

Central bank independence before and after the crisis*

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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. There are good reasons for this delegation. For example, Alesina and Tabellini (2008) argue that delegation of decision-making authority to non-elected bureaucrats is especially beneficial when the tasks are technical in nature and monitoring quality is difficult.¹ No wonder therefore that over time many countries have made their central bank more independent (see section 3).

However, recently things seem to have changed due to the financial crisis during which

“central banks were either called upon or felt compelled to take many actions they had never (or rarely) taken before. ... Like lending to banks on a massive scale (not entirely unprecedented, but very rare) against collateral that didn't quite meet Bagehot standards—an action which can easily slide into a “bailout” of an imperiled bank. Or lending to nonbank financial institutions. Or purchasing non-traditional assets such as mortgage-backed

¹ Another important consideration is that policymakers' actions do not have first-order distributional effects, transferring income or wealth between groups in society. Although policy interest rate changes transfer wealth between borrowers and lenders, it is widely believed that the primary impact of monetary policy changes is on macroeconomic quantities such as output and inflation and that distributional effects are limited.

securities (the Fed), peripheral country debt (the ECB), and a wide variety of financial instruments (the Bank of Japan). Each of these unusual activities shares one attribute in common: There is a non-trivial chance that the central bank, and thus indirectly the country’s taxpayers, will suffer a loss. For this reason, they are often called *quasi-fiscal policies*, a term that suggests that such actions constitute a kind of government spending, which they do in an actuarial sense. Public spending by the central bank crosses the traditional line between monetary and fiscal policy, suggesting to some that the central bank has strayed into the fiscal domain.” (Blinder et al., 2017).

As a consequence, several authors argue, central bank independence is under threat. According to Buiters (2016), this threat

“comes both from the wider political and social climate – the rise of populism and of anti-establishment, anti-expert and anti-technocratic sentiment – and from developments specific to central banks. Since the start of the Great Financial Crisis (GFC) in mid-2007, central banks in most advanced economies have become more powerful and political. ... Their mandates have expanded far beyond monetary policy narrowly defined.” (Buiters, 2016: 3).

Central bankers do not seem to share this worry. Blinder et al. (2017) asked both central bank governors and academics about their views to what extent central bank independence has changed due to the financial crisis. Table 1 (Blinder et al. 2017), suggests that central bank governors felt that little had changed, but academics were slightly more worried.

Table 1. Has central bank independence changed during the crisis?

	Governors		Academics	Chi-sq.	
	All	AEs		vs. all	vs. AEs
CB independence was _____ during the crisis (N_G=54, N_A=158)				34.8***	15.0***
Gained	13.0	0.0	5.1		
Neither gained nor lost	79.6	93.8	43.0		
Lost a little	1.9	6.3	40.5		
Lost a lot	1.9	0.0	4.4		
Difficult to say	3.7	0.0	7.0		

Notes: The question asked was: *How much independence do you believe your central bank either relinquished, saw taken away from it, or gained during the crisis?* Percentages of number of responding governors or academics. *** denotes significance at the 1% level, calculated using Chi-squared tests for the independence of responses of governors and academics. AEs is advanced countries. N_G/N_A denotes number of responding governors/academics. *Source:* Blinder et al. (2017).

2. Why is CBI important?

The traditional economic case for CBI rests on countering inflationary biases that may occur for various reasons in the absence of an independent central bank (Fischer, 2015). 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.² As people are aware of this temptation, they have higher inflation expectations, which would lead to higher inflation without any gains in employment or output. By delegating monetary policy to an independent and conservative (i.e. inflation averse) central bank, promises to keep inflation low are more credible. 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 (Bernanke, 2010).

There is strong evidence for a negative relationship between CBI measures based on the central bank legislation in place and inflation (Crowe and Meade, 2008).³ Countries with an independent central bank on average have lower inflation than countries where the central bank is controlled by the government. In their meta regression analysis, Klomp and de Haan (2010: 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." This effect of legal

² Seminal references are Kydland and Prescott (1977), Barro and Gordon (1983) and Rogoff (1985). It is important to realize that in the model of Rogoff (1985), 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 government and independence would not matter (Berger et al., 2001).

