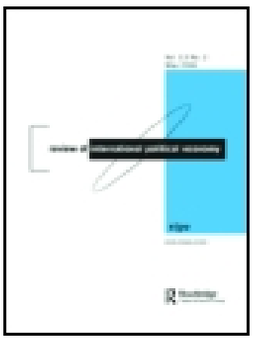

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The performativity of potential output: pro-cyclicality and path dependency in coordinating European fiscal policies

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ABSTRACT

This paper analyzes the performative impact of the European Commission's model for estimating 'potential output', which is used as a yardstick for measuring the 'structural budget balance' of EU countries and, hence, is crucial for coordinating European fiscal policies. In pre-crisis years, potential output estimates promoted the build-up of private debt, housing bubbles and macroeconomic imbalances. After the financial crisis, these model estimates were revised downwards, which increased fiscal consolidation pressures. By focusing on the euro area's economies during 1999–2014, we show how the model's estimates influence actual economic outcomes. We identify two major economic impacts of the potential output model. First, the political implications of the model led to pro-cyclical feedback loops, reinforcing prevailing economic developments. Second, the model has contributed to national lock-ins on path dependent debt trajectories, fueling 'structural polarization' between core and periphery countries.

KEYWORDS Performativity; potential output; path dependency; Eurozone crisis; fiscal policy; austerity

1. Introduction

This paper poses the question about the impact of macroeconomic theory and modeling on economic development in Europe in the run-up to and in the aftermath of the global financial crisis 2008/2009. In doing so, we take the claim that economic models 'do not merely record a reality […] but contribute powerfully to shaping, simply by measuring, the reality' (Callon 1998, 23) as our main vantage point. While the performativity of economic models (Callon 1998; MacKenzie 2003, 2006) has been studied extensively in microeconomic contexts, especially in financial markets (e.g. Beunza and Stark 2004; Lockwood 2015; MacKenzie 2005; MacKenzie and Millo 2003; MacKenzie 2011; Mügge 2009; Paudyn 2013; Svetlova 2012), the scholarly literature has so far largely remained silent on the performative impact of macroeconomic models on overall economic performance (Braun 2014, 2015). This gap in the literature is remarkable, given that the role of macroeconomic theory and models has been the subject of intense

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academic debate, especially when it comes to explaining the global financial crisis (e.g. Cochrane 2009; Colander et al. 2009) and economic policies in Europe in the crisis aftermath (e.g. Blyth 2013; Truger 2013). Similarly, the impact of economic thought on politics in general is a classic theme in the political economy literature (e.g. Hall 1989; Mirowski and Plehwe 2009; Skidelsky 2003).

In this paper, we aim to address this research gap by analyzing the performative effect of the European Commission's model for estimating 'potential output' with a particular focus on the Eurozone over the period 1999–2014. In the EU's fiscal regulation framework, estimates of 'potential output' play a crucial role. Potential output is defined as the (unobservable) level of output in an economy at which all production factors are employed at 'non-inflationary levels' (Havik et al. 2014). Estimates of potential output are derived from the European Commission's 'potential output model' (Planas and Rossi 2015) – henceforth: the 'PO-model' – which builds on a standard production function approach (Havik et al. 2014, 9). The model estimates have important implications for the scope of fiscal policy as they are used to calculate 'structural budget balances', which in turn translate into country-specific fiscal policy restrictions (e.g. Klär 2013; Tereanu et al. 2014).

More specifically, the Commission uses its in-house model for constructing estimates of the 'output gap' – the difference between actual GDP and unobservable potential output – as an indicator for the cyclical position of an economy. When the output gap is positive, an economy is said to be over-heated, while a negative output gap is signaling an underutilization of economic resources. The Commission's estimate of the output gap is translated into a judgment on how much of the fiscal deficit (or surplus) in a particular country is 'structural' in the sense that it cannot be attributed to variations in the business cycle. In other words, the estimates for potential output and the corresponding output gap estimates have an impact on the fiscal policy scope of member states. Since 2005, the structural balance serves as an important control indicator for fiscal conduct as implied by the Stability and Growth Pact as well as the Fiscal Compact (ECFIN 2013; Fiscal Compact 2012).

Due to this institutionalization of the structural balance in the EU's fiscal regulation framework, an increase in the structural deficit amplifies the pressure to implement fiscal consolidation, while a decrease in the structural deficit (or an increase in the structural surplus) reduces the urgency for fiscal adjustment. Against this backdrop, we analyze the PO-model not primarily as a scientific device that allows economists to assess the position of an economy in the business cycle, but rather as a conceptual foundation for an authoritative political practice that structures the room for fiscal policy maneuvering in EU countries. In doing so, we find that the model exerts a performative effect: it imposes estimates on the economies under study that are self-reinforcing both in boom and crisis times and move the economy closer towards the world represented by the PO-model.

This paper is structured as follows. In Section 2, we provide a framework for summarizing economic developments in the Eurozone since the introduction of the Euro to provide an adequate background for understanding the performativity of the PO-model, which is more thoroughly introduced in Section 3. While Section 4 illustrates the performative effects of the PO-model and the mechanisms underlying the model's influence on actual economic outcomes, Section 5 empirically illustrates the pro-cyclicality of the Commission's model estimates and discusses their impact on macroeconomic developments. Section 6 provides an empirical analysis on the role of

the PO-model in shaping private and public sector debt trajectories in Europe. Section 7 concludes our argument.

2. A tool and its context: income inequality, debt, current account imbalances and the Eurozone crisis

In order to understand how the PO-model influenced European economic developments in recent years, we introduce a simple framework for summarizing the build-up of imbalances and fragilities before the global financial crisis of 2008/2009 as well as their prolonging during the Eurozone crisis from 2010 onwards. In doing so, we provide information on the specific economic context in which the PO-model was applied.

The PO-model plays a key role in understanding the European policy-response to the crisis. While we will subsequently demonstrate how the Commission's model estimates have influenced fiscal policy-making, we start by providing an overview on macroeconomic developments in Europe to illuminate the specific historical and economic context in which the model was applied. For illustration purposes, we focus on four stylized

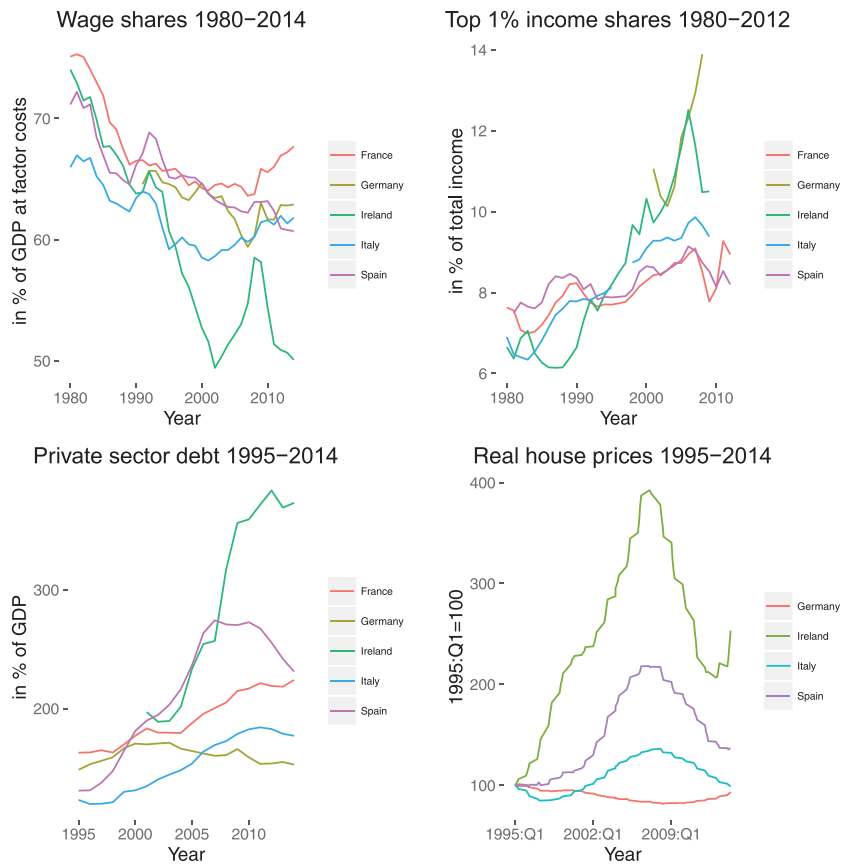

Figure 1. Distribution, debt and housing prices in five countries.
Data: Wage shares were obtained from AMECO (5 November 2015), data on income shares from the World Wealth and Income Database (29 March 2015), data on private sector debt from OECD.Stat (2 December 2015) and real house prices from the Dallas Fed (International House Price Database, 2015:Q3; no data on France).

empirical facts, depicted in Figure 1 for five selected countries (France, Germany, Ireland, Italy and Spain). First, wage shares have shown a falling trend across the Eurozone from the early 1980s to the financial crisis. Second, income inequality has increased markedly over the same time period. Third, private sector debt has witnessed a significant rise in many Eurozone countries after the introduction of the Euro, with the remarkable exception being Germany, where private sector debt to GDP has been falling since the turn of the millennium. Finally, real house prices have risen in many, but not all Eurozone countries, with some economies experiencing sharp increases in house prices before the financial crisis and corresponding declines in more recent years.

In order to set the stage for analyzing the role of the PO-model in European fiscal policy-making, our framework relates these stylized facts to each other in a coherent form: first, an increase in inequality in conjunction with the deregulation of financial markets drives pre-crisis economic developments in the Eurozone. The underlying mechanics are twofold: (1) falling and more unequally distributed wage shares put downward pressure on domestic demand (e.g. Cynamon and Fazzari 2016; Stockhammer 2015), and (2) increasing inequality and financial market deregulation both contributed to increasing private sector indebtedness and rising asset prices before the financial crisis (e.g. Perugini et al. 2016; Stockhammer and Wildauer 2016; Storm and Naastepad 2016). Second, in the course of the financial crisis the resulting imbalances between creditor and debtor countries triggered instability, which lead to further declines in demand and an acute recession in many Eurozone countries.

