

Centre for Global Finance



Working Paper Series

No.1 / 2019

Central bank independence: What are the key issues?

By Désiré Kanga and Victor Murinde

The Centre for Global Finance (CGF) Working Paper Series features recent studies by resident members of CGF as well as visiting researchers, altogether demonstrating the depth and breadth of research being undertaken at CGF. The papers are published to facilitate preliminary dissemination of ongoing research, enhance quality of work and contribute to the advancement of knowledge. We acknowledge, without implication, financial support from the DEGRP Research Grant (ES/N013344/2), funded by DFID and ESRC, on “Delivering Inclusive Financial Development and Growth”, the ESRC-NSFC (ES/P005241/1) Research Grant on “Developing financial systems to support sustainable growth in China – The role of innovation, diversity and financial regulation”, and the AXA Research Fund.

List of previous Working Papers of CGF:

- No.1/2018 *Capital, risk and profitability of WAEMU banks: Does cross-border banking matter?* By Désiré Kanga, Victor Murinde, and Issouf Soumaré
- No.2/2018 *Capital flows and productivity in Africa: The angel is in the details.* By François A. B. Bationo, Stephany Griffith-Jones, Victor Murinde, Issouf Soumaré and Judith Tyson
- No.3/2018 *The persistence of bank fragility in Africa: GMM dynamic panel data evidence.* By Abbi M. Kedir, Syed Faizan Iftikhar, Victor Murinde and Bernadette Kamgnia
- No.4/2018 *Reflections on central banking.* By Victor Murinde and Patrick Njoroge
- No.5/2018 *Let beholders behold: Can banks see beyond oil booms and mitigate the Dutch disease?* By Morakinyo O. Adetutu, John E. Ebireri, Victor Murinde and Kayode A. Odusanya
- No.6/2018 *National culture, CEO power and risk-taking by global banks.* By Eilnaz Kashefi Pour and Victor Murinde
- No.7/2018 *Corporate investment, financing and payout decisions under financial constraints and uncertainty: Evidence from UK firms.* By Qingwei Meng, Victor Murinde and Ping Wang
- No.8/2018 *Bank opacity and risk-taking: Evidence from analysts' forecasts* By Samuel Fosu, Collins G. Ntim, William Coffie, and Victor Murinde
- No.9/2018 *Does microcredit increase hope, aspirations and well-being? Evidence from Sierra Leone.* By Adriana Garcia, Robert Lensink, and Maarten Voors
- No.10/2018 *Lessons from Emerging Economies for African Low Income countries on Managing Capital Flows.* By Stephany Griffith-Jones and José Antonio Ocampo

- No.11/2018 *Financial inclusion and economic growth: What do we know?* By Joshua Y. Abor, Haruna Issahaku, Mohammed Amidu, and Victor Murinde
- No.12/2018 *Climate Vulnerability and the Cost of Debt.* By Gerhard Kling, Yuen C Lo, Victor Murinde, and Ulrich Volz
- No.13/2018 *Pan-African Banks on the Rise: Does Cross-Border Banking Increase Firms' Access to Finance in WAEMU?* By Désiré Kanga, Victor Murinde, Lemma Senbet, and Issouf Soumaré
- No.14/2018 *The peer monitoring role of the interbank market and implications for bank regulation: Evidence from Kenya.* By Victor Murinde, Ye Bai, Christopher J. Green, Isaya Maana, Samuel Tiriongo, and Kethi Ngoka-Kisinguh

Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the authors of this paper. The views expressed in the paper are those of the authors and do not necessarily reflect those of the CGF.

All CGF Working Papers can be downloaded from CGF Website.

Centre for Global Finance
SOAS University of London
10 Thornhaugh Street, Russell Square
London
WC1H 0XG

Email: cgf@soas.ac.uk

Website: <https://www.soas.ac.uk/centreforglobalfinance/publications/>

Central bank independence: What are the key issues?¹

Desire Kanga, ENSEA, Abidjan & SOAS University of London

Victor Murinde, SOAS University of London (vm10@soas.ac.uk)

Abstract

The concept of an independent central bank arises from the underlying idea that the central bank should be institutionally designed to entrench independence from political interference by the executive arm of the government in power. Precisely, by design, the central bank should be insulated from political pressure in undertaking the main roles of managing the country's currency, money supply and interest rates, as well as the ability to act a 'lender of last resort' to the banking sector in the case of a financial crisis. In this paper, we discuss the key issues surrounding central bank independence. We examine the key ideas in the existing literature relating to the measurement of central bank independence and central bank conservatism and the implications for the main role of central banks, namely to deliver price stability (inflation). We also examine the determinants of central bank independence, the benefits associated with an independent central banks, and board structure and governance of central bank.

