
<https://doi.org/10.54318/eip.2022.mp.325>

MILOŠ PAUNOVIĆ

E-mail: milospaunovic.ekof@gmail.com

THE INFLUENCE OF INTEREST RATES ON ECONOMIC GROWTH

JEL CLASSIFICATION: E40, H63, O42

ABSTRACT:

Today, the total world debt is several times higher than the total world production. Interest, which is an integral part of debt, is therefore a variable that can significantly affect economic and overall social developments. The subject of the analysis of this paper is to consider the impact that interest rates have on economic growth. The conducted analysis based on secondarily available data showed that interest rates (observed in absolute amounts) negatively affect economic growth, ie that the accumulation of debt and interest affects the reduction of economic growth rates. Also, the analysis showed that the reduction of interest rates did not result in higher rates of economic growth, which is contrary to the assumptions of many theoretical concepts.

**KEYWORDS:**INTEREST RATE, REAL OUTPUT, PUBLIC DEBT

1. INTRODUCTION

The total world debt is about 300 trillion dollars, while the world gross domestic product (all goods produced and services provided) is about 80 trillion dollars. In such a structure of the world economy, interest rates represent a variable that can significantly affect the generated GDP. The real sector of the economy must achieve a return higher than the return related to interest payments in order to achieve growth, otherwise there will be a reduction in the real sector and an increase in debt, and therefore increased allocations for interest. World debt and interest rates have been growing steadily in recent decades. The phenomenon of indebtedness is therefore increasingly present in public debates and in economic research. Therefore, interest, as the main element of debtor-creditor relations, has an important, if not decisive, influence on economic and overall social relations.

In the modern economy, interest rates represent one of the most important variables since they are present in most economic transactions, both at the micro level (the level of individual economic subjects), the macro level (the level of national economies) and at the global (mega-economic) level. The subject of consideration in this paper will be the assessment of the impact of interest rates on economic growth. First, the possible directions of influence will be defined by considering the theoretical model of the relationship between interest rates and economic growth, and then the empirical data related to these variables will be analyzed to finally draw a conclusion about their mutual influence. As interest rates are related to borrowed funds (money), the following analysis will look at the relationship between public debt (indebtedness) and economic growth. Accumulating debt, and thus the amount of interest paid on that debt, can have significant effects on economic growth. The conducted analyzes will be based on secondary available data on nominal interest rates, inflation, real interest rates, public debt and real output growth rates related to member countries of the Organization for Economic Co-operation and Development (OECD) and will be processed using descriptive and analytical methods.

2. DEFINITION OF POSSIBLE EFFECTS OF INTEREST RATES ON ECONOMIC GROWTH

Different theoretical concepts differ greatly in defining the impact of interest rates on economic growth. However, many concepts point to a negative link between interest rates and economic growth (with rising interest rates comes a decline in real output). Thus, for example, according to Tobin's monetary model, a higher real return on money (higher real interest rate) as an alternative means of capital has a negative impact on the demand for capital in the medium term (Tobin, 1965). Monetary policy can influence the amount of the "investment premium" by adjusting the supply, i.e. the demand for money or other securities that change the interest rate. A large number of economic studies have shown that banks exert an extremely large influence (of the first order) on economic development (Fabris, 2011). Tobin also points out that stock prices are rising as a result of lower interest rates on deposits, thus increasing investments and output. Neoclassical theory in the investment segment argues that a negative relationship between inter-



est rates and real output results in a negative effect of real interest rates on the cost of enterprise capital (Haavelmo, 1960). Business cycle theory shows that rising interest rates, as a consequence of technological shock, lead to a reduction in labor supply and thus negatively affect production (Lucas, 1975). Increasing the expected inflation rate reduces the real interest rate, thus changing the investment portfolio, which negatively affects economic growth.

Some of the theoretical concepts also point to the mixed impact of interest rates on real output. The theory of non-refundable investments concludes that on one hand the increase in interest rates, caused by the increase in demand for investment funds, has a positive impact on production due to increased investment activity in the current period, while on the other hand it has a negative impact on real output. According to the open economy model, rising interest rates lead to the appreciation of the domestic currency, which on the one hand increases imports of intermediate goods (raw materials and means of production) and production, while on the other hand is a factor that reduces the competitiveness of domestic products, so that the interest rate has a mixed impact on economic growth (Baškot, 2012). The analysis of the consumer channel, especially the intertemporal choice of consumers and the relationship between net creditors and net borrowers, can establish the direction of the impact of interest rates on production. If the economy is dominated by creditors, then there is a positive impact of interest rates and production, because an increase in interest rates increases their income, and thus consumption and production. In the event that the economy is dominated by borrowers, then there will be a negative impact of interest rates on production, because borrowers income decreases with increasing interest rates.