The link between income concentration and private sector debt is typically explained by two complementary mechanisms. First, households confronted with stagnant or declining incomes may try to preserve their living standards – either out of mere necessity or to keep up with socially mediated consumption standards –, which increases the propensity to incur debt (Kapeller and Schütz 2014). Second, rising asset prices increase the wealth but not the liquid means of those households that hold at least some assets (Stockhammer and Wildauer 2016). In this context, household debt can serve as a means to transforming the increase in asset prices into actual liquidity. In the short-term, such an increase in household debt may compensate the impact of wage losses on aggregate demand, 'thus providing the solution to the contradiction between the necessity of high and rising consumption levels, for the growth of the system's actual output, and a framework of antagonistic conditions of distribution which keeps within limits the real income of the vast majority of society' (Barba and Pivetti 2009, 113).

In turn, financial innovations and the liberalization of capital flows ensure that the increase in households' demand for credit is met by sufficient credit supply. Indeed, the emerging fragilities of individual Eurozone countries during the pre-crisis years were fueled by credit-led economic growth and large capital flows from Eurozone 'core countries' like Germany, France and the Netherlands to 'periphery countries' such as Spain, Ireland, Portugal and Greece (e.g. Baldwin et al. 2015; Hobza and Zeugner 2014; Storm and Naastepad 2016).[1] As a consequence, capital inflows and private sector credit expansion triggered the build-up of major bubbles in housing markets, especially in Spain and Ireland (e.g. Drudy and Collins 2011; Ruiz et al. 2016). The periphery countries in general accumulated large current account deficits before the financial crisis; as the Eurozone's pre-crisis current account balance was close to zero, other Eurozone countries – such as Germany, Austria and the Netherlands – had to run correspondingly large current account surpluses (e.g. Tressel et al. 2014).

Hence, the financial crisis served as a trigger for the unfolding of the Eurozone crisis, which finds its essential roots in the accumulation of severe macroeconomic imbalances

between creditor and debtor countries (e.g. Stockhammer and Sotiropoulos 2014). Political constraints on fiscal and monetary sovereignty have, in turn, contributed to the inability of European countries to adequately react to the economic breakdown. While the loss of monetary sovereignty – due to the introduction of a common monetary policy for all euro area countries – is widely acknowledged (e.g. de Grauwe 2012), our paper highlights another, equally important source for the persistence of the current crisis: the profound impact of European constraints and regulations on the fiscal policy space of member countries, where assessments of the existing fiscal policy scope depend on estimates of 'potential output' as derived from the Commission's PO-model.

Specifically, the importance of the Commission's PO-model derives from the fact that there are three general possibilities to compensate for a stagnation of or a decline in effective demand. First, an economy may compensate the downward pressure on domestic demand by expanding its exports. This is what has happened in Germany (e.g. Storm and Naastepad 2015b) and – to a lesser extent – in other surplus countries like Austria and the Netherlands. Second, the decrease in demand may be compensated by expansionary fiscal policy and a corresponding increase in public debt as in Greece and Portugal during pre-crisis years (e.g. Lane 2012) – a path now largely blocked by European economic governance in conjunction with the PO-model. Third, the economies concerned may develop a growth model that is driven by private sector debt accumulation. Since the adoption of the Euro, debt-led growth regimes have especially characterized large parts of the Eurozone's periphery countries (e.g. Stockhammer and Wildauer 2016).

Hence, although the Euro had raised high hopes for economic convergence (e.g. Blanchard and Giavazzi 2002), economic reality was characterized by the build-up of large macroeconomic imbalances, which did not reflect a healthy 'catch-up process' in the poorer countries, but rather the emergence of an unsustainable mix of debt-led and export-led growth regimes across Eurozone countries. As long as a seemingly benign financial environment masked the fragilities corresponding to the accumulation of private debt and the rising dependencies regarding the financing of current account deficits, the emergence of macroeconomic imbalances stimulated the real economy in large parts of the Eurozone.

The outbreak of the financial crisis, however, revealed these fragilities. Deficit countries suffered a 'sudden stop' in capital inflows, followed by massive capital outflows, implying that large current account deficits had to be reduced (e.g. Giavazzi and Spaventa 2010). This reversal in capital flows triggered a fall in economic growth and increases in unemployment in the deficit countries, as over-indebted private sector actors were forced to deleverage by cutting back on their spending. Public debt and fiscal deficits rose sharply, while the public sector in many Eurozone countries socialized private sector and financial sector debt in order to avoid a breakdown of the financial system. During this process, Greece, Portugal, Ireland and Cyprus were forced to apply for being bailed out by the Troika, consisting of the European Commission, the ECB and the IMF. Financial assistance was granted on the condition that stressed countries implement drastic cuts in government spending and wages (Sapir et al. 2014).

After the start of the financial crisis, downward revisions of the Commission's model estimates of potential output have systematically affected the policy space of Eurozone countries, because these revisions implied that 'structural fiscal deficits' were estimated to be substantial, with the most significant restrictions coming for the countries hit hardest by the crisis (this argument will be made in detail in the subsequent sections of this paper.). In the countries that were forced to implement the harshest fiscal austerity

measures, demand was squeezed the most (e.g. de Grauwe and Ji 2013; Heimberger 2017), which improved the current account of these countries due to a sudden decrease in imports. The process of unwinding pre-crisis imbalances and reducing the private sector debt overhang thereby had a strong negative effect on the real economy (Koo 2015). This observation is consistent with historical evidence that debt deleveraging weighs heavily on aggregate demand, implying sluggish recoveries (Jorda et al. 2016) – with the most pronounced impact on countries that had previously accumulated the largest current account deficits.

In this section, we have sketched the historical and economic context, in which the Commission's PO-model has been applied. The purpose in the remaining sections is to analyze how the model has been employed as part of an authoritative political practice that – through its institutionalization in the EU's fiscal regulation framework – has helped to structure and shape the developments described in this section.

3. The European Commission's potential output model and its use in European fiscal policy-making

In what follows, we open the 'black box' of the Commission's PO-model, where 'black box' is understood as a device that is opaque to outsiders, because its content is regarded to be overly technical (MacKenzie 2005). The 'unpacking' of the model will foster our understanding about how it impacts the economic developments discussed in Section 2. In essence, the PO-model is used for judging which part of the fiscal balance in EU countries is 'structural', i.e. related to the true capabilities of an economy and driven neither by the business cycle nor by temporary one-off effects such as costs related to averting the break-down of the financial system (Havik et al. 2014; Mourre et al. 2014). The Commission employs a standard production function approach based on a Cobb–Douglas production function (Cobb and Douglas 1928). Estimates of the 'structural balance' directly depend on the Commission's measure of the output gap (OG_t), which is derived from the PO-model and enters the corresponding formula for calculating the 'structural balance' as sketched in Figure 2 (Mourre et al. 2014, 9).

The PO-model is the Commission's preferred operational surveillance tool for evaluating fiscal policies as it supplies measures of potential output (PO_t), which are translated into estimates of the structural balance (SB_t) by calculating the relative difference between actual output and potential output, called the 'output gap' (OG_t). The institutional importance of these estimates derives from the EU's fiscal regulation framework as the Stability and Growth Pact defines countries' medium-term budgetary objectives (MTOs) in terms of the structural balance. In case of a deviation from the MTO, a country has to correct 'excessive structural deficits' by improving the structural balance

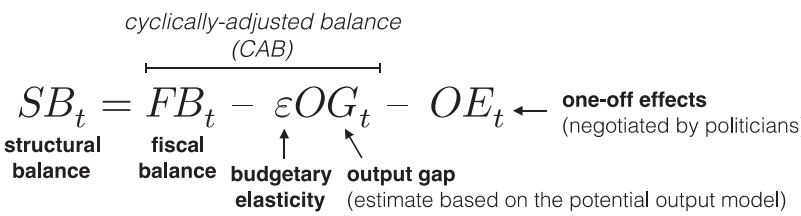

Figure 2. Estimating structural budget balances.

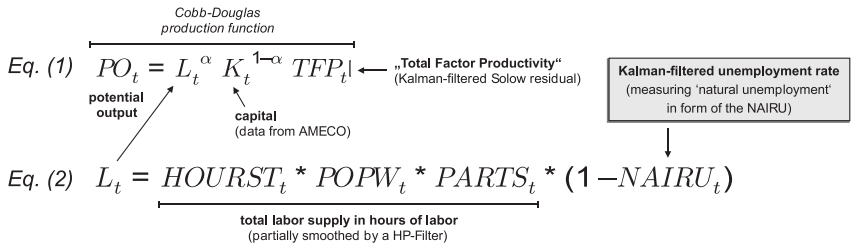

Figure 3. Estimating potential output by employing a Cobb–Douglas production function.

by 0.5 percentage points of GDP per year (ECFIN 2013). Moreover, the Fiscal Compact makes reference to estimates of the structural deficit, since governments are legally obliged to ensure that the structural deficit does not exceed 0.5% of GDP per year – a rule which signatory states had to codify into national law, preferably as a constitutional safeguard (Fiscal Compact 2012). Hence, larger structural deficits amplify the pressure to implement fiscal consolidation measures; and vice versa.

The Commission defines potential output as the level of output at which inflation remains stable. As can be seen from equation (1) in Figure 3, the PO-model employs a Cobb–Douglas production function[2] to obtain estimates of unobservable potential output PO_t (Havik et al. 2014). While measures of the capital stock (K_t) are taken as provided in the Commission's AMECO-database,[3] the production factor labor L_t is operationalized as a statistically filtered trend of total working hours ($HOURS_t$) offered by the active labor force ($POPW_t * PARTS_t$), *which would be employed according to the Commission's estimates of 'natural unemployment'* (1 – NAIRU). This argument is captured by equation (2) in Figure 3. The final ingredient of the underlying production is total factor productivity (TFP_t), which is first calculated as average output per hours worked, then corrected for 'cyclical' deviations by a statistical filter and eventually reinserted into the model as a proxy for 'technological progress'. Hence, the Cobb–Douglas function primarily serves as a calculative vehicle for integrating empirical data, while the essential economic question – 'Which components of unemployment and productivity growth are to be judged "structural" or "cyclical"?' – is delegated to the statistical de-trending of the respective time-series on unemployment and TFP. The de-trending procedure makes use of a Kalman filter approach (Durbin and Koopman 2012; Kalman 1960), which is at the heart of the Commission's PO-model. The basic idea behind this kind of statistical filtering is to separate the underlying time series (e.g. the unemployment rate in Spain over time) into two components: a structural component and a trend component, where the former is assumed to be determined by institutional features of an economy, while the latter captures the ups and downs of the business cycle.

