

JENA ECONOMIC RESEARCH PAPERS



2017 – 001

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www.jenecon.de

ISSN 1864-7057

The JENA ECONOMIC RESEARCH PAPERS is a joint publication of the Friedrich Schiller University Jena, Germany. For editorial correspondence please contact markus.pasche@uni-jena.de.

Impressum:

Friedrich Schiller University Jena
Carl-Zeiss-Str. 3
D-07743 Jena
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Low Long-Term Interest Rates - An alternative View

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- This Version -
February 1, 2017

Abstract

The fall in risk free interest rates since the 1980s has mostly been described as being induced by factors that push down interest rates from the demand side. This paper contributes to the literature by adding a view of the supply side, namely that interest has to be earned first, before it can be distributed. Consequently, interest can only sustainably be distributed from the added value in a given period. But through higher debt ratios today, a smaller amount of added value can be used to fund interest payments than in the past. In such an environment, average interest rates can only be held stable, if the nominal amount of interest paid is rising, which would then lead to lower income for labour and/or a lower reward for entrepreneurs in the form of corporate profits and dividends. But labour and entrepreneurial income did not fall as much as would be needed to compensate for the much higher amount of interest bearing assets since the 1980s. The only logical consequence then is a fall in average interest rates.

Keywords: Secular stagnation, low interest rates

JEL Classification: E25, E40, E44, E50, O40

**The author would like to thank Hans-Walter Lorenz, Markus Pasche and Lars Other for helpful comments.*

1 Introduction

For the last four decades the world experienced a substantial decline in risk free interest rates. Many theories on this secular decline circulate in the literature and the policy debate. Standard theories about the fall in interest rates explain it by a drop in the natural risk free interest rate, the so called *Wicksellian* rate, which is in line with an economy operating without any inflationary or deflationary pressures, i.e. when demand for capital is equalling its supply (Wicksell (1898)). There are proponents who ascribe this decline to an overhang of savings relative to investments, the so called *Global Savings Glut* hypothesis (see Bernanke (2005)), to a lower investment-demand schedule (see Gordon (2010)), a higher demand for safe instead for risky assets (see Caballero and Farhi (2013)), reduced growth and inflation outlooks potentially leading towards *Secular Stagnation* (see Summers (2014)), lower term premia (see Adrian et al. (2015)), a central bank driven fall in interest rates, a shift in demographics (see Favero et al. (2013)), or rising inequality (see Rachel and Smith (2015)). Bean et al. (2015) and the IMF (2014) give an overview about these numerous explanations.

Most of these theories look onto the demand side of interest rates, but leave out the supply side, namely that interest has to be earned (supplied) first, before it can be distributed to the specific stakeholders. Based on this premise, the following paper aims to contribute to these mentioned plentiful theories about the secular decline of interest rates by adding the additional viewpoint, that interest can sustainably only be distributed from the added value in the economy in the long-run.

Due to this constraint, there is a boundary on the amount of interest, that can be distributed. If all added value flows towards interest payments, which would imply that other stakeholders (labour and company owners) do not receive any payments for their contribution in the production process, the maximum amount of interest to be distributed is given by the added value divided by the amount of outstanding debt—the GDP-to-debt ratio. But the ability to distribute interest has receded in the last forty years, since higher debt levels in the economy have lead to more interest bearing assets in relation to added value. However, this paper is not giving a causal interpretation as of how interest rates evolve over time in such a higher indebted world, but only shows the limits of interest payments from the above mentioned constraint.

There would be no pressure on interest rates, if the nominal amount of interest paid out in the economy would grow proportionally to the growth of financial

claims. But since the added value has to be distributed amongst the different stakeholders, namely to creditors in the form of interest, to labour in the form of wage payments and to company owners and entrepreneurs in the form of profits and dividends, there is no guarantee that interest remains proportionally the same in a higher financialised world.

The constraint to distribute interest is binding on a first stage for entities which generate economic value, as they can make interest payments without sacrificing current or future payments. These are predominantly non-financial corporations, as their share of added value is above 70% for most advanced economies. Due to the increasing proportion of debt to the underlying added value, from which the different stakeholders have to be paid out, there needs to be a fall in either the proportion going to labour, a decline in amounts available to company owners, lower average interest rates distributed to the creditors, or a combination of all of these. This puts a ceiling on how much these corporations are sustainably able to pay for taking out loans without running the risk of not being able to pay the creditors in full, based on the assumption that these corporations are not living off of the substance and/or are not engaging in some kind of *Ponzi*-financing.

On a second stage, financial intermediaries face a constraint to pass on interest by the amounts they receive in income (interest and non-interest) from the value adding sector. They are subject to the same trade-off as non-financial corporations, as they also need to channel their surpluses towards labour, profits and interest. But due to higher financialisation, the funds which are flowing to the financial sector have to be distributed to a larger number of debt obligations originated within the financial sector itself.

So there are pressures on interest rates from the value adding sector, which is higher indebted, and from a similarly higher indebted financial sector. As long as these developments do not reverse, there is no room for higher interest rates, without other stakeholders needing to cut back on their claims in the production process. This has vast implications for future developments of interest rates in most advanced economies of the world, as these are probably bound to be low for a longer period of time, if the other stakeholders do not significantly abide from their claims or debt levels are reduced substantially.

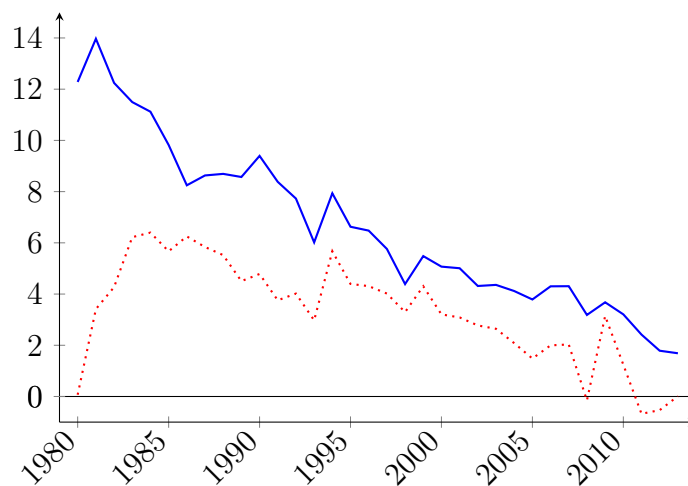
The paper is structured as follows. Section 2 will give a short overview of the prevailing theories of why interest rates fell over the last couple of decades. In Section 3 the rationale, as for why looking at the origin of interest in the economy is important to understand the evolution of interest rates in the past,

will be given. Section 4 then captures the underlying developments of interest rates and debt levels, while Section 5 looks at the distribution of factor incomes. Section 6 specifically accounts for the impact of the financial sector towards lower interest rates. Section 7 concludes.

2 Literature Review

The drop in short- and long-term interest rates in advanced economies over the last 40 years has received much attention in academic research and policy discussions in the last couple of years. Several factors have been identified to contribute to this decline. Although the literature mainly ascribes the secular decline to inflation adjusted real interest rates, a large part of the decline, especially since the 1990s, when inflation became anchored in most western economies, can be attributed to a decline in nominal rates (see Figure 1).

Figure 1: Reference interest rates on 10-year government bonds



Note: Nominal (—) and real (.....), simple average over France, Germany, the UK and the US. Source: IMF.

There are three main categories of explanations in the literature, where most of the theories of falling interest rates can be attributed to.

The first is pointing towards a shift in the savings-investment schedule across the world. Substantially higher savings rates, especially in emerging economies, but also in some advanced ones like Germany or the Netherlands, have put pressure on rates because of a surplus of savings over investments. Bernanke (2005)

ascribes this process especially to emerging markets, specifically to south-east Asian countries, shifting their policy objectives after the *Asian Financial Crisis* in the late 1990s towards building up foreign reserve portfolios, and therefore maintaining high current account surpluses. He coined the term of a *Global Savings Glut* in this regard.

