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Abstract

A central fiscal capacity (CFC) in the European Union (EU) can in principle perform three roles: provide cyclical stabilisation, support national reforms and investment, and deliver European Public Goods. We build a simple aggregate demand - aggregate supply model, where a CFC depends on shocks and degrees of compliance with common fiscal rules. This analytical framework allows us to examine the policy implications of the three options for a CFC. Based on both the theoretical analysis and the EU's experience in handling the global financial crisis and the pandemic, we show that a CFC would improve policy efficiency by focusing on stabilisation in the event of negative demand shocks and on boosting potential output in the event of negative supply shocks. In the current stagflationary environment, the provision of European Public Goods appears to be the most promising avenue. The need to calibrate the central interventions in relation to the typology of shocks implies that a CFC cannot be put on an automatic pilot. CFC calls for a reform of the euro-area institutional set up, including the creation of a European Minister for Economic Affairs in charge of the "vertical coordination" of the EU's and national budgets and the calibration of the centralised expenditures.

1. Introduction

The recent debate on economic policy coordination in the European Union (EU) has centred on the implementation and future evolution of Next Generation-EU (NGEU), the EU response to the economic consequences of the pandemic launched in the summer of 2020. NGEU and its main programme (the Recovery and Resilience Facility: RRF) focus on a "triple transition" - green, digital, and social – that aims at enhancing the main strengths of the EU's economy (environmental compatibility, welfare system, and regulation), as well as addressing some of its crucial weaknesses (gaps in digital innovations and artificial intelligence with respect to the United States and China).[1] The policy discussion has mainly focused on the challenges in delivering the reform and investment commitments under the RRF, the implications for the monetary-fiscal policy mix, and the possible "vertical coordination" of a temporary centralised fiscal capacity and national fiscal policies.

The international and European economic outlook dramatically changed at the beginning of 2022. In the USA, the overheating of the economy has fuelled a traditional inflation process. Faced with the acceleration of inflation since mid-2021, the Federal Reserve, after some initial hesitation, shifted to an increasingly restrictive monetary policy as of March 2022. The negative impact of the pandemic on global value chains and Russia's invasion of Ukraine have caused a different, but no less worrying,

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[1] For a discussion on the NGEU, see Buti (2021) and Messori (2021); for an analysis of the EU's technological gaps, see Buti and Messori (2021b and 2022b).

inflation dynamics in the EU that has pushed the ECB to adopt a gradually restrictive monetary policy. The end of the net purchases of government bonds by the Euro-system of central banks has weakened the 'safety net' that allowed expansionary national fiscal policies even in member states with a high public debt ratio. Moreover, the end of the generous conditions of the refinancing of the EA banking sector (by means of negative interest rates within the so-called T-LTROIII) is decreasing the amount of liquidity that is circulating in the economy. The ECB has tried to offset the potential asymmetric impact of these measures via the creation of a new tool, the Transmission Protection Instrument (TPI).

The combination of the external shocks and the need to put inflation under control and start reducing the very high stock of public debt will result in a severe slowdown in the economic growth of the Euro Area (EA). The likelihood of a period of stagflation has increased substantially.

Given the protracted geopolitical tensions and economic instability resulting from Russia's invasion of Ukraine, NGEU may not be sufficient to ensure the success of the EU's "triple transition" and its shift onto a higher sustainable growth path. The adoption and diffusion of the new technologies, the green transition and the other reforms and investments, at the core of the NGEU, call for a fully-fledged EU energy policy and the creation of an EU defence and security system.

In two companion papers (Buti and Messori, 2022a and 2022b), we argue that providing appropriate stabilisation tools and the supply of European Public Goods (EPGs)[2] is crucial not only for domestic reasons, but also for strengthening the role of the EU in global economic governance. A significant international role of the EU is key to avoid, in the post-pandemic and post-war period, the demise of the previous multilateral system and its replacement with a bilateral opposition between the USA and China. In Buti and Messori (2021b), we argue that, to avoid a new trans-pacific "cold war", the EU should play the role of "non-neutral" economic mediator between the USA and China.

The combination of stabilisation, reforms and investments, and the EPGs' production would require a central fiscal capacity (CFC) at the EU level supporting the efforts of monetary and national fiscal authorities to effectively respond to the challenges of low growth, high inflation, and unsustainable public finances. Currently, the radical economic and social uncertainty, the ECB's difficulties in defining a clear forward guidance, and the political-institutional weaknesses of the EA and of several of its members make that task very difficult. However, the design of a new economic governance and the implementation of NGEU in the upcoming years could create the longer-term conditions supporting the overhauling of the EU's current economic governance framework.

In the paper, we explore these conditions. By building on the analysis in a previous paper (Buti and Messori, 2021a), we focus on the role of a CFC to ensure a balanced policy mix able to tackle severe shocks and support the EU's long-term economic integration. The main functions potentially performed by a CFC are sketched out in Section 2. In Section 3 we build a stylised model that includes some of the features of the EA and incorporates a central cyclical stabilisation tool. Section 4 presents the main analytical results in an intuitive graphical form. In the light of this theoretical framework, Section 5

[2] In this paper we will refer to the concept of European 'public goods' as different from that of 'common goods' (see also Buti and Papacostantinou, 2022). A pure 'public good' is characterised by two main features: (i) the use of this good by an additional beneficiary has a marginal cost approaching zero; (ii) the exclusion of a potential beneficiary is either inefficient or impossible. These two features imply that market mechanisms tend to supply an insufficient amount of pure 'public goods.' Hence, the creation of an adequate amount of 'public goods' requires a direct or indirect State intervention. A 'common good' shares point (ii) but not (i) of the 'public goods.' By referring to EPGs, we will include goods that are not fully compliant with features (i) and (ii).

analyses the implications of a CFC in terms of policy efficiency. Section 6 describes the impact of the different forms of CFC and discusses the implications of the EU's centralised interventions after the outbreak of the global financial crisis. In the final Section we outline the policy and institutional implications of our analysis.

2. Three possible roles of a CFC

The EU's long-term economic potential would be improved if the member states were able to effectively meet the NGEU and 'Fit-for-55' requirements, also through the RePower-EU, as proposed by the European Commission. NGEU's main programme, the RRF, is the centralised fiscal initiative agreed by the EU in 2020 to achieve these objectives and *build-back-better* after the pandemic. The war on the EU's eastern border should push the area to strengthen its security system, adopt a fully-fledged common energy policy, and improve its economic and social stabilisation, thus easing the convergence between member states. The implementation of such a strategy would allow the EU to weaken the negative impact of the pandemic and war shocks, as well as reduce the EU's technological gaps with respect to the USA and China. It would also allow the EU to strengthen its environmental advantages, thus easing the reform of the welfare systems to ensure a high level of social inclusion related to the new technological and green challenges.

Economic and financial stabilisation, a successful implementation of the RRF, and the production of public goods require appropriate macroeconomic policies and effective microeconomic measures. From a macroeconomic standpoint, the contrasting experience of the global financial crisis and the pandemic shock show that it is very difficult to achieve a long-term adequate fiscal stance solely by means of the coordination of national fiscal policies. Moreover, the new restrictive stance of the ECB's monetary policy in response to the surge in inflation reduces national fiscal space, especially in EU countries with very high stocks of public debt. In terms of microeconomic strategies, the establishment of a European security system and the supply of other EPGs (from a joint public procurement of vaccines to investment in hydrogen energy or from the construction of a European telecommunication network to the joint production of semiconductors), which are key to generate positive externalities in the European single market, cannot be done simply via an aggregation of national projects.

In a previous paper (Buti and Messori, 2021a), we outlined that – in principle – a CFC could focus on three functions: cyclical stabilisation, support for the implementation of national structural reforms and investments, and the supply of EPGs. In Buti and Messori (2021b and 2022b), we show that these different options also have important implications for the EU's geo-economic role. Table 1 sketches out the main goals, the operational targets, and the key features of these three options.

The first option, that is, creating a central stabilisation capacity, would be the most rational one for the completion of the EA's economic governance framework. It would complement the ECB's monetary policy and national fiscal policies in response to symmetric and country-specific demand shocks. The ensuing more balanced policy mix would lower the dependence on external demand, thereby allowing the EU to rely less on the role of the euro exchange rate as a channel of adjustment, and hence as a potential factor of friction with international partners.

Such an option, however, has proven to be very contentious politically. One year before the pandemic shock, the Commission proposed an embryo of a stabilisation capacity based on loans: the European Investment Stabilisation Function (EISF) (European Commission, 2018). The discussions in the EU Council and the European Council proved very difficult and substantially weakened the ambition of the Commission's proposal. Eventually, as the pandemic hit the EU, the EISF was superseded by NGEU.

Table 1 CENTRAL FISCAL CAPACITY: THREE OPTIONS

Central fiscal capacity / Policy Goal	Stabilisation function	Reform and investment support	Supply of EPGs
Main goal	Ensure a balanced policy mix in case of large shocks	Enhance resilience and sustainability	Promote the double transition and security
Operational target	Support of domestic demand	Boost reforms and investment for growth and adjustment	Increase centrally-financed long term investment
Key feature	EA dimension of stabilisation	Trust building as condition for vertical coordination	Foster open strategic autonomy

Source: Authors' elaboration

The most cumbersome political issue of this first option is 'moral hazard': if the national governments anticipated the support by a central fiscal instrument in case of negative shocks, they would have a lower incentive to create national fiscal room for manoeuvre in periods of strong growth. This would lead to a ratcheting up of public debt and increase the risk of fiscal dominance. The observed lack of fiscal adjustments during "good times" strengthened this argument (see e.g., European Commission, 2019). As economic literature has proved long ago (e.g., Hirshleifer and Riley, 1992; Kreps, 1990), such concerns could be alleviated via appropriate incentives and eligibility requirements. However, in the European debate, the design of contracts under imperfect information has not received enough consideration. A reason is that the reference to 'moral hazard' is not analytically based, but it reflects a deep mistrust between member states masked as concern for institutional legitimacy. This implies that the political feasibility of the first option will remain untested unless there is improvement in cooperation (and trust) between the EU's member states.

