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PUBLIC DEBT IN THE "NEW NORMAL": A SCHUMPETERIAN PERSPECTIVE ON FISCAL POLICY

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ABSTRACT

This paper shows that important insights for fiscal policy can be derived from Joseph Schumpeter's academic work. This concerns his fundamental distinction between theories in which the monetary sphere is identical with the real sphere (“real analysis”), and theories in which financial sphere is independent of the real sphere. From the “monetary analysis” propagated by Schumpeter follows that the financing of government investment does not depend on household saving. Thus, Schumpeter's growth theory shows that credit-financed investment, which leads to an innovative use of existing resources, plays a decisive role in economic development. For fiscal policy, this results in the model of the "entrepreneurial state" (Mazzucato) as an engine for future investment. This model goes far beyond the narrow portrayal of government debt in “real analysis” of the neoclassical theory, which assigns the state merely the role of a capital destroyer. But it also offers a broader perspective than that of monetary Keynesian theory, including MMT, in which government debt is seen to serve only to produce full employment (but not beyond). Schumpeter's rejection of the concept of a purely goods-based real interest rate is also innovative. It provides the basis for the strategy of "yield curve control," in which the long-term interest rate is directly controlled by the central bank so that the sustainability of government debt is not determined by capital markets.

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This paper shows that important insights for fiscal policy can be derived from Joseph Schumpeter's academic work. This concerns his fundamental distinction between theories in which the monetary sphere is identical with the real sphere ("real analysis"), and theories in which financial sphere is independent of the real sphere. From the "monetary analysis" propagated by Schumpeter follows that the financing of government investment does not depend on household saving. Thus, Schumpeter's growth theory shows that credit-financed investment, which leads to an innovative use of existing resources, plays a decisive role in economic development. For fiscal policy, this results in the model of the "entrepreneurial state" (Mazzucato) as an engine for future investment. This model goes far beyond the narrow portrayal of government debt in "real analysis" of the neoclassical theory, which assigns the state merely the role of a capital destroyer. But it also offers a broader perspective than that of monetary Keynesian theory, including MMT, in which government debt is seen to serve only to produce full employment (but not beyond). Schumpeter's rejection of the concept of a purely goods-based real interest rate is also innovative. It provides the basis for the strategy of "yield curve control," in which the long-term interest rate is directly controlled by the central bank so that the sustainability of government debt is not determined by capital markets.

Keywords: fiscal policy; public debt; monetary economics; economic growth; full employment.
JEL codes: E00; E4; E6; E62; H6; O4.

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Executive summary

The crises of recent years have led to impressive **paradigm shifts in fiscal policy**. For example, with the Recovery and Resilence Facility, the European Commission has been enabled for the first time to finance a broadly based investment programme by borrowing on the capital market. In Germany, the debt brake anchored in the Basic Law has been challenged by the "turn of the times" ("Zeitenwende") proclaimed by Chancellor Scholz. With a change in the basic law, investments for external security can now be financed through debt with a "**special fund**" ("Sondervermögen) of 100 billion euro. Another "special fund", the Climate and Transformation Fund, is also using public debt in the order of magnitude of 60 billion euro to finance future-oriented investments. In the United States, President Biden has launched the "**Infrastructure Investment and Jobs Act**" and the "**Inflation Reduction Act**", two comprehensive public investment programmes, especially in infrastructure. These programmes are accompanied by new federal borrowing relative to GDP in 2020 and 2021, which was only exceeded in the years 1942 to 1945.

A Schumpeterian theory for debt-financed public investment

Despite a growing academic interest in the role of public debt, mainly due to low interest rates, one finds few theoretical foundations for the growing role of fiscal policy in the "**new normal**", i.e., in managing and fostering the environmental and digital transition through public investment and industrial policies. **Neoclassical theory** ultimately sees public debt only as an instrument for reducing the capital stock. Public debt can therefore only have positive effects in situations with an over-accumulation of capital. **Keynesian theories** of public debt, including Modern Monetary Theory (MMT), focus on situations of underemployment. An example of such a narrow view is the forthcoming book by Blanchard (2022) which pays little attention to the role of the state as an **investor in the future**.

The starting point for this study is therefore the finding that, despite the abundance of publications, there is a lack of a comprehensive theory of public debt. It shows that one can find important innovative building blocks for such a theory in the huge oeuvre of **Joseph A. Schumpeter**. A theory inspired by Schumpeter's ideas opens a perspective for the role of public debt even in full employment situations. This function is rudimentarily laid out in the traditional "Golden Rule" of public debt. It can be theoretically substantiated and unfolded with **Schumpeter's growth theory**, which, unlike neoclassical theory, is not about accumulating more and more units of the same all-purpose good. Rather, economic development results from innovative production technologies that channel existing resources into entirely new uses ("Andersverwendung"). In such a growth model, the rationale of public debt is not the destruction of excessive capital, but a precondition for investment in future technologies. Schumpeter saw this innovative role primarily for private

investors, but he also had this role in mind for the state. Explicitly, this innovative function of the state was introduced into the discussion by Mazzucato (2013) with the term "**entrepreneurial state**".

Schumpeter's distinction between monetary and real analysis

Schumpeter's distinction between "**real analysis**" and "**monetary analysis**" is of central importance for an analytical classification and an appropriate understanding of the various theoretical approaches to public debt. Put simply, in "real analysis" the financial sphere is identical with the real sphere (which is unfortunately largely not mentioned in the literature), whereas in "monetary analysis" the real and the spheresfinancial are conceptually separate, even if they interact with each other. The "real analysis" corresponds to the neoclassical theory of the "loanable funds model". The "monetary analysis" can be represented by the traditional IS/LM model, a modified IS/MP-model and a comprehensive IS/PC/MP-model.

A consistent analysis of the two paradigms shows that their assumptions are **incompatible**. Real analysis assumes an all purpose asset (APA) that can be used equally as a consumption good, financial asset, and investment good (capital). Monetary analysis is characterised by a coexistence of financial assets (money, bonds) and real assets (consumption goods, investment goods) that cannot be transferred into each other. Accordingly, the two paradigms lead to opposing laws of motion. While in the real analysis saving is the prerequisite for investment, in the monetary analysis investment generates saving. While in the real analysis deposits at banks are the prerequisite for loans, in the monetary analysis bank loans create bank deposits. In real analysis, the interest rate is a **commodity rate** determined by the ratio of units of the unit good tomorrow relative to one unit of the unit good today. In monetary analysis, interest is always a **monetary phenomenon**. It is defined in units of money tomorrow relative to one unit of money today.

The emphasis on the incompatibility of the two paradigms is in contrast to the literature which, like **Blanchard** for example, assumes an **equivalence of the two approaches**: while the "real analysis" is supposed to describe the long-term laws of development, the monetary analysis is supposed to apply to the short-term analysis of underemployment situations. This misconception leads to the omission of a "monetary analysis" of public debt for full employment situations.

A similar analytical deficit also characterises **Modern Monetary Theory**, which of course argues entirely in the framework of monetary analysis. But, due to its rejection of the IS/LM model, it lacks a comprehensive theoretical framework that goes beyond the simple income/expenditure model (Mitchell, Wray, & Watts, 2019). In addition, it reduces the role of the state to a **job guarantee** and thus does not pay very much attention to public investment and the innovative role of public

debt.

Limitations of the neoclassical growth theory

The **limitations of the real analysis** are evident in the implications of the neoclassical growth theory for the role of public debt. It suffers above all from the assumption that public debt is basically only used for **consumption purposes**. Credit-financed government investments are not discussed. In simple models, such as those presented in Mankiw's textbook (Mankiw, 2019), public debt leads to a reduction in saving, to a lower capital stock and thus to lower growth.

However, this negative effect can be turned positive if one diagnoses **excessive saving**. Thus, von Weizsäcker and Krämer (2021) call for a "negative capital supply" of the state to compensate for an oversupply of private saving diagnosed by them, primarily related to demographic developments. However, this is difficult to reconcile with the narrow analytical framework of the neoclassical model, which assumes a fixed technology for the unit good. This means that state investments that borrow the unit good from the private sector cannot provide any positive impulses. If instead the state uses the unit good for transfers to the private sector, it undermines the private sector's efforts to build up wealth for old age.

Blanchard presents the neoclassical models of Phelps (1961) and Diamond (1965), in which public debt achieves positive effects because it reduces over-accumulation of capital and enables higher consumption and thus higher utility of private households through transfers. However, this raises the question of whether advanced economies have actually reached a level of capital intensity that has led to a decline in private household consumption. An analysis for the United States shows that rising capital intensity continues to have a positive impact on labour productivity. It becomes clear that the theoretical derivations of the neoclassical models are essentially shaped by the assumption of the APA.

The low **economic policy relevance** of these models becomes evident in Blanchard's policy conclusions for pure public finance. Contrary to what the models might suggest, he does not call for more public debt. Rather, he comes to the opposite conclusion, that governments should reduce public debt in good times.

Monetary analysis: Financial crowding-out versus real crowding-out

A fundamental difference between the real and the monetary analysis concerns the crowding-out effects of public debt. Due the assumption of full employment and the identity of the real and

the financial sphere in the real analysis, a budget deficit leads to real and financial crowding out: It reduces private investment which is identical with a reduction of the financial funds that are available for private investors.

In the monetary analysis, a more differentiated approach is required.

- Whether there is a **real crowing-out** depends on the state of the economy. Real crowding-out takes place in a situation with full employment, but not in a situation with unemployment.
- Due to the independence of the monetary sphere from the real sphere, **financial crowding-out** is not identical with real crowding-out. It requires therefore an explicit analysis

In the framework of the monetary analysis, a government deficit does not reduce the money holdings of the private sector. They remain constant in the case of capital market financing. In the case of commercial bank and central bank financing, private money holdings increase. But an increase of the interest rate which is caused by higher economic activity can only be excluded if the central bank targets a long-term interest rate.

In the **monetary analysis**, the **real "crowding-out"** depends on the situation of the economy. The theory of "**functional finance**", developed by Lerner (1943) and explicitly taken up by Blanchard, calls for an economic policy that is basically responsible for a macroeconomic equilibrium. As a rule, however, functional finance focuses on situations with unemployment. Thus, additional credit-financed government spending or transfers do not trigger a real "crowding-out" in this set-up.

Government intervention in the sense of functional finance is particularly warranted when the central banks' interest rate policy reaches its limits due to the **effective lower bound for interest rates**. Blanchard goes so far as to assign fiscal policy the task of generating a real interest rate level that opens up sufficient room for manoeuvre for the central bank. **Modern Monetary Theory** also does not go beyond the analysis of unemployment situations, even if the job guarantee is accompanied by additional advantages, especially for low-skilled workers.

The role public investment in full-employment situations

This leads to the central question of this study: what role does a monetary analysis attribute to public investment and public debt in full employment situations? First, the fundamental difference with real analysis is that public debt is used for investment and with sufficient central bank support there is no financial crowding-out. However, real crowding-out remains a challenge. This is where Schumpeter's growth theory comes in. In contrast to neoclassical growth theory, his theory is not about an ever-greater accumulation of a unit good for which there is an invariable production

function. Rather, Schumpeter focuses on the **different use** of available resources in **innovative production processes**. He is aware of the crowding-out effects for the real economy and their inflationary impulses. However, he sees this as only a temporary phenomenon that dissipates when the positive supply effects of innovative investments come into play. The quintessence of his growth theory can be summed up as follows: without a temporary real crowding-out and more inflation, one cannot have dynamic economic development. In fact, as major central banks (ECB and Federal Reserve) define their inflation targets for the medium-term, there should be sufficient space for such transitory inflation shocks due to a Schumpeterian innovation process. The IS/PC/MP-model helps to understand the dynamics of this adjustment process.

In Schumpeter's growth theory, the **banker** and the **private investor**, to whom the purchasing power for their innovation projects is made available through loans, are the driving forces of the growth process. This approach can be modified by replacing the capitalist with the **entrepreneurial state** as described by Mazzucato (2013). In Schumpeter's work "Business Cycles" (Schumpeter, 1939) there are passages in which he at least thinks along these lines. The economic justification for such a role of the state can be found in the literature on **industrial policy**. The uncertainty of fundamental technological innovation, network effects and path dependencies, which make private actors stick to existing technologies, are particularly worth mentioning. In addition, industrial policy can also be justified by the fact that other major economies behave strategically in this way.

China offers an instructive example of a development strategy based on the concept of monetary analysis in the sense of Schumpeter/Mazzucato. Extensive loans from state-owned banks have enabled companies to achieve a leading position on world markets in innovative business areas such as solar cells and battery cells. At the provincial level, for many years the provincial governments have been running very high budget deficits, which has enabled them to provide substantial funding to investment funds and directly to firms. The example of China illustrates that inflationary dangers go hand in hand with such a growth model. But after intermittent bouts of inflation in the 1980s and 1990s, China has managed to reconcile high growth rates with moderate inflation rates.

Sustainability of public debt with a monetary real interest rate

While the literature deals intensively with the question of "public debt" in the sense of public deficits, the state of knowledge on the **optimal level of public debt** is very limited. To date, there is no generally accepted study that derives an optimal or maximum level of public debt. But there is agreement that debt sustainability is determined by the relationship between the real interest rate (r) and real economic growth (g).

This leads back to the distinction between real and monetary analysis. In the real analysis, the **real interest rate** is a variable determined by real economic factors, especially demographics and productivity development. Thus, the sustainability of debt is determined by factors that can only be influenced very indirectly by monetary and fiscal policy. In contrast, in monetary analysis, as explicitly emphasised by Schumpeter, there is only a monetary interest rate, even if this is called the "real interest rate" after deducting the inflation rate. A "real interest rate" understood in this way is then no longer exogenous, it can be explicitly controlled by the central bank. Such a monetary policy strategy is the so-called **yield curve control**. In practice, this strategy, which had already been conceived by Keynes in his Treatise on Money (Keynes, 1930, Vol. II), has so far been practised by the Federal Reserve, the Bank of Japan and the Reserve Bank of New Zealand. Leading representatives of the ECB have already commented positively on this.

Without explicitly addressing the strategy of yield curve control, Blanchard is rather sceptical about the central bank's ability to control the long-term interest rate. For him, the "**default risk**" of public debt limits the possibilities for interest rate policy action. But as Modern Monetary Theory emphasises, large economies that are indebted in their own currency cannot become insolvent. The "default risk" is only a problem for emerging countries that can only borrow in foreign currency and for the member states of the European monetary union that are indebted in euro. Yield curve control thus frees large economies from the dictates of global investors, which euphemistically is labelled as "market discipline", but it does not mean unbridled freedom to control long-term interest rates. As the IS/PC/MP-model shows, there is an optimum real interest rate that has to respond to macroeconomic shocks. If the central bank targets an interest rate for fiscal considerations that differs from such an optimum rate, **fiscal dominance** occurs. In this case, the central bank loses control over the inflation rate.

Paradigm changes dealing with the incompleteness of the European Monetary Union

Finally, the Schumpeterian approach to fiscal policy highlights the **incompleteness of the European Monetary Union**. Although it is a large currency area, the member states do not have the fiscal sovereignty postulated by MMT. Since the completion of the monetary union through a political union with a comprehensive transfer of fiscal competences to the European level is not to be expected in the foreseeable future, pragmatic solutions are needed.

The incompleteness of the monetary union became evident with the Great Financial Crisis. Due to the lack of monetary policy support by the ECB, the economically weaker member states came under severe pressure from the financial markets. Despite several rescue programmes, the so-

called euro crisis could only be overcome in the end by the famous courageous statement by Mario Draghi (“whatever it takes”), who signalled to the financial markets that the ECB would ensure the solvency of all member states without restriction. This **paradigm shift** paved the way for the euro area to pursue a fiscal policy in the sense of functional finance in crisis situations without member states coming up against financing limits. Accordingly, the COVID pandemic in the euro area was managed without major tensions.

But there has been another **paradigm shift** that enables the member states to act according to the model of the "entrepreneurial state". With the **Reconstruction and Resilience Facility**, an intelligent institutional design was found that significantly helps to reduce the imperfections of the monetary union without having to take major steps towards political union. The solution is based on a combination of competences on the national and supra-national level:

- At the supra-national **community level**, the financing and monitoring of the earmarked use of the funds takes place.
- At the **national level**, there is autonomy over the concrete investment programmes as well as over the complementary reform programmes that are demanded at the same time.

It is hoped that the programme can be successfully implemented and completed and that it will serve as a model for future investment initiatives, as it ideally corresponds to the model of Schumpeterian-inspired fiscal policy developed here.

Ultimately, **German fiscal policy** has also moved in this direction. The decision to amend the Basic Law to allow a debt of 100 billion euros within the framework of a special fund to strengthen external security makes it clear that the goal of constant public debt is no longer the highest priority in German politics. At the same time, it is a model for debt rules in the sense of the **golden rule**, which enable targeted state investments in areas relevant to the future without opening the door to a general "deficit bias" of political decision-makers.

1 Introduction

The crises of recent years have led to massive **paradigm shifts in fiscal policy**. For example, with the **Recovery and Resilience Facility**, the European Commission has for the first time been able to finance a broad-based investment program by borrowing on the capital market. In Germany, the debt brake anchored in the Basic Law has been challenged by the "turn of the times" ("Zeitenwende") proclaimed by Chancellor Scholz. With a change in the Basic Law, investments for external security can now be financed through debt with a "**special fund**" of 100 billion euro. Another "special fund", the Energy and Transformation Fund is also heavily relying on public debt for the financing of future oriented public investments. In the United States, President Biden has launched the "**Infrastructure Investment and Jobs Act**", a comprehensive public investment program, especially in infrastructure. This program is accompanied by historically high new federal borrowing relative to GDP in 2020 and 2021, which was only exceeded in the years 1942 to 1945.

Despite a growing academic interest in questions of public debt, mainly due to low interest rates, one finds few theoretical foundations for debt-financed public investment. Neoclassical theory ultimately sees public debt only **as an instrument for reducing the private saving**. Public debt can therefore only have positive effects in situations with an over-accumulation of capital. Keynesian theories of public debt, including Modern Monetary Theory (MMT), focus on **situations of underemployment**. In these theories, the concrete form of the fiscal stimulus is of secondary importance.

An example of this narrow view is the forthcoming book by Blanchard (2022) entitled "Fiscal Policy Under Low Interest Rates". It deals with neoclassical theory under "pure public finance" and Keynesian theory under "functional finance". As a consequence, the role of the state as a **investor in the future** is largely ignored.

In this paper, we try to close this theoretical deficit by developing a comprehensive theoretical framework for the analysis of public investment and debt which is based on key insights from Joseph A. Schumpeter. At first sight, it is not evident that the Schumpeterian perspective might be fruitful, as Schumpeter, apart from Schumpeter (1918), did not explicitly focus on macroeconomic issues of fiscal policy. However, in our view, Schumpeter has to offer four important insights that are relevant for a comprehensive theory of fiscal policy.

- More than any other economist, Schumpeter has emphasized the dichotomy between the two main paradigms in macroeconomic theory which he labels "**real analysis**" and "**monetary analysis**". The former can be approximated by the "loanable funds theory", the latter comes very close to the main features of the IS/LM-model and the IS/MP or IS/PC/MP-models. While most economists believe that the two approaches are compatible, the Schumpeterian

perspective shows that they are as incompatible as the Ptolemean and the Copernican world view. Clearly differentiating between these two paradigms helps to avoid a lot of confusion in the discussion on public debt and opens the perspective for a monetary analysis of debt-financed public investment under **conditions of full employment**.

- As main consequence of Schumpeter's monetary analysis, **saving is neither a source nor a limitation for growth**. In Schumpeter's world, banks are able to produce purchasing power autonomously. This removes the saving constraint for fiscal policy and the financial crowding-out which exists in the loanable funds theory.

- Schumpeter differs from mainstream economics also with his **growth theory**. Decades before the neoclassical growth model was developed, he emphasized that growth is typically not the result of adding more and more identical assets. Instead, what matters for growth is the **usage of available resources for completely new products** ("Andersverwendung"). As Burlamaqui (2020) has shown, Schumpeter also made statements that can be interpreted as an endorsement for the role of the state as "entrepreneurial state", a concept which was fully elaborated by Mazzucato (2013).

- In the discussion on the sustainability of government debt, the relation between real GDP growth (g) and the real interest rate (r) plays a decisive role. For most economists and in line with the real analysis, the real interest rate is a physical rate which is outside the direct influence of economic policies. In this regard, Schumpeter, consistent with the monetary analysis, presents the almost revolutionary idea that there is no such thing as a physical real rate. In his view the **real interest rate** is always a **monetary phenomenon** which then can be controlled by monetary policy. But if this is the case, there is no longer a real interest rate determined by real factors, which acts as a constraint for the sustainability of public debt.

- An additional motivation for the study and Schumpeter's theoretical approach is a large body of empirical work showing that public investment has significant positive output effects in the long run, so there is empirical support, e.g. Aschauer (1989); Bom and Ligthart (2014); Dullien, Jürgens, Paetz, and Watzka (2021); Ramey (2020).

In **section 2**, the main insights from Schumpeter that are indirectly or directly relevant for fiscal policy are presented.

In **section 3**, we present the „**real analysis**" with the loanable funds model and the "**monetary analysis**" with simple monetary macroeconomic models (IS/LM, IS/MP, and IS/PC/MP). The comparison of the models shows the **incompatibility** of the real analysis and the monetary analysis due to their assumptions and their opposite laws of motion. Thus, a comprehensive analysis of fiscal policy cannot combine the two models or even derive the monetary model from the real

model. A decision has to be made for one of the two paradigms which in our view is monetary analysis due to its more realistic critical assumptions.

Section 3.5 shows that the identification of real analysis with full employment situations and monetary analysis with situations of unemployment, which characterizes mainstream macroeconomic theory, leads to the **omission of a monetary theory of fiscal debt** and public investment in situations with full employment.

Section 4 presents the theory of "**pure public finance**", i.e., a real analysis of fiscal debt in situations with full employment. Due to its unrealistic assumptions, this theory only discusses the use of public debt for consumption, e.g. government transfers to private households. As a consequence, it considers public debt as detrimental for growth with the only exception of situations with excessive capital formation. It is not surprising that this theory has very little to offer for the actual discussion on the role of public debt and public investment in the "new normal".

Section 5 discusses public debt in the model world of the **monetary analysis**. In section 5.1 it shows the fundamental difference for the analysis of **financial crowding-out**. While in real analysis real and financial crowding-out are identical due to the identity of the real and the financial sphere in this model, in monetary analysis there is no quantitative financial crowding-out: In the case of capital market financing, the money stock of the private sector remains constant, but it is redistributed by public debt which might lead to a qualitative crowding-out, i.e. an increase of the interest rate. This is different in the case of commercial bank and central bank financing where the money stock of the private sector is increased by budget deficits. If the central bank targets the longer-term rate, a financial crowding-out can be avoided.

Whether there is a real crowding-out depends on the macroeconomic situation. In the case of **functional finance** (section 5.2) which typically focuses on situations with unemployment and an underutilization of existing capacities a real crowding-out does not take place.

In section 5.3 the **Schumpeterian model of fiscal policy** is presented. It is based on the assumption of full employment so that real crowding-out is a serious challenge. The solution is provided by the Schumpeterian growth model which propagates the withdrawal of exiting resources from existing to innovative production processes. This leads to **temporary inflationary tensions**, but they will subside as the growth effects of the innovation become manifest. With the IS/PC/MP model this process can be discussed analytically. The innovative role of the state ("entrepreneurial state") is justified by the literature on **industrial policy** which is reviewed in this section. Finally, a short presentation of the **Chinese development process** provides some empirical support for the

Schumpeterian approach to fiscal policy.

Section 6 discusses the problems associated with the **level of public debt**. While there is no sufficient theoretical and empirical research that is able to derive a **reference value** for the relation of public debt to GDP, there is a consensus that the relation between the real interest rate (r) and real GDP growth (g) matters for the sustainability of public debt. In this context the differentiation between real and monetary analysis is very important. For real analysis, r is a **physical variable** determined by real factors that are outside the reach of fiscal and monetary policy. For monetary analysis, the real interest rate is simply the difference between a monetary rate and an inflation rate. In other words, it is always a **monetary phenomenon**. This insight shapes the monetary policy strategy of **yield curve control**, which was practiced in the United States after the Second World War and which is still practiced in Japan. The strategy frees governments from the "market discipline" of private investors, but central banks must still regard its implications for macroeconomic stability in order to avoid fiscal dominance.

Section 7 uses the Schumpeterian approach to highlight the **incompleteness of the European Monetary Union** where the member states have given up their fiscal sovereignty without re-establishing it at the supranational level. It shows that Mario Draghi's "*whatever it takes*" can be regarded as a pragmatic regime change which has enabled the member states to apply functional finance in situations with negative macroeconomic shocks. A second pragmatic paradigm change is the EU's Recovery and Resilience Facility which provides a blueprint for Schumpeterian Finance in the European Union.