Gordon (2010)), on the other hand, points towards a lower investment demand schedule in advanced economies, due to the less capital intensive business models observable in the last two decades, especially in the tech-economy (see also Bean et al. (2015)). Specifically software companies only need a small fraction of financing in contrast to more traditional companies to generate the same added value. This puts a downward pressure on interest rates, as less financing is needed for the same amount of added surplus.

Since the *Global Financial Crisis* another explanation has been given for the occurrence of low interest rates, the so called *Balance Sheet Recession* (see also Koo (2009), who tackled this subject for the aftermath of the burst of the housing bubble in Japan in the early 1990s). Proponents of this theory stress that high debt levels force most economic agents to deleverage. While most agents (especially businesses and households) are trying to bring down their own debt levels, there is a dearth of consumption and investment, which leads to stagnating economic activity, and pushes down interest rate levels. Although this theory is also revealing that high debt levels might be a cause for the low interest rate environment, the reasoning as to why interest rates are low is different to the theory in this paper. The Balance Sheet Recession theory places a big emphasis on the notion that economic agents are not able to service their debt anymore in the aftermaths of a crisis caused by high levels of indebtedness. The focus is thereby on the principal, and not necessarily on interest obligations, while only looking at the ability to service debt, and not on how these payment obligations are earned in the first place. Furthermore, this theory cannot completely explain the secular falling trend in interest rates before the Financial Crisis.

According to Favero et al. (2013), demographics might also play a role in the savings-surplus. The authors specifically ascribe higher savings ratios due to the life cycle hypothesis, which tries to explain the savings ratio of the population over time. This hypothesis postulates that the working age population accumulates savings over the time of their working age to live off of these during retirement and to cater for intergenerational transfers. A higher proportion of the working age population should therefore lead to a higher savings rate. Globally, the working

age population rose from around 50% to about 58% over the last 30 years, which then contributed to higher savings rates, and therefore to lower interest rates. Additionally, today there is more risk on the safety of pension systems due to aging societies, especially in advanced economies, but also emerging ones like China for example. This induces people to save even more during their working age, as expected pensions become less and less secure due to the larger pool of retirees (see Rachel and Smith (2015), or von Weizäcker (2015)).

Contributing to this trend is rising inequality within many advanced economies (see e.g. Rachel and Smith (2015)). Since wealthier people save a higher proportion of their income (see Saez and Zucman (2014)), a higher concentration of wealth and income at the top means less mass consumption and higher desired savings, which also puts pressures on interest rates (see also Kumhof et al. (2015)).

A second line of reasoning explains lower interest rates by a shift in demand from risky to more safe assets, especially after the Asian Financial Crisis, the *Dot-com Bubble* and the Global Financial Crisis (see e.g. Caballero and Farhi (2013), or IMF (2012)). Investors today are more reluctant to invest in riskier assets than before, which suppresses interest rates, too. There is also a link to the Savings Glut argument of Bernanke, as most of the reserve accumulation since the middle of the 1990s occurred in safe government and high grade corporate bonds, and less so in more risky assets (see also Gourinchas and Jeanne (2012)).

The third strand in the literature (but mainly prevailing in the policy debate) is pointing towards a central bank induced fall in interest rates. Proponents of these theories ascribe the interest rate fall driven by expansive monetary policies by the major central banks in the last two decades (see Bindseil et al. (2015) for a rebuttal of such critiques from a German perspective). According to Bindseil et al. (2015), such an argumentation is quite unconvincing, as permanent deviations of central bank refinancing rates far below the natural Wicksellian-rate would lead to inflationary pressures. But these have not materialised since the 1990s, as inflation is firmly anchored across the advanced economies (see also Constâncio (2016)). However, central banks might have recently contributed to lower long-term rates through their proclamations to hold rates low for a longer than usual time. But this is certainly not ascribable to the more secular trend visible before the 2008 financial crisis (see also Adrian et al. (2015)). Furthermore, a high deviation of policy and market rates would be visible in the data, which is not, as risk-adjusted long-term rates track policy rates quite closely (see e.g. De Bondt

(2005), Hanson and Stein (2015), or Illes and Lombardi (2013)).

While most of the above mentioned theories look only to the demand side of the distribution of interest, the following Section accounts for the secular decline in interest rates from the production side of interest payments.

3 Maximum Interest

Interest is a claim on a part of the produced output. By providing funding for companies, households and governments, creditors receive a claim on a part of future surpluses of debtors in the form of interest payments. But these have to be earned first through economic activity (the supply of interest). Interest can then only be distributed from these surpluses. Therefore, there is a natural boundary to how much interest can be distributed in an economy.

Suppose that all added value would only flow towards interest payments. This would imply that all other stakeholders (entrepreneurs and labour) would be left without any compensation. Thus, the (theoretically) maximum amount of paid out interest (at least in the long-run) can be abstracted empirically by the amount of value added to the whole amount of interest bearing assets¹:

$$Interest_{max} = \frac{Value\ Added}{Debt} \quad (1)$$

But interest is not the only payment obligation which arises out of the added value, as the generated surplus from economic activity has to be distributed generally between different stakeholders. This is reflected in national income accounts statistics. Total factor income is represented as follows:

$$\begin{aligned} Total\ Factor\ Income = & Employee\ Compensation + Rental\ Income + \\ & Proprietor's\ Income + Corporate\ Profits + \\ & Net\ Interest \end{aligned} \quad (2)$$

¹ More conveniently, instead of the added value, GDP is applied in the empirical section, as both amounts are almost identical in most (advanced) countries, since the amount of taxes minus subsidies is quite small, and GDP data is available for a longer period of time and for more countries.

For reasons of clarity, throughout the paper only three factor income groups shall be considered. Profits, proprietor's income and rental income are considered together as income from economic activity, which shall also cover dividends for external capital providers, who do not receive income in the form of predefined interest payments. Thus, income throughout the paper is considered to be divided between:

1. Employees of the companies, who are rewarded for providing their services in the production process. Generally this is compensated for at the amount of their marginal productivity by wage payments.
2. Capital providers, who offer financing in the form of credit, are compensated in the form of interest payments.
3. Company owners and entrepreneurs, who are rewarded for their economic activities through residual claims (e.g. dividends, self-employed income, retained profits, rents). Their premium is a form of compensation for the risks they conduct (see Knight ([1921](#))).

With these three stakeholders all competing for a part of the *GDP-pie*, company owners and entrepreneurs, and/or employees would need to abide from a part of their claims in the production process, if the level of interest rates should be held constant in an environment where the growth of interest bearing financial claims outpace economic growth. If labour and entrepreneurs do not cut back in their claims in the same magnitude as debt increases, then the individual interest for each creditor has to be smaller, which implies that average interest rates have to fall. This does per-se not imply that nominal interest rates have to be low in such an environment. This observation could also occur in a higher interest, higher inflation paradigm with a fast growing economy, as only the relationship between debt obligations and real economic growth is binding for this ratio.

It is certainly possible to meet the demand for interest payments in the short-run by liquidating assets (living off the substance) or by issuing new debt instruments, which moves the obligation to pay into the future. But in the long-run this is not a viable option, as either capital is getting depreciated too much or the debt burden is getting too large to service, if the productive capacity does not keep up with the higher amounts of debt. Although it might theoretically be possible that GDP is growing with the same rate as interest bearing assets (even if they grow substantially), this is not what is observable over the last 40 years.

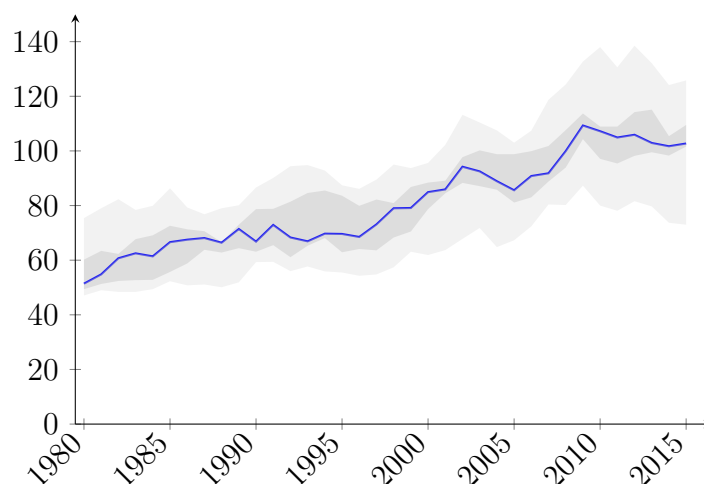
Even if this would be the case, there is still a natural limit to debt and interest payments in the long-run, which is bound by the added value in relation to the financial obligations which have to be met.

