Why have interest rates fallen far below the return on capital?
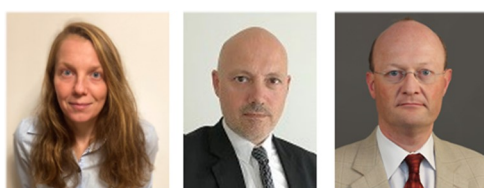
By Magali Marx, Benoît Mojon and François R. Velde*

Interest rates have been falling since the mid-1980s by about 5 percentage points while the return on capital has remained flat. We therefore need to understand why rates declined and why the risk premium increased.

In a calibrated OLG model with recursive preferences encompassing many of the ``usual suspects'' cited in the debate on secular stagnation, we find that demographics and lower productivity growth account for a 2.2pp (respectively a 4.8pp) decline in the US (respectively the euro area) real rates and the increases in public debts have lifted equilibrium interest rates by nearly 2pp.

The increase in the risk premium reflects two forces. Bonds have become a better hedge for stocks, notably in the euro area, and risk aversion has increased. In our model, changes in labor share, longevity, and inequality have had negligible effects on interest rates.

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Real risk-free rates have decreased while the return on capital was stable.

We observe both a downward trend in real interest rates and stable return to productive capital.

First, Figure 1, left panel illustrates different measures of real interest rates and shows that real interest rates have declined steadily over the last three decades; the decline since 1980 was persistent and substantial, about 4-5 percentage points. This downward trend is observed across OECD countries, for short-term and long-term interest rates as well as estimates of the natural rate of interest, and does not depend on the way inflation expectations are measured to compute ex ante real interest rates.

Second, the return on capital as measured from national accounts or from stock markets has remained flat. Gomme et al. (2011) build the return to productive capital as the net operating surplus, which is equal to value added minus depreciation and payments to labor, divided by the capital stock. Gomme et al. (2015) and Caballero et al. (2017) stress that, in the US, return to productive capital has no trend. It fluctuates with the cycle around 7 to 9 percent before tax and around 7 percent after tax. In Figure 1, right panel, we report different measures of the return on productive capital for the euro area and the US. We see no downward trend in this measure of the return on investment. Interestingly, estimates of the return on capital computed on the basis of stock returns have fallen much less than real interest rates; in particular Krishnamurthy (2019) shows that the equity risk premium of the S&P500 has increased from about 4 percent pre-2008 to 6.1 percent since 2009.

Figure 1: Real return on government bonds (left panel) and real return on capital (right panel)
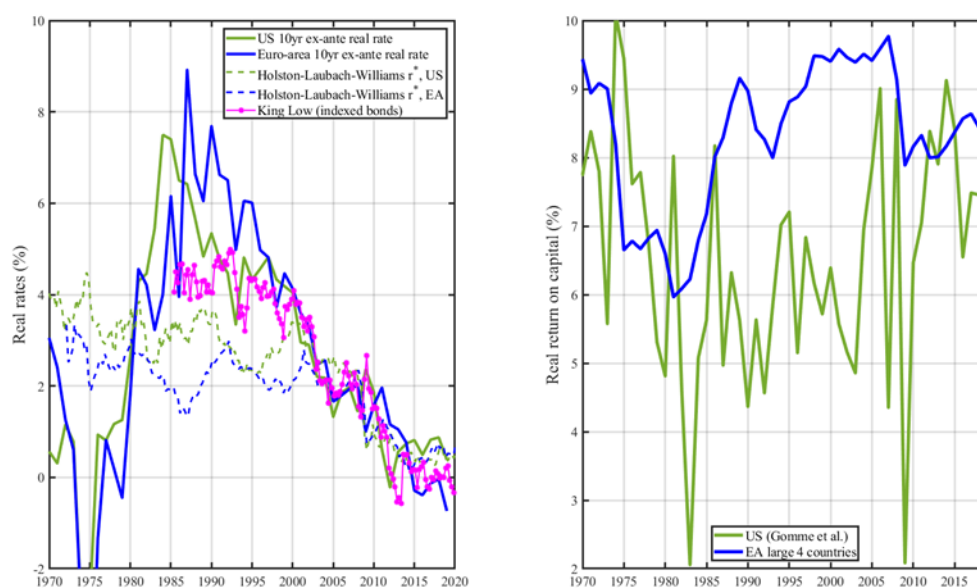
Note: Left panel represents different measures of real interest rates: 10Y ex-ante interest rates for the US (green) and the EA (blue), from Hamilton et al. (2016), natural real rates for the US (dotted green) and the EA (dotted blue) from Holston et al. (2017) and real rates deduced from inflation indexed bonds (magenta, King and Low, 2014). Right panel represents measures of the return on capital for the US (green) from Gomme et al. (2011), and the EA (blue), computed by the authors with a similar method.