There are concepts that explain that real interest rate growth has a positive short and medium-term effect on economic growth as a result of financial liberalization. Financial liberalization means changing interest rates until they reach equilibrium levels, which correspond to a free competitive market. It comes after a period of financial repression, a period in which interest rates are kept at an artificially low equilibrium level, which has a negative impact on the accumulation of savings and laying the foundations for future investments (Lin, 2011). This causes stagflation (accelerating inflation and slowing economic growth) in the short term, but in the medium term the savings rate may reach a high enough level to compensate for the effect of adjusting the asset portfolio, so that the income effect is stronger than the savings effect.

The aforementioned theoretical concepts consider the real interest rate to be endogenous, in other words they believe that the interest rate varies as a result of shocks of nominal or real model variables and their spread to other model variables. In firm theory, the condition for profit maximization is to equalize the real interest rate to the marginal product of capital (Fisher, 1907). Generalizing this approach to the whole economy, it could be concluded that real interest rates could be high in countries with high marginal capital products, such as in countries with low capital levels.

The assumption of exogenous real interest rates can be applied only in the case of individual segments of the previously explained models. Thus, for example, in the theory of non-refundable investments, the real interest rate is an exogenous variable and as such can affect economic growth. Household behavior in the previous models was described

on the basis of consumption life cycle theory and the permanent income hypothesis, for instance on the assumption that the actual rate of return on-accumulated wealth is exogenous, which implies that interest rates have a one-way effect on economic growth (Piketty, 2014). Therefore, all the channels through which interest rates affect the real economy can be traced into an investment channel or a consumption channel.

Some of the presented theoretical models indicate that real interest rates are negatively related to economic growth, while other approaches show that real interest rates have a positive impact on economic growth rates. Thus, the existing theoretical concepts show that the relationship between interest rates and economic growth rates is positive or negative depending on the premises on which these models are based.

The analysis of the impact of interest rates on economic growth raises the question of whether nominal or real interest rates should be applied. On the one hand, based on the assumption of a perfect global market, without the monetary illusion, economic theory identifies the real interest rate as a variable related to the rate of economic growth (Gesell, 1959). On the other hand, the nominal interest rate is essential for considering the effects of the behavior of economic agents with regard to their cash flow and market performance. Nominal interest rates, even if they contain perfect forecasts of inflation, have a very strong impact on cash flow (Kennedy, 1995). In contrast, real interest rates are extremely complex, as they require an assessment of inflation expectations, which involves modeling and adjusting. This is because inflation and nominal interest rates do not vary synchronously, so that the real interest rate varies over time, and changes in nominal interest rates and inflation do not move in exactly the same direction. Empirical data show that real interest rates in developing countries vary significantly over time, while their value is stable in developed countries, and that nominal interest rates and inflation are higher in developing countries than in developed countries.

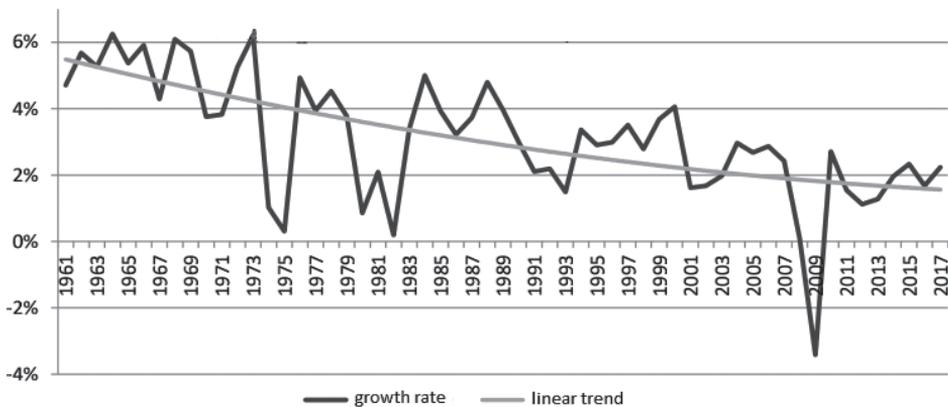
Two ways of studying real interest rates are known in the economic literature. Ex-post real interest rate is defined as the difference between the nominal interest rate realized in a certain period of time and the actually realized inflation rate in the same period of time. Ex-ante real interest rate is expressed as the difference between the nominal interest rate realized in a certain period of time and the expected inflation rate for that period. Under the assumption of rational expectations, these two real interest rates are equal, but if this assumption is ignored, the differences between these two interest rates can be explained in the specifics of inflationary expectations of economic agents and the degree to which they deviate from actual inflation. The degree and direction of the impact of nominal and real interest rates on economic growth largely depends on the level of economic development, the characteristics of the institutional environment, macroeconomic factors and the like (Suhr, 1983).