4 Empirical Observations

The previous Section explained theoretically, why there might be a boundary for interest payments in the long-run. Moreover, this long-run maximum fell during the last 40 years, as the debt-to-GDP ratio rose in almost all advanced economies. Thus, even if all added value would have been redirected towards interest payments, average interest payments would have needed to fall, since the added value has to be distributed towards a larger base of interest bearing assets. This trend alone put a pressure on interest payments, even without specifying which stakeholders receive which amount of the added value.

Furthermore, as total nominal interest payments did not rise proportionally with the outstanding amount of debt, each individual claim received a smaller proportion of the total amount of interest paid out in a specific period. Thus, actual average interest rates had to fall, too. This observed trend will be analysed in more detail in this Section.

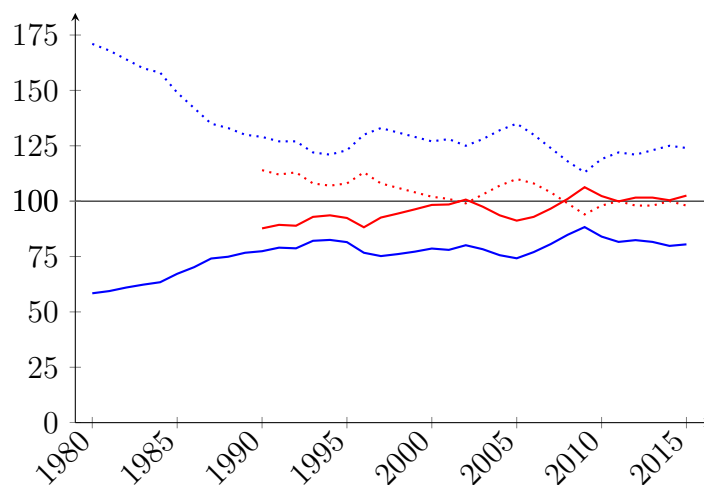
Over the last 40 years, the debt-to-GDP ratio has risen in most advanced economies. As laid out in the Introduction, most value added is produced by non-financial corporations. Therefore, the main focus is on non-financial corporate debt data. Figure 2 shows the growing debt ratios by depicting the dispersion of the non-financial corporate debt ratios for 13 OECD countries. While debt levels at non-financial corporations were at between 50 and 70% of GDP in most countries in the early 1980s, this ratio has risen to around 100% today, with some countries even having non-financial corporate debt levels of above 150%.

Figure 2: Median non-financial corporate debt ratio

Note: Debt ratios as a percentage of GDP for the country sample (—), with the 60/40 (dark grey) and 80/20 (light grey) confidence intervals. The country sample consists of Australia, Belgium, Canada, Finland, France, Germany, Italy, Japan, Norway, Portugal, Spain, the United Kingdom and the United States. Source: BIS.

As the debt-to-GDP ratio has grown exceptionally in the past, the maximum interest, which can be distributed, has fallen considerably. Since 1980 the maximum amount of interest, if measured by the non-financial corporate GDP-to-debt ratio (only including bank credit), has receded from around 180% to around 120% today (see Figure 3).² Using a broader definition, by also including debt securities (like corporate bonds) issued by non-financial corporations, then the maximum interest stands at around 100% of GDP today.

² Debt in the empirical section is assessed with the fair value. Movements in the debt stock therefore do not allow to draw conclusions towards the amount of interest which has to be paid. Falling debt levels would not per-se imply that interest payments are receding automatically, since it might just be because of revaluations of the outstanding amount in the balance sheet, while the debt burden for the debtor is staying constant (see Behrendt (2016) for an in depth analysis of this problem). Empirically, the amount of outstanding debt is therefore just serving as a proxy to which extent interest has to be paid (in relation to the average interest rate), as data on the actual amounts of interest payments are not available for this long period of time for many countries.

Figure 3: Debt-to-GDP ratios for non-financial corporations

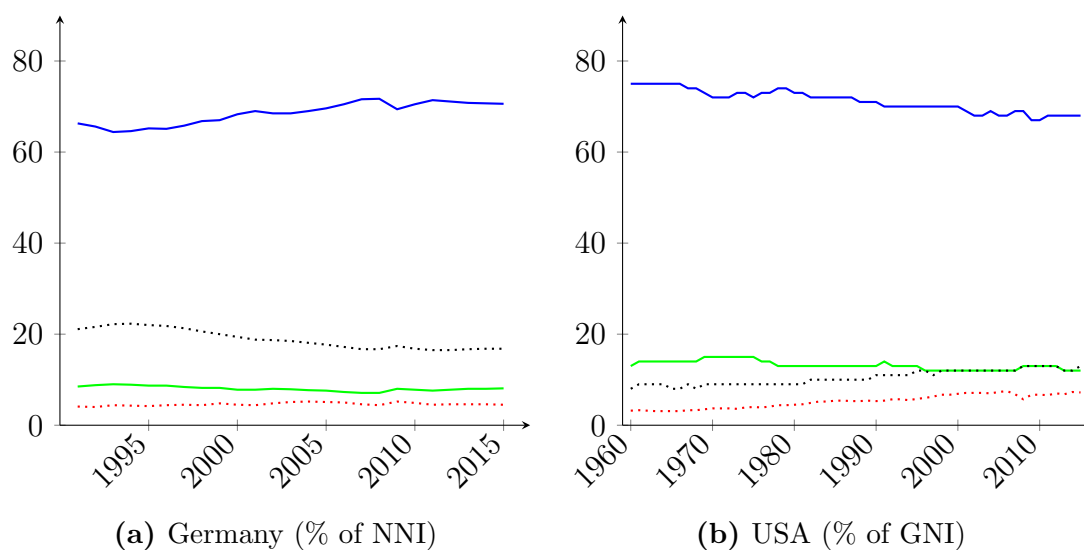
Note: Debt issued by banks to non-financial corporations (—) and including debt securities issued by non-financial corporations (—), plus the corresponding maximum interest (..... and) in %. The country sample is as in Figure 2. Debt securities data missing for Japan until 1997 and Norway until 1995. Note, that this ratio is calculated as the total amount and not the individual country median, thus the differing magnitude of the lines. Source: BIS.

The rationale for focussing on debt levels of non-financial corporations is that they are the most likely entities which generate economic surplus from which they can distribute interest payments, without sacrificing current or future payments. The exception is income generated by the state, the household sector and financial corporations through their own economic activities. But the majority of the added value is produced by non-financial corporations. In Germany, around 70% of the production value is made by these (see Figure 4(a)). Quite the same picture prevails in the USA. There, the non-financial corporate sector also contributes to around 70% of the added value, although financial corporations increased their share in the production from around 3 to about 7% of GNI since the 1960s. The remaining 20% is produced by non-corporate private businesses and the general government (see Figure 4(b)).

Due to that reasoning, one would consequently need to apply the maximum interest for the non-financial corporate sector by dividing the added value in the non-financial corporate sector by the total amount of debt in this sector. This can be done in the case of the US or Germany for example. But on an international level, data availability does allow for such a differentiation, as such detailed statistics are not available for a time horizon spanning back to the 1980s

in many countries. That is why, on the international level, total added value, respectively total GDP, is applied as the denominator. But, as non-financial corporate added value is lower than total added value (and additionally quite stable over time), it would only push down the maximum interest rate. In the US for example, the difference is fluctuating stable at around 50% of the non-financial corporate debt ratio as measured to total and to only non-financial corporate value added. Thus, the maximum interest today would then be only 100%, instead of 150%, but with the same falling trend being visible.

Figure 4: Percentage of national income



Note: Non-financial corporations (—), financial corporations (.....), government (—), private non-business sector (.....). Sources: Destatis, BEA.