The second option, that is, setting up conditional transfers to national budgets to support reforms and investment, would help build trust, increase resilience, and enhance potential growth and economic dynamism with favourable effects both domestically and internationally. Such an option would be akin to *de facto* reviving the proposal of 'Contractual Arrangements' made by Herman van Rompuy in mid-2013 when he was at the helm of the European Council. The proposal was rejected by the majority of the EU's member states at the end of that same year: the Northern countries refused permanent transfers whilst the Southern countries resented an intrusive role of the European authorities in their domestic policy choices. However, after the pandemic shock, the RRF has built an institutional infrastructure that encompasses many ingredients of the original Contractual Arrangements, including conditional grants

and precise commitments on reforms and investments. The main differences pertain to the legal and political conditions more than to the economic ones.[3]

In case of success, the CFC would thus perform two roles: cyclical stabilisation, and reforms and investment support. As mentioned in Table 1, it remains that the CFC would not have a sufficient "European added value". As we have pointed out in an earlier paper (Buti and Messori, 2020; see also: Pisani Ferry, 2020; Buti and Fabbrini, 2022), in the agreement on NGEU reached at the European Council in July 2020, the non-allocated part of RRF which would have provided "pure" EPGs (as dubbed by Buti and Papacostantinou, 2022) was substantially reduced in favour of transfers to member states.[4]

This is a signal that, due to national political incentives, increasing the supply of EPGs delivered and financed at EU level would be far from easy. However, as shown by the pandemic and Russia's invasion of Ukraine, a sequence of negative and extraordinary shocks makes the supply of EPGs compelling. It is sufficient to recall here the need of centralising the purchase of Covid-19 vaccines, of building an EU security to protect all the member states under external threat, and of pooling the EU's energy provisions to weaken its dependence on Russia.

Our discussion of Table 1 confirms that, in principle, a CFC should achieve its three roles and be utilised according to the different economic phases. This is clearly a tall order. As in many other areas, the EU would have to acknowledge that it operates in a second-best environment and put its limited "political capital" into achieving the most likely results. This second-best approach poses an obvious question: which is the effective implementation of the CFC's different functions to handle present and future shocks? To address this question in an appropriate framework, we need to refer to a crucial aspect concerning the legal foundations of a CFC.

As shown by Tosato (2021; see also Maduro *et al.*, 2021), NGEU's architecture and the related issuance of European debt are based on a temporary construction, which is outside the EU multiannual framework and was justified by a sudden and unpredictable event: the outbreak of the pandemic. As already mentioned, this means that the EU Treaty allows for a CFC as a temporary response to extraordinary events, and hence it is difficult to attribute to fiscal centralisation a permanent role (such as the stabilisation function or the production of EPGs). The continuation of a CFC beyond 2026 could only be justified by a new extraordinary emergency. However, as Tosato (2021) suggests, the sequence of negative events characterising the EU in the last fifteen years indicates that the recurrence of dramatic shocks could become the 'new normal' in the future. In this respect, Russia's invasion of Ukraine and the likely perspective of a long-lasting 'cold war' offer a dramatic confirmation. Consequently, whilst a central fiscal tool would remain temporary, it could become recurrent to handle an unexpected but likely sequence of shocks.

A recurrent CFC could be further strengthened by an appropriate reform of the EU fiscal rules. As argued by Amato *et al.* (2021; see also Romanelli *et al.*, 2022), these new rules could be inspired by the RRF's methodology. This methodology implies that centralised transfers to member states are conditional on

[3] The NGEU's legal basis (art 122 of the European Treaty), recently extended to RePower-Eu, allows for temporary community action due to extraordinary events, such as the pandemic or Russia's invasion of Ukraine. Instead, Contractual Arrangements would imply conditional transfers independently of specific events. We will argue below that it is possible to build a bridge between the two options.

[4] The Commission attempted to recreate the space for EPGs by focusing on seven flagship initiatives (three in the domain of ecological transition, three in digital transition, and one in social policy), and by pushing member states to present transnational projects within their RRPs. Such an attempt, however, was not fully successful.

the implementation of the national plans in the due time and at the agreed costs. Analogously, the new fiscal rules should provide for achievements of fiscal targets by means of agreed country-specific adjustments in the national balance sheets; and the centralised transfers to the EU countries would become conditional on their compliance with these specific commitments. Moreover, the production of EPGs would be predicated upon stepping up political integration within the area.

Thus, in this medium-term framework compatible with the current European Treaties, a temporary but recurrent CFC could perform one (or more) of the three roles illustrated in Table 1, depending on the specific circumstances. In the longer term, a successful implementation of the CFC could lead to changes in the EU Treaties, so that the NGEU would become the first step in the construction of a permanent fiscal capacity at the EU level.

3. A simple model of an economy with a central fiscal capacity

In the previous section we argued that a CFC could perform three roles: cyclical stabilisation, support of reform and investment, and the supply of public goods. To pave the way for a better assessment of the implications of a CFC on the EU policy mix, we build a simple aggregate demand – aggregate supply model of an economy with and without a CFC.[5] The general version of the model roughly incorporates the three functions attributed to the CFC. Then, as mentioned above, we define the equilibria determined by a specific version of this model, where the CFC works only as a stabilisation tool.

In our general model, the economy is described by four equations determining the equilibrium value of output and the rate of inflation. Aggregate demand and supply are affected by shocks whose expected value is zero.

(1) $Y_d = a_1 D - a_2 (i - \pi^e) - a_3 \pi + a_4 C + \varepsilon_d$

(2) $Y_s = Y_P + b (\pi - \pi^e) + \varepsilon_s$

(3) $Y_P = Y_N + t C$

(4) $Y_d = Y_s = Y$

where the symbols represent:
Y_d and Y_s – respectively – the 'real' aggregate demand and the 'real' current supply; Y_P the potential output; Y_N the long-term 'real' output, D the national structural deficit; C the 'real' flow of centralised net expenditures, i the nominal average level of interest rates; π the current inflation rate, π^e the expected inflation rate, and π_t the target inflation rate; a_j (with j = 1, 2, 3), a_4, b and t parameters, with $0 < a_j , b < 1 , a_4 \gtrless 0, 0 \leq t \leq 1$; ε_d and ε_s exogenous demand and supply shocks, here modelled as white noises with $E(\varepsilon) = 0$.

Aggregate demand depends, positively, on the stance of national and centralised fiscal policies and, negatively, on the real interest rate. It depends also on the inflation rate π which affects the internal

[5] In principle, we should analyse a two-country model where countries have different levels of public debt and different preferences for fiscal discipline. However, the distinction between these two countries would make the analytical solution of the model and the graphic representation of its main results excessively complex compared to the aim of this paper.

purchasing power and, externally, net exports.[6] On the supply side, the deviation of output from potential is related to the inflation surprise. If *C* is just a stabilisation tool, it does not affect potential output, therefore *t=0*. Instead, if the centralised net expenditures support the implementation of structural reforms and investment at the national level or are a direct investment in public goods, potential output is a function of CFC (*t>0*).

The CFC is assumed to depend on the shocks to the economy and on the degree of compliance with the fiscal rules:[7]

(5) $C = C_0 - \mu (\varepsilon_d + \varepsilon_s) - \delta (D - D_t)$;

where C_0 denotes the 'real' flow of centralised net expenditures that are carried out when the centralised fiscal rules are met; D_t indicates the structural deficit target complying with the fiscal rules; and μ and δ are parameters, with $\mu > 0$ and $0 < \delta < 1$.

We assume $D \geq D_t$ because the national policy maker responds to political incentives for re-election by boosting public spending. We also assume $D - D_t \leq C_0/\delta$, which implies that *C* becomes negative only in the case of large positive shocks.[8] It follows that, beyond C_0, the CFC depends on two sets of variables in our model: the intensity of the shocks and the degree of compliance with the deficit target determined by the common fiscal rules (in the EU, by the Medium-Term Objective as defined in the 2012 'Fiscal Compact'). By referring again to the current EU setting, whilst a 'temporary' fiscal centralised stimulus can be thought about as depending just on the intensity of the negative shocks (the case of NGEU), in our model a long-term CFC is crucially linked also to the degree of compliance with the common fiscal rules.

As already indicated, in the analytical version of the model, we assume that the CFC plays only the role of cyclical stabilisation. This means that *C* acts through the demand side and does not affect supply, that is, $a_4 > 0$ and $t = 0$. Hence, Y_P becomes equal to Y_N. Under this specific case, the system (1) – (4) can be re-written as:

(6) $Y_d = a_1 D - a_2 (i - \pi^e) - a_3 \pi + a_4 C + \varepsilon_d$

(7) $Y_s = Y_N + b (\pi - \pi^e) + \varepsilon_s$

(8) $Y_d = Y_s = Y$

In the absence of shocks, 'divine coincidence' holds (see Blanchard and Galì, 2007): meeting the inflation rate target implies that also a zero-output gap is achieved.

[6] The model refers to a closed economy, therefore the impact via net export is only implicit. Nonetheless, the effect of this impact is significant because, in the past years – mainly from 2014 to mid-2021 - the EA's economic growth was often export-led.

[7] In our model, we have two policy actors - the fiscal authority and the central bank – which minimise their loss function (see equations 9 and 10 below). One could interpret equation (5) as the behavioural function of a European central authority which supplies a shared good - *C* - according to pre-specified rules. In the current European institutional setting, our model would then capture a three-party game between the ECB, the Council (as the national fiscal authority) and the Commission (as the central fiscal authority). In a similar vein, Balboni *et al.* (2007) develops a model where the ECB, the Council and the Commission are represented as interacting optimising agents.

[8] In the rest of the analysis, we focus on negative shocks which imply $C > 0$.

The behaviour of the fiscal authorities and the central bank are captured by two loss functions (see also: Buti *et al.*, 2001):

(9) $L_{FP} = (Y - Y_N)^2 + \alpha\,(D - D_t)^2 + \beta\,(D - D_p)^2$

(10) $L_{MP} = (\pi - \pi_t)^2 + \gamma\,(i - i_N)^2$

where the symbols denote:
D_p the deficit target determined by national political objectives; and i_N the equilibrium interest rate. α, β and γ are parameters with a positive sign. We also set the interest rate equal to the central bank's policy interest rate. Hence, the assumption $i \geq 0$ implies that the central bank is subject to a zero-lower bound (ZLB) constraint.

Both the representative national policy maker and the central bank aim at minimising their loss functions (L_{FP} and L_{MP}, respectively) by utilising their instrumental variables, that is, D in the case of the national fiscal policy maker and i in the case of the central bank.

According to equation (9), the national fiscal authority aims at keeping output close to potential. However, it is costly for the national government to deviate from two targets: the deficit target complying with the fiscal rules (D_t), due to the negative reaction of C to $D > D_t$; and the deficit target coherent with the internal political goals of the re-elections (D_p), where $D_p \geq D_t$.

According to equation (10), the central bank attempts to meet the inflation target but faces a cost in deviating from the equilibrium interest rate, i_N, which, in absence of shocks, ensures $\pi = \pi_t$. This configuration leads to an interest rate smoothing: in equilibrium (i.e., in absence of shocks), the central bank meets the inflation target because i_N fully offsets any impulse coming from the national or central fiscal policy (see Woodford, 2003); however, when shocks occur, the interest rate is moved only gradually towards the level required to keep inflation on target. It must be noted that, in our model, i_N is endogenously determined. In absence of shocks, we have:[9]

(11) $i_N = [\frac{\beta D_p}{\alpha + \beta}\,(a_1 - a_4\,\delta) + a_4\,C_0 - 1]\,\frac{1}{a_2}$

Equation (11) shows that i_N depends on C_0: if the exogenous variable C_0 increases, there will be an increase in the equilibrium level of i_N and i so that the ZLB becomes less binding.