2 Schumpeter's main insights with relevance to fiscal policy

For a better understanding of Schumpeter's views, we will start with a short presentation of original quotes that are relevant for our analysis of fiscal policy.

"Real analysis" versus "monetary analysis"

In his opus magnum "History of Economic Analysis", Schumpeter (1954) makes a distinction between "real analysis" and "monetary analysis" as the two paradigms in macroeconomics that can hardly be found in other publications.

> "*Real Analysis proceeds from the principle that all the essential phenomena of economic life are capable of being described in terms of goods and services, of decisions about them, and of relations between them. Money enters the picture only in the modest role of a technical device that has been adopted in order to facilitate transactions. This device can no doubt get out of*

> *order, and if it does it will indeed produce phenomena that are specifically attributable to its modus operandi. But so long as it functions normally, it does not affect the economic process, which behaves in the same way as it would in a barter economy: this is essentially what the concept of Neutral Money implies. Thus, money has been called a 'garb' or 'veil' of the things that really matter, both to households or firms in their everyday practice and to the analyst who observes them. Not only can it be discarded whenever we are analyzing the fundamental features of the economic process but it must be discarded just as a veil must be drawn aside if we are to see the face behind it.* [...]; *saving and investment must be interpreted to mean saving of some real factors of production and their conversion into real capital goods, such as buildings, machines, raw materials; and, though 'in the form of money,' it is these physical capital goods that are 'really' lent when an industrial borrower arranges for a loan.*" (Schumpeter, 1954, p. 264)

And he describes "**monetary analysis**" as follows:

> "*Monetary Analysis, in the first place, spells denial of the proposition that, with the exception of what may be called monetary disorders, the element of money is of secondary importance in the explanation of the economic process of reality.* [...] *Monetary Analysis introduces the element of money on the very ground floor of our analytic structure and abandons the idea that all essential features of economic life can be represented by a barter-economy model. Money prices, money incomes, and saving and investment decisions bearing upon these money incomes, no longer appear as expressions—sometimes convenient, sometimes misleading, but always nonessential—of quantities of commodities and services and of exchange ratios between them: they acquire a life and an importance of their own, and it has to be recognized that essential features of the capitalist process may depend upon the 'veil' and that the 'face behind it' is incomplete without it. It should be stated once for all that as a matter of fact this is almost universally recognized by modern economists, at least in principle, and that, taken in this sense, Monetary Analysis has established itself.*" (Schumpeter, 1954, p. 265)

Banks as producers of purchasing power

A direct implication of the "monetary analysis" which shapes Schumpeter's theory, is the role of banks in the economy which he develops in his book "Theory of economic development" (Schumpeter, 1934). Instead of serving as mere intermediaries for existing saving flows, they are able to produce money autonomously:

> "*The banker, therefore, is not so much primarily a middleman in the commodity "purchasing power" as a producer of this commodity.* [...] *He makes possible the carrying out of new combinations, authorizes people, in the name of society, as it were, to from them is the ephor* [Leader in ancient Sparta] *of the exchange economy.*" (Schumpeter, 1934, p. 62)

In Schumpeter's view, this role derives from the ability of banks to create money "*out of nothing*":

> "*It is always a question, not of transforming purchasing power which already exists in someone's possession, but of the creation of new purchasing power out of nothing — out of nothing even if the credit contract by which the new purchasing power is created is supported by securities which are not themselves circulating media — which is added to the existing circulation.*" (Schumpeter, 1934, p. 61).

As a consequence, saving is not needed for the financing of growth. Schumpeter (1954, p. 1080) argues that it is

> "[...] *highly inadvisable to construe bank credit on the model of existing funds' being withdrawn from previous uses by an entirely imaginary act of saving and then lent out by their owners. It is much more realistic to say that the banks 'create credit,' that is, that they create deposits in their act of lending, than to say that they lend the deposits that have been entrusted to them. And the reason for insisting on this is that depositors should not be invested with the insignia of a role which they do not play. The theory to which economists clung so tenaciously* [...] *attributes to them an influence on the 'supply of credit' which they do not have.*"

Growth as the result of new combinations of existing resources

The neoclassical growth model is not only based on the view that household saving is required for investment, it also assumes that growth is the result of piling up more and more of the same assets. In contrast to this, Schumpeter argues that it is the new combination of existing resources for the production of entirely new assets which matters for growth:

> "*That rudiment of a pure economic theory of development which is implied in the traditional doctrine of the formation of capital always refers merely to saving and to the investment of the small yearly increase attributable to it.* [...] *The slow and continuous increase in time of the national supply of productive means and of savings is obviously an important factor in explaining the course of economic history through the centuries, but it is completely overshadowed by the fact that development consists primarily in employing existing resources in a different way, in doing new things with them, irrespective of whether those resources increase or not.*[...] *Different methods of employment, and not saving and increases in the available quantity of labor, have changed the face of the economic world in the last fifty years.*" (Schumpeter, 1934, p. 57)[1]

While Schumpeter did not mention the state in his earlier writings, he stated in his book "Business Cycles" (Schumpeter, 1939) with reference to the "*State-Directed Economy of Germany*":

[1] See also Schumpeter (1939, p. 110): "*But if innovation is financed by credit creation, the shifting of the factors is effected not by the withdrawal of funds—"canceling the old order"—from the old firms, but by the reduction of the purchasing power of existing funds which are left with the old firms while newly created funds are put at the disposal of entrepreneurs : the new "order to the factors" comes, as it were, on top of the old one, which is not thereby canceled.*"

> *"A large part of the investments in industry was for the development of resources that were to replace imported materials* [...] *But that was not all. New things were done involving the distinct entrepreneurial act that constitutes 'creative adaptation'."* (Schumpeter, 1939, p. 973)

The **"creative destruction"** for which Schumpeter is mainly quoted today, did not play a role in these earlier writings. In fact, his development theory is based on the idea that new entrepreneurs which are given purchasing power by a bank are able to withdraw resources from existing firms. As the new firms are created before the existing firms are exiting the market, "creative adaption" is a better description of this process than "creative destruction".

No such thing as a physical real interest rate

A direct implication of Schumpeter's monetary analysis is his criticism of the concept of a real, i.e., physically determined, interest rate:

> *"For us, however, there is no such thing as a real rate of interest, except in the same sense in which we speak of real wages: translating both the interest and the capital items of any loan transaction into real terms by means of the expected variation in an index of prices, we may derive an expected and, by performing the same operation ex post, an actual rate of interest in terms of 'command over commodities.' But nominal and real rates in this sense are only different measurements of the same thing or, if we prefer to speak of different things even in this case, it is the monetary rate which represents the fundamental phenomenon."* (Schumpeter, 1939, p. 128)

3 Real analysis versus monetary analysis

As Schumpeter did not elaborate the differences between real analysis and monetary analysis in detail, we will present simple models which can be regarded as prototypes for the two approaches. Real analysis will be presented with the loanable funds theory and monetary analysis with the IS/LM model, an IS/MP and an IS/PC/MP model. This presentation will show above all that it is not correct to regard the two approaches as compatible. Keynes (1933, p. 408-411) who has made a similar differentiation as Schumpeter has put this as follows:

> *"Most treatises on the principles of economics are concerned mainly, if not entirely, with a real exchange economy; and – which is more peculiar – the same thing is also true of most treatises on the theory of money.* [...] *The theory which I desiderate would deal, in contradistinction to this, with an economy in which money plays a part of its own and affects motives and decisions and is, in short, one of the operative factors in the situation, so that the course of events cannot be predicted, either in the long period or in the short, without a knowledge of the behaviour of money between the first state and the last. And it is this which we ought to mean when we*

speak of a monetary economy. [...] *Everyone would, of course, agree that it is in a monetary economy in my sense of the term that we actually live.* [...] *The idea that it is comparatively easy to adapt the hypothetical conclusions of a real wage economics to the real world of monetary economics is a mistake.*"

Unfortunately, in his "General Theory" Keynes did not explicitly follow this differentiation which could have avoided many misinterpretations. In fact, there is no systematic treatment of the financial sector in this book. Schumpeter (1954, p. 1114-1115) criticizes Keynes explicitly:

"*The deposit-creating bank loan and its role in the financing of investment* ***without any previous saving up of the sums thus lent*** *have practically disappeared in the analytic schema of the* ***General theory****, where it is again the saving public that holds the scene.*"

3.1 Real analysis (Loanable funds model)

Summers (2016) describes the commodity logic of the loanable funds model as follows:

"*Just as the price of wheat adjusts to balance the supply of and demand for wheat, it is natural to suppose that interest rates—the price of money—adjust to balance the supply of savings and the demand for investment in an economy. Excess savings tend to drive interest rates down, and excess investment demand tends to drive them up.*"

Box 1: Savings, saving, and the confusion about "capital"

An obvious symptom for the confusion between the two paradigms is the usage of the key terms "saving", "savings", and "capital" in the academic literature. Without addressing it explicitly, most authors use these terms as synonyms. A good example is a post by Bernanke (2015) where he changes continuously between terms "saving glut" and "savings glut".

In the terminology of the system of national accounts and the associated flow of funds analysis only the term "**saving**" is used. In this terminology, saving is a **flow concept** and it is identical with the increase of the net worth of an agent or a sector within a certain period (excluding valuation gains).

The term "**savings**" does not exist in these accounting systems. It is also not used in banking statistics. Here only the concept of "savings deposits" can be found. Thus "savings" is not a technical term and it should be avoided in professional papers. If "savings" is used colloquially it is associated with "savings deposits" or even more loosely with bank deposits. In this regard "savings" could be regarded as a **stock concept**.

In other words, using the terms „saving" and „savings" as synonyms means confusing stocks and flows. This confusion was already identified by Kalecki:

> *"I have found out what economics is; it is the science of confusing stocks with flows."* Kalecki quoted according to Robinson (1982, p. 295)

The incorrect usage of the term "savings" is more than a semantic problem. It blurs the main deficiency of the classical interest rate theory. "Savings" can then be understood simultaneously as a flow concept (associated with act of saving) and as a stock concept (associated with supply of bank deposits). With this **dual nature** of saving/savings the impression is created that "saving" is a source of financial flows not only in the abstract world of the real analysis but also in reality.

A similar confusion is a associated with the term "**capital**". It can be regarded a stock concept reflecting physical assets like a machine in the production function. But the term "capital" is also used for financial assets. However, in the model world of the real analysis "capital" is used as a flow concept, e.g. in the context of international flows of "capital" which are created by national saving (e.g. by Feldstein (1980)) and as a stock concept in the production function.

Schumpeter (1939, p. 130) therefore recommends: *"It is best to avoid altogether a term which has been the source of so much confusion and to replace it by what it means in every case—equipment or intermediate goods and so on—and this we shall do, except in cases in which no misunderstanding is likely to arise."*

The model applies the standard supply and demand apparatus on the demand for and supply of "savings" (Box 1). Graphically, the financial market can be represented in a simple demand/supply-diagram (Figure 1). The supply of funds which is identical with planned saving is an upward-sloping line representing the amount of funds supplied for each possible value of the interest rate (r) received. Saving decisions are determined by the positive time preference of the households. The demand for "savings" is identical with planned investment. It is as assumed that investment decisions are determined by the productivity of investments. Equilibrium between the supply and demand for funds (or planned saving and planned investment) is achieved by the interest rate mechanism. The equilibrium interest rate is a real interest rate. As it reflects the time preferences of the savers and the productivity of investments it is a purely real phenomenon.

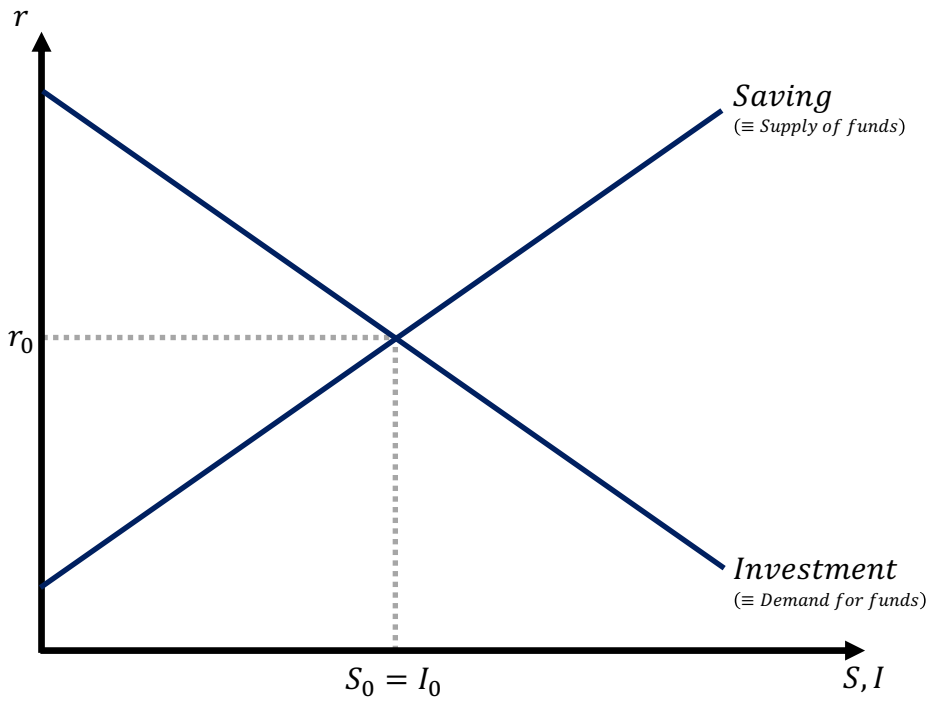

Figure 1: Representation of the financial market in a simple demand/supply diagram.

While this sounds intuitive, it is important to note that mechanisms of this model depend on a "*critical assumption*" (Rodrik, 2015) that is rarely made explicit. The theory assumes that it can describe reality with a one-asset model: this asset is a **all purpose asset** (APA) which can be used interchangeably as a

- consumption good,
- financial asset ("savings"), if it is saved by private households and becomes available as a supply of funds,
- investment good ("capital"), which increases the capital stock, and

- sole output of the production process for consumption in the future.

If one follows Rodrik, who argues that the empirical relevance of a model depends on the realism of its critical assumption, this assumption raises serious doubts on the relevance of the loanable funds model. Barro and Sala-i Martin (2004, p. 25) illustrate this assumption as follows:

> "*One way to think about the one-sector technology is to an analogy with farm animals that can be eaten or used as inputs to produce more farm animals. The literature on economic growth has used more inventive examples – which such terms as smoohs, putty or ectoplasm – to reflect the easy transmutation of capital goods into consumables, and vice versa.*"[2]

The assumption of an APA has far-reaching implications. As the only asset is at the same time a real and a financial asset, financial transactions and flows are identical with real transactions and flows. Financial decisions are identical with consumption or investment decisions:

- The supply of the APA, i.e., the **supply of "savings"** on the capital market, is identical with the saving decision which is nothing else but the **consumption decision**,
- The demand for the APA, i.e., the **demand for "savings"** on the capital market, is identical with the **investment decision**.

Thus, in the real analysis, there are no financial decisions that are not identical with consumption/saving decisions or investment decisions which increase the capital stock. The financial sphere is identical with the real sphere (Bertocco, 2007). Borio (2016) speaks of "*real economies disguised as monetary ones*". Or as Schumpeter puts it, financial transactions cannot "*acquire a life and an importance of their own*" (Schumpeter, 1954, p. 265).

As a consequence, the so-called capital market in the loanable funds theory is a **flow market**. It equilibrates saving and investment flows. Private households and their saving decisions play a decisive role for the financing of investments. Only if consumers are willing to give up consumption, the GPG becomes available as a supply of funds or "savings" which investors can borrow on the capital market and then use as "capital" in the production process.

Correspondingly, the role of banks and other financial institutions is limited. As they are unable to produce the GPG, they can only operate as "resource trading intermediaries that, wholly or primarily, store, borrow and lend physical commodities" (Jakab & Kumhof, 2019). In fact, banks are only needed if there are "frictions" in the transmission process between savers and investors.

[2] See also Obstfeld and Rogoff (1996): "*A unit of capital is created from a unit of the consumption good. This process is reversible, so that a unit of capital, after having been used to produce output, can be "eaten". You may find these assumptions unrealistic, but they help us sidestep some technical issues that aren't really central here.*"

3.2 Monetary analysis (IS/LM model, IS/MP model and IS/PC/MP model)

While the "loanable funds model" provides a perfect representation of what Schumpeter calls "real analysis", the same applies to the traditional IS/LM model regarding the monetary analysis. Despite much criticism, the model still serves as the **workhorse of macroeconomic teaching** (Gärtner, Griesbach, & Jung, 2013). Krugman (2000), Blanchard (2009) and Tanner (2017) emphasize the simplicity of the IS/LM model as its positive feature. In the most recent editions of leading textbooks (e.g. Blanchard (2021b), Mankiw (2019)), the IS/LM model provides the core macroeconomic model for the short-term analysis.

Blanchard (2021b, p. 123) gives the following assessment of the IS/LM model:

> "[. . .] *what we observe in the economy is consistent with the implications of the IS-LM model. This does prove that that the IS-LM model is the right model. It may be that what we observe in the economy is the result of a completely different mechanism, and the fact that the IS-LM model fits well is a coincidence. But this seems unlikely. The IS-LM model looks like a solid basis on which to build when looking at movements in activity in the short-run.*"

As the textbook by Mitchell et al. (2019) shows, the proponents of MMT have so far not been able to develop a simple theoretical framework for the monetary analysis that goes beyond the "Keynesian cross". At the same time, they heavily criticize the IS/LM model. Mitchell et al. (2019, p. 445) argue:

> "[...] *the IS-LM model is fundamentally flawed. Indeed, its creator, Hicks, later admitted that it is incoherent. It is highly misleading when used to understand the economy and dangerous if used to formulate policy."*

We will show in the following that the IS-LM model is indeed outdated as it assumes that central banks target a monetary aggregate and not an interest rate (Mitchell et al., 2019). Therefore, we will modify the model in a way that it is able to deal with the actual monetary policy strategies of central banks which either control the short-term rate on the money market or in addition the long-term rate on the capital market, either implicitly (quantitative easing) or explicitly (yield curve control). We call this model IS/MP model as it uses the traditional IS curve and combines it with a curve that represents the two different monetary policy approaches. We will also present a IS/PC/MP model which has the advantage that it focuses on the real interest rate and can therefore deal with flexible prices.

3.2.1 The IS/LM model

The fundamental difference between the IS/LM model and the loanable funds model becomes evident if one compares the assets that are used in the two models. While the loanable funds

model is a one-asset model, the IS/LM model comprises five independent assets: a consumption good and an investment good, money (bank deposits), monetary base (central bank deposits), and a bond (consol). As the IS/LM model is a fix-price model, the interest rate of the model is a **nominal interest rate**. In addition, it is a **long-term rate**, as the yield for consols in the LM part and investment decisions in the IS part depend on a long-term rate. Thus, the interest rate in this model is not the short-term policy rate set by the central bank. [3]

Using a model with distinct real and financial assets has the effect, that – in contrast to the identity of the financial and the real sphere which characterizes the loanable funds model – the real and the monetary sphere are separate. The **goods market** is a flow market represented by the IS curve. The **financial market** is a stock market represented by the LM curve. It is often argued that the model suffers from the inconsistency that the IS curve represents a flow equilibrium while the LM curve is for a stock equilibrium (Mitchell et al., 2019, Box 28.1). However, the problem can be solved if one assumes that consumption and investment decisions which constitute the IS curve have to be made at a point in time, i.e., at the beginning of a period depending on the prevailing interest rate, not over a time interval.

The **IS curve** shows that saving and investment decisions alone cannot determine the equilibrium interest rate. There are many equilibria for saving and investment depending on the interest rate. This is a main difference to the classical model where the interest rate is determined as saving-investment equilibrium.[4]

The **LM curve** reflects the independence of the financial sphere from the real sphere which is the key feature of the monetary analysis. Equilibria on the LM curve are not influenced by real decisions, e.g., saving and investment decisions. As already mentioned, the LM curve suffers from the assumption that central banks target the **monetary base**. Another serious flaw is the assumption of a mechanistic relationship (the so-called money multiplier) between the supply of the monetary base and the supply of bank loans which is identical with the supply of bank deposits. As a result, the LM curve assumes that by increasing the monetary base the central bank can increase the money stock. But this would only be the case in a disequilibrium situation where the demand for bank loans exceeds the supply at a given interest rate (Bofinger, Reischle, & Schächter, 2001).

[3] Thus, Blanchard (2016) is not right if he argues that in the IS/LM model "*the people and firms were assumed to borrow at the policy rate set by the central bank*".

[4] It is important to note that the IS curve is derived from the so-called Keynesian cross which represents an equilibrium of aggregate demand (consumption and investment demand) and short-term aggregate supply which is represented by the 45-degree line. The IS curve reflects equilibria on the goods market depending on the interest rate. Thus, Seccareccia and Lavoie (2015) are not right when they argue that saving can never be independent of investment and criticise the IS curve for presuming that independence.

3.2.2 The IS/MP model

The IS/LM model can be modified in way that it reflects the standard practice of central banks which typically target a short-term interest rate as policy rate. In addition, one can also include the approach where the central bank also controls the long-term interest rate either implicitly (quantitative easing) or explicitly (yield curve control).

It is often assumed that the conventional approach where central banks manage a short-term interest rate implies that they are unable to control the credit supply of the banking system and thus the supply of bank money (Seccareccia & Lavoie, 2015). However, in Bofinger et al. (2001), a price-theoretic model is presented, which shows that the central bank can control the credit supply indirectly with its policy interest rate.

Critics of the LM curve argue that it should be substituted by a horizontal line that reflects the policy rate set by the central bank (Seccareccia & Lavoie, 2015). E.g., Mitchell et al. (2019, p. 464) argue:

> "*The reality* [...] *is that the central bank sets the so-called official policy or target rate.* [...] *The fact that the money supply is endogenously determined means that the LM schedule will become horizontal at the policy interest rate.*"

But, as already mentioned, the relevant interest rate for the investment decisions that make up the IS curve is not the policy rate of the central bank but a **longer-term rate** either charged by banks or determined by the capital market.

With this differentiation in mind, one can derive two monetary policy curves presenting the relationship between output and the long-term interest rate (i_{LT}):

- If the central bank targets the **short-term rate** only, one can assume that a higher economic activity leads to higher long-term interest rate. In Bofinger et al. (2001) such a positively sloped rate is derived for a constant short-term rate, above all due to the higher credit risk of a growing loan portfolio. Thus, for this case one can derive an **upward-sloping MP curve** (MP^{ST} in Figure 2).
- A **horizontal MP curve** which is assumed by heterodox economist requires a monetary policy strategy where the central bank targets the long-term rate with asset purchases in addition to the conventional control of the short-term rate (MP^{LT} in Figure 2).

Compared with the LM curve, the MP curves are a short-cut of the processes on the financial market. The MP curve simply assumes that the central bank can control the respective interest

rates without analyzing how the control is implemented. Compared with the real analysis where the central bank is irrelevant for the interest rate, the MP curve shows the dominant role of the central bank in the monetary analysis.

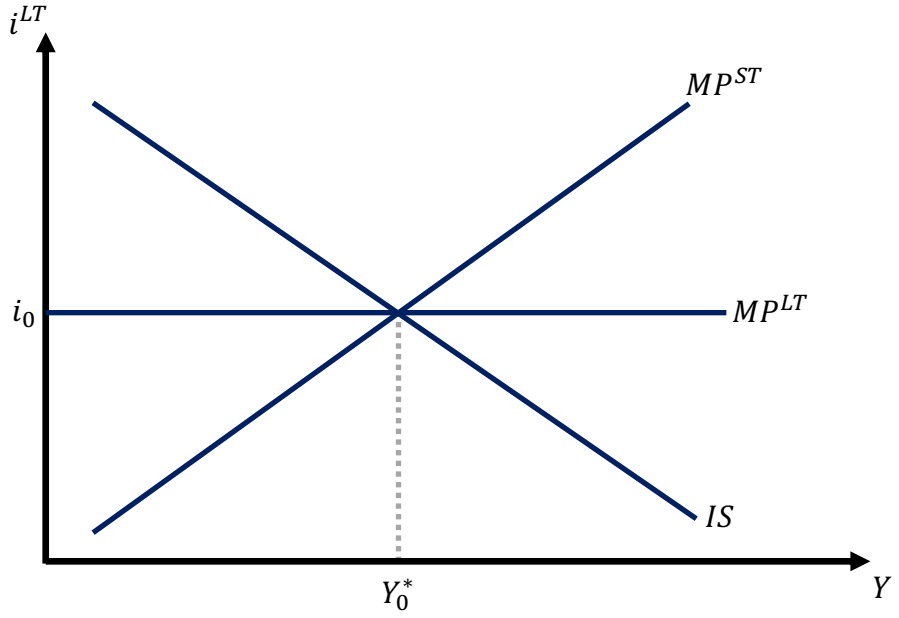

Figure 2: IS/MP model with short-term (MP^{ST}) and long-term (MP^{LT}) interest rate control of the central bank.

