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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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The politics of central bank independence*

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Abstract

This paper reviews recent research on the political economy of monetary policy-making, both by economists and political scientists. The traditional argument for central bank independence (CBI) is based on the desire to counter inflationary biases. However, studies in political science on the determinants of central bank independence suggest that governments may choose to delegate monetary policy in order to detach it from political debates and power struggles. This argument would be especially valid in countries with coalition governments, federal structures and strongly polarized political systems. The recent financial crisis has changed the role of central banks as evidenced by the large set of new unconventional monetary and macro-prudential policy measures. But financial stability and unconventional monetary policies have much stronger distributional consequences than conventional monetary policies and this has potential implications for the central bank's independence. It may also have changed the regime from monetary dominance to fiscal dominance. However, our results do not suggest that CBI has been reduced since the Great Financial Crisis. This holds both for legal measures of CBI and the turnover rate of central bank governors.

Keywords: central bank independence, fiscal dominance, determinants of CBI.

JEL classification: E42, E52, E58.

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1. Introduction

Central bank independence (CBI) means that monetary policy is delegated to unelected officials and that the government's influence on monetary policy is restricted. However, even the most independent central bank does not operate in a political vacuum (Fernández-Albertos, 2015). For instance, in a survey among 24 central banks, Moser-Boehm (2006) shows that central bankers and government officials frequently meet and also have informal ways for discussing (the coordination of) monetary and fiscal policy. In addition, there may be political pressure on the central bank—where the ultimate threat is to remove the central bank's independence—notably if politicians disagree with the central bank's policies (see Ehrmann and Fratzscher, 2011 and references cited therein).¹

This chapter reviews recent research on the political economy of monetary policy-making, both by economists and political scientists, thereby updating our previous surveys on this topic (Eijffinger and de Haan, 1996; Berger et al., 2001 and Klomp and de Haan, 2010).

The theoretical case for CBI rests on countering inflationary biases that may occur for various reasons in the absence of an independent central bank (Fischer, 2015).² One reason for such a bias is political pressure to boost output in the short run for electoral reasons. Another reason is the incentive for politicians to use the central bank's power to issue money as a means to finance government spending. The inflationary bias can also result from the time-inconsistency problem of monetary policy making. In a nutshell, this is the problem that policymakers are not credible, i.e. they have an incentive to renege in the future on their promise made today to keep inflation low.³ By delegating monetary policy to an independent and conservative (i.e. inflation averse) central bank, promises to keep inflation low are more credible. In the words of Bernanke (2010):

“a central bank subject to short-term political influences would likely not be credible when it promised low inflation, as the public would recognize the risk that monetary policymakers could be pressured to pursue short-run

¹ Following a similar methodology as proposed by Havrilesky (1993) for the case of the European Central Bank, Ehrmann and Fratzscher (2011) show that politicians, on average, favor significantly lower interest rates. They find that politicians put relatively less weight on inflation. In addition, politicians' preferences are affected by political economy motives, while they also primarily focus on national economic objectives rather than the euro area as a whole.

² There always have been critics of this view. For instance, Stiglitz (2013) argues that the “notion of the desirability of an independent central bank was predicated on the belief that monetary policy was a technocratic matter, with no distributional consequences. There was a single policy that was best for all—a view to which the simplistic models that the central banks employed may have contributed, but which was not supported by more general models. There does not, in general, exist a Pareto superior monetary policy. That in turn implies that delegating the conduct of monetary policy and regulations to those who come from and reflect the interests of the financial market is going to result in policies that are not necessarily (and weren't) in society's broader interests.”

³ Seminal references are Kydland and Prescott (1977), Barro and Gordon (1983) and Rogoff (1985). Alesina and Stella (2010) provide an excellent review of the models used in these papers.

expansionary policies that would be inconsistent with long-run price stability. When the central bank is not credible, the public will expect high inflation and, accordingly, demand more-rapid increases in nominal wages and in prices. Thus, lack of independence of the central bank can lead to higher inflation and inflation expectations in the longer run, with no offsetting benefits in terms of greater output or employment.”⁴

It is important to realize that in the model of Rogoff (1985), which is the theoretical basis for the views outlined by Bernanke (2010), the time inconsistency problem of monetary policy can only be reduced if monetary authority is delegated to an independent *and* conservative central bank. Conservative means that the central bank is more inflation averse than the government. If the central bank would have the same preferences as the government it would follow the same policies as the government and independence would not matter. Likewise, if the central bank would be fully under the spell of the government, its inflation aversion would not matter. Only if the central bank is more inflation averse than the government and can decide on monetary policy without political interference, it can credibly promise to keep inflation low (Berger et al., 2001). It is the combination of central bank independence (CBI) and central bank conservatism (CBC) that matters. The optimum level of inflation can be realized under several combinations of CBI and CBC.⁵