For the sake of simplicity, we set $\pi_t = 0$ and $D_t = 0$.[10] We also set $\pi^e = 0$, thus economic agents expect that the central bank meets its inflation target in absence of shocks. Concerning the impact of fiscal policy on demand, we make two other specifications. First, we assume that the multiplier of the CFC is higher than that of the national fiscal capacity, that is, $a_1 - a_4 < 0$.[11] Second, we assume $a_1 - \delta a_4 > 0$, which implies

[9] See the Appendix for the algebra.

[10] The ECB's target has been recently set at 2% instead of lower but close to 2% (see, e.g., Benigno *et al.*, 2021b); hence, our assumption will fit with the rationale of the new rule, even if we simplify the target to 0. The same applies to D_t. According to the Fiscal Compact, the MTO should not exceed 0.5% of GDP, (i.e. $D_t \leq 0.5$) in the EA member states with a public debt-to-GDP ratio above 60%; this is consistent with assuming $D_t = 0$.

[11] This assumption, which is crucial in our framework, can be easily justified. It suffices to recall that a CFC strengthens the stabilisation in the area, thus determining positive externalities of all the players. If we referred to the other possible functions of CFC, these externalities would also depend on the support that the CFC offers to reforms and investment and to the production of EPGs.

that a rise in the national budget deficit has a net positive effect on output (i.e., the direct fiscal impulse is larger than the indirect negative impact arising from the decrease in C).

Given these assumptions, we solve the minimisation problem set by equations (9) and (10). The solution is presented in the Appendix. In their general form, $\partial L_{FP}/\partial D = 0$ and $\partial L_{MP}/\partial i = 0$ imply:

$$(12)\quad D = D\,(i, C_0, D_p, \varepsilon_d, \varepsilon_s)$$
$$\qquad\qquad +\ -\ +\ -\ -$$

$$(13)\quad i = i\,(D, C_0, D_p, \varepsilon_d, \varepsilon_s)$$
$$\qquad\qquad +\ +\ +\ +\ -$$

Expressions (12) and (13) represent the implicit form of the reaction functions of the national fiscal authority and the central bank, respectively. They show that D and i depend on the other policy variable, the parameters of the model and the two shocks. The Nash equilibrium is given by the intersections of the two reaction functions. These equilibrium values are labelled $\{D_E, i_E\}$.

Given the assumption $a_1 - \delta a_4 > 0$, the signs of the partial derivatives in (12) and (13) imply that both the monetary and fiscal reaction functions are positively sloped. Moreover, reasonable assumptions on the relative values of the parameters imply that the monetary reaction function is flatter than the fiscal one (see the Appendix). These two conditions on the slopes of the reaction functions lead to stable equilibria in the absence as well as in the presence of a CFC. Finally, the assumption $a_1 - \delta a_4 > 0$ implies that the multiplier of the national fiscal policy is lower – i.e., the slope of the fiscal reaction function is flatter – above the D_t threshold, as the deviations from the deficit target set by the central fiscal rule (D_t) decreases the size of the CFC (see equation 5).[12] However, as stated above, the non-compliance with D_t reduces but does not cancel the effectiveness of the national fiscal policy in the presence of a CFC.

These results corroborate the conclusion reached in Section 2. Even in its simplified form relating to the stabilisation function, our model highlights that the strengthening of the CFC implies a lower probability that monetary policy hits the ZLB and eases the construction of a credible rules-based governance. This amounts to state that, in the EU institutional setting, a growing weight of the CFC weakens the likelihood of a country ending up under the Excessive Deficit Procedure. These results are also important with respect to the EU's international role. As just stated, our model indicates that a stronger CFC increases the equilibrium level of i (see equation 11). However, due to the interest rate smoothing (see equation 10), this adjustment takes time, so that there is a temporary increase in the current inflation rate; in turn, as implicitly suggested by equation (6), the inflation rate influences the exchange rate. It follows that a stronger CFC indirectly deters export-led growth.

As we will show graphically in the next section, a CFC also has specific impacts in presence of negative exogenous shocks (see equations 12 and 13). CFC implies that negative demand shocks have a lower probability to lead to an excess of public expenditure as well as to impose "fiscal dominance" and a

[12] In principle, one could argue that the multiplier of the national fiscal policy becomes *increasingly* lower, and the slope of the fiscal reaction function becomes flatter *and concave*, as the difference between D and D_t rises. However, our model is too simple to encompass such non-linearities in the reaction functions. The inclusion of these non-linearities would require the endogenization of the parameter δ and a more complex structure of equation 5 that goes beyond the scope of our analysis.

violation of the ZLB constraint (that is, negative policy interest rates).[13] Conversely, in the case of negative supply shocks, the introduction of CFC would increase the probability that monetary policy would hit the ZLB or lose its independence.

4. The CFC as cyclical stabilisation: a graphical presentation

The previous analysis can be clarified by using a graphical representation of the main results.

The upper part of Figure 1 depicts the monetary and fiscal reaction functions in the policy space $D - i$, whilst the relations between the national and the central fiscal policy are presented in the lower part, in absence of exogenous shocks. The $F_D - F_D$ line represents the fiscal reaction function without central fiscal capacity, whereas the bold $F_{D+C} - F_{D+C}$ line represents the correspondent reaction function with a CFC as specified in equation (5). $F_{D+C} - F_{D+C}$ becomes flatter to the right of D_t (by assumption equal to 0). The changing shape of $F_{D+C} - F_{D+C}$ is due to the assumption that the multiplier of the CFC is higher than that of the national fiscal capacity. Hence, on the left of D_t, the slope of $F_{D+C} - F_{D+C}$ is steeper than that of $F_D - F_D$, because the multiplier is a combination of a given amount of central net expenditures (C_0) and of a national decreasing structural surplus. To the right of D_t instead, C starts decreasing in a proportion defined by δ, and becomes zero at $D_t + C_0/\delta$. Hence, to the right of D_t, the slope of $F_{D+C} - F_{D+C}$ is flatter (even with respect to $F_D - F_D$) and, at $D_t + C_0/\delta$, the $F_{D+C} - F_{D+C}$ line and the $F_D - F_D$ line coincide. The lower part of Figure 1 represents the relation between national and central fiscal policies according to equation (5), in the $C - D$ space. C_{D+C} is the equilibrium point.

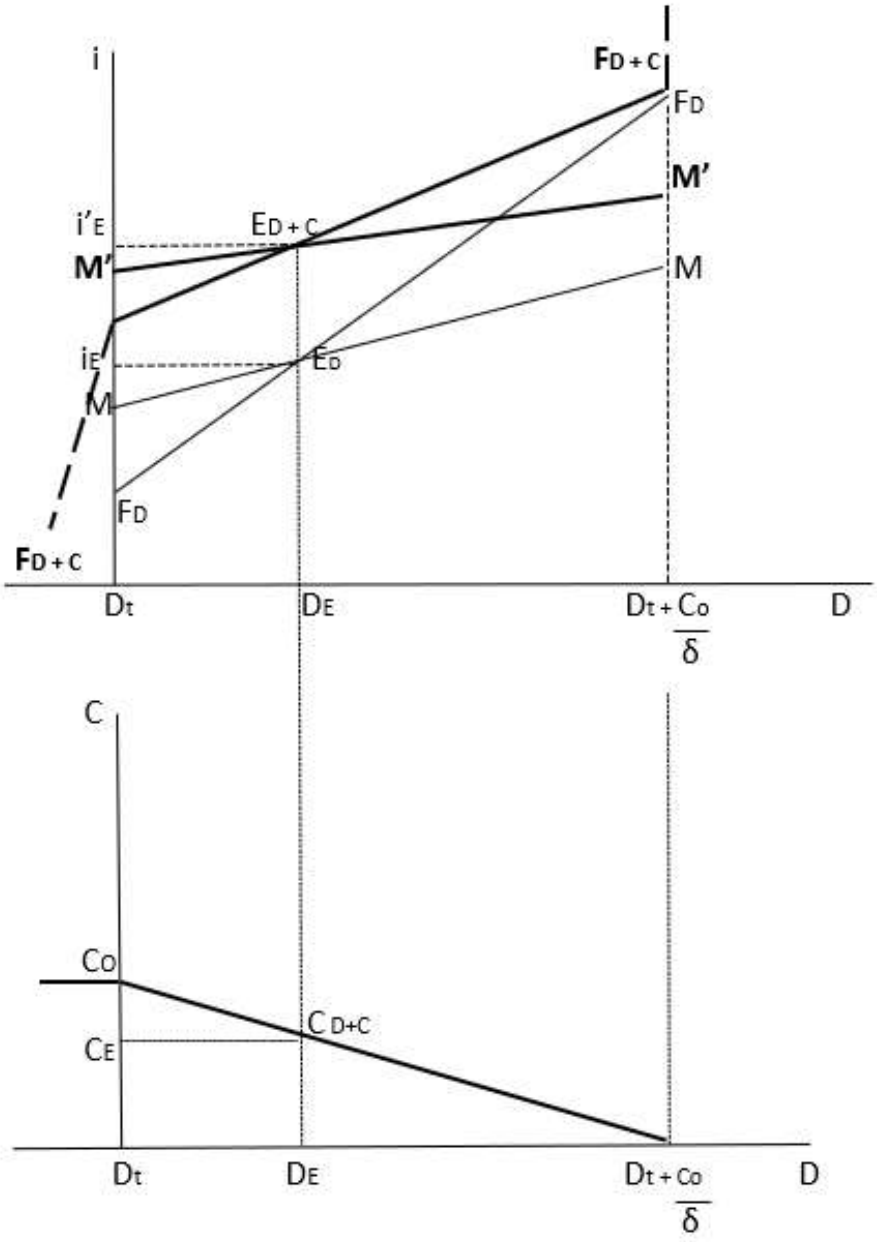
As already mentioned, 'divine coincidence' implies that, in the absence of shocks, the monetary policy achieves the inflation target and – in so doing – also ensures the zero-output gap condition. In the case without CFC, the Nash equilibrium is determined by the intersection of the monetary reaction function $M - M$ and the fiscal reaction function $F_D - F_D$ (see point E_D in the upper part of Figure 1), so that $\{D_E, i_E\}$ are the equilibrium values in the policy space.

The introduction of a CFC implies an upward shift in the fiscal reaction function (C is added to D). To reach the equilibrium, the central bank increases the interest rate, thus determining an upward shift of the monetary reaction function to $M' - M'$ line.[14] This means that the increase in the equilibrium interest rate (from i_E to i'_E) fully compensates the introduction of a CFC, that is, it absorbs the expansionary impact of the new mix of national and central fiscal policies (see equation 11). Hence, the risks of excessive inflation rates and of current aggregate output above the potential are avoided without any change in D_E. The new Nash equilibrium is determined by the intersection of the monetary reaction function $M' - M'$ and the fiscal reaction function $F_{D+C} - F_{D+C}$ (see point E_{D+C}), that is, by the equilibrium values $\{D_E, i'_E\}$.