3.2.3 The IS/PC/MP model

Another flaw of the IS/LM model is the underlying assumption of a stable price level so that the differentiation between the nominal and the real interest rate does not matter. This has led to the IS/PC/MP models where the central bank does not control the nominal but the real interest rate. Such models consist of three building blocks: an IS curve, a Phillips curve and a monetary policy function. A simple IS/PC/MP model was developed by Bofinger, Mayer, and Wollmershäuser (2006).

The IS curve is given by:

$$y = a - br + \varepsilon_1$$

with y as output gap, a as an autonomous demand component, b as real interest rate elasticity, r as the real interest rate and ε_1 as an exogenous demand shock.

The Phillips curve is given by:

$$\pi = \pi^e + dy + \varepsilon_2$$

with π as the inflation rate, π^e as the expected inflation rate, d as the slope of the Phillips curve and ε_2 as an exogenous supply shock.

Monetary policy can be described with a welfare function that presents the loss for the society due to an inflation gap and an output gap:

$$L = (\pi - \pi^*)^2 + \lambda y^2$$

with π^* as the central bank's inflation target and λ as a preference parameter reflecting the relative weighting of the inflation and the output gap.

Assuming that the central bank is credible so that $\pi = \pi^e$ the optimum interest rate for the central bank can be calculated as follows (Appendix A, section 9):

$$r^{opt} = \frac{a}{b} + \frac{1}{b}\varepsilon_1 + \frac{d}{b(d^2 + \lambda)}\varepsilon_2$$

Graphically, this can be shown as a horizontal MP curve for the real interest rate. While this model has the important advantage that it focuses on the real interest rate, which is relevant for investment and consumption decisions, it also suffers from the lack of differentiation between the short-term and the long-term real rate.

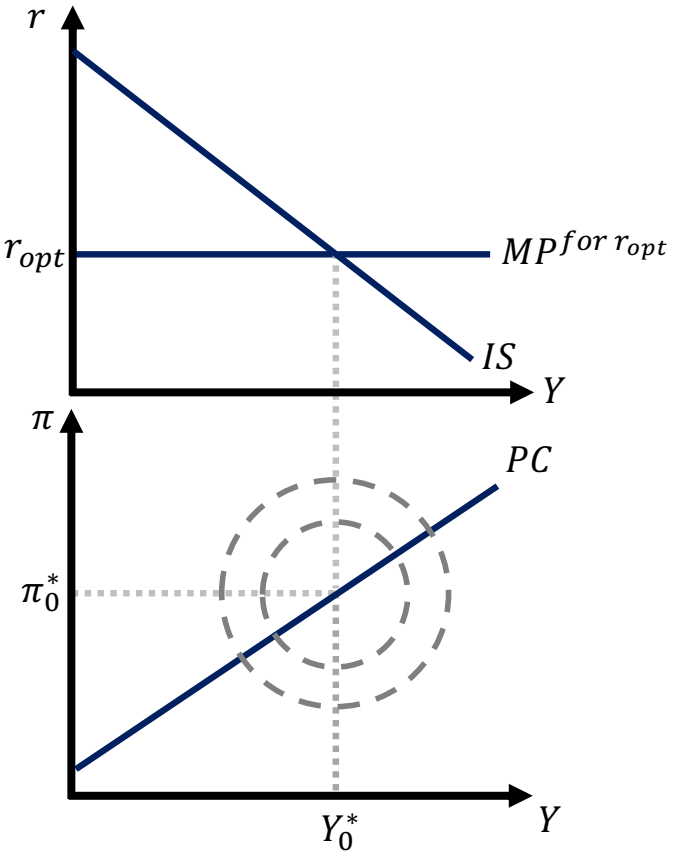

Figure 3: IS/MP/PC model with r_{opt}

In the following we will use the IS/MP model with its differentiation between the short-term and the long-term rate for the analysis of the direct financial effects of fiscal debt where the repercussions on the inflation rate are less relevant. For the effects of fiscal policy on inflation and output and the interplay with monetary policy we will use the IS/PC/MP model.

3.3 Implication for the concept of an equilibrium interest rate

The fundamental differences between the real analysis and monetary analysis becomes obvious if one compares the concept of the equilibrium interest rate.

In the loanable funds theory, there is only a **one flow-equilibrium** for the demand and the supply of the GPG in its dual manifestation as a commodity and a financial asset. The equilibrium interest rate is a **commodity rate** which is determined by the time-preference of consumers and the productivity of the GPG in the roundabout investment process. Thus, the neutral rate is the rate where saving plans equal investment plans. Due to the commodity logic of the real analysis, the interest rate is a physical rate. It is the price for abandoning consumption. It is defined in units of the GPG tomorrow for one unit of the GPG today.

In the monetary models, the financial market equilibrium is a **stock equilibrium**. The interest rate is a **money rate**. It is defined in units of money tomorrow for one unit of money today. The interest rate is the price for abandoning liquidity. In this model five different equilibria are possible:

- A **flow equilibrium on the goods market** which is equivalent with an equilibrium between planned saving and planned investment. These multiple equilibria are represented by the IS-curve.
- A **stock equilibrium on the financial market**, i.e. an equilibrium of the demand for money and the supply of money (which is identical with an equilibrium of the demand for bonds and the supply of bonds). These multiple equilibria are represented by the LM curve. In the IS/MP model and the IS/PC/MP model, the financial market equilibrium is reduced to the MP curve which represents the interest rate policy of the central bank.
- A **simultaneous equilibrium on the financial market and the goods market** that is determined by the intersection of the IS and the LM or MP curve.
- A full employment equilibrium, which is a simultaneous **equilibrium of the IS curve and the LM curve or MP curve** that is at the same time compatible **with full employment**. This is the **"neutral interest rate"** in Blanchard (2022). Laubach and Williams (2016) have this equilibrium in mind when they determine their "natural rate of interest".
- In the IS/PC/MP model, not only the output gap but also the inflation gap, i.e., the difference between the actual inflation rate (π) and the inflation target (π^*) must be considered. This leads to the concept of an **"optimum interest rate"**. Such a concept of a "natural rate" was already preferred by Keynes:

  > *"I am no longer of the opinion that the concept of a 'natural rate' of interest, which previously seemed to me a most promising idea, has anything useful or significant to contribute to our analysis.* [...] *If there is any such rate of interest, which is unique and significant, it must be the rate which we might term 'neutral rate of interest', namely the natural rate in the above sense which is consistent will full employment, given the other parameters of the system; though this rate might better be described, perhaps, as the 'optimum rate'."* (Keynes, 1936, p. 243)

3.4 Incompatibility of the two paradigms

Many economists (Woodford (2010), Krugman (2011)) assume that the IS/LM model can be derived from the loanable funds model and that both approaches are identical. Krugman (2011) puts it as follows:

> *"My favorite of these approaches is to think of IS-LM as a way to reconcile two seemingly incompatible views about what determines interest rates. One view says that the interest rate is determined by the supply of and demand for savings – the "loanable funds" approach. The other says that the interest rate is determined by the tradeoff between bonds, which pay interest, and money, which doesn't, but which you can use for transactions and therefore has special value due to its liquidity – the "liquidity preference".*

A similar statement can be found in Blanchard who argues that the interest rate can be defined in two equivalent ways:

> *"The first is that it is the safe real interest rate such that saving is equal to investment, assuming output is equal to potential output. The second is that it is the safe real interest rate such that aggregate demand is equal to potential output. The two definitions are indeed equivalent but suggest different ways of thinking about the factors which determine the neutral rate* [...]".(Blanchard, 2022, Chapter 2, p. 3)

Our presentation of the two paradigms shows the incompatibility of the two approaches (a summary table of the previous discussion on the differences of the two paradigms is provided at the end of this subsection in Table 1). Due to their critical assumptions, they are characterized by laws of motion that go in opposite directions. In real analysis saving generates investment. In monetary analysis, investment via the multiplier generates higher income and higher saving. In real analysis, bank deposits create loans. In monetary analysis, loans create deposits. In addition, dimensions of the interest rate are incompatible. In real analysis, the interest rate is a commodity rate expressed in units of goods. In monetary analysis, it is a money rate expressed in units of money.

For these reasons, it should be obvious that it is not possible to derive the IS/LM model from the "loanable funds model" or to create a synthesis of the two. Nevertheless, prominent economists like Hicks (1937), Woodford (2010) and Krugman (2011) provide graphical derivations of the IS curve from the loanable funds model. But if one believes that the loanable funds model presents the capital market, it should be obvious that one cannot derive the IS curve of the IS/LM model from it, which is assumed to present the goods market of this model, and then add a curve for the financial market (LM curve) to it. In Appendix 2 we demonstrate the flaws of such exercises.

With the differences in the "*dominant causal mechanisms*" (Rodrik, 2015) it is also not possible to argue that – in line with the "neoclassical synthesis" – the real analysis applies for the **longer-term**, while the monetary analysis describes **short-term** processes. For instance, if banks are able to create money autonomously in the short-term why should they lose this ability in the longer-term? Table 1 gives a survey on the fundamental differences between the two paradigms:

	Real Analysis	Monetary Analysis
Assets	•General purpose good (GPG)	•Consumption good, investment good, money, bonds, reserves
Financing/ Financial Market	•Provision of the GPG by saving of households (abandonment of consumption) •Financial Market: Flow Market	•Provision of money by banks or by other lenders (abandonment of liquidity) •Financial Market: Stock market
Saving and Investment	•Saving of households generates investment	•Investment generates saving of households.
Banks	•Banks are pure intermediaries of funds and unable to produce the GPG •Deposits create loans	•Banks are the only manufacturers of funds. •Loans create deposits.
Central Bank	•Central bank is a powerless institution.	•Central bank is a very powerful institution.
Interest Rate	•Real phenomenon •Interest rate is a real rate: units of the GPG tomorrow for one unit of the GPG today	•Monetary phenomenon •Interest rate is a nominal rate: units of money tomorrow for one unit of money today.

Table 1: Real analysis vs. Monetary analysis

3.5 Implications for fiscal policy

The explicit distinction between real analysis and monetary analysis as incompatible paradigms has far-reaching implications for the theory of public debt. Above all, it opens up the view that monetary analysis cannot be limited to situations of unemployment. Rather, there is also a need for a monetary analysis of public debt in full employment situations, since real analysis, as will become clear below, has little to contribute in this regard.

The narrowing of monetary analysis to a situation of unemployment characterizes **Modern Monetary Theory**, for which the role of the state is focused to providing a job guarantee which includes not only a job but also a sufficient wage and adequate medical care.[5] The same applies to Blanchard who differentiates between two perspectives for fiscal policy ("*two extreme approaches to fiscal policy*" (Blanchard, 2022, Chapter 1, p. 10)) which he labels "pure public finance" and "functional finance":

- "**Pure public finance**" is based on the theoretical framework of the real analysis. For Blanchard this approach applies to situations with **full employment** and high real rates. It "*focuses on the role of debt and deficits, ignoring the effects of fiscal policy on demand and output, for example by implicitly assuming that monetary policy can maintain output at potential in response to a change in fiscal policy*"(Blanchard, 2022, Chapter 5, p. 3).

- "**Functional finance**", a term that was coined by Lerner (1943), is based on the theoretical

[5] Nersisyan and Wray (2020, p. 6) describe the job guarantee as follows: "*The Levy proposal includes paying $15 per hour plus generous benefits (at 20 percent of the wage bill, including Medicare-style healthcare and free child-care), plus an amount of spending equal to 25 percent of the wage bill to cover materials costs. Thus, the JG not only provides full employment, it also ensures an effective national minimum wage of $15 per hour—and this is accomplished whether or not $15 is the legal minimum.*"

framework of the **monetary analysis**. For Blanchard this approach applies to situations with **weak private demand** and low real interest rates. In this approach, the macroeconomic stabilization role of fiscal policy is required (Blanchard, 2022).

In line with the **neoclassical synthesis**, he also assumes that the two approaches are compatible and can thus be combined:

> "*I argue that the right fiscal policy is a mix of these two approaches, with the weight on each one depending on the level of the neutral rate.*"(Blanchard, 2022, Chapter 5, p. 3)

The explicit differentiation between real and monetary analysis and the hypothesis that a monetary analysis is also fruitful for situations with full employment, leads to a concept that could be called a Schumpeterian approach for fiscal policy (Table 2). Such an approach is identical with a concept that Mariana Mazzucato has labelled the "entrepreneurial state".

	Unemployment/ Negative output gap	**Full employment**
Classical/ Real analysis	NA	**Pure public finance:** Real and financial crowding out
Monetary analysis	**Functional Finance** (Keynesian fiscal policy): No real and no financial crowding-out **Modern Monetary Theory**	**Entrepreneurial state** (Schumpeterian finance): Real crowding out, but no financial crowding out

Table 2: A systematic approach to the role of fiscal policy

We will see in the following that the different approaches are confronted with different forms of **crowding-out effects** of public debt.

- In pure public finance, there is real and financial crowding-out as the real and the financial sphere are identical.
- In functional finance there is neither real nor a financial crowding out.
- The entrepreneurial state is confronted with real crowding-out, but not with a financial crowding-out.

In other words, MMT and Blanchard's approach have the effect that a monetary analysis of fiscal policy in full employment situations, i.e., a role for fiscal policy that goes beyond the Keynesian stabilization role, is missing. This applies above all to the Schumpeterian role of the government as investor or financier of long-term projects like a Green New Deal or ambitious technological projects ("moonshots").[6]

[6]As a consequence, Blanchard mentions these important functions of public debt only shortly at the very end of his book: "*I also feel that there is a set of urgent policy issues which need to be addressed. Let me take two of them: The first is how public green investment should be financed.* [...] *I have argued that any public green investment with a risk adjusted social rate of return should be implemented. Some of the measures, such as a carbon tax may increase fiscal revenues, although some of the revenues will have to be spent to limit adverse distributional effects. But most of the measures will have to be financed either through taxes or through debt. The issue is what that mix should be.*" (Blanchard, 2022, Chapter 7, p. 4)

4 Public debt in the framework of the real analysis ("pure public finance")

The loanable funds model is widely regarded as a useful theoretical framework for analyzing the macroeconomic effects of public debt in situations of full employment. In this section, we will discuss theoretical models for fiscal policy based on the real analysis and the policy implications that can be derived from such models. All models are shaped by the assumption that government debt is used for **consumption**. In other words, the role of government investment is neglected.

This is line with the thinking of classical British scholars (e.g., Adam Smith, David Ricardo, Thomas Robert Malthus and John Stuart Mill) which Holtfrerich (2013, p. 24) describes as follows:[7]

> "*The British classical school regarded all public debt as exclusively or mainly a diversion of capital from productive uses in the private economy that impaired capital accumulation and economic development.*"

E.g. Smith (1776) wrote:

> "*The progress of the enormous debts which at present oppress, and will in the long-run probably ruin, all the great nations of Europe, has been pretty uniform.*" (Smith, 1776, Book Five, Chapter III)

But the neglect of public investment as a usage for public debt can also be found in the more recent past, e.g. in the traditional textbook "Public Finance in Theory and Practice" by Musgrave and Musgrave (1989).

4.1 A simple model in Mankiw's textbook

A simple presentation of the effects of fiscal debt in a loanable funds model can be found in the textbook by Greg Mankiw (2015). His analysis leads to the classical conclusion: "*Government deficits reduce the economy's growth rate.*" (Mankiw, 2015, p. 562) The argument is based on three effects (Figure 4):

[7] Holtfrerich (2013, p. 24) also shows that German scholars at that time had a much more positive view on public debt: "*German public finance economists, in contrast, assigned a much larger role to disposable domestic and to foreign capital that gave the public sector leverage to promote economic development.*" Holtfrerich mentions above all Carl Dietzel (1829-1884) who claimed that the huge progress in material and intellectual welfare of the more advanced peoples of Europe in modern times is owed in large measure to the development of public credit ever since the last decade of 17^{th} century England.

1. Budget deficits reduce national saving and thus the supply of loanable funds. This shifts the supply curve upwards.
2. The lower supply of loanable funds increases the real interest rate.
3. The higher interest rate reduces investment which reduces economic growth

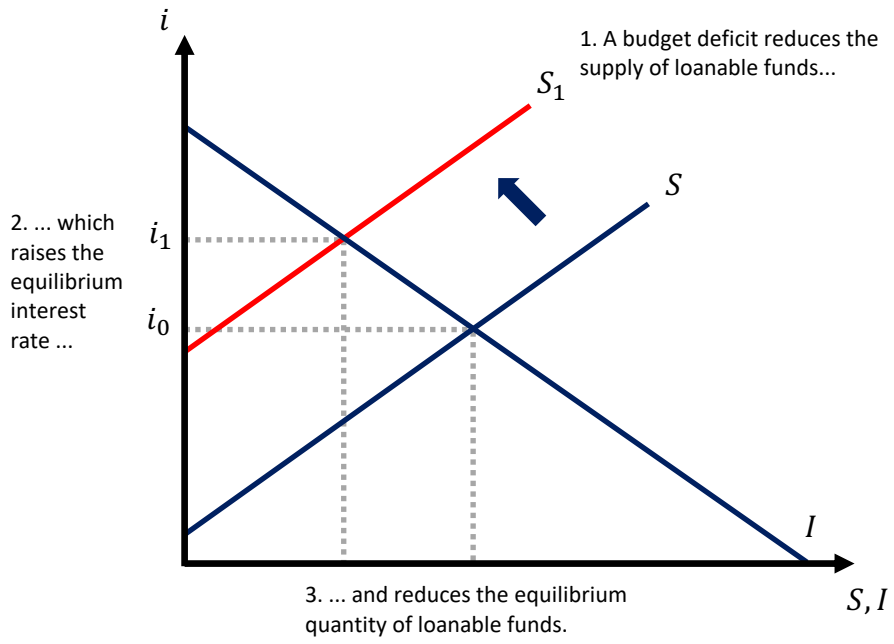

Figure 4: The effects of a budget deficit used for consumption based on Mankiw (2015).

In its simplicity, this presentation follows the critical assumption which can be found in all analytical papers that are based on the real analysis: The funds raised with a budget deficit are used for **consumptive purposes**. The possibility of debt-financed public investment is never considered. Therefore, public debt always reduces the capital stock of the economy.

The importance of this assumption can be demonstrated using Mankiw's presentation. If a budget deficit is used for investment, the effect of the budget deficit can be described as an upward shift of the investment curve. In this case, the higher demand for investment would lead also to a higher interest rate but also to more saving. Overall, higher investment would imply more growth.

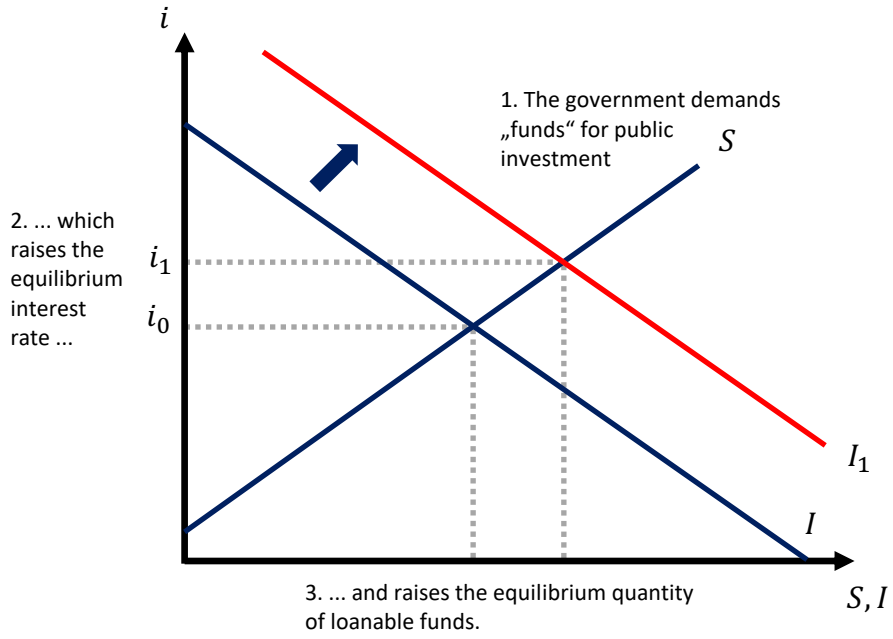

Figure 5: The effects of a budget deficit used for government investment

At first sight it seems surprising that theoretical models based on the loanable funds model do not consider the possibility of using public deficits for public investment. But the assumption is consistent with the framework of the real analysis. In this one-asset world there is only one **production function** which transforms the GPG from one period to the next. As long as there is no other production technology for the government, borrowing funds from the private households for public investment has no beneficial effect on the economy. In other words, as the demand for investment schedule is identical with the production technology of the economy, the government cannot shift in the way as we have shown it in Figure 5.

4.2 Weizsäcker and Krämer (2021): Government debt as a negative supply of capital

The view that the main effect of public debt is a reduction of the supply of capital also shapes the comprehensive theoretical and analytical analysis of public debt by von Weizsäcker and Krämer (2021). However, in contrast to Mankiw the authors derive a positive welfare effect of public debt as they diagnose an **excess supply of capital**. They argue that a longer life expectancy and rising prosperity increase the propensity of private households to save which increases the supply of capital. In contrast, technological progress has the effect that the demand for capital by firms remains more or less constant. The result is the "**Great Divergence**", as the authors

called it, on the capital market between private supply of capital (Z) and private demand for capital (T). In line with the loanable funds model, this divergence can be depicted as follows (Figure 6):

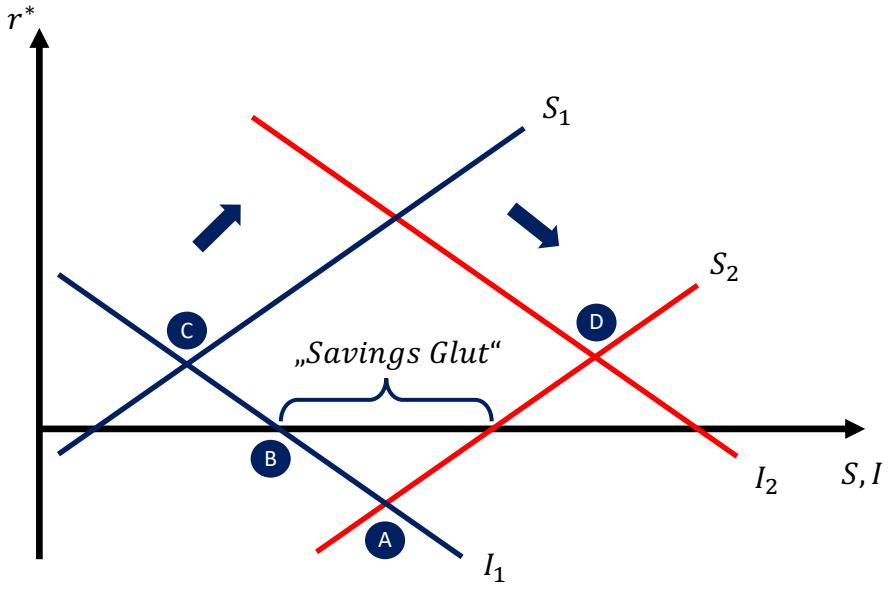

Figure 6: The Great Divergence

von Weizsäcker and Krämer (2021) assume that the propensity to save (=supply of capital) has increased so much (shifting the saving function from S_1 to S_2) while the investment schedule has remained constant at I_1, that there would be an equilibrium with a negative real interest rate (point A). As the real interest rate cannot fall below zero, there is an excess of capital supply over capital demand, a "**saving(s) glut**". With the zero lower bound, actual investment is at point B. In this case, investment determines saving which is also at point B.

If a positive real interest rate is to be achieved in this situation, according to von Weizsäcker and Krämer (2021) the government is required to unleash a "**negative capital supply**" through government debt.

> *"The state has to develop a negative capital supply by increasing public debt just enough so that, despite the private savings glut, full employment is preserved at a non-negative real rate of interest."* (von Weizsäcker & Krämer, 2021, p. 9)

But von Weizsäcker and Krämer (2021) do not discuss how the government could implement such a negative capital supply. They succinctly state:

> *"In this book, we concentrate on presenting the finding that there is an excess of saving, on deriving and situating it theoretically, and on providing empirical support for it.* [...] *Public dis-saving can be brought about either by generalized tax cuts or by increasing public spending.*

The use to which additional public revenue is put is a secondary matter in this connection and is not the subject of this book." (von Weizsäcker & Krämer, 2021, p. 220)

A negative capital supply could imply that the government **reduces national saving** in the way as it is described by Mankiw. The government develops a demand for the APA which it uses for transfers to the private sector. This can be presented as an upward shift of the saving schedule back to S_1. But while this increases the real interest rate, it is counterproductive if one diagnoses a need of the private sector to save more due to longer life expectancy and higher prosperity. At point C, Investment and saving are lower than in B.