What determines central bankers’ conservativeness? In economic models, the central bank’s conservativeness is usually assumed given, but Adolph (2013) comes up with an interesting approach making it endogenous, arguing that many of the influences on bureaucrats’ preferences are bound up in their observable career paths. Career backgrounds shape policy ideas (career socialization). In addition, they are shaped by bureaucrats’ desire to move their career forward (career incentive), which makes them respond to the preferences of future employers, be it the government or the financial sector. Bureaucrats respond to these ‘shadow principals’. Using central bankers’ career paths, Adolph (2013) comes up with an index of Central Banker Career Conservatism (CBCC), which depends on how long the central banker had ‘conservative’ jobs, where four types of jobs are considered, namely financial sector, finance ministry, central bank and government. According to Adolph, the first two are

⁴ Another way of enhancing credibility is to delegate monetary authority to an independent and conservative (i.e. inflation-averse) foreign central bank by fixing the exchange rate (see Bernhard et al., 2002; Bodea, 2010 and Fernández-Albertos, 2015 for details). Although these two institutional choices might be alternative ways to achieve monetary credibility in the short run, once a fixed exchange rate regime has been adopted, a central bank might be instrumental in making the currency commitments politically sustainable over the long run (Fernández-Albertos, 2015).

⁵ Eijffinger and Hoeberichts (1998, 2008) examine this trade-off between CBI and CBC in more detail. Hefeker and Zimmer (2011) revisit this issue using a setting where there is uncertainty about the preferences of the central bank. In particular, they concentrate on the case in which the public cannot perfectly observe the output gap target of the central bank. In their model full CBI is not optimal, as the uncertainty about the central bank’s preferences induces too much volatility in the economy. Therefore, it is no longer true that the government can simply give the central bank a certain level of independence and choose the optimal level of CBC to attain the first best solution. Also CBC and CBI are not necessarily substitutes anymore.

'conservative', while the latter two are 'liberal'. This classification is based on regressions of inflation and career components, controlling for CBI.⁶ It turns out that CBCC is strongly related to inflation. Adolph's regression results suggest that a one standard deviation increase in central banker conservatism leads to a point and a half decline in inflation in advanced countries and a single point decline in developing countries, where the effect is stronger in countries with an independent central bank.

An alternative way to measure central bank conservativeness has been proposed by Leveuge and Lucotte (2014). They use the so-called Taylor curve, showing the trade-off between the variability of the inflation rate and the variability of the output gap, which is derived from the minimization of a central bank's quadratic loss function. The index is based on the value of the angle of the straight line joining the origin and a given point on the Taylor Curve. Once rescaled to [0, 1], this angle measure constitutes the central bank's inflation aversion. The authors calculate their index for 32 OECD countries for the period 1980-98.

Most empirical evidence on the impact of CBI on inflation does not explicitly take central bank conservatism into account, which—from a theoretical perspective—is a serious shortcoming. There is strong evidence for a negative relationship between CBI measures—such as those of Cukierman et al. (1992)⁷ and Grilli et al. (1991), which are discussed in more detail in section 4—and inflation. Countries with an independent central bank on average have lower inflation than countries where the central bank is controlled by the government.⁸ In their meta regression analysis, Klomp and de Haan (2010a: 612,) conclude that their evidence “corroborates the conventional view by finding a significant ‘true effect’ of CBI on inflation, once we control for a significant publication bias. The effect is strongest when a study focuses on OECD countries, the period 1970–1979, considers the labour market, and when the relation is estimated using a bivariate regression.”⁹

Giordano and Tommasino (2011) highlight another benefit of delegating monetary

⁶ However, for a sample of 20 OECD countries over the period 1974–2008, Neuenkirch and Neumeier (2015) report that the professional background of the governors of the central bank does not come out significantly in their estimates of the Taylor rule, while political affiliation does. Adolph (2013) focuses on the career background of all monetary policy committee members.

⁷ It should be pointed out that under the measure of Cukierman et al. (1992) a central bank is considered more independent if its charter states that price stability is the sole or primary goal of monetary policy. Our interpretation is that the measure of Cukierman et al. captures both central bank independence and central bank “conservativeness as embedded in the law”.

⁸ However, this evidence has been criticized by various authors, claiming that the results are sensitive with respect to the measure of CBI used (see, for instance, Forder, 1996), the specification of the model (see, for instance, Posen, 1995; Campillo and Miron, 1997) or the inclusion of high-inflation observations (see, for instance, de Haan and Kooi, 2000). Klomp and de Haan (2010b) report that CBI only has a significant effect on inflation in a minority of the countries in their sample.

⁹ The political economy literature suggests that political and economic institutions significantly influence the extent to which an independent bank will reduce inflation. For example, Franzese (1999) shows that the effect of central bank independence on inflation is conditional on several political and institutional factors, such as government partisanship and labor market organization. For a discussion of this line of research we refer to Berger et al. (2001) and Fernández-Albertos (2015).

policy to an independent central bank, namely the increased debt sustainability of a country. They show that countries with more independent central banks are less likely to default on their debt. The authors explain this by a theoretical model, which analyzes the default decision as a political process, where different groups in the society (poor, middle class and rich) may have different interests. They show that if a central bank is sufficiently independent and conservative, the incentives for the government to default are lower. Also some other recent studies report evidence that CBI may constrain fiscal policy. For instance, Bodea and Higashijima (2015) find that CBI in democracies has a deterrent effect on fiscal overspending, mediated by partisanship and the electoral cycle. Likewise, Bodea (2013) reports for a sample of 23 democratic and undemocratic post-communist countries that that independent central banks restrain budget deficits only in democracies.

