rates, non-financial and financial investments with comparatively low expected returns become unprofitable and have to be abandoned. As the central bank keeps the interest rate high during the downswing, the commercial banks tighten credit ($\Delta C<0$). Non-financial and financial investment have to be abandoned and their prices fall. In the resulting recession, unemployment rises.

If central banks change interest rates in an asymmetric way – i.e. interest rates are cut more during the recession than they are lifted during the recovery after the crisis to prevent unemployment[24], interest rates will gradually decline towards zero as shown in Figure 1. Also, the average productivity of investment would be affected. While during the cumulative upswing, financial and non-financial investments with comparatively low marginal productivity are realized, these investment projects would not be abandoned during the downswing. The average productivity of investments would decline and growth dynamics would be weakened.

[23] As this tightens the supply of consumer goods, prices of consumer goods will drift upwards.

[24] From a historical perspective it has been argued that – in line with the overinvestment theory – the Federal Reserve has held money supply too tight during the Great Depression (Bernanke 1983). Under Federal Reserve chairman Alan Greenspan an asymmetric behavior emerged with respect to stock prices, as monetary policy tended to respond to falling stock prices while it refrained from intervening against rising stock prices as bubbles could not be identified (Hoffmann 2009). In the so-called Jackson Hole Consensus, US central bankers agreed that central banks do not have sufficient information to spot and prick bubbles, but should intervene in times of financial turmoil (Blinder and Reis 2005).

4. Empirical Evidence

In both the Keynesian/neo classical and the Austrian framework, the natural or neutral interest rate is a theoretical concept, which cannot be observed directly in reality. Empirical estimations of the natural interest rate as discussed in section 2 are only as reliable as the underlying model is an appropriate representation of the reality. Any specification errors would be captured by the interest rate i derived from the model. The Keynesian model lacks a banking sector and ignores credit (or money) creation by banks. Furthermore, the Phillips-curve relating the output gap to inflation, on which the Keynesian model relies, has flattened and has become unstable[25] in most industrialized countries such as US, Japan and Germany as shown in Figures 14 and 15 in the appendix.

4.1. Global Savings Glut, Ageing Society and Increasing Inequality

A core argument of the secular stagnation hypothesis is that interest rates have been driven down by ageing societies, where people strive to save for the future (section 2). This would imply that low birth rates in the industrial countries and China would go along with growing household savings rates.

To provide empirical evidence for the savings glut hypothesis, Demary and Voigtländer (2018) estimate an econometric model explaining real interest rate developments in 24 OECD countries with proxies for the savings glut (life expectancy, old age dependency, young age dependency) and secular stagnation (total factor productivity growth, labor force growth). Total factor productivity growth has no statistically significant effect on real interest rates. The old and young age dependency ratios have a statistically significant negative influence on real interest rates, but in contrast to the savings glut hypothesis only the young age dependency has a positive effect on savings.[26]

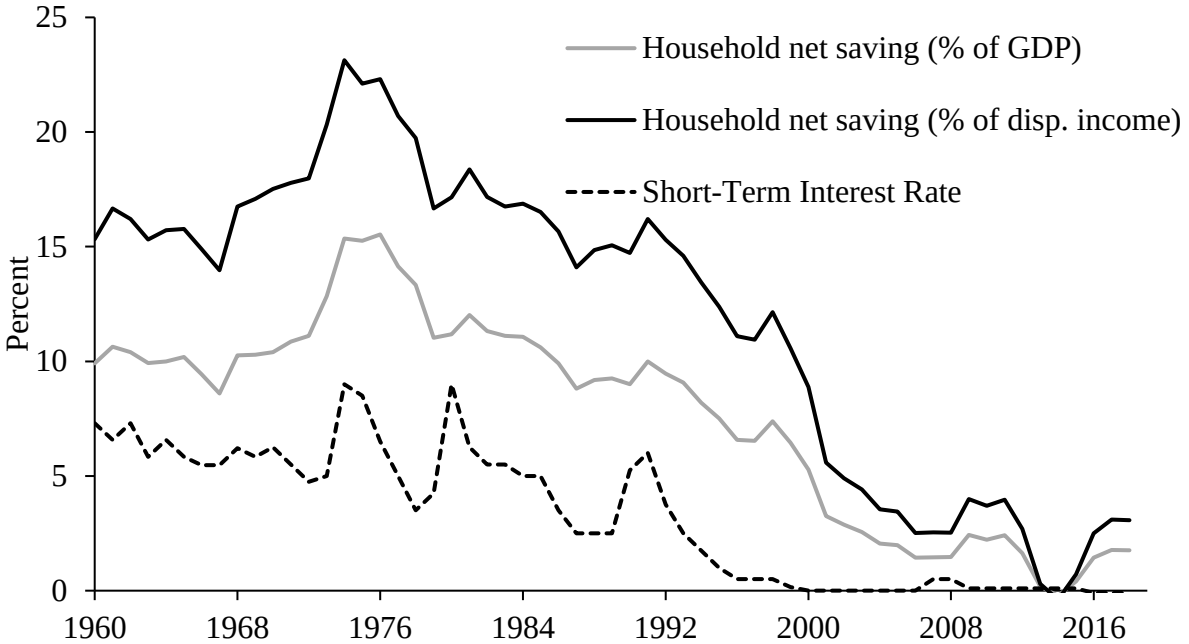
Empirically the link between ageing populations and household savings rates is weak. The most prominent example is Japan, where since the 1980s the fast ageing of the society has come along with declining household savings rates. Figure 2 shows that together with the short-term interest rate, which has been pushed down by the Bank of Japan to zero, household net savings

[25] See Hooper, Mishkin and Sufi (2012) and Israel (2017).

[26] Thus, the results are inconsistent with both the savings glut and the secular stagnation hypotheses. Furthermore, the specification ignores credit creation for investment by the banking sector and interest rate setting by central banks as determinants of the real interest rate, therefore suffering from omitted variable bias.

as percent of GDP and as of disposable income has declined as well. Latsos (2019) shows empirically that the main determinant of Japanese household savings rates has been the declining interest rate set by the Bank of Japan, with interest rate cuts constituting an incentive to save less. This is in stark contrast to the ageing society hypothesis of Bernanke (2005), Summers (2014) and von Weizsäcker (2014).

Figure 2: Household Saving Rate and Short-term Interest Rate in Japan



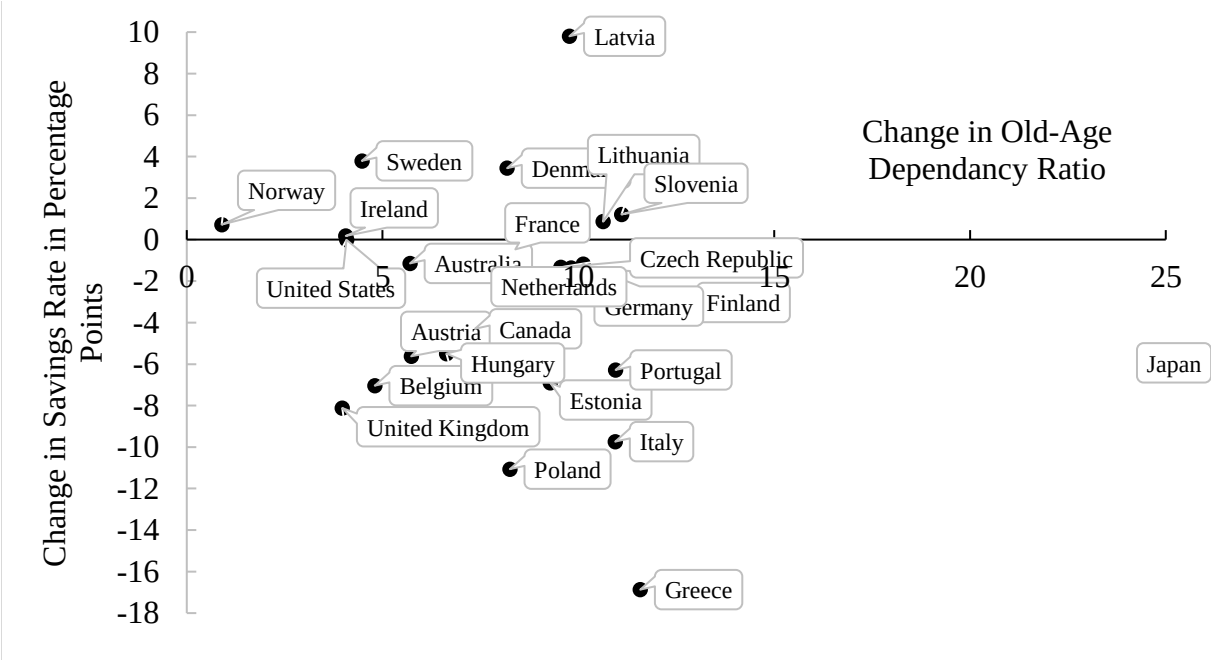
Source: OECD, IMF, Bank of Japan.