[13] A definition of "fiscal dominance" that specifically applies to the 2014- 2018 period in the EA is offered by Benigno *et al.* (2021a) and Buti and Messori (2021b). As shown by Buti (2021) and Messori (2021), this definition cannot be fully assimilated to the famous statement made by Sargent and Wallace (1981).

[14] As shown by equation A7 and the related assumptions in the Appendix, $M' - M'$ is flatter than $M - M$.

Fig. 1 ***Monetary and fiscal reaction functions***

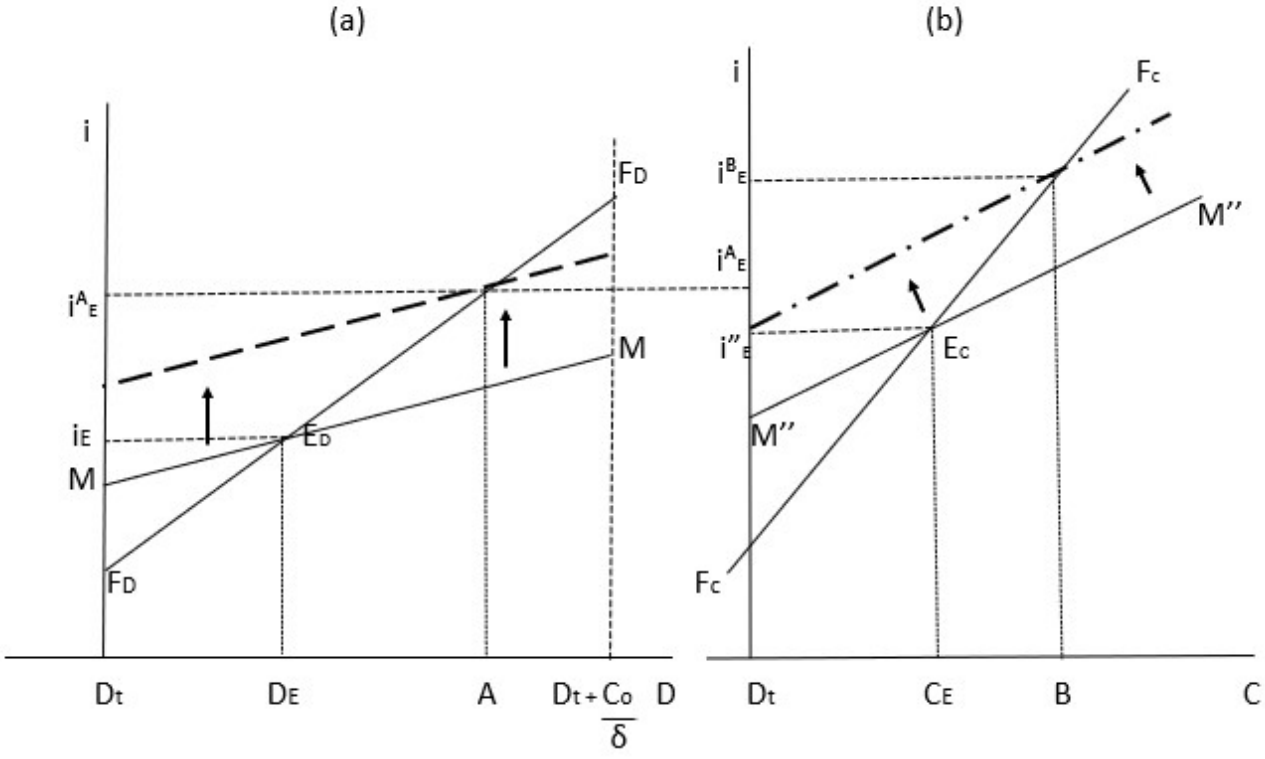


Source: Authors' elaboration

Figure 2 compares two 'corner' solutions still in the absence of external shocks: the equilibrium reached without a CFC, and the equilibrium that would be reached if the national fiscal policy was fully replaced with the CFC. In the left-hand part of Figure 2 (panel a), the Nash equilibrium is point E_D (see Figure 1); in the right-hand part of Figure 2 (panel b) instead, the equilibrium is determined by plotting the fiscal and monetary reaction functions in the new space $C - i$. We obtain, respectively, $F_C - F_C$ and $M'' - M''$. Let us compare Figure 2 (b) to Figure 1. The fiscal reaction function $F_C - F_C$ is steeper than $F_D - F_D$, and even than $F_{D+C} - F_{D+C}$ on the left of D_t on the horizontal axis, because it is assumed that the multiplier of

the CFC is higher than that of national fiscal policy. It follows that also the monetary reaction function *M" – M"* is steeper than *M – M*.[15] The intersection between $F_C - F_C$ and *M" – M"* sets an equilibrium interest rate ($i"_E$) which is not only higher than i_E but also higher than i'_E (as determined in Figure 1).

Fig. 2 ***Reaction functions as "corner" solutions***



$D_t D_E = D_t C_E$ with $D_E A > C_E B$

Source: Authors' elaboration

These two extreme settings (without CFC or only with a CFC) show that a restrictive monetary impulse can be compensated by a lower amount of centralised net expenditures than of national spending. Let us assume that the initial equilibria in the two settings of Figure 2 (panel (a) and (b), respectively) are characterised by the same amount of public net expenditures ($D_t D_E = D_t C_E$), that is, by a structural deficit that is equal to $D_t D_E$ in case (a) and that coincides with the net centralised expenditure $D_t C_E$ in case (b). Then, we assume a given restrictive monetary impulse represented by an equivalent upward shift in the monetary reaction functions of both these cases. In case (b), this impulse can be absorbed by a weaker reaction of fiscal policy than in case (a), that is, $C_E B < D_E A$. By construction, the equilibrium interest rate will be higher in case (b) than in case (a) (that is, $i^B_E > i"_E$, $i^A_E > i_E$). An equivalent conclusion also applies to non-corner solutions: if the weight of the CFC increases relative to the national fiscal policy, a given restriction in monetary policy and the consequent rise in the interest rates can be compensated by a lower increase in *C + D*.

[15] See the Appendix for a detailed analytical treatment.

Our conclusion is that, even if we consider the upward pressure on the interest rate, *ceteris paribus,* the strengthening of the CFC will stabilise the economy. For instance, in a recession such as the one that has characterised the EU economy during the pandemic, an increase in the weight of the CFC reduces the probability of unsustainable increases in public deficits and public debt, as well as the probability that monetary policy hits the ZLB/Effective Lower Bound (ELB). With reference to the EA and the EU, this means that a growing role of the CFC weakens the likelihood of a country ending up in Excessive Deficit and of the ECB having to move into a negative interest rate territory.

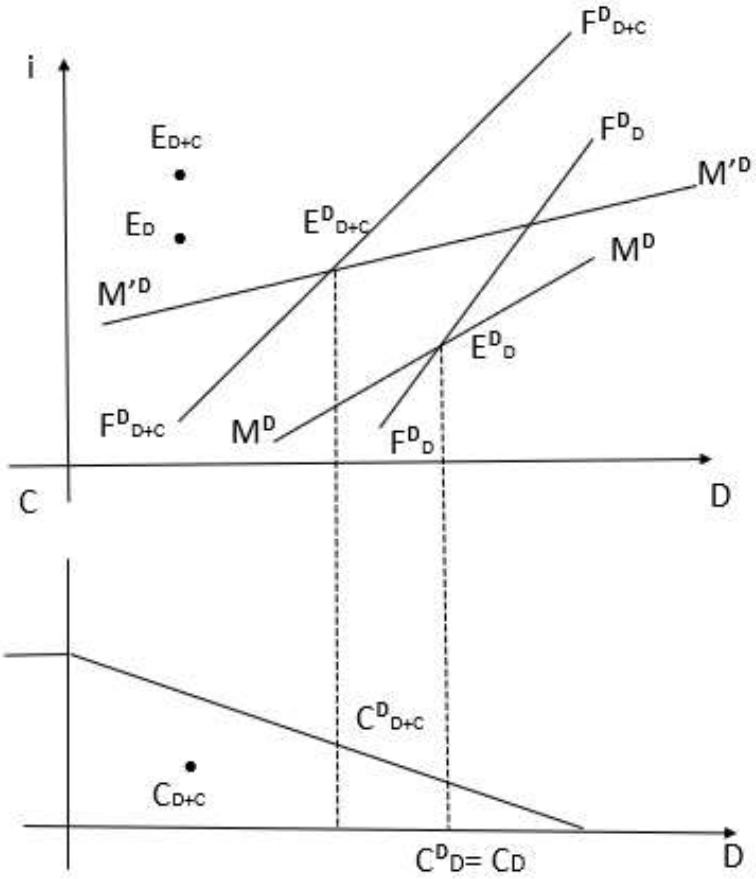
So far, we have looked at the equilibria that are reached in a model with a fiscal centralised stabilisation function in absence of shocks. Equations (6) – (11) and (5) show that, when negative shocks occur either on the demand or on the supply side of our model (see above, n. 8), the new equilibrium values of D and i are determined by shifts in both reaction functions with respect to Figure 1.

The upper part of Figure 3 portrays these shifts in the case of a negative demand shock starting from the equilibria E_D and E_{D+C}. This shock determines shifts to the right of both the fiscal reaction functions without and with CFC (respectively, from $F_D - F_D$ to $F^D{}_D - F^D{}_D$ and from $F_{D+C} - F_{D+C}$ to $F^D{}_{D+C} - F^D{}_{D+C}$) due to the decrease in the aggregate demand. The corresponding monetary reaction functions shift downward (respectively, from $M - M$ to $M^D - M^D$ and from $M' - M'$ to $M'^D - M'^D$) to contrast an inflation rate moving below the target as a consequence of a negative output gap.[16] It follows that the two new Nash equilibria (respectively, $E^D{}_D$ and $E^D{}_{D+C}$) are characterised by lower interest rates and higher national structural deficits in comparison with the corresponding equilibria in Figure 1 (that is, E_D and E_{D+C} also specified in the upper part of Figure 3). It must be noted that, in presence of a CFC, the positive direct reaction of C to the negative shock dominates the negative indirect effect on C due to the deviation of the structural deficit from the central fiscal rules (see the above assumptions and equation 5). Hence, the centralised net expenditure goes up; and due to the higher fiscal multiplier of the CFC, the deviation of the national structural deficit from the central fiscal rule is lower than in the case without CFC. The new reaction functions $F^D{}_{D+C} - F^D{}_{D+C}$ and $M'^D - M'^D$ in the upper part of Figure 3 entail a shift in the curve relating C to D in the lower part of the same figure: the increase in the centralised net expenditure determines the equilibrium $C^D{}_{D+C}$, which is on the right and above the previous equilibrium in absence of shocks (see C_{D+C}).