Thus, the only solution would be an increase in public investment. In this case, the "negative capital supply" would be interpreted as a **positive capital demand** by the state. This would shift the investment schedule from I_1 to I_2 so that point D could be reached. This would require that the government has investment opportunities that are not available to the private sector. But as von Weizsäcker and Krämer (2021) assume, in line with the one-asset logic of the real analysis, that all technically feasible investment possibilities are already exhausted, such public investments could not generate the required return for savers. Thus, von Weizsäcker and Krämer (2021) are trapped in the **narrow logic of the real analysis**. The state can only remove the "saving glut" if it reduces national saving which, however, is incompatible with the requirement to increase private saving.

4.3 Pure public finance in Blanchard (2022)

In an earlier version of his book, Blanchard (2021a, Chapter 5, p. 3) acknowledges that government debt can be used for "*a major public investment, for example a 'Green New Deal' to fight global warming*". However, in the updated version (Blanchard, 2022), he has removed this passage and his theoretical analysis of pure public finance only discusses the use of government debt for consumption. Also in his presentation, the only effect of government debt is the reduction of the capital stock. In line with von Weizsäcker and Krämer (2021), Blanchard sees the possibility that a reduction of national saving can have welfare enhancing effects if there is a situation of excess saving characterized by a low real interest rate:

"*The "Golden Rule" result, due to Phelps 1961, that, if* $(r - g) < 0$*, less capital accumulation increases welfare; and the demonstration by Diamond 1965 in an overlapping generation model, that, if* $(r - g) < 0$*, issuing debt does, by decreasing capital accumulation, increase the welfare of both current and future generations. These are clearly important and intriguing results.*"(Blanchard, 2022, Chapter 1, p. 9)

The logic of these models is as follows: They assume a constant depreciation of the capital stock (δk^*). Thus, if the capital stock per worker (k) increases, depreciation increases proportionally. At

the same time, the marginal productivity of additional capital shows decreasing returns. Welfare is determined by the level of consumption (c) which is the difference between income and saving $(sf(k^*))$. Maximum consumption is reached at point A, i.e. the level of the capital stock where the marginal productivity of capital $(f(k^*))$ is equal to the depreciation of the capital stock (δk^*). In the steady state this is identical with gross saving $(sf(k^*))$. A higher saving rate would lead to a higher capital stock but as depreciation increases more than output, consumption would be lower.

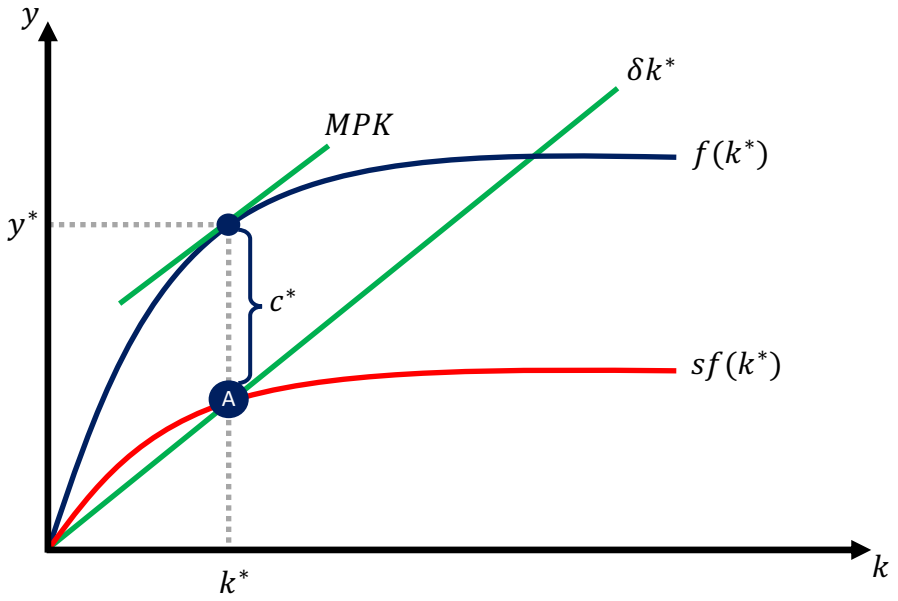

Figure 7: The Golden Rule capital stock in the Solow Growth Model

From this model Blanchard (2022) develops a chart that shows the optimum capital stock:

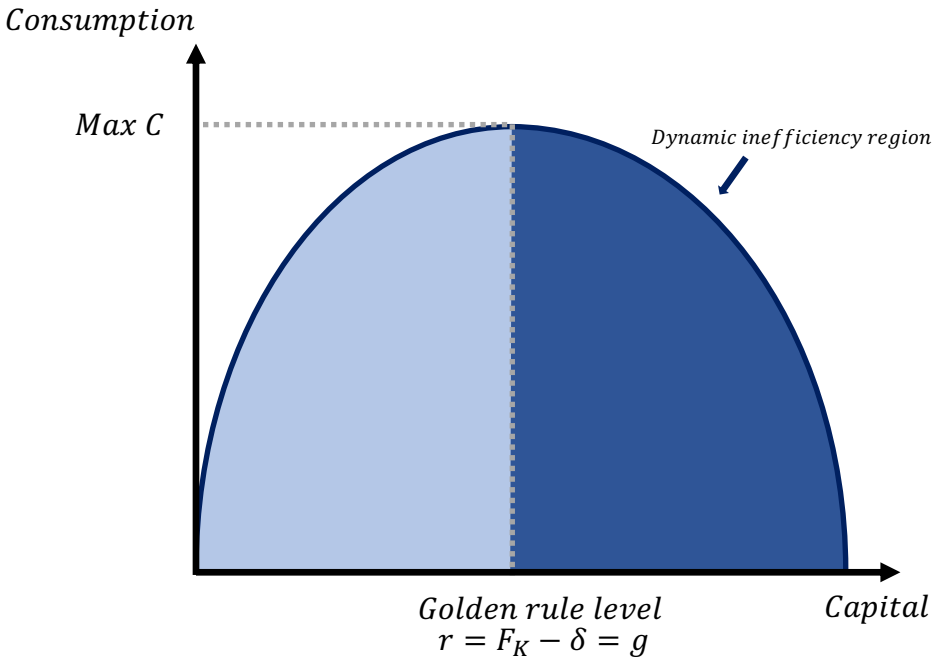

Figure 8: Optimum capital stock
Source: Blanchard (2022)

In this model, the rationale for government debt is the same as in the Mankiw model. Public debt reduces private saving which leads to a lower capital stock. But as in the von Weizsäcker and Krämer (2021) approach, the reduction of saving has a positive welfare effect. By absorbing (unproductive) saving of private households, public debt allows transfers to private households which increase their consumption.

While this is a consistent theoretical model, it is not obvious whether it is of practical relevance. Blanchard does not give a definitive answer[8], but he tends to the assessment that "*debt still has welfare costs, albeit limited ones.*"(Blanchard, 2022, Chapter 5, p. 16) Accordingly, he does not use the public finance approach as an argument for increasing public debt. On contrary and somewhat astonishingly, he concludes his section on the pure public finance approach with a recommendation for **debt reduction**:

> "*It is widely believed that the levels of debt we observe today are higher than what this approach would suggest. If so, under this approach, debt should be decreased over time, and governments should be running primary surpluses.*" (Blanchard, 2022, Chapter 5, p. 16)

[8] "*Could it really be that advanced economies accumulate too much capital? Could public debt really be good for welfare, independent of what is done with it?*" (Blanchard, 2022, Chapter 5, p. 7)

4.4 The straitjacket of the real analysis

The theoretical literature, which is based on the paradigm of the real analysis comes to a distorted picture of public debt. Without explicitly addressing it, the models assume that government debt is always **used for consumption**, i.e. it cannot be used for investment. This is consistent with the logic of real analysis and its one-good and one-production function economy, in which the government has no better investment opportunities than the private sector.

With a given amount of private saving, the inevitable result is that government debt leads to less investment in the economy. Such a **real and financial crowding-out** of private investment is at first sight negative, as it weakens economic growth.

Therefore, the assumption of **excessive private saving** ("saving(s) glut", "overaccumulation") must be made in order to derive a positive effect of government debt at all. But government debt used for transfers to the private sector cannot solve the problems arising from the increased saving desires of aging societies. It is also questionable whether there really is an over-accumulation of capital in highly developed economies, which would lead to a marginal return on investment which is lower than depreciation.

The mechanisms of the neoclassical growth model are determined by the assumption of a decreasing marginal productivity of capital. This is related to the underlying assumption of the all purpose asset. Thus, growth is the accumulation of more and more of the same APA which leads to more and more quantities of the same output. Solow (2000, p. 351) puts this as follows:

> "*Probably the best method of exposition is to think of the neoclassical growth model as being a story about an imaginary economy that has only one produced good that can be consumed directly or stockpiled for use as a capital good.*"

As already mentioned, Schumpeter (1934, 57) explicitly criticized this approach:

> "*Different methods of employment, and not saving and increases in the available quantity of labor, have changed the face of the economic world in the last fifty years.*"

Thus, while it is plausible that a continuous accumulation of the same input factor leads to decreasing marginal returns, this is not obvious in the case of "*different methods of employment*" which lead to new input and output factors.

The difference between the model world and reality can be illustrated with **data from the United States**. They show that the capital intensity of the US economy has increased steadily over time.

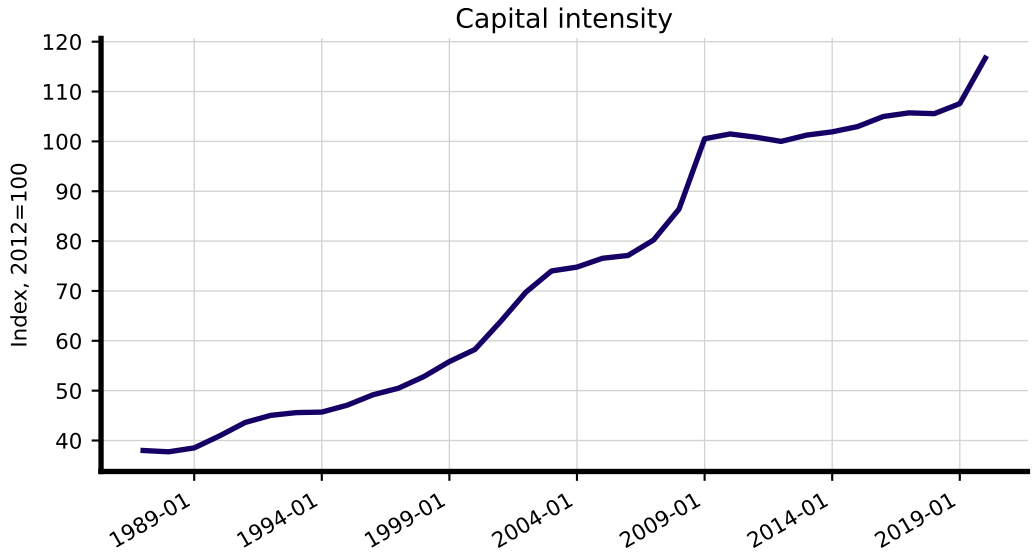

Figure 9: Capital intensity.
Source: Federal Reserve Bank of St. Louis

An analysis by the Bureau of Labor Statistics (2021) makes it possible to obtain a nuanced view of the effects of the higher capital intensity. It shows that from 1987 to 2020, the input of capital services has increased by 3.4 percent annually. The output per unit of capital has declined by 0.7 percent (Figure 10), which could imply that the capital intensity has increased too much.

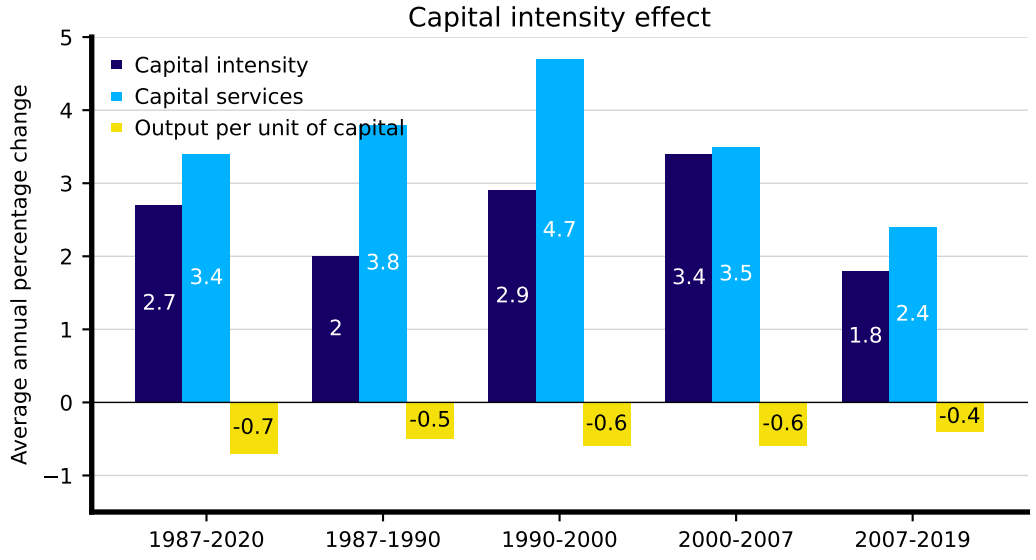

Figure 10: Capital intensity effect.
Source: BLS

For an understanding of this outcome, it is important to look at the definition of **"capital services"**. The OECD (2001, p.17) defines it as follows:

> *"When capital input is measured in its theoretically preferred form, i.e., as a flow of services adjusted for changes in the quality of investment goods, the capital measure translates embodied technical change (rising or falling quality of capital goods) into a larger or smaller flow of constant-quality capital services. Thus, rising quality of capital goods implies a larger amount of capital services. For the same rate of output growth, this implies a fall in capital productivity."*

Thus, "capital services" is defined in line with the neoclassical theory. It assumes the accumulation of an identical capital good over time. The statistical decline in capital productivity mirrors the neoclassical capital theory which assumes a diminishing marginal productivity of capital which can even become negative.

Therefore, the positive effect of the increasing capital intensity is reflected in its contribution to labor productivity of 0.9 percentage points annually. The total annual increase in labor productivity was 1.9 percent annually in the years 1987-2020.

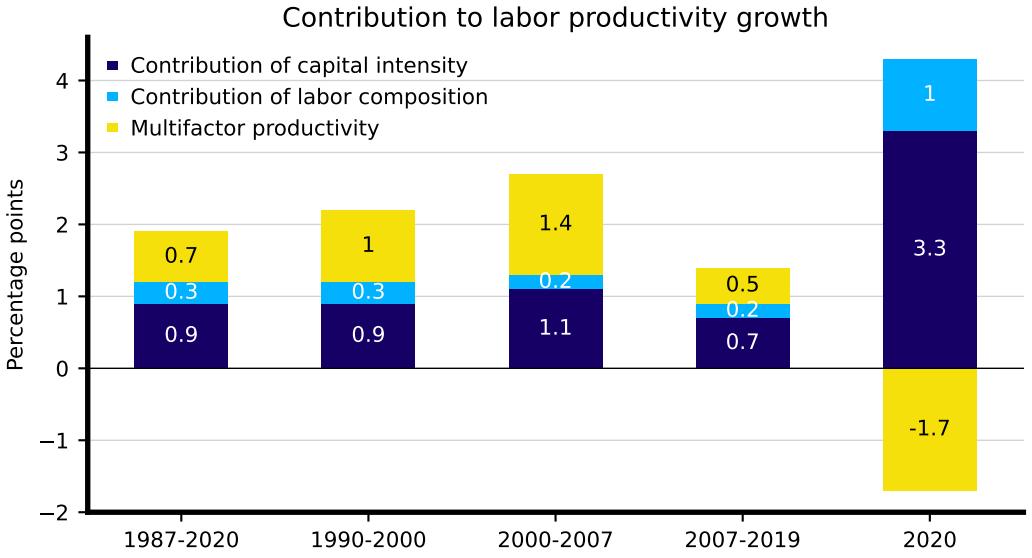

Figure 11: Contributions to labor productivity growth.
Source: BLS

Finally, the analysis of the different forms of capital services growth shows that capital accumulation is not a piling of an identical capital good. In the last thirty years, the growth rate of intellectual property rights was very strong, especially compared with the growth rate of structures.

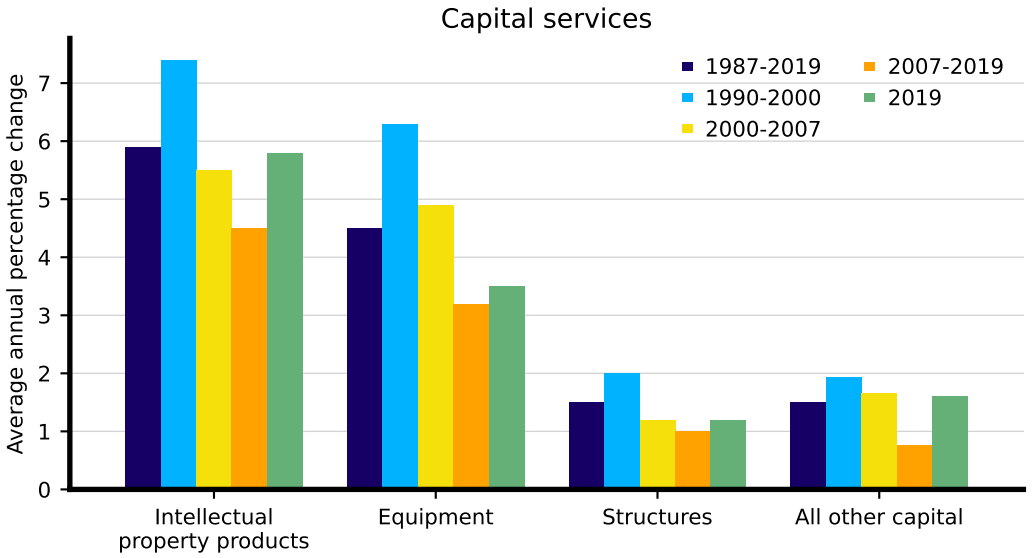

Figure 12: Capital services growth.
Source: BLS

In sum, at least for the United States, there is no indication that a growing capital intensity has become excessive in a way that it might have warranted in the past or might warrant today a reduction of private saving and the private capital stock by increasing public debt.

5 Public debt in the model world of the monetary analysis

A fundamental difference between the real and the monetary analysis concerns the crowding-out effects of public debt. Due the assumption of full employment and the identity of the real and the financial sphere in the real analysis, a budget deficit leads to real and financial crowding out: It reduces private investment which is identical with a reduction of the financial funds that are available for private investors.

In the monetary analysis, a more differentiated approach is required:

- Whether there is a **real crowing-out** depends on the state of the economy. Real crowding-out takes place in a situation with full employment, but not in a situation with unemployment.
- Due to the independence of the monetary sphere from the real sphere, **financial crowding-out** is not identical with real crowding-out. It requires therefore an explicit analysis.

In this section, we will start with an analysis of the financial effects of government debt in the monetary analysis and identify the conditions under which no financial crowding-out takes place (section 5.1). We will then discuss the real effects of government debt in unemployment situations,

the so-called theory of functional finance (section 5.2) before we address the main topic, the role of government debt and public investment in full employment situations, "Schumpeterian finance" (section 5.3).

5.1 The financing of public debt in the monetary analysis

While it is widely agreed, especially in the MMT literature, that there is no financial constraint for the government in monetary analysis, there is little systematic discussion of the effects of debt financing on interest rates and output.

On the one hand, the outcome depends on the concrete form of the financing of public debt. The government can raise money on the capital market, by borrowing from banks, or directly from the central bank. On the other hand, the (long-term) interest rate effect also depends on the monetary policy strategy of the central bank.

- A central bank can target the **short-term rate** so that the long-term rate which is relevant for aggregate demand will increase with a higher output level. With the IS/MP model, this can be represented with a positively sloped MP curve (MP^{ST}).
- A central bank can also explicitly or implicitly target the **long-term rate** (with quantitative easing or yield curve control) which implies a horizontal MP curve (MP^{LT}).

5.1.1 Capital market financing

We assume that the government finances higher expenditures on the capital market. The increased government activity shifts the IS-curve upwards (from IS_0 to IS_1). Capital market financing means that the government increases its money holdings by selling bonds, while the money holdings of the private sector decline. But as the government uses the money to purchase goods from the private sector or for transfers to the private sector, the money holdings of the government are reduced, and the private money holdings have the same level as before the government's activity. In this sense, no quantitative crowding takes place. The government debt has only redistributed the money holdings within the private sector.

But this redistribution can have an effect on the interest rate if the liquidity preference of the recipients of public payments is higher than the liquidity preference of the private bond investors. This can be represented by an upward-shift of the MP^{ST} curve from MP_0^{ST} to MP_1^{ST}. As Figure 13 shows, the capital market financed government expenditure can lead to a higher interest rate (from i_0 to i_1). Thus, although the quantity of money in the private sector remains constant (no quantitative crowding-out), the interest rate on the capital market can increase and reduce private

investment. This effect can be regarded as qualitative crowding-out.

This effect can be avoided if the central bank targets the long-term interest rate so that the **MP curve is horizontal** (MP^{LT}). This is in line with the view of heterodox economists (Seccareccia and Lavoie (2015)). In this case, which reflects the MMT approach, neither a quantitative nor a qualitative crowding takes place.

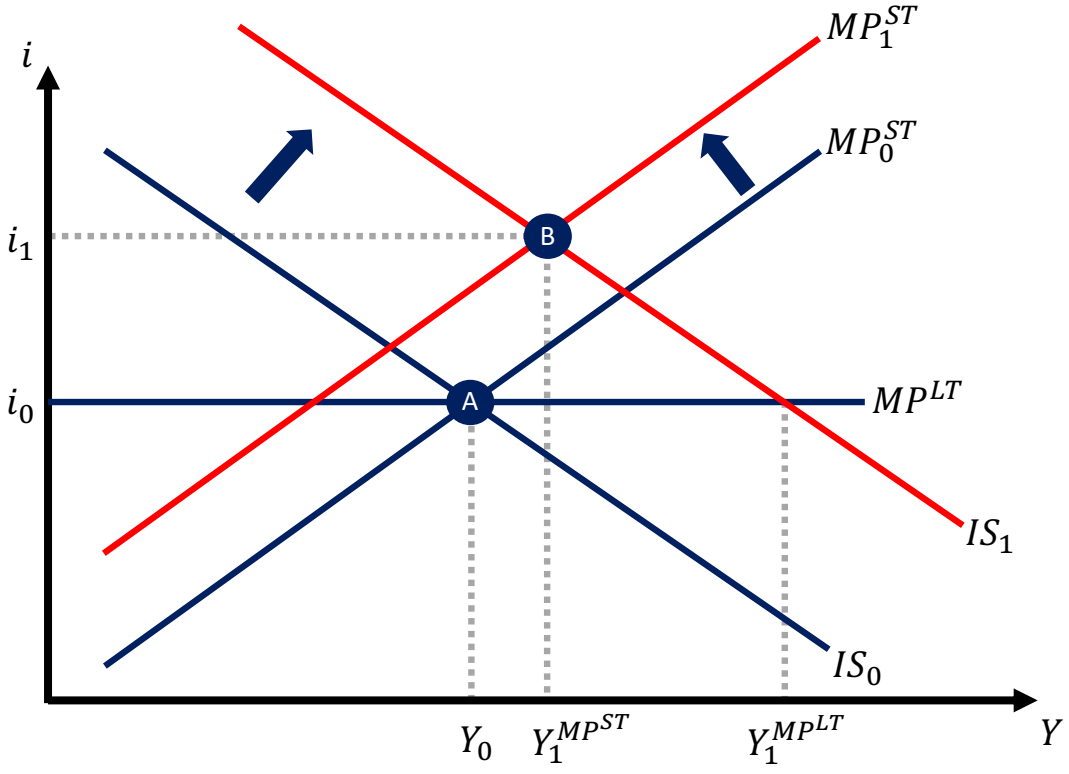

Figure 13: Effects of capital market financing

5.1.2 Commercial bank financing

It is not uncommon that commercial banks finance the government directly, especially by purchasing government bonds. For instance, in the euro area in 2015, commercial banks held about one fifth of the total government debt.

If a commercial bank lends to the state, the effects are not different from the lending to a firm or a private household. The state receives a credit to its bank account which increases the money supply in the economy. As one can assume again that the government spends the funds immediately for transfers, purchases or lowering taxes, the money holdings of the private sector increase.