³ Not everybody agrees with this view. See Berger et al. (2001) for a discussion of studies arguing against it. A prominent critique comes from Posen (1995) who argues that opposition to inflation from the financial sector directly determines both inflation and central bank independence. Posen's argument rests on the idea that central banks can only be anti-inflationary if there is a strong political coalition that backs policies aimed at stable prices. While this is an important critique, the subsequent literature has found that legal central bank independence (in developed countries) or turnover of central bank governors (in developing countries) is associated with lower inflation even when controlling for the relative strength of the financial sector (Franzese 1999, de Haan and Kooi 2000). A broader point can be raised about central bank independence being effective because of popular preferences for price stability, even though stable, country specific attitudes about price stability can be tackled with appropriate research design choices, including country fixed effects or General Method of Moments (GMM) estimations. More recently, Cargill (2016, p. 5/6) challenged the conventional wisdom, arguing that most empirical studies use "measures of independence that are subject to considerable measurement error. That is, any measurement based on the legal standing of the central bank is unlikely to be an indicator of actual political independence for short periods of time, and it is even more unlikely for longer periods."

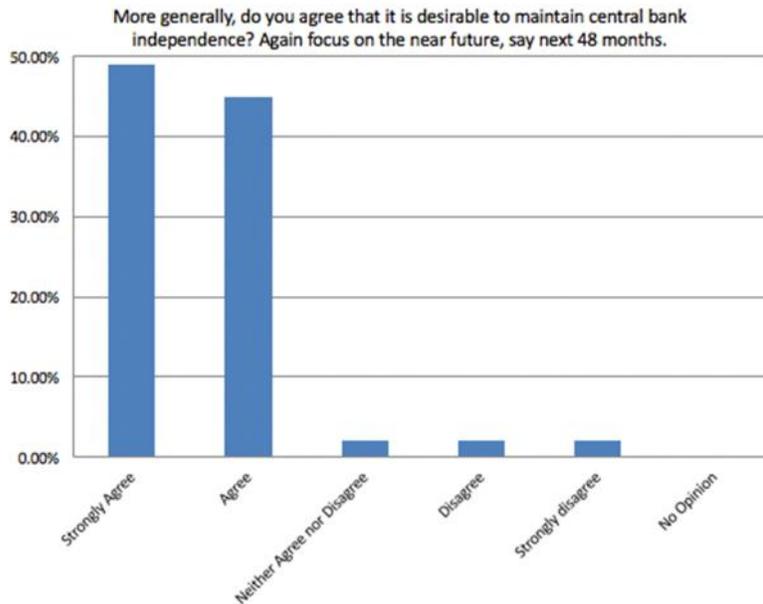
indexes of CBI independence is likely limited to countries where political and social institutions allow the legislation governing the central bank to have a de facto bite, i.e. in countries with strong democratic institutions (Broz, 2002; Bodea and Hicks, 2015), multiple veto players (Moser, 1999; Keefer and Stasavage, 2003; Hayo and Voigt 2008) or a strong, free press (Bodea and Hicks, 2015).

Although there is thus 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). 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).

Also academics strongly agree that CBI remains useful, as shown by Figure 1, which shows the answers of the CFM-CEPR panel to the question of whether it is desirable to maintain CBI in the future.⁴

⁴ There are also critics. 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.” Likewise, according to Wren-Lewis (2016), “by encouraging the creation of independent central banks, economists had helped create both the obsession with austerity and an institutional arrangement that made a recession busting policy impossible to enact.”

Figure 1. Desirability to maintain CBI



Notes: The question asked was: *More generally, do you agree that it is desirable to maintain central bank independence in the future?* The bars show percentages of number of responding academics. *Source:* Den Haan et al. (2016).