In sum, in the event of a negative demand shock, both national fiscal and monetary policies move in an expansionary direction, but such expansion is more moderate in the presence of CFC than without.

[16] It is worth noting that these shifts do not change the slopes of the respective monetary reaction functions; and the same applies to the fiscal reaction functions analysed above. However, this time, the $F^D{}_{D+C} - F^D{}_{D+C}$ line has a different point of discontinuity at $D_t + C_0/\delta$. With respect to the case without shock, it is no longer true that, at the right of $D_t + C_0/\delta$, C becomes equal to 0. Given that D does not increase further by assumption, C can continue to be pushed up until the exogenous demand shock continues to have a negative impact on the economy.

Fig. 3 ***Response to a negative demand shock***



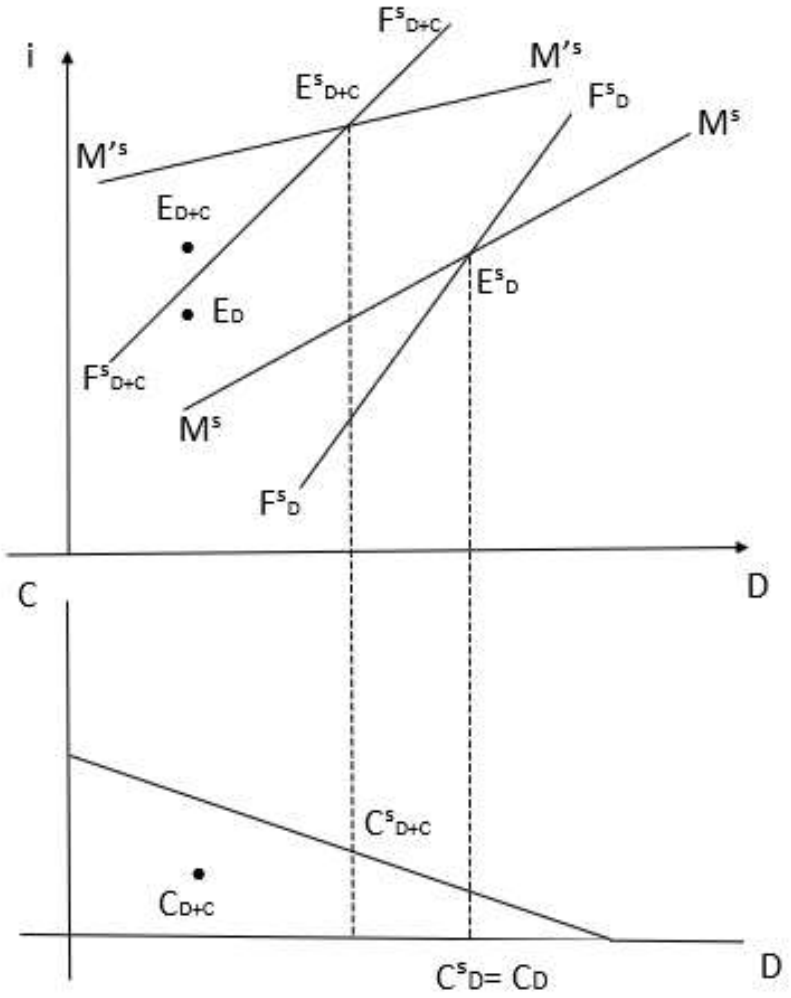
Source: Authors' elaboration

The upper part of Figure 4 portrays the shifts in fiscal and monetary reaction functions in the case of a negative supply shock starting from the equilibria in Figure 1 (E_D and E_{D+C} also specified in the new Figure). On the one hand, as in the case of the demand shock, this new shock determines shifts to the right of the fiscal reaction functions without and with CFC (respectively, from $F_D - F_D$ to $F^S_D - F^S_D$ and from $F_{D+C} - F_{D+C}$ to $F^S_{D+C} - F^S_{D+C}$) to counter the decrease in the aggregate demand. On the other hand, the corresponding monetary reaction functions shift upward (respectively, from $M - M$ to $M^S - M^S$ and from $M' - M'$ to $M'^S - M'^S$) to contrast a rising inflation rate above the target. It follows that the two new Nash equilibria (respectively, E^S_D and E^S_{D+C} in Figure 3) are characterised by higher interest rates and higher national structural deficits in comparison with the corresponding equilibria in Figure 1. In presence of a CFC, the new reaction functions $F^S_{D+C} - F^S_{D+C}$ and $M'^S - M'^S$ entail a shift in the curve relating C to D in the lower part of Figure 4: the increase in the centralised net expenditure moves to C^S_{D+C} which is on the right and above the previous equilibrium in absence of shocks (see C_{D+C}).

As expected, if the economy is hit by a negative supply shock, the policies move in opposite directions: an expansionary fiscal policy goes hand in hand with a restrictive monetary policy. As in the case of the

negative demand shock, the centralised net expenditure goes up; however, due to the higher multiplier of the CFC, the stance of the monetary policy must be more restrictive in the presence than in the absence of a CFC.

Fig. 4 Response to a negative supply shock



Source: Authors' elaboration

Figures 3 and 4 complete the graphical representation of our model. This representation specifies a rich set of Nash equilibria determined by the intersections between the fiscal and the monetary reaction functions. In the next section, we discuss the policy efficiency of these equilibria.

5. Different options of a CFC: impact on policy efficiency

In our definition, policy efficiency holds when a given policy mix implies minimised values of the two loss functions of our model (see equations 12 and 13, given equations 9 and 10), that is, when the combination of *D*, *C*, and *i* leads to an equilibrium at which these loss functions have values that are lower than the corresponding values deriving from any other policy mix compatible with our model's equilibria.

The previous graphical presentation highlights that, in the absence of shocks, the introduction of a CFC improves policy efficiency. As shown in Figure 1 (see Section 4), the equilibrium $\{D_E, i'_E\}$ with CFC dominates the equilibrium $\{D_E, i_E\}$ without CFC in the sense that, given the same national structural deficit, point E_{D+C} allows a lower expansionary stance of monetary policy than point E_D so that E_{D+C} represents the best combination of the policy tools compatible with equilibria in our model in the absence of a shock. As shown in Figure 2, this is equivalent to stating that a given stance of the monetary policy is associated with a progressively lower amount of net public expenditures when CFC is introduced and acquires a growing weight relatively to the national structural deficit (at the corner solutions, $C_EB < D_EA$). Analogously, Figure 2 implies that a given increase in net public spending will require a more substantial increase in the policy interest rate to ensure price stability if this increase is based on a larger share of central expenditure. These results are due to the assumption that central fiscal policy has a higher multiplier than that of the national fiscal policy.

As depicted in Figure 3, the same results apply in the presence of a negative demand shock. As we have already shown, in comparison with the equilibrium with CFC but without a demand shock (E_{D+C}; see also Figure 1), the new equilibrium (E^D_{D+C}) implies that, both, the monetary and fiscal policies expand to absorb the impact of the new shock. However, by enhancing the effectiveness of the fiscal multiplier, the CFC entails a lower pressure on monetary policy, as exemplified by the position of E^D_{D+C} with respect to that of the new equilibrium without CFC (E^D_D). When there is a CFC, the response to a given negative demand shock is based on a lower national structural deficit and a less expansionary stance of the monetary policy than in the case without CFC. Hence, CFC implies that the likelihood of 'fiscal dominance' (see n.13, above) is weakened and the independence of the central bank is strengthened. It is interesting to add that, as monetary policy works also externally via the exchange rate, our model implicitly suggests that a stronger CFC also implies – *ceteris paribus* – a lower accumulation of external surpluses, and hence less reliance on external demand.

Our general conclusion is that, in case of a negative demand shock, the Nash equilibrium with CFC $\{E^D_{D+C}$ in Figure 3$\}$ dominates, in terms of policy efficiency, the corresponding equilibrium without CFC $\{E^D_D\}$.

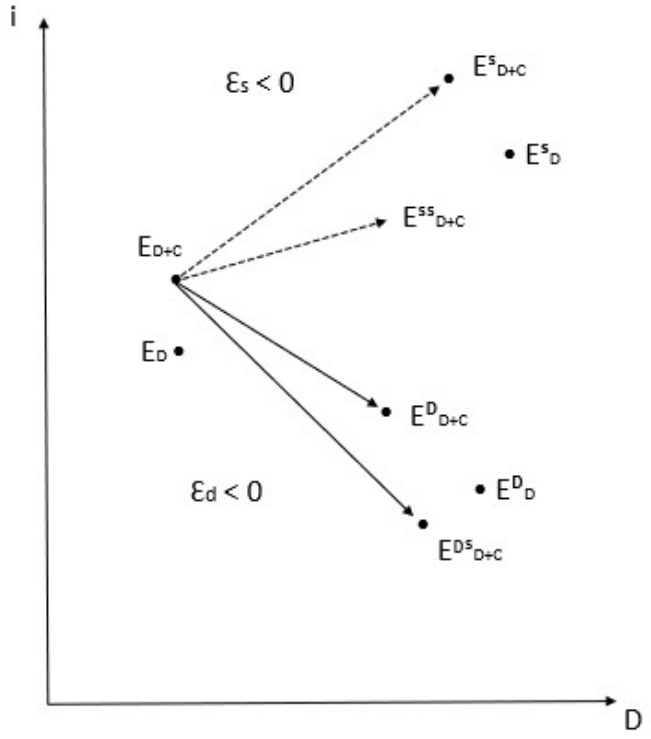
This result does not mean that the presence of CFC ensures an improvement in policy efficiency under any type of exogenous shocks. The introduction of a stabilisation-based CFC does not improve the policy efficiency in the event of a negative supply shock. In such a case, as shown in Figure 4 and the previous equilibrium with CFC but without a negative shock (E_{D+C}; see also Figure 1), the new equilibrium with CFC and with a negative supply shock (E^S_{D+C}) is determined by an opposite reaction of fiscal and monetary policies: as already shown in Section 4, the response to the shock implies an expansion of the fiscal policy and a restriction of the monetary policy. The main implication, highlighted by the comparison between the new equilibrium with CFC (that is, E^S_{D+C}) and the new equilibrium without CFC (E^S_D), is that the introduction of a central fiscal stimulus requires a stronger restrictive reaction by the central bank. Needless to say, this result is the consequence of the higher fiscal multiplier of the central capacity. Here, it matters because it confirms that E^S_{D+C} does not dominate E^S_D in terms of policy efficiency.

The previous analysis of the graphical equilibria has thus shown that, in our model focusing on stabilisation, a CFC helps improve policy efficiency in absence of shocks and in presence of negative demand shocks, but not in the case of negative supply shocks. Will this conclusion hold if we consider the other two functions of CFC, namely the support to reforms and investment and the supply of public goods?