As stressed above, most of the value added is produced by the non-financial corporate sector. Although there is still a decent amount of value added in the other sectors, these sectors hold exceedingly more debt in relation to their own economic activities. Thus, they are relying on other means to generate income, to service their interest obligations.

For instance, the majority of households does not add value on their own account. Households are predominantly employed in the corporate sector (to which the surpluses are being ascribed) and earn income in the form of wage payments. These household debtors pay interest by foregoing labour income, which would otherwise be used for consumption or saving purposes. But these incomes have also to be earned by companies in the first place and are then distributed towards workers in the form of labour income. Growing debt in the

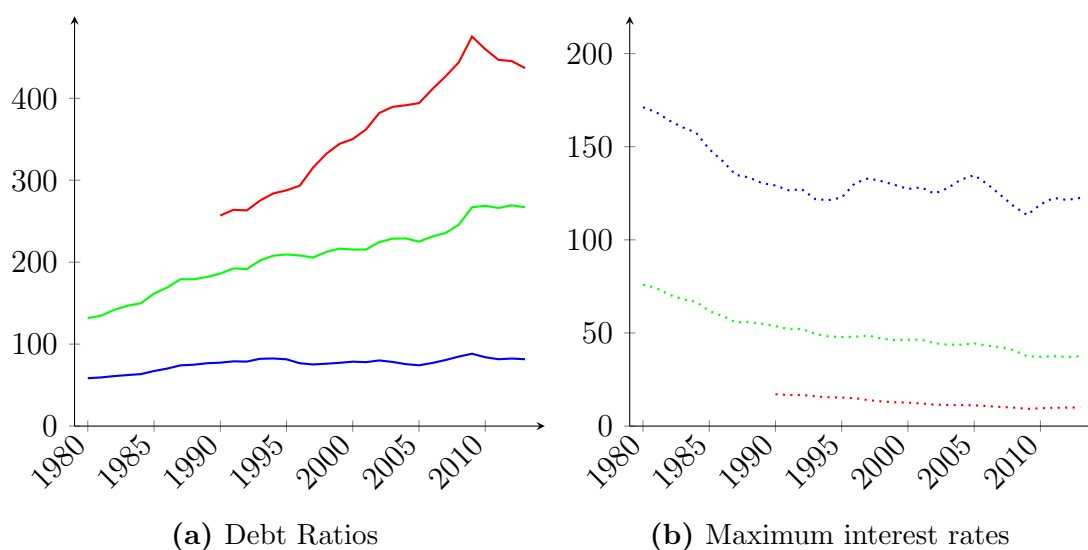
household sector therefore does primarily only contribute to a falling percentage of income which can be used for consumption or savings purposes, as a larger share has to be used for interest payments (if interest rates are presumed to be stable).

The same reasoning applies to government debt, as interest on these are paid primarily by taxing the private sector, which represents only a shift from income of households and profits of firms, and is thus not flowing out of the added value generated by the state itself.

It is empirically not distinguishable to which part financial corporations, the non-corporate private sector and the government pay interest from funds received through their own economic surplus generating activities, or merely by receiving funds shifted from other sectors (like wages, taxes and interest income from the non-financial sector). Therefore, the main focus of the empirically distinguishable binding interest payment constraint shall lie on non-financial corporate sector's surplus.

But to account for the whole picture, total debt is to be considered as well. As the growth in the debt ratio of the non-financial corporate sector was slower than in the other sectors, the fall in the maximum interest becomes even more drastic while applying broader debt definitions. In Figure 5, total private sector and gross public debt are considered together. Leaving out financial corporations, the theoretically achievable maximum interest fell from around 75% in 1980 to 37% in 2013 for the country sample. Additionally integrating financial sector debt, the maximum would stand at 29% in 2013. Adding debt securities issuance on the own account of the corporate sector, debt in the country sample would even grow to above 400%, which would then result in a maximum interest of below 25% in 2013.

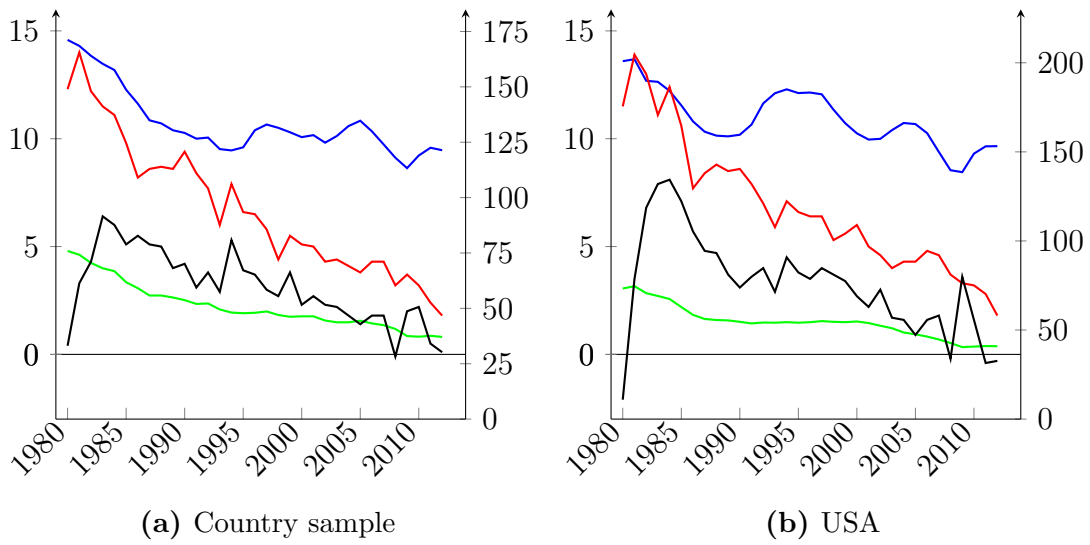
This 25% maximum interest threshold would imply that if all surpluses are redirected towards interest payments, each financial claim could receive 0.25 times the headline amount in interest, which is way down from the from the amounts prevailing in the past. But as entrepreneurs and labour have also to be rewarded adequately for their part in the production process, not all generated value can flow to the creditors. The maximum interest is therefore only a theoretical concept, but it shows the limits of interest distribution quite forcefully.

Figure 5: Debt-to-GDP ratios and maximum interest

Note: Non-financial corporations (—), non-financial sector (non-financial corporations + private households + government) (—), all sectors including debt securities (—), plus the corresponding maximum interest rates for non-financial corporations (·····), the non-financial sector (·····) and all sectors including debt securities (·····). Country sample as in Figure 2. Government debt data for Belgium is missing in 1980 and 1981. Therefore, a linear growth of government debt for Belgium from 1979 to 1982 is assumed and interpolated values are taken there. Sources: BIS, Jordá et al. (2016).

This general downward trend of the maximum interest over the last 40 years alone put a pressure on average interest rates, as the pie from which interest can be distributed is getting smaller for each individual debt contract, even without specifying if labour and entrepreneurs are rewarded adequately. More specifically, today each amount of debt is facing a smaller share of the added value from which interest can be paid out. Thus, in a higher financialised world there is a natural tendency towards lower interest rates, if entrepreneurs and labour do not significantly cut back on their claims in the production process.

What Figure 6 shows quite emphatically is the lockstep in which the decline in interest rates fell together with the fall of the maximum amount of interest which can theoretically be distributed (for the country sample and the USA). From the 1980s on, long-term nominal interest rates fell from above 10% to around 2% today. This decline cannot be attributed to falling inflation rates alone, for which creditors want to be compensated, as real interest rates also receded from around 6% in 1980 to around 0% today. During the same time, the maximum distributable interest fell quite equally.

Figure 6: Maximum interest and bond rates

Note: Reference interest rates on 10-year government bonds as in Figure 1 (nominal (—, lhs) and real (—, lhs)), and the maximum interest for non-financial corporations (—, rhs) and the non-financial sector (—, rhs). Sources: BEA, BIS, FRBNY, IMF, Jordá et al. (2016).