The structural component as estimated by the Kalman filter is interpreted as a form of 'natural unemployment' (Friedman 1968; Phelps 1967), namely as the 'non-accelerating inflation rate of unemployment' (in short: NAIRU), which is said to represent the true employment capacities underlying any given economy. The NAIRU's central proposition is that any economy can be characterized by a clearly defined, but unobservable, rate of unemployment, at which (wage) inflation would remain stable. While in theory the NAIRU depends on the institutional characteristics of a given economy – especially labor market regulations –, in practice the Commission simply determines NAIRU values by means of statistical filtering: the 'structural component' obtained

from the Kalman filter is assumed to represent the NAIRU. As indicated by equation (2) in Figure 3, the NAIRU directly impacts the size of the 'structural deficit' as an increase in the NAIRU will cause a reduction in potential output leading to less fiscal policy scope. The intuition here is that with high NAIRU values, a smaller part of actual unemployment is considered to be cyclical, so that creating additional demand by fiscal means would subsequently lead to inflation (because actual unemployment would fall below the NAIRU).

The Kalman filter is of crucial importance for the Commission's model's estimates, on which budgetary targets in the EU's fiscal regulation framework are eventually based (Fioramanti 2016). Kalman filtering is a statistical technique originally developed in engineering (Kalman 1960), where its basic purpose is to allow for the refinement of noisy empirical measurements and marginally inexact theoretical predictions (e.g. in GPS-navigation or aviation). The filtering process itself is based on a recursive procedure, i.e. all estimates obtained from the underlying model – even those relating to past periods – change whenever new data (e.g. new values of the unemployment rate and wage inflation) are brought into the model (e.g. Planas and Rossi 2015). This feature explains why NAIRU estimates constantly vary: in practice, the whole time-series of NAIRU estimates and all associated forecasts change whenever new observational data is entered into the model. In the process of calculating real-time estimates, the Kalman filter furthermore assigns a crucial role to the most recent observations – a phenomenon that the statistical filtering literature calls the 'end point bias' (e.g. Ekinci et al. 2013; Havik et al. 2014; Kaiser and Maravall 2001). As a consequence, NAIRU estimates based on the Kalman filter exhibit a pro-cyclical bias, i.e. the NAIRU tends to fall in boom times and to increase in crisis times. Indeed, although 'natural rate theory' suggests that the NAIRU can be explained by only referring to the 'institutional features' of an economy, the Commission's NAIRU estimates are in fact significantly determined by 'cyclical factors' (Heimberger et al. 2017). It follows that the Kalman filter approach as employed by the Commission leads to NAIRU estimates of structural unemployment, which exhibit an end-point bias, are influenced by cyclical factors and subjected to successive revisions.

4. The performativity of the potential output model and pro-cyclical feedback loops in Europe: an overview

In this section, we develop our arguments on the performativity of the Commission's model and describe the mechanisms that are relevant for understanding the model's influence on actual economic outcomes.

4.1 The performative impact of the potential output model

We proceed by explaining the role of the PO-model within the general economic dynamics described in Section 2. We focus on two distinct pro-cyclical feedback loops for the Eurozone during 1999–2014: first, an 'optimist loop' operated from the introduction of the Euro up to the financial crisis; it reinforced private debt-driven economic growth and the development of asset-price bubbles in the pre-crisis period, but also contributed to the emergence of large-scale macroeconomic imbalances. Second, a 'pessimist loop' has emerged in the period after the outbreak of the financial crisis, which is characterized by austerity policies, i.e. by a combination of fiscal tightening

and deflationary wage pressure geared towards increasing international competitiveness throughout the Eurozone.

At its core, the performativity of the PO-model follows the same basic principle in both the boom and the bust phase: first, it provides a series of estimates for 'natural unemployment', i.e. the NAIRU, and 'potential output' to assess the 'true position' of a given economy within the business cycle. Second, these estimates trigger political reactions, which make actual economic outcomes sensitive to the size of and changes in these estimates. The *size* of NAIRU estimates matter from a static perspective: ceteris paribus, higher NAIRU-estimates imply less fiscal leeway and, hence, higher unemployment. C*hanges* in NAIRU estimates, on the other hand, exert their influence in a dynamic context, e.g. when an increase in the NAIRU *further* constrains fiscal space in the face of rising unemployment. In other words, these NAIRU estimates come with political impacts that move the economy closer towards the world as represented by the Commission's PO-model.

Thereby, two mechanisms are crucial for understanding the impact of NAIRU and potential output estimates on economic policy-making. The first of these mechanisms is that the Commission's model estimates provide allegedly exact quantitative evaluations of the 'structural health' of a country's macroeconomic and fiscal developments, thereby influencing the policy-makers' (non-)priorities in terms of policy objectives and policy measures. The second mechanism is that estimates of NAIRU and potential output affect the timing and speed of fiscal policies, which is due to their importance for assessing whether member countries meet structural deficit targets in the EU's fiscal regulation framework.

The performative effect of the PO-model contributes to positive feedback effects arising from the model's political application and triggers *a reinforcement of cyclical trends and developmental trajectories*. The reinforcement of cyclical trends arises from the model's impact on short-run fiscal policy-making as the PO-model promotes a pro-cyclical fiscal policy stance, which is most visible in the countries hit hardest by the crisis. A second instance of positive feedback is geared more towards long-term, structural developments: the pro-cyclical policies and constraints imposed by the PO-model in conjunction with the Stability and Growth Pact make it much more difficult for crisis-ridden countries to change their current path of development as they lack policy space. In other words, the PO-model reinforces the lock-in on current growth-models, which may lead to developmental traps for some countries and to prolonged prosperity for others. For the Eurozone as a whole, this constellation facilitates fragility and institutional conflicts between creditor and debtor countries.

4.2 How the potential output model influences actual economic outcomes

How do the Commission's NAIRU and potential output estimates influence actual economic outcomes? For illustration purposes, consider the example of Spain. In Autumn 2011, the Commission estimated the Spanish NAIRU for 2011 to be 16.8% as compared to an actual unemployment rate of 21.4%. In other words, the Commission's NAIRU model estimate implied that about 80% of total unemployment was 'natural' or 'structural' and, hence, incurable by expansionary fiscal efforts. However, as explained in Section 3, the Commission's NAIRU estimates suffer from the well-known end-point bias, which means that the most recent data points have an over-proportional impact on NAIRU estimates (Ekinci et al. 2013; Heimberger et al. 2017; Klär 2013). Starting

from a NAIRU of 16.8%, the Commission calculates potential output (€1008 billion) and the output gap (−5.0%), where the latter expresses the difference between actual GDP (€957 billion) and potential output in percent of potential output. The output gap is then used to perform the cyclical adjustment of the budget balance in accordance with the EU's fiscal regulation framework (see Figure 2). Specifically, the Commission's official estimates lead to a cyclically adjusted budget deficit of −4.2% of potential output (instead of a headline fiscal deficit of −6.6%), from which another 2.5% of GDP are to be subtracted to incorporate budgetary one-off effects (costs for bailing out financial institutions), resulting in a structural deficit of −1.7% (see Table 1). The resulting deficit thereby misses the structural deficit target of −0.5% within the EU's fiscal regulation. Eventually, these outcomes put further pressure on Spain to implement fiscal consolidation measures in order to cut 'excessive deficits' (see Section 3).

To illustrate the performative effect of the PO-model, we employ a replication of the Commission's model to compare the path actually taken with two alternative scenarios, where we assume either that the NAIRU is 6%-points lower than the official estimate (this would correspond to a NAIRU estimate of 10.8%) or, alternatively, that the NAIRU is 6%-points higher (implying a NAIRU of 22.8%, which is higher than actual unemployment of 21.4%). In the first scenario, Table 1 indicates that potential output increases by €46.7 billion compared to the official baseline Commission estimate in Autumn 2011, which nearly leads to a doubling of the (negative) output gap and a corresponding decline of the structural deficit by 2.0 percentage points (from −1.7% to +0.3%). For simplicity, let us assume that this difference of 2.0 percentage points could have been used by Spain to implement expansionary fiscal policies in 2011. The current literature suggests that fiscal policy has more of an impact during crisis times. Thus, an exogenous increase in government spending by 1%-point of GDP leads to an increase in output of at least 1%-point, likely more (e.g. DeLong and Summers 2012; Heimberger 2017). As Spain's economy was still mired in crisis back in 2011 (e.g. Koo 2015), it is thus conservative to gauge that the impact of an expansionary fiscal impulse of 2%-points would have increased GDP by at least 2 percentage points, leading to a fall in unemployment. By bringing actual unemployment closer towards the assumed 'structural' unemployment rate of 10.8%, this example illustrates how the size of the NAIRU acts as an attractor for actual unemployment.

The reverse argument also holds. In our second scenario, we assume that the NAIRU is 22.8% and, hence, higher than actual unemployment. As can be seen from Table 1, this goes along with lower estimates of potential output (declining by €47.8 billion) and the (negative) output gap (now at −0.3%) as well as a higher structural deficit (−4.0%). For illustration purposes and simplicity, we assume that in 2011, Spain would

Table 1. The performative impact of the Commission's potential output model.