As we have pointed out in the general formulation of our model (see equations (1) – (4) in Section 3), option two and three in Table 1 imply that CFC exerts a positive impact not only on aggregate demand but also on aggregate supply. Formally, this means that the parameter *t* becomes positive in equation 3, so *C* affects potential output (Y_P). The impact of the CFC on the supply side of the economy alters the reaction of monetary and fiscal policies (see equations 5, 9 and 10). Hence, we should complement the solutions derived for the case of stabilisation (system of equations 6 – 8), with a formal derivation of two other versions of our model incorporating the additional functions of CFC. This exercise would be cumbersome. Under various typologies of negative shocks, the channels of propagation of their impact go in opposite directions so that the signs of the policy reactions become theoretically ambiguous. Hence, to achieve clear-cut results, the two new versions of our model would require a full parametrisation of the model. This goes beyond the scope of this paper.

Despite the limits of our framework, it is possible to draw various qualitative results under plausible assumptions on the values of the parameters. In this respect, Figure 5 captures the positive impact of CFC on aggregate supply (see equations 2 and 3), regardless of its specific form (NGEU-type or EPGs). Given this positive impact, the introduction of a CFC that boosts output supply tends to be destabilising in the event of negative demand shocks and stabilising in the event of negative supply shocks.

Fig. 5 Supply side effects of a CFC



Source: Authors' elaboration

As the centralised fiscal supports of reforms and investment or public goods boost aggregate supply, they tend to exacerbate the impact of a negative demand shock ($\varepsilon_D < 0$) which leads to lower inflation and a lower output. Conversely, the increase in (one of) the two new forms of CFC leads to a higher potential output which entails a larger negative output gap compared to the first model, where a CFC has only the function of stabiliser; given that the CFC increases potential output, there is also a larger fall in inflation. It follows that the monetary policy should be loosened more than in the model with only central fiscal stabilisation. Moreover, as the national fiscal policy aims at stabilising output at around its higher potential level, also the national structural deficit should be increased more than in the model with only cyclical stabilisation. It follows that, with (one of) the new forms of CFC, both the central bank and the national fiscal authorities need to implement more expansionary policies to absorb the consequences of a negative demand shock (see E^{DS}_{D+C} compared to E^{D}_{D+C} in Figure 5).

Conversely, the positive supply side effects of the two new forms of CFC ease the absorption of the lower output and higher inflation deriving from a negative supply effect ($\varepsilon_S < 0$); hence, the monetary policy should restrict less compared to the model with cyclical stabilisation only. Similarly, a less expansionary fiscal stance would be needed to keep output close to potential. In short, monetary policy can restrict less and national fiscal policy can expand less to handle the consequences of a negative supply shock (see E^{SS}_{D+C} compared to E^{S}_{D+C} and to in Figure 5).

These results, based on the comparison between an economy with a central fiscal stabiliser and an otherwise identical economy with a CFC acting on both the demand and the supply side, are unambiguous. However, what are the implications for policy efficiency of an equilibria model with and without a CFC? The comparison between the equilibria with and without CFC depends on the net balance of the opposite effects on aggregate demand and supply. The new forms of CFC would improve policy efficiency if the demand impact was stronger (weaker) than the supply impact in the event of negative demand (supply) shocks.

So far, we have bundled together the two new forms of CFC in Table 1: a NGEU-type central instrument to support investment and reforms, and the provision of EPGs. However, it is inappropriate to assume that these two forms of CFC play the same role in the determination of the equilibria in our model.

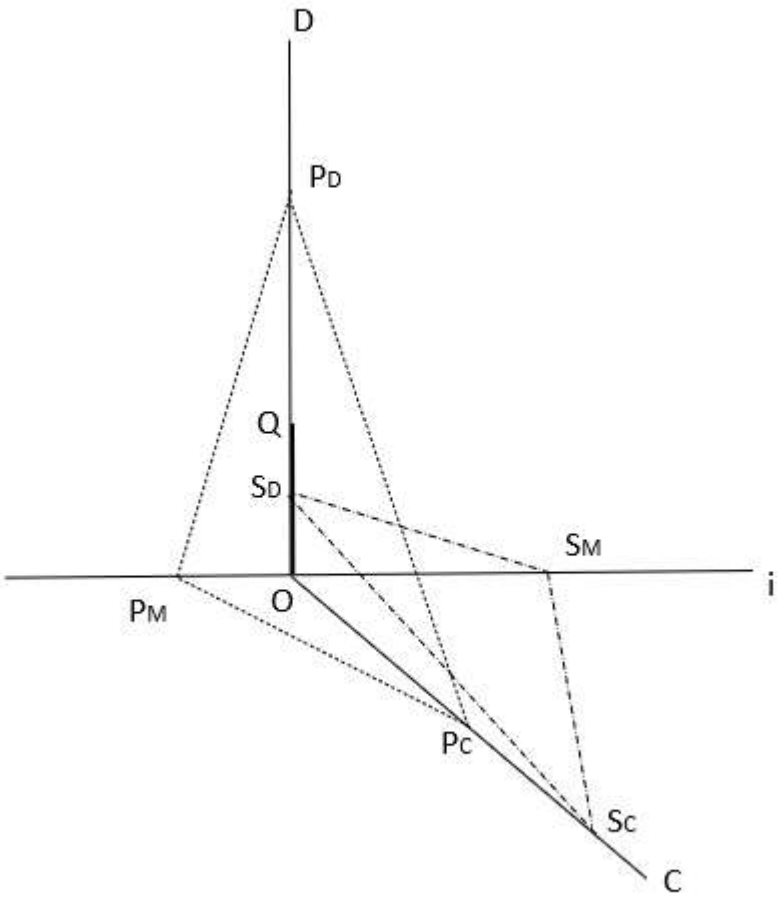
As stated above, the introduction of a NGEU-type central instrument in our model has a positive impact on potential output ($t > 0$ in equation 3) and aggregate demand ($a_4 > 0$ in equation 1). However, certain types of reforms can reduce demand, partly offsetting the positive impact of investment, and some innovative investment can temporarily reduce output due to production restructuring. Hence, it is reasonable to assume that, in our simplified model, the impact of NGEU-type CFC is weaker in comparison with CFC as a provider of EPGs. The impact of this form of CFC on both demand and supply are likely to be larger because it improves output directly by adding to the production potential, and indirectly via economies of scale.

In sum, in our model, a central stabilisation tool improves policy efficiency in equilibrium and under negative demand shocks, but not under negative supply shocks. A supply side-enhancing CFC can have positive effects under supply shocks, but not under demand shocks. These last effects are accentuated if the CFC focuses on providing EPGs, compared to supporting reforms and investment, given the higher supply-side and demand-side effects of the former compared to the latter.

6. From theory to practice: policy sequencing in the last twelve years

In Sections 3 to 5, we have developed an analytical framework to assess the implications on policy efficiency of various forms of CFC. In the present section, we analyse the evolution of the policy mix in the EU from the end of the global financial crisis and the peak of the EA crises to the late consequences of the pandemic and the war in Ukraine in the light of our theoretical results. Our narrative can, thus, be interpreted as a qualitative analysis of the gaps between the actual policies implemented in the EU and an ideal policy efficiency. We examine three periods: the 2014 – 2018 period, the output shortfall in the first half of 2020 and the subsequent economic rebound, the current stagflationary phase. Figure 6 portrays the combinations of *D*, *i* and *C* throughout these three periods.

Fig. 6 ***Policy mix: from the pandemic to stagflation***



Source: Authors' elaboration

In the years following the global and European crises, the EA's national fiscal policies were characterised by a restrictive or a neutral stance in the context of high public debt and deficits. Due to the EA's new recessionary phase (2011 – 2013), these policies were largely pro-cyclical. The central fiscal interventions were centred on European aid programmes and focused on the macroeconomic adjustments in the most fragile member states. The onus of sustaining aggregate demand fell exclusively on the shoulders of the ECB. The initiative of the Outright Monetary Transactions (OMT, in September 2012) paved the way for the unconventional monetary expansion (since late summer of 2014). The OMT and, then, the T-LTROs and the APPs had a strong stabilising effect by sustaining the economy and alleviating market concerns on redenomination risks. The downside of this unbalanced policy mix was an overburdening of the monetary policy implying a *sui generis* fiscal dominance (Buti, 2021; Messori, 2021). In Figure 6, the main features of this first period are represented by the interest rate at the ZLB (i = 0), a sizeable structural deficit (*OQ*), and no CFC (C = 0).

The reaction of the European institutions to the pandemic shock shows an effective process of 'learning by doing' or, better, of 'learning by correcting previous mistakes.' The policy mix implemented by the EU and national policymakers in 2020-2021 was radically different from that pursued immediately after the global financial crisis and the peak of the EA crises. When the pandemic hit the EA and EU economies, monetary policy moved even more into negative interest rate territory, de facto attaining the ELB.[17] The ECB coupled these decisions on interest rates with the launch of new asset purchase programmes (the PEPP and a once-for-all enlargement of the previous APP), the strengthening of the T-LTROIII, the revival of various forms of LTRO, and the suspension of its collateral framework. Fiscal policies became more reactive. Thanks also to the 'safety net' offered by the ECB, national fiscal policies expanded vigorously after the activation of the General Escape Clause of the Stability and Growth Pact. At the central level, the EU set up a temporary CFC via the SURE programme and, more importantly, via the NGEU. Therefore, in this second period, the policy mix was characterised by a simultaneous expansion of monetary policy, national fiscal policies supported by a centralised intervention, and a CFC. All together the outcome was centred on a strong stabilisation effect and on an embryo of a CFC supporting reforms and public and private investments.[18]

In terms of Figure 6, the policy response to the pandemic is captured by the triangle $P_M P_D P_C$ in dotted lines. OP_M is an indicator of the ELB and the huge amount of liquidity pumped into the economic system; OP_D signals the huge amount of national transfers to firms and households that dramatically increased national structural deficits; OP_C indicates the long-term loans and grants transferred by the EU to its member states through the allocation of SURE and NGEU.

The EU policy response to the stagflationary shock brought about by the legacy of the pandemic and Russia's invasion of Ukraine is still in the making. The rise in the inflation rate has pushed the ECB to discontinue its unconventional net purchases of assets, to reduce its amount of refinancing, and to move out of the negative policy interest rates territory. Moreover, the ECB has announced additional rises in its rates in the next months. On the fiscal side, it will become necessary to bring the bourgeoning public

[17] It should be recalled that the ECB introduced negative interest rates in June 2014, fixing a rate of – 0.10% on deposit facility, and then (spring 2016) the ECB itself offered a negative rate of – 0.40% on the refinancing of the most virtuous banks in terms of their past and future lending policy.

[18] The actual launch of the RRF, as the main programme of NGEU, can be dated to late summer 2021. Hence, the NGEU's positive impact on reforms and investment, and thus on the European aggregate demand and supply, has become significant since the first two quarters of 2022. However, many member states cashed the first (equal to 13% of the total amount) and the second portion of their RRF's resources by the end of 2021.