Although there is a strong case for instrument independence, i.e. the ability of the central bank to decide on the use of its instruments without political interference, this is different for goal independence, i.e. the ability of the central bank to set its own goals for monetary policy. The argument against goal independence is that in a democracy, the government is accountable to the electorate. As central bankers are not elected, the ultimate goals of monetary policy should therefore be set by the elected government (Mishkin, 2011). Indeed, it seems that a “broad consensus has emerged among policymakers, academics, and other informed observers around the world that the goals of monetary policy should be established by the political authorities, but that the conduct of monetary policy in pursuit of those goals should be free from political control” (Bernanke, 2010).¹⁰ Central banks, in other words, have a delegated authority to achieve their legally mandated objective(s) and have instrument independence to reach their objective(s). This requires that the central bank is protected from what Sargent and Wallace (1981) call a regime of fiscal dominance, i.e. a regime in which the central bank is forced to support government’s fiscal policy.

However, things have changed since the onset of the financial crisis. First, during the crisis central banks had to intervene at a grand scale to maintain financial stability. And, as pointed out by Blinder (2012), during a financial crisis the monetary and fiscal authorities have to work together more closely than under more normal situations for several reasons:

“when it comes to deciding which financial institutions shall live on with taxpayer support (e.g., Bank of America, Citigroup, AIG,...) and which shall die (e.g., Lehman Brothers violently, Bear Stearns peacefully), political legitimacy is critically important. The central bank needs an important place at the table, but it should not be making such decisions on its own. If the issue becomes politicized, as is highly likely, the Treasury, not the central bank, should be

¹⁰ Not everyone agrees with this view. For instance, Alesina and Stella (2015: 15-16) argue: “One may or may not agree with the idea of Central Bank independence. But the “compromise” of instrument independence does not reconcile the two views, it is essentially a refinement of the idea that Central Banks should not be independent, at least for what really matters.”

available to take most of the political heat--even if the central bank provides most of the money.”¹¹

Since the financial crisis, many central banks pay major attention to financial stability, sometimes because they have been given explicit responsibility for macro-prudential supervision, and sometimes because they now construe financial stability as essential to the traditional pursuit of macroeconomic stability (Cerutti et al., 2016).

Second, nowadays the inflation problem in most leading economies is that inflation is too low, not too high. And this has led to the use of different monetary policy instruments. Before the crisis, monetary policy makers in most countries primarily relied on short-term (e.g., overnight) interest rates to maintain price stability. Under this framework, policymakers would announce a desired level of the policy rate and enforce it relatively easily with liquidity management operations. Thus monetary policy could be, and was, implemented without large changes in the size of the central bank’s balance sheet. But the depth of the recession following the financial crisis pushed short-term nominal interest rates to or near their effective lower bound (ELB), rendering the traditional policy instrument almost useless. In response, many central banks turned to forward guidance and/or a variety of unconventional monetary policies, such as lending to banks (and sometimes even to nonbanks) in huge volume and large-scale asset purchases (‘quantitative easing’). In both cases, the central bank actively uses its balance sheet to affect market conditions. According to Bernanke (2010),

“there is a good case for granting the central bank independence in making quantitative easing decisions, just as with other monetary policies. Because the effects of quantitative easing on growth and inflation are qualitatively similar to those of more conventional monetary policies, the same concerns about the potentially adverse effects of short-term political influence on these decisions apply. Indeed, the costs of undue government influence on the central bank’s quantitative easing decisions could be especially large, since such influence might be tantamount to giving the government the ability to demand the monetization of its debt, an outcome that should be avoided at all costs.”

The new responsibilities and instruments of central banks have two important

¹¹ Likewise Cukierman (2013: 381) argues: “It appears that in democratic societies, financial crises that require large liquidity injections cannot be left only to the discretion of the CB. The reason is that as the magnitude of those injections rises, they become more similar to fiscal policy in that they involve a redistribution of wealth, at least potentially. This violates the (implicit) principle that at least in a democratic society, distributional policies should be determined by elected officials rather than by unelected bureaucrats.” Under Dodd-Frank, emergency lending by the Fed must be approved by the Secretary of the Treasury.

consequences. First, financial stability and unconventional monetary policies of central banks have stronger distributional implications (Fernández-Albertos, 2015). Of course, decisions by central banks will always affect relative prices and therefore their decisions will have redistributive effects. But financial stability and unconventional monetary policies have much stronger distributional consequences than conventional monetary policies and this has potential implications for the central bank's independence (section 2). Second, it may have changed the regime from monetary dominance to fiscal dominance (section 3). An important question therefore is whether these changes have made the pendulum swing in another direction: has CBI decreased since the financial crisis (section 4)? Section 5 concludes.