	NAIRU	PO	OG	CAB	SB
Spain, Year 2011					
Baseline: estimate from Autumn 2011	16.8%	€1007.9bn	−5.0%	−4.2%	−1.7%
First alternative: NAIRU minus 6ppts.	10.8%	€1054.6bn	−9.2%	−2.2%	0.3%
Second alternative: NAIRU plus 6ppts.	22.8%	€960.1bn	−0.3%	−6.5%	−4.0%

Notes: Data: AMECO.

All potential output numbers were calculated at constant prices with the base 2005 = 100. NAIRU, non-accelerating (wage) inflation rate of unemployment (in %); PO, potential output (in billion €); OG, output gap (in % of PO); CAB, cyclically adjusted budget balance (in % of PO); SB, structural balance (in % of PO). Ppts. denotes percentage points.

have had to cut the structural balance by 2.3%-points to reach the same deficit as in the baseline scenario. Under the conservative assumption that a reduction in the structural deficit by 1%-point leads to a decline in GDP by at least 1%-point (e.g. Blanchard and Leigh 2014), the negative impact of pro-cyclical fiscal austerity would have amounted to 2.3%-points of GDP, leading to an increase in actual unemployment – towards the NAIRU, which, again, acts as an attractor for actual unemployment.

The analysis presented above has thus clearly illustrated how the *size* of NAIRU estimates contributes to shaping the fiscal policy space in Eurozone countries in a *static* framework of analysis. However, as has been shown, NAIRU estimates are themselves sensitive to economic trends due to their well-known end-point bias. This feature implies that the *changes* in NAIRU estimates also have political consequences as they constrain or widen fiscal policy space over time relative to some historical vantage point. In the post-crisis phase, the PO-model has attained a self-reinforcing inertia as it is used to justify austerity-measures, which bring forth large negative growth effects (e.g. de Grauwe and Ji 2013) and a corresponding increase in unemployment mirroring the increase in NAIRU estimates after the crisis (e.g. Klär 2013). As fiscal austerity contributes to prolonging the slump, NAIRU estimates and structural deficits are pushed upwards and (additional) reductions in public spending become mandatory, which indicates the *dynamic* impact of the PO-model. In contrast, an initially low NAIRU estimate or successively falling estimates provide additional fiscal policy space to governments, which – if used for expansionary fiscal policies to stimulate the economy – allows for pushing down unemployment, so that the economy is again dragged in the direction of the initially low NAIRU estimate. In the following subsections, we analyze the mechanisms that are crucial for understanding the impact of NAIRU and potential output estimates on fiscal policy-making and economic developments.

5. The pro-cyclicality of NAIRU and potential output estimates: impacts on macroeconomic developments and fiscal-policy-making

In this section, we analyze and empirically illustrate the positive feedback processes associated with applying the PO-model in European fiscal policy-making in more detail.

5.1 Pre-crisis years in the euro area: the 'optimist loop'

As can be seen from Figure 4, the pre-crisis 'optimist loop', characterized by seemingly favorable real economic developments in large parts of the Eurozone, lead to downward revisions in 'real-time' NAIRU estimates, which were most pronounced in the Eurozone's periphery countries (Klär 2013; Palumbo 2015). These downward revisions in the NAIRU suggested 'structural labor market improvements'. The resulting reaffirmation of optimistic pre-crisis beliefs about macroeconomic convergence served to justify policy inaction with respect to the build-up of private debt, housing bubbles and macroeconomic imbalances. European policy-makers and mainstream economists largely ignored these factors or interpreted them as being part of a healthy 'catch-up process' in the Eurozone (e.g. Blanchard and Giavazzi 2002; Giavazzi and Spaventa 2010) – an interpretation fully supported by pre-crisis estimates of the Commission's PO-model.

As potential output estimates signified an improvement in structural balances, the pre-crisis loop was also characterized by more fiscal scope. Table 2 again uses the case of Spain to empirically illustrate this point. In the run-up to the recent crisis, Spain

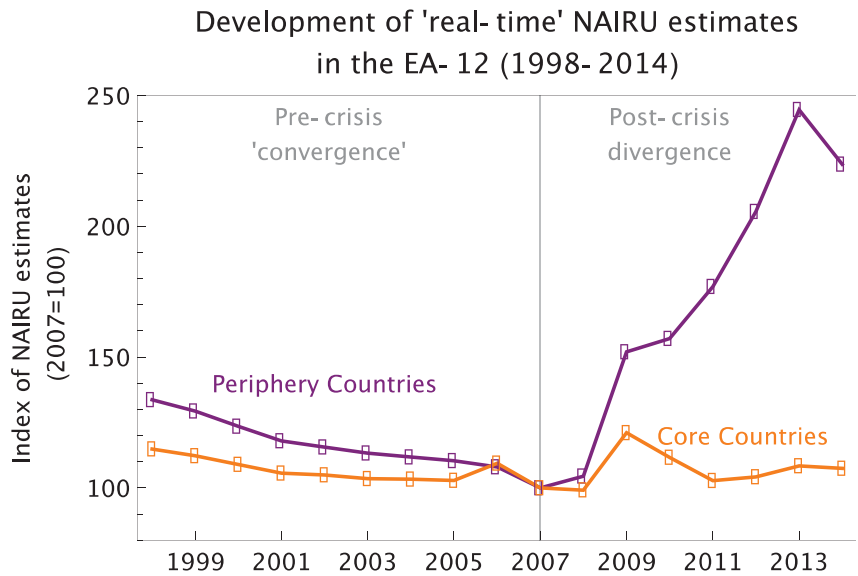

Figure 4. Pro-cyclical NAIRU estimates in the Eurozone.
Source: Different AMECO forecast vintages. 'Real-time' means that we use the NAIRU estimate from the Commission's Spring forecast vintage of the respective year (e.g. Spring 2009 NAIRU estimate for the 2009 NAIRU), since those 'real-time' estimates are most relevant for shaping fiscal policy scope. Core countries consist of Belgium, Germany, France, Luxembourg, Netherlands, Austria, Finland. Periphery countries include: Ireland, Greece, Spain, Italy, Portugal.

experienced a housing boom driven by a surge in private sector debt, which led to a substantial reduction in unemployment (e.g. Ruiz et al. 2016). In Autumn 2007, the Commission's official NAIRU estimate for the year 2006 was 8.6%, which implied a potential output of €773.6 billion, an output gap of −0.6% and a cyclically adjusted budget surplus of 2.1%. To illustrate the effects of NAIRU downward revisions in pre-crisis years, we compare the results given above with estimates obtained by using the NAIRU estimates from Spring 2005, when the EC had forecast that the Spanish NAIRU in the year 2006 would stand at 9.6% (i.e. 1 percentage point higher than the estimate published in 2007). In such a scenario, potential output would have been estimated 0.7% lower, the output gap would have turned positive (overutilization of resources instead of underutilization) and the cyclically adjusted balance would have been equal to 1.8% instead of 2.1% of potential output. In practical terms, these numbers imply that the Commission's model estimates granted the Spanish government more fiscal policy space as the housing bubble picked up speed.

Table 2. Pro-cyclical NAIRU estimates and their impact on potential output, the output gap and structural balances.

	NAIRU	PO	GDP	OG	CAB
Pre-crisis BOOM	↑	↓		↑	↓
Spain, Year 2006 (estimates from Autumn 2007)					
Official Commission estimates	8.6%	€773.6bn	€768.7bn	−0.6%	2.1%
Estimates (Spring 2005 NAIRU)	9.6%	€767.8bn	€768.7bn	0.1%	1.8%

Notes: Data: AMECO.
All potential output numbers were calculated at constant prices with the base 2000 = 100. NAIRU, non-accelerating (wage) inflation rate of unemployment (in %); PO, potential output (in billion €); GDP, real gross domestic product; OG, output gap (in % of PO); CAB, cyclically adjusted budget balance (in % of PO).

In the pre-crisis phase, Spain's government-debt-to-GDP-ratio fell from 60.9% to 35.6% (data from 1999 to 2007). To a large extent, this development reflected the (housing) boom of the Spanish economy, which increased tax revenues and reduced unemployment-related government spending. However, some economists argue that given the debt-driven boom, Spain (and some other) countries should have leaned more strongly against the wind by pushing for restrictive fiscal policies to counteract the rise in private debt and dampen the cycle (e.g. Lane 2012). Clearly, the Commission's favorable potential output model estimates did not support this argument in pre-crisis times, as downward revisions in the NAIRU suggested to policy-makers that there was even more room for fiscal maneuvering than originally envisaged. Thereby, the performative impact of the model estimates did not only contribute to a reaffirmation of optimistic assessments of pre-crisis growth trajectories and economic policies (implying a non-priority for curbing unsustainable private debt dynamics); pro-cyclical NAIRU estimates were also fed into the PO-model, thereby increasing the leeway for fiscal policy-makers due to lower 'structural deficits'.

Summing up, the 'optimist loop' in pre-crisis years was characterized by positive feedback effects arising from the model's political application. As the Kalman filter integrated new observations on unemployment rates – which were falling in large parts of the periphery after the introduction of the Euro as a consequence of a (mostly private sector) debt-led upswing –, the model estimates picked up this tendency and NAIRU estimates tended to be revised downwards, which fuelled optimism and increased fiscal policy space. As the PO-model did not consider private debt and current account imbalances, it reinforced general macroeconomic developments by shaping policy-makers' assessments of the 'structural health' of macroeconomic and fiscal developments and by a model-induced pro-cyclical bias in fiscal policy coordination within the Eurozone. The resulting 'optimist loop' lasted until it was broken by the financial crisis, which triggered an unwinding of the macroeconomic imbalances accumulated in pre-crisis years as described in Section 2.