Also, for a broader sample of OECD countries, there is no robust evidence for a correlation of ageing societies and growing household savings rates. Figure 3 shows for the OECD countries[27] on the x-axis the change in the old-age dependency ratio since 1995, proxied by the old-age dependency ratio in 2018 minus the old-age dependency ratio in 1995. A positive value indicates an aging society. For all OECD countries in the sample the societies have aged based on this measure. Japan stands out as a particularly fast aging society. The y-axis shows the difference in the household savings rate between 2018 and 1995 in percentage points. A negative (positive) value indicates a declining (increasing) household savings rate since 1995. Based on this measure the majority of countries experienced a decline in the household savings rate. The aging-society-savings-glut hypothesis would imply a close positive relationship between the two indicators in form of an upward trending line moving from the south-western to the north-eastern part of the Figure 3. But there is no correlation at all.

[27] Countries where data were unavailable are excluded.

Instead of household savings rates, enterprise savings rates have increased in some industrialized countries such as Germany and Japan (Figure 4), due to three reasons. First, interest rate cuts reduced the financing costs of enterprises, which traditionally have been borrowers in capital markets. Lower interest expenses raised retained earnings. Second, for the enterprises of export-oriented economies such as Japan and Germany depreciations of the domestic currencies caused by strong monetary expansions generated windfall profits. Third, fixed capital investment as percent of GDP tended to decline. This could be explained in the tradition of Hansen (1939) by slowing population growth (Summers 2014) and slowing technological innovation (Gordon 2012). More likely, however, enterprises anticipated slowing real wage growth because of relaxed interest rate constraints (see section 4.3.).

Figure 3: Old-Age Dependency and Household Savings Rate in OECD Countries, 1995-2018

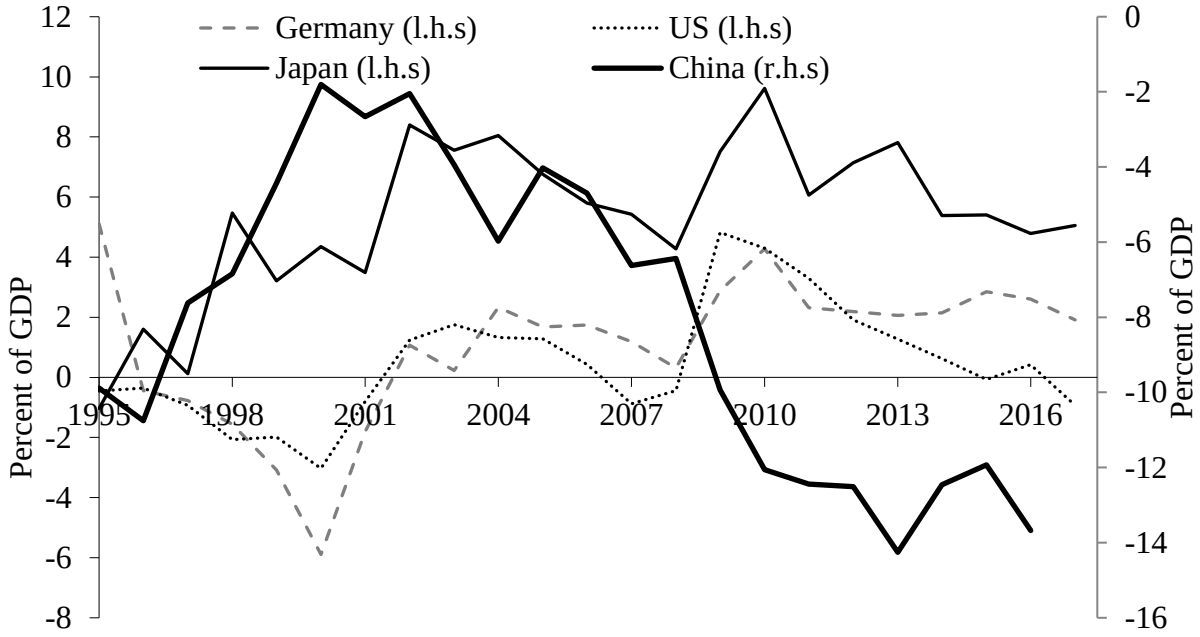


Source: OECD. Household savings rates in percent of GDP.

Finally, Summers (2014) argues that increased income inequality reduces (increases) the propensity to consume (to save). However, growing income and wealth inequality may not have been driven by "the laws of capitalism" (as, for instance, suggested by Piketty 2014), but by expansionary monetary policies (see Duarte and Schnabl 2018). The redistribution effects of persistently loose monetary policies have several dimensions.

One important transmission channel for growing wealth inequality is that ultra-loose monetary policies drive up prices of assets, which are over-proportionally held by wealthier people. In contrast, the interest rates on bank deposits, which are the preferred saving vehicles of the middle- and lower-income classes, are depressed in real terms into negative territory. Growing income inequality can also arise from the negative impact of persistently loose monetary policy on real wages (see section 4.3).

Figure 4: Net Corporate Lending in US, Japan, Germany and China



Source: OECD. Corporate net lending is equivalent to net enterprises savings minus net investment, plus net capital transfers, minus acquisitions less disposals of non-financial non-produced assets.

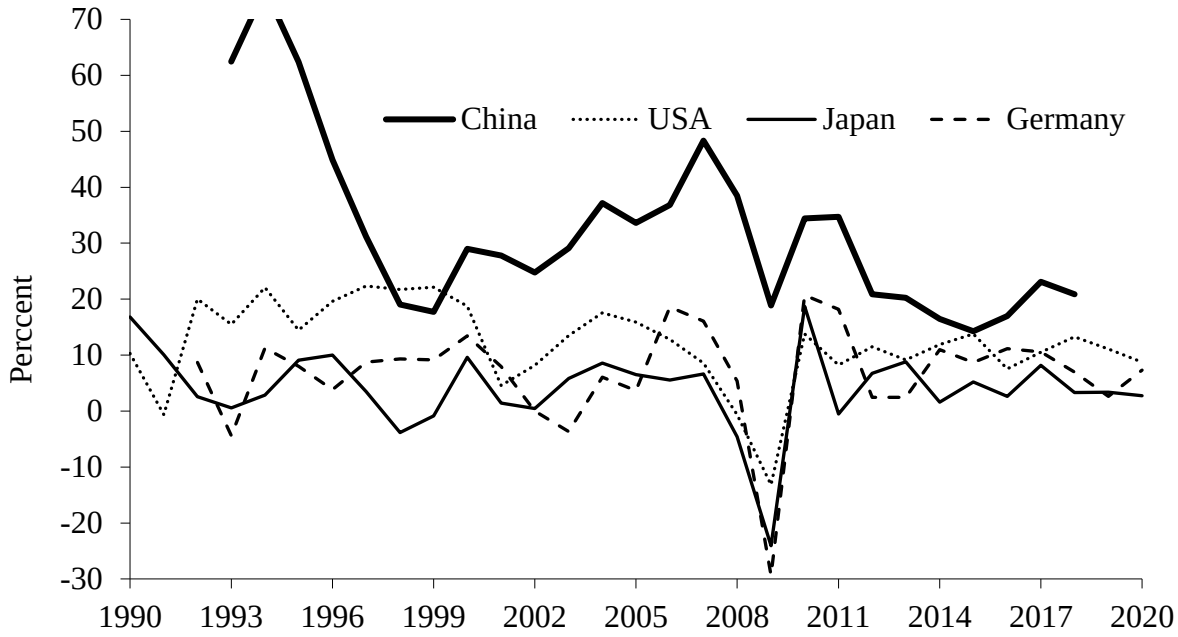
4.2. Constant Marginal Efficiency of Investment in Industrialized Countries

The neoclassical extension of the IS model by Gordon (2012) assumes that the marginal productivity of capital has declined, possibly into negative territory. Figure 5 shows that this hypothesis cannot be supported empirically for industrialized countries such as US, Japan and Germany. The marginal productivity of capital, defined according to equation (9) as the ratio of the absolute change in real GDP to real investment, is largely constant in the US, Japan and Germany.[28]

[28] The data look similar for the euro area.