Likewise, Balls et al. (2016, p. 12) argue that:

“The pre-crisis arguments in favour of central bank independence in monetary policy remain strong: if inflationary pressures return, politically-engineered business cycles and time inconsistency are no less likely to be problems than the past, and delegation of authority to an independent expert body remains important for credibility. Indeed, many of these arguments apply to some of the new central bank functions, including macro-prudential policy and bank supervision.”

Indeed, there is ample evidence that central bank independence contributes to financial stability. For instance, Klomp and de Haan (2009) report for a sample of some 60 countries covering the period 1985–2005 that there exists a significant negative relation between CBI and financial instability. Likewise, Quintyn and Taylor (2003) argue that regulatory and supervisory independence– both from the government and the industry – is essential for the achievement and preservation of financial stability.

It is widely believed that independent central banks should be accountable. In a principal-agent approach, the essence of accountability is that once a principal (such as the legislator) delegates a particular task to an agent (the central bank, for example) and gives the agent instruments to perform this task, the agent must be held accountable for achieving the objective. This means that the principal must form an opinion of the agent’s performance (de Haan et al., 2012). If this assessment is negative, the principal can intervene by, for example, dismissing the agent or by

giving the agent a different objective. However, it is important in this respect to avoid political interference in the normal activities of the agent.

De Haan et al. (2005) argue that the concept of central bank accountability has three main features: 1. decisions about the *explicit definition and ranking of objectives* of monetary policy; 2. *disclosure* of actual monetary policy; and 3. who bears *final responsibility* with respect to monetary policy.

In a democratic society, elected politicians should decide on the *explicit definition and ranking of objectives of monetary policy*. Why would decisions on the objectives of this form of economic policy be treated differently than those of other forms of economic policy, like fiscal policy? Indeed, it is widely believed that only elected representatives should decide on tax laws and government spending. It is therefore questionable whether it is legitimate in a democratic system to leave the decisions on the objectives of monetary policy in the hands of an independent institution, which is not subject to elections.

Disclosure is also a very important element of accountability. Where the reasoning behind and strength of opinion supporting certain monetary policy decisions are clear it is easier to make a judgment and to hold central bank officials accountable for their behavior. So, a central bank should be required to report in regular intervals on its past performance and future plans. There are various possibilities, ranging from reports, minutes, testimony to legislatures, presence of government representatives in monetary policy committees and other communication devices (see Blinder et al., 2008 for an extensive discussion).

With respect to the *final responsibility for monetary policy*, de Haan et al. (2005) argue that three issues are crucial: the relationship with parliament, the existence of some kind of override mechanism, and the dismissal procedure for the central bank governor.⁵

In their view, parliament has to play a major role in the democratic accountability of the central bank. There should be a legal requirement for the central bank to report to parliament and/or explain policy actions in parliament. Parliament should have the opportunity to review the performance of the central bank with regard to monetary policy on a regular basis, while the central bank at the same time can explain and justify its conduct. It has been argued in the context of national central banks, in general, that parliament always holds the ultimate responsibility for monetary policy since it can change the legal basis of the central bank. Indeed, the mere threat of a change of the law may ensure that even highly legally independent central banks (like

⁵ Some of these issues may reduce the independence of the central bank. However, there is evidence suggesting that this is not detrimental for the effect of CBI on inflation as that relationship seems to be driven by instrument independence (see Balls et al., 2016 and references cited therein).

the Bundesbank in the past; see de Haan, 2017) will ensure that monetary policy will be broadly in accordance with the wishes of elected politicians. In general, the central bank may not (only) be directly accountable to parliament but (also) to the government, which is, in turn, accountable to parliament. In that case it is important that the government is able to influence central bank behavior. Without such instruments, accountability would not go beyond mere reporting by government to parliament of central bank policies, for which the government can in that case not be held responsible.