5.2 Post-crisis years: the 'pessimist loop'

Positive feedback effects arising from the application of the Commission's PO-model are even more apparent in the post-crisis period, as the Eurozone crisis had a strong impact on potential output measures in European countries (e.g. Ball 2014; Palumbo 2015). In order to empirically illustrate this point, we employ the methodology proposed in Ball (2014) and extrapolate the developments in potential output estimates before the financial crisis in 2007 (PO^{**}) to compare these pre-crisis trends with recent potential output estimates from November 2015 (PO^{*}).[4] From the *y*-axis values in Figure 5, it can be seen that losses in potential output (in the year 2014) relative to pre-crisis trends vary markedly across European countries, ranging from 36.3% in Greece and 24.4% in Ireland to much smaller losses in 'core countries' such as Germany (1.1%). The *y*-axis values depict how much actual output in 2014 was below the extrapolated pre-crisis trend in potential output. It can be seen that the losses in actual output and potential output are almost perfectly correlated, suggesting that the countries most affected by the crisis suffered the largest downward revisions in potential output and vice versa.

Downward revisions in potential output have supported the dominant narrative that 'excessive fiscal deficits' are at the roots of Europe's economic crisis (e.g. Blyth 2013;

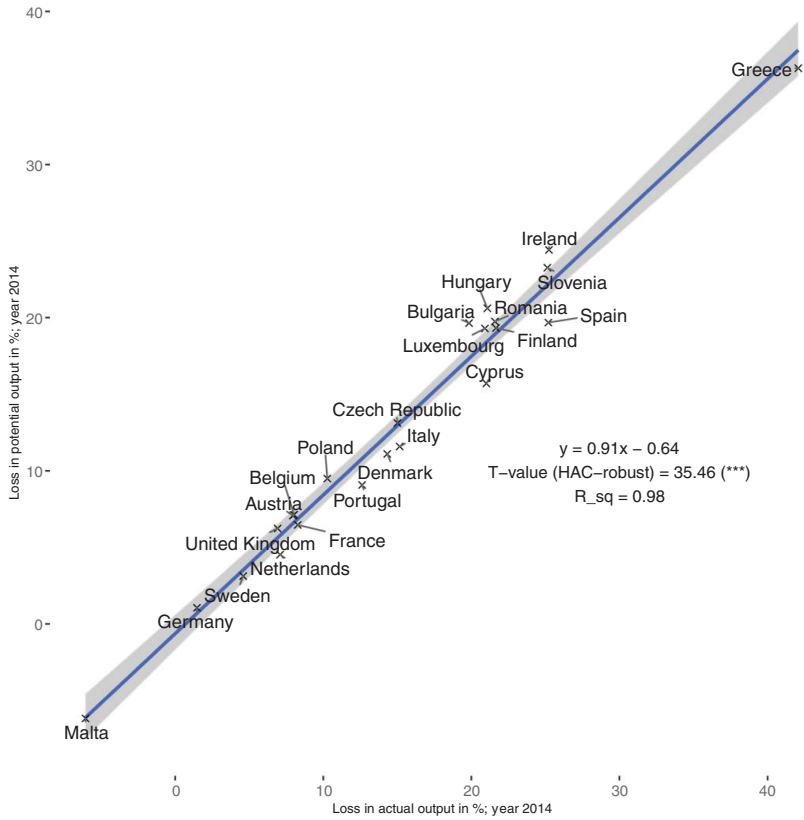

Figure 5. The close correlation of actual and potential output losses.
Data: AMECO (December 2007, November 2015); authors' calculations. Loss in potential output = (PO**-PO*)/PO**. Loss in actual output = (PO**-Y)/PO**. PO**… extrapolated estimate of pre-crisis PO. See Ball (2014, 150) for details on the extrapolation methodology. PO*… EC's PO estimate (AMECO, November 2015). Y… real GDP (AMECO, November 2015). ***denotes statistical significance at the 1% level.

Storm and Naastepad 2016). The sudden divergence in 'natural unemployment' as depicted in Figure 4 was taken as evidence for a sudden 'structural shock' that revealed 'labor market mismatches' between the jobs offered and the labor supply of people looking for jobs, with mismatches supposedly affecting the structural capacities of peripheral economies (e.g. European Commission 2013). This interpretation of Figure 4 provides a clear-cut theoretical justification for the turn to fiscal austerity in 2010/2011, which was apparent in the design of the Troika adjustment programs for Greece, Ireland, Portugal and Cyprus (Sapir et al. 2014), the reform of the Stability and Growth Pact in 2011 and the introduction of the Fiscal Compact in 2012. In this process, the structural deficit has gained additional importance when it comes to coordinating fiscal policies in Europe (ECFIN 2013).

Via the institutionalization of structural balances in the EU's fiscal regulation framework, downward revisions in potential output increased fiscal consolidation pressures in Europe (Tereanu et al. 2014). Table 3 illustrates this relationship for five Eurozone periphery countries and five core countries. Negative output gaps would have been

Table 3. Downward revisions in potential output estimates increased fiscal consolidation pressures: all numbers for the year 2014.

	Output gap	Output gap**	Cyclically adjusted balance	Cyclically adjusted balance**
Periphery countries				
Greece	−9.1%	−42.1%	0.8%	16.6%
Ireland	−1.1%	−25.2%	−3.3%	9.5%
Portugal	−3.9%	−12.6%	−5.2%	−0.7%
Spain	−6.9%	−25.2%	−2.2%	7.7%
Italy	−4.0%	−15.2%	−0.9%	5.1%
Core countries				
Austria	−0.9%	−7.9%	−2.2%	1.9%
Germany	−0.4%	−1.4%	0.5%	1.1%
France	−1.9%	−8.3%	−2.8%	1.0%
Netherlands	−2.7%	−7.1%	−0.6%	2.2%
Belgium	−1.0%	−8.0%	−2.5%	1.8%

Data: AMECO (December 2007, November 2015); authors' calculations.
Output gap = (Y-PO*)/PO*.
Output gap** = (Y-PO**)/PO**.
Cyclically adjusted balance = FB – ε OG.
Cyclically adjusted balance** = FB – ε OG**.
FB… fiscal balance (AMECO, November 2015).
ε … budgetary semi-elasticity (Mourre et al. 2014, 21).
See Figure 5 for details on Y, PO* and PO**.

much larger than the Commission's official numbers provided in November 2015 if one assumes that potential output during 2010–2014 had grown at a constant average pre-crisis growth rate (as in Figure 5). For example, the official output gap estimate for Spain in 2014 was −6.9% of potential output, which corresponded to a cyclically adjusted budget deficit of −2.2%. However, assuming that the potential output loss computed in Figure 5 has not occurred, we find that the output gap is −25.2% (OG**), which indicates a much more severe underutilization of economic resources than the Commission's official estimate. As a consequence, Spain would exhibit a cyclically adjusted budget surplus of 7.7% of GDP.

Whoever finds the OG** estimates in Table 3 implausibly large should take the pro-cyclical nature of pre-crisis potential output estimates into account, which underscores our point about the optimistic nature of the pre-crisis loop described in the previous subsection. Table 3 shows that this pattern holds not only for the other periphery countries, but also for the core countries, although in a less pronounced way. Without the substantial downward revisions in potential output, which vary across European countries depending on how hard the respective country was hit by the crisis (see Figure 5), fiscal consolidation pressures would have been much less severe, because model estimates would have indicated substantial cyclically adjusted budget surpluses and, hence, would have pointed to a need for fiscal expansion.

As can be seen from Figure 4, 'real-time' NAIRU estimates in 2014 in the Eurozone's periphery countries had more than doubled from the pre-crisis year 2007. Meanwhile, core countries – which were affected less by the crisis than the periphery – experienced a comparably small increase in NAIRU estimates (see Figure 4). As illustrated in Section 4, higher NAIRU estimates put further fiscal consolidation pressure on the countries concerned, since they lead to higher 'structural deficits'. It becomes clear from these illustrations on the 'pessimist loop' in post-crisis years that the implicit imperative of the Commission's model during a crisis is fiscal austerity. A broad literature has shown in recent years that pro-cyclical fiscal tightening has pronounced negative effects

on economic growth and employment (e.g. Blanchard and Leigh 2014; Jordà and Taylor 2016), which aligns well with the finding that demand was squeezed the most in those European countries that implemented the harshest fiscal austerity measures (de Grauwe and Ji 2013; Heimberger 2017). Thereby, it is no coincidence, but rather an implicit consequence of the 'end-point bias' in Kalman filtering that downward revisions in potential output were most pronounced where the crisis stroke hardest, which systematically subjected the Eurozone's most fragile countries to a self-defeating cycle of austerity measures.[5]

In sum, we have argued that the Commission's PO-model has produced pro-cyclical estimates in pre-crisis and post-crisis years. As these estimates influence assessments about whether Eurozone countries meet budgetary targets in the EU's fiscal regulation framework, these pro-cyclical estimates translated into pro-cyclical policies. In the pre-crisis 'optimist loop', pro-cyclical model estimates justified policy non-action regarding the build-up of private debt, asset-price bubbles and macroeconomic imbalances and provided additional scope for fiscal policies, thereby reinforcing boom-patterns in several Eurozone countries. In the post-crisis 'pessimist loop', downward revisions in potential output increased the pressure to implement fiscal consolidation measures via the institutionalization of structural balances in the EU's fiscal regulation framework. The austerity-burden caused by model-induced deteriorations in structural deficits has clearly affected those periphery countries the most, which had accumulated the largest current account deficits and debt overhangs in pre-crisis years. Against this backdrop, the next section turns to an analysis on the PO-model's impact on structural development paths in Europe.

6. Model performativity and debt trajectories in Europe: the self-defeating nature of the Stability and Growth Pact

In the previous section, we described the pro-cyclical impact arising from the application of the Commission's NAIRU and potential output estimates as authoritative guides for designing fiscal policies across Europe. We did so by highlighting the role of these model estimates in reinforcing national growth paths. In this section, we go beyond this argument by providing a more explicit consideration of private and public sector indebtedness in the context of international competition. In Section 2, we sketched three possible ways out of economic stagnation on a national level, namely to increase aggregate demand either by rising private sector debt, expansionary fiscal policies or an increase in exports. Only the first two strategies imply a – *ceteris paribus* – rise in a country's aggregate debt, while the latter strategy requires other countries to accumulate additional (foreign) debt to finance their current account deficits. Against this backdrop, we argue in this section that the NAIRU and PO-model do not only amplify cyclical fluctuations and growth paths of national economies in Europe, but also influence their overall structural development. As developmental trajectories are currently diverging, the underlying spirit of the Stability and Growth Pact – to coordinate and to harmonize economic developments across Europe – is successively undermined.