Apart from the cyclical downturn during the global financial crisis in 2008/09, the marginal productivity has remained positive and fairly stable around 10 percent. This implies that gradual interest rate cuts and increasing money creation by the large central banks in the industrialized countries have not boosted real non-financial investment to an extent that would have lowered the marginal productivity of real capital. This is consistent with the fact, that – together with slowing output growth – fixed capital investment as percent of GDP has tended to decline, in particular in industrial countries such as Japan and Germany (see Figure 6).

Figure 5: Marginal Productivity of Capital of US, Japan, China and Germany



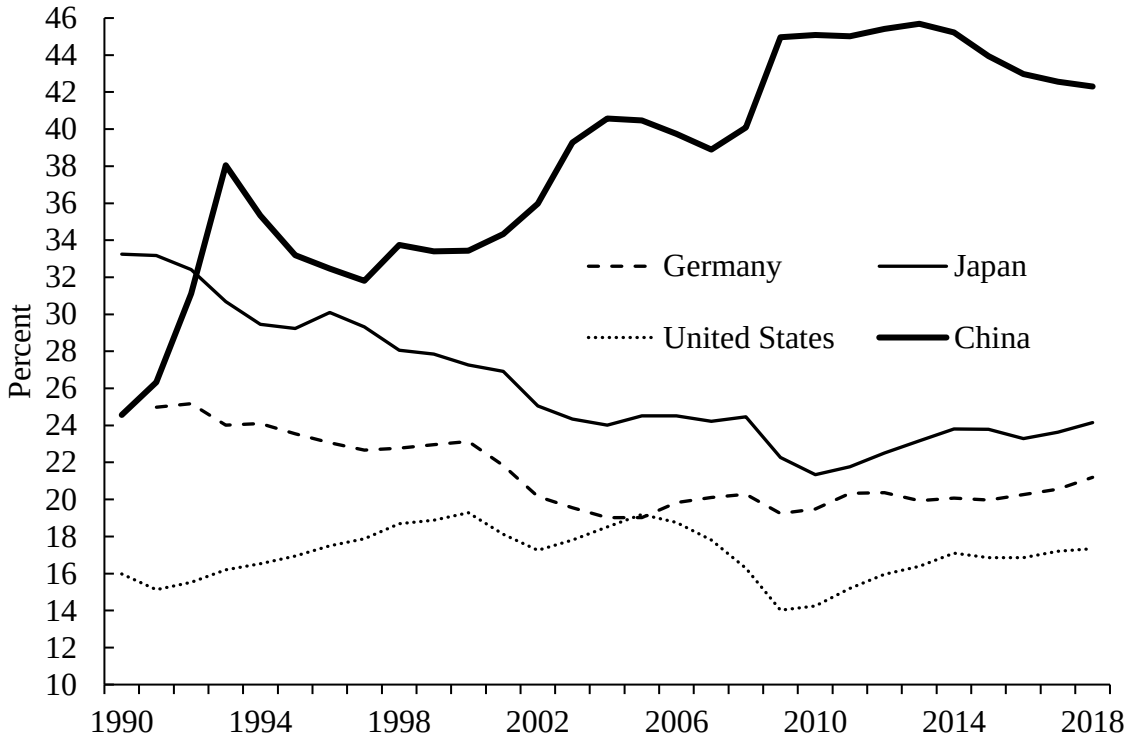
Source: AMECO. Marginal productivity of capital defined as the absolute change of real output compared to the previous year divided by real investment of the current year.

Since the turn of the millennium – driven by capital inflows from the industrialized countries – the capital stock expanded very fast in China (Figure 6) and other East Asian countries (Schnabl 2019b). Chinese investment (as percent of GDP) increased far beyond the industrialized countries. At the same time, as shown in Figure 5 the marginal productivity of capital in China has declined substantially since the early 1990s.

Moreover, the gradual decline of interest rates seems to have boosted real financial investment, with financial markets expanding. New asset classes, such as asset-backed securities, were created and new countries, such as a number of emerging market economies, joined the international capital markets. Also, asset prices strongly increased, as shown in Figure 7. Since

the late 1980s, the arithmetic mean of stock and real estate prices in the US, Japan and Germany have – with fluctuations – increased strongly relative to consumer prices. With asset prices being inflated, the marginal productivity of financial investment seems to have declined, for instance, indicated by increasing price-to-rent ratios in many real estate markets.

Figure 6: Fixed Capital Investment as Percent of GDP



Source: IMF.

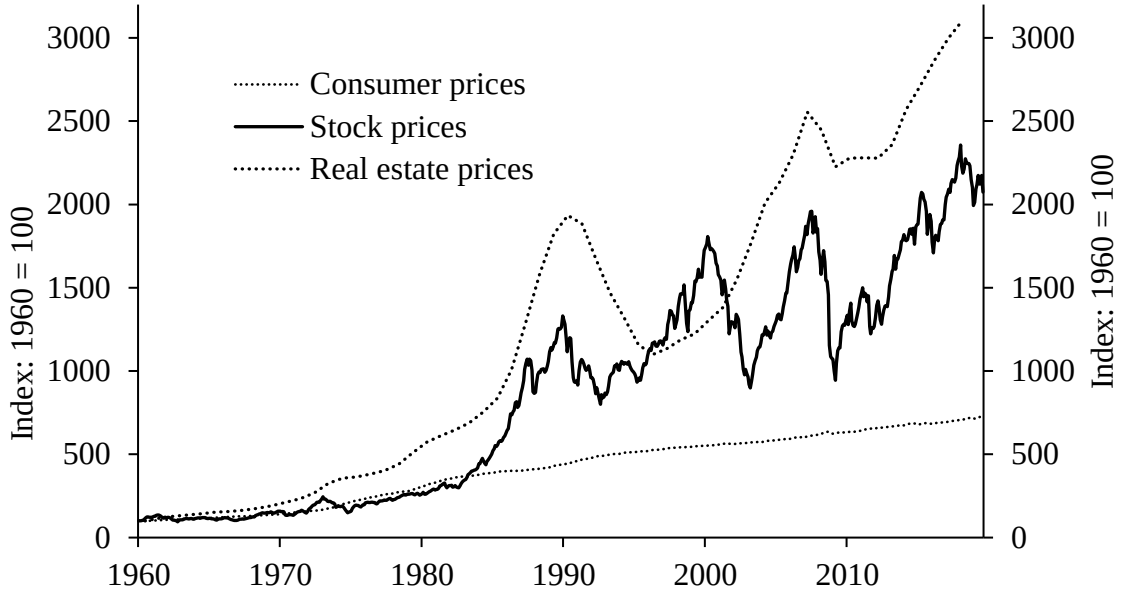
The inverse relationship between low interest rates (associated with a high degree of new money creation by central banks) and asset prices can be illustrated with the Gordon (1959) growth model of equity valuation, which relates the price earnings ratio of enterprises to the interest rate. A simple version of this model can be written as

$$\frac{SP}{E} = \frac{1}{i-g} \tag{15}$$

where *SP* denotes the stock price per share, E earnings per share, g expected nominal earnings growth and i the discount rate, representing the financing costs of the enterprise. The secular stagnation hypothesis suggests that the price-earnings ratio of equities should have been largely unaffected by the decline in interest rates as expected earnings growth should have declined in parallel to fading growth dynamics. Thus, the relationship between stock prices and earnings

should have remained stable. On the other hand, if the interest rate decreases exogenously and expected earnings growth remains widely unchanged, the price-earnings ratio rises.