The difference to the real analysis is obvious. Instead of the financial crowding-out there is a **financial crowding-in**. In the IS/MP-model with an upward-sloping MP-curve, higher money

holdings can be represented by a downward shift of the MP-curve. With a constant liquidity preference, higher money holdings imply a higher demand for bonds which reduces the long-term rate. Thus, even at a constant short-term rate, commercial bank financed deficit spending could be achieved without higher long-term rates if private money holders are willing to purchase additional government bonds.

The final outcome depends on the combined shifts of the IS-curve and the MP-curve (Figure 14). It cannot be excluded that the interest rate increases, but the effect is lower than in the case of capital market financing where the money holdings of the private sector remain constant.

Again, an increase of the long-term interest rate can only be excluded for a horizontal MP-curve, i.e. if the central bank is willing to target the long-term either implicitly (quantitative easing) or explicitly (yield curve control) which leads to a horizontal MP curve.

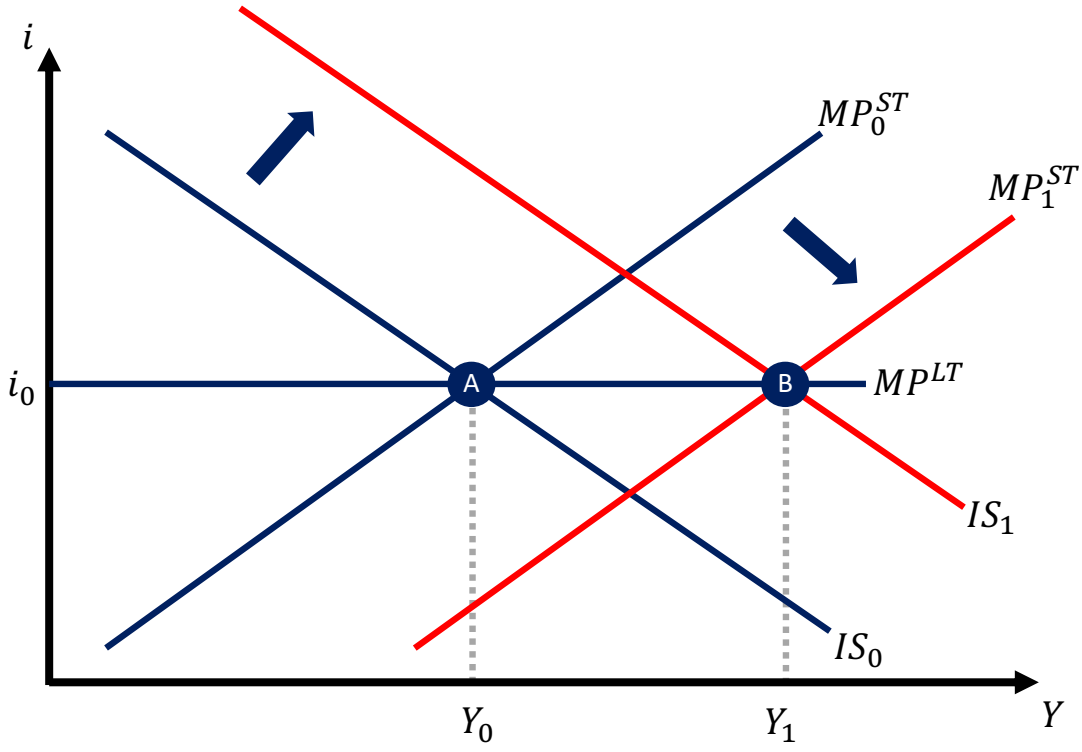

Figure 14: Effects of commercial bank financing

5.1.3 Central bank financing

It reflects the confusion between real and monetary analysis that even prominent Keynesian economists try to analyze the central bank financing of government debt with the loanable funds model of the real analysis. In a piece for the New York Times, Paul Krugman (2021) was asked the

following question: *"But is the Fed really financing the budget deficit?"*

His answer was:

> *"Not really. At a fundamental level, households are financing the deficit: the funds being borrowed by the government are coming out of the huge savings undertaken by families saving much of their income in an environment where much of their usual consumption hasn't felt safe.*
>
> *However, household financing of the deficit isn't direct. Instead, it has taken the form of a sort of financial daisy chain. Families are stashing their savings in banks. Banks, in turn, have been accumulating reserves — that is, lending to the Fed, which these days pays interest on bank reserves. And the Fed has been buying government bonds."*

How can one explain the central bank financing of government deficits within the framework of the monetary analysis? In this model, the opposite causality can be identified. It runs from government borrowing, higher transfers (higher household incomes) and a higher money stock to higher saving.

The T-accounts below explain this process in detail.

- As a first step, the federal government issues an amount of 1 billion USD bonds that are purchased by commercial banks. They have to pay for this with their central bank reserves. The government's FED account is credited with FED deposits.
- As a second step, the government makes transfer payments to private households. The payments from the government to the households result in an increase in households' bank deposits. The money stock increases. Commercial banks are compensated with a transfer of FED reserves from the government's FED account.
- As third step, the FED practices quantitative easing. It purchases the bonds from commercial banks and credits the banks' FED account with additional central bank reserves.
- In sum, the government transfers result in an increase of the money stock and an increase of the commercial banks' central bank reserves (monetary base).

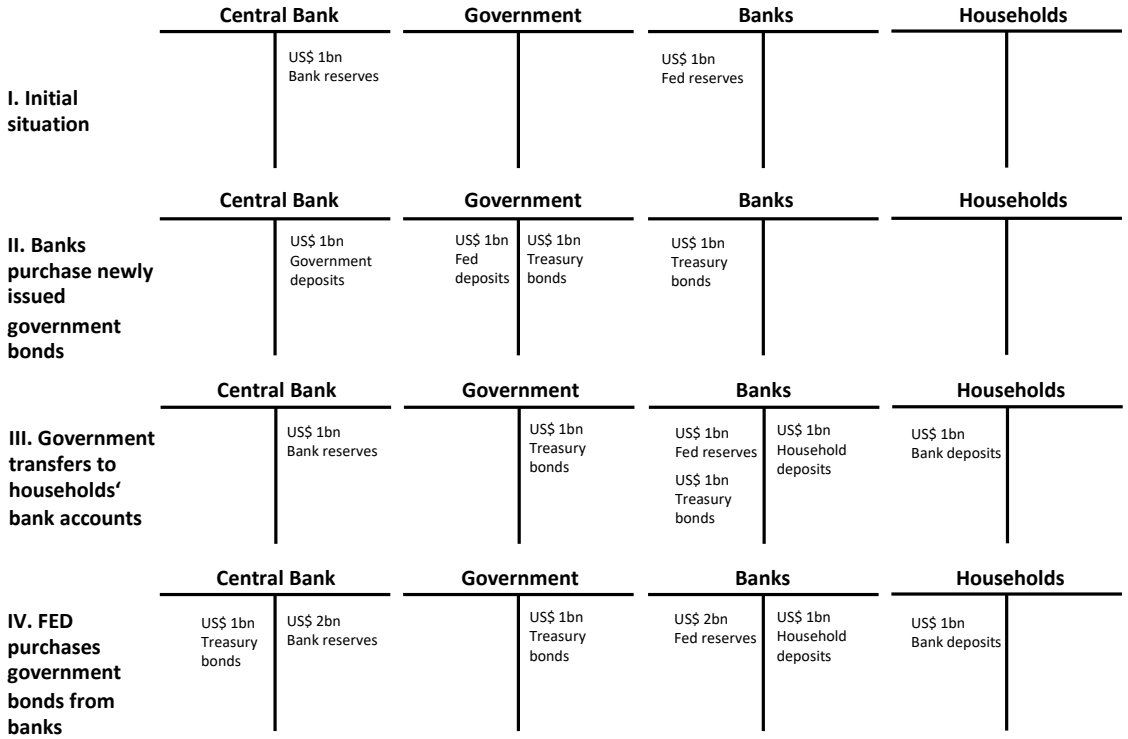

Figure 15: T-accounts on the financing of government deficits

In sum, the effects of central bank financing are not fundamentally different from commercial bank financing. Above all, in both cases the money stock increases by the amount of the government deficit. Thus, in the framework of the IS/MP-model with an upward-sloping MP curve there is again a simultaneous downward shift of the MP curve and an upward shift of the IS curve as shown in figure 14. With a horizontal MP curve, the long-term interest remains constant.

5.1.4 Comparison of the effects

Our analysis shows that the effects of debt financed government expenditures are determined by the way how they are financed. In contrast to the real analysis, one can show that the amount of "funds" within the private sector are not reduced by government deficits. Thus, no quantitative crowding-out takes place (Table 3). In the case of commercial bank financing the money stock even increases. In the case of central bank financing, the money stock and the monetary base increase.

If the central bank targets a short-term rate (MP^{ST}), one cannot exclude that additional government debt leads to a higher interest rate that reduces private investment ("qualitative crowding out"). This effect is more like with capital market financing which shifts the MP curve upwards than with commercial bank and central bank financing. In these cases, the MP curve shifts downwards so that the interest rate could also decline.

But a financial crowding out (quantitative and qualitative) can be ruled out it if the central bank is willing to target a long-term interest rate so that the MP curve becomes horizontal (MP^{LT}). Thus, in the monetary analysis, it is technically possible to remove the financial constraint for the government.

Financing	Money Stock M1	Monetary Base	MP^ST shift	Interest rate	
				MP^ST	MP^LT (horizontal)
Capital market	0	0	upward	+	0
Commercial banks	+	0	downward	+/-	0
Central bank	+	+	downward	+/-	0

Table 3: Summary of effects of public debt depending on financing

5.2 The theory of functional finance

5.2.1 Abba Lerner and MMT

A direct application of the monetary analysis to fiscal policy is the theory of functional finance that goes back to **Abba Lerner**. He argues for a leading role of fiscal policy in safeguarding macroeconomic equilibrium:

> "*The first financial responsibility of the government (since nobody else can undertake that responsibility) is to keep the total rate of spending in the country on goods and services neither greater nor less than that rate which at the current prices would buy all the goods that it is possible to produce. If total spending is allowed to go above this there will be inflation, and if it is allowed to go below this there will be unemployment.*" (Lerner, 1943, p.39)

The central bank plays a secondary role in this economic policy assignment. It has to ensure that that the government is not subject to financial restrictions in its stabilization function:

> "*In applying this first law of Functional Finance, the government may find itself collecting more in taxes than it is spending, or spending more than it collects in taxes. In the former case it can keep the difference in its coffers or use it to repay some of the national debt, and in the latter case it would have to provide the difference by borrowing or printing money.*" (Lerner, 1943, p.40)

In other words, financial constraints are irrelevant for functional finance. However, as the quote from Lerner shows, he is aware of real constraints that can lead to inflation that like unemployment must be prevented by fiscal policy.

In line with Lerner, for MMT the key responsibility of fiscal policy is to ensure full employment. But for **MMT** it is not sufficient that the unemployment rate is low, it requires that workers are able to find jobs with decent working conditions. Thus, the state should provide a "**job guarantee**".

"It is neither an emergency policy nor a substitute for private employment, but would become a permanent complement to private sector employment. A direct job creation program can provide employment at a basic wage for those who cannot otherwise cannot find work. No other programme can guarantee access to jobs at a decent wage." (Mitchell et al., 2019, p.295)

5.2.2 Olivier Blanchard on functional finance

Blanchard describes functional finance in a somewhat different form:

"As monetary policy cannot set the interest rate low enough to match the neutral rate, output is lower than potential. Then, priority must be given to macro stabilization, to an increase in the budget deficit so as to return output to potential."(Blanchard, 2022, Chapter 5, p. 17)

Instead of the dominant role of fiscal policy envisaged by Lerner, Blanchard makes it dependent on the ability of the central bank to stabilize the economy. But he goes even further by arguing that fiscal policy should aim at a real interest rate (r^*) that is higher than the r_{min}, i.e. the rate which is required to achieve full employment at a given IS-curve.

"Thus, what fiscal policy should do is aim for a higher value of r^* say $r^* = r_{min} + x$ to give some room to monetary policy. How large x should be depends on the trade-off between giving more room to monetary policy versus increasing the costs of debt.[...] In effect fiscal policy would set a floor for the neutral rate, standing ready to increase deficits if the neutral rate decreased below $r_{min} + x$." (Blanchard, 2022, Chapter 5, p. 17)

Blanchard assumes that the central bank targets a real policy rate (r) and sets it at the level of the neutral rate. While he does not provide a model or a graphical exposition of this proposal, one can describe it with the IS/PC/MP model (Section 3.2.3) which is designed for a real interest rate. In this model the central bank derives an optimum real interest rate which can be represented with a horizontal MP curve.

The starting point is a situation where the MP curve for the effective real zero lower bound intersects the IS curve at a level of output which is below full employment (A). Thus, the actual output level is at point B. With an expansionary fiscal policy, the IS-curve can be shifted upwards from IS_1 to IS_2 so that full employment can be reached at point C.

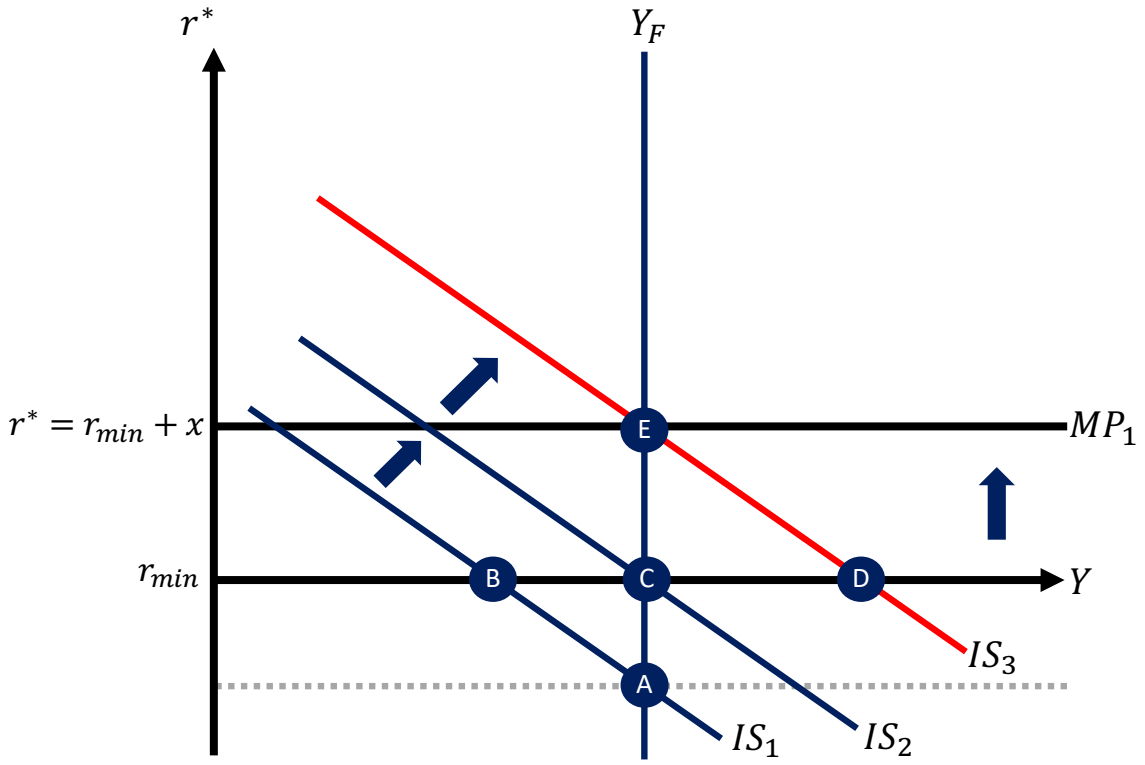

Figure 16: Fiscal policy in the IS/MP model

Blanchard recommends a stronger fiscal impulse in order to achieve a policy rate r^* above r_{min}. This can be reached with an additional stimulus that shifts the IS curve to IS_3. With a constant policy rate, point D would be realized which is above the full employment level. This requires the central bank to increase its policy to $r_{min} + x$ so that point E is reached.

Thus, functional finance, as Blanchard recommends it, is the textbook case for an active fiscal policy in situations of unemployment, especially if the central bank is unable to boost economic activity due to the effective lower bound for the real interest rate. Questionable is his proposal that fiscal policy should set a **floor for the neutral rate** above r_{min}. Blanchard puts it as follows:

> *"Indeed, one of the main conclusions of this book will be that the goal of fiscal policy should be to maintain r^* high enough that the ELB condition is not strictly binding, and possibly higher. If such a fiscal policy is implemented, this would put a floor on how low r^* can be."* (Blanchard, 2022, Chapter 3, p. 19)

Blanchard makes a key point here. If fiscal policy is too restrictive, it can contribute to the IS curve entering a range where full employment can only be achieved at an interest rate below r_{min}. The development in the past decade, which was characterised by a very restrictive fiscal policy, may well have led to such an outcome (Figure 17).

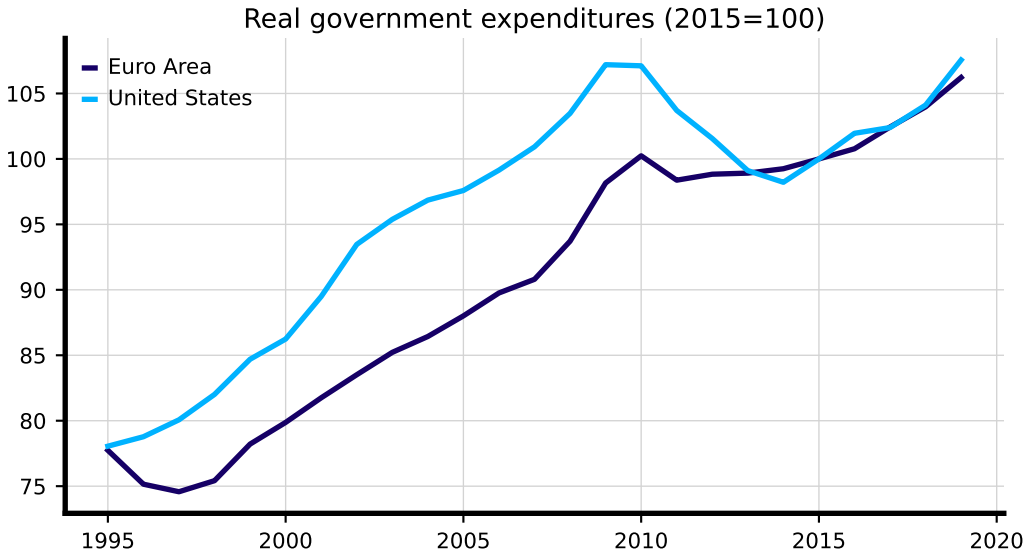

Figure 17: Real government expenditures
Source: FRED and AMECO

But it is questionable whether, conversely, it can make sense to gear fiscal policy to achieving a certain minimum interest rate. The price of this is a crowding-out of private demand, so that it would have to be examined whether the central bank's greater scope for interest rate policy outweighs this disadvantage.

At a more general level, the question also arises as to whether the problem of the effective zero lower bound can be depicted at all with a model that refers to the **real interest rate**. The variable relevant for practical monetary policy is always the nominal interest rate as depicted in this paper in the IS/MP model. If one wants to achieve greater room for manoeuvre for this instrument variable, one should rather think of solutions that lead to a higher inflation rate in the medium term. An example of this would be an inflation target of 4 percent, as brought into the discussion by Blanchard et al. (2010).

5.3 Schumpeterian Finance: The entrepreneurial state

If one equates the real analysis with a full employment situation and the monetary analysis with an underemployment situation, one loses sight of a monetary analysis of fiscal policy in situations with full employment.

The main difference between neoclassical growth models and a monetary model with full employment, is the **absence of a financial crowding-out**. But even an economist as Lerner, who is regarded as a founding father of MMT, is fully aware that a **real crowding-out** is inevitable. He

asks "*whether it is possible by internal borrowing to shift a real burden from the present generation, in the sense of the present economy as a whole, onto a future generation, in the sense of a future economy as a whole.*" (Lerner, 1961, p. 140). And he comes to the clear conclusion "*that the latter is impossible because a project that uses up resources needs the resources at that time that it uses them up and not before or after.*" (Lerner, 1961, p. 140)

But nevertheless, a case for public debt can be made if one gets out of the theoretical straitjacket of the neoclassical model and considers not only the use of debt for consumption but also for public investment. In fact, this perspective is expressed in the **Golden Rule** which plays an important role in the traditional theory of public finance, but is neither considered in MMT nor in Blanchard (2022). According to the Golden Rule, public investment should be financed with public debt.[9] A good description of the Golden Rule can be found in an expertise by the German Council of Economic Experts:

> "*However, this (a permanent public debt) can also be justified to a certain extent from an intergenerational distributional point of view, namely in connection with public investments that increase the wealth of future generations or, mediated by their productivity effects, leave future returns and thus make them "richer." The intergenerational redistributive effect of public debt is a desired outcome here, so that future beneficiaries of today's spending also share in the financing burden. This is the intention behind the "Golden Rule of Fiscal Policy," which allows credit financing of investments.*" (German Council of Economic Experts, 2007, p. 1)[10]

In other words, conceptually the Golden Rule enables the state to invest like a private enterprise but it prevents it from financing government consumption with debt. This entrepreneurial role can be highlighted by a synthesis of Joseph Schumpeter and Mariana Mazzucato:

- **Schumpeter**'s contribution lies in his theory of economic development, which emphasizes not only the absence of a financial (or saving) constraint for investment but also a growth model based on innovation by using existing resources in a different way. In this approach the real resource constraint is broken up by the different usage of existing resources which enables a growth process generating additional resources.
- **Mazzucato**'s contribution lies in her recognition of the importance of government as an investor in fundamental technological leaps that would not be taken by private investors because of their uncertainty.

[9] For MMT there is no need to justify deficits with investment: "*In a normally functioning modern economy, the government runs chronic deficits and the domestic private sector runs surpluses*" (Mitchell et al., 2019, p. 555)

[10] My translation. In German: Auch diese (eine dauerhafte Staatsverschuldung) kann aber in gewissem Umfang unter intergenerativen Verteilungsgesichtspunkten gerechtfertigt sein, nämlich im Zusammenhang mit öffentlichen Investitionen, die das Vermögen kommender Generationen erhöhen oder, vermittelt über ihre Produktivitätseffekte, künftige Erträge hinterlassen und diese somit „reicher" machen. Die intergenerative Umverteilungswirkung der Staatsschuld ist hier ein gewünschtes Ergebnis, um auch die künftigen Nutznießer der heutigen Ausgaben an den Finanzierungslasten zu beteiligen. Dies ist die Intention hinter der „Goldenen Regel der Finanzpolitik", die eine Kreditfinanzierung von Investitionen zulässt. (German Council of Economic Experts, 2007, p. 1)

The synthesis of Schumpeter's Entrepreneur and Mazzucato's innovating state is the "Entrepreneurial State". This is also the title of Mazzucato's groundbreaking book.

5.3.1 Schumpeter's growth theory

Schumpeter's growth theory is the counterpart of the neoclassical growth theory. For the latter, growth consists in an accumulation of the unit good with an invariant production function, in which ever larger quantities of the unit good are produced. Schumpeter sees economic development as technological progress, i.e. "*different employment of existing services*", with the aim of "*carrying out new combinations*".

The starting point for Schumpeter's development model is a situation corresponding to an equilibrium state of the economy. Schumpeter speaks of a "***circular flow**, running on in channels essentially the same year after year - similar to the circulation of the blood in an animal organism*" (Schumpeter, 1934, p. 52). In this state, which corresponds to the Walrasian equilibrium model, all resources are fully utilized.

The distinctive feature of Schumpeter's theory of economic development is its *"revolutionary"* (Schumpeter, 1934, p. 53) character:

> *"Development in our sense is a distinct phenomenon, entirely foreign to what may be observed in the circular flow or in the tendency towards equilibrium. It is spontaneous and discontinuous change in the channels of the flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing. Our theory of development is nothing but a treatment of this phenomenon and the processes incident to it"* (Schumpeter, 1934, p. 54).

Unlike in real analysis, the innovative activity of the entrepreneur is not limited by the ongoing saving activity of private households. Rather, banks can create credit and thus purchasing power for the entrepreneur out of thin air. The entrepreneur thus gains access to the real resources of the economy before having them opened them up through own economic activity.

Schumpeter is aware of the fact that there must be no financial crowding out in this process, but certainly a real crowding out. He therefore speaks of "**credit inflation**". According to the logic of the quantity theory, for a given stock of labor and land (these are the resources Schumpeter has in mind), the higher money supply must lead to inflation. Schumpeter differentiates between credit for consumption and credit for investment. Whereas in the case of consumptive use of credit the

imbalance between higher money supply and given resources is of a permanent nature, in the case of successful investment projects the higher money supply ends up with a higher supply of goods.