An *override mechanism* for government would be an instrument to change central bank policy. If the government does not interfere, it apparently agrees with central bank policies and can be held accountable for this by parliament. Such a mechanism existed in the Netherlands before the latest change of the Dutch central bank law due to EMU.⁶ If such an override mechanism exists, it is crucial that the conditions under which it can be applied are laid down in detail. It has to be ensured that the mechanism is not used as a tool for undesired political influence. The procedure for the application for the override mechanism itself needs to be transparent. The decision to apply the override mechanism should be made public. Furthermore, the procedure to apply an override should provide for some kind of review (like a possibility for the central bank to appeal) to make sure that the override is being used carefully.

Finally, the *dismissal procedure* for a central banker can be a mechanism of *ex post* accountability if a central bank official can be dismissed on grounds of bad performance, that is, not realizing stated objectives. Dismissal may function as a sanction for poor performance by linking the tenure of central bank officials to policy results, i.e. meeting the predetermined monetary policy target. This is the case for the Reserve Bank of New Zealand where the PTA between the governor of the Bank and the Minister of Finance lays down the policy targets, which the former has to achieve. Inadequate performance may result in the dismissal of the governor.

De Haan et al. (1999) have constructed an indicator of democratic accountability based on the general definition as given above. Table 2 is reproduced from this study. The table shows the accountability index for some major central banks. The index is constructed by posing 13 different questions and the total number of positive answers determines the score for the central bank concerned. It should be pointed out that the indicator is based on central bank laws. Table 2 also shows the level of central bank independence, using the data described in more detail in the next section. The table suggests that central banks with a high level of independence do not necessarily have a low level of accountability. De Haan et al. (1999) show that only the

⁶ The override of the central bank decisions is still possible, for example in the UK (under extreme circumstances, with parliament approval) or Canada (by way of a mandatory written directive) (Bodea and Huemer 2010).

third dimension of accountability for monetary policy has a negative relationship with CBI.⁷

Table 2. Accountability of some major central banks with respect to monetary policy

Various aspects of accountability:	Bank of Japan	Bank of England	Fed. Res. System	ECB ^b
1. Does the central bank law stipulate the objectives of monetary policy?	yes	yes	yes	yes
2. Is there a clear prioritisation of objectives?	no	yes	no	yes
3. Are the objectives clearly defined? ^a	no (yes)	yes	no (yes)	no (yes)
4. Are the objectives quantified (in the law or based on document based on the law)?	no (yes)	yes	no (yes)	no (yes)
Subtotal on <i>ultimate objectives of monetary policy</i>	1 (3)	4	1 (3)	2 (4)
5. Must the central bank publish an inflation or monetary policy report of some kind, in addition to standard central bank bulletins/report?	-	yes	yes	no (yes)
6. Are minutes of meetings of the governing board of the central bank made public within a reasonable time?	no	yes	yes	yes
7. Must the central bank explain publicly to which extent it has been able to reach its objectives?	yes	yes	yes	yes
Subtotal on <i>transparency</i>	1	3	3	2 (3)
8. Is the central bank subject to monitoring by Parliament (is there a requirement – apart from an annual report - to report to Parliament and/or explain policy actions in Parliament)?	yes	yes	yes	yes
9. Has the government the right to give instructions?	yes	yes	no	no
10. Is there some kind of review in the procedure to apply the override mechanism?	yes	yes	yes	no
11. Has the central bank possibility for an appeal in case of an instruction?	no	no	no	no
12. Can the central bank law be changed by a simple majority in Parliament?	yes	yes	yes	no
13. Is past performance a ground for dismissal of a central bank governor?	no	no	no	no
Subtotal on <i>final responsibility</i>	4	4	2	1
Total on accountability	6 (8)	11	6 (8)	5 (8)
Level of CBI	0.47	0.65	0.48	0.87