Figure 7: Consumer, Stock and Real Estate Prices in US, Germany and Japan



Source: IMF. Arithmetic mean.

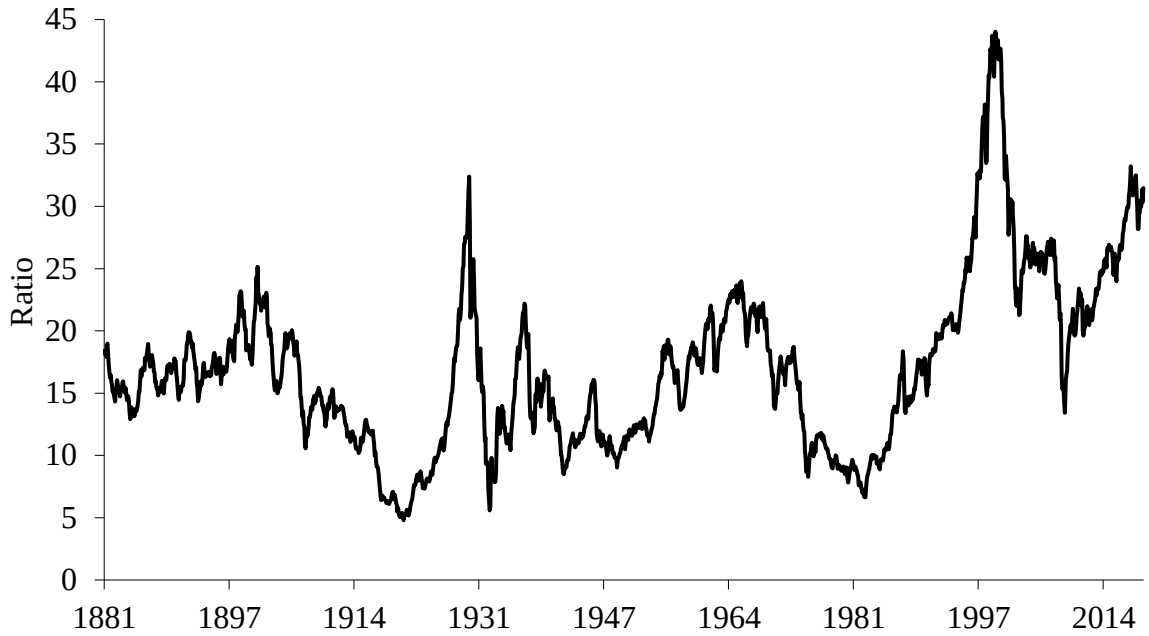
The rise of the price-earnings ratios since the start of the global asymmetric monetary policies in the second half of the 1980s is consistent with a decline in interest rates relative to the growth of expected earnings. The US S&P 500 Shiller cyclically adjusted price-earnings ratio has increased sharply on trend since the late 1980s (Figure 8). It reached a peak in the year 2000 and has remained far above the level of the 1980s. A similar strong expansion occurred in the second half of the 1920s before the black Friday in September 1929, which triggered the Great Depression. It seems that central banks pursing a point inflation targets[29] during a period where global factors have depressed inflation[30] have not only pushed real interest rates in credit and capital markets to ever lower levels, but also boosted asset prices to record highs.[31]

[29] As consumer price inflation rates remained very low (but above zero) following the global financial crisis maximum inflation targets as pursed for instance by the ECB until the year 2003, would not have justified unconventional monetary policy measures. Only the shift to inflation point targets, as it occurred in the case of the ECB in the year 2003, allowed very extensive asset purchases, which kept for instance the debt burden of highly-indebted euro area member states sustainable (See also footnote 12).

[30] Note that since the turn of the millennium, low interest rates in the US boosted capital flows to China, where the capital stock was strongly extended by borrowing abroad. Thus, large overcapacities were created, which led to sales at prices subsidized with cheap credit on the world markets (Schnabl 2019b). This has depressed inflation in the industrialized countries and set – given inflation point targets – the stage for further monetary expansion.

[31] If real wage growth slows down in an environment of slowing productivity gains, the ability of enterprises to increase prices is undermined. If, furthermore, the persistently loose monetary policies redistribute income from lower- and middle-income to high-income classes, consumer prices tend to remain low while asset prices increase.

Figure 8: US S&P 500 Shiller Cyclically Adjusted Price-Earnings Ratio



Source: Macrobond.

4.3. Increasing Debt, Declining Labor Productivity, Wage and Financial Repression

When interest rates are pushed ever lower, possibly below the growth of real income, increasing levels of debt become sustainable. It becomes more attractive for enterprises to raise their return on equity through financial leverage than through non-financial investment aimed at increasing productivity.[32] This can be illustrated by decomposing the return to equity into profits (R), equity (E), turnover (T), and total capital (C).[33]

$$\frac{R}{E} = \frac{R}{T} * \frac{T}{C} * \frac{C}{E} \tag{16}$$

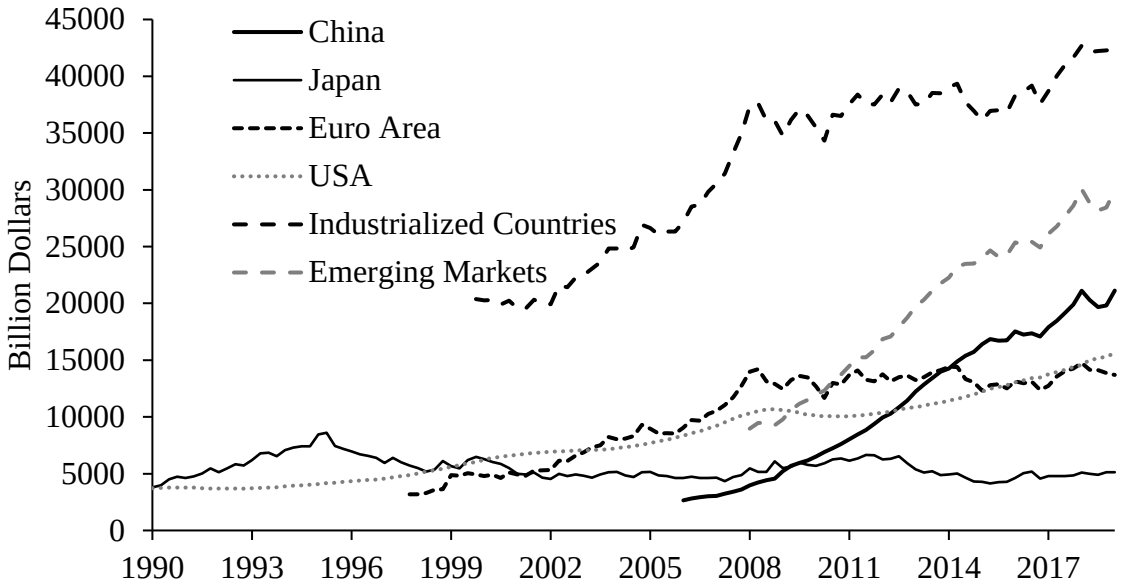
The rate of return to equity $\frac{R}{E}$ can be raised by increasing the profit margin $\frac{R}{T}$, capital productivity $\frac{T}{C}$, and/or financial leverage $\frac{C}{E}$ (through an increase of the ratio of debt to equity capital). In a competitive environment the increase in profit margins $\frac{R}{T}$ is limited. The

[32] In addition, asymmetric monetary policies constitute an implicit insurance mechanism for speculation in financial markets as interest rates are cut when asset prices collapse. The interest rate cuts either stabilize the market segments in a crisis or create alternative speculation opportunities, which allow to offset valuation losses. In contrast, possible losses from investment in innovation and efficiency gains (i.e. fixed capital investment) have to be borne by the entrepreneurs. This policy pattern constitutes an incentive to shift resources from non-financial investment to financial investment. Financial investment can also include the take-over of competitors and buy-backs of own shares.