Keywords: central bank independence; inflation discipline; central bank governance.

JEL Classification No: D72; E58.

¹ This paper is a preliminary version, representing work in progress. We acknowledge, without implication, financial support from the DEGRP Research Grant (ES/N013344/2), funded by DFID and ESRC, on "Delivering Inclusive Financial Development and Growth", the ESRC-NSFC (ES/P005241/1) Research Grant on "Developing financial systems to support sustainable growth in China – The role of innovation, diversity and financial regulation", and the AXA Research Fund. We retain responsibility for errors.

1 Introduction

The concept of an independent central bank arises from the underlying idea that the central bank should be institutionally designed to be independent from political interference that may be unleashed by the Ministry of Finance or Treasury or the executive arm of the government in power. Precisely, by design, the central bank should be insulated from political pressure in undertaking the main roles of managing the country's currency², money supply and interest rates, as well as the ability to act a 'lender of last resort' to the banking sector in the case of a financial crisis. The central bank directly (or indirectly through a quasi-autonomous agency) also exercises independence in the supervision and regulation of commercial banks in order to ensure the solvency of banks, prevent bank runs, and discourage reckless or fraudulent behaviour by banks and other financial institutions and maintain financial stability. Hence, central bank independence consists of delegating monetary policy to central banks, who a high level of inflation aversion, or to give strong incentives to central bank's management for controlling inflation. It means that the government's influence on monetary policy is restricted.

The idea of central bank independence is as old as the initial configuration of a central bank. The first central bank was created in 1668 (Sveriges Riksbank)³ to enhance the financial power of governments. For example, the creation of the central bank reassured creditors and made it easier and cheaper for the government to borrow during the nine years' war (1688-1697). In the 1800s, central banks were forced to manage crises resulting from financial panics triggered by lenders who lose confidence in the creditworthiness of private banks. Central bank, namely Bank of England, act as "lender of last resort", consisting of central bank lending to solvent banks, which could provide collateral, at high rates⁴. Already at this stage, a potential conflict is emerging: provide liquidity during the crisis (i.e. increase money supply) which can coincide with a need to restrict the money supply to safeguard the currency.

During the two world wars and aftermath of the WWII, central banks played various roles: managing gold reserves, money supply, stabilisation of currencies (exchange rate management), and interest rates. Central banks supported governments during the war by keeping interest rates low and ensuring that governments could borrow to finance military spending⁵. However, conflict emerged after the WWII between politicians (government or president) and central bank governors. The United States is a typical example to illustrate this conflict. After experiencing the benefits of low interest rate during the war, government had no desire to see monetary policy tighten again. Harry Truman (President) pressed William McChesney Martin (who ran the Federal Reserve of the United States from 1951 to 1970), to keep rates low despite the inflationary consequences of the Korean war. Despite the Governor refused, the government maintained the pressure under him even after Truman left office. Outside the United States, finance ministries played the dominant role in deciding on interest rates, leaving central banks responsible for financial stability and maintaining exchange rates (fixed under Bretton Woods regime).

² This means independence by the central bank in exercising its monopoly to issue the monetary base in the country, or to control the production of notes and coins of the national currency - the country's legal tender.

³ It is worth noting that the template of the first central bank was set by Bank of England created in 1694.

⁴ This is the original idea as defined by Bagehot in 1873. This concept changed during the recent financial crisis. Central banks have provided liquidity to the banking system as a whole and not only to solvent banks because of the systemic nature of the crisis.