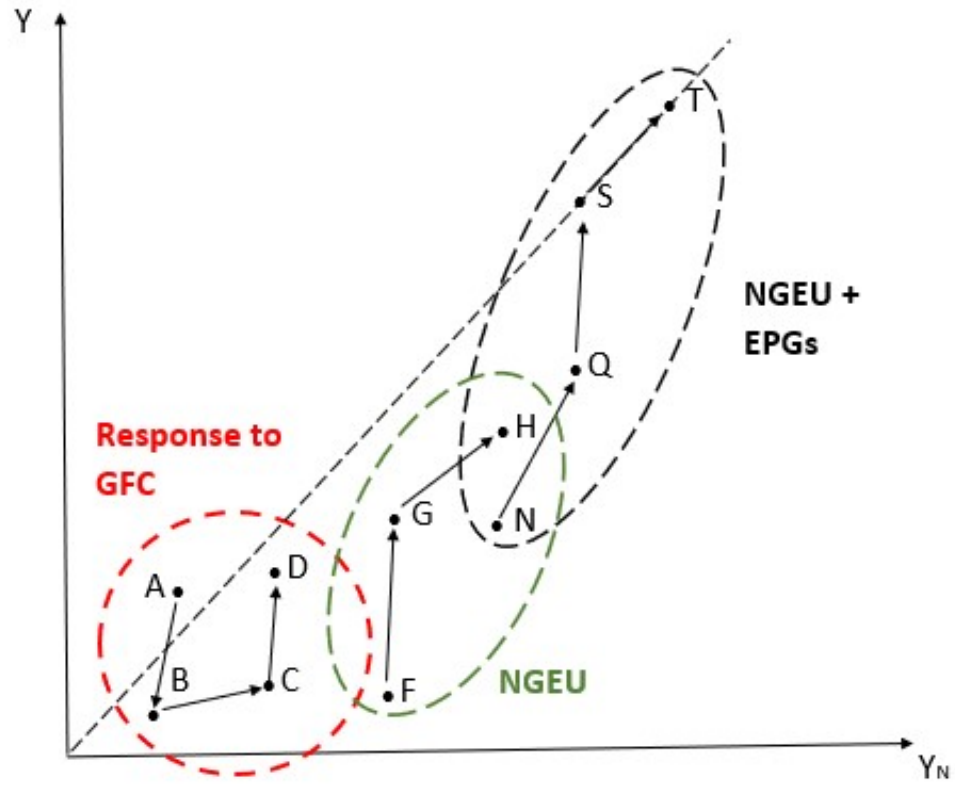
debt under control, particularly in the most fragile EA member states deprived of the ECB's safety net. This necessary retrenchment will lead to a gradual reduction in the national structural deficits. The resulting policy mix is needed to put the inflation rate under control; however, it also increases the risk of recession in the EA. This trade off would be lessened if the EU were to agree on a recurring extension and a strengthening of the CFC (see also Section 2). Given the goal of taming inflation, the centralised fiscal intervention should be designed so as to boost the supply side of the economy in order to counter the present negative supply shock. This is equivalent to stating that the focus should be on the second and third form of CFC, as stressed in Table 1, and specifically on the CFC as provision of EPGs (see also Section 5).

In Figure 6, the EU-national policy mix in the third period analysed and still in the making is represented by the triangle $S_D\, S_M\, S_C$ in chain-dot lines. OS_M indicates the current and upcoming increases of ECB's interest rates; OS_D (or better, P_DS_D) is a measure of the required gradual adjustments in national structural deficits; OS_C (or better, P_CS_C) stresses the need of a strengthened and recurrent CFC, mainly a CFC as provision of EPGs, to reduce the risk of implementing a policy mix as an unplanned support of stagflation.

To complete our narrative on the recent evolution of the various types of European policy mix, it is worthwhile to assess the impact of the latter on the EU's economic outcomes. In Figure 7, we attempt to describe in a synthetic and qualitative fashion how the EU policy decisions over the past twelve years have affected actual output (Y) in terms of cyclical stabilisation, and potential output (Y_N) in terms of long-term growth.[19] We focus on three phases that, roughly, overlap the three periods analysed in Figure 6: the response to the global financial crisis and the EA sovereign debt and banking crises, the response to the pandemic, and the desirable response to the current stagflationary threats.

[19] For the sake of simplicity, henceforth we neglect the distinction of potential and long-term natural output introduced in our general model.

Fig. 7 *Policy outcomes from the pandemic to stagflation*



Source: Authors' elaboration

The effects on actual and potential output of the European response to the global financial crisis and the EA crisis are represented by the *A-D* sequence of this figure. After an initial swift response via expansionary monetary and fiscal policies, which led to a cyclical rebound, the monetary-fiscal policy mix turned restrictive in 2010 and in the first three quarters of 2011, precisely when the EA economy was heading into new severe macroeconomic problems and was on the brink of a second recession. The EFSF and ESM interventions during the EA sovereign debt crisis were key to safeguarding the integrity of the EA, but they had a pro-cyclical recessionary bias that also affected the potential output. The short-term outcome was a severe decrease in actual output (see *AB* in Figure 7). The market-induced structural reforms had a longer-term positive impact on potential output in the most vulnerable member states (see segment *BC*). The EU and EA economies recovered since mid-2014 thanks mainly to the vigorous ECB measures centred on unconventional monetary policy tools which had a strong stabilising effect (as depicted by *CD*).

The response to the pandemic is captured by the *F-H* sequence (see again Figure 7). The lockdown brought about a severe fall in output. The strong stabilising effects of the monetary and fiscal policies measures, taken from spring to summer 2020, avoided the bankruptcy of efficient firms, a generalised collapse in the average purchasing power, and a long-term decrease of the participation rate in the EU

labour market. These policy interventions prevented a significant decrease in the potential output and paved the way for a strong rebound in current output towards its pre-crisis level (segment *FG*). Moreover, current and potential output benefitted from the implementation of NGEU via the RRF and the National Recovery and Resilient Plans (NRRPs). As already noticed, several national plans were approved in mid-2021. Hence, the segment *GH* records the short-term expansionary impact of reforms and investment on aggregate demand and supply; and it registers the initial steps of the positive effects of the NGEU-type CFC on EU long-term output, which is still more important.

The third sequence (*N-T*) in Figure 7 offers a snapshot of the desirable evolution of actual and potential outputs in the upcoming years. It encompasses the successful completion of RRF and the possible establishment of a new form of CFC, centred on the production of EPGs. In the short term, the expected negative impact of the bottlenecks on global value chains and of the war in Ukraine, as well as the restrictive policy mix, weigh on actual and potential output. However, the EU longer-term prospects are more positive. The implementation of NGEU until 2026-27 is expected to benefit both actual and potential output. In the first phases (see segments *NQ* and *QS*) the implementation of the investment to foster the green and digital transitions determines a significant but contrasted increase in aggregate demand and supply due to the mentioned temporary constraints; then, these constraints can still limit the supply-side, thereby increasing *Y* and closing the output gap.[20] In the light of the analysis in Section 5 (included in Figure 7), the most effective response to the risk of stagflation is thus offered by the steadfast implementation of NGEU, coupled with the new form of CFC centred on EPGs, complementing a gradual tightening by the ECB. These two forms of CFC would boost both the current and the potential output (see segment *ST*). Such a combination would dominate others in terms of policy efficiency.

7. Concluding remarks

In this paper, we have analysed if and how a CFC could help achieve a more efficient policy mix in the EU. A CFC can in principle take three forms: a fiscal stabilisation tool, an instrument to support the national reforms and investment, and a central supply of EPGs. By means of a stylised aggregate demand-aggregate supply model, we show that a CFC would help rebalance the contributions of the common monetary policy and national fiscal policies in equilibrium, whilst its benefits in response to shocks depend on the typology of shocks and the CFC's relative impact on demand and supply: a central fiscal stabilisation would reduce the pressure on national fiscal policies - hence favouring compliance with the common fiscal rules - and help monetary policy to escape the ZLB/ELB under negative demand shocks; a CFC focusing on supporting reform and investment or, even more, delivering public goods would improve policy efficiency in the event of negative supply shocks.

We argue that the introduction of NGEU as a temporary fiscal tool contributed to achieving a more effective response to the pandemic if compared to the response to the global financial crisis and the EA crisis. To help monetary policy escape the ELB, fiscal policy had to become expansionary during the pandemic. If only national fiscal policy had been available, the appropriate national fiscal stance would have required an even larger violation of the common rules going even further beyond the *de facto* suspension of the SGP by means of the "escape clause". It would have also increased the pressure on the ECB, thereby accentuating the risks of fiscal dominance.

[20] The rationale is that production restructuring takes more time than the overcoming of the short-term negative impact that some reforms have on aggregate demand.

Whilst it is largely acknowledged that the central fiscal expansion helped tackle the short-term economic fall out of the pandemic, would a CFC also help to deal with the stagflationary shock brought about by the legacy of the pandemic and the outbreak of the war in Ukraine? Our answer is positive, provided that this central fiscal policy is designed to improve the supply side of the economy. Should the CFC be focused on the provision of EPGs, it would have two effects: first, it would help sustain demand and hence relieve the pressure on national fiscal policies, and second, by boosting the supply side, it would support the anti-inflationary policies of the ECB.

How to create the political conditions to establish a CFC? Here, we need to avoid a possible 'vicious circle'. If national fiscal policies keep violating the common fiscal rules, the political conditions to centralise a number of fiscal tasks are unlikely to be met; however, the lack of a central fiscal tool increases the likelihood violation of the central fiscal rules during a severe economic shock. Since the beginning of 2022, a similar 'vicious circle' has risked materialising. The unexpected persistence of the disruption of value chains in the aftermath of the pandemic and the impact of the war are causing an acceleration of inflation rates and a sharp slowdown in economic growth. The stance of the ECB's monetary policy is becoming restrictive and the fiscal space of member states with excessive public debt/GDP ratios is rapidly vanishing. In this situation, a strengthening of the CFC would be crucial in the EU to avoid such a vicious circle.

From the discussion above we conclude that the central fiscal capacity should ideally fulfil all three roles and be activated in a differentiated manner depending on the specific circumstances of the economy. Two overarching policy implications emerge from the analysis. First, given the current high stagflationary risks, priority should be given to a central fiscal expenditure that has positive supply side effects. Investing in EPGs in the areas of health, energy, security and defence appears to be the most appealing avenue at the current juncture. Second, the appropriate size and the effective form of a CFC need to be calibrated according to the different circumstances of the EU economy (typology of the exogenous shocks, cyclical phase, etc.). This calibration can only be achieved by a system of economic governance with a strong central power, namely a European Minister of the Economy in charge of "vertical coordination" of national budgets and the central fiscal capacity in its various forms.[21]

The above would imply a radical overhaul of the European system of economic governance. We realise that this is clearly a tall order and may be out of reach in the present circumstances. However, as the establishment of NGEU shows, whilst the EU continues to operate in a second-best environment, its "political capital" is elastic, especially in periods of deep uncertainty such as the present one. In such circumstances, setting the political and institutional ambitions high is the prudent strategy to pursue.

