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**Working Paper**

## Towards a new paradigm: The inflation shock as a catalyst?

Working Papers, No. 04/2024

**Provided in Cooperation with:**

Forum New Economy, Berlin

*Suggested Citation:* Creel, Jérôme; Geerolf, François; Levasseur, Sandrine; Ragot, Xavier; Saraceno, Francesco (2024) : Towards a new paradigm: The inflation shock as a catalyst?, Working Papers, No. 04/2024, Forum for a New Economy, Berlin

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<https://hdl.handle.net/10419/289820>

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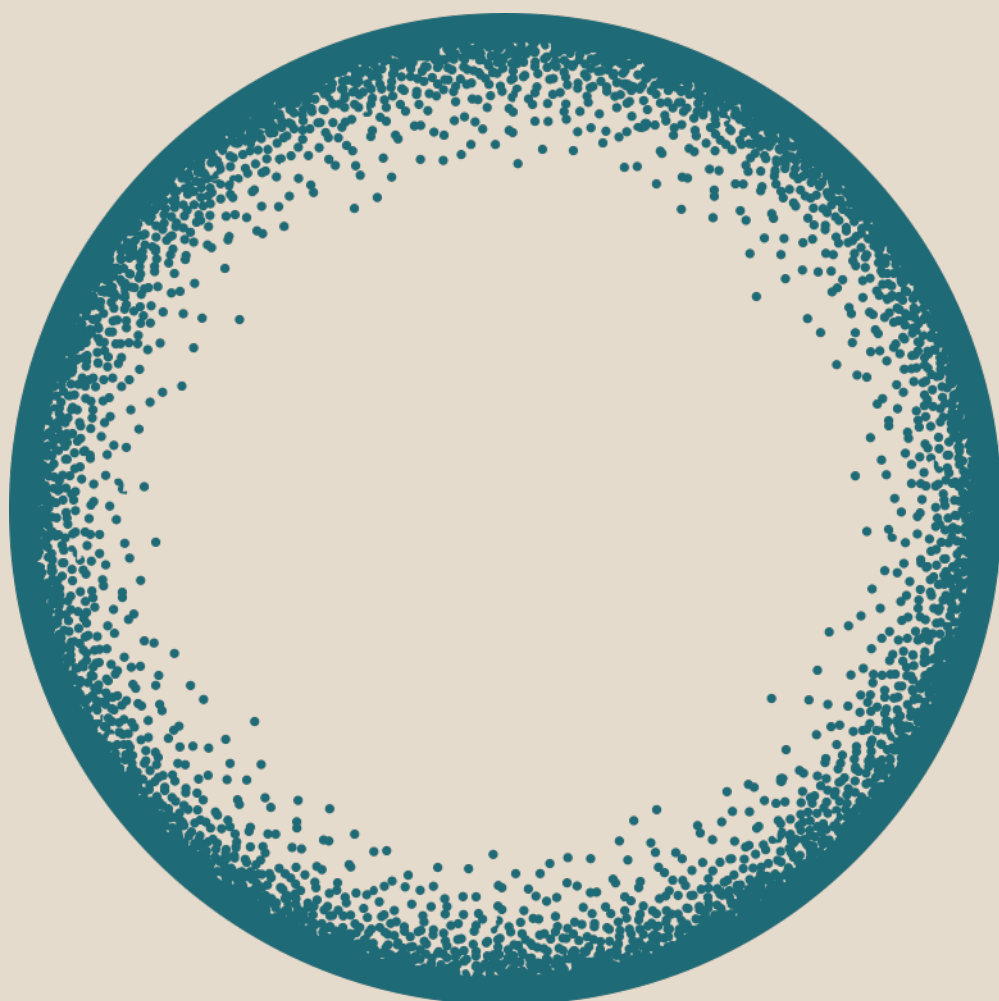
FOR A

NO. 04  
2024

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## Impressum:

Forum New Economy Working Papers

ISSN 2702-3214 (electronic version)

Publisher and distributor: Forum for a New Economy

Neue Promenade 6, 10178 Berlin, Germany

Telephone +49 (0) 30 767596913, email [press@newforum.org](mailto:press@newforum.org)

Lead Editor: Thomas Fricke

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## **TOWARDS A NEW PARADIGM – THE INFLATION SHOCK AS A CATALYST?**

Jérôme Creel\*, François Geerolf, Sandrine Levasseur, Xavier Ragot & Francesco Saraceno

### **Abstract**

During the recent inflation episode, the paradigm of separated objectives for monetary and fiscal policies has shown some limits. Fiscal policies have helped mitigate inflation. We advocate for the emergence of a new paradigm that gives equal consideration to fiscal and monetary policies and their interactions. These interactions and their respective spillover effects demand better political coordination and a good dose of pragmatism, in contrast with the binding rules embedded in the separation paradigm so present in the European governance framework. The latter should give more leeway to supply-driven fiscal policies and learn from the US experience.

**JEL codes:** E50, E60, H12

**Keywords:** fiscal policy, monetary policy, inflation, Tinbergen, coordination

We are very grateful to Thomas Fricke for the opportunity to reflect on the European policy mix against the backdrop of high inflation and for his invitation to present the outline of this paper at the New Paradigm Workshop in May 2023. We are also grateful to the amazing line-up of participants at the roundtable (Kerstin Bernoth, Anatole Kaletsky, Philip Lane, Ulrike Malmendier, and Isabella Weber) for their remarks and comments. Finally, we wish to express our thanks to Giovanni Ricco for the discussions on the topic, for his feedback, and for sharing his deep knowledge of the literature.

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## 1. INTRODUCTION

For more than three decades, there was a widespread consensus that there is a clear division of labor when it comes to economic policies. While governments aimed at ensuring debt sustainability, central banks were supposed to concentrate on the fight against inflation, on banking stability and, in some countries, on economic stabilization. This paradigm, which we propose to call the “separation paradigm”, has been challenged for a while already with the Global Financial Crisis as a critical moment. When inflation hit back in 2021, there has been on the one hand a revival of the orthodoxy, especially among central bankers and classical economists. On the other hand, this division of labor has been questioned in practice as governments have increasingly intervened. Indeed, and for more than a decade, empirical research at e.g., the IMF, has focused on the effectiveness of fiscal policy (fiscal multipliers) and on the need to stimulate public investment for long-run growth. Meanwhile, it is striking that the consensus on the separation of fiscal and monetary policies remains an intellectual anchor for the EU governance and prevents the elaboration of a new operational paradigm for reforming the EU institutions.

The long-held separation paradigm was first questioned during the period at the zero or effective lower bound (when policy rates were at or below zero). Fiscal policy was then called to the rescue to increase aggregate demand and fight against disinflationary pressures. Second, during the Covid-19 period, the EU finally pushed for a large fiscal stimulus, both at the national level for stabilisation purposes and at the European level to foster public investment: year 2020 marked the beginning of Next Generation EU (NGEU) and of “whatever-it-takes” fiscal policies. Third, the energy crisis and the sudden increase in gas and electricity prices led governments to implement innovative fiscal policy to protect households from the direct effect of fluctuations in energy prices, such as tax shields or transfers to households, and dampen inflation and the fall in purchasing power. Despite the use of fiscal policy in combating inflation, there still remains some disagreement between those who argue that debt reduction and low inflation are a priority for sound long-run policy, trying to revitalize the separation paradigm, and those who argue that priorities and challenges are elsewhere, e.g. in climate mitigation, and that they may require a change in the desirable inflation rate or the relevant debt target.

By definition, the former paradigm rests on a sharp separation between monetary and fiscal policies (one could also call this the “Tinbergen Principle”) as regards their respective effectiveness at either achieving price stability, higher growth and debt sustainability. Monetary policy is viewed as rather effective at stabilising the economy mainly through inflation targeting and expectations’ anchoring whereas fiscal policy is viewed as being able (or having) to stabilise debt and deliver (pos-

sibly in a non-distortionary way) the desired amount of redistribution across households. It is noteworthy though that the empirical literature is not clear-cut on the effectiveness of monetary and fiscal policies at achieving the respective objectives that the separation paradigm imposes.

One reason relates to the failure of the Tinbergen principle in a complex world and to the importance of policy interactions. The Tinbergen principle posits that one objective requires at least one instrument for achieving it. If the objective of price stability is well separated from the objective of debt sustainability and redistribution, the Tinbergen principle may work. However, the situation is more complicated and the two objectives are not independent. Moreover, not only are policy objectives intertwined, policy tools are also interacting with one another, being more complements than close substitutes. To highlight this latter point, we use the recent inflation surge as a case study. We show that monetary policy (aiming at the neutral interest rate), tax & fiscal policies (some departing from the “temporary-targeted-timely” optimal feature) and industrial policies (mainly in the US with the Inflation Reduction Act, IRA) have all contributed to the reduction of inflation.