[33] The so-called Dupont analysis (see Gropelli and Ehsan 2000, 444-445).

productivity of capital $\frac{T}{C}$ has remained broadly stable over a longer time horizon as shown in Figure 11. Therefore, an increase in the return on equity $\frac{R}{E}$ as shown in Figure 6 can be achieved only if the ratio of total capital to earnings $\frac{C}{E}$, i.e. the financial leverage, is increased.

Figure 9: Credit to Non-Financial Corporations



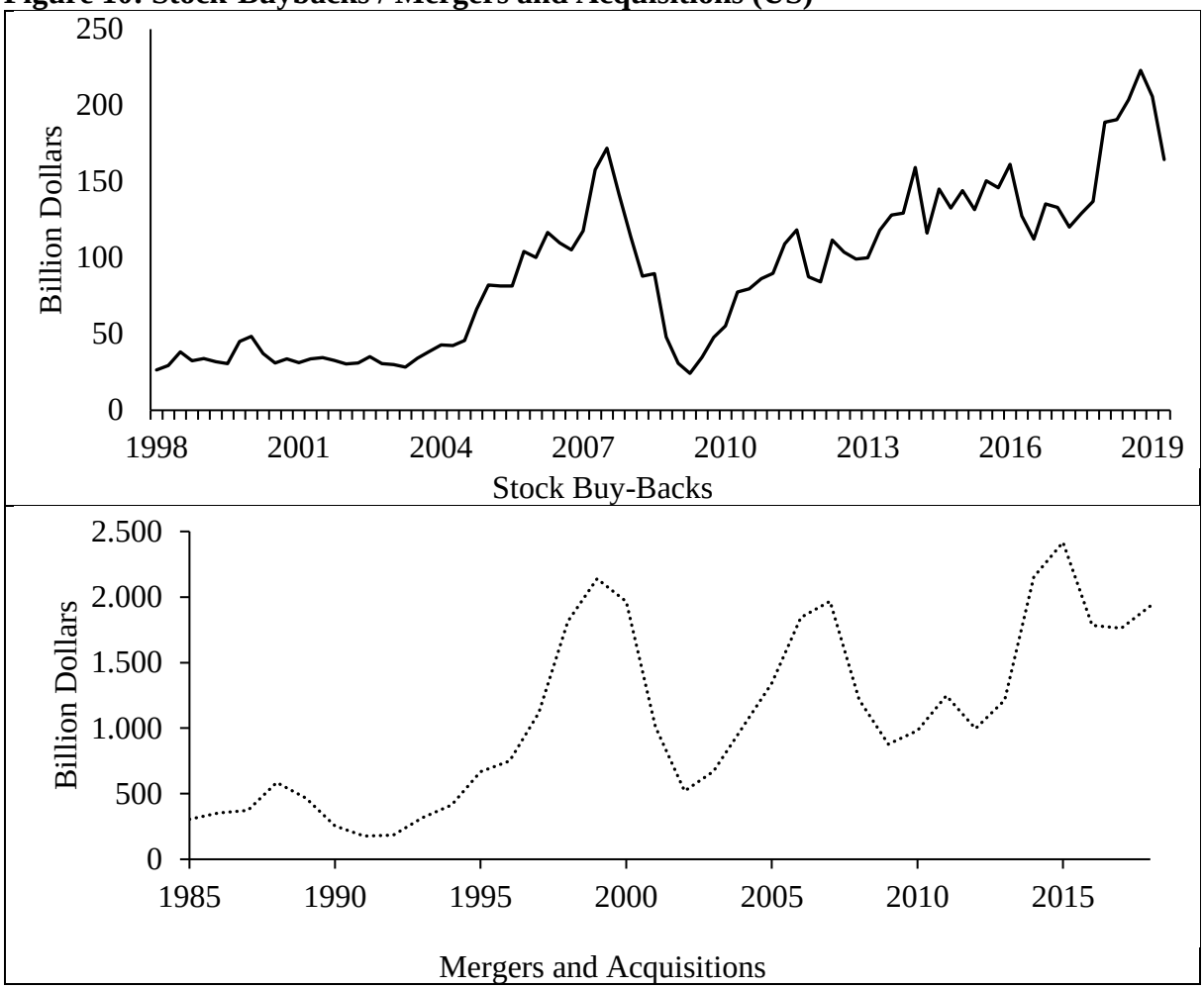
Source: BIS.

Indeed, enterprises have raised their indebtedness substantially, in particular in the United States and China (Figure 9). In China, the additional credit has been used to build up a large capital stock. In Germany, since 2008 in particular large enterprises have strongly expanded the amount of outstanding bonds, encouraged by low interest rates and by corporate bond purchases of the European Central Bank. The additional funds have served different purposes, not least take-overs and acquisitions. As shown in the lower panel of Figure 10, the volume of mergers and acquisitions has strongly increased since the 1980s, reaching a peak in 2015. Mergers and acquisitions increased the market and pricing power, thereby creating monopolistic rents.

US enterprises have bought back large amounts of shares, which has boosted the return to equity by reducing the amount of outstanding stocks and increasing leverage. As shown in the upper panel of Figure 10 stock-buyback rose since the turn of the millennium, in particular between 2003 and 2007 as well as since 2009. The preference of large enterprises to use cheap credit for share buy-backs and mergers and acquisitions instead of investment in new real capital can be explained by skepticism concerning future economic development (see section 4.3.). If income growth is expected to slow, extending capacities is not a good idea. Instead, the price-earnings

ratio can be increased by increasing leverage and profit margins, with the latter achieved by expanding market power through mergers and acquisitions.[34]

Figure 10: Stock-Buybacks / Mergers and Acquisitions (US)



Source: Macrobond and IMMA Institute.

High equity valuations (SP/E) and low earning yields (E/SP) should have lowered the costs of equity assumed for the evaluation of new investment projects. However, the decline in interest rates has not lowered the weighted average costs of capital, which listed companies in general use for the evaluation of new projects (Gehringer and Mayer 2017).[35] Lehmann (2019) argues that listed companies have raised the imputed costs of equity by increasing the risk premium

[34] Indeed, market concentration seems to have substantially increased, as found by Gutiérrez and Philippon (2017) as well as by De Loecker and Eeckhout (2017). Enterprises can charge a higher mark-up on prices or have stronger power versus trade unions in wage negotiations.

[35] The weighted cost of capital is the rate that a company is expected to pay to finance its assets. It is calculated as the weighted average of the costs of debt, i.e. the interest rate, and of internal financing, i.e. equity.

on equity returns as they increased leverage.[36] Thus, enterprises did not follow the markets, which raised equity valuations, anticipating lower equity returns in the future.

If low interest rates induce enterprises to raise financial instead of fixed-capital investment and keep enterprises in business that would have been unprofitable otherwise, growth will decline (Schnabl 2019a). McKinnon (1973) and Shaw (1973) showed for the developing countries and emerging market economies in the 1950s and 1960s that state-directed capital allocation at low interest rates[37] depressed growth. Schnabl (2015) shows for Japan that an ultra-loose monetary policy has continued to cause financial instability and sluggish growth. [38]

Peek and Rosengreen (2005) argue for Japan that persistently low interest rates have constituted a – what they call – "perverse" incentive to keep low-return investments alive via a misallocation of credit enterprises of low returns. Caballero, Hoshi and Kashyap (2008) link a forbearing credit extension of Japanese banks to otherwise insolvent enterprises with paralyzed market dynamics and higher costs for profitable enterprises. They link postponed restructuring in depressed industries to lower productivity growth, caused by what they call "zombie enterprises". Similarly, Acharya et al. (2019) associate low interest rates and unconventional monetary policies of the European Central Bank to lower productivity growth in the euro area.[39]

The distorted allocation of funds comes along with distortions in the financial sector, as the ultra-loose monetary policy reduces the incentive to clean bank balance sheets from bad loans. Furthermore, the margins of the traditional banking sector are squeezed (Gerstenberger and Schnabl 2018). With short-term interest rates being held at or below zero and long-term interest rates being pushed further down via unconventional monetary policy measures, traditional sources of banks' income, i.e., the credit margins (credit rates minus deposit rates) and the transformation margins (long-term rates minus short-term interest rates), shrink. Brunnermeier and Kolby (2019) show that at some point interest rate cuts have a negative effect on credit growth, investment and output, because the positive effect of low interest rates on the valuation

[36] This is in line with the Modigliani-Miller theorem, which argues that abstracting from taxes, default risk and agency costs and given perfect information, the way of financing does not affect the value of a firm (Modigliani and Miller 1958).