The next section will analyze the impact of interest rates on economic growth using empirical data and will try, based on previously considered theoretical models, to conclude what is the relationship between the two variables.

3. ANALYSIS OF THE IMPACT OF THE INTEREST RATE ON REAL OUTPUT

Growth rates of real output presented in the form of growth rates of gross domestic product in the period 1960-2017. years for OECD countries (Organization for Economic Co-operation and Development), as well as their linear trend are shown in the following figure.

▶ **GRAPH 1: GDP GROWTH RATE FOR OECD COUNTRIES IN THE PERIOD 1960-2017. YEARS**



Source: World Bank national accounts data, <https://www.data.worldbank.org/indicator/NY.GDP.MKTP.KD.CD>

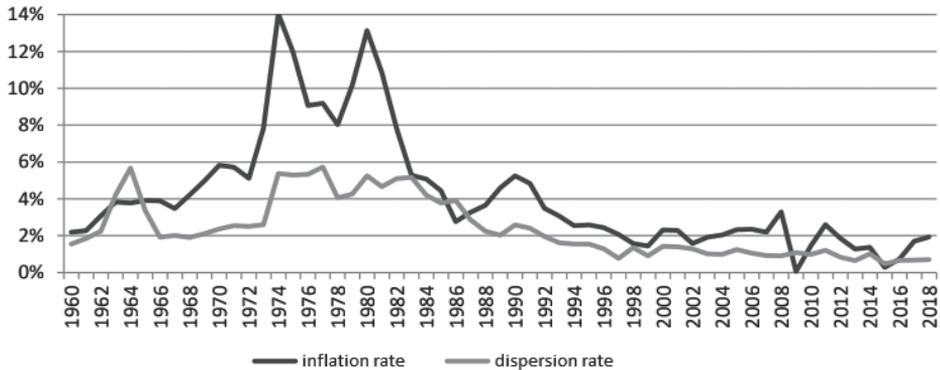
The growth rate of gross domestic product fluctuated around a declining trend during the 1960s. At the beginning of the observed period, the GDP growth rate was around 5%, before falling to below 4% during the 1970s. During the 1990s, it fell below 3%, and at the beginning of the 2000s, it fell to 2% and remained at that level until 2017, slowing down the decline. In addition to moderate increases and decreases in GDP growth rates related to business cycles, the picture can easily show the occurrence of shocks that caused a marked decline in this rate, namely: 1974 and 1981 due to oil shocks in 1993 and 2009 due to recession. In addition, rapid growth rates can be identified in the second half of the 1980s and 1990s.

If GDP growth rates are viewed separately by country, it can be concluded that there is a continuous reduction in growth variability, i.e. that production growth cycles in OECD countries are becoming increasingly synchronized. For example, growth rates in 2009 fell sharply at almost the same time due to the global financial crisis. The reason for that is the progress of globalization processes and structural connections.

In addition to the growth rate of real output, it is necessary to analyze the inflation rate, which largely affects nominal interest rates. Inflation in this case refers to the increase in average consumer prices expressed through the CPI - Consumer price index. The

following figure shows the inflation and dispersion in relation to inflation among OECD countries in the period 1960-2018. years.