^aThis can refer, for example, to inflation targets. ^bThe ECB goes in some respects further than the law prescribes (operationalization of the objective, monthly report, the reasoning behind specific decisions is made public immediately, appearances before European Parliament). Also the Fed and the BoJ have defined their inflation objective more precisely. Therefore, Table 2 also shows in parentheses the score

⁷ It will be more difficult to hold central banks democratically accountable for their new powers. For instance, the goal of macro-prudential policy (“financial stability”) is more difficult to define than price stability (“2% inflation”), it is determined by a far greater number of factors, including exogenous shocks and the use of other policy instruments, and the tools to achieve it are less well understood than conventional monetary policy tools such as interest rates (Balls et al., 2016; de Haan et al., 2012).

for these central banks if actual practice is taken into account. The UK has a formal inflation target set by the government at 2% annually. *Source:* Updates of De Haan et al. (1999) and Bodea and Hicks (2015).

3. Central bank independence over time

The most widely employed indicator of central bank independence is the index of Cukierman et al. (1992).⁸ In our analysis, we use updates of the Cukierman et al. index, which is based on four characteristics of the central bank's charter (Klomp and de Haan, 2010). First, a bank is viewed as more independent if the governor is appointed by the central bank board rather than by the government, is not subject to dismissal, and has a long term of office. Second, the level of independence is higher the greater the extent to which policy decisions are made without government involvement. Third, a central bank is more independent if its charter states that price stability is the sole or primary goal of monetary policy. Fourth, independence is greater if there are limitations on the government's ability to borrow from the central bank. In our view, this index is the best proxy for CBI for several reasons, one of them being that this measure takes into account the conservativeness of the central bank as embedded in the law, i.e. the more priority the central bank law gives to price stability the higher the score of the index.⁹

Bodea and Hicks have expanded the Cukierman et al. (1992) index of central bank independence for 124 countries from the end of the Bretton Woods system until 2014.¹⁰ The result is an original data set that codes independence annually and covers legislation changes in the last twenty-five years. Figure 2 shows that the average level of independence has increased remarkably since the 1970s, even though the variance has also increased over time, reflecting deepening regional differences (Figures 3 and 4).¹¹ Average CBI steadily increased and leveled in the mid-2000s. This also holds true for different country groups as shown in Figure 4 (the classification of countries follows that in the IMF's World Economic Outlook).

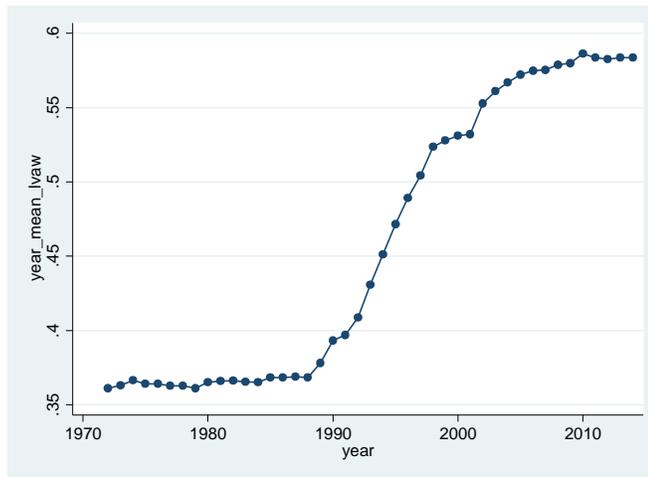
⁸ Even though this and other similar CBI indicators are supposed to measure the same phenomenon and are all based on interpretations of the central bank laws in place, their correlation is sometimes remarkably low (Eijffinger and De Haan, 1996). Legal measures of CBI may not reflect the true relationship 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.

⁹ This explains why a central bank receives a higher score the more important the inflation objective is; if the index would have measured goal independence the more specific the law prescribes the mandate of the central bank, the lower the index should have been.

¹⁰ Bodea and Hicks (2015) covered 78 countries from 1973 to 2008.