This evolution is also confirmed by a simple correlation analysis. In Table 1 the cross-correlations of the 10 year nominal interest rates with the different maximum interest rate definitions are listed. The upper part for the whole country sample applies the nominal interest rate as in Figure 1. Correlations from the raw data (termed *simple*) are very high throughout, irrespective of which maximum interest rate definition is taken. They are even higher while taking a more long-term view using five year averages, to eliminate yearly fluctuations which are not explainable by long-term trends. In the lower part of Table 1, the same approach is applied for US data. Here, the 10 year nominal interest rate for US Treasury bonds is taken as a reference. Additionally, AAA rated corporate bond yields are also considered to further reflect the interest obligations for the corporate sector. The same pattern as for the whole country sample emerges, with only slightly lower coefficients for the maximum corporate interest, irrespective of the applied interest rate. The results also do not change much using short-run interest rates, like 3-month treasury bill or money market (LIBOR) rates.³

³ Results are omitted here, but are available from the author upon request.

Table 1: Cross-correlations between nominal interest rates and the maximum interest

	10yr nominal rate	
	simple	5yr avg
Max. interest	0,9662	0,9794
Max. private interest	0,9468	0,9637
Max. non-fin. corp. interest	0,8312	0,8207
Max. non-fin. corp. interest*	0,8939	0,9109

*only France, Germany, UK, US

	10yr nominal rate		AAA corporate bond rate	
	simple	5yr avg	simple	5yr avg
Max. interest	0,9669	0,9861	0,9681	0,9875
Max. non-fin. interest	0,9501	0,9546	0,9534	0,9577
Max. corp. interest	0,7727	0,7733	0,7507	0,7581

Note: Upper part: country sample; lower part: USA. Sources: BEA, BIS, FRBNY, IMF, Jordá et al. (2016).

However, these correlations do not mean that there are no other explanations for low interest rates, as mentioned in Section 2. It merely adds to these theories from another perspective. Additionally, no prediction is being made here about possible causalities, as higher debt-to-GDP ratios do not strictly imply that the percentage of interest paid out cannot remain stable or even rise. Merely a simple indicator about the parallel secular trends of the ability to distribute interest and actual interest rate levels over the last 40 years is given here.

5 Distribution of Factor Income

Until now, no observations have been made on how GDP has been distributed to the different stakeholders. The maximum interest just laid out the basic concept of how high interest rates can be, if all added value is flowing towards interest payments. This section now concentrates on the evolution of factor income over the last 40 years, to see to which extent the income distribution might have shifted in light of the larger amount of debt obligations.⁴

⁴ There is no detailed long-run data for most OECD countries available, that is why the main focus in this Section is on the United States (and to a lesser extent Germany and Japan).

So far, it could be seen that while the debt-to-GDP ratio rose, interest rates likewise did fall over the last four decades. But, even if the credit-to-GDP ratio is growing, interest rates could remain stable or even rise, if profits and labour income would fall to compensate creditors.⁵ But if labour is going to be rewarded at (or near) its marginal-productivity and entrepreneurs (including stockholders in the form of dividends) should still be able to reap in benefits for taking economic risks, average interest rates have to fall, if debt-to-GDP ratios rise.⁶ This then does not mean that total distributable interest has to shrink relative to the added value. It only bears the consequence that the piece of the interest pie is getting smaller for each debt contract.

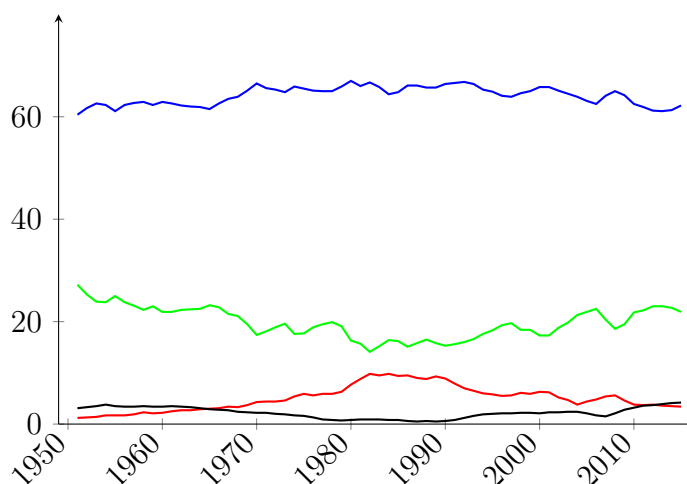
The rewards for each group of stakeholders, as outlined in Section 3, can be seen in Figure 7 for the United States.⁷ It should be noted that interest payments are only depicted as total net interest in the whole economy, which empirically is not reflecting that the gross amount of interest payments generated by economic activity should really be the concept of choice here. This restriction has to be made because more detailed data is not available for the US. Nevertheless, it might paint a general picture of the level of interest paid out.

What is apparent is that labour income has been quite stable in the US since the 1950s, fluctuating between 60 and 65% throughout. Interest income has been growing from 2% of GNI in the 1950s to almost 10% in the late 1980s, to subsequently fall to around 3% nowadays. Interest income in the 1980s ate up a good proportion of entrepreneurial income. Consequently, profits and proprietor's income fell to under 20% in the middle of the 1980s, before growing to around 25% today again.

⁵ Or if for example a larger part of labour income is used to pay private debt obligations, resulting in a reduction of consumption and/or savings.

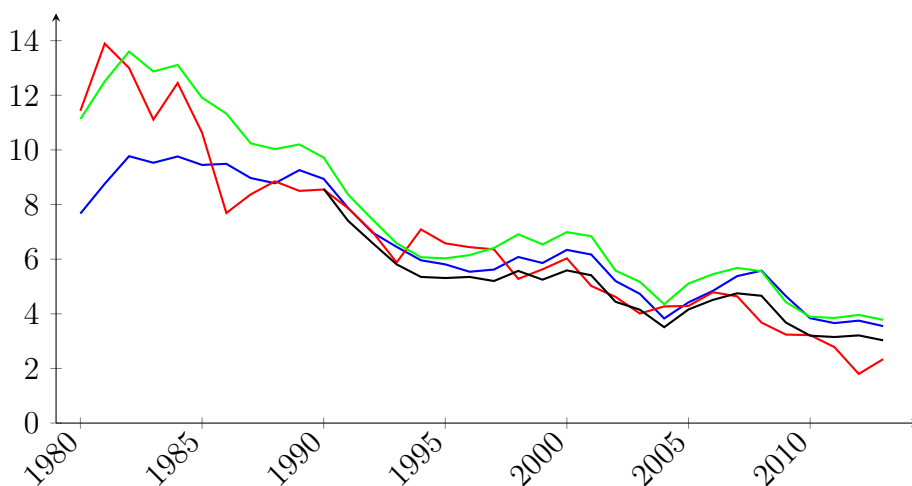
⁶ To which extend factor income is distributed towards the different stakeholders is certainly an outcome of a negotiation process between labour, company owners and external capital providers. There is no natural law, which forces a certain primary distribution of income.

⁷ Abstracting here for a second that the US cannot be considered as a closed economy. More consequently, an international perspective would have to be taken, to better reflect cross-border capital transfers. But this is not possible, since detailed long time series are not available in many countries. Mostly only the compensation of employees is available for such a long-term perspective.

Figure 7: Factor income as a percentage of GNI for the US

Note: Compensation for employees (—), profits and proprietor's income (—), net interest (—) and rents (—). Source: BEA.

But only looking at the total amount of interest paid out gives no hint about the level of interest rates. The following Figure 8 is thus quite enlightening, as the amount of interest paid out is not only depicted in relation to GNI, but also in relation to debt in the non-financial corporate sector, the denominator in the distribution of interest payments towards the specific financial claims.

Figure 8: Paid-out interest

Note: Net interest as a percentage of GNI (—), non-financial corporate debt (—), and non-financial corporate debt plus debt securities (—), as well as nominal interest rates on 10-year Treasury securities (—) for the US. Sources: BEA, BIS, FRBNY.