Many argue that the recent policy mix is only transitory as it has been used to combat inflation in exceptional circumstances. Therefore, they argue, the separation paradigm doesn’t need to be challenged: it has had sufficient internal flexibility to perform rather well. We claim instead that adding exceptions to the separation paradigm has at least two drawbacks. First, the high frequency of large economic and financial shocks requires a great deal of deviations from the stated principles that, in the end, weigh on the credibility of the policy architecture. Second, the separation paradigm has not allowed a balance between objectives: the obsession with price stability that has been embedded in the European fiscal rules has limited the scope of fiscal policies towards public investment and economic stabilisation. This is a costly outcome when large public investments are needed to accelerate the ecological transition, not even to mention the defence needs that have spiked since the Russian invasion of Ukraine. We argue therefore that the past decade highlights the need for a new paradigm, for both good and bad times.

This article uses the recent inflation episode as a case study. First, Covid-19 and the energy crisis have been tackled by powerful fiscal tools affecting both the dynamics of public debt and inflation. Second, these recent crises are something that we now have to reckon with: large economic shocks are going to be the norm (look at their frequency!) rather than the exception and they call for strong and frequent economic stabilisation. One should also think about investment on climate change in this framework, and the US IRA is a relevant example of strong policy reaction. Third, the simplest form of the Tinbergen principle can be misleading in front of large shocks, as both fiscal and monetary instruments are affecting multiple objectives at all time horizons. Fourth, fiscal policy should also be thought of as a supply-side policy and include industrial policies. Fifth, European institutions should

evolve in accordance with the changing framework and be better equipped to face frequent and large shocks.

The text has 6 sections. The first is about what we call the “separation paradigm”. The second section looks at the recent increase in energy prices, inflation dynamics and their causes in some Euro area countries, as well as economic policy measures that were taken to deal with them. The third section analyses the US Inflation Reduction Act as a case study of a new type of policy reaction. Section 4 summarizes the findings of the empirical literature on the effects of fiscal and monetary policy on inflation and economic activity. There, we assess the empirical validity of the separation paradigm. Section 5 concludes on the contours of a new operational paradigm. It also discusses the necessary evolution of European institutions. Section 6 concludes.

## **2. CHANGING PARADIGMS - FROM THE RETURN OF THE ORTHODOXY TO A NEW PARADIGM**

Since the 1990s, a large consensus has emerged on a strict separation of tasks between central banks, which have been made (more) independent from governments, and governments themselves. It is noteworthy that the consensus has then been challenged, albeit briefly, by the management of the Global Financial Crisis (GFC).

### **2.1. About the former paradigm of strict division of tasks**

Paradigm shifts in reaction to the previous consensus are by no means an exception. Indeed, the years that followed the Great Recession and incidentally the publication of Keynes’ General Theory were characterized by government activism in the economy. Governments actively used monetary and fiscal policy to smooth the cycle and to implement industrial policies for the reconstruction of the economy and in some cases for its transition to a manufacturing economy. That period was also characterized by “fiscal dominance”: non-fully independent central banks routinely accommodating the financing of government deficits.

The primacy of government activism came to a brutal halt at the end of the 1960s following a shock that in many respects is similar to the current situation: increases in energy prices were followed by a period of stubbornly high inflation. The policy response seemingly made things worse, as expansionary fiscal and monetary policies did boost aggregate demand while not addressing the supply side problems.

The stagflation of the 1970s opened a new phase. The theoretical stage had been set by Milton Friedman (1968) who had introduced the notion of a “natural” unemployment rate and had revived the old quantity theory linking, via a stable money demand, prices to the quantity of money circulating in the economy. From the 1980s onwards, following the crisis of Keynesian economics, the main-

stream in economics revolved around the “natural” equilibrium, to which the economy tends spontaneously in the medium term. Within this framework, even in the presence of rigidities, persistent deviations from the equilibrium will eventually exert pressure on prices that will bring the economy back to “natural” equilibrium. This “separation paradigm” hinges on a set of results that are independent of the individual characteristics of the different models:

- a) The reference framework is the Real Business Cycles (RBC) model in which fluctuations are “optimal”, as they are determined by the reaction of agents to technological shocks, with little market failures.
- b) Market imperfections, especially nominal rigidities, may cause the economy to deviate from its “natural” growth rate in the short-term, i.e., to experience demand-led fluctuations.
- c) There is a need for structural reforms, which, by removing rigidities, increase the “natural” growth rate of the economy and bring it closer to the Pareto optimum. As in the old pre-Keynesian model, structural reforms are the main policy tool: curbing monopolies (both in goods and in labour markets), reducing the weight of the state in the economy, avoiding informational asymmetries, eliminating price and wage rigidities, should make it possible to remove the frictions that hinder potential growth as well as amplify cyclical fluctuations.
- d) Discretionary macroeconomic policies are ineffective at stabilising economic activity. Abiding to monetary and fiscal rules is preferable because economic policy action becomes easier to integrate into agents' expectations (which are therefore “anchored”).
- e) Short-term fluctuations in production have no influence on the “natural” growth rate (there is a dichotomy between the short and long run, which is also an assumption in standard macro-economics textbooks).

As long as the economy tends to return to the “natural” equilibrium, the illusion of some naïve Keynesians that policy makers could “buy” a decrease in inflation by accepting an increase in unemployment, a choice implicit in the negative slope of the Phillips curve, disappears. In this framework, the curve is actually vertical, with the unemployment rate close to its natural rate and inflation varying depending on demand shocks. It is therefore clear that this framework was in fact close to the pre-Keynesian neoclassical theory: macroeconomic policy is only effective in the short run, and only if it remains predictable.

Fiscal policy was removed from policy makers’ toolbox, because its effectiveness would be hampered by lags and by the risk of political capture by vested interests. Although it was also supposed to have a limited impact in the management of income fluctuations, monetary policy was con-



sidered to be preferable to fiscal policy because of its rule-based and technocratic character. A monetary policy focused on price stability would anchor expectations and constrain fiscal policy to be responsible, thus yielding the appropriate nominal stability for markets to function smoothly. This “monetary dominance” explains why when the Global Financial Crisis started, in 2007, monetary policy was the privileged tool in the attempt to counter the recession. It was only in 2009, when the economy became enmeshed in the liquidity trap and monetary policy lost traction, that fiscal stimulus packages were implemented by both advanced and emerging economies.

From the middle of the 1980s to the beginning of the crisis in 2007, the global economy experienced a period of strong growth, low and stable inflation, and limited macroeconomic uncertainty. To be true, the reasons for this period of “Great Moderation” remain unclear. Some pointed to wage moderation, which is also a factor in increasing inequality (Piketty 2013), and which led to asset price inflation and a credit boom, both of which eventually were at the roots of the 2007 crash. But the majority of economists (see, e.g. Bernanke 2004, Blanchard 2009) did explain the Great Moderation by the adherence of policy makers to the competent management of the cycle by central banks, coupled with reforms and deregulation that made markets more efficient improving the “natural” equilibrium.

It was in this context that the Maastricht Treaty of 1992 laid down the rules of the game for the euro area, from the criteria for adopting the single currency to the statute of the European Central Bank (ECB). In 1997, the Treaty of Amsterdam completed the institutional framework with the Stability and Growth Pact (SGP), which laid down the rules of conduct for the euro area member countries’ fiscal policy. In accordance with the consensus, the main objective of the SGP is to limit fiscal policy to the operation of automatic stabilisers. The structural (i.e., independent of cyclical factors) budget must be balanced. The Fiscal Compact, hastily approved in 2012 during the Greek debt crisis, adds to this rule the constraint of reducing public debt whenever this is above the 60% level set by the Maastricht Treaty.

Monetary policy was also consistent with the consensus’ conceptual framework, as the ECB was only given a price stability mandate, which it can pursue with considerable independence. The difference with the US Federal Reserve’s mandate is striking: the statute of the latter, which dates to the late 1970s (when Keynesian economics was still influential in the policy landscape) gives it a “dual mandate” of pursuing price stability and full employment.

Last, but not least, the Single Act of 1986 brought to completion what had been a pillar of the European Union since the Treaty of Rome in 1957, competition policy, aimed at curbing all forms of market power, and in so doing eliminating rigidities that prevent markets from converging towards

the “natural” equilibrium. The interpretation that the European Commission and the European authorities have given to competition policy, and the rather rigid definition of "state aids" (mostly forbidden by the Treaties as they hamper competition), have in fact prevented member states from implementing coherent industrial policies and long-term economic planning.

## **2.2. The Global Financial Crisis has challenged the separation of tasks between central banks and governments**

Many of the beliefs that dominated macroeconomics before 2008 were shaken by the GFC. Whether or not economists believed in the existence of a natural rate of unemployment, it soon became obvious after 2008 that the economy had moved significantly away from it and would not return to it alone. The rise in unemployment should then have led to downward pressure on wages, and therefore on prices. The steep collapse of prices and wages implied by the Phillips curve, nevertheless, did not materialize. Similarly, when the recovery started, from 2010-2011, and unemployment was reabsorbed (especially in the US, as Europe was embroiled in a self-inflicted sovereign debt crisis), even when unemployment reached 3.5% in January 2020, prices did not rise. In short, between 2008 and when the pandemic broke out in 2020, advanced economies experienced wide fluctuations in unemployment, and virtually stagnant prices. The Phillips curve not only seemed to be not vertical in the long run, but not even negatively sloped in the short term. The seemingly disappearance of the Phillips curve led to an interesting discussion. It could have been caused by increased competition from emerging countries that made it difficult for firms to raise prices or for workers to demand higher wages in response to changes in domestic demand. Alternatively, the apparent flattening Phillips curve could have been the result of the success of central banks, that had become so credible that they anchored expectations and made prices less sensitive than before to the business cycle.