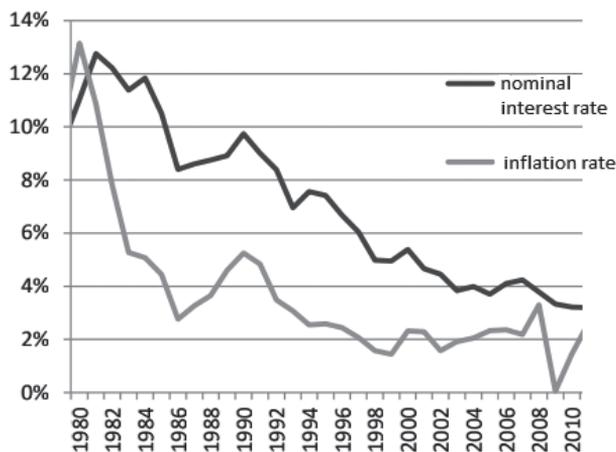
▶ **GRAPH 2: INFLATION AND DISPERSION AMONG OECD COUNTRIES IN THE PERIOD 1960-2018. YEARS**



Source: International Financial Statistics and data files, <https://www.data.worldbank.org/indicator/FPCPI.TOTL.ZG>

As a reaction to the pressure on wages during the 1960s, inflation jumped due to the oil shocks of 1974 and 1981 (the highest recorded inflation rates in the observed period - 14% and 13%, respectively). At the end of the 1980s, until the last years of the observed period, inflation stabilized at around 2%, which is a result of the application of inflation targeting policy at that level in most OECD member countries. Thus, inflation has become predictable, and the inflationary expectations of economic agents have been successfully anchored at the level of inflation targets set by the central bank thanks to the acquired credibility. Regarding the inflation rate, it is important to note that after the oil shocks, convergence of inflation rates was achieved among the observed countries (the European Monetary Union also contributed to that in part by introducing the euro). The movement of nominal interest rates can be largely explained by the movement of inflation rates. The following figure shows the movement of nominal interest rates and inflation rates in the period 1960-2010. years for the same group of countries as in the previous overviews.

▶ **GRAPH 3: NOMINAL INTEREST RATES AND INFLATION IN THE PERIOD 1960-2010. IN THE OECD COUNTRIES**



Source: IMF, IFS and data files, <https://www.data.worldbank.org/indicator/FR.INR.LEND>

From the beginning of the observed period, nominal interest rates have been growing until 1982, when their continuous decline began. It can be seen from the picture that nominal interest rates reacted strongly to rising inflation after a one-year delay in oil shocks and that after inflation stabilized at around 2% from the mid-1990s onwards, nominal interest rates continued to fall without any signs of growth until the end of the observed period. The slow adjustment of interest rates during oil shocks can be attributed to the fact that the rise in inflation was unexpected and that high inflation was not expected to last. In contrast, the different movements between a stable inflation rate and a low interest rate can not be explained by the expected negative inflation, so the change in the interest rate is not only nominal (Di Muzio & Robins, Richard, 2015).

In order to understand this segment of change, it is necessary to report the real component of the interest rate, i.e. the real interest rate, in a way that the interest rate is harmonized with the inflation rate. The interest rate derived in this way is called the ex-post real interest rate or the interest rate adjusted for inflation. The following graph shows such an interest rate for the period 1960-2016. years for the OECD group of countries.

▶ **GRAPH 4: INTEREST RATE ADJUSTED FOR INFLATION IN THE PERIOD 1960-2016. YEARS FOR OECD COUNTRIES**



Source: IFS and World Bank data files, <https://www.data.worldbank.org/indicator/FR.INR.RINR>

During the sixties, the real interest rate was around 2%, then in the period of oil shocks it fell and was negative, especially during the first one. After that, at the beginning of the eighties, it increased to about 6%, but in the period from 1983 until the end of the observed period, the real interest rate continuously decreased.

Collectively, taking into account the growth rate of real output, nominal interest rate, inflation rate and real interest rate, the period 1960-2016. years can be divided into two intervals that characterize similar movements of these variables. The period since 1960, which includes both oil shocks, is characterized by higher growth rates of real output, higher inflation rates and nominal interest rates compared to the following period and stable real interest rates. In the period after oil shocks, until the end of the observed period and with the same tendencies in the future, the movement of the observed variables is as follows: growth rate of real gross domestic product is continuously declining, inflation rate is declining (stabilizing at around 2%), and the real interest rate is continuously falling. This one-way movement of the observed variables leads to the conclusion that reducing interest rates (nominal and real) and reducing inflation and keeping it relatively low leads to a reduction in real output growth or that the process is reversed, or that reducing real GDP growth rate leads to lower interest rates and inflation. The analysis of the scope of the extremely expansive monetary policy in the USA and the Eurozone indicates its impotence, and the fundamental causes for this should be sought in the distortion of interest rates in the relationship: interest rates on the money markets - interest rates on the copper loan markets (Đurić, 2013).