2. Political economy of CBI

The economic case for CBI as outlined in the Introduction is often considered as the main explanation for the increase in CBI that occurred in most countries during the 1980s and 1990s (see Crowe and Meade, 2007; 2008; Cukierman, 2008).¹² According to Lohmann (2006, p. 536), "in monetary policy, macro political economy made the unthinkable thinkable, and more: turned it into conventional wisdom." However, political scientists have come up with different explanations for the increase in CBI.¹³ As Bernhard et al. (2002: 694) argue:

"the time-inconsistency framework does not capture how political actors evaluate the benefits and costs of different monetary arrangements. The choice of these institutions may have less to do with the desire to fight inflation than with the desire to redistribute real income to powerful constituents, assemble an electoral coalition, increase the durability of cabinets, or engineer economic expansions around elections. [...] we need to move beyond [the time-inconsistency framework] to incorporate factors that influence the opportunity costs of adopting alternative monetary institutions."

Several authors provide political explanations for why delegating to independent monetary authorities might be attractive. For instance, according to Bernhard (1998), information asymmetries create potential conflicts between different political actors, such as backbench legislators, coalition partners, and government ministers. The severity of these conflicts conditions politicians' incentives regarding the choice of central bank institutions. If backbenchers and coalition partners can credibly threaten to withdraw their support from the government, politicians will choose an independent central bank. But if legislators, coalition partners, and government ministers share similar policy incentives or where the government's position in office is secure, central bank independence will be low. Bernhard (1998) provides evidence in support for this view. Several proxies suggested by this theory,

¹² Crowe and Meade (2008) perform a regression analysis to highlight the determinants of the reforms to CBI. Their evidence suggests that reform is correlated with low initial levels of CBI and high prior inflation, meaning that the failure of past anti-inflationary policies led to more independence for the central bank; reform is also correlated with democracy and less flexible initial exchange rates.

¹³ The following heavily draws on Fernández-Albertos (2015).

such as the Alford index (measuring class voting), a proxy for bicameral systems, and the threat of punishment (reflecting the polarization of the political system, legislative institutions, and the existence of coalition and minority governments), are all significant in cross-country regressions explaining differences in CBI.

Hallerberg (2002) provides two additional political factors that determine CBI. First, he argues that multiparty governments will primarily use fiscal policy to target key constituencies, which makes it attractive to leave (non-targetable) monetary policy in the hands of an independent central bank. Second, subnational governments in federal systems prefer an independent central bank to restrain central political authorities' control over monetary policy. Hallerberg's evidence suggests that central banks in federal countries with multi-party governments have the highest level of independence. Also some other studies report that countries with federal structures are associated with more politically independent central banks (Moser, 1997; Farvaque, 2002; Pistoiesi et al., 2011).

A similar argument—which is also based on the number of veto players—has been made by Keefer and Stasavage (2002; 2003). The more veto players, the more difficult it will be for the government to overturn the independence of the central bank. This suggests that independent central banks will be more likely in systems with many veto players. Following Keefer and Stasavage (2002), this can be explained as follows. Under a system with only one veto player, the central bank will provide the inflation preferred by the veto player knowing that it otherwise would be overridden. In contrast, when political power is divided between multiple veto players with different preferences, the central bank can now successfully implement policies that one veto player would prefer to override. The empirical evidence of Keefer and Stasavage suggests that increased CBI only has a negative effect on inflation in countries with a relatively high level of checks and balances. Likewise, Crowe (2008) argues that policy delegation can cut the cost of coalition formation by reducing the dimensionality of political conflict. The model yields the empirically testable proposition, that delegation is more likely when the correlation of agents' preferences across different policy dimensions is lower.

According to Goodman (1991), CBI may be interpreted as an attempt of current governments to tie the hands of future ones. Current governments can extend the implementation of their preferred policies beyond their electoral mandates by delegating monetary policy to central bankers who share their policy preferences. A related but slightly different view has been put forward by Lohmann (1997). Referring to Germany, Lohmann (1997) argues that if the monetary preferences of the two main political parties are different but their time horizons are sufficiently long, the parties might benefit from committing to a monetary institution that implements an intermediate monetary policy, thereby eliminating the negative social cost associated with the partisan business cycle generated by the alternation in

power between the two parties.¹⁴ Alesina and Gatti (2005) provide a formal analysis of this argument. While in Rogoff's (1985) model the lower level of average inflation following delegation of monetary to an independent (and conservative) central bank is achieved at the cost of higher output variance, in this model an independent central bank can achieve at the same time lower inflation and more output stabilization because the politically-induced variance in output is reduced.