At its core, our argument goes as follows. While the impact of the political application of the PO-model was rather uniform across countries in pre-crisis years – reinforcing optimism by slightly varying degrees, largely independent of a country's specific growth model –, this tide turned rather quickly in the post-crisis period. In the aftermath of the financial crisis, countries focusing on compensating deficiencies in

domestic demand via the export side faced mainly financial risks and were continually granted comparably positive assessments of their real economic development (Storm and Naastepad 2015a, 2015b, 2015c). However, those European countries that in the pre-crisis years had relied on increases in private and public sector debt to increase demand and thereby accumulated large current account deficits, were confronted with a much more intense economic downturn and a reversal of their developmental trajectories in close correspondence with the extent of their private and public sector debt overhang (Lane 2012; Shambaugh 2012). The application of the PO-model has amplified this structural divergence between export-led creditor-countries and (overly) indebted countries by providing political and fiscal leeway to those already successful, while delegitimizing already stressed periphery countries via model-induced deteriorations in 'natural unemployment' (NAIRU), potential output and structural deficits. In addition, due to their importance in determining MTOs and moderating excessive deficit procedures in the EU's fiscal regulation framework, the PO-model's estimates serve as the technocratic component for enforcing fiscal discipline in the rise of the 'European consolidation state' (Chapter 4 in Streeck 2016).

In exploring this argument in more depth, we first provide an empirical analysis of the development paths of individual economies in a plane constructed out of national time-series for the NAIRU and the sum of private and public sector debt in percent of GDP (Figure 6) in order to assess the intensity of structural polarization in Europe. As a first step to making sense of the information contained in Figure 6, we suggest

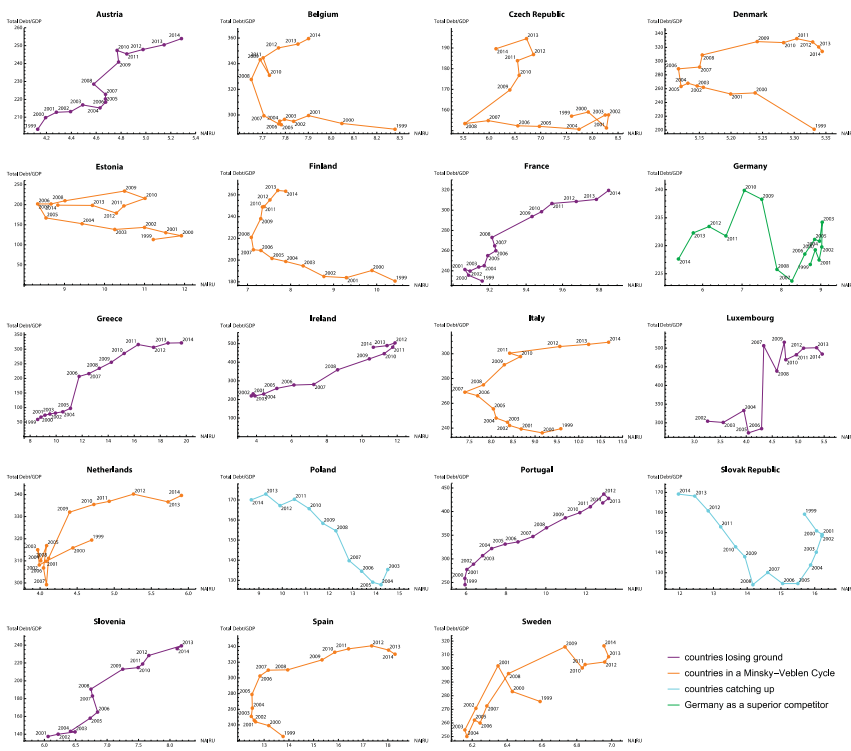

Figure 6. Four different patterns in country-specific trajectories on a NAIRU-debt plane.
Data: OECD (private sector debt in % of GDP), AMECO (November 2015); authors' calculations. Total debt (*y*-axis) is the sum of private sector and public sector debt in % of GDP.

focusing on the developmental trajectories of individual countries. In doing so, four basic types emerge: (1) countries experiencing a rough non-linearity in their developmental path when the financial crisis hit, resembling the structure of a 'Minsky–Veblen Cycle' (Kapeller and Schütz 2014); (2) countries, which are – either very slowly or rather rapidly – 'losing ground', as debt-levels and NAIRU estimates rise simultaneously; (3) countries with rising debt levels, but a decreasing NAIRU, which are 'catching up' to the Eurozone's core countries; and (4) a single country – Germany – exhibiting both decreasing levels of debt and a falling NAIRU, thereby signifying Germany's position as the powerful 'victor' in the European race for competitiveness (Simonazzi et al. 2013; Storm and Naastepad 2015b).

While this approach supplies us with an overview on the individual countries' developmental trajectories that are reinforced by the Commission's model, a disadvantage of this perspective is that it hardly allows for synthesizing data and interpretation across countries. In order to remedy this fact, we provide an aggregate NAIRU-debt plane for 20 EU countries, including 15 Eurozone countries. Figure 7 is based on a simple aggregation of all time-series provided in Figure 6. Its main feature is that it separates the whole plane into grids and thereby calculates the average movement per period within the respective grid and plots these averages as arrows. This setup is inspired by the complexity economics approach developed in Cristelli et al. (2015), who argue that a vector-like representation in a plane such as ours allows for a better understanding of the complex trajectories of different countries.

Dividing the NAIRU-debt plane into grids not only allows for visualizing average dynamics within a pooled set of countries, but also for assessing the relative strength of diverging moves within more densely populated areas, i.e. grids characterized by many observations: while for a certain, more extreme, range of NAIRU-debt values clear patterns emerge, in more densely populated areas the dynamics across countries tend to

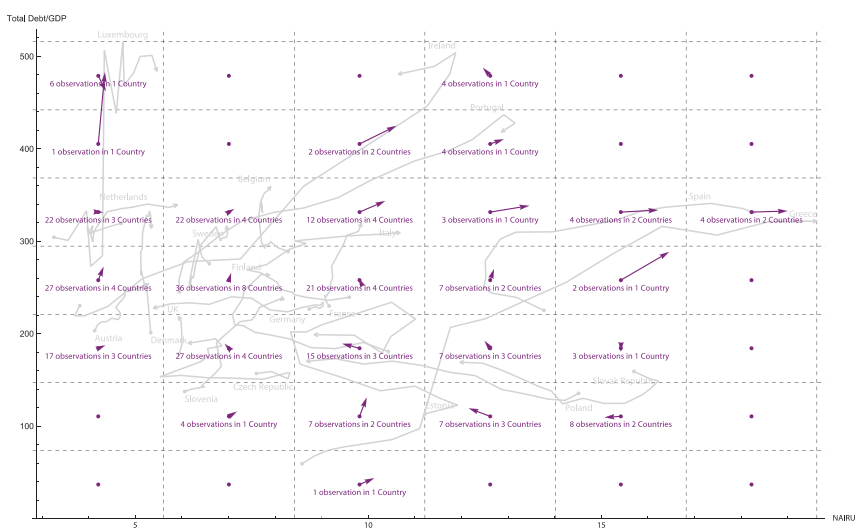

Figure 7. Europe on a NAIRU-debt plane: an aggregate view.
Data: OECD, AMECO (Autumn 2015); authors' calculations. Total debt is the sum of private sector debt and public sector debt (in % of GDP).

level each other out. Regarding the sensitivity of the results in the NAIRU-debt plane, we find that they are robust with respect to variations in the number of grids applied.

In this bird's-eye view on developmental trajectories in Europe, several areas with distinct properties emerge from Figure 7, which roughly resemble the individual trajectories depicted in Figure 6. First, there is a small group of countries (Luxembourg, Netherlands and Ireland) with a pronounced financial sector, high debt-levels and varying NAIRU estimates. Second, there is a slightly larger group of countries where the NAIRU is estimated to be high, while the burden of indebtedness is also enormous (Greece, Portugal, Spain as well as, less pronounced, France and Italy). These countries seem to have fallen into an austerity-trap from which there is no clear way out. The ongoing deleveraging in the private and/or public sector leads these countries deeper into debt-deflationary territory (e.g. Koo 2013; Mastromatteo and Rossi 2015), from which the Commission's pro-cyclical potential output estimates make it very difficult to escape, because the model's implicit imperative in a prolonged crisis is simply more fiscal austerity (see Section 5). Third, there is a densely populated middle area, where the trajectories of individual countries largely cancel each other out. The only exception is a small 'path of hope' exemplified by Poland, Slovakia and (partially) the Czech republic, signaling the possibility that an increase in debt might allow for a sustainable catch-up process – but only for those countries starting with rather low levels of total debt.

While there are not too many data points underlying the pattern exhibited by the second group, consisting of countries in an austerity-trap, these observations are still of high economic and political significance as the main questions – how to bring them back into the game and how to reset their developmental trajectories – remain unanswered by current policy approaches. Quite on the contrary, the policy tools currently in place further reinforce the underlying divergence, as the PO-model provides no escape route from a debt-deflationary path that causes countries to move further into the (upper) right 'grids of despair' in the NAIRU-debt plane (Figure 7).

These countries are caught in self-defeating debt-deflation since the European regulatory innovations introduced in the aftermath of the financial crisis place strong restrictions on their political and fiscal leeway. In this context, the countries in the upper-right part of the NAIRU-debt plane are under direct disciplinary supervision regarding their debt outlooks, where this supervision is, again, based on 'structural deficit numbers' derived from estimates of NAIRU and potential output as provided by the model under study. According to the prevailing rules in the Stability and Growth Pact, these countries are legally obliged to bring down 'excessive structural deficits' and, hence, experience limited financial autonomy, which undermines the introduction of alternative policies ensuring a more sustainable economic development (e.g. the buildup of competitive industries).