Alternatively, some economists argue that the link between inflation and economic activity was always unstable, such that the very notion of a Phillips curve as a simple relationship between inflation and unemployment should be questioned (Galbraith, 1997; Geerolf, 2019). Inflation is also the consequence of changes in some key relative prices and in the nominal exchange rate. Hence, economic policy, both monetary and fiscal, must consider these additional determinants.

Finally, the 2008 crisis sparked some renewed interest in theories where aggregate demand might have effects even on long-run growth (Blanchard and Summers, 1986). Some research inspired by the 2008 crisis (Blanchard et al. 2015; Fatás and Summers, 2018) has shown that marked cyclical fluctuations have a negative effect on long-run growth, mainly through hysteresis and human capital decumulation, which reduce potential growth. But if the natural equilibrium is influenced by what happens in the short run, it ceases to be the attractor for the economy and this opens the way for the return of aggregate demand to explain not only cyclical fluctuations but also, together with supply

factors, long-run growth. There also was some renewed interest in theories of secular stagnation whereby aggregate demand and GDP can be permanently depressed (Summers, 2015).

The end of the dichotomy between short and long term, between supply and demand, between macroeconomic policies and structural policies has the important consequence that intertwined, and sometimes contradictory objectives, can only be pursued by mobilizing different instruments at the same time; in other words, by reviving the policy mix. This is why in 2014, announcing the forthcoming Quantitative Easing to try to keep interest spreads under control and to support the financial system, the then President of the ECB Mario Draghi (2014) invoked the intervention of national governments to support growth with public investment. Or, more recently, when the Covid crisis has been addressed through the coordinated utilization of fiscal policies and monetary policies, to support incomes and recovery.

### **3. THE RETURN OF INFLATION HAS ACCELERATED THE BREAKUP OF THE SEPARATION PARADIGM**

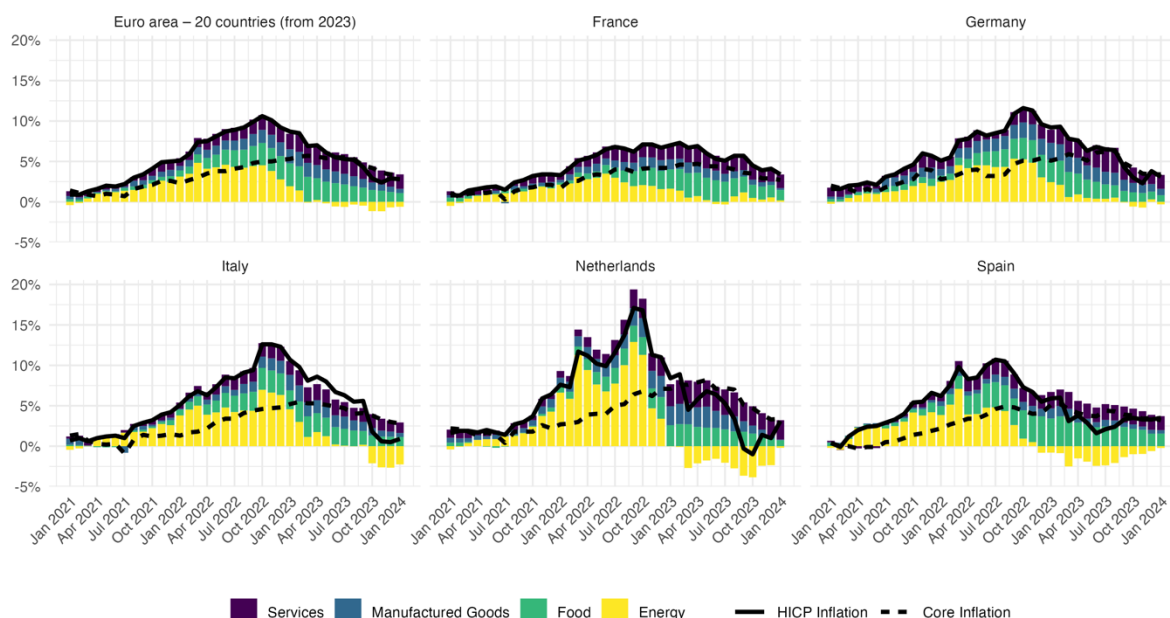
In the midst of this ongoing paradigm shift in the policy mix, a major surge in inflation has appeared in 2022/23, not only in the Euro area, but also in the US. This sudden reappearance of inflation was in a first period followed by voices calling for a return to the orthodoxy of strict division of tasks with central banks as unique actors to counter inflationary pressures via higher interest rates. Nevertheless, in practice, this crisis has led to a number of rather ad hoc interventions by governments which de facto questioned the idea that central banks are exclusively in charge, and whether they should be.

In 2022/23, the Euro area has been experiencing the strongest ever inflationary episode since the creation of the Euro. At around 3 % in late 2023, inflation has receded from a peak at 10.6 % in October 2022. It is therefore time to look back at this inflationary episode, analyse how European countries have used macroeconomic policy to deal with it, and what lessons might be learned for the future. This can help us understand what kind of “new paradigm” would be needed to deal more efficiently with future crises.

In the Euro area, much of inflation has been coming from energy and food prices, as shown on the top left-hand panel of Figure 1. Energy prices have increased substantially because of a surge in oil, natural gas, and electricity prices, especially following the Russian invasion of Ukraine on February 24, 2022 although the increase started during the post-Covid recovery phase. Food prices have also increased for the same reason, in part from the rise in energy prices as well. Core inflation, excluding energy and food prices, has also been trending up. Although it has often been interpreted as a sign of overheating or too much aggregate demand, core inflation has also risen because of energy and food prices: energy is an input to almost all industrial and service sectors. Moreover, automatic indexations of wages (e.g. in Belgium and for the minimum wage in France) or goods and services

(such as rents) also imply that core inflation mechanically rises when energy and food inflation increase.

**Figure 1. HICP annual inflation and its main components in the Euro area, France, Germany, Italy, and the Netherlands, January 2021-January 2024.**



Source: Eurostat. Code : prc\_hicp\_manr, prc\_hicp\_inw

Figure 1 also shows that the rise in price has been very different across European countries. This partly reflects the role of macroeconomic policy, which has been used in many countries to reduce inflation. However, it also reflects differences in energy mix, as European countries were not equally dependent on Russian energy supplies (Geerolf et al., 2022), as well as differences in methodologies for measuring inflation. This episode has indeed shown that measures of inflation are not necessarily harmonized across European countries, which is an area where European countries should strive to achieve more progress. For example, some European countries such as the Netherlands are recording energy prices on new contracts (the flow of new contracts), while other European countries such as France were recording every price on existing contracts as well (the stock), as they should (CBS, 2022)<sup>1</sup>.

Faced by such huge shocks to consumers and industry, many governments by 2022 started to introduce instruments designed to either limit price hikes or compensate the impact. First, many countries decided to help consumers by introducing price subsidies or price caps (e.g. France and Spain)

<sup>1</sup> Statistics Netherlands has been working on a new methodology, but it is unclear what has been done in other European countries.

rather than cheques to households. Although price subsidies or price caps are often criticized, as they reduce incentives to save natural gas, they have one very important advantage in that they target more accurately who suffers most from energy inflation: those who are helped more by these measures are those who consume the greatest quantities of gas. Another difference with these price subsidies is that they lead to a reduction in measured inflation, which implies that automatic indexation mechanisms (when they exist, e.g. on pensions or social allowances) play a lesser role.