The literature discussed above suggests that in politically heterogeneous contexts (federal systems, strong checks and balances, strong partisan differences) the emergence of independent monetary authorities is more likely.¹⁵ As pointed out by Fernández-Albertos (2015), many of the arguments used to explain the political decision to delegate monetary policy to independent central banks are remarkably similar to those used to understand why other non-elected institutions remain autonomous from political interference. In their seminal paper, Alesina and Tabellini (2008) address the issue whether society might benefit from delegating certain tasks to bureaucrats, taking them away from direct control of politicians. Both types of policymakers have different incentives. Politicians aim to be reelected and they therefore need to provide enough utility to a majority of the voters. Bureaucrats instead have career concerns and they want to appear as competent as possible looking ahead toward future employment opportunities. Given these different incentive structures, Alesina and Tabellini show that it is optimal for society to delegate certain types of activities to non-elected bureaucrats with career concerns, while others are better left in the hands of elected politicians. Delegation to bureaucrats is especially beneficial for tasks in which there is imperfect monitoring of effort and talent is very important because of the technical nature of the tasks. Under normal circumstances, monetary policy is a policy task relatively technical in nature and therefore would be a good candidate for delegation to a career bureaucrat. An important consideration is the extent to which redistribution is at play:

“Consider first policies with few redistributive implications, such as monetary policy or foreign policy. Bureaucrats are likely to be better than politicians if the criteria for good performance can be easily described *ex ante* and are stable over time, and if political incentives are distorted by time inconsistency or short-termism. Monetary policy indeed fulfills many of these conditions, and the practice of delegating it to an independent agency accords well with some of these normative results. Politicians instead are better if the policy

¹⁴ There is some evidence suggesting that partisan factors affect central bank policy. See, for instance, Belke and Potrafke (2013) and references cited therein. These authors find that that leftist governments have somewhat lower short-term nominal interest rates than rightwing governments when central bank independence is low. In contrast, short-term nominal interest rates are higher under leftist governments when central bank independence is high.

¹⁵ A few studies have pointed to international finance to explain the rise of CBI. For instance, according to Maxfield (1997) countries raise CBI as a signaling device aimed at convincing international investors of their commitment to economic openness and sound macroeconomic policy making. Similarly, Polillo and Guillen (2005) argue that pressures to compete in the global economy force governments to imitate the organizational forms adopted by other countries.

has far reaching redistributive implications so that compensation of losers is important, if criteria of aggregate efficiency do not easily pin down the optimal policy, and if there are interactions across different policy domains....” (Alesina and Tabellini, 2008, 444).

3. Interactions between central banks and fiscal authority

3.1 Fiscal dominance and monetary-fiscal policy interactions

In their seminal work Sargent and Wallace (1981) highlighted how a central bank might be constrained in determining inflation by a fiscal authority that counts on seigniorage to service its debt, a situation referred to as fiscal dominance. For a long time it was rather treated as a theoretical caveat, at least in the case of advanced economies, but with the rise of government debt to levels unseen for decades the risk of fiscal policy dominating monetary policy has become real.

Resende (2007) proposes to measure central bank independence in terms of lack of fiscal dominance. Fiscal dominance is defined as in Aiyagari and Gertler (1985), namely as the fraction of government debt $1-\delta$ that needs to be backed by monetary policy. When $\delta=0$, there is no fiscal dominance and monetary policy is fully independent. The author uses a cointegrating relationship between government debt, consumption and money supply and the structural relationship between those variables to estimate the parameter δ for a large sample of countries. The results show that there is no fiscal dominance in all OECD countries and in some of the developing countries. The δ -measure of central bank independence is substantially different from traditional measures of CBI (see below). It shows weak correlation with de jure CBI measures and a somewhat stronger correlation with de facto measures. Resende and Rebei (2008) estimate the δ -measure of central bank independence using a structural DSGE model and Bayesian techniques. The empirical results point to independent monetary policies in Canada and US, but suggest fiscal dominance in Mexico and South Korea.

Kumhof et al. (2010) consider whether a central bank can target inflation under fiscal dominance. Using a DSGE model of a small open economy, these authors study the case when fiscal policy does not react sufficiently to government debt, implicitly relying on monetary policy to stabilize the economy. They show that a central bank could extend its interest rate rule to react also to government debt. In such a setup if the central bank wants to follow inflation targeting it has to set the coefficient of inflation in its reaction function higher than one, a condition typically referred to as the Taylor principle. The authors show, however, that under fiscal dominance such an interest rate rule would imply high inflation volatility and a frequently occurring effective lower bound. Therefore, they conclude that fiscal dominance makes it impossible for the monetary authority to target inflation. This lesson was originally considered relevant for developing economies, but might become (or even already be) relevant for advanced economies as well.