⁵ The Economist (2017), <https://www.economist.com/briefing/2017/04/27/the-history-of-central-banks>)

After the collapse of the Bretton Woods system, currencies floated, inflation took off and worse still, many countries suffered high unemployment at the same time. This crisis has paved the way of the current power of central banks since politicians had shown they could not be trusted with monetary discipline. Typically, politicians faced time inconsistency problem described by Kydland and Prescott (1977) and Barro and Gordon (1983): they worried that tightening policy to head off inflation would alienate voters. At this point in time, central banks have begun to enjoy an independence to conduct monetary policy. An independent central bank can give full priority to low levels of inflation whereas other considerations (re-election perspectives of politicians and a low level of unemployment) may interfere with the objective of price stability in a country with a more dependent central bank.

By following Milton Friedman's advice to control the growth rate of money supply to keep inflation low (*rules* instead of *discretions*), Paul Volcker was able to break the inflationary spiral down in the United States in the mid-1980s. In the wake of Volcker's success, other countries moved towards making central banks more independent, and central bankers were asked to target inflation. Or, to put it differently, monetary policy is delegated to an independent and "conservative" central banker (Rogoff, 1985). Conservative means that the central banker is more averse to inflation than the government, in the sense that he places a greater weight on price stability than the government does (Berger et al., 2001). Now, it is widely believed that a high level of central bank independence coupled with some explicit mandate for the bank to restrain inflation are important institutional devices to assure price stability (Berger et al., 2001).

There are two major types of independence or autonomy: *instrument* independence and *goal* independence (see Table 1). Instrument independence is the ability of the central bank to decide on the use of its instruments without political inference. Goal independence is the ability of the central bank to set its own goals for monetary policy. This may be the case when the government gives a broad mandate to the central bank and the central bank must interpret and prioritise these goals (Crowe and Meade, 2007), as in the United States. For instance, the Federal Reserve Act assigns the United States central bank to seek "maximum employment, stable prices, and moderate long-term interest rates". There is a strong case for instrument independence as opposed to goal independence because 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)⁶. Therefore, central banks have a delegated authority to achieve their legally mandated objectives with the available instruments in an independence manner. Some central banks, such as the European Central Bank (ECB), enjoy also *target* independence or autonomy; that is, the central bank determines the target of the overall goal. For example, the ECB has an overriding goal of price stability and attempts to keep inflation close to or below 2 per cent.

Some political scientists suggest that governments may choose to delegate monetary policy to detach it from political debates and power struggles (de Haan and Eijffinger, 2016) or central bank independence may be interpreted as an attempt to tie the hands of the future government by the current one (Goodman, 1991). Other scholars argue that the federal structures or political diversity of countries are associated with more politically independent central banks (Lohmann,

⁶ This consensus is debatable since it could be interpreted as a loss of central bank's independence (Alesina, and Stella, 2010).

1998; Farvaque, 2002; Hallerberg, 2002; Gilardi, 2007). In addition to showing that central bank independence is endogenous to the political system, these studies emphasise that it is difficult to follow a strict policy rule. In the real world, monetary authorities do enjoy discretion because it is impossible to predict all potential contingencies that a central bank will confront (Fernández-Albertos, 2015). The most prominent evidence is the response of central banks to the recent crisis by deviating from rules to conduct “unconventional” monetary policies (quantitative easing and forward guidance).

Table 1: Various configurations of central bank independence

Type of autonomy	Description
Goal autonomy	The central bank is responsible for determining the monetary policy and exchange rate regime. In principle, goal autonomy gives the central bank authority to determine its primary objective from among several objectives included in the central bank law or, rarely, to determine the objective if there is no clearly defined objective.
Target autonomy	The central bank is responsible for determining monetary policy and the exchange rate regime. Here, the primary objective is clearly defined and stipulated in the law; only the target can be fixed by the central bank.
Instrument autonomy	It implies that the government or the legislature decides the monetary policy target, in agreement with the central bank, or the exchange rate regime, but the central bank retains sufficient authority to implement the monetary policy target using the instruments it sees fit.
Limited (no) autonomy	It means that the central bank is basically a government agency. The government determines the policies (objectives and targets) as well as influences the implementation.

Source: Compiled by the authors from Lybek and Morris (2004).

Despite the large literature on the measure and the effects of central bank independence on inflation⁷, independence is often not distinguished carefully from conservativeness. The independence is the extent to which the central bank can freely decide about the use of monetary policy instruments whereas the conservativeness represents the preferences of the central bank regarding the stabilisation of inflation relative to the stabilisation of the output gap. More preference for price stability, the higher the central bank is conservative. In practice, independence and conservativeness matter for optimal monetary policy (Eijffinger and Hoeberichts, 2008; Hefeker and Zimmer, 2011).