A possible objection to our argument regarding the austerity-promoting features of the PO-model's estimates in crisis times is that the Commission retains some discretionary power within the EU's fiscal regulation framework when it comes to assessing fiscal conduct, as there are several flexibility clauses and exceptions that could temporarily override structural deficit targets (e.g. Claeys et al. 2016). For example, one could argue that a large, politically strong country such as France has more leverage to withstand the Commission's pressure to implement corrective actions than a smaller, less powerful country such as Portugal. However, although the existing fiscal regulation framework leaves some scope for discretionary flexibility of the Commission, the

PO-model's estimates shape the EU fiscal regulation framework's policy objectives, allowing for allegedly exact quantitative evaluations of the 'structural health' of a country's fiscal situation from which political exceptions may be granted on a discretionary basis.

Against this background, it becomes clear that the Commission's NAIRU and potential output estimates play an important role in the 'drama of democratic states being turned into debt-collecting agencies' (Streeck 2016, 29). In doing so, the model does not only promote polarization, but also fuels political conflicts between debtor and creditor countries in Europe – for example between Germany and France, as the former is running current account surpluses while the latter has been accumulating deficits (e.g. Simonazzi et al. 2013). In other words, it might be the case that a large country such as France is more likely than smaller countries to benefit from a flexible assessment, even if the Commission's model estimates point to the imperative of more fiscal austerity. However, the pro-cyclical model estimates increase the consolidation pressure on the French government, as its position vis-à-vis creditor countries with more favorable NAIRU and potential output estimates is nonetheless weakened due to the model's restraining impact on structuring the available policy scope.

While it is evident that austerity policies aiming at improvements in the structural development by increasing competitiveness can never succeed in all countries at the same time, the performative impact of the Commission's model is not only to be found in fiscal restriction: by providing pro-cyclical downward revisions of potential output estimates as well as correspondingly higher numbers on 'excessive structural deficits' in times of crisis, the potential output model translates an econometric problem (the 'end-point bias' in calculating NAIRU and TFP by means of Kalman filtering) into political momentum. This has helped policy-makers to argue that the 'structural health' of the economies in the Eurozone periphery had previously been overestimated, and that drastic deflationary austerity measures would be 'without alternative' to increase price competitiveness and ensure public debt sustainability. Accordingly, model estimates of the NAIRU and potential output also contribute to lopsided attributions of 'blame' for the dire macroeconomic developments in Europe (e.g. Varoufakis 2017). The decrease in political scope in debt-burdened countries makes alternative political proposals or economic visions for European economic policy more difficult to defend.

7. Conclusions

This paper shows that the Commission's model for estimating the non-accelerating inflation rate of unemployment (NAIRU) and potential output has contributed powerfully to shaping macroeconomic developments and fiscal policy-making in Europe, with particular focus on the euro area's economies during 1999–2014. Our arguments fill a gap in the performativity literature, which has so far mostly neglected the role of macroeconomic models in economic policy-making. We have demonstrated that the potential output model provides estimates for 'natural unemployment', i.e. the NAIRU, and 'potential output', which are interpreted as assessments of an economy's 'true position' in the business cycle. Against the background of their institutionalization in the EU's fiscal regulation framework, these model estimates then lead to political reactions, which increase the sensitivity of actual economic outcomes to the size of and changes in these model estimates. In particular, when estimates of the NAIRU go up during crisis times, a country's scope for additional government borrowing decreases. The reason

is that higher NAIRU estimates imply that less of the actual unemployment rate is cyclical; hence, expansionary fiscal policies cannot be expected to reduce unemployment significantly before inflation kicks in. As a consequence, the Commission's NAIRU estimates constrain the policy-maker's scope for revitalizing the economy through extra debt-financed spending within the EU's fiscal regulation framework.

In sum, we have identified two major economic impacts that are brought forth by the performativity of the potential output model. First, the Commission's estimates were demonstrably pro-cyclical – both in the pre-crisis years from the introduction of the Euro to the financial crisis, and in the post-crisis period. The application of these estimates for macroeconomic coordination purposes in turn reinforced general economic developments not only by affecting national fiscal policies but also by reaffirming and amplifying established views on economic conditions and appropriate policies in Europe. The second self-reinforcing feedback loop lies in the model's amplifying effects on structural development paths in Europe. While the PO-model could not account for the increasing polarization underlying the pre-crisis period as it ignores international competition and the financial system altogether, it did indeed track the harsh reversal in the developmental paths of the Eurozone's periphery countries – and, in doing so, amplified the crisis in those countries as the public sector was forced to deleverage simultaneously with the private sector. The Commission's potential output model blocks any promising possibility to overcoming the resulting austerity-trap, because the massive downward revisions in potential output in those countries hit hardest by the crisis have put persistent fiscal consolidation pressure on the respective governments.

Counteracting the drag on aggregate demand exerted by private sector deleveraging and overcoming the divergence in structural development trajectories in Europe within the given focus on improving competitiveness eventually requires fiscal scope for public investment to foster structural improvements and innovations (e.g. Koo 2015; Mazzucato 2013). The Commission's model, however, has systematically failed to grant the necessary policy leeway. Hence, it has proven self-defeating in the sense that it contributes to the increase in structural divergence between the Eurozone's core and periphery countries – a phenomenon that contradicts the spirit of convergence allegedly embedded in the Stability and Growth Pact. While the practical difficulties associated with surveilling budgetary discipline gave rise to the potential output model in the first place, today it serves as a restrictive and intransparent 'experts cage' for confining democratic policy-making.

Notes

1. Hence, the roots of the Eurozone crisis in the years prior to the financial crisis of 2008/2009 lie *not* in excessive fiscal deficits and public debt, although the crisis has created severe sovereign debt problems from 2010 onwards (e.g. de Grauwe and Ji 2014; Lane 2012; Shambaugh 2012).
2. The Cobb–Douglas framework used by the Commission is well established, although many criticisms have been put forward that challenge its theoretical foundations and empirical usage (e.g. Felipe and McCombie 2014).
3. Criticisms related to measures of the capital stock are profound but beyond the scope of this paper; see Felipe and McCombie (2014) for a recent literature review.
4. The Commission's forecast from December 2007 provides time-series data for potential output for all EU countries through 2009 (we exclude five countries for which the 2007 data could not be compared to 2015 data). We take this pre-crisis data, denote them by PO^{**}, and extend all time-

series beyond 2009 by means of log-linear extrapolation. Specifically, we compute the average annual change in the logarithm of PO** during 2000–2009, and then assume that potential output has increased at a constant rate from 2010 to 2014 (see Ball 2014, 150).

5. Partly and to varying degrees across countries, revisions in potential output were also due the collapse in the growth rate of the capital stock (e.g. Darvas 2013; Klär 2013; Palumbo 2015).

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Disclosure statement

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References

Baldwin, R., Beck, T., Benassy-Quere, A., Blanchard, O., Corsetti, G., de Grauwe, P., den Haan, W., Giavazzi, F., Gros, D., Kalemli-Ozcan, S., Micossi, S., Papaioannou, E., Pesenti, P., Pissarides, C., Tabellini, G. and Weder di Mauro, B. (2015) 'Rebooting the Eurozone: Step 1 – agreeing a crisis narrative', *CEPR Policy Insight* 85: 1–15.

Ball, L. (2014) 'Long-term damage from the Great Recession in OECD countries', *European Journal of Economics and Economic Policies* 11: 149–60.

Barba, A. and Pivetti, M. (2009) 'Rising household debt: its causes and macroeconomic implications – a long-period analysis', *Cambridge Journal of Economics* 33: 113–37.

Beunza, D. and Stark, D. (2004) 'Tools of the trade: the socio-technology of arbitrage in a wall street trading room', *Industrial and Corporate Change* 13: 369–400.

Blanchard, O. and Giavazzi, F. (2002) 'Current account deficits in the euro area: the end of the Feldstein-Horioka puzzle?', *Brookings Papers on Economic Activity* 33: 147–210.

Blanchard, O. and Leigh, D. (2014) 'Learning about fiscal multipliers from growth forecast errors', *IMF Economic Review* 62: 179–201.

Blyth, M. (2013) *Austerity. The History of a Dangerous Idea*, Oxford: Oxford University Press.

Braun, B. (2014) 'Why models matter. The making and unmaking of governability in macroeconomic discourse', *Journal of Critical Globalisation Studies* 7: 48–79.

Braun, B. (2015) 'Governing the future: the European Central Bank's expectation management during the Great Moderation', *Economy and Society* 44: 367–91.

Callon, M. (1998) 'Introduction: The embeddedness of economic markets in economics', in M. Callon (ed) *The Laws of Markets*, Oxford: Blackwell Publishing, pp. 1–59.