An overlapping generation model, which embeds all the usual suspects.

Marx et al. (2021) develop an overlapping generation model offering a joint quantitative analysis of the decline in real interest rate since the mid-80s in the US and the EA and assessing the contributions of changes in the main ingredients usually highlighted in the debate on secular stagnation:

- demographics because the ageing of OECD baby-boomers could explain an increase in savings,
- trend productivity because it determines wealth and saving over the long run,
- time-varying credit constraints in order to account for the post-crisis deleveraging hypothesis,
- risk, which has two (possibly correlated) dimensions, one affecting the return to capital and the other the return on (otherwise safe) nominal debt.

The first two are readily observable, we approach the last two flexibly to see what is required to match the data. In the model, risk only affects the spread between the two assets, capital and risk-free bonds. The other factors: demographics, productivity, and the borrowing constraint, determine the return that would prevail in the absence of risk, which can itself be inferred from the observed risk-free rate and the return on capital. In other words, those factors affect the levels of the rates equally, while risk affects the spread between the rates asymmetrically.

As it turns out, to match the data the borrowing constraint does not need to tighten. Our model explains that interest rates have fallen in spite of the increase in public debts issued by OECD countries. Given that we use such debts as a proxy for safe assets in the model we have to explain why real rates have fallen in spite of an increased supply of safe assets.

Figure 2 represents the decomposition of the risk free rate for the US and the EA (top panel) and the decomposition of the return on capital (bottom panel) by decade.

Figure 2: Contributions of various factors to the return on capital and the return on bonds
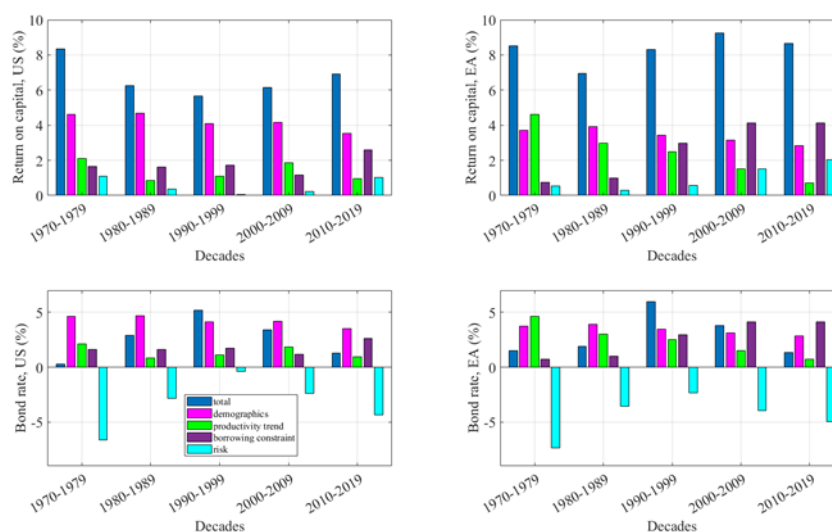
Note: for each decade, we represent the decomposition of the rates (blue) with respect to the contribution of demographics (magenta), productivity (green) and the borrowing constraint (purple). The blue bar includes the contribution of a constant (not shown separately).