Leeper (1991) proposes a somewhat different approach in which he differentiates between two regimes, an active and a passive regime, for monetary and fiscal policy. The active monetary policy regime means a strong response of interest rates to inflation, while the regime is passive if the response of monetary policy to inflation is weak. The opposite terminology applies for fiscal policy, where a strong response of taxes to debt characterizes the passive regime and a weak response characterizes the active regime. Leeper (1991) studies the implications of the different regimes for the economy in a dynamic general equilibrium model. He shows that the model's dynamics are determined only for two out of the four policy regime combinations, namely active monetary, passive fiscal policy (AMPF), and passive monetary, active fiscal policy (PMAF). The first regime is the standard regime considered by modern macroeconomists under which monetary policy stabilizes inflation, while fiscal policy stabilizes government debt. Under the second regime, fiscal policy no longer fully stabilizes government debt, while monetary policy is no longer able to fully control inflation. Under those circumstances higher debt levels translate into higher inflation levels. Davig and Leeper (2011) construct a DSGE model where regime switches between the four different regimes are possible. They estimate this model for the US over 1949 to 2008 and find that most of the Great Moderation period was characterized by the active monetary and passive fiscal policy regime, whereas during the last six years of their sample (2002-2008) a passive monetary and active fiscal policy regime was in place. This might actually indicate that the regime switch to fiscal dominance took place well before the crisis.

Leeper and Walker (2013) show that the risk of central banks losing control over inflation are far greater than suggested by Sargent and Wallace (1981). In particular, they consider three cases where monetary policy stops being effective even if fiscal policy is passive, i.e. an economy at the fiscal limit,¹⁶ an economy with risky sovereign debt and a monetary union with one of the countries running unsustainable fiscal policy. In all those cases, higher debt levels translate into higher inflation, despite the central banks' effort to stabilize inflation.

In line with Leeper's (1991) approach, Bhattarai et al. (2012, 2016) build a DSGE model allowing for different policy regime combinations and estimate it for the US pre-Volcker and post-Volcker era. They show that the post-Volcker era can be best described by the active monetary and passive fiscal policy regime, in which the central bank has full control of inflation. At the same time they find that the pre-Volcker era is characterized by a regime where both policies are passive, possibly leading to indeterminacy. As the prevailing regime has important consequences for macroeconomic variables, the authors show that had the pre-Volcker era been characterized by an active monetary and passive fiscal policy regime then the inflation increase in the 1970s could have been lower by approximately 25%.

¹⁶ The fiscal limit is modeled as an extreme reluctance to increase taxes above some threshold level. Once the fiscal authority reaches a level close to the fiscal limit the option to use higher tax revenues to stabilize debt is constrained and fiscal policy switches from passive to active.

Bhattarai et al. (2014) combine the literature on fiscal/monetary dominance (by Sargent and Wallace, 1981) with the literature on active/passive policies (Leeper, 1991). They build a DSGE model in which they analyze the effects of the different policies and debt levels. In particular, they compare the monetary dominance regime with the AMPF regime and fiscal dominance with the PMAF regime. They show that government debt has no effect on inflation under monetary dominance and under AMPF. The opposite is true, however, for the fiscal dominance and PMAF regimes, under which higher debt levels translate into higher inflation. This exercise shows that only under monetary dominance and AMPF central banks are able to fully control inflation.

3.2 Financial independence and balance sheet concerns

Stella (2005) was among the first to highlight the importance of the financial dimension of central bank independence. The author associates the financial strength of the central bank with the probability that it will be able to attain its policy goal without external financial support. A financially weak central bank faces a large risk of failing to achieve its policy goals, as losses will force the central bank to resort to current or future money creation. Whereas central banks in advanced economies have recorded long periods of substantial profits, this is not true for central banks in Latin America. In particular, the Argentinian and Jamaican central banks in the late 1980s are mentioned as two prominent cases of central bank losses leading to an abandonment of policy goals.

The notion of financial independence of the central bank gained importance after the financial crisis, when major central banks saw their balance sheets and their financial risks increase. Hall and Reis (2015) define new-style central banking as the strategy pursued by many advanced economies central banks, where they borrow large amounts of funds from commercial banks in the form of reserves and invest those in risky assets with different maturities. The new strategy is in sharp contrast to the old-style central banking under which central banks were mostly holding low-risk short-term government bonds. According to the authors, this new strategy has important implications for the financial position of central banks. In one explosive scenario, central banks either have to engage in a Ponzi scheme or have to apply to the government for fiscal support. In both cases the central bank can no longer remain an independent financial institution and cannot pursue its goal of price stability. Hall and Reis (2015) argue that different central banks are currently facing different types of risks. The Federal Reserve faces mostly risks connected to raising interest rates. An interest rate increase would imply higher payments on reserves owed to commercial banks, while at the same time it would also reduce the value of the Fed's portfolio on longer term bonds. The European Central Bank faces the same kind of interest rate risk, but more important for its situation is the default risk connected to the bonds of the peripheral countries of the Eurozone. The default risk is connected to direct holdings of bonds as well as to the indirect exposure due to accepting government bonds as collateral from commercial banks. The third type of risk faced by central banks is exchange-rate risk faced by the central banks of small open economies such

as the Swiss National Bank. Hall and Reis (2015), using historical data, also calculate the financial strength of the three aforementioned central banks. According to their calculations the actual risk of any of those banks becoming insolvent is small. However, Del Negro and Sims (2015) argue that the use of historical data to extrapolate the future risk of insolvency for central banks may be misleading. Therefore, they consider a theoretical model to study whether the lack of fiscal support may imply that the central bank is no longer able to control inflation. The authors distinguish between fiscal support and fiscal backing, where the latter is defined as in Cochrane (2011), i.e. a commitment of the fiscal authority to set fiscal policy in line with the inflation target of the central bank (see also Reis, 2015). The model may have self-fulfilling equilibria in which the public's belief that the central bank will resort to additional seigniorage to cover its losses is enough to cause a solvency crisis. The calibration of the model to reflect the current balance sheet of the Fed shows, however, that insolvency is only possible under extreme scenarios. Nevertheless, a guarantee by the government that it will make automatic fiscal transfers if the central bank incurs losses could eliminate the threat of insolvency altogether. The same effect could be obtained by holding the central bank's risky assets on a separate account guaranteed by the government, as is the case for Bank of England.