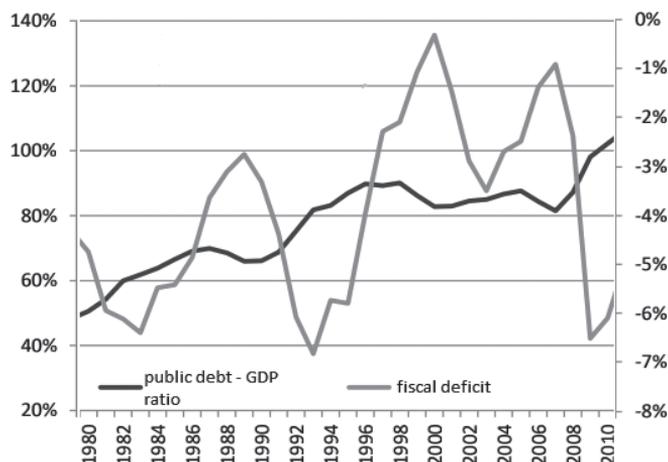
The conclusion is contrary to many theoretical concepts that have pointed to a negative or inverse relationship between interest rates and real output (that reducing interest rates increases real output), but it should be borne in mind that the global financial crisis

has led an expansive monetary policy affected low interest rates and which affected the results obtained (Kennedy, 2012). In order to confirm or refute the obtained conclusion, the relationship between public debt (indebtedness) and real output must be considered, because the accumulated debt and thus the total amount of interest paid on it can be significant obstacles to achieving a higher degree of economic growth. This relationship will be discussed in the next section.

4. ANALYSIS OF THE IMPACT OF PUBLIC DEBT AND DEBT ON REAL OUTPUT

Empirical data on the movement of real output are presented in the previous section, so that the relationship between public debt and GDP, as well as fiscal imbalance (the difference between government revenues and expenditures) will now be presented. Data related to these variables, and for the period 1970-2010. years for a group of OECD countries are shown in the figure below.

▶ **GRAPH 5: PUBLIC DEBT AND FISCAL DEFICIT IN THE PERIOD 1970-2010. YEAR (OECD AREA)**



Source: International Debt Statistics, <https://www.data.worldbank.org/indicator/DT.DOD.DECT.CD>

The ratio of public debt to gross domestic product in OECD countries grew almost continuously in the observed period, as a result of the state budget deficit. At the beginning of the analyzed period, before the oil shocks, it can be said that the debt ratio was stable and amounted to about 40% of GDP. It then rose to 60% and stabilized in the late 1980s, but rose again to 80% during the recession (1992-1994) and was relatively stable until the 2008 recession after which it rose to 120% of GDP. The cause of such a drastic increase is fiscal expansion in response to the crisis. Thus, the development and accumulation of debt is reflected in the fact that in the phases of economic cycles char-

acterized by increased production and employment (real expansion), the governments of the observed countries failed to cover debts incurred during recessions (Baro, 1979). Governments actually increased spending during the recession, but did not reduce it during the expansion.

Economic theory explains the high level of debt to GDP and its continuous increase from different angles. Keynes macroeconomic theory holds that fiscal expansion affects the simultaneous increase in real output and interest rates. Although such a statement could be true in the short term, the long-term period after the oil shocks refutes it, because the increase in debts in that period was accompanied by a decrease in the interest rate.

The negative impact of public debt on economic activity is not surprising, as it requires the payment of interest rates that limit the room for maneuver of using government expenditures for other (more productive) purposes. Some research has shown that increasing the debt-to-GDP ratio from 60% to 90% reduces the real output growth rate by 1% (Reinhart & Rogoff, 2010). Therefore, the established opinion of the Keynes school about the positive relationship between public debt and interest rates (increasing public debt, increasing interest rates and production) is wrong. The reason for such a conclusion can be found in the fact that higher indebtedness makes it difficult to repay the debt and requires higher amounts of interest to be paid. However, the Keynes school concludes that in a state of higher indebtedness, savers will lend money but with higher interest rates, in order to compensate for the perceived risk of default, i.e. higher debt will increase the risk premium which will result in rising interest rates (Keynes, 1956). Such a conclusion does not fit into the data we have previously analyzed, which refer to the interest rate and the function of the public debt-to-GDP ratio. The period after the oil shocks (1983-2016) for OECD countries shows a strong negative correlation between interest rates and debt-to-GDP ratios and is characterized by expansionary monetary policy.