It can be seen that distributed interest as a percentage of total debt roughly equals the nominal interest rate in the long run. Total distributed interest fell from around 10% of GNI in the the 1980s in the USA to around 4% today, while non-financial corporate debt rose from around 60% of GNI to around 80% in the same span. Consequently, the interest rate distributable per non-financial corporate debt share fell from around 13% in the beginning of the 1980s to roughly 4% today. The nominal risk free interest rate (illustrated by 10 year Treasury bonds) matches this evolution almost one for one during this period. Cross-correlation analysis also confirms the eye test here, as the coefficients are above 0.9 (see Table 2).⁸

Table 2: Cross-correlations of paid-out interest

	10yr nominal rate
Interest/GNI	0,89354
Interest/Non-fin. corp. debt	0,95261
Interest/Non-fin. corp. debt + debt securities	0,92104

Note: Cross-correlations between the 10 year nominal government bond rate and the net interest amount paid in relation to the specific definitions in the US. Source: BEA, BIS, FRBNY.

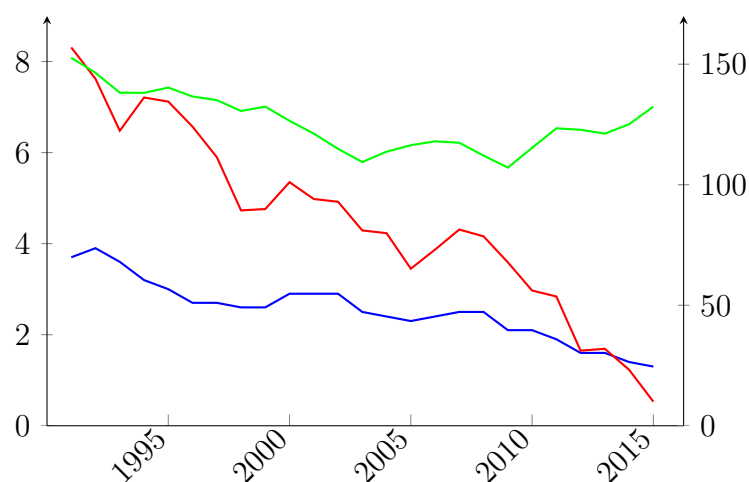
Consequently, interest rates are low today, because interest payments per share of debt have receded, as total interest payments (the nominator) have fallen as a percentage of value added and debt (the denominator) has risen faster than added value. In sum, not only did the ability to distribute interest (the maximum interest) fall, but also the actual relative amount of distributed interest, too. Thereby highlighting the constraints on the ability to earn interest through higher indebtedness, which lead to lower average interest rates over the last 40 years.

A problem with the US statistics is that they only show the net amount of total interest payments in the economy. Interest paid out only by the non-financial corporate sector cannot be measured for the US in gross terms. But, more detailed

⁸ It certainly might be that the nominal Treasury bond rate does not represent the actual average amount of interest rates for all debt contracts payable by corporations, as market rates do not per-se equal the 10 year Treasury bond rates. But loan rates (cross-correlation of 0.92 with 10 year Treasury rates), corporate bond rates (cross-correlation of 0.99) and estimates of risk free natural interest rates (e.g. by Laubach and Williams (2015)) are matching this trend quite equally.

accounts can be found for example in German national income statistics. In these, the gross amount of interest paid out by non-financial corporations can be seen more distinctly. Figure 9 shows the gross amount of interest in relation to net national income (NNI) paid out by the non-financial corporate sector to all other stakeholders. This gross amount shrank from almost 4% in the early 1990s to 1.3% of NNI in 2015 (earlier data before the German unification is not available). During the same time, yields on 10-year German government bonds (which can be seen as long-term risk-free assets) shrank quite dramatically, too.

Figure 9: Interest and debt for Germany



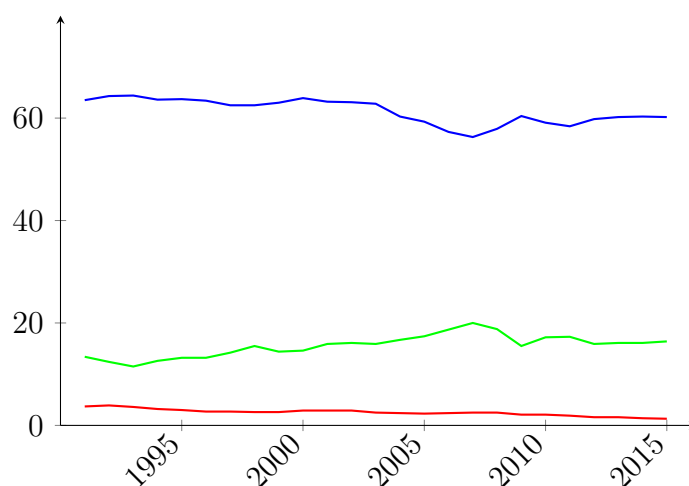
Note: Interest paid out by non-financial corporations as a percentage of NNI (—, lhs), nominal interest rate on 10 year government bonds (—, lhs), and the maximum interest for non-financial corporations (—, rhs) for Germany. Source: BIS, Destatis, ECB.

For Germany the fall in interest paid out by non-financial corporations is also visible, although this drastic decline certainly cannot be fully explained by a rise in debt levels since 1990 (earlier data is not publicly available). Interest payments from non-financial corporations as a percentage of NNI fell from around 4% in the 1990s to below 2% today. In the same time, non-financial corporate debt rose from around 65% to above 90% of NNI until 2009, while subsequently falling to about 75% in 2015. Simultaneously, the maximum interest of non-financial corporations fell from around 150% to about 100% from the early 1990s until 2009. This rise in the debt level is mainly attributable to debt securities, as they rose threefold between 1991 and 2009.

German data also shows, that labour and entrepreneurial income did not fall during this time (see Figure 10), even as non-financial corporate and also total debt (from around 170% to above 250% of GDP since 1990) in the economy

grew. This also implies that average interest rates had to fall, as entrepreneurs and labour did not abide from their share of added value. In spite of growing debt obligations, interest payments as a percentage of NNI even fell from about 4% to slightly above 1% since the early 1990s, leading to smaller average interest rates.

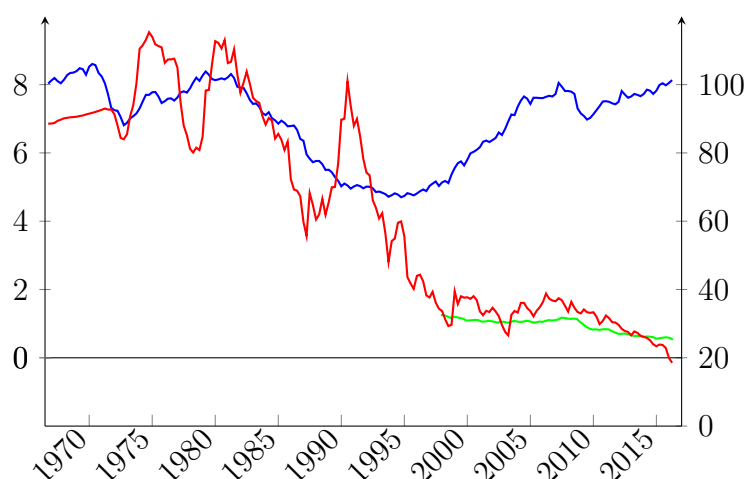
Figure 10: Factor income for Germany



Note: Compensation for employees (—), corporate surpluses (—), and interest paid out by non-financial corporations (—) as a percentage of NNI. Source: Destatis.

This is also visible for Japan, which was one of the first advanced countries, where interest rates distinctly began to fall. The fall in nominal interest rates fell together with drastically rising non-financial corporate debt. This is depicted by the falling non-financial corporate maximum interest in Figure 11.

Even as non-financial corporations were able to delever after the housing market crash in the early 1990s, interest rates did not rise, as other sectors (especially the government and financial sector) increased their indebtedness, which resulted in a growing debt-to-GDP ratio for the whole economy and thus in a lower maximum interest, as calculated by these broader definitions (see the green line in Figure 11; earlier debt data is not available for all other sectors).

Figure 11: Interest and debt for Japan

Note: Maximum non-financial corporate interest rate (—, rhs), maximum non-financial interest rate (corporations, households and government) (—, rhs), and 10-year government bond rate in % (—, lhs). Source: BoJ.