4. Has central bank independence changed since the crisis?

The previous sections would suggest that CBI has changed as current mandates and instruments of central banks have stronger distributional consequences than in the past, while a regime of fiscal dominance may have become more likely. To examine CBI one needs an indicator of the extent to which the monetary authorities are independent from politicians.¹⁷ Most empirical studies use either an indicator based on central bank laws in place, or the so-called turnover rate of central bank governors (TOR). The most widely employed legal indicators of central bank independence are (updates of) the indexes of Cukierman et al. (1992) and Grilli et al. (1991). Even though these and other indicators are supposed to measure the same phenomenon and are all based on interpretations of the central bank laws in place, their correlation is sometimes remarkably low (Eijffinger and De Haan, 1996). Furthermore, legal measures of CBI may not reflect the true relationship between the central bank and the government. Especially in countries where the rule of law is less strongly embedded in the political culture, there can be wide gaps between the formal, legal institutional arrangements and their practical impact. This is particularly likely in many developing economies. Cukierman et al. (1992) argue that the TOR may therefore be a better proxy for CBI in these countries than measures based on central bank laws. The TOR is based on the presumption that, at least above some threshold, a higher turnover of central bank governors indicates a lower level of independence. There are, however, some theoretical with using governor turnover as a proxy for CBI

¹⁷ This part heavily draws on de Haan et al. (2008) and Klomp and de Haan (2010a).

(see Adolph 2013: 288–290 for a discussion). The most important objection is that a high tenure of the central bank governor could also reflect that the governor behaves in accordance with the wishes of the government.

4.1 Legal independence

Bodea and Hicks (2015) have expanded the Cukierman et al. (1992) index of central bank independence for 78 countries from the end of the Bretton Woods system until 2010. The result is an original data set that codes independence annually and covers legislation changes in the last twenty-five years. Table 1 shows the average level of legal CBI before and after the start of the financial crisis for several groups of countries (based on IMF classifications). The table does not suggest that CBI has decreased after 2007.

Table 1. Legal CBI before and after the Global Financial Crisis

IMF-Aggregate	1995-2007	2008-2010
Advanced economies	0.57	0.59
Commonwealth of Independent States	0.60	0.70
Emerging and Developing Asia	0.46	0.59
Emerging and Developing Europe	0.67	0.83
Latin America and the Caribbean	0.63	0.66
Sub-Saharan Africa	0.41	0.42

Source: own calculations using the data of Bodea and Hicks (2015), which are available at: <http://www.princeton.edu/~rhicks/data.html>. The classification of countries follows that in the IMF's World Economic Outlook.

However, Masciandaro and Romelli (2015) come to a different conclusion. These authors provide empirical evidence on the evolution of central bank independence (based on updates of the Grilli et al. (GMT) index of legal CBI) for a sample of 45 countries over the period 1972-2014. They find that a clear reversal in the level of independence is noticeable following the Global Financial Crisis, where this decrease is more pronounced in non-OECD countries. This trend reflects that central banks in many countries have become responsible for banking supervision, which in the GMT index reduces CBI. However, this feature of the GMT index has been severely criticized, as it not obvious that a responsibility for banking supervision reduces CBI (see Eijffinger and de Haan, 1996).

4.2 Turnover rates

Even central banks that have a high degree of independence are not immune from political pressure. Politicians seeking to influence monetary policy may, for instance, choose to undermine CBI by filling important positions at central banks with individuals that they believe are favorably predisposed towards their preferred policies. Adolph (2013) shows that left- and right-wing governments tend to appoint

central bankers with different monetary preferences. By the same logic, central bankers following policies that are not in line with those preferred by the government may be removed. Indeed, Adolph (2013) reports that central bank tenures tend to be significantly shorter when inflation is high only under right-wing governments, and when unemployment is high under left-wing ones. Of course, the extent to which governments are able to replace central bank governors depends on the law in place. The evidence of Klomp and de Haan (2010c) suggests that governor turnover is lower following the implementation of central bank reform which strengthens CBI.¹⁸

Several recent papers have examined economic and political determinants of the central bank governor turnover rate. For instance, Keefer and Stasavage (2003) find that multiple constitutional checks and balances and political polarization reduce the bank governor's risk of being fired within six months after elections took place. Using new data on the term in office of central bank governors for a large set of countries for 1970–2005, Dreher et al. (2010) estimate a model for the probability that a central bank governor is replaced before the end of his legal term in office. They conclude that, apart from economic factors such as inflation and the development of the financial sector, political and regime instability and the occurrence of elections increase the probability of a turnover. Using the data of Dreher (2010) for 101 countries over the period 1970–2007, Artha and de Haan (2015) find that also financial crises increase the probability of a turnover.