> "*After completing his business — in our conception, therefore, after a period at the end of which his products are on the market and his productive goods used up — he has, if everything has gone according to expectations, enriched the social stream with goods whose total price is greater than the credit received and than the total price of the goods directly and indirectly used up by him. Hence the equivalence between the money and commodity streams is more than restored, the credit inflation more than eliminated, the effect upon prices more than compensated for there is no credit inflation at all in this case — rather deflation — but only a non-synchronous appearance of purchasing power and of the commodities corresponding to it, which temporarily produces the semblance of inflation.*" (Schumpeter, 1934, p. 96–97)

While Schumpeter discusses the **real crowding-out** caused by private investment, the effects are identical if the government raises funds for investment in a full employment situation. This aspect was discussed in the 1950s and 1960s e.g. by Brownlee and Allen (1954, p. 126):

> "*The public project is paid for while it is being constructed in the sense that other alternative uses for these resources must be sacrificed during this period.*"

One can describe the Schumpeterian growth process with the IS/PC/MP model presented in section 3.2.3. Graphically the model can be presented by combining the IS/MP diagram with a Phillips curve diagram, where the output level determines the inflation rate. We start with an equilibrium situation (A) where the output is at the full employment level, i.e., the output gap is zero, and the inflation rate is equal to the inflation target. This situation is characterized by the minimum welfare loss of zero in the macroeconomic loss function.

If additional purchasing power is provided to an entrepreneur or to the government from the banking system, aggregate demand increases, and the IS curve shifts upwards from IS_0 to IS_1. In the Phillips curve diagram, the higher output level leads to an inflation rate π_1 which is above the equilibrium inflation rate π_0. If the central bank reacts immediately to the increase in inflation and raises the interest rate to r_2^* the Schumpeterian process is stopped.

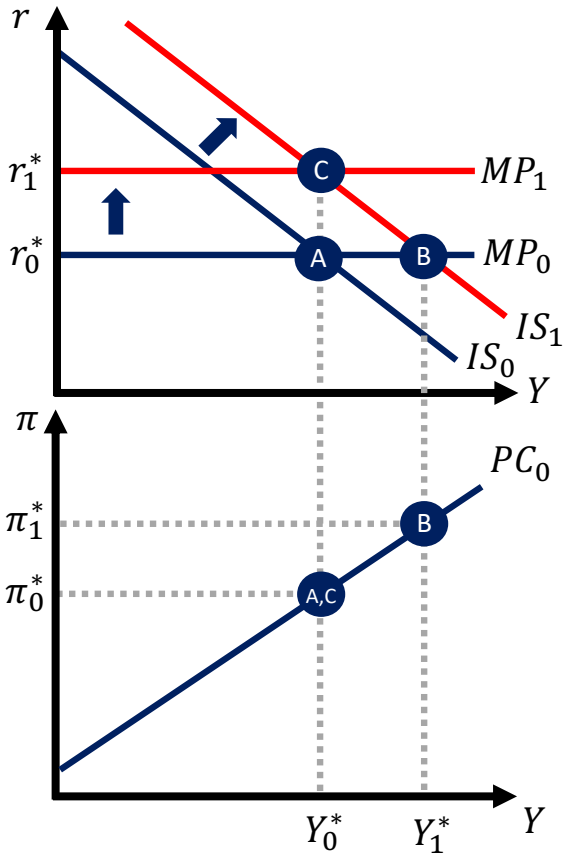

Figure 18: Fiscal and monetary policy in the IS/PC/MP model

Therefore, a dynamic process can only unfold if the central bank is willing to accept a **temporary deviation of the inflation rate** from the inflation target. In its new monetary policy strategy, the ECB has declared the medium-term orientation of its strategy and a willingness to accept such deviations under specific conditions:

> *"The Governing Council confirms the medium-term orientation of its monetary policy strategy. This allows for inevitable short-term deviations of inflation from the target, as well as lags and uncertainty in the transmission of monetary policy to the economy and to inflation. The flexibility of the medium-term orientation takes into account that the appropriate monetary policy response to a deviation of inflation from the target is context-specific and depends on the origin, magnitude and persistence of the deviation. It also allows the Governing Council in its monetary policy decisions to cater for other considerations relevant to the pursuit of price stability."*(European Central Bank, 2021)

In a similar way, Jerome Powell (2020, p. 12), the President of the Federal Reserve declared in 2020:

> *"(. . .) our new statement indicates that we will seek to achieve inflation that averages 2 percent over time. Therefore, following periods when inflation has been running below 2 percent,*

appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time. In seeking to achieve inflation that averages 2 percent over time, we are not tying ourselves to a particular mathematical formula that defines the average. Thus, our approach could be viewed as a flexible form of average inflation targeting. Our decisions about appropriate monetary policy will continue to reflect a broad array of considerations and will not be dictated by any formula."

With such a **flexible inflation targeting**, there is scope for a Schumpeterian development process which requires a temporary deviation of inflation from the inflation target. The increase in aggregate demand leads to an increase of the inflation rate from π_0 to π_1. If the growth process is successful and *"enriched the social stream with goods whose total price is greater (...) than the price of the goods directly or indirectly used up"* (Schumpeter, 1934, p. 96) by the investor, the potential output of the economy increases so that the full employment output shifts from Y_1^* to Y_2^*. Thus, the positive output-gap vanishes. As the Phillips-curve is defined for the output gap, it shifts downwards from PC_1 to PC_2 and the inflation rate declines to the inflation target.

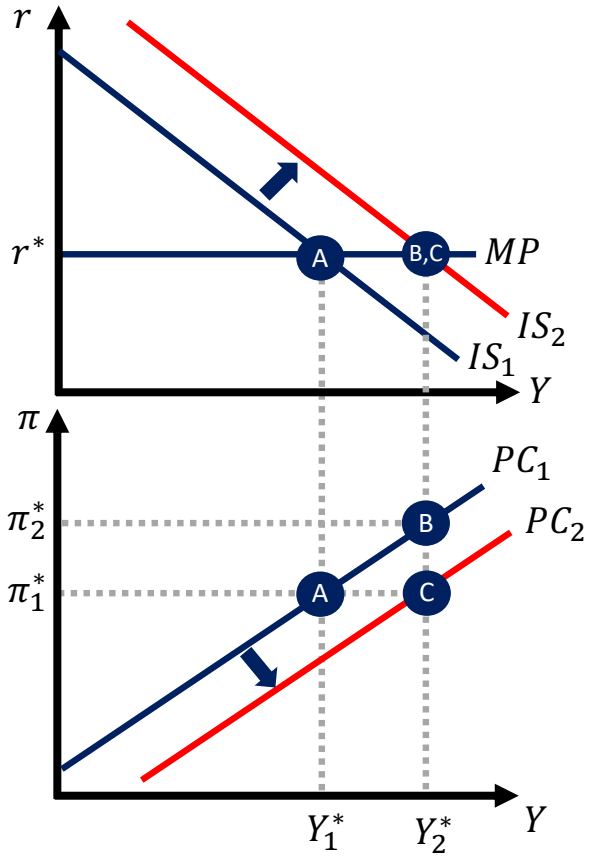

Figure 19: Fiscal policy in the IS/PC/MP model

The Schumpeterian growth model provides an important insight for fiscal policy and public debt. It argues that the real resource constraint which characterizes full employment situations should

not be regarded as a hinderance for debt-financed public investments as long as they contribute to an increase of the production potential. The temporary inflationary pressure that is caused by an increase in aggregate demand is an inevitable by-product of such a process, but it will vanish by itself as soon as the positive growth effects of the investment materialize. The growth model also has the important lesson for monetary policy that it requires a medium-term orientation in order not to suffocate such processes. Fortunately, the ECB and the FED have already adopted medium-term monetary policy strategies.

Thus, the Schumpeterian growth model fills the analytical gap that exists in the literature on public debt which has a "real analysis" approach for full employment situations ("pure public finance" in Blanchard (2022)) and a "monetary analysis" approach for unemployment situations ("functional finance" in (Blanchard, 2022)). The Schumpeterian model provides a "monetary analysis" for full employment situations.

5.3.2 "The entrepreneurial state"

The focus of Schumpeter's growth theory is on the interplay between private banks and private investors with a dominant role of the banker. As the focus of this paper is on fiscal policy, we discuss the role of the state either as investor or as financial supporter of private investments. The innovative role of the state in a Schumpeterian growth process has been intensively discussed in the literature on industrial policy which was stimulated above all by Mariana Mazzucato (2013).

The essence of **industrial policy** can be found in John Maynard Keynes (1926) where he pointed out that it is not a matter of the state doing things that the private sector is already doing and then doing them somewhat better or worse. Rather, he said, it is a matter of doing the things that private parties are not currently doing at all. There are three main arguments that can justify the activity of state as an entrepreneur (Mazzucato & Wray, 2015):

- "**Uncertainty**" in the sense of Knight (1921), which differs from "**risk**" in that no probability distribution for the possible outcomes is known,
- **Network effects and externalities**, which require coordinated action by private and government actors,
- **Path dependencies**, which result from high fixed costs and the long lifetime of investments, especially in the energy sector.

In addition, from a **strategic point of view**, industrial and innovation policy action may also be warranted if other economically significant countries are pursuing active industrial policies that

may lead to disadvantages for domestic suppliers in global competition.

The **problem of uncertainty** or at least very high risks can lead private actors to refrain from making innovative investments, even though they do not fundamentally view them negatively in terms of their earnings potential. This situation is often subsumed under the term "capital market failure" (Chang, Andreoni, & Kuan, 2013).

In retrospect, it can be stated that due to such uncertainty, neither the industrial use of nuclear energy nor the widespread use of renewable energies would have occurred without massive government support. Relying on the "*decentralized knowledge and individual actions*"(German Council of Economic Experts, 2018, p. 59) of market actors would not have gotten far here. Rather, it was crucial that policymakers establish" *protected markets*" (Bergek & Jacobsson, 2010, p. 23) that make it attractive for suppliers to make appropriate investments. This is then a prerequisite for economies of scale to emerge, which, as the example of solar energy illustrates, lead to an impressive drop in costs and widespread adoption.

The **problem of coordination** arises from the fact that innovations are less and less about isolated technologies and industries. Rather, most modern technologies involve systems and entire value chains. They are characterized by interdependencies between several industries, which in the process develop advanced materials and components, manufacturing systems and entire service systems (Keller & Block, 2013; Tassey, 2010). For example, electromobility is not just about the automobile, but also about the charging infrastructure, the energy supply networks required for it, mobility services ("car sharing"), autonomous driving, battery cells (or other forms of propulsion), the raw materials required for it, and intelligent traffic control.

Innovation processes are therefore highly interdependent and exhibit pronounced positive externalities that cannot be adequately taken into account by individual companies in their innovation decisions. Conducive to innovation are therefore "industrial commons," by which Pisano and Shih (2009) mean spatially concentrated collective research, engineering, and industrial production capabilities that drive innovation.

The **problem of path dependence** is seen by Aghion, Boulanger, and Cohen (2011) as the fact that firms tend to stick to existing technologies because of externalities of fundamental innovations. This, they argue, particularly favors an adherence to "dirty technologies." The authors substantiate this with a study showing a positive correlation between innovations in "clean" technologies and a company's existing patents in this area, and a negative correlation for the stock of patents in "dirty" technologies. The comparatively low efforts of German automotive companies in the past decade

to develop innovative propulsion technologies can serve as anecdotal evidence in this regard, as can the long adherence of German energy utilities to conventional energy sources.

Path dependency has proved particularly disadvantageous in competition with China. Since it was hardly possible for Chinese companies to catch up with German manufacturers in combustion engines, it was obvious for them to largely skip this stage of development. This is confirmed by the strong technological position China now holds in the field of electromobility (Ni, 2018).

A study by Block and Keller (2011) provides evidence for the important role of the US government as an enabler of innovation:

> *"Our data set provides evidence of three interrelated changes in the U.S. economy over the past generation. These are the declining centrality of the largest corporations to the innovation process in the U.S., the growing importance of inter-organizational collaboration and small startup firms in the innovation process, and the expanded role of public sector institutions as both participants in and funders of the innovation process."*(Block & Keller, 2011, p. 19)

Mazzucato and Wray (2015) come to a similar conclusion:

> *"Such mission-oriented investments, like putting a man on the moon or fighting climate change, are not driven by the need to simply "fix" market failures, but are more about shaping and creating new markets. Through these kinds of mission-oriented investments, the state has led in the development of key "General Purpose Technologies" (Lipsey et al. 2005; Bresnahan 2010) such as the US mass production system, aviation technologies, space technologies, information technology, internet technologies, and nuclear power."* (Mazzucato & Wray, 2015, p. 29)

5.3.3 China: The entrepreneurial state in action

Successful examples of the Schumpeterian growth model include China and some other Asian countries (Cherif & Hasanov, 2019). The economic development in these countries shows that industrial policy is able to promote innovative technologies in such a way that the domestic companies could thereby achieve a leading position on the world markets. For this process, it is crucial not to rely on existing comparative cost advantages, but to target new comparative cost advantages.

Naughton (2021, p. 121) describes three channels through which private investors have been encouraged by the state in China:

- *"Government provides free, patient capital as the initial investor in the funds (. . .). Government waits patiently, its investment making an implicit zero return, thus essentially providing interest-free loans to the investment."*

- *"Government sponsorship is used to attract low-interest loans to complement direct investment."*
- *"Government provide explicit and implicit guarantees for investments."*

One example of successful Chinese industrial policy is the development and production of **solar cells**, where China has succeeded in becoming the world's largest manufacturer in a short time. Globally, the top three suppliers of solar panels now come from China, which produced about two-thirds of the world's output from 2010 to 2015 (Sanderson, 2018). The rapid development in this capital-intensive sector cannot be explained from the conventional perspective of comparative cost advantages. Rather, Gang (2015) sees it as a success of state capitalism in the form of a common East Asian development model in which states play a significant and sometimes decisive role in industrialization and market creation. In China, subsidies in solar cell development and production included interest-free or low-interest loans, tax incentives, research grants, low-cost land, energy subsidies, and technological, infrastructure, and personnel support (Gang, 2015).

The strong support of the Chinese growth process by the financial system is reflected in the continuously **high growth rates of bank credits** to the private non-financial sector. It by far exceeds the growth rates in other emerging market economies (Figure 20). As all important banks in China are still majority owned by the state (Naughton, 2021), we see an interesting hybrid of Schumpeter's banker and Mazzucato's entrepreneurial state.

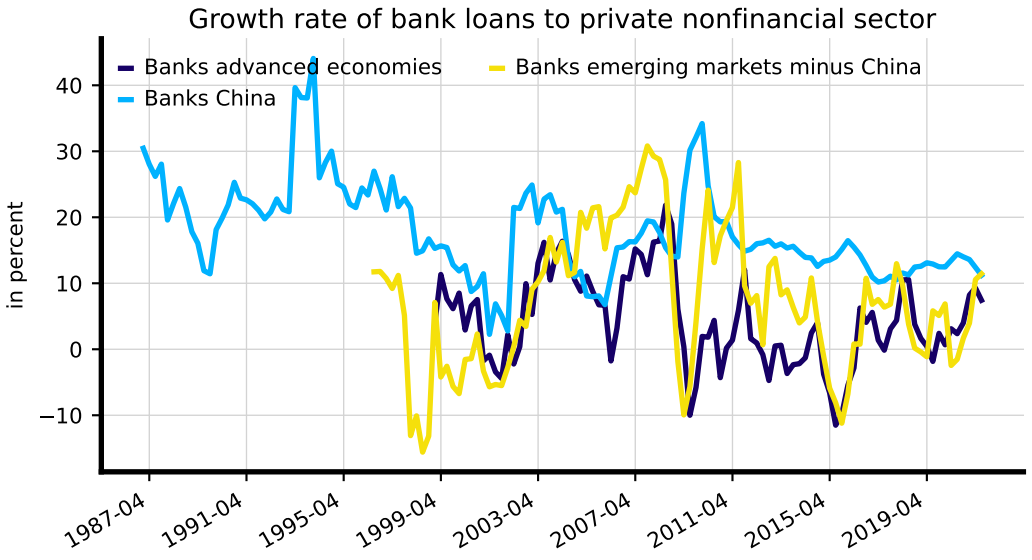

Figure 20: Growth rate of bank loans.
Source: BIS

But the Chinese growth process does not only rely on bank loans to the private non-financial sector. The **public sector** is also heavily making use of debt financing. While the official deficit of the

Chinese government has been relatively low in international comparison, the local governments show very high fiscal imbalances. This is illustrated by IMF annual Article 4 reports for China which provide data for an **augmented net lending/borrowing** of the public sector. This item includes infrastructure spending financed by local government financing vehicles and the spending of special construction funds and government guided funds is included. The data show that the augmented net lending of the provincial governments has reached double digit figures in the last few years.

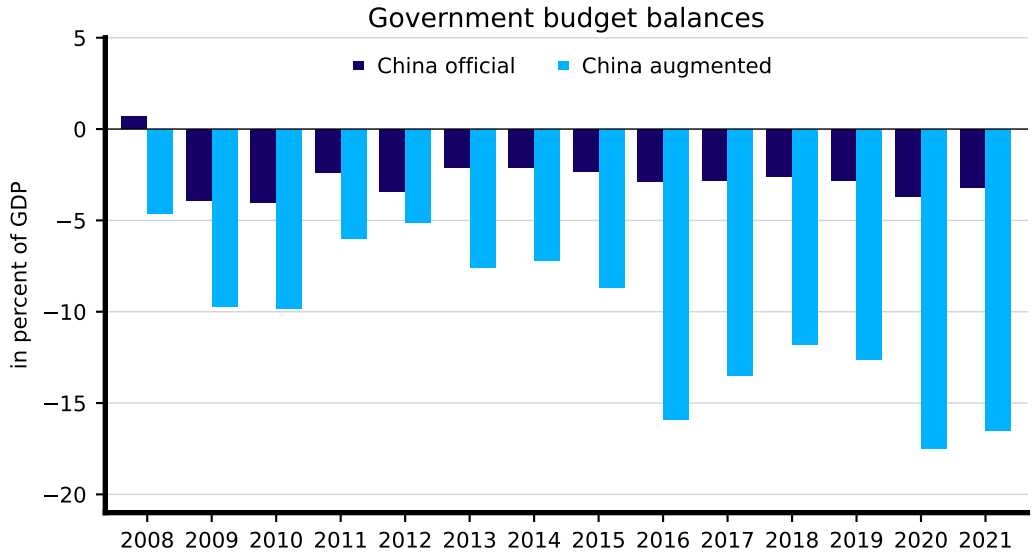

Figure 21: Government budget balances.
Source: IMF, based on IMF annual Article 4 reports for China (various years)

As Naughton (2021, p. 112) shows, provincial but even more so municipal local governments play a crucial role in the development process. A relatively new, but important instrument are the so-called "Industrial Guidance Funds". They can be described as follows:

> *"The government sets up a platform; central SOEs serve as sponsors; the [state] banks come in close behind; and social capital will follow."* (Chen (2015) quoted in Naughton (2021, p. 106)).

According to data from Naughton the size of these funds is impressive. The amount of 10.32 trillion RMB is approximately equal to 1.5 trillion USD. Almost two thirds are held by provincial and municipal governments.

	Trillion RMB	Percent
National/Central	1.96	19%
Provincial	3.3	32%
Municipal	3.72	36%
County	1.34	13%
Total	10.32	100%

Table 4: Value of Industrial Guidance Funds (2020)
Source: Naughton (2021, p. 107)

The danger of boosting economic development with strong credit growth is **inflation**. In fact, in China in the 1980s and 1990s the strong financial stimulus led to double-digit inflation rates. But in the last two decades the Chinese authorities had been able to keep inflation well under control. This indicates that it is possible to initiate innovative processes which require *"employing existing resources in a different way"* (Schumpeter, 1934, p. 57) without generating inflationary processes.

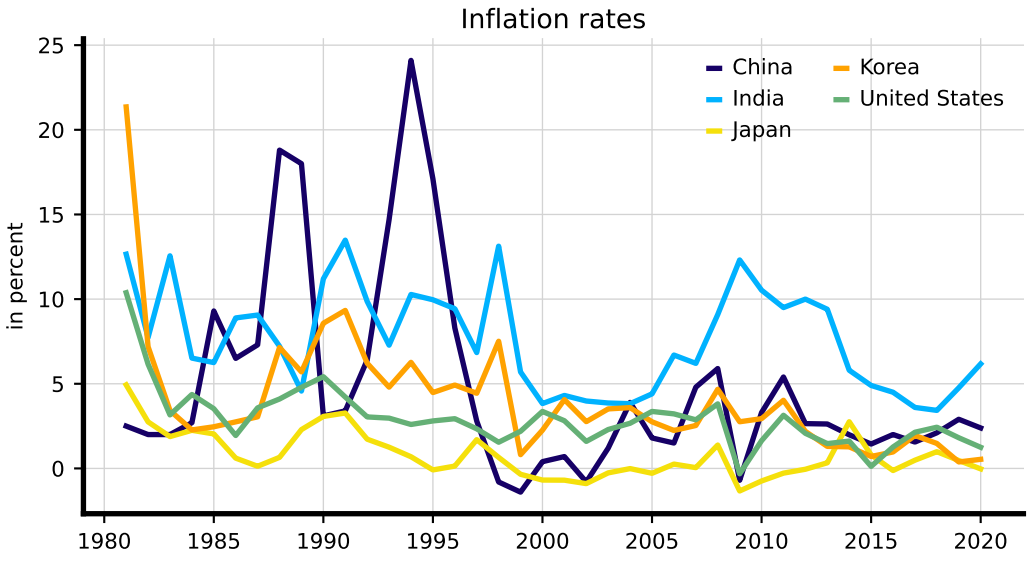

Figure 22: Inflation.
Source: IMF

Overall, the development process in China comes very close to the Schumpeterian growth model, if one sees the banker not as private but as public institution. A very comprehensive analysis of the Chinese growth model and its Schumpeterian features can be found in Herr (2010) and Burlamaqui (2020) who comes to the conclusion:

> "[...], *from a Schumpeterian (rekindled) perspective, the Chinese entrepreuneurial state encompassed the functions of Ephor, Entrepreneur-in-Chief and policy coordinator*"(Burlamaqui, 2020, p. 14)

6 What is the optimal level of government debt?

So far, while we have discussed the topic of "public debt", we have always addressed it from a flow perspective. In the neoclassical and Keynesian models, "debt" is always a flow concept, while the absolute level of public debt is of no relevance. But of course, the stock perspective, i.e. the question of the optimal or maximum level of government debt, is equally important.

6.1 Limited theoretical and empirical knowledge

While there is an intensive public and political debate on the level of public debt, there are comparatively few theoretical and empirical studies on this topic. The attempt by Reinhart and Rogoff (2010) to derive an upper limit of 90% had received a lot of public attention as it was heavily criticized (Herndon, Ash, & Pollin, 2014). A paper by leading German fiscal policy experts, Holtfrerich et al. (2015), argues that the negative correlation between debt and growth beyond the 90% threshold is based on individual observations for the years after the end of the Second World War. Therefore, the limited knowledge about an optimum debt level is also reflected in the paper of this institution:

> "*Certain thresholds above which negative effects of government debt on economic growth occur cannot be identified. Moreover, the causal relationship is unclear whether high public debt affects growth or, conversely, whether low or negative growth causes high public debt.*"Holtfrerich et al. (2015, p.10)[11]

Blanchard discusses the question of the optimal level of government debt from the perspective of sustainability. But he admits that "*assessing debt sustainability is as much an art as a science*" (Blanchard, 2022, Chapter 4, p. 12). In his considerations, the **default risk** plays an important role, which in his view would speak for very low debt levels.

> "*The question becomes: How low is low enough. Based on ongoing work* [...], *the conclusion is: Very low.*" (Blanchard, 2022, Chapter 4, p. 25)

For the sustainability of public debt, the relationship between real economic growth (g) and the real interest rate (r) is of central importance. The development of the debt ratio (d), i.e., debt to GDP, is determined by this differential and the primary surplus (s):

$$\Delta d_t = -s_t + \frac{(r-g)}{(1+g)} d_{t-1}$$

[11] Original in German: „*Bestimmte Schwellenwerte, ab denen negative Auswirkungen der Staatsverschuldung auf das Wirtschaftswachstum eintreten, lassen sich nicht feststellen. Außerdem ist der Kausalzusammenhang unklar, ob nämlich die hohe Staatsverschuldung das Wachstum beeinträchtigt oder umgekehrt das geringe oder negative Wachstum die hohe Staatsverschuldung verursacht.*" Holtfrerich et al. (2015, p.10)

As Blanchard (2022, Chapter 4, p. 2) notes, in the case when g exceeds r, countries can run primary deficits without increasing the debt ratio or "*governments appear to have infinite fiscal space...*".