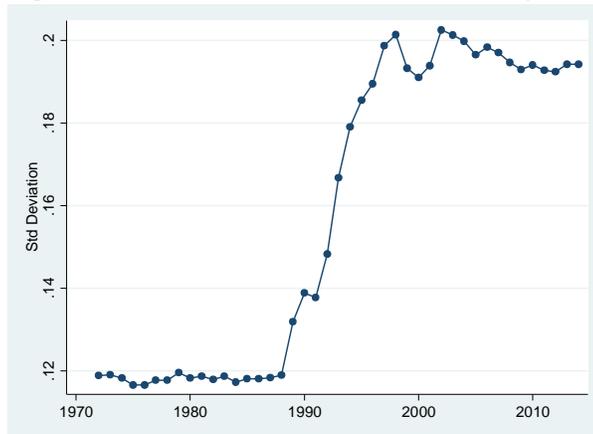
¹¹ As shown by Dincer and Eichengreen (2014), the same holds for central bank transparency.

Figure 2. Average CBI (all countries), 1970-2014



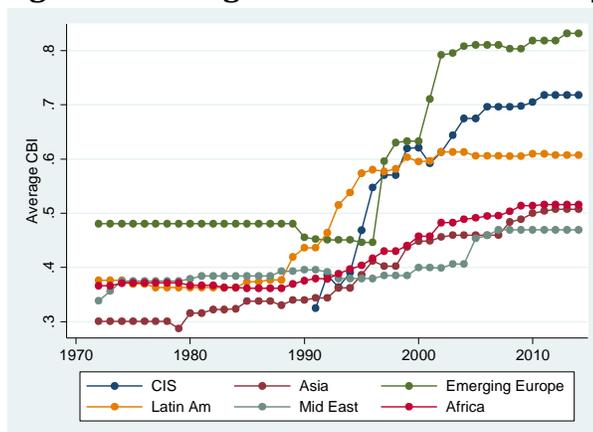
Source: updates of Bodea and Hicks (2015).

Figure 3. Standard deviation of CBI (all countries), 1970-2014



Source: updates of Bodea and Hicks (2015).

Figure 4. Average CBI in different country groups, 1970-2014



Source: updates of Bodea and Hicks (2015).

4. What has changed since the financial crisis?

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 had 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 available to take most of the political heat--even if the central bank provides most of the money.”¹²

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., 2017). Of note, of the four major central banks in Table 2, all, except the ECB were involved in macro-supervision. The US Federal Reserve and the Bank of Japan were also involved in micro-supervision of financial institutions, and the Federal Reserve was, in addition, a regulator (Bodea and Huemer 2010).

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 powerless. 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 non-banks) in huge volume and large-scale asset purchases ('quantitative easing'). In both cases, the central bank actively uses its balance sheet to affect market

¹² Some are critical of the Federal Reserve – Treasury cooperation: Buiters (2009) made the point that the central bank allowed “itself to be used as an off-budget and off-balance-sheet special purpose vehicle of the Treasury” (post on Willem Buiters' blog “Should central banks be quasi-fiscal actors?”, November 2, 2009: <http://blogs.ft.com/maverecon/2009/11/should-central-banks-be-quasi-fiscal-actors/#more-7561>)

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 consequences. First, financial stability and unconventional monetary policies of central banks have stronger distributional implications (Fernández-Albertos, 2015, Vujčić, 2016). Of course, decisions by central banks will always affect relative prices and therefore their decisions will have redistributive effects, but over the cycle these effects more or less balance out.¹³ However, macro-prudential and unconventional monetary policies have much stronger distributional consequences than conventional monetary policies and this has potential implications for the central bank’s independence. This is especially true for macro-prudential policies. According to Vujčić (2016), the “distributional impact of financial stability policy is often more central to its effectiveness than is the case with monetary policy. Macro-prudential tools have distributional effects that are central to their success.” Take, for instance, the case of a real estate boom that may turn into a bust. In the short run, the boom will increase the (apparent) wealth of homeowners, and boost output in the construction business. Policymakers could reduce the amplitude of both the boom and the bust by using macro-prudential policies, for instance by making caps on the loan-to-value (LTV) ratio or the debt-to-income (DTI) ratio more stringent. As these policies will hurt homeowners, the construction sector, and will make it more difficult for newcomers at the housing market to buy a house, such measures have redistributive consequences and are therefore politically not very attractive, especially if elections are near. In contrast, an interest rate change has a very broad impact across business and society. So even though macro-prudential tools almost surely makes them more efficient devices for intervention, their distributional consequences mean that they are more difficult to delegate without controversy.