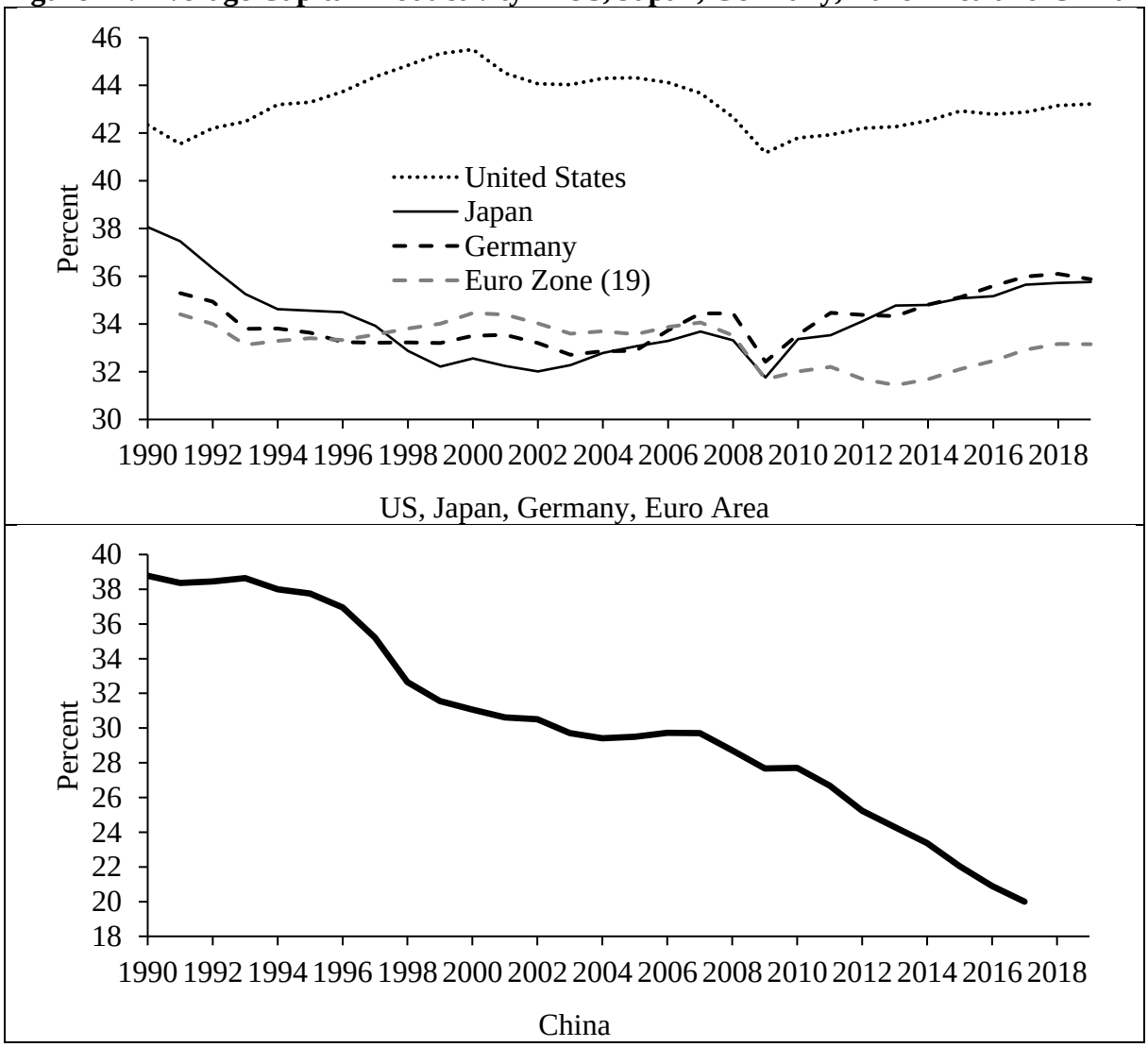
[37] McKinnon (1973) and Shaw (1973) dubbed this 'financial repression'.

[38] Similarly, Rungcharoenkitkul, Borio and Disyatat (2019) argue that too low interest rates can induce the emergence of a new unprofitable sector in the economy, which reduces the average marginal productivity of the economy. Monetary policy that leans insufficiently against the build-up of financial imbalances increases the vulnerability to financial busts over successive cycles. "*As a result, low rates beget lower rates*."

[39] See Schnabl (2019b) on overinvestment in China as well as Shen and Chen (2016) on zombie firms in China.

of bank assets is overwritten by the negative effect of low interest rates on bank profits. The overall value of assets is falling, thereby forcing banks to restrict lending.[40]

Figure 11: Average Capital Productivity in US, Japan, Germany, Euro Area and China



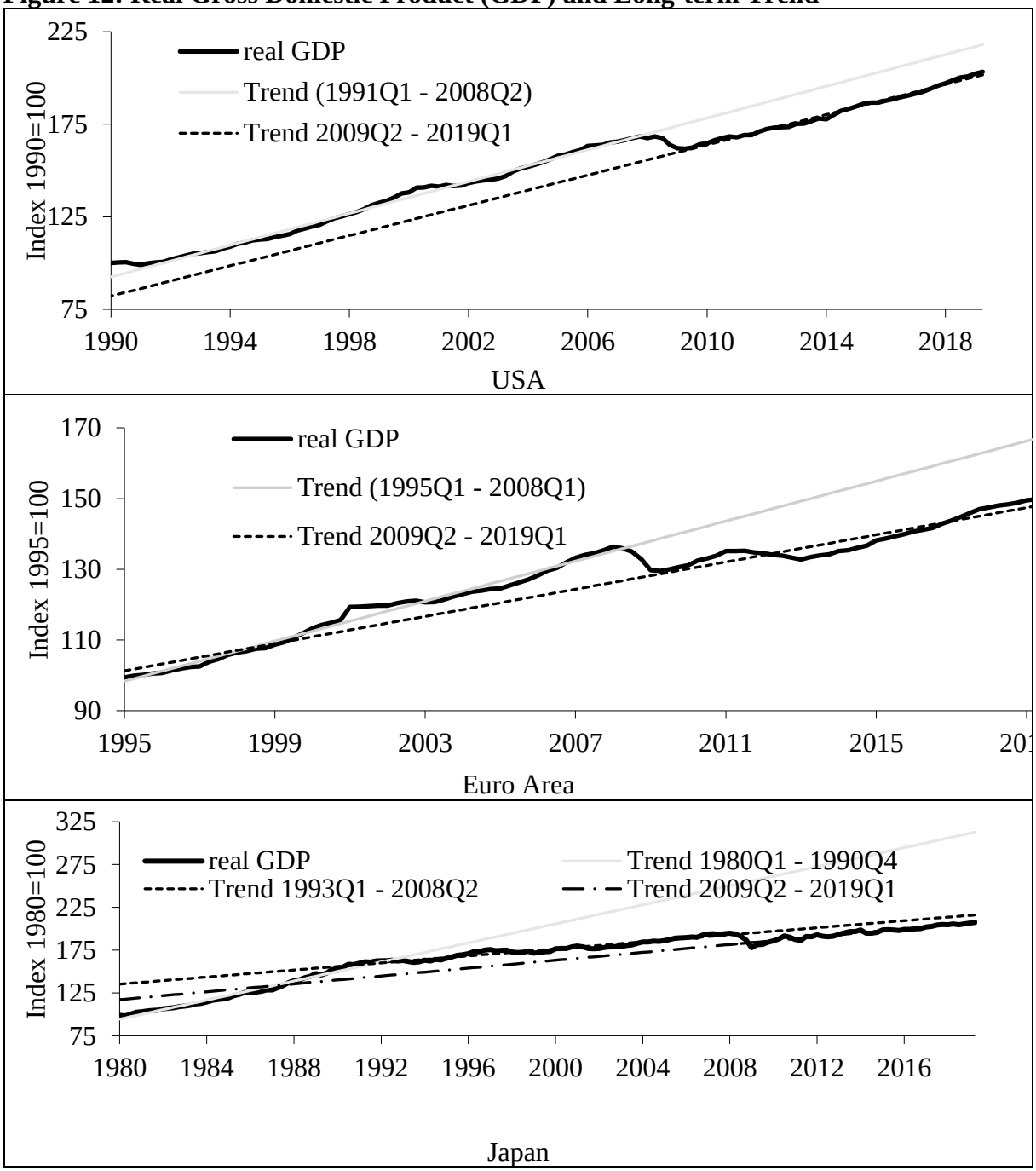
Source: AMECO Database and Penn World Tables. Average capital productivity calculated as output divided by capital stock (both in 2010/2011 prices).