As debt sustainability depends on the relation between r and g, the definition and determination of r is of decisive importance: Is the real interest rate a variable that must be passively accepted by fiscal policy or is it possible to control it with the help of monetary policy in such a way that it does not affect the sustainability of fiscal policy?

As already mentioned, for the **real analysis**, the real interest is a variable that is determined by saving and investment, which in this paradigm are affected by real variables only: time preference of households, productivity, demographics. Monetary factors have no influence on r. Lane (2019) puts it as follows:

> "*Taking monetary policy first, it is important to recognise that the primary determinants of long-term equilibrium real rates are non-monetary in nature: potential growth rates; demographics; risk preferences in portfolios.*"

Thus, within the theoretical framework of the real analysis, the relation of r and g is determined by real factors (demographics, time preferences, productivity) that provide an outside constraint for the fiscal space of governments.

As already mentioned Schumpeter as an adherent of the monetary analysis dismisses the concept of a physical real interest rate (Schumpeter, 1939, p. 128). In fact, the concept of a physical real interest rate is difficult to image outside the **one-asset model** of the real analysis. In a corn economy, one can calculate the real interest rate by relating the output of corn to the input of corn. But already in a two-asset world, the inputs and outputs must be homogenous by translating them into monetary variables. This point has been made already by Myrdal (1932, p. 392):

> "*The notion of physical productivity, however, presupposes that there is only one factor of production (besides waiting) and only one product and, moreover, that both are of the same physical quality.*"

Myrdal (1932, p. 402) goes so far to argue in relation to Wicksell's natural interest rate:

> "[...] *his 'natural interest', thought of as a physical marginal productivity, is a concept that does not belong to this world at all.*"[12]

In sum, in the monetary analysis is no room for a physical interest rate that is independent from monetary policy. If the interest is considered a purely monetary phenomenon, the relation of r and

[12]The original is in German: "*denn sein "natürlicher Zins", gedacht als eine physische Grenzproduktivität ist ja ein Begriff der überhaupt nicht dieser Welt angehört.*"

g no longer constitutes a completely exogenous constraint for the fiscal space of a government.

6.2 Yield curve control

These theoretical considerations have found their way into practical monetary policy already a long time ago in the form of a strategy of yield curve control. John Maynard Keynes wrote in the "Treatise on Money":

> "*It should not be beyond the power of a Central Bank (international complications apart) to bring down the long-term market rate of interest to any figure at which it is itself prepared to buy long-term securities.*" (Keynes, 1930, p. 371)

In the General Theory, Keynes went even further:

> "[A] *complex offer by the central bank to buy and sell at stated prices gilt-edged bonds of all maturities, in place of the single bank rate for short-term bills, is the most important practical improvement which can be made in the technique of monetary management.*" (Keynes, 1936, p. 206)

Yield curve control was practiced for the first time in the **United States** from April 1942 to March 1951 (Kliesen & Bokun, 2020; Rose, 2021). In order to keep the borrowing costs for the government low, the Fed capped yields at 0.375% for short-term rates and at 2.5% for long-term rates (25 years and longer). As the inflation rate increased rapidly in winter 1950/51 yield curve control was stopped, against the declared will of the government, by the Treasury-Fed Accord in March 1951.

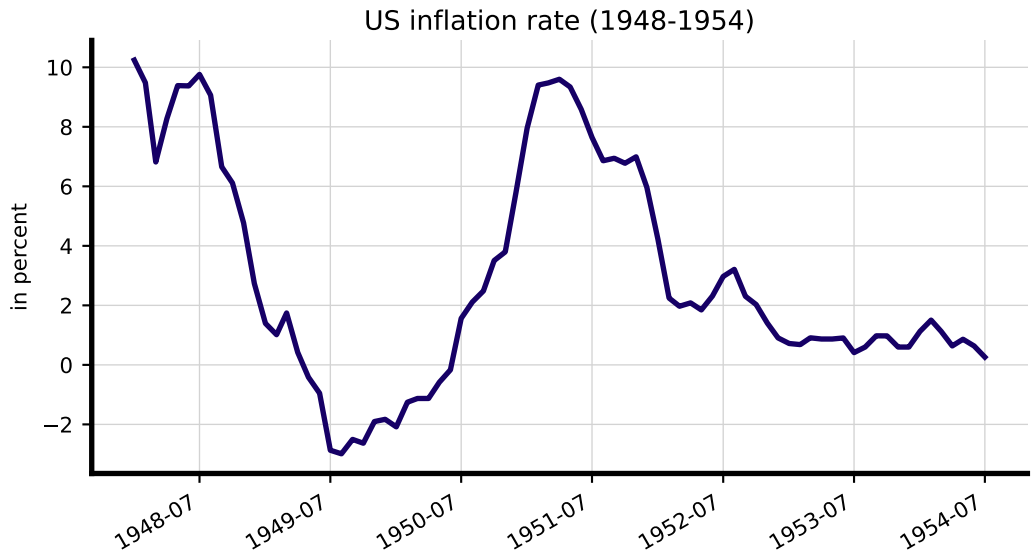

Figure 23: US Inflation rate (1948-1954).
Source: Federal Reserve Bank of St. Louis

In **Japan**, the Bank of Japan (2016) announced YCC in September 2016:

> *"The guideline for market operations specifies a short-term policy interest rate and a target level of a long-term interest rate.*[...]
>
> *The short-term policy interest rate: The Bank will apply a negative interest rate of minus 0.1 percent to the Policy-Rate Balances in current accounts held by financial institutions at the Bank.*
>
> *The long-term interest rate: The Bank will purchase Japanese government bonds (JGBs) so that 10-year JGB yields will remain more or less at the current level (around zero percent)."*

The Bank of Japan has continued YCC until today and defended the target rates with sometimes very high interventions.

An early assessment of the Japanese YCC by economists from Columbia University (Brichetti et al., 2018) under the guidance of Richard Clarida came to a rather positive assessment:

> *"In this paper, we argue that YCC can bring about several benefits to the Fed. YCC would allow the Fed to target interest rates on Treasury securities closer to the level which the Fed considers appropriate given the prevailing economic conditions. With clear communication of interest rate targets and the credibility of the Fed's operations, YCC could allow the Fed to lower the magnitude of asset purchases required to keep the interest rates close to the target.* [...] *On the other hand, there are also potential risks around YCC. There could be a large increase in the size of the Fed's balance sheet, which might cause the Fed to lose control of its balance sheet. In addition, interest rate targeting under YCC could amplify macroeconomic shocks. Finally,*

exiting from YCC might be associated with large capital losses. In order to mitigate these risks, a Fed-sponsored YCC would require skillful communication and high credibility amongst market participants." Brichetti et al. (2018, p. 10)

Higgins and Klitgaard (2020), economists at the Federal Reserve Bank of New York, made the following assessment:

"*Under the new policy, the BoJ has been able to exert fairly close control over the term structure of interest rates without resorting to large-scale interventions in the JGB market. Investors accept that the Bank can buy whatever quantity of JGBs is needed to keep yields from rising and, as a result, it has not had to buy many at all.*"

A positive assessment can also be found in the paper by Hattori and Yoshida (2021). Blanchard (2022) discusses three episodes where fiscal policy played or plays a major role. Under the heading "Just right" he presents Japan as "a qualified success", but without mentioning YCC:

"*Japanese macroeconomic policy is often characterized as a failure, with the central bank unable to achieve its inflation target, a low growth rate, and debt ratios steadily rising to reach more than 170% for net debt and 250% for gross debt. I think it should be seen instead as a qualified success, with the use of aggressive fiscal and monetary policies to compensate for very weak private demand: Output has remained close to potential.*" (Blanchard, 2022, Chapter 1, p. 11)

The **Federal Reserve Bank of Australia** started YCC in March 2020 with aim of maintaining the yield on 3-year Australian bonds at a target of 0.25 percent. In November 2020, the target rate was reduced to 0.10 percent. In November 2021, the target was suspended. In retrospect, the central bank came to the assessment, that "*the yield target has been effective and has supported the recovery of the Australian economy.*" (Lowe, 2021, p.2). It helped to directly anchor the short end of the yield curve and reinforced the bank's forward guidance that the cash rate was very unlikely to be increased for three years, which at the time ran until March 2023.

Thus, at least from a technical perspective, the historical experience shows that central banks are able to control longer-term interest directly for a prolonged period of time. In fact, the ECB seems already close to such a monetary approach to long-term interest rates. In an interview with the Financial Times in March 2021, the ECB's chief economist, Philip Lane, said:

"[O]*ur objective is basically to make sure that yield curves—which play an important role in determining overall financing conditions—do not move ahead of the economy. Because, as you know, financial markets are very forward-looking and you can have a steepening in yield curves which is not conducive to maintaining progress in terms of the inflation dynamic. It is really a shift in monetary policy away from focusing on just the short-term rate by looking at all*

*financing conditions. For many economic decisions, especially under the conditions we have now, the longer end also matters."*Lane (2021)

In a recent interview, Isabel Schnabel (2022); Member of the Executive Board of the ECB, stated:

"*We will decisively counter any sudden jumps in yields that have no fundamental justification.*"

With its new "Transmission Protection Instrument" the ECB goes now even further. By managing the spreads of the yields of government bonds it opens the possibility to target the yield curve even for individual member states (European Central Bank, 2022).

6.3 Does the default risk limit the central bank's ability to control the interest rate?

Blanchard comes to a more skeptical assessment of the central banks' ability to control longer-term interest rates, especially "*if changes in fundamentals were to put debt sustainability in doubt*". (Blanchard, 2022, Chapter 4, p. 30) In his reasoning, the risks of "sudden stops" and of default play a dominant role.[13]

But is the default risk a general risk for fiscal policy? It depends on the currency denomination of government debt. Governments that are **indebted in their national currency** are not exposed to a default risk, as the central bank can always purchase new government bonds so that government is in a position to redeem maturing bonds. This is the main insight of Modern Monetary Theory (Mitchell, Wray, & Watts, 2016). The risk for investors is therefore not a default risk, but the risk of inflation and the risk of changes in interest rates if they want to sell bonds before maturity.

The situation is different for emerging market economies where government debt is often denominated in a foreign currency ("**original sin**") and for the member states of the **European Monetary Union** where debt is denominated in the common currency and where the national central banks are not able to purchase national government bonds without the permission of the ECB.

Thus, for large currency areas like the United States, Japan, China or the United Kingdom, default risk is not a limitation for the central banks' ability to target the yield curve. For the Euro Area the default risk can be mitigated if the ECB is willing to support a member state within the framework

[13] "*Now take the case of a deterioration of fundamentals, which leads investors to ask for a risk premium and therefore a higher interest rate even under the good equilibrium. In this case, it is not obvious that the central bank, were it to want to do so, will be able to decrease the risk premium.* [...] *In contrast to private investors, the central bank is part of the consolidated government. When it buys government bonds, it pays for them by issuing central bank liabilities. These days, these liabilities typically take the form of central bank reserves at the central bank which pay interest and are held by banks. Thus, looking at the balance sheet of the consolidated government (central government plus central bank), what happens is a change in the composition of its liabilities, fewer bonds and more central bank reserves, but no change in its overall liabilities. Thus, if investors worried about default risk, they have no reason to worry less than they did before the intervention.*"(Blanchard, 2022, Chapter 4, p. 28–29)

of the outright monetary transactions. Mario Draghi's forceful intervention on 26 July 2012 ("*whatever it takes*", Draghi (2012)), which is also quoted by Blanchard, is an impressive example for the ability to change bad equilibria into good equilibria. The specific challenges of the euro area will be discussed in the following section.

In sum, the experience shows that there is no need for large currency areas to expose their long-term interest rates to the pressures of "**market discipline**".[14] While some economists might regret this, the performance of market discipline on the macroeconomic level has not been convincing. It was well described by the so-called Delors-Report (Delors Committee, 1989, p. 20):

> "*Rather than leading to a gradual adaptation of borrowing costs, market views about the creditworthiness of official borrowers tend to change abruptly and result in the closure of access to market financing. The constraints imposed by market forces might either be too slow and weak or too sudden and disruptive.*"

6.4 The risk of fiscal dominance

The technical ability of central banks to control the entire term structure on the capital market does not mean that the relation between r and g is no longer a limitation for the sustainability of government debt. It implies that there are no financial constraints set by the capital market, but the real resource constraint must always be respected.

In simplified terms, the long-term real monetary interest rate can be equated with the optimum real interest rate used in the IS/PC/MP model (section 3.2.3). This interest rate represents the central lever with which the central bank responds to macroeconomic supply and demand shocks. Thus, the optimum interest rate is determined by the macroeconomic situation.

If instead the central bank were to orient the real interest rate unilaterally to the goal of debt sustainability, it would no longer be able to respond appropriately to such shocks. In the event of supply or demand shocks that push up the inflation rate, inflation expectations that are no longer anchored could then lead to a dangerous vicious circle. If macroeconomic stabilization requirements were subordinated to the objective of low interest rates for government bonds, the problematic constellation of **fiscal dominance** would exist. This, once again, shows that monetary analysis only implies the lack of financial restraint for the state and the central bank. It does not imply the lack of a real constraint.

[14] Holtfrerich et al. (2015, p. 39) see this differently:„*Die Zinssätze für sichere Anlagen werden auf dem Weltkapitalmarkt gebildet. Ein einzelner Fiskus hat nur einen geringen Einfluss auf sie.*" (Interest rates for safe investments are formed on the world capital market. An individual treasury has little influence on them.)

Nevertheless, a long-term real interest rate geared to the goal of macroeconomic stabilization represents a paradigm shift from the view that interest rate formation on the capital market should be left to private investors and the "market discipline" they exercise. Specifically, yield curve control can prevent movements in long-term interest rates that go beyond what is necessary for macroeconomic stabilization.

Thus, debt sustainability which crucially depends on the relation between r and g is not determined by financial markets but by the central bank which must prioritize macroeconomic stability, but which must not passively accept long-term interest rates dictated by the capital market.

This insight is especially relevant for the **euro area** where rising capital market rates are always associated with the risk of "fragmentation".[15] This risk has become evident after the recent strong increase in euro area government bond yields, which has prompted the ECB Council to develop a new instrument dealing with the risk of fragmentation (Lagarde, 2022).

7 Implications for fiscal policy in the euro area and Germany

The Schumpeterian perspective has interesting implications for fiscal policy in the euro area and in Germany. Above all, it becomes obvious that the European Monetary Union as it was conceived in the Maastricht Treaty is suffering from a **fundamental design flaw**. It deprives member states from its monetary sovereignty without reestablishing it at the supranational level. Thus, the whole system is exposed to a financial constraint for fiscal policy that it is absent for other large currency areas. In addition, fiscal rules requiring balanced budgets in full employment situations prohibit member states from acting as entrepreneurial states.

So far, two paradigm changes have contributed to the survival of this unstable architecture: the "what-ever-it-takes" proclamation by Mario Draghi in July 2012 and the establishment of the NextGenerationEU fund in 2021. Even in Germany, the so-called "Zeitenwende" proclaimed by Chancellor Scholz seems to undermine the rigid fortress of the "Schuldenbremse".

7.1 The incompleteness of the Maastricht Treaty

From a Schumpeterian, but also from a MMT perspective, the most striking implication for fiscal policy is the incompleteness of the European Monetary Union. With their membership in EMU the

[15] See Lagarde (2022): *„But in order to preserve the orderly transmission of our policy stance throughout the euro area, we need to ensure that this repricing is not exacerbated and distorted by destabilising market dynamics, leading to a fragmentation of our original policy impulse."*

member states gave up the privileged role as the issuer of currency. Mitchell et al. (2019) describe this role as follows:

> *"The most important conclusion reached by MMT is that the issuer of a currency faces no financial constraints. Put simply, a country that issues its own currency can never run out and can never become insolvent in its own currency. It can make all payments as they come due."* (Mitchell et al., 2019, p. 13)

With EMU membership, all national public debt that had previously been denominated in the national currency was automatically **redenominated into euro debt**. At the same time, national central banks lost the power to purchase national bonds without consent of the ECB council. As a consequence, the EMU member states can no longer be considered as monetarily sovereigns in the sense of MMT.

It reflects that lack of a thinking in terms of a monetary analysis among economists that this fundamental implication of EMU membership was not discussed in the 1990s. One of the few exceptions is Sievert (1993) who argued:

> *"The all-changing decision lies in the fact that the nation states of the economically decisive part of Europe want to move to a money which they cannot create themselves. The decision for this renunciation of economic freedom of action seems outrageous* [...]."[16]

This regime change was especially severe as there was no willingness among the member states to establish a joint treasury with the ability to issue supranational bonds. The incompleteness of EMU therefore reflects the unwillingness to combine monetary union with, at least, a rudimentary form of **fiscal union**.

In addition to this far-reaching functional constraint, the founding member additionally agreed on a legal framework, i.e. the **Stability and Growth Pact**, that dismissed the golden rule by requiring de facto **balanced budgets** in full-employment situations. This framework formally prohibited member states from acting as entrepreneurial states financing public investment by issuing debt. The same logic characterizes the **European Fiscal Compact**, i.e. the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union, an intergovernmental treaty signed on March 2^{nd} 2012 by all member states of the European Union (EU), except the Czech Republic. In Article 3 it stipulates:

> *"the budgetary position of the general government of a Contracting Party shall be balanced or in surplus"*.

[16] *„Die alles verändernde Entscheidung liegt darin, dass die Nationalstaaten des wirtschaftlich maßgeblichen Teils von Europa zu einem Geld übergehen wollen, das sie selbst nicht schaffen können. Die Entscheidung für diesen Verzicht auf wirtschaftliche Handlungsfreiheit erscheint unerhört* [...]." (Sievert, 1993, p. 14)

An additional, but not effective, safeguard in the Treaty is Article 123 which prevents the ECB from **directly financing governments** and from directly purchasing debt instruments from governments. As the experience has shown, this does has prevented the ECB from massive indirect purchases of government bonds.

Thus, the EMU started its operations in 1999 with member states that even for macroeconomic stabilization ("functional finance") were confronted with a **tight financial constraint**. This constraint is especially rigid, as in a monetary union, investors are always able to shift their euro deposits outside the national financial system without changing the currency, i.e. without an exchange rate risk. Thus, while we have shown in Section 5.1.1 that in the case of capital market financing of public debt the amount of private sector deposits in the national context remains constant, this is not necessarily the case in the euro area.

7.1.1 The regime shift by Draghi's "Whatever-it-takes"

The inadequacy of this framework become obvious with the **Great Financial Crisis**. While the FED was willing to finance the government with massive bond purchases, the ECB remained almost passive (Figure 24). As a consequence, several member states with higher debt levels were no longer able to obtain capital market funding for their debt. But instead of relating this problem to an inadequate central bank financing of governments during and after the crisis, the so-called "**euro crisis**" was one-sidedly attributed to policy mistakes in the peripheral countries of EMU. In fact, the ECB even aggravated the crisis by raising its policy rates on 13 April 2011 and 13 July 2011 (Bofinger, 2020).

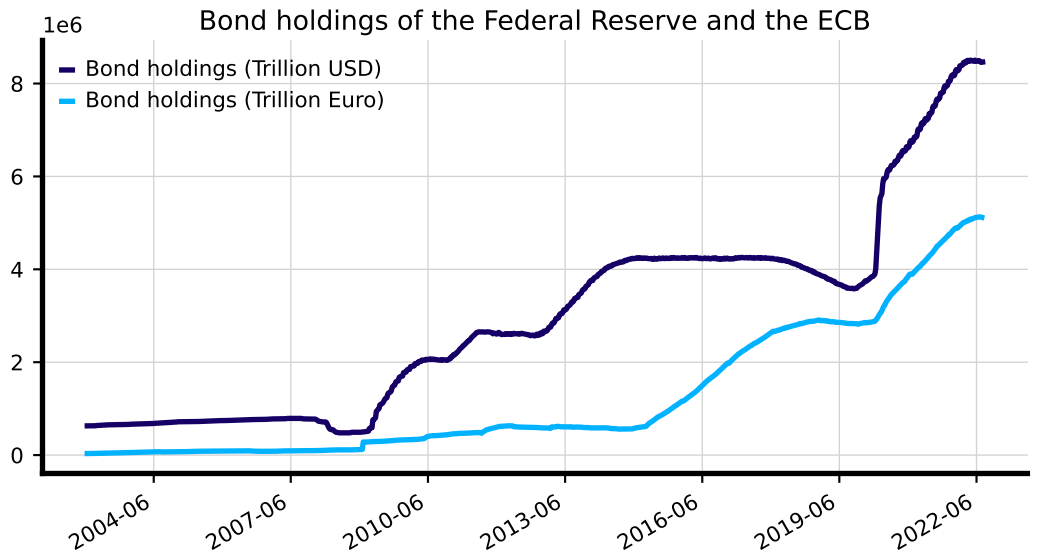

Figure 24: Bond holdings of the Federal Reserve and the ECB.
Source: ECB, FED.

The dysfunctional system would have collapsed if it had not been saved by the pragmatic behavior of Mario Draghi with his famous statement on 26 July 2012:

> *"Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough."* (Draghi, 2012)

The enormous prominence of the statement reflects that it actually implied a regime change for EMU which de facto removed the financial constraint for the member states, at least for situations with a joint macro-economic shock for the euro area where functional finance is required. Ehnts and Höfgen (2019, p. 78) put it as follows:

> *"While they Eurozone countries are lacking the policy space that they could potentially derive from issuing their own fiat currency, the fact that the ECB is actively buying their national bonds as part of the announced "whatever it takes" approach is providing them with more financial space than local governments typically have".*

The regime change is reflected in the policy reaction of the ECB to the **COVID pandemic**. In this crisis, the ECB increased its bond holdings substantially, even if the increase was less pronounced than in the case of the Federal Reserve (Figure 24). As result, during most of the crisis, spreads between the bonds of the member states remained relatively low (Figure 25).

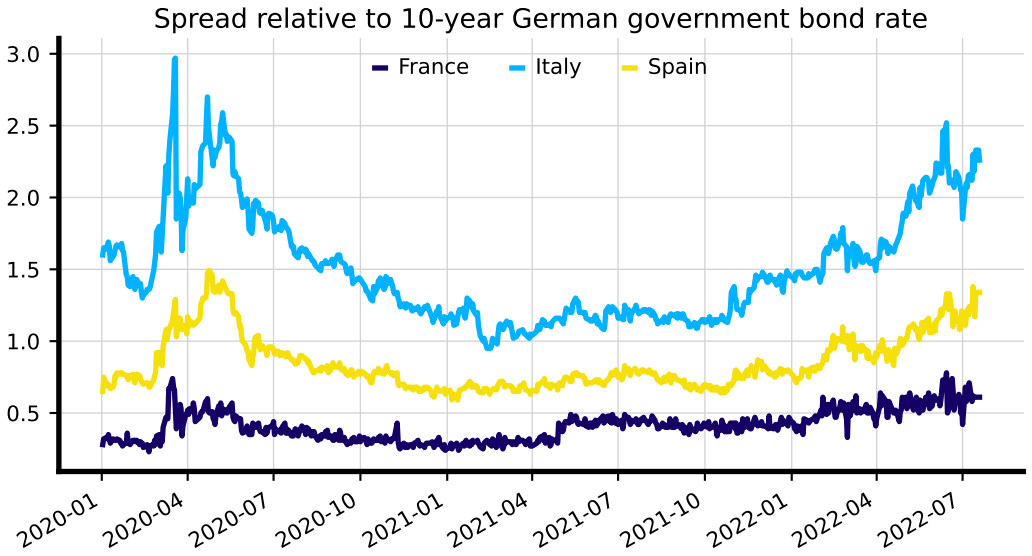

Figure 25: Spread relative to 10-year German government bond rate.
Source: Eurostat.

7.1.2 NextGenerationEU: A pragmatic approach towards a fiscal union?

While the pragmatic behavior of the ECB has made it possible for the member states to pursue a fiscal stabilization policy in line with the concept of **functional finance** without running up against financing limits, there is also a need for a more flexible fiscal policy framework that would allow them to become active in the sense of an "entrepreneurial state" in full employment situations.

A certain **degree of flexibility** in the fiscal rules has at least been created by the suspension of the Stability and Growth Pact from 2020 up to and including 2023 due to the pandemic and now the Ukraine war. An innovative answer to the incompleteness of EMU is the **Recovery and Resilience Facility**, established by Regulation (EU) 2021/241 on 19 February 2021. While it is designed for the whole union, it has important effects on the euro member states. The facility is the centerpiece of "NextGenerationEU", the EU response to the challenges of the COVID pandemic. It was agreed by the heads of state and government at the extraordinary Extraordinary European Council meeting of July 17-21, 2020.