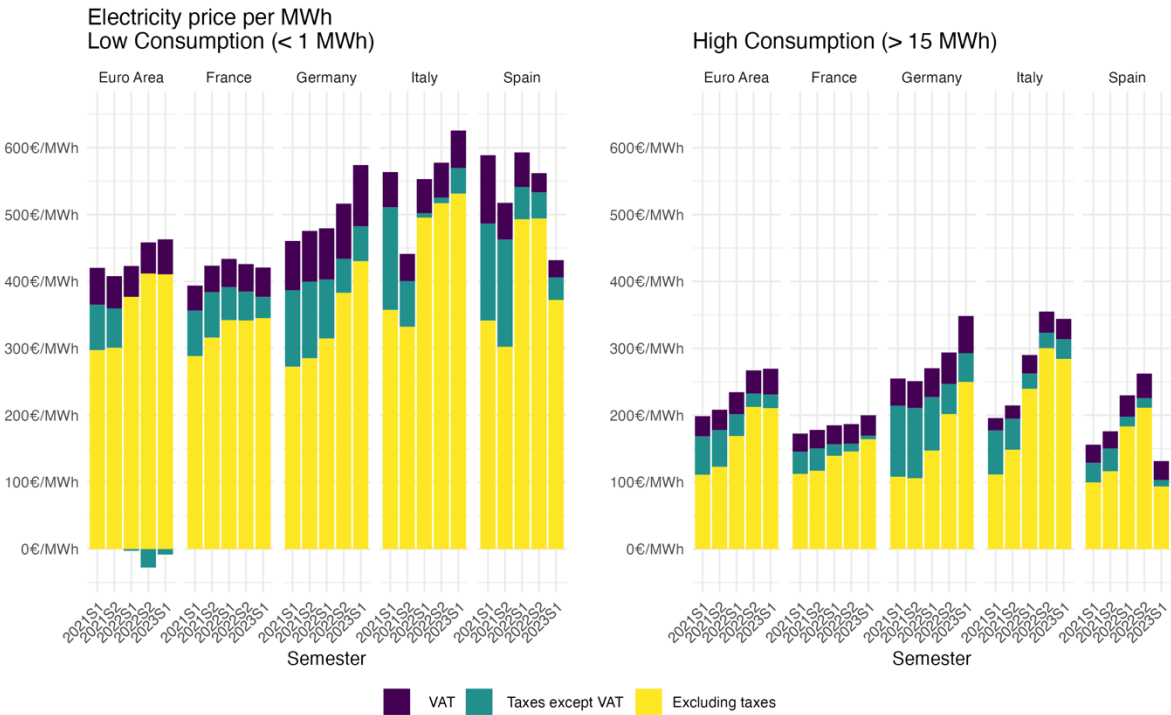
Figures 2 and 3 illustrate the multidimensionality of macroeconomic policies with respect to energy prices. It shows that there are several types of energy consumers: households who have a rather low consumption, and businesses which typically have much higher consumption. In response to increasing prices of energy, European countries have used different measures to contain prices for households and / or industries. Households have been protected through a mix of reduction in taxes (Value Added Taxes, or other types of taxes, for example in Italy) as well as price shields (for example in France). Figures 2 and 3 are a simplification in that they measure the average price of energy: in some countries, such as France, there was a uniform reduction in energy prices; in the Netherlands or Germany, there was a reduction for the price of a given quantity of energy, while consumers were paying the market price for a larger consumption. This latter policy has an advantage, which is to let the price signal work in the short-run and incentivize more energy savings (although in the long-run, such policies incentivize a “wait-and-see” behaviour, as early adopters of energy savings technology are being penalized ex-post since they can’t reduce their consumption anymore and need to pay higher prices). Spain has taken another approach, which has been to subsidize natural gas for electricity generation, so as to reduce the price of electricity (coming from all sources, because of marginal pricing) at a minimal fiscal cost. With the benefit of hindsight, this strategy later dubbed as the “Iberian model” has proven quite effective.

European governments also used different policy measures for the industrial sector, known as a heavy consumer of energy. European countries were hit differentially by the reduced supply of energy and natural gas, especially after the Nord Stream pipeline was sabotaged. Germany was certainly being most severely hit, given the importance of energy-intensive sectors such as the chemical and the pharmaceutical industry (Geerolf, 2022). In order to cope with this sudden loss in competitiveness (particularly with respect to the U.S. and China, whose price of energy was much lower), Germany has decided to subsidize industry whereas France has focused directly on overall inflation so as to avoid a wage-price spiral and a loss in competitiveness.

This episode has also revealed some strains across European countries, in order to respond as effectively as possible to the crisis. First, countries’ best macroeconomic response to the crisis has not always been in Europe’s overall best interests. For example, Germany has criticized the “Iberian

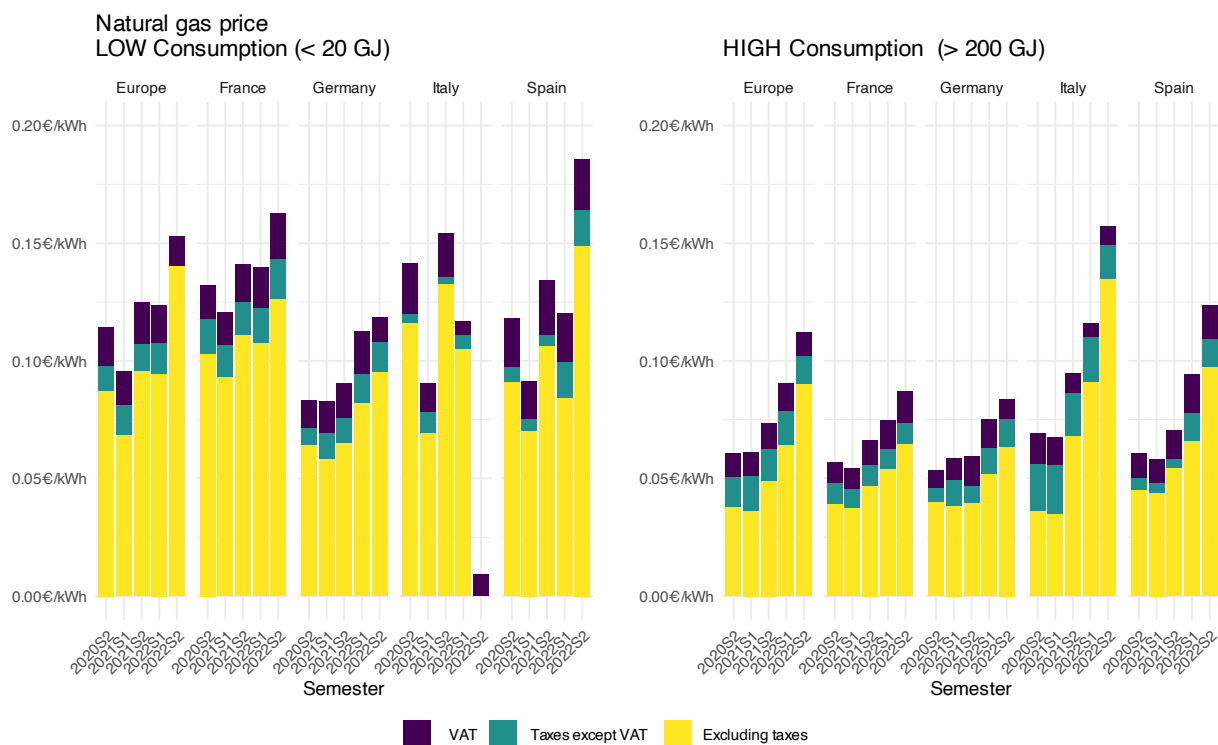
model” on grounds that it did not incentivize enough natural gas savings, which was increasing energy prices throughout Europe, and therefore imposing a negative externality on all, especially on Germany which needed gas much more heavily for its energy-intensive industrial sector.