These findings are supported by the development of the average (in contrast to the marginal) productivity of capital. As shown in Figure 11, average capital productivity in the US, euro area, and Japan has dropped in the wake of each financial crisis (1990-91 in Japan, 2007-08 in the US and the euro area), and it has not returned to its pre-crisis level in the subsequent upswing. The consequence has been a persistent shortfall of output below its long-term trend, as observed in Japan since the 1990s. The bursting of the so-called bubble economy triggered interest rates

[40] In addition, the growing regulatory burden after the financial crisis may restrict lending.

cuts towards zero and – since the lower zero interest rate bound was reached in 1999 – comprehensive unconventional monetary policy measures, which have inflated the Bank of Japan's balance sheet from 10% of GDP to about 100% of GDP. In contrast to the desired recovery of the Japanese economy, output has been lagging behind the long-term trend (see lower panel of Figure 12).

Figure 12: Real Gross Domestic Product (GDP) and Long-term Trend

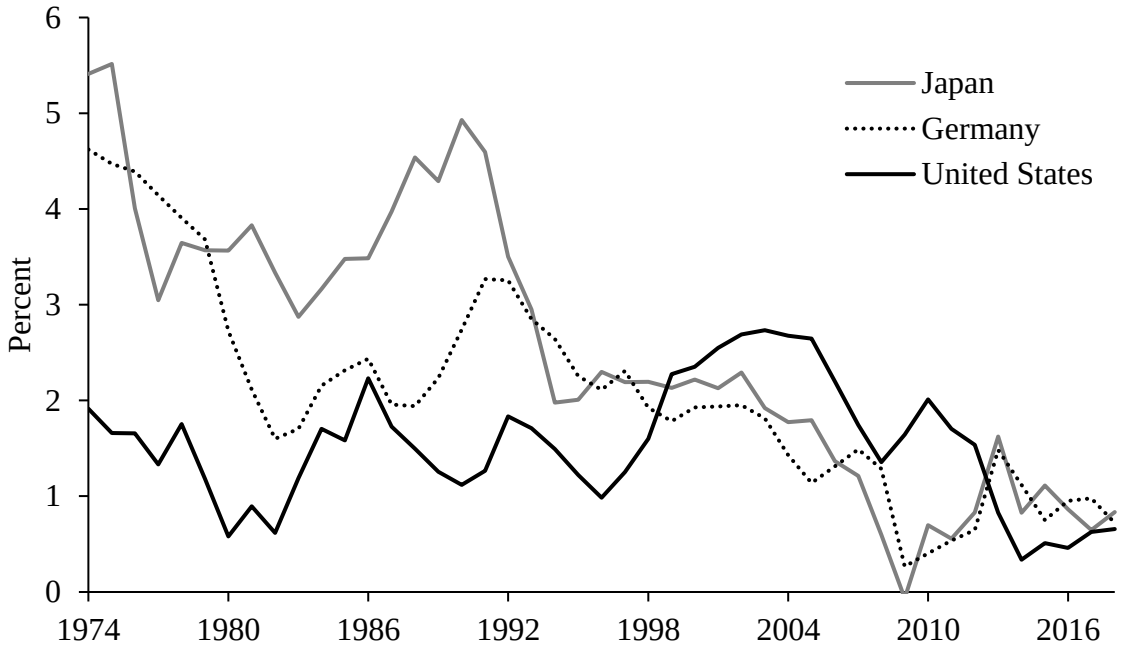


Source: Macrobond.

Similarly, since the outbreak of the global financial crisis, the US Federal Reserve and the European Central Bank moved to extensive unconventional monetary policy measures. Like in Japan, in both the US and euro area output has since then not returned to its long-term growth path (see center and upper panel of Figure 12). A savings glut or secular stagnation should have affected growth more gradually and not have just started with the financial crises.

The upshot is that output growth has declined while increasingly loose monetary policies have prevented or even reduced unemployment by preserving distorted economic structures. Even more, in many countries, such as Japan and Germany, the number of employed increased as real incomes declined and more people entered the labor market (Israel and Latsos 2019). Therefore, the increasingly expansionary monetary policies of the large central banks have come along with declining labor productivity gains as shown in Figure 13.

Figure 13: Labor Productivity Gains in US, Japan and Germany



Source: OECD. Four-period backward-looking rolling averages.

In neoclassical theory, labor productivity gains are the prerequisite for real wage increases. If the persistently loose monetary policies have reduced the incentives for banks and enterprises to innovate and create productivity gains, real wage levels are depressed. This effect is most pronounced in Japan, where real wages are trending downwards since 1998 (Latsos 2019). If

enterprises expect a declining purchasing power of consumers, they will hesitate to increase the capital stock, shifting their activities to financial investment.

Kornai (1986) dubbed a similar process in the central and eastern European planned economies "soft budget constraints". Because unemployment was politically inopportune, public banks were forced to provide unconditional credit to highly inefficient enterprises. The losses of state-owned banks were covered by the printing press of the central bank. The outcome was low or even negative productivity growth, which came along with a low consumption level compared to the western industrialized countries. From this perspective the persistently loose monetary policies are quasi soft budget constraints, which have become a major impediment to productivity growth.

5. Economic Policy Implications

The Keynesian and neoclassic schools of thought explain the secular decline of nominal and real interest rates since the 2007/08 global financial crisis with a savings glut and secular stagnation. According to this view, monetary policy has only reacted to a given structural change in a new economic environment. We have argued that both the Keynesian and neoclassical models lack a banking sector and therefore do not capture the capital market implications of asymmetric central bank interest rate cuts. The ability of banks to extend credit ex nihilo and the fact that capital goods need to be produced first before they increase the capital stock is ignored by the IS identity, which is assumed to hold permanently in the Keynesian theory. We also find no empirical evidence for the savings glut and secular stagnation hypotheses.

In contrast to the Keynesian and neoclassical models, the Austrian model incorporates a banking sector which either finances real fixed capital or financial investment. Interest rates have become depressed by a pro-active monetary policy when technological progress, closer trade ties, and overinvestment in China exerted downward pressure on prices. The global deflationary pressure originating from China can be linked to subsidized credit and overinvestment in China. Thus, given the newly introduced point inflation targets expansionary monetary policies have boosted asset instead of goods prices and contributed to growing income inequality.

Moreover, the Austrian view suggests that the depression of interest rates lowers productivity gains and trend GDP growth via quasi "soft budget constraints" for enterprises. It leads to an inefficient allocation of resources, as it can be observed in Japan and increasingly in Europe. The policy implication is that only the end of the manipulation of interest rates would reanimate growth. The interest rate on credit is the single most important price in an economy. It relates a society's time preference to its ability to create capital in an efficient way. It is a presumption of knowledge they do not have when bureaucrats at central banks determine the interest rate. They would truly serve society if they left the determination of interest to the markets.