5. CONCLUSION

The impact of interest rates on real output is considered from two aspects, i.e. two variables were analyzed (level of interest rates and level of public debt) according to the growth rate of real output. The first conclusion obtained by comparing the ratio of interest rates and real output is that the reduction of interest rates affects the reduction of real output. Based on the second conducted analysis, which refers to determining the relationship between indebtedness and public debt, it is concluded that increasing public debt and indebtedness reduces the real output.

The conclusion obtained from the first analysis is not in line with most theoretical concepts, but if supplemented by the conclusion from the second analysis (which uses total cumulative variables), a final conclusion is obtained which confirms the position of most theoretical concepts on the negative relationship between interest rate and real output. The high level of accumulated debt (and interest paid on it) has led to a decline in economic activity (expressed through a reduction in economic growth rates) and a decline in interest rates (which are at a "low" level - observed in percentages, and in absolute terms are large amounts due to accumulated debt). The low level of interest rates in the previ-

ous period did not result in the expected increase in real output, but there was a decrease in economic progress due to the high level of accumulated debt (and the absolute amount of interest paid on it).

REFERENCES

Baro, R. (1979). On the Determination of the Public Debt. *Journal of Political Economy*, 87(2), 940-971. <https://doi.org/10.1086/260807>

Baškot, B. (2012). Kamatna stopa kao slučajna promenljiva. *Acta Economica*, 16(2), 319-334.

Di Muzio, T., & Robins, Richard H. (2015). *Debt as Power*. New York: Bloomsbury Academic, 110-118.

Đukić, Đ. (2013). Nemoć ekspanzivne monetarne politike u prevazilaženju globalne recesije. *Ekonomске ideje i praksa*, 9/10(3), 157-169.

Fabris, N. (2011). Bankarske krize sa posebnim osvrtom na male otvorene ekonomije. *Ekonomске ideje i praksa*, 2(1), 25-41.

Fisher, I. (1907). *The rate of interest*. New York: The Macmillan

Gesell, S. (1959). *The natural economic order*. London: Peter Owen Ltd.

Haavelmo, T. (1960). *A Study in the Theory of Investment*. Chicago: The University of Chicago Press.

Kennedy, M. (1995). *Interest and Inflation Free Money*, Philadelphia: New Society Publishers.

Kennedy, M. (2012). *Occupy Money: Creating an Economy Where Everybody Wins*. Philadelphia: New Society Publishers.

Keynes, J. M. (1956). *Opšta teorija zaposlenosti, kamate i novca*. Beograd: Kultura.

Lin, J. Y. (2011). New Structural Economics: A Framework for Rethinking Development. *The World Bank Research Observer* 26(2), 193-221. <https://doi.org/10.1093/wbro/lkr007>

Lucas, R. E. (1975). An Equilibrium Model of the Business Cycle. *The Journal of Political Economy*, 83(6), 1113-1144. <https://doi.org/10.1086/260386>

Piketty, T. (2014). *Capital in the Twenty-First Century*, Cambridge, MA: Belknap Press

Reinhart, C., & Rogoff, K, (2010). Growth in a Time of Debt. *American Economic Review*, 100(2) <https://doi.org/10.1257/aer.100.2.573>

Tobin, J. (1965). Money and Economic Growth. *Journal of the Econometric Society*, 33(4), 671-684. <https://doi.org/10.2307/1910352>

Suhr, D. (1983). *Geld Ohne Mehrwert*. Frankfurt am Main: Fritz Knapp Verlag

»The World Bank« World Bank national accounts data, <https://www.data.worldbank.org/indicator/NY.GDP.MKTP.KD.CD>

»The World Bank« International Financial Statistics and data files, <https://www.data.worldbank.org/indicator/FP.CPI.TOTL.ZG>

»The World Bank« IMF, IFS and data files, <https://www.data.worldbank.org/indicator/FR.INR.LEND>

»The World Bank« IFS and World Bank data files, <https://www.data.worldbank.org/indicator/FR.INR.RINR>

»The World Bank« International Debt Statistics, <https://www.data.worldbank.org/indicator/DT.DOD.DECT.CD>