**Figure 2. Electricity prices in the Euro Area, France, Germany, Italy and Spain 2021S1-2023S1**



Source: Eurostat. Code: nrg\_pc\_204

**Figure 3. Natural gas prices in the Euro Area, France, Germany, Italy and Spain 2021S1-2023S1**

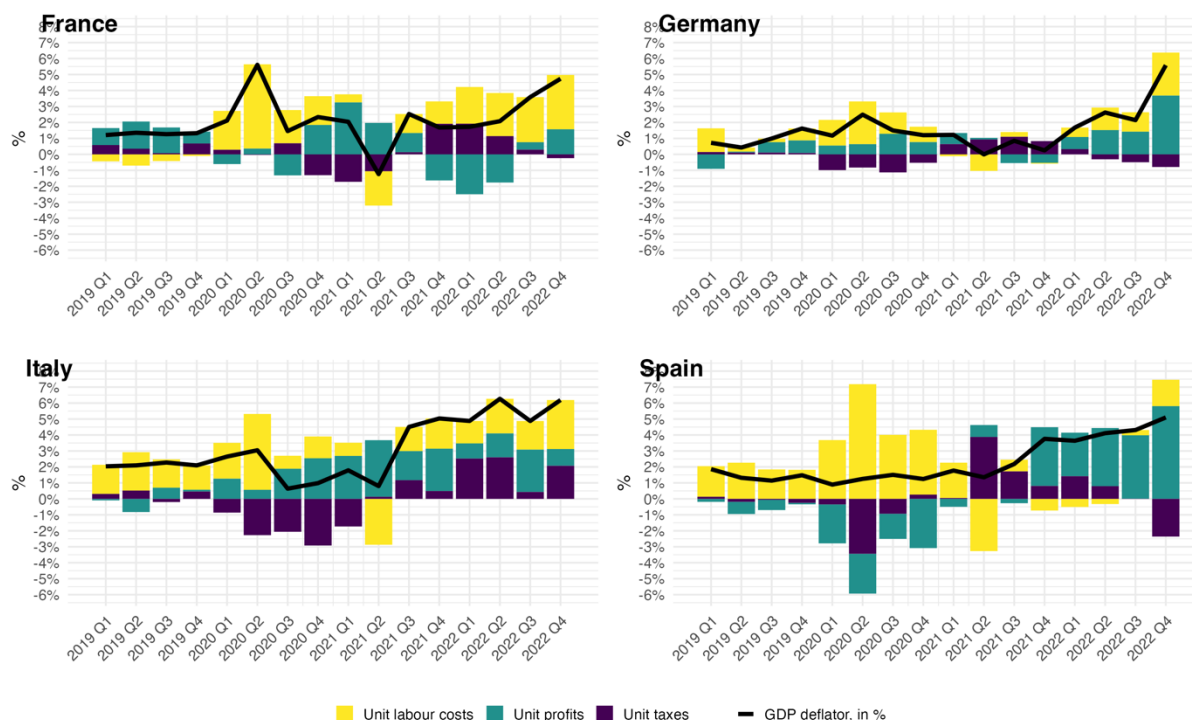


Source: Eurostat. Code: nrg\_pc\_202

This inflationary episode has therefore taught us a few lessons about how to respond to an energy price-driven inflationary episode. Firstly, inflation cannot always be attributed to a rise in wages. Secondly, unemployment does not necessarily need to increase in order to achieve lower inflation, although this was seen as a lesson from the 1980s stagflation episode. The United States is achieving a “soft landing”, with a decline in inflationary pressures which is not accompanied by an increase in the unemployment rate.

Even more fundamentally, some scholars have argued in favour of inflation driven by profits rather than wages, highlighting the relative importance of the profit-price spiral versus the more conventional wage-price spiral, which has reignited a debate in Europe on whether wages or profits tend to drive inflation. (Weber & Wasner (2023); Lavoie (2023); Lorenzoni & Werning (2023); Krebs & Weber (2024)) Here again, country experiences have been very heterogeneous: in some countries, inflation has been more wage-led, while the profit-price spiral has been much more important elsewhere, such as in Germany and Spain, as shown on Figure 4. (Another example, which is not shown here, is Austria.) Another surprise is that inflation has not proven more persistent in countries which are well-known to have wage indexation agreements, such as Belgium or Luxembourg (ECB, 2008; ECB 2021). This too, will require further study going forward, as (partial) wage indexation could help alleviate the profit-price spiral during potential future episodes of imported inflation.

**Figure 4: Unit labour costs, unit profits and unit taxes in France, Germany, Italy and Spain**



Source: OECD.

There are some other challenges to orthodoxy. Europe also saw a change in paradigm in that expansionary fiscal policy was used as a tool to reduce inflation, rather than to fight deflation: fiscal policy was therefore used with an opposite aim as orthodoxy would have it. Inflation was fought with other unconventional tools, which were very diverse. For example, (i) price caps on goods and services were often used; (ii) automatic indexation of rents was sometimes adjourned, in order to slow down inflation (at the cost of landlords), which helped contain core inflation; (iii) governments sometimes encouraged bonuses rather than wage increases through tax advantages in order to contain the wage-price spiral.

Even without a coherent rethinking of macroeconomic policy, European countries have therefore innovated and used policy measures which were not thought to be possible before, and which were overall successful. Two arguments can be made in this respect. First, as figure 1 shows, the inflation episode in the euro area has been mostly supply-driven: capping the prices of energy and limiting the pass-through from energy prices to final prices have had almost immediate impacts on inflation (see the different national case studies in Galgoczi, 2023). Second, the speed at which inflation has declined is irreconcilable with the observed, much more moderate decline in demand: it must also come from a sharp rise in the supply-side, thanks to fewer global supply chain disruptions and



thanks to public policies towards firms which have not resorted to higher unemployment (see Konczal, 2023).

Both macroeconomic data and policymaking in Europe during this inflationary episode have moved away from mainstream macroeconomic models and macroeconomic policymaking. Thinking through this episode is required, both for improving on macroeconomic models and responding in a more coherent, more and perhaps more efficient manner next time.

#### **4. THE IRA – A MAJOR POLICY CHANGE FACILITATED BY THE INFLATION SHOCK**

In the midst of the inflation shock, in summer 2022, US President Joe Biden has launched a major program titled Inflation Reduction Act (IRA). Contrary to its name, this Act is only marginally designed to bring down overall inflation. Nevertheless, the program would probably not have been launched, at least under this name, without the experience of the inflation shock<sup>2</sup>. And there are several instruments that at least partially act to reduce specific prices, especially on products needed to accelerate the transition towards a carbon neutral economy.

According to J. Biden, the IRA is essentially about the reduction of price for certain categories of goods (i.e. energy, but also drugs, which are the other component of IRA). As electricity and natural gas account for only small weights in the US consumer price index (respectively, 3.6% and 1%), a fall in energy and healthcare prices can only have a minor impact on the aggregate level of prices and therefore on the US CPI.

To the contrary, the IRA has become a central piece of rethinking macroeconomic policy via, this time, a rethinking of industrial policy, especially in the United States, where substantial funds are made available to companies. In particular, the IRA, constitutes the ultimate piece of a broader policy package of the Biden administration with a huge industrial policy perspective (Deese, 2022).

##### **4.1. Goals and philosophy behind the IRA**

In a nutshell, the IRA consists of generous subsidies to a large spectrum of green activities, from the production of clean energy sources (wind, solar) to the uptake of electrical vehicles (EVs), as well as carbon sequestration, the production of renewable fuel, clean manufacturing or the purchase of heat pumps by households. After the CHIPS and Science Act, which dedicates funds toward cutting-edge R&D for semiconductors, and the Infrastructure Investment and Jobs Act, which provides much of infrastructure these technologies need to scale at speed, the role of the IRA is to drive investment growth through demand-pull measures that allows these technologies to reach market maturity (Carey and Shepard, 2022). Moreover, in order to secure production on the US territory, subsidies are subject

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<sup>2</sup> It is now acknowledged that the law was named as such in order to secure the vote of Senator Manchin, who initially was firmly opposed to further public spending on climate and health.

to input requirements, with a certain content of critical raw materials, intermediate goods, and labour to be of North American origin. In other words, the IRA is the ultimate, but crucial, piece of a larger set of measures aimed at reindustrialising the United States, securing its energy supply while also encompassing the fight against global warming.

To date, the budgetary cost of IRA is quite uncertain, in the range of \$400 to \$1,200 billion for its climate and energy provisions (see Annex 1 for more details on the specific provisions). The discrepancy between assessments depends crucially on assumptions regarding the uptake rate of EVs and the scale of clean energy deployment. Moreover, the availability of critical material from domestic source and of skilled workers could be a potential brake to a large spread of clean technologies<sup>3</sup>. Note that taking the lower bound of assessments, i.e. \$400 billion, the IRA constitutes the most ambitious package ever found in American history for financing the green transition. Importantly, compared to the previous US green packages, the IRA provides long-lasting financing, with a ten-year window and possible federal payments until 2040, thus paving the way for more structural investment. In addition, IRA subsidies at the federal level often complement private funding and public spending dispersed at the municipal or state level. This is a significant shift from previous US green packages, which were both more short-sighted and fragmented in their financing, and by far less well-funded.

Last, the IRA articulates also a reform of tax policies in which corporations, especially the large ones, are important contributors to the financing of the green transition, thus allowing for a more balanced and fair funding of the ecological transition. In particular, the 15 % minimum tax on incomes of corporations will shut down corporate tax dodging, at least to some extent. Importantly, this provision constitutes a crucial step towards a more ambitious type of corporate minimum tax, i.e. a global corporate minimum tax of 15 %, on which the Biden administration agreed with most of the world's governments. From this point of view also, the IRA represents a shift in paradigm, as it pursues the goal of stopping the race to the bottom among countries in terms of corporate tax rates.

Even so, given all its characteristics, the IRA represents a turning point in the US policy thinking and making. The current standby of some clean projects (such as offshore wind farms in the US and elsewhere in Europe) due to, among other factors, high interest rates also shows that monetary policy should be better coordinated (or articulated) with budgetary policy so as not to unnecessarily hike rates and jeopardise the long-term (structural) projects. The new EU paradigm would benefit from elaborating on both the positive and negative points of IRA.

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<sup>3</sup> For a comprehensive and critical review of assessments, see Bistline et al. (2023).

#### **4.2.The EU responses to the US IRA: What has been done and what would be desirable**

In the EU, the reaction to the passing of the IRA has been instantaneously epidemic and stirred panic (Crawford, 2022). The IRA was perceived as a threat to EU reindustrialisation since the US domestic content's requirement could incentivize European firms to cross the Atlantic to do business there and access the US market.