Vuletin and Zhu (2011) differentiate between new governors drawn from the ranks of the executive branch of the government ('government ally') and new governors who come from outside the executive branch ('non-government ally'). Their evidence suggests that the removal of central bank governors only causes inflation when they are replaced with individuals drawn from the government sector (former politicians and bureaucrats).

Enns-Jedenastik (2014) has collected data on the partisan back-ground of 195 central bank governors in 30 European countries between 1945 and 2012 to test whether partisan congruence between governors and the executive (the government or the president) is associated with a higher probability of governor turnover. The author finds that partisan ties to the government strongly increase a governor's odds of survival *vis-à-vis* nonpartisan and opposition-affiliated individuals. Further examination reveals that the effect of opposition affiliation is time-dependent. 'Hostile' governors face greater odds of removal early in their term, but this effect vanishes after less than four years.

Table 2 shows average turnover rates for different groups of countries before and after the Global Financial Crisis. The results do not suggest that the number of central bank governor turnovers has changed since the Great Financial Crisis. This holds both

¹⁸ However, the strength of this effect depends on how well the country concerned adheres to the rule of law and its degree of political polarization. If a country does not adhere to the rule of law while there is a high degree of political polarization, the central bank law reform will not affect the term in office of the central bank governor.

for the total number of turnovers and irregular turnovers (when the governor is replaced before the end of his/her legal term in office).

Table 2. CB governor turnover rates before and after the financial crisis

Average annual turnover	1995-2007		2008-2013	
	Total	Irregular	Total	Irregular
Advanced economies ¹	4.4	2.7	4.2	1.3
Commonwealth of Independent States	1.2	0.9	1.2	1.0
Emerging and Developing Asia ²	4.2	2.9	2.7	2.0
Emerging and Developing Europe	1.8	0.8	1.0	0.5
Latin America and the Caribbean ³	6.6	4.8	4.3	2.7
Middle East, North Africa, Afghanistan and Pakistan	2.1	1.7	2.7	2.2
Sub-Saharan Africa ⁴	4.1	2.2	3.8	2.5
Total	24.3	16.0	19.8	12.2

¹ Including ECB.

² Including Macau.

³ Including Aruba, Bermuda and Cuba.

⁴ Including "Bank of Central African States" and "Central Bank of West African States".

Source: own calculations using [Axel Dreher's turnover data](#). The classification of countries follows that in the IMF's World Economic Outlook.

5. Conclusion

This survey investigates the recent theoretical and empirical literature on central bank independence. The traditional argument for CBI is based on the desire to counter inflationary biases. However, recent studies on determinants of central bank independence suggest that governments may choose to delegate monetary policy in order to detach it from political debates and power struggles. This argument would be especially valid in countries with coalition governments, federal structures and strongly polarized political systems. Such reasoning brings the discussion on central bank independence closer to the political economy studies on the independence of other non-elected institutions. Those developments may allow for an incorporation of the question of central bank independence into a broader framework of institutional setup and political economy.

As documented by the macroeconomic literature, the recent financial crisis and the following European debt crisis have put much pressure on central banks and changed monetary policy. The altered role of modern central banks is evident in the large set of new unconventional monetary policy measures employed during the rest decade. The new tools and responsibilities of the central banks come with new challenges for central bank independence.

Firstly, in an environment of global debt hangover the balance of power between fiscal and monetary policy changes. With high public debt levels fiscal authorities may be tempted to rely on monetary policy to generate additional inflation to alleviate the debt burden. Opposite to previous decades, the threat of fiscal dominance might be particularly strong in the developed world, which has seen remarkably strong increases in sovereign debt levels.

The second risk to central bank independence stems from the consequences of central bank policies. The unprecedented size of the central bank balance sheets has far reaching implications for the financial dimension of independence. Theoretical studies differ in their assessment of the financial risk faced by central banks. Even if it is small, the financial risk should not be underestimated, as lack of financial independence and the reliance on government financing of the central bank would strongly undermine the credibility of a central bank. Credibility, in turn, is crucial for controlling inflation and inflation expectations. This calls for a very careful consideration and design of exit strategies by the central banks, i.e. policies aiming at the reduction of balance sheets to more conventional levels.

Finally, the last threat to central bank independence is also associated with the set of unconventional monetary policies employed during the crisis. Crucial for any arguments in favor of CB independence is the assumption that monetary policy has no or little redistributive consequences. The recent policies employed by central banks threaten, however, to undermine this argument, as they are far more redistributive than traditional monetary policy. The survey also highlights the further need for work on CBI measures, as all existing measures have their limitations. Incorporating the abovementioned risks into those measures might be one of the largest challenges in future studies on CBI.

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