Although the above described correlations between debt levels and interest rates do not mean that there is a direct causation, but the lockstep is quite striking and certainly plausible. While it could be argued that the fall in interest rates stems from the demand side (which is definitely true to a certain extent, see the theories in Section 2), the ability of non-financial corporations to supply interest payments out of added value surely fell during the last 40 years, which then contributed to the lower average interest rates through the channels laid out above.

Additionally to the lower ability of the non-financial corporate sector to provide interest payments, the developments in the financial sector itself lead to a further pressure on interest income. This development will be described in the following chapter.

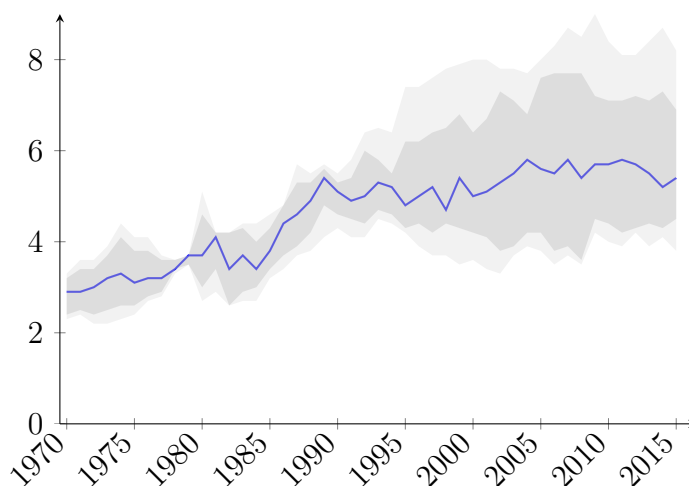
6 Impact on Interest of Financialisation

Once interest has been paid out by non-financial corporations to (mostly) financial corporations, it can be used to cover costs for labour, operating expenses and also for their own debt obligations (interest payments). Financial corporations are therefore also bound to pass on interest by their ability to raise income. But interest payments by the non-financial sector is not the only income for financial corporations, as they can also generate income by undertaking intermediation

activities, from which they receive fees (providing payment services for the general public for example), or advisory income (by doing investment banking activities). Furthermore, they can generate income through financial gains.

The difference between non-financial and financial corporations is that most financial sector intermediaries (mostly non-bank financial intermediaries) do not produce much of a surplus themselves. The financial sector is accountable for only 4 to 7% of GDP in most advanced economies (see Figure 12). Most of the business activities are in the form of redirecting funds within the financial sector itself, as only 15% of the financial flows from banks go to businesses (see Turner (2015)). The rest is spent on buying and selling existing financial instruments. This closed loop of finance of buying and selling existing assets like stocks, bonds, or mortgages instead of going into new business investment is mostly not contributing to a large amount to GDP growth, and therefore does not enhance the financial sector's ability to earn interest themselves.

Figure 12: Median financial sector size

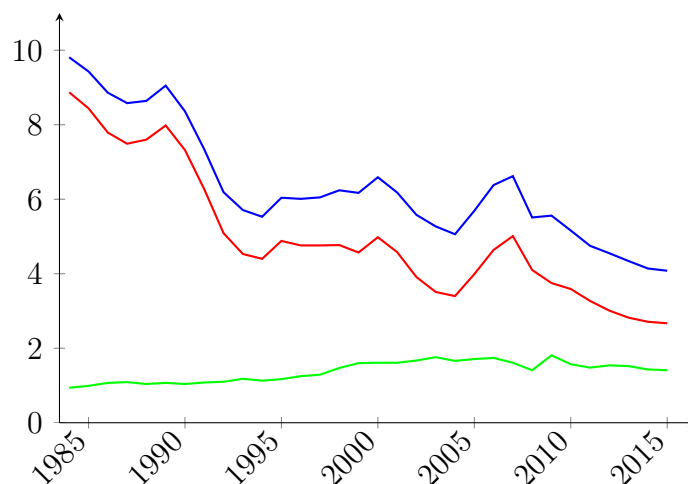


Note: Contribution of the financial sector to GDP (in % of total GDP) (—), with the 80/20 (dark grey) and 90/10 (light grey) confidence intervals. The country sample consists of Australia, Belgium, Canada, Finland, France, Germany, Italy, Japan, Korea, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States. Source: OECD.

The financial sector is therefore constrained in its ability to distribute interest by their ability to raise non-interest income plus the interest income they receive from the non-financial sphere. In the US, the share of interest income to GDP which flows from the private sector to the FDIC-insured commercial banks and savings institutions fell drastically during the last 40 years (from about 9% in 1980 to around 3% today). Non-interest income could not make up this fall

(total income fell from around 10% to 4% of GDP for commercial banks and savings institutions since 1980). As a result, total income has fallen. Figure 13 shows this development.

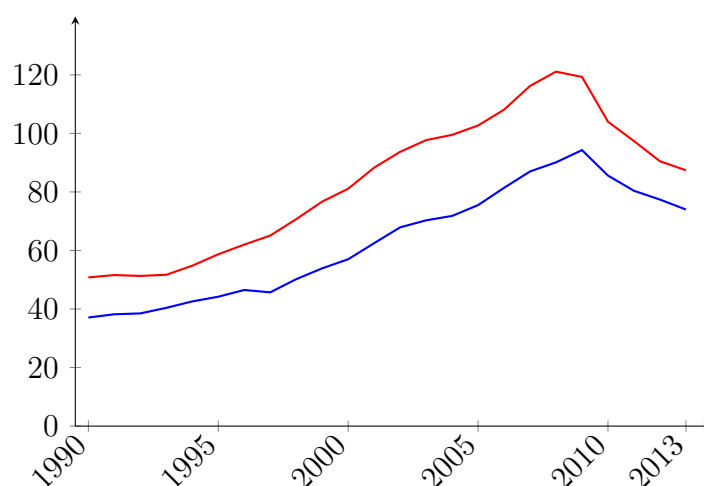
Figure 13: Annual income of US banks



Note: US FDIC-insured commercial banks and savings institutions (total income (—), interest income (—), and non-interest income (—)) as a percentage of GDP. Source: FDIC.

Although the financial sector today is responsible for a higher share of value added in most advanced countries (see again Figure 12), it might not be able to generate enough non-interest income, to make up for the loss of interest income from the non-financial sector to keep their interest expenses at the same level as before.

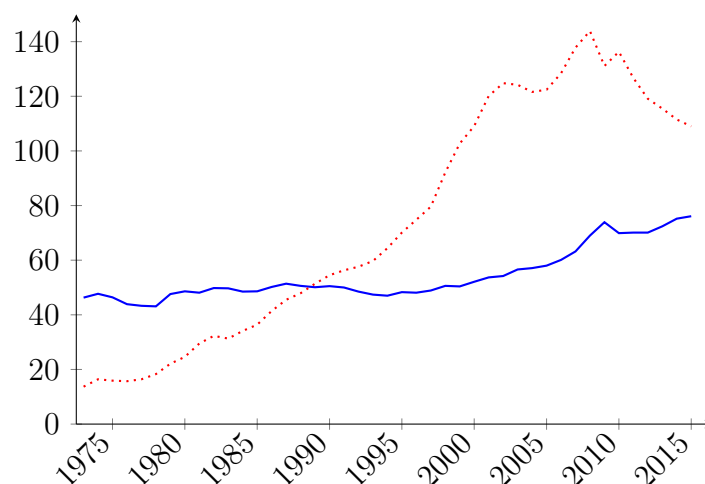
Furthermore, not only did income from the non-financial sector recede in the last 40 years, outstanding debt in the financial sector also grew faster than GDP during this period (see Figure 14). This puts, through the same mechanism as for the non-financial corporate sector, a further pressure on interest payments, as a larger debt share is facing a smaller income share. The ability to pass on interest on debt contracts, which the financial sector issued itself, has therefore also receded.

Figure 14: Bank debt

Note: Debt for the country sample as in Figure 3 (except for Norway; Japanese data only available from 1997 on) (—), and the US (—) as a % of GDP. Source: BIS.