A few months later, in February 2023, the EU activated a loosening in the State-aid rules at least until 2025, assorted with a “Green Deal Industrial Plan” (GDIP), signaling the rebirth of an industrial policy at the EU level. The GDIP was subsequently declined in two important EU Acts, namely the Net-Zero Industry Act (NZIA) and the Critical Raw Materials Act (CRMA), and further funds were added to support the new EU industrial policy. All in all, summing all European funds targeted toward green transition (from NextGeneration EU to Cohesion fund, and including State-aid funds) would give roughly similar amounts of subsidies than in the case of IRA for the United States (if we consider its lower bound of \$400 billion). Three main concerns remain in the current framework:

- i) A loosening of State aid rules tends to favour rich (and large) countries to the detriment of the poorest (and smallest) EU members. It is conducive to a “race to the top” among EU countries in terms of subsidies. Moreover, resorting to State aids means the extreme opposite of coordinated policies, potentially giving rise to inefficiencies and a loss of public resources;
- ii) Many different funding sources create unnecessary complexity for investors and, once again, inefficiencies;
- iii) The time horizon remains fairly short, subject to either a 7-year multiannual financial framework and/or the 4-year mandate of the European Parliament and Commission.

Finally, a better framework should solve (i)-(iii), or at least tends to decrease inefficiencies arising from (i)-(iii). In particular, a European sovereign fund, which unifies the existing EU funds, could be a part of the toolkit, allowing for a longer time horizon, decoupled from rigid multiannual calendars, functioning in a one-ticket manner, and solving more easily the problem of coordination.

To sum up, and drawing on the recent US experience, the budgetary policy should incorporate more (long-term) supply-side elements, alongside its (short-term) demand-side elements. Budgetary policy also calls for a fine-tuning with monetary policy, to avoid the financing of long-term investment to be hampered by an inappropriate interest rate policy. Moreover, the current standby of some offshore wind projects on both sides of the Atlantic constitutes a good example of why the ECB should operationalize its secondary objectives, in particular those related to climate mitigation.

## 5. DOES THE SEPARATION PARADIGM REST ON STRONG EMPIRICAL GROUNDS?

The separation paradigm takes for granted that monetary policy is effective at stabilizing inflation and the economy, whereas fiscal policy is much less. Against the backdrop of recent experience in policymaking in Europe and in the US, it is worth acknowledging that empirical research on the effects of monetary and fiscal actions has provided a disappointingly large range of plausible effects on output and prices, despite intense effort<sup>4</sup>. While there is still uncertainty on the overall size and timing of the effects, and some puzzles remain to be understood, the literature seems to generally agree that monetary policy tightening in advanced economies has contractionary effects on output and its components and on nominal variables.

For conventional monetary policy, a reasonable range of estimates, obtained with modern identification methods, would suggest that a 100-basis point rise in the policy rate lowers industrial production by between 1% and 2% in the horizon 12-18 months, and prices by between 0.2% and 1.4% at a 24-month horizon (Gertler and Karadi, 2015, Miranda-Agrippino and Ricco 2021, Jarocinski and Karadi 2020).

Unconventional monetary policy is a broad term that may refer to very different forms of policy interventions beyond the conventional change in policy rates in response to economic conditions. Those include quantitative easing (QE), negative interest rates, forward guidance, swap lines, liquidity interventions and more. For the current debate, the effects of the reverse of QE, the so-called quantitative tightening (QT) are the most relevant ones. From an empirical point of view, the research is still developing, and the evidence remains uncertain and weak. While most economists would probably agree that quantitative actions affect financial assets in line with theoretical effects, their macro effects are still debated (see Kuttner 2018 and Dell’Ariccia 2018 for literature reviews). Estimated effects have a wide range, with a 1 trillion dollar QE raising GDP between 0.25 and 1.6% and prices between 0.2% and 1.6%, in the US. Estimated for the Euro Area are generally within this interval (see Hartmann and Smets 2018).

Empirical research has also tried to shed light on the macroeconomic effects of government purchases on economic activity. Results have been hotly debated. However, most empirical economists would agree that output multipliers for a temporary, deficit-financed increase in government purchases obtained from aggregate data tend to span a very large interval with most of the estimates concentrated between 0.6 and 1.5 (see Ramey, 2011, 2016). The empirical research has generally (and surprisingly!) ignored the response of prices to a fiscal shock. However, it has been shown that in most empirical specifications prices do not increase in response to a positive government spending

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<sup>4</sup> See Annex 2 for a thorough review of the recent empirical literature.

shock – the response of prices is flat or even negative –, a ‘fiscal price puzzle’ and contrarily to the effects in theoretical models (Jørgensen and Ravn, 2022).

Theory predicts rather unequivocally that unanticipated increases in taxes – especially when distortionary – should have contractionary effects. However, anticipated tax changes are predicted to affect the economy differently, due to the intertemporal substitution behaviour of the agents that may bring forward their planned activities. The empirical literature on the macro effects of tax shocks is relatively developed and follows closely the literature on government purchases, employing similar identification strategies – narrative and with calibrated elasticities. The work of Mertens and Ravn’s (2014) has offered a reconciliation of the results obtained with different identifications and provided support for tax multipliers in the range - 2 to - 3, in line with the narrative approach of Romer and Romer’s (2010).

## **6. TOWARD A NEW PARADIGM OF JOINT RESPONSIBILITIES**

The emergence of a new paradigm stems from a few observations discussed in the previous sections:

- The high frequency in the occurrence of deep economic crises, for which standard automatic stabilizers are not enough.
- The use of discretionary fiscal policy to stabilize both economic activity and inflation, following the literature on the fiscal multiplier effect of positive sign, although uncertain in size.
- The questioning of the Tinbergen principle attributing exclusively to monetary policy the task of inflation stabilization. Fiscal policy can be used to reduce or increase inflation.
- The end of the dichotomy between a demand-driven short run and a supply-driven long run (Fatas and Summers 2018), and therefore:
- The necessary relationship between short-run economic stabilization and long-run economic objectives, such as the energy transition or the reduction in inequality, which is absent from the separation paradigm.

### **6.1. Monetary and fiscal policy: sharing objectives**

To summarize, monetary policy alone cannot achieve price stability. Joint monetary, tax, fiscal and industrial policies are needed, and were actually used during past episodes. In France, the rise in public deficit after the government used price caps and tax rebates has contributed to reducing the inflation rate by 2.4 percentage points in 2022 and 2 percentage points in 2023 (Creel, Plane & Sampognaro, 2023).

It is usually argued that the recognition of a role for fiscal policy in affecting inflation (denoted as fiscal dominance in the economic literature) is a recipe for a costly inflation bias. What is claimed

in this policy paper is different. Indeed, fiscal policy affects inflation and it is worth acknowledging that it can contribute, together with monetary policy, to price stability over the medium term, especially in a context of large, recurrent crises. It certainly requires a new coordination of tools between euro area governments and the ECB, which is discussed in the following subsection.

The explicit recognition of a role of fiscal policy on price stability would alleviate the pressure on monetary policy to achieve its mandate. Only after this recognition could the current hierarchical mandate of the ECB be fully operationalized. Indeed, after its strategy review in 2021, the ECB has reaffirmed the importance of secondary objectives. The ECB mandate prevents it from fulfilling secondary objectives if it jeopardizes its primary objective (price stability). In this respect, the new paradigm will not give the ECB more traction during an inflation episode. Meanwhile, the ECB will be able to give more substance to the secondary objectives, like the ecological transition, because fiscal policy will also contribute to the first objective which is price stability. Moreover, recognizing the role of fiscal policy in combating inflation would remove the obligation to constantly communicate on the effectiveness of monetary policy at curbing inflation, although this is not always correct. As we show, inflation can have multiple sources that monetary policy alone cannot all fix on its own.

Now regarding fiscal policy, and once again considering the challenges ahead related with the ecological transition, a counter-cyclical feature seems of utmost importance. It will counteract the effects of unexpected shocks on energy and food prices which are inherent to such a transition. That is what we have learned from the experience of some euro area countries in the context of the Ukrainian war. And importantly, fiscal policy should be also oriented towards public and private investment to foster the ecological transition, as we have learned from the US experience with the IRA. A case for a more supply-driven fiscal policy can be made in a similar way for the digital transition.

More precisely, in contrast with the former paradigm, which has drawn on a short-sighted demand-driven policy mix, the new paradigm must be structural: it should try to affect the supply-side of the economy. There are at least three caveats with a structural monetary and fiscal policy mix. First, the long-run view embedded in the policy mix (fostering investment to accelerate the ecological transition) still requires some flexibility in the short run. Measures to alleviate a shock on households' consumption cannot be excluded. They must be consistent with the 3Ts (Timely, Temporary & Targeted). In contrast, structural fiscal policies should be made consistent with what we label TILT policies, i.e. Timely, Investment-related, Lasting (to match the entire horizon of the ecological transition) and Targeted (towards intertemporal fairness – the present generations cannot leave the full burden of climate change to the future generations –, and towards intra-temporal fairness – to prevent strong redistributive effects of public policies to accelerate the ecological transition) . Second, the unfolding of these TILT policies cannot be left unwarranted and the rise of public debts unlimited. The fiscal

margins for manoeuvre of the new paradigm must be consistent with debt sustainability. However, and also because the concept of debt sustainability is very complex and disputable, debt sustainability must really be understood as a political economy constraint, on broad agreement for some households and some firms to pay more taxes at some point in time. There must be a balance between the tool (fiscal policy), its effectiveness at achieving the objective (the ecological transition) and its consequences on the debt ratio. Last, political feasibility must be discussed. Some different layers are possible, between the country-level and the European-level.