Second, it may have changed the regime from monetary dominance to fiscal dominance. Importantly, fiscal policy is usually not very directly part of the legal

¹³ However, Coibon et al. (2012) report that while monetary policy shocks cannot account for the trend increase in income inequality in the U.S. since the early 1980s, they appear to have nonetheless played a significant role in cyclical fluctuations in inequality and some of the longer-run movements around the trends. This is particularly true for consumption inequality.

mandate of an independent central bank, even if, in the long run, debt accumulation through deficit spending may affect inflation (expectations), which is directly of concern to the bank. At the most, central banks may have a role in government's budgetary process by advising or sitting in budget negotiations.

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. Hall and Reis (2015) point out that the strategy pursued by many advanced economies central banks, i.e. they borrow large amounts of funds from commercial banks in the form of reserves and invest those in risky assets with different maturities, may force central banks to engage in a Ponzi scheme or to apply to the government for fiscal support. In both cases the central bank is no independent and cannot pursue its goal of price stability. According to Hall and Reis (2015), 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 (ECB) faces the same kind of interest rate risk, but more important 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. Also, Bodea (2013) and Bodea and Higashijima (2017) show that independent central banks are associated with lower fiscal deficits.

Independent central banks, however, do not necessarily deter fiscal deficits in a counter-cyclical fashion, but, rather have a political non-neutral behavior during election years and depending on government's partisanship (Bodea and Higashijima, 2017).

5. Has central bank independence changed since the crisis?

Bodea and Hicks (2015 - updated) have expanded the Cukierman et al. (1992) index of central bank independence for 124 countries from the end of the Bretton Woods system until 2014. Table 3 shows the average level of legal CBI before, during 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 the GFC (see also Dincer and Eichengreen, 2014).

Table 3. Legal CBI before, during and after the Global Financial Crisis

Country group:	1995-2007	2008-2009	2010-2014
Advanced economies	0.61	0.64	0.63
Federal Reserve	0.48	0.48	0.48
ECB	0.87	0.87	0.87
Bank of Japan	0.40	0.47	0.47
Bank of England	0.60	0.65	0.65
Commonwealth of Independent States	0.61	0.70	0.72
Emerging and Developing Asia	0.44	0.49	0.50
Emerging and Developing Europe	0.70	0.80	0.82
Latin America and the Caribbean	0.60	0.61	0.61
Middle East and North Africa	0.41	0.47	0.47
Sub-Saharan Africa	0.46	0.51	0.52

Source: Own calculations using the updated data of Bodea and Hicks (2015), which are available at: <http://www.princeton.edu/~rhicks/data.html>.

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. Table 4 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, except in advanced economies. The latter result suggests that in some countries there has been increasing political pressure on central banks, in line with anecdotal evidence.

Table 4. Central bank governor turnover rates before, during and after the Global Financial Crisis

	1995-2007	2008-2009	2010-2014
Advanced economies	4.3	3.5	5.6
Commonwealth of Independent States	1.2	1.5	1.8
Emerging and Developing Asia	4.2	5.5	2.2
Emerging and Developing Europe	1.8	0.0	1.8
Latin America and the Caribbean	6.6	6.5	5.4
Middle East and North Africa	2.1	1.5	3.8
Sub-Saharan Africa	4.1	4.0	5.0

Source: Own calculations using [Axel Dreher's turnover data](#). The classification of countries follows that in the IMF's World Economic Outlook. See Dreher et al. (2010) for details.