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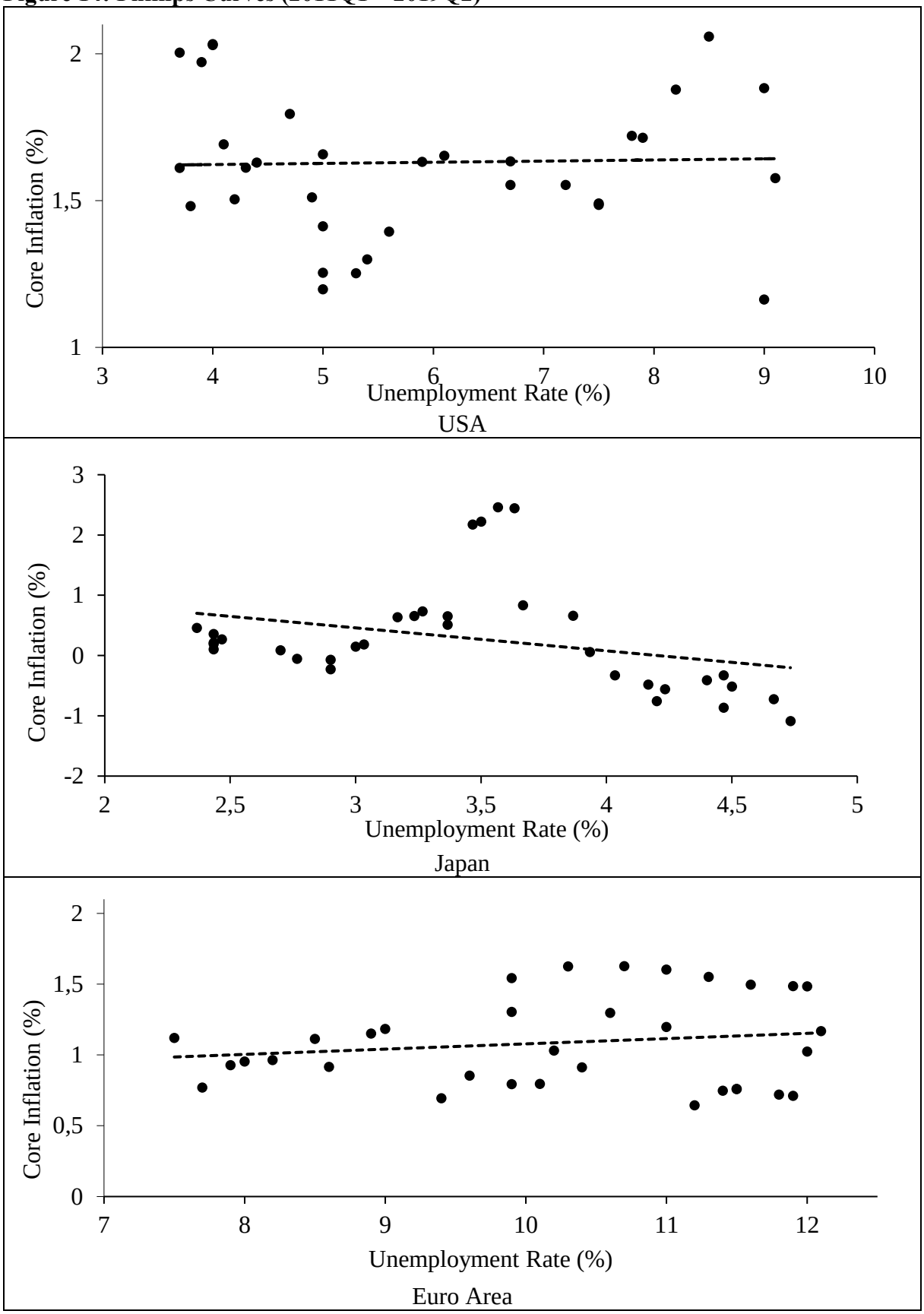
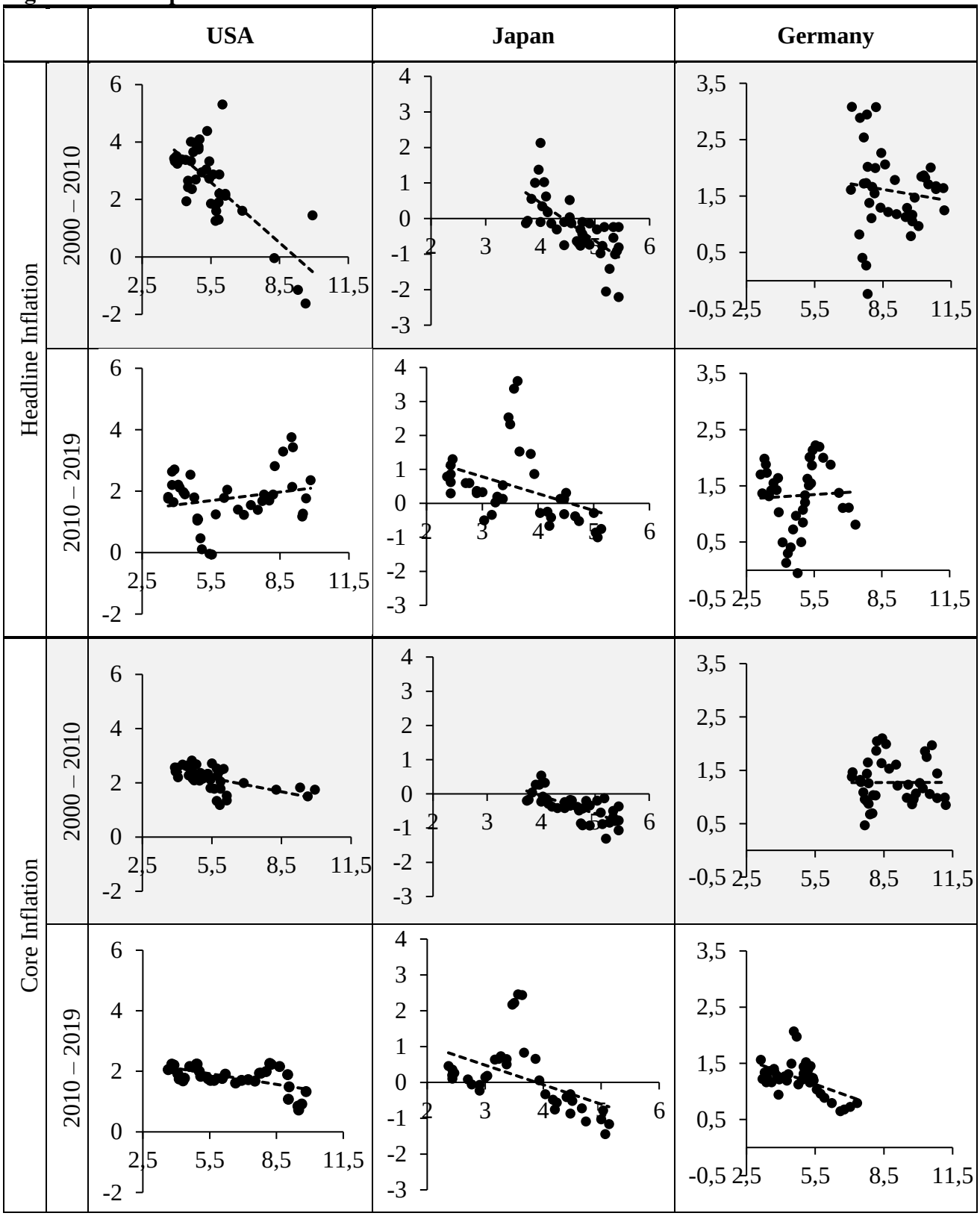
Appendix:

Figure 14: Phillips Curves (2011Q1 – 2019Q2)



Source: Datastream.

Figure 15: Phillips Curves: Headline and Core



Source: Datastream.

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