This shows first that the two drivers of trend growth (demographics in magenta and productivity in green) both pulled down interest rates by a cumulated 4.8 percentage points in the euro area and 2.2 percentage points in the US. The timing and relative contributions of each factor differed across countries. In the euro area, the deceleration of productivity has been steady from 3.3 percent yoy growth rate in the 1970s to 0.8 percent since 2010, pushing down interest rates by nearly 4 percentage points. In addition, the working age population slowed by 1 percentage point, bringing interest rates down by another 1 percentage point. In the US, the evolution of growth has been less dramatic with a much more limited deceleration of productivity.

Second, the evolution of rates and economic growth imply an increase in leverage with the largest increase occurring in the 1990s. Higher leverage (purple bars in Figure 2) has pushed interest rates by almost 1.5 percentage points (2 percentage points) from the 1980s to the 2010s in the US (the euro area). This compares with the estimates of Rachel and Summers (2019) that find that OECD increases in public debt increases interest rates by 3 percentage points and Eggertsson and Mehrotra (2019) who estimate this effect at around 2 percentage points.

Finally, the contribution of risk on the rates is represented in cyan; the pattern is similar in both the US and the EA. The effect upwards on the return on capital is smaller than downwards on the risk-free rate. Notably, through the lens of the model, the effects of risk on the risk free rate has a hump shape. These effects lower the risk free rate to a very low level in the 1970s. These negative effects diminish in the 1980s and the 1990s before resuming an increasingly negative impact in the 2000s and the 2010s. Quantitatively, the risk factor may have explained over 4 percentage points of the decrease of the bond rate since the 1990s in the US (3 in the euro area), while it has raised the return on capital by 1.5 percentage points in the US.

We also show in Marx et al. (2021) that other potential drivers as the relative price of investment goods, the decline in the labor share, changes in mark-ups, longevity or inequalities do not change drastically this global pattern.

What drives the risk premium?

The sources of risk in our model are the risk on productivity of labor and nominal risk on the return of bonds. We observe the variance of the productivity shocks, the nominal shocks and their correlation (Table1) and let the model affect the evolution of the risk premium, expressed as the gap between the return on capital and the risk free rate. We leave room for the changing correlation to play a role in this evolution.

Table 1: Second moments of the determinants of interest rates

| | US | | | EA | | |
| | std. dev. | | corr. | std. dev. | | corr. |
	inflation	productivity		inflation	productivity	
1970-79	2.7	3.9	-0.6	3.0	2.6	-0.1
1980-89	2.7	3.1	-0.2	3.3	2.1	-0.2
1990-99	1.2	2.8	-0.2	1.7	1.6	0.2
2000-09	1.9	2.8	0.3	1.5	2.1	0.5
2010-19	1.1	2.2	-0.1	1.0	1.2	0.4

Source: Marx et al. (2021)

From the 1990s to the 2010, the risk premium has gone from around 0.5 % before 1990 to around 6 % after 2000 in the US and from 3 % to 7 % in the euro area, an increase larger than 4 percentage points. In the US, the bulk of this decline reflects an increased aversion to the risk on productivity. Turning to the euro area, the decline in the risk free rate away from the return on capital reflects two evolutions.

Similarly to the US, the risk aversion has also increased. In addition, the higher correlation between inflation and productivity shocks (see Table 1) imply that bonds become a better hedge for stocks. This contributes to increase the convenience yield on bonds by as much as 2 percentage points since the 1990s and even 4 percentage points since the 1980s. In the US, this hedging factor is most striking in the 1970s. The very negative correlation between productivity and inflation has had a very large negative impact on the risk premium. Altogether, higher risk perception or risk aversion are consistent with Hall (2016) who argues that risk averse investors have a higher weight in the pool of investors. ■

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Magali Marx is a senior economist in the monetary policy division at Banque de France. She earned an undergraduate degree at the École Polytechnique in France and a Ph.D. in Mathematics at Sorbonne Paris Nord University. She taught at Sciences Po, Ecole Polytechnique and Paris Dauphine University.

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