Even though this evidence corroborates the views of central bank governors that independence has not been reduced since the financial crisis, in several countries the situation may change. In the United States, for instance, there are now several bills under discussion that would change the structure, powers, and/or operations of the Federal Reserve—several of which would undermine its independence. Closer congressional oversight of the Fed's operations—as opposed to the current framework of assessing the inflation and employment outcomes relative to the central bank's statutory mandate—will tend to substitute congressional control for Fed decision-making (Wachtel, 2017). Abenomics in Japan involved significant intervention by political authorities over the target and actions of the Bank of Japan. In Europe, support is rising for populist parties that generally do not favour central bank independence and want to exit the euro area and return to national currencies, or even to follow the UK and exit the EU. Furthermore, only 30% of Germans trust the European Central Bank (ECB), according to the Eurobarometer survey of public opinion. The ECB's policies have led to worries about the politicization of monetary policies. According to Bullard (2013),

“An example of this creeping politicization trend is the European Central Bank's (ECB's) outright monetary transactions (OMT) program, which has been widely interpreted as a promise to buy the sovereign debt of individual nations. Should purchases occur, they are conditional on the nation meeting certain fiscal targets. This is fiscalization of monetary policy: asking the central bank to take actions far outside the remit of monetary policy. Assistance like this from a central authority to a region is best brokered through the political process in democratically elected bodies. By conducting a fiscal action, the central bank has been pulled away from its ordinary macroeconomic stabilization policy. Standard monetary policy has become wrapped up in the fiscal policy package and subject to the

negotiations that surround that package. This defeats one of the original purposes of central bank independence: having a monetary authority that can react to macroeconomic shocks quickly and effectively.”

In the UK, some commentators have been critical of governor Mark Carney’s involvement in the Brexit debate (Den Haan et al., 2016). Blinder et al. (2017) therefore asked central bankers and economists their views about the future of CBI. The answers, as shown in Table 5, which is copied from Blinder et al. (2017), are perhaps surprising. Academics seem to worry more about CBI than central bank governors. About 37% of academic respondents believe that CBI is threatened either “a lot” or “a moderate amount,” whereas only 9% of central bankers see things that way. At the other end of the worry spectrum, more than 60% of central bankers (50% in advanced economies), but only 13% of academics, see no threat at all. This conclusion also follows from the CFM-CEPR Expert survey: only 31 of the 70 respondents disagreed with the statement that there will be significant changes in the independence of monetary policy in the UK and the Eurozone in the foreseeable future (Den Haan et al., 2016).

Table 5. Central bank independence in the near future

	Governors		Academics	Chi-sq.	
	All	AEs		vs. all	vs. AEs
CB independence is threatened ____ (N_G=55, N_A=159)				75.4***	25.4***
None	61.8	50.0	13.2		
A little	10.9	12.5	46.5		
A moderate amount	7.3	18.8	27.7		
A lot	1.8	0.0	9.4		
Too early to judge	18.2	18.8	3.1		

Notes: Percentages of number of responding governors or academics. The question asked is: *How much is your central bank's independence threatened now or in the near-term future?* *** denotes significance at the 1% level, calculated using Chi-squared tests for the independence of responses of governors and academics. N_G/N_A denotes number of responding governors/academics. Source: Blinder et al. (207).

6. Conclusions

The traditional argument for CBI is based on the desire to counter inflationary biases. 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 overhang 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.

Although economists have expressed serious concerns that CBI is under threat, central bank governors are less worried. Our analysis of CBI indicators before and after the financial crisis suggests that, so far, little has changed. But it may be too early to put the worries about threats to CBI aside. The fact that the TOR of governors in advanced countries has increased suggests that political pressure on central banks in these countries has increased.

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