It is difficult to say whether the new paradigm is consistent with or complementary to the underlying framework of the European Commission regarding the reform of the European fiscal framework. On the one hand, the European Commission acknowledges the necessity of more counter-cyclical fiscal policies (the proposed expenditure rule is netted out of cyclical unemployment benefits), and the debt correction will depend on the implementation of reforms and investments. On the other hand, the European Commission acknowledges that debt sustainability is the priority of the European fiscal framework. Moreover, the policy horizon is limited at 4 (or 7) years. This may not be long enough to deliver the ecological transition before having to recourse to fiscal austerity. While the new paradigm is meant to give priority to long-term ecological, economic and social challenges, and argues that financial considerations (debt sustainability) is second, the European Commission proposal fits better in the separation paradigm.

## **6.2. Institutions for investment and crisis management**

Drawing on the past functioning of the EU, the new paradigm should make it possible to improve on the coordination of fiscal policies during crises and to face common challenges like the ecological transition. This requires analytical capacity at providing evidence of the superiority of fiscal coordination. The European Fiscal Board, which has now a long experience at assessing the euro area fiscal stance, could help at organising European fiscal coordination. Secondly, the new paradigm should provide a consistent path to reduce public debt in a smooth way to avoid sharp reductions in aggregate demand. The credible implementation of this path is a central issue. Finally, it should acknowledge that economic shocks are not predictable, neither in their size nor in their origin (banking sector, financial markets, commodity prices). Policy discretion and escape clauses are therefore unavoidable.

The achievement of fiscal objectives like inflation, debt reduction, or long-run growth can proceed from different tools. The “standard” option is to elaborate sophisticated rules. For example, the recent reform of the Stability and Growth Pact in an attempt to redefine fiscal rules and make them less pro-cyclical. Institutions provide a second way to implement fiscal policy. An institution could be envisioned in which both Members of the European Parliament and governments are represented to minimise negative and maximise positive spillovers.

Building institutions, not rules, for fiscal coordination may be the best option as heterogeneity in Europe does not allow for a unique fiscal rule for all countries. The Italian debt-to-GDP ratio is twice as high as Germany's. We need consistent institutions to implement a realistic downward path for public debt for countries such as Italy and Portugal. The European Commission's proposal did go in this direction, but the recent agreement is too restrictive in setting through the safeguard clauses deficit reduction target independent on economic conditions.

There are two kinds of critiques one can make, when one thinks of resorting to institutions to implement (fiscal) policies. First, the lack of political consensus makes this option very risky politically, as some countries would see such institutions as an infringement upon their sovereignty. Secondly, these institutions would need to be able to punish countries that do not comply with their commitments. The two critiques are related. It is noteworthy though that they do not only concern institutions but also the ability to implement rules in general.

Among institutions able to foster fiscal coordination, one cannot ignore the possible emergence of a central fiscal capacity. The debate about such a capacity has changed after the Covid crisis and the adoption of Next Generation EU. The issuance of European public debt proves that the tools are available for joint investment policies. In addition, the identification of European public investment needs is now well documented (Cerniglia and Saraceno 2023). The discussion of the path to solve for political economy issues, to be able to implement the desired level of public investment in Europe is outside the scope of the current paper. However, the supply-side nature of fiscal policy that the new paradigm advocates for calls for a coordination of public investment in Europe that a central fiscal capacity may help deliver.

## **7. CONCLUSION**

Over the last decade, the world has shifted from one where fiscal policy was meant to be implemented via rules, such as the full play of automatic stabilisers, to one where fiscal policy was allocated many different objectives while facing recurrent crises: inequality, demand and crisis management, climate change, European convergence and price stability. This is not a problem in itself because fiscal policy consists of a wide set of tools, such as taxes and subsidies, expenditure, and regulation (the example of IRA discussed above is a good case in point). Nevertheless, a new paradigm is needed to coordinate expectations into a consistent set of policies that the former paradigm cannot prescribe because of its reliance on a restrictive application of the Tinbergen principle. While there is a need for as many policy tools as there are policy objectives, separate allocation is no longer relevant in a shaky world.

Despite no coherent rethinking of macroeconomic policy, European countries have thus already innovated and used policy measures which were not thought to be possible before, and which were overall successful. Both macroeconomic data and policymaking in Europe during the current



inflationary episode have moved away from mainstream macroeconomic models and mainstream macroeconomic policymaking.

At this stage, it is certainly important to clarify that a paradigm shift is not required because of the sole return of inflation or that the paradigm shift would not be required now that inflation is fading away. The inflation episode has been an accelerator of our collective awareness of two deficiencies in the separation paradigm. First, it places too much faith in the capacity of monetary policy at achieving price stability. Second, it grants too little effectiveness to fiscal policy at achieving macroeconomic objectives, including in the long run to pursue the ecological transition policy agenda via supply-side fiscal policies.

The new paradigm that we advocate for must give equal consideration to fiscal and monetary policies and their interactions. This is how the use of each of them to achieve the set of objectives will be optimized. These interactions and their respective spillover effects demand better political coordination and a good dose of pragmatism, in contrast with the binding rules embedded in the separation paradigm.

Achieving the right political balance between policies is not easy, but Europeans could usefully refer to precedents. One must first acknowledge a pervasive difference in national preferences, which can be summarised by the amount of national redistribution and the relative size of public finances. In addition, as Europe is not a federation, high permanent transfers across countries must be nationally politically debated. Finally, the amount of public debt inherited from the crises creates additional difficulties in the transition process toward a new fiscal system. A solution to these constraints could be the clear distinction between the regular business cycle and a crisis period. The main focus should be on crisis management. In addition to the institutional coordination of national fiscal policy, we need stabilising tools implementing risk-sharing among European member states and their citizens, notably to mitigate the unemployment risk. The precedent of European instrument for temporary Support to mitigate Unemployment Risks in an Emergency (SURE) is certainly telling: SURE was created at the early stage of the pandemic and it has been unanimously acknowledged by European policymakers as a successful tool to manage aggregate risk sharing in Europe. Enlarging its scope and generalizing it via a new European institutional impetus, rather than via strict but difficult to fulfil rules, is an avenue for considering a new policy paradigm for the EU.

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## ANNEX 1: Main provisions and budgetary assessment of the IRA

Table 1 summarises the budgetary assessment of the main IRA's provisions carried out by the Congressional Budget Office (CBO), as published in September 2022.

On the side of spending, provisions related to energy and climate mitigation account for the bulk of IRA's expenditures, at just under \$370 billion over 10 years. Another provision of the IRA consists of a temporary extension of subsidies related to the Affordable Care Act for an amount of a little less than \$65 billion. This latter aims at reducing the health costs of the elderly (age > 65) and less wealthy American people through 2025.

Regarding revenues, higher taxes paid by corporations make a large contribution to the budget. On the one hand, a 15 % minimum tax rate on the book income of large corporations should finance around \$315 billion over the ten-year window. On the other hand, a reform of the Internal Revenue Services (IRS) consisting of stiffer tax enforcement should fund just under \$125 billion. In addition to higher fiscal revenues, a cap on prescription drug prices would allow the federal authorities to save a little less than \$290 billion.

Thus, according to the CBO, the IRA would reduce the US public deficit by around \$300 billion over the next ten years.

**Table 1: Budgetary Assessment of the IRA by Major Provision**

(10-year impact, 2022-2031, a sign (+) means that the provision contributes to reducing the public deficit, a sign (-) contributes to increasing it).

Provisions	Amounts (in billions of dollars)
Extension of expanded <i>Affordable Care Act</i> subsidies	-64
Climate and energy provisions	-368
<b>Total spending</b>	<b>-432</b>
Minimum tax on book income of certain corporations	313
Carried interest tax reform	13
Prescription drug pricing and other health provisions	288
<i>Internal Revenue Services</i> funding	124
<b>Total revenues</b>	<b>738</b>
<b>TOTAL spending and revenues of IRA</b>	<b>305</b>

Source: CBO (2022), updated assessment released in September 2022.

Other assessments regarding IRA shows that a budgetary cost of \$370 billion for climate and energy provisions, as reported by the CBO, constitutes probably the lower bound, with more plausible estimates yielding figures two or even three times higher (e.g. PWBM, 2022 & 2023; Goldman and Sachs, 2023; Crédit Suisse, 2022; Cole et al., 2023; Bistline et al., 2023). Discrepancies in the assessments are essentially about two elements: (i) the extent to which Americans will adopt EVs and (ii)

the scale of deployment in electrification capacities (for a comparison of assessments, see Bistline et al., 2023).