[21] The establishment of a European minister for the economy was put forward by the Commission in December 2017 as part of a proposed overhauling of the EA's institutional setting (see European Commission, 2017).

Appendix: Analytical solution of the model

A1. Deriving the expressions of the reaction functions

The reference is to the system of equations (6) – (8), (5) and (11), as discussed in Section 3. By utilising equilibrium condition (8), equations (6) and (7) lead to:

(A1) $a_1 D - a_2 (i - \pi^e) - a_3 \pi + a_4 C + \varepsilon_d = Y_N + b (\pi - \pi^e) + \varepsilon_s$.

As well as set $\pi^e = \pi_t$ and π_t, $D_t = 0$, we normalise Y_N to 1. After substituting (5) in (A1), we find the expression of the inflation rate, π:

(A2) $\pi = \Lambda D - \Omega i + \Gamma C_0 + \varepsilon_d (\Phi - \Gamma \mu) - \varepsilon_s (\Phi + \Gamma \mu) - \Phi$;

where: $\Lambda = (a_1 - a_4\delta) / (a_3 + b)$; $\Omega = a_2 / (a_3 + b)$; $\Gamma = a_4 / (a_3 + b)$; and $\Phi = 1 / (a_3 + b)$; with $\Lambda, \Omega, \Gamma, \Phi > 0$.
By substituting equation (A2) and equation (5) in equation (6), we obtain the equilibrium level of output, Y:

(A3) $Y = b \Lambda D - (2a_3 + b) \Omega i + b \Gamma C_0 + b \Phi (1 - a_4 \mu) \varepsilon_d + \Phi (a_3 - a_4 b\mu) \varepsilon_s + a_3 \Phi$.

Being $0 < a_3, a_4, b, \mu < 1$, it is reasonable to assume that $a_3 > a_4 b\mu$, therefore a negative supply shock leads to a lower Y.

The loss functions of the national fiscal policy maker and of the central bank are specified by equations (9) and (10), respectively (see Section 3). Given the simplifications specified above, the two loss functions become:

(A4) $L_{FP} = (Y - 1)^2 + \alpha D^2 + \beta (D - D_p)^2$

(A5) $L_{MP} = \pi^2 + \gamma (i - i_N)^2$.

Fiscal and monetary policy makers minimise their loss functions with reference to *D* and *i*, respectively.

The reaction function of the fiscal policy maker satisfies the first-order condition for the following value of its instrumental variable:

(A6) $D = \theta \{[b\Lambda (2a_3 + b) \Omega] i - b^2 \Lambda \Gamma C_0 + \beta D_p - b^2 \Lambda \Phi (1 - a_4 \mu) \varepsilon_d - b\Lambda \Phi (a_3 - a_4 b\mu) \varepsilon_s + b\Lambda + - a_3 b \Lambda \Phi)\}$

where: $\theta = \frac{1}{\alpha + \beta + b^2\Lambda^2}$.

Analogously, the reaction function of the central bank satisfies the first-order condition for the following value of its instrumental variable:

(A7) $i = \Psi [\Lambda\Omega D + (\Omega\Gamma + a_4 K) C_0 + KZ D_p + \Omega (\Phi - \Gamma\mu) \varepsilon_d - \Omega (\Phi + \Gamma\mu) \varepsilon_s + \Omega \Phi - K]$

where: $\Psi = \frac{1}{\Omega^2 + \gamma}$, $K = \frac{\gamma}{a_2}$, and $Z = \frac{a_1 - a_4\delta}{\alpha + \beta}$.

By attributing reasonable relative values to the various parameters, equations (A6) and (A7) offer a confirmation of the signs of the partial derivatives as stated in equations (12) and (13) of Section 3.[22]

[22] The specification of these values as necessary and sufficient conditions for obtaining the required signs in equations (12) and (13), as well as the following results illustrated in the *Appendix*, are available upon request.

Both reaction functions have a positive slope in the policy space, as portrayed in the Figures of Section 4. Whilst not immediately evident by looking at complex expressions, "well behaved" policy reaction functions require that the slope of the monetary one is flatter than that of the fiscal reaction function. As shown in Buti *et al.* (2001, footnote 9), this implies that a higher interest rate (structural deficit) leads to a higher structural deficit (interest rate). The last statement is tantamount to saying that we rule out non-Keynesian effects of national fiscal policies.

The slope of the fiscal reaction function as well as that of the monetary reaction function become flatter when the central fiscal capacity is introduced in a framework that was previously characterised only by a national fiscal policy (see Section 4, Figure 1). As shown by equation (1), the parameter a_4 becomes equal to 0 in the absence of a central fiscal capacity; and the indicator Λ, which is one of the determinants of the slopes of both these reaction functions, is equal to $(a_1 - a_4\delta) / (a_3 + b)$. It follows that the value of Λ reaches its maximum in the absence of a central fiscal capacity, and this same value decreases in the presence of a central fiscal capacity so that the two corresponding reaction functions become flatter.

These results are consistent with the following statements: (a) the slope of the fiscal reaction function in case of a full centralisation of the fiscal capacity is steeper than the slope of this same reaction function in the absence of any central fiscal capacity or in case of a combination of the central fiscal capacity and a positive national structural deficit; and (b) the slope of the monetary reaction function in case of a full centralisation of fiscal policy is steeper than the slope of this same reaction function in the absence of a central fiscal capacity.

A2. Deriving the expressions of the equilibrium interest rate

In the absence of shocks, the central bank will set the interest rate i_N so as to ensure:

$Y = Y_N = 1$, and $\pi = \pi^e = \pi_t = 0$.

It follows that the fiscal reaction function becomes:

(A8) $L_{FP} = \alpha D^2 + \beta (D - D_p)^2$

Hence, $\frac{\partial L_{FP}}{\partial D} = 0$ implies:

(A9) $D_E = \frac{\beta D_p}{\alpha + \beta}$.

Given the simplifications of the monetary reaction function, it is trivial to show that these conditions are compatible with: $i = i_N$.

It should be remembered that i_N is an endogenous variable in our model. In equilibrium, without exogenous shocks, equation (A1) becomes

(A10) $a_1 D_E - a_2 i + a_4 C_E = 1$

Given equation (A8) and some manipulation of equation (A3), $i = i_N$ leads to:

(A11) $i_N = [\frac{\beta D_p}{\alpha + \beta} (a_1 - a_4 \delta) + a_4 C_0 - 1] \frac{1}{a_2}$

References

Amato, G., Bassanini, F, Messori, M. and G.L. Tosato (2021), "The new European fiscal framework: How to harmonise rules and discretion, *Astrid Paper*, n. 81, December.

Balboni, F., Buti, M., and M. Larch (2007), "ECB vs Council vs Commission: Monetary and fiscal policy interactions in the EMU when cyclical conditions are uncertain", *European Economy, Economic Papers*, 277, May.

Benigno, P.P., Canofari, P., Di Bartolomeo, G. and M. Messori (2021a), "Financial Dominance in the Pandemic and Post-Pandemic European Economy", Publication for the committee on Economic and Monetary Affairs, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, pp. 1-34; also in *SEP Working Paper*, n. 16.

Benigno, P.P., Canofari, P., Di Bartolomeo, G. and M. Messori (2021b), "The implementation and rationale of the ECB's new inflation target", Publication for the committee on Economic and Monetary Affairs, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, November, pp. 1-28; also in *SEP Working Paper*, November, n.17, pp. 1-25.

Blanchard, O. and J. Galì (2007*). "Real wage rigidities and the New Keynesian model." Journal of Money, Credit and Banking*. **39** (1): 35–65.

Buti, M. (2021), *The man inside. A European journey through two crises*, Milan: Bocconi University Press.

Buti, M., J. In't Veld and W. Roeger (2001), "Monetary and fiscal policy interactions under a Stability Pact", *Fiscal Rules Conference*, Bank of Italy, Rome.

Buti, M. and Messori, M. (2020), "Next Generation – EU: This time Italy must not miss the opportunity", *SEP Policy Brief*, n. 34, August.

Buti, M. and Messori, M. (2021a), *Euro area policy mix: From horizontal to vertical coordination*, CEPR Policy Insight, No. 113, October.

Buti, M. and Messori, M. (2021b), *Towards a new international economic governance: The possible role of Europe*, STG Policy Papers, School of Transnational Governance, November, Issue 20.

Buti, M. and M. Messori (2022a), "Reconciling the EU's domestic and global agendas", *VoxEu*, 11 April.

Buti, M. and M. Messori (2022b), "The role of central fiscal capacity in connecting the EU's domestic and global agendas", *STG Policy Papers*, School of Transnational Governance, June, Issue 13.

Buti, M. and S. Fabbrini (2022), "Next Generation EU and the future of economic governance: Towards a paradigm change or just a big one-off?", *Journal of European Public Policy*, forthcoming.

Buti, M. and G. Papacostantinou (2022), *European public goods: How we can we supply more*, VoxEU, 31 January.

European Commission (2017), "Reflection paper on the deepening of the Economic and Monetary Union", COM (2017) 291, May.

European Commission (2018), "Proposal for a regulation on the establishment of a European Investment Stabilisation Function", Brussels.

European Commission (2019), *Report on public finances in EMU 2018*, Institutional Papers, 095, January.

Hirshleifer, J., and J.G. Riley (1992), *The analytics of uncertainty and information*, Cambridge University Press: Cambridge.

Kreps, D.M. (1990), *A Course in Microeconomic Theory*, Princeton University Press: Princeton.

Maduro, M., Martin, P., Piris, J.-C., Pisani-Ferry, J., Reichlin, L., Steinbach, A. and B. Weder di Mauro (2021), *Revisiting the EU framework: Economic necessities and legal options*, CEPR Policy Insight, n. 114, December.

Messori, M. (2021), *Recovery pathways. The difficult Italian convergence in the Euro Area*, Milan: Bocconi University Press.

Pisani-Ferry, J. (2020) "European Union recovery funds: Strings attached, but not tied up in knots," *Policy Contribution*, n. 19, October, Bruegel.

Romanelli, M., Tommasino, P. and E. Vadalà (2022), "The future of European fiscal governance: A comprehensive approach", *Occasional Papers*, Bank of Italy, n. 691, April.

Sargent, T. J. and Wallace, N. (1981) "Some unpleasant monetarist arithmetic," *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3): 1–17.

Tosato, G.L. (2021a), "Sulla fattibilità giuridica di una capacità fiscale dell'Unione europea a trattati costanti", *Astrid Rassegna*, n. 344, ottobre.

Woodford, M. (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton: Princeton University Press.