Additionally, it is not only commercial banks for which it becomes more difficult to pass on interest themselves. Within the financial sector, non-bank financial intermediaries (NBFIs) are bound by the same constraints. The size of the shadow banking sector—measured by its outstanding liabilities—in the US alone grew from 20% to about 140% in relation to GDP at the beginning of the Global Financial Crisis (see Figure 15).⁹ The shadow banking sector is mainly depending on the surpluses which other financial intermediaries generate (foremost banks through credit extension) and the non-financial sector, and which pay them for their services. To a smaller extend, they generate added value themselves by offering liquidity services for example. But as the shadow banking sector grew much faster than GDP (and also GDP generated by the sector itself) and interest income as a percentage of GDP fell, also their ability to pass on interest receded, as labour and company owners of these NBFIs have to be compensated as well.

⁹ See Poszar et al. (2013) for a definition of the shadow banking system for the US.

Figure 15: Financial sector liabilities in the US

Note: Total liabilities as a percentage of GDP of commercial banks (—), and the shadow banking sector (.....) for the US. Shadow banking liabilities are as in Poszar et al. (2013) from government-sponsored enterprises, government-sponsored enterprises and federally related mortgage pools, issuers of asset-backed securities, money market mutual funds, plus U.S. government agency securities and open market papers. Source: FRBNY.

Not only has higher financialisation lead to a lower ability to pass on interest within the financial sector through higher debt levels, there is growing evidence that in many advanced economies financial sectors might have become so big that they are detrimental to economic growth (see for example Cecchetti and Kharoubi (2015), Jordá et al. (2013), Philippon (2015), Philippon and Reshef (2009), and Turner (2015)). Cecchetti and Kharoubi (2012) for example show that from a certain point of financial development, additional growth of the financial sector becomes a drag on economic growth. They argue, that the size of financial sectors in many advanced economies today might already be at a point where the marginal costs are outweighing the marginal utility.

One reason is that much of the growth in debt has been in mortgage credit to private households in the past. Many of these construction activities are contributing relatively little to productivity growth (see Cecchetti and Kharoubi (2015)). This might be the case because these credits are often just used to refinance or buy existing mortgages (see Philippon (2015)). Such transactions have little immediate effect on economic activity and thus do not enhance the ability to earn interest. Cecchetti and Kharoubi (2015) therefore argue that by extending debt mainly towards low productive investments, average productivity and economic growth fell during the last decades. Through this, the *GDP-pie* from which interest can be distributed additionally shrunk relative to the amount of

interest bearing assets.

Furthermore, as more human capital in the financial sector is redirected from liquidity services towards credit activities, there is a shift in the form of employment visible in the financial sector (see Philippon and Reshef (2009)). There is a reduction in routine work through technological progress, which is substituted by more complex jobs in credit monitoring, in designing, originating, and trading complex products, and in advisory services. These jobs have a higher productivity and are therefore remunerated higher. This has the effect that average wages in the financial sector have outperformed wages in all other sectors. The majority of the benefits therefore go to a small group of highly skilled workers in the financial sector, who earn extraordinarily high wages. These wealthy individuals save on average a higher proportion of their income, which is contributing to lower interest through higher savings rates. Philippon and Reshef (2009) estimate that the financialisation since the 1970s is responsible for around 15-25% of the total increase in the GINI coefficient as well as the Theil index in the US. Higher inequality in turn has led to slower growth across the developed countries in the last decades (see e.g. Rachel and Smith (2015), or Stiglitz (2012)). Furthermore, Cecchetti and Kharoubi (2015) show that these highly skilled workers might generate negative externalities for other sectors, as they might be able to persuade borrowers to invest in projects with lower productivity, which then could lead to a slowdown of total factor productivity.

Additionally, technical progress in the financial sector put downward pressures on interest rates as well. Through better monitoring and risk management, and lowered intermediation costs, financial intermediaries are able to lower average interest rates which they offer. Additionally, through better hedging, pooling and monitoring financial sectors have become more liquid in the last couple decades. This in turn implies that investors have to pay a lower liquidity premium, which c.p. lowers interest rates (see e.g. Nagel (2016)). Furthermore, rising securitisation activity increased loan supply through higher liquidity and increased profitability of banks (see Altunbas et al. (2014) for an overview). On the other hand, effective credit demand also rose, as banks have lent to riskier borrowers. As similarly alternative financing demand has risen, total credit creation rose, which is visible in the higher debt-to-GDP ratios. Thus, securitisation activities and alternative financing also contributed to the increased pressure on interest rates.

The financial sector might therefore contributing to lower growth rates, and

as a consequence to lower interest rates twofold. By issuing more credit, especially for unproductive uses, growth slowed and the ability to earn interest receded. Additionally, technological progress and changes in business models in the financial sector also put pressures on interest rates.

Nevertheless, even if these pressures were not present, financial intermediaries would still face the constraint of lower interest income from the non-financial corporate sector through their higher share of outstanding debt. Thus, the long-run trend in lower average interest rates is not only explainable from demand side induced progresses, but also by the aforementioned supply side developments.

7 Conclusion

This paper laid out an alternative supply side perspective as of why interest rates have fallen considerably since the 1980s around the world. This view is based on the premise that interest can only be sustainably distributed in the long-run through the added value in the economy. Since a larger amount of debt is facing a proportionally shrinking amount of added value, there is a pressure on average interest rates.

Through higher indebtedness in the non-financial corporate sector, the maximum interest for non-financial corporations has receded from around 180% in the 1980s to around 100% today (and even lower, if only added value of non-financial corporations is considered). This alone puts pressures on interest payments, even if labour and entrepreneurs would cut back in their claims to the produced economic value. Consequently, the lower amount of paid out interest to the financial sector lead to a lower ability of these entities to pass on interest payments on their own debt securities as well, as the nominal amount of income from interest shrunk and financial institutes face a higher debt burden themselves, while not being able to make this shortfall up by raising their non-interest income to the same extent. Furthermore, the growing financial sector supposedly contributed to lower economic growth in the last couple of decades. This put further pressure on the denominator in the maximum interest, leading to lower average interest available for each amount of debt. Additionally, higher liquidity through better intermediation lead to lower liquidity premia, which lowered interest rates, too.

If average interest rates shall for example rise by just one percentage point, a shift from all other factor income groups of four percentage points towards interest would be needed, as the maximum interest for all debt obligations is at

about 25% in the country sample (with a debt-to-GDP ratio of 400%).

On these grounds, the notion that central banks should just raise policy rates to prop up interest rates in the financial markets can be challenged. If central banks would raise interest rates drastically and market rates would therefore rise too, then a higher amount of added value would flow towards creditors, at the expense of workers, and/or entrepreneurs and company owners. Either labour income might then have to fall below their marginal productivity or workers could only spend a lower portion of their income on consumption, which might lead to slower economic growth, or entrepreneurs and company owners might not be rewarded adequately for their engagement to take entrepreneurial risks anymore. In the short-run it might certainly be possible to live off of the substance or refinance payment obligations by issuing more debt, if workers and entrepreneurs do not cut back on their claims, but these are no viable long-run options, because either the capital stock would be depreciated too much or default risks (because of over-indebtedness) would rise. That would probably lead to lower growth and inflation in the long-run, as financial instability risks would rise. Thus, central banks might be inclined to cut interest rates again. So, there might be no room for central banks to raise rates, without other negative repercussions potentially arising. Furthermore, market rates might not even rise in response to a policy rate increase, as creditors might not be able to generate enough income to pay all interest obligations and simultaneously pay workers and reward company owners.¹⁰

This has the consequence, that if employee compensation and profits shall not fall below their fair share in the production process, interest can only rise sustainably in the long-run by lowering the debt-to-GDP ratio either through higher growth rates or by lower nominal amounts of debt. If none of these or a combination of these options come to pass, then average nominal interest rates are probably bound to be low for a long period of time.

¹⁰ Although debt-to-GDP levels have slightly fallen during the last couple years after the Global Financial Crisis (at least in advanced economies), this might not be enough to lead to a significantly higher ability to earn interest.

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