Claeys, G., Darvas, Z. and Leandro, A. (2016) 'A proposal to revive the European Fiscal Regulation Framework', *Bruegel Policy Contribution* 7: 1–20.
Cobb, C. and Douglas, P. (1928) 'A theory of production', *American Economic Review* 18: 139–65.
Cochrane, J. (2009) 'How did Paul Krugman get it so wrong?', *Economic Affairs* 31: 36–40.
Colander, D., Goldberg, M., Haas, A., Juselius, K., Kirman, A., Lux, T. and Sloth, B. (2009) 'The financial crisis and the systemic failure of the economics profession', *Critical Review* 21: 249–67.
Cristelli, M., Tacchela, A. and Pietronero, L. (2015) 'The heterogenous dynamics of economic complexity', *PLoS ONE* 10: e0117174.
Cynamon, B. and Fazzari S. (2016) 'Inequality, the great recession and slow recovery', *Cambridge Journal of Economics* 40: 373–99.
Darvas, Z. (2013) 'Mind the gap! And the way structural budget balances are calculated', *Bruegel Blog Post*, 18 October; accessed at http://bruegel.org/2013/10/mind-the-gap-and-the-way-structural-budget-balances-are-calculated/, 12 May 2016.
de Grauwe, P. (2012) 'The governance of a fragile Eurozone', *Australian Economic Review* 45: 255–68.
de Grauwe, P. and Ji, Y. (2013) 'From panic-driven austerity to symmetric macroeconomic policies in the Eurozone', *Journal of Common Market Studies* 51: 31–41.
de Grauwe, P. and Ji, Y. (2014) 'How much fiscal discipline in a monetary union?', *Journal of Macroeconomics* 39: 348–60.
DeLong, B. and Summers, L. (2012) 'Fiscal policy in a depressed economy', *Brookings Papers on Economic Activity* 44: 233–97.
Drudy, P. and Collins, M. (2011) 'Ireland: from boom to austerity', *Cambridge Journal of Regions, Economy and Society* 4: 339–54.
Durbin, J. and Koopman, S. J. (2012) *Time Series Analysis by State Space Methods*, Oxford: Oxford University Press.
ECFIN (2013) 'Building a strengthened fiscal framework in the European Union: a guide to the stability and growth pact', *European Economy Occasional Papers* 150: 1–35.
European Commission (2013) 'Labour market developments in Europe 2013', *European Economy* 6: 1–133.
Ekinci, F., Kabas, G. and Sunel, E. (2013) 'End-point bias in trend-cycle decompositions: an application to the real exchange rates of Turkey', *Central Bank of Turkey Working Paper* 13: 1–23.
Felipe, J. and McCombie, J. (2014) 'The aggregate production function: 'Not Even Wrong', *Review of Political Economy* 26: 60–84.
Fioramanti, M. (2016) 'Potential output, output gap, and fiscal stance: is the EC estimation of the NAWRU too sensitive to be reliable?', *MPRA Paper* 73762: 1–16.
Fiscal Compact (2012) *Treaty on Stability, Coordination and Governance in the Economic and Monetary Union*, T/SCG/EN 1, Brussels: European Commission.
Friedman, M. (1968) 'The role of monetary policy', *American Economic Review* 58: 1–17.
Giavazzi, F. and Spaventa, L. (2010) 'Why the current account matters in a monetary union: lessons from the financial crisis in the Euro Area', *CEPR Discussion Paper* 8008: 1–17.
Hall, P. A. (ed) (1989) *The Political Power of Economic Ideas: Keynesianism Across Nations*, Princeton, NJ: Princeton University Press.
Havik, K., Morrow, K. M., Orlandi, F., Planas, C., Raciborski, R., Roeger, W., Rossi, A., Thum-Thysen, A. and Vandermeulen, V. (2014) 'The production function methodology for calculating potential growth rates and output gaps', *European Economy Economic Papers* 535: 1–112.
Heimberger, P., Kapeller, J. and Schütz, B. (2017) 'The NAIRU determinants: what's structural about unemployment in Europe?', *Journal of Policy Modeling*. accessed at https://doi.org/10.1016/j.jpolmod.2017.04.003, 10 August 2017.
Heimberger, P. (2017) 'Did fiscal consolidation cause the double-dip recession in the euro area?', *Review of Keynesian Economics* 5: 439–58.
Hobza, A. and Zeugner, S. (2014) 'The 'imbalanced balance' and its unraveling: current accounts and bilateral financial flows in the euro area', *European Economy – Economic papers* 520: 1–25.
Jorda, O. and Taylor, A. (2016) 'The time for austerity: estimating the average treatment effect of fiscal policy', *Economic Journal* 126: 219–55.
Jorda, O., Schularick, M. and Taylor, A. (2016) 'Sovereigns versus banks: credit, crises, and consequences', *Journal of the European Economic Association* 14: 45–79.
Kaiser, R. and Maravall A. (2001) 'Some basic limitations of the Hodrick-Prescott filter, measuring business cycles in economic time series', *Lecture Notes in Statistics* 154: 87–115.

Kalman, R. (1960) 'A new approach to linear filtering and prediction problems', *Journal of Basic Engineering* 82: 35–45.
Kapeller, J. and Schütz, B. (2014) 'Debt, boom, bust: a theory of Minksy-Veblen cycles', *Journal of Post Keynesian Economics* 36: 781–813.
Klär, E. (2013) 'Potential economic variables and actual economic policies in Europe', *Intereconomics* 48: 33–40.
Koo, R. (2013) 'Balance sheet recession as the "Other Half" of macroeconomics', *European Journal of Economics and Economic Policies* 10: 136–57.
Koo, R. (2015) *The Escape From Balance Sheet Recession and the QE Trap*, Singapore: John Wiley & Sons.
Lane, P. (2012) 'The European sovereign debt crisis', *Journal of Economic Perspectives* 26: 49–68.
Lockwood, E. (2015) 'Predicting the unpredictable: value-at-risk, performativity, and the politics of financial uncertainty', *Review of International Political Economy* 22: 719–56.
MacKenzie, D. (2003) 'An equation and its worlds: bricolage, exemplars, disunity and performativity in financial economics', *Social Studies of Science* 33: 831–68.
MacKenzie, D. and Millo, Y. (2003) 'Constructing a market, performing theory: the historical sociology of a financial derivatives exchange', *American Journal of Sociology* 109: 107–45.
MacKenzie, D. (2005) 'Opening the black boxes of global finance', *Review of International Political Economy* 12: 555–76.
MacKenzie, D. (2006) *An Engine, Not a Camera. How Financial Models Shape Markets*. Cambridge, MA: MIT Press.
MacKenzie, D. (2011) 'The big, bad wolf and the rational market: portfolio insurance, the 1987 crash and the performativity of economics', *Economy and Society* 33: 303–34.
Mastromatteo, G. and Rossi, S. (2015) 'The economics of deflation in the euro area: a critique of fiscal austerity'. *Review of Keynesian Economics* 3: 336–50.
Mazzucato, M. (2013) *The Entrepreneurial State: Debunking Public vs. Private Myths in Risk and Innovation*, London: Anthem Press.
Mirowski, P. and Plehwe, D. (eds.) (2009) *The Road from Mont Pelerin. The Making of the Neoliberal Thought Collective*, Cambridge: Harvard University Press.
Mourre, G., Astarita, C. and Princen, S. (2014) 'Adjusting the budget balance for the business cycle: the EU methodology', *European Economy – Economic Papers* 536: 1–32.
Mügge, D. (2009) 'Tales of tails and dogs: derivatives and financialization in contemporary capitalism', *Review of International Political Economy* 16: 514–26.
Palumbo, A. (2015) 'Studying growth in the modern classical approach: theoretical and empirical implications for the analysis of potential output', *Review of Political Economy* 27: 282–307.
Paudyn, B. (2013) 'Credit rating agencies and the sovereign debt crisis: performing the politics of creditworthiness through risk and uncertainty', *Review of International Political Economy* 20(4): 788–818.
Perugini, C., Hölscher, J. and Collie, S. (2016) 'Inequality, credit and financial crises', *Cambridge Journal of Economics* 40: 227–57.
Phelps, E. (1967) 'Phillips curves, expectations of inflation and optimal unemployment over time', *Economica* 34: 254–81.
Planas, C. and Rossi, A. (2015) 'Program GAP. Technical description and user-manual (Version 4.4)', *Joint Research Centre Ispra Scientific and Technical Reports* 4: 1–46.
Ruiz, J., Stupariu, P. and Vilarino, A. (2016) 'The crisis of Spanish savings banks', *Cambridge Journal of Economics* 40: 1455–77.
Sapir, A., Wolff, G., de Sousa, C. and Terzi, A. (2014) *The Troika and Financial Assistance in the Euro Area: Successes and Failures*, (committee study on the request of the Economic and Monetary Affairs Committee, February 2014). Brussels: European Parliament.
Shambaugh, J. (2012) 'The Euro's three crises', *Brookings Papers on Economic Activity* 43: 157–231.
Simonazzi, A., Ginzburg, A. and Nocella, G. (2013) 'Economic relations between Germany and Southern Europe', *Cambridge Journal of Economics* 37: 653–75.
Skidelsky, R. (2003) *John Maynard Keynes 1883–1946. Economist, Philosopher, Statesman*, London: MacMillan.
Stockhammer, E. and Sotiropoulos, D. (2014) 'Rebalancing the Euro area: the costs of internal devaluation', *Review of Political Economy* 26: 210–33.

Stockhammer, E. (2015) 'Rising inequality as a cause of the present crisis', *Cambridge Journal of Economics* 39: 935–58.
Stockhammer, E. and Wildauer, R. (2016) 'Debt-driven growth? Wealth, distribution and demand in OECD countries', *Cambridge Journal of Economics* 40: 1609–34.
Storm, S. and Naastepad, C. W. M. (2015a) 'Europe's hunger games: income distribution, cost competitiveness and crisis', *Cambridge Journal of Economics* 39: 959–86.
Storm, S. and Naastepad, C. W. M. (2015b) 'Crisis and recovery in the German economy: the real lessons' *Structural Change and Economic Dynamics* 32: 11–24.
Storm, S. and Naastepad, C. W. M. (2015c) 'NAIRU economics and the Eurozone crisis' *International Review of Applied Economics* 29: 843–77.
Storm, S. and Naastepad, C. W. M. (2016) 'Myths, mix-ups and mishandlings: understanding the Eurozone Crisis' *International Journal of Political Economy* 45: 46–71.
Streeck, W. (2016) *How Will Capitalism End?*, London: Verso.
Svetlova, E. (2012) 'On the performative power of financial models', *Economy and Society* 41: 418–34.
Tereanu, A., Tuladhar, A. and Simeone, A. (2014) 'Structural balance targeting and output gap uncertainty', *IMF Working Papers* 14: 1–30.
Tressel, T., Wang, S., Kang, J. and Shambaugh, J. (2014) 'Adjustment in Euro area deficit countries: progress, challenges, and policies', *IMF Staff Discussion Note* 14: 1–34.
Truger, A. (2013) 'Austerity in the euro area: the sad state of economic policy in Germany and the EU', *European Journal of Economic and Economic Policies* 10: 158–74.
Varoufakis, Y. (2017) *Adults in the Room: My Battle With Europe's Deep Establishment*, London: Bodley Head.