In his speech presenting the facility to the German Parliament on 25 February 2021, the then German Finance Minister, Olaf Scholz, made a remarkable statement:

> *"Now, in this crisis, we have taken the step we need to take to be able to move into a fiscal union."*(Scholz, 2021)[17]

From the Schumpeterian perspective, NextGenerationEU is indeed a **second paradigm change**

[17] *„Jetzt, in dieser Krise sind wir den Schritt gegangen, den wir gehen müssen, um in eine Fiskalunion hineinkommen zu können."*(Scholz, 2021)

compared with the institutional framework established by the Maastricht Treaty. It combines national investment and reform programs with a joint EU financing and a Commission surveillance and monitoring. The Own Resources Decision which entered into force on 1 June 2021 enables the Commission to borrow for the Next Generation EU (NGEU) temporary recovery instrument up to EUR 806.9 billion in the period 2021-2026 (current prices).[18] This is an unprecedented funding volume which is equivalent to 6% of 2020 EU GDP. About half of the RRF funds are made available in the form of non-repayable grants to Member States (€ 358.8 billion); the other half (€ 338.0 billion) is made available in the form of loans.

As a survey by Freier et al. (2022) shows, relatively more funding is made available for countries that have been hit hardest by the pandemic crisis, which also display lower GDP per capita and/or relatively higher debt-to-GDP levels. As a result, almost two-thirds of RRF funding requested in the euro area is currently allocated to Italy and Spain. Nearly 50% of expenditure is direct government investment and about 30% takes the form of support to private investment via capital transfers (grants to the private sector, public-private partnerships, etc.). As a result, the use of the RRF is expected to increase the share of public investment in euro area GDP during the period 2021-26 by about 2.5 percentage points (Freier et al., 2022).

Funds are available for public expenditures in the following **six pillars**:

(i) green transition,

(ii) digital transformation,

(iii) smart, sustainable and inclusive growth, including economic cohesion, jobs, productivity, competitiveness, research, development and innovation, and a well-functioning internal market with strong small and medium enterprises (SMEs),

(iv) social and territorial cohesion,

(v) health, and economic, social and institutional resilience with the aim of, inter alia, increasing crisis preparedness and crisis response capacity, and

(vi) policies for the next generation, children and the youth, such as education and skills.

In order to foster the green and digital transitions of the EU economies, the RRF Regulation[19] requires the member states to dedicate at least 37% of its recovery and resilience plan's total allocation to measures contributing to **climate objectives** and at least 20% of the total allocation to **digital objectives**. A report by the European Commission (2022) shows that so far both thresholds

[18]The European Commission became an issuer in the bond markets first the first time during 2020 by raising €100 billion for financing the SURE programme (standing for Support to mitigate Unemployment Risks in an Emergency)

[19]Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility (OJ L 57, 18.2.2021, p. 17)

have been exceeded.

A key feature of the Recovery and Resilience Facility is its **performance-based nature**. RRF funds are disbursed when Member States have satisfactorily fulfilled key steps in the implementation of the reforms and investments included in the recovery and resilience plans. These key implementation steps are referred to as milestones and targets. Milestones represent a qualitative implementation step, targets a quantitative implementation step. The survey by Freier et al. (2022) also shows that the reforms that were enacted were broadly based with a focus on the public sector and green/digital conditions (Figure 26).

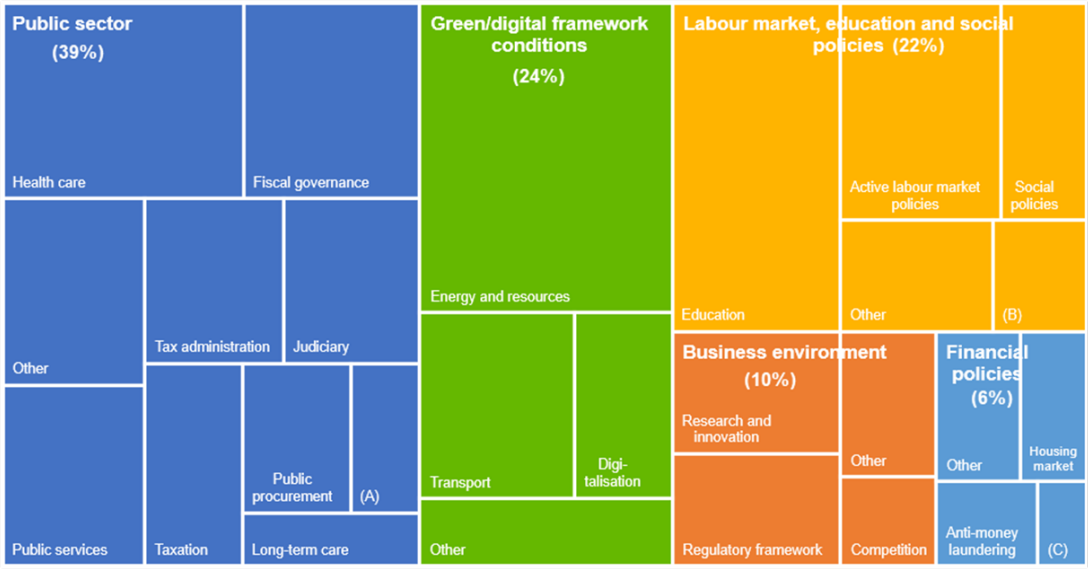

Figure 26: Breakdown of RRP reforms in euro area countries by policy area (percentage of total)
Source: Freier et al. (2022)[20]

So far, the European Commission (2022, p. 64) comes to a positive assessment of the program:

> *"A year after the establishment of the Facility, major advancements have been made and implementation is firmly on its way. The Council adopted 22 recovery and resilience plans, which account for a total of EUR 445 billion (EUR 291 billion in non-repayable financing and EUR 154 billion in loans)."*

Beyond the technicalities, this program is significant for Europe because it provides an interesting blueprint for reducing the imperfections of the Maastricht Treaty without going all the way to a fiscal union, which many member states would not do today.

[20]Notes: (A) Pensions; (B) Employment protection legislation, framework for labour contracts; (C) Insolvency frameworks. The classification is based on an ECB staff assessment. It has been applied at the level of individual milestones and targets (Freier et al., 2022)

From the perspective of fiscal policy and public debt developed in this paper, it provides governments financial funds which enables them to play an important role as an investor or co-investor in new and green technologies. This is exactly what is prevented by the Stability and Growth Pact with its orientation towards balanced budgets. Moreover, as the RRF debt is not counted as national debt, member states with high debt levels must not fear higher risk spreads on the capital market.

The paper by Freier et al. (2022) considers the RRF as **a new governance framework** with several innovative elements, which could be a decisive factor for the success of NGEU and provide lessons for the economic governance framework. The authors mention three main advantages:

- First, a clear framework for the approval of national reform and investment plans, as well as their implementation.
- Second, a balance of roles for the Member States, the European Commission and the Council, which has resulted in close cooperation between national governments and these institutions. It also has the potential to increase national ownership of policy design and the effectiveness of peer reviews.
- Third, disbursements are made conditional on the fulfilment of milestones and targets set out in each Member State's RRP, providing positive incentives and accountability for productive investment and reforms.

In sum, the authors conclude:

> *"Thus, the RRF could provide useful lessons for the economic governance framework and for a potential permanent fiscal capacity for the euro area in the future."*(Freier et al., 2022, p.107)

7.2 "Sondervermögen": a regime shift in Germany?

The essence of our analysis is nicely condensed in the famous saying by the German economist Lorenz von Stein (1871):

> *"A state without public debt either does too little for its future, or it demands too much from its present."* (von Stein, 1871, p. 666)[21]

The counterpart to this view is the **Debt Brake** laid down in Articles 109 and 115 of the German Basic Law, which in principle deprives the state of the possibility of borrowing for full employment situations.[22] From a dynamic point of view, the debt brake also leads to a convergence of government debt relative to gross domestic product toward zero. It thus reflects the perspective

[21] *„Ein Staat ohne Staatsschuld thut entweder zu wenig für seine Zukunft, oder er fordert zu viel von seiner Gegenwart."* (von Stein, 1871, p. 666)

[22] The Federal Government is allowed to run a deficit of 0.35 percent of GDP.

of real analysis on government debt as presented in the section on pure public finance (section 4): Apart from the situation of overaccumulation, public debt is detrimental to the economy and should therefore be prohibited.

Proponents of the debt brake do not argue that public debt is a priori detrimental. They justify it with a "**deficit bias**" of elected politicians (Feld & Reuter, 2019, p. 325):

> *"For various reasons, politicians and governments have a tendency to let good times in particular for consolidating public finances pass by unused. They are by no means acting irrationally, but are trying to increase their chances of re-election and the benefits for their electorate. This deficit bias is empirically well documented and has various causes, such as incentives to overuse common resources (common pools), information asymmetries between politicians and voters, political competition and electoral cycles, impatience or short-sightedness of politicians."*

But if one assumes short-sightedness of politicians, prohibiting public debt transforms the deficit bias in an under-investment bias. As the traditional public finance literature shows, the **real burden** of debt, i.e. the usage of available resources by the state, must inevitably be borne by the present generation. Prohibiting debt financing adds a **financial burden** to the real burden, as investment must be financed either with higher taxes or lower public expenditures. In fact, the German experience shows that net public investment has been close to zero in the last two decades and in most years even with a negative sign.

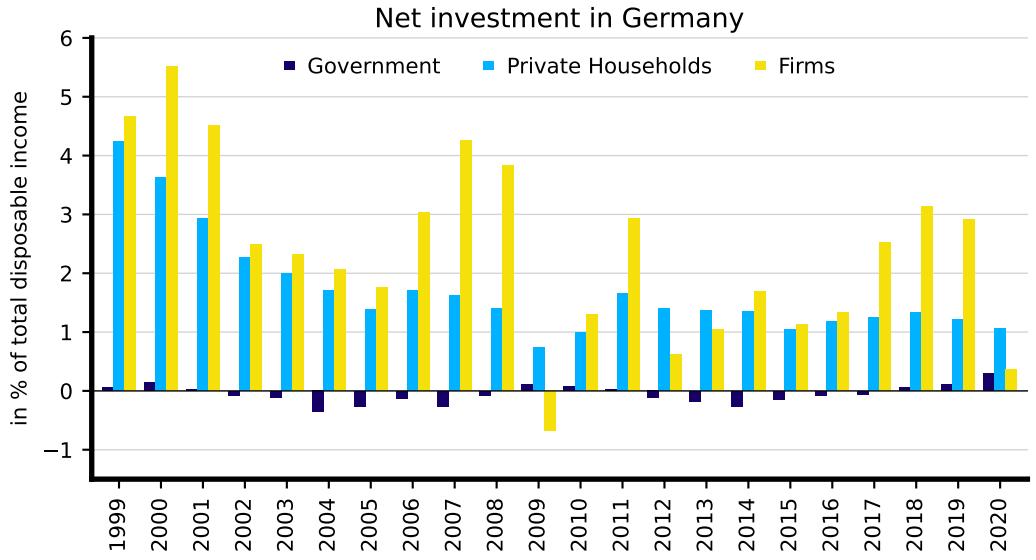

Figure 27: Net investment in Germany.
Source: Deutsche Bundesbank.

The German disinvestment bias is also reflected in the international comparison where Germany

belongs to the countries with the lowest public investment relative to GDP.

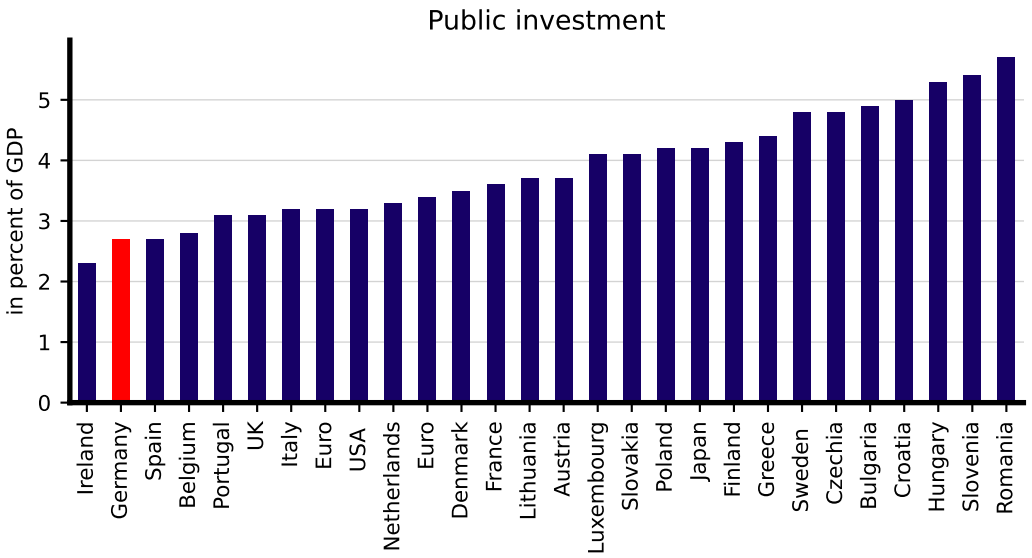

Figure 28: Public investment relative to GDP.
Source: European Commission.

The fact that it is not possible to finance the necessary state investments in Germany's future with the debt brake is now also recognized, at least implicitly, by the broader German political community. It was thus possible to amend the Basic Law to establish a special fund for the Bundeswehr amounting to 100 billion, thus enabling the debt financing of extensive investments in the military sector (Bundesministerium der Verteidigung, 2022):

- 33.4 billion euros for investments in the "air dimension"[23], i.e. air transport and air defense, in the air force, army and navy,
- 20.7 billion euros for investments in the "command capability/digitalization dimension"[24] of the armed forces,
- 16.6 billion for investments in the "land dimension"[25], especially for tanks, and
- 8.8 billion euros for investments the "sea dimension"[26].

Another massive perforation of the debt brake is the decision by the governing coalition to transfer unused loans from 2021 to a climate and transformation fund worth 60 billion. This special fund is intended to create "*sustainable financing options for overcoming climate change or transforming the German economy.*"[27] The creation of these special funds has thus opened up a way to create financing

[23] "Dimension Luft"
[24] "Dimension Führungsfähigkeit/Digitalisierung"
[25] "Dimension Land"
[26] "Dimension See"
[27] "*nachhaltige Finanzierungsmöglichkeiten zur Überwindung des Klimawandels bzw. zur Transformation der deutschen Volkswirtschaft*" (Deutscher Bundestag, 2021, p. 5)

options for government investments in the future while maintaining the debt brake, enabling the state to become active as an "entrepreneurial state". However, it would be too early to diagnose here a paradigm shift in German fiscal policy that could lead out of the narrow perspective of the neoclassical theory of government debt.

8 Concluding remarks: What are the main insights from the Schumpeterian perspective on public finance?

1. Schumpeter's distinction between "real analysis" and "monetary analysis" provides **theoretical clarity**. It shows that the loanable funds model (real analysis) and Keynesian models (IS/LM, IS/MP, IS/PC/MP; monetary analysis) are not equivalent, but incompatible. Therefore, "a mix" of the two approaches cannot provide a theoretical framework for fiscal policy.

2. Schumpeter's growth model shows the **deficiencies of the neoclassical model** where growth is the accumulation of the same inputs with the same production technology. Therefore in this model, the role of public debt is limited to the destruction of capital. Positive effects of public debt are limited to situations with an excessive accumulation of capital ("savings glut"). As a result, the neoclassical theory has nothing relevant to contribute for actual fiscal policy.

3. Schumpeter's **theory of finance** which relies on the production of purchasing power by banks provides the basis for a monetary theory of public debt which is not confronted with a financial crowding-out. In practice, this can require that central banks target the nominal long-term interest rate implicitly (quantitative easing) or explicitly (yield curve control).

4. Schumpeter's growth theory provides an innovative framework for an analysis of the **role of public debt in situations with full employment** where a real crowding-out is inevitable: innovation creates inflationary pressures as the innovator withdraws resources from existing uses. But if the innovation is successful, its growth effects increase the production potential so that the inflationary pressure vanishes. Thus, a flexible **medium-term oriented inflation targeting** by central banks is required to allow for such dynamics.

5. Schumpeter's dismissal of the concept of a real (physically determined) interest rate has important implications for the sustainability of public debt which relies on the relation between the "real" interest rate and the real growth rate of the economy. If the real rate is a monetary rate deflated by some inflation measure it can be targeted by the central bank and must not be left to the vagaries of global capital markets. This insight has led the Federal Reserve (after the Second World War) and the bank of Japan (since 2016) to implement the

strategy of **yield curve control**. But the fact that yield curve control frees the long-term interest rate from the pressures of global capital markets, does not imply complete discretion of the central bank. In order to avoid financial dominance, central banks must always regard the requirements of macroeconomic stability.

6. The combined insights of a Schumpeterian approach provide a theoretical basis for a **fiscal policy in the new normal** which is shaped by the need to transform our economies in way that they can deal with the challenges of climate change, disruptions in energy supplies, digitalization and demographics. These challenges require massive investments, either directly by the state or subsidized by the state, which cannot be financed out of the current government revenues. This is a specific challenge for the member states of the euro area which lack the ability to finance themselves with their own national central bank. The **Recovery and Resilience Facility** created by the European Union can be regarded as a promising blueprint for a Schumpeterian approach to fiscal policy in Europe.

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9 Appendix A

The derivation of the optimum interest rate

The three central equations of the model:

$$IS : y = a - b \cdot r + \varepsilon_1 \tag{1}$$

$$PC : \pi = \pi^e + d \cdot y + \varepsilon_2 \tag{2}$$

$$MP : L = (\pi - \pi^*)^2 + \lambda \cdot y^2 \tag{3}$$

For optimal monetary policy, minimize the central bank loss function under constraint of the PC. Insert PC curve (2) in loss function (3) and derive it for y^{opt}, i.e. the optimal output gap (8):

$$L = ((\pi_0 + d \cdot y + \varepsilon_2) - \pi^*)^2 + \lambda \cdot y^2 \tag{4}$$

$$\leftrightarrow L(y) = (d \cdot + \varepsilon_2)^2 + \lambda \cdot y^2 \tag{5}$$

Minimization:

$$\frac{\partial L(y)}{\partial y} = 2(d \cdot y + \varepsilon_2) \cdot d + 2\lambda \cdot y \stackrel{!}{=} 0 \tag{6}$$

$$d^2 y + d\varepsilon_2 + \lambda y = 0 \tag{7}$$

$$\leftrightarrow y^{opt} = -\frac{d\varepsilon_2}{(d^2 + \lambda)} \tag{8}$$

Insert y^{opt} (8) in PC (2) to derive π^{opt} (11):

$$\pi^{opt} = \pi_0 + d \cdot y^{opt} + \varepsilon_2 \tag{9}$$

$$\leftrightarrow \pi^{opt} = \pi_0 + d \cdot (-\frac{d\varepsilon_2}{(d^2 + \lambda)}) + \varepsilon_2 \tag{10}$$

$$\leftrightarrow \pi^{opt} = \pi_0 + \frac{\lambda}{d^2 + \lambda}\varepsilon_2 \tag{11}$$

Insert y^{opt} (8) in IS (1) to derive r^{opt} (15):

$$y^{opt} = a - b \cdot r + \varepsilon_1 \tag{12}$$

$$-\frac{d\varepsilon_2}{(d^2+\lambda)} = a - b \cdot r + \varepsilon_1 \tag{13}$$

$$br = \frac{d}{d^2+\lambda}\varepsilon_2 + a + \varepsilon_1 \tag{14}$$

$$\leftrightarrow r^{opt} = \frac{a}{b} + \frac{1}{b}\varepsilon_1 + \frac{d}{(d^2+\lambda)b}\varepsilon_2 \tag{15}$$

10 Appendix B

The flawed derivation of the IS curve from the loanable funds model

Hicks (1937) starts with the loanable funds model of the classical interest-rate theory for a situation with an equilibrium interest rate. He then assumes an increase in income from Y_0 to Y_1, which shifts the saving schedule downwards and the investment schedule upwards. Hicks assumes that the downward shift of the S curve is stronger than the upward shift of the I curve. This leads to a decline in the equilibrium interest rate from i_0 to i_1 with a higher level of saving and investment. Transferring the combinations of Y_0, i_0 and Y_1, i_1 into an i/Y diagram yields an IS curve with a negative slope (Figure 29).

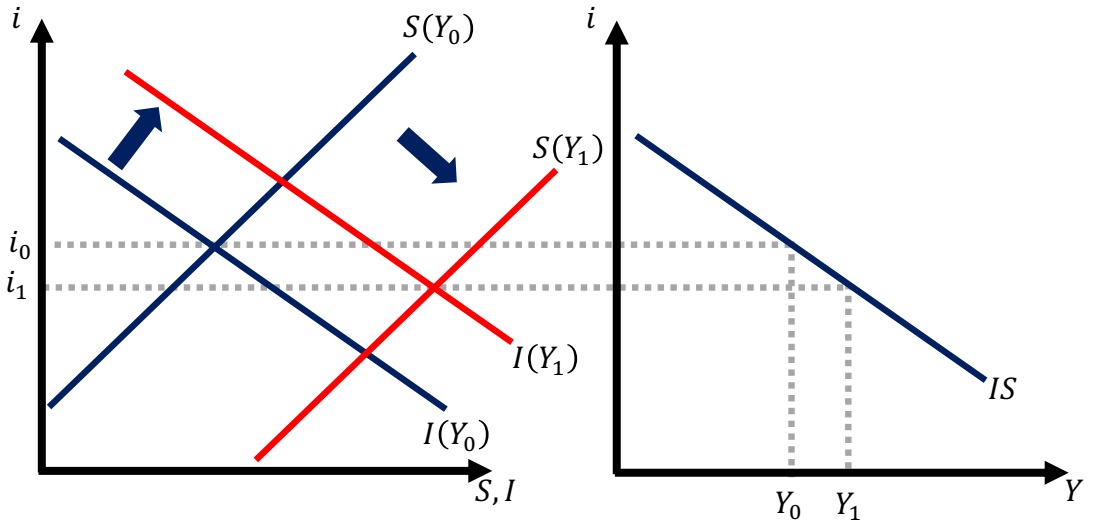

Figure 29: Hick's attempt to derive the IS curve from the IS model.

This approach implicitly assumes that income can increase by itself without a change in saving or investment. But in the IS–LM model an increase in income – that is, a movement along the IS curve from Y_0 to Y_1 – must be caused by a decline in the interest rate. This requires a downward shift in the LM curve (Figure 30). The lower interest causes an increase in investment and income, which results in higher saving.

If this is translated into an IS schedule, a different picture emerges. The saving schedule is vertical, as saving is independent of the interest rate in the IS–LM model. The slope of the I schedule is negative. The decline in the interest rate does not shift the I schedule. It causes a movement along the curve. The higher income shifts the S curve to the right. Thus, Hicks is wrong, as the IS curve cannot be derived from an autonomous shift in income which shifts the I schedule.

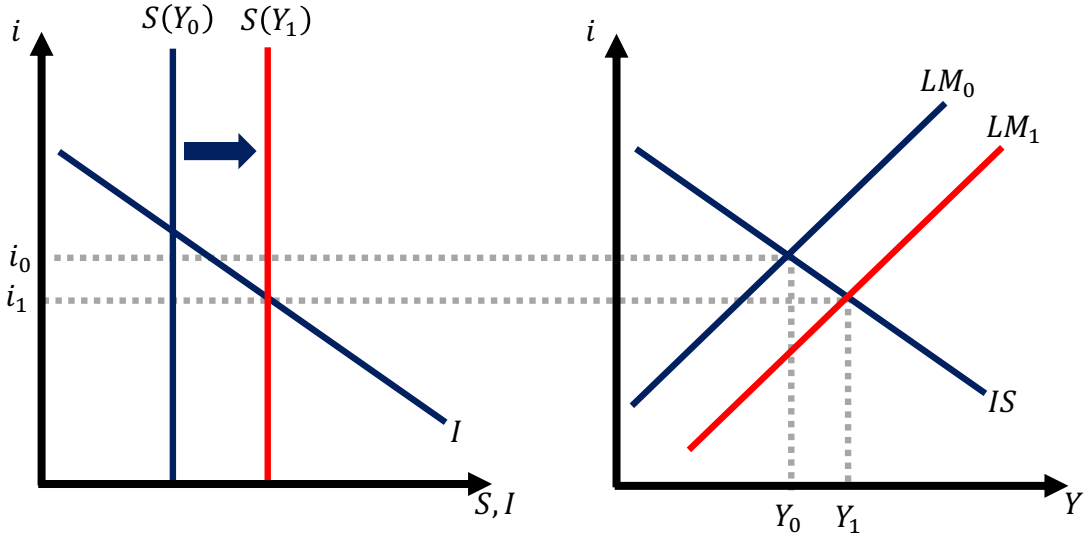

Figure 30: The correct relationship between the IS model and the IS-LM model.

In addition, the assumed size and direction of the shifts of the I-curve and the S-curve are **arbitrary**. With a stronger upward shift of the I-curve and a weaker downward shift of the S-curve, the higher income would lead to a higher interest rate and an **upward-sloping** IS curve.

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