## **ANNEX 2: Empirical effects of monetary and fiscal policy, a review of the empirical literature**

### **A. 2.1. Effects of Monetary Policy**

The macroeconomic effects of conventional monetary policy shocks have been intensely studied over the past 40 years. A very common identification strategy is the “recursive identification” where monetary policy is assumed to respond to fluctuations in output and prices within the month or the quarters but not to financial variables (see Christiano et al 1999). This identification also assumes that prices and output react with a delay to monetary policy, while financial and monetary aggregates can immediately change in response to monetary shocks. These assumptions are based on a view of the central bank’s reaction function, as well as of the presence of frictions in the economy. Results obtained with this approach show contractionary effects of monetary policy on output and a range of results on prices from mildly contractionary to expansionary – the so-called “price puzzle”.

A different approach, using an instrument to study monetary policy has been proposed by Romer and Romer (2004). This approach, called the “narrative approach”, uses Greenbook forecasts – the Fed’s private forecast of key economic variables – to estimate a forward-looking empirical rule for the policy rate. The residuals of that rule are then assumed to be an instrument for monetary policy shocks. When using this instrument, Romer and Romer (2004) also impose recursive assumptions requiring that output and prices do not respond on impact to policy shocks. They find large contractionary effects on prices and output, albeit with long lags.

Coibion’s (2012) reconciliation of the Romers’ results with the recursive VAR results suggests that a 100-basis point rise in federal funds rate lowers industrial production by about 2% at 18 months.

A different approach, not using the recursiveness assumption, uses sign restrictions (e.g., Uhlig 2005). Sign restrictions do not identify a single model but a set of models compatible with loose assumptions on the response of macro variables. Using this approach, Uhlig (2005) argues that data do not seem to provide indication of real effects of monetary policy, while nominal variables contract following a tightening.

The more recent literature seems to have mostly adopted a high-frequency approach that employs price revisions in financial assets, triggered by monetary policy announcements, to identify shocks. Gertler and Karadi’s (2015) used a high-frequency identification in the form of the monetary policy surprises on federal fund futures of Gurkaynak et al. (2005). They identify contractionary effects to a monetary tightening, roughly in line with recursive identification but without imposing impact restrictions.

A careful examination of the empirical evidence by Ramey (2016) has cast doubts on the empirical evidence from Romer and Romer (2004) and Gertler and Karadi (2015) and showed that it suffers of severe lack of robustness, with unstable results showing even expansionary effects on output and prices of a policy tightening.

A few recent papers (see Miranda-Agrippino and Ricco 2021 and Jarocinski and Karadi 2020) have explained these puzzling results as coming from “information effects” and proposed different strategies to improve the inference. The key idea is that policy announcements convey not only information on policy shifts but also on the state of the economy, contaminating the identification. Estimates obtained with these approaches are fairly robust and provide the range of estimates reported above. Differences remain on the time profile of the impact of monetary shocks.

### **A. 2.2. Unconventional monetary policy**

QE/QT entails the use of the central bank’s balance sheet to influence long-term rates in the economy. Several channels have been proposed for the propagation of macro effects: (i) imperfect substitutability, (ii) signalling about the future policy stance, and (iii) effects on financial balance sheets.

If assets are imperfect substitutes, each asset class has its own demand curve, with limited scope for arbitrage. This would allow changes in the relative supplies of assets to affect prices and yields. Imperfect asset substitutability may arise from two sources: the sensitivity of the term premium to interest rate fluctuations, and market segmentation. Using asset purchases to reduce the supply of long-term bonds should therefore lower their yields by narrowing the term premium or by changing the quantity of different assets available.

QE could also affect interest rates by sending a signal of the willingness of the central bank to maintain an expansionary stance over time. Effectively such a channel would imply that the central bank is binding itself to delay the increase in rates, when it would be required in the future since it would need to first operate a QT to banks off-loads securities from its balance sheet not to incur losses.

Finally, QE may stimulate the loan supply by increasing the value of the existing assets on balance sheets and raising banks’ capital ratios.

These three mechanisms combined are expected to transmit QE and provide stimulation to the economy, and vice versa in the case of QT (the second mechanism is less clear in the case of a tightening).

### **A.2.3. Government purchases**

The macroeconomic effects of government purchases have been hotly debated over the years. Differently from the case of monetary shocks the literature seems not to be fully settled, not just on the magnitude or timing of the effects but also on the sign of the responses of key macroeconomic variables.

Standard neoclassical and new Keynesian (NK) models generally predict that an increase in government purchases, financed through deficits or lump-sum taxes and not allocated to productive public investment, would result in a rise in GDP and hours worked. However, these theories suggest that such an increase would likely lead to a decrease in private consumption and real wages, thus delivering output multipliers below unity, and differently from traditional Keynesian models (see Baxter and King 1993, and Cogan et al 2010 for a discussion based on the RBC and the NK models, respectively). In RBC and NK models, whether private investment increases or decreases depends on how long the government spending increase persists. Beyond the real effects, standard New Keynesian models would predict that expansionary fiscal policy has inflationary effects.

Estimated new Keynesian DSGE models, as for example Smets and Wouters (2007), produce results that are in line with the effects discussed above and close to the neoclassical model and far away from the old-Keynesian intuition: a shock to government spending lowers consumption and results in multipliers below unity.

Models with a larger than one multiplier, along with rises in consumption and real wages, can only be obtained by modifying the standard models to incorporate non-Ricardian/non-optimising features, such as rule-of-thumb consumers, as well as off-the-labour supply curve behaviour of workers (see for example Gali et al., 2007).

A different mechanism happens when the policy rate does not respond to fiscal actions. In fact, the NK model can obtain larger multipliers when the economy is at the “zero lower bound” (see Eggertsson and Woodford 2003, Christiano, Eichenbaum, Rebelo 2011 and Woodford 2011). When nominal interest rates are held constant, agents in the model expect an increase in future inflation, that pushes the real interest rate down, providing stimulation to the economy and delivering large multipliers. These models show that the monetary policy stance is crucial in determining the output and price effects of fiscal actions.

Empirical research has tried to shed light on the effects of fiscal shocks using mostly identified Vector Autoregression models or local projections, incorporating aggregate data, and in conjunction with a few instrumental variables and identification strategies. Common identifications strategies have employed (i) a recursive ordering in which government purchases cannot react to business cycle shocks within the quarter (Blanchard and Perotti, 2022); (ii) sign restrictions (Mountford and Uhlig, 2009), (iii) exogenous increases in spending due to wars and geopolitical events (Ramey, 2011), (iv) professional forecast errors (Ramey, 2011), revisions of fiscal expectations (Forni and Gambetti, 2010).

Results are far from being conclusive and are open to several methodological questions. One key element of difference in the identified responses to fiscal shocks concerns the response of consumption. While recursive identification usually delivers an increase in private consumption, military



news shocks produce either very short-lived increases or contractions in consumption. A different line of research has looked into ‘local multipliers’, estimated on US states or regions and generally reported larger multipliers (see for example Nakamura and Steinsson, 2014). The mapping from local to nationwide multipliers is debated – since taxes are levied at the national level, it is difficult to use local estimates to infer their national counterpart.

Important factors long ignored by standard theoretical and empirical models are (i) the presence of heterogeneous components in fiscal spending and in particular effect of government spending via its investment component; (ii) the effect of transfers across agents with different propensity to consume; and (iii) the presence of slack in the form of underutilization of resources (see Ramey, 2011, for a discussion).

A few studies have explored the possibility that fiscal multipliers may be state-dependent, and possibly larger in recessions due to the presence of slack in the economy. Auerbach and Gorodnichenko (2012a, b) find evidence of larger multipliers in recessions using a smooth transition vector autoregression model and local projections. Ramey and Zubairy (2014) report little evidence of state dependence, based on recessions, elevated unemployment rates, or the zero lower bound. They dispute previous findings as due to methodological problems in the computation of multipliers. Another important deviation from standard models concerns the monetary policy regime. A recent paper by Bianchi et al (2023) looks at the recent inflation surge in the light of a model in which the central bank can respond differently to fiscal shocks either by controlling inflation, or by accommodating unfunded fiscal shocks, and allowing for persistent movements in inflation, output, and real interest rates.

#### **A.2.4. Fiscal transfers and fiscal shocks**

The literature on the macroeconomic effects of fiscal transfers is rather undeveloped, and with very little empirical work on the associated multiplier. The challenge is in identifying exogenous shifters in transfers.

One interesting work is the research of Oh and Reiss (2012) on the effects of transfers in the stimulus packages adopted during the Great Recession. In this work, a heterogeneous agent model is employed to predict multipliers on transfers.

In contrast, the empirical literature on the macro effects of tax shocks is relatively developed and follows closely the literature on government purchases, employing similar identification strategies – narrative and with calibrated elasticities. The work of Mertens and Ravn’s (2014) has offered a reconciliation of the results obtained with different identifications and provided support for tax multipliers in the range - 2 to - 3, in line with the narrative approach of Romer and Romer’s (2010).