In this paper, we discuss the key issues surrounding central bank independence. We examine the key ideas in the existing literature relating to the measurement of central bank independence and the implications for the main role of central banks, namely to deliver price stability (inflation). The remainder of this paper is organised as follows. The next section reviews the measure of central bank independence and central bank conservatism. Section 3 examines the determinants of central bank independence. The benefits of central bank independence are

⁷ See Berger et al. (2001) and Banaian (2008) for a review of the literature on the measure of central bank independence, and the references cited therein.

discussed in Section 4. The governance of central banks is discussed. Section offers some concluding remarks.

2 Measurement of central bank independence and central bank conservatism

Key measures of central bank independence

The first measures of central bank independence initiated by Bade and Parkin (1982) were centred on two legal characteristics namely the appointment process for the central bank's board, and whether the central bank maintained autonomy for monetary policy or the government held a veto. These authors considered three main questions:

- a) Who has the final authority for monetary policy?
- b) Are a majority of the members of the central banks appointed independently of the government?
- c) Is there a government official on the central bank board?

This prior work by Bade and Parkin (1982) has been improved by Alesina (1988) who adds a fiscal dimension to this list by asking whether or not central banks required to purchase Treasury bills. Following Alesina, central bank independence index benefits from the work by Cukierman (Cukierman, 1993; Cukierman, Webb and Neyapti, 1992; Cukierman and Webb, 1995) and others (Eijffinger and Schaling, 1992; Grilli, Masciandaro and Tabellini, 1991). Table 2 gives a summary of the central bank independence indices. Grilli, Masciandaro and Tabellini (1991) or GMT index is count type index that uses a yes/no choice for some institutional feature. Cukierman, Webb and Neyapti (1992) improved the existing measures by allowing a richer set of possible institutional arrangements and a variety of scales (2/3 to 7-point scale compared to yes/no scale in GMT).

Table 2: Various measures of central bank independence

Measure	Definition
LVAW and LVAU (Cukierman et al., 1992) are the (un)weighted legal independence index	Based on 16 legal variables, the authors define four indexes (appointment and term of office of the governor of the central bank or CEO, policy formulation, objectives of the Central Bank, limits on lending to the government) and one aggregate index.
QVAW (Cukierman, 1993)	The questionnaire-based indices, which are based on the responses of experts in various central banks, are useful for identifying informal practices and other dimensions of independence that are not captured by the legal indices.
TOR is the actual turnover of the Central Bank governor (Cukierman et al., 1992)	The likelihood that (s)he will be removed from office following a political transition

NOR is the non-political turnover rate (Cukierman and Webb, 1995)	Probability of change of central bank governor more than nine months after a political transition.
GMT (Grilli, Masciandaro and Tabellini) index	The legal independence is a combine political and economic independence. Political independence includes (i) the procedure for appointing the members of the central bank governing bodies; (ii) the relationship between these bodies and the government; and (iii) the formal responsibilities of the central bank. The economic independence of the central bank refers to the autonomy of a central bank in choosing the instruments of monetary policy and is described by: (i) the influence of the government in determining how much to borrow from the central bank; and (ii) the nature of the monetary instruments under the control of the central bank.
Alesina-Summers (AL)	Central bank independence is measured by “political independence” which is taken to depend on the institutional relationship between the central bank and the executive, the procedure to nominate and dismiss the head of the central bank, the role of government officials on the central bank board, and the frequency of contacts between the executive and the bank. The index is based on the prior idea by Bade and Parkin (1982) and amended by Alesina (1988).
Eijffinger and Schaling index (ES, 1992)	In fact, the ES index is more than a purely legal index of central bank independence. The central bank laws are examined against the background of monetary policymaking. This indicator tries to grab some of the actual independence.
VUL (Political vulnerability)	Political instability (Cukierman and Webb, 1995) is measured by counting political transitions of various types. Political vulnerability of the bank is the fraction of political transitions that are followed within six months by a replacement of the CB governor
Latent index (de Haan et al., 2003)	A composite index based on AL, ES, LVAW, LVAU, GMT. The authors used a latent variables approach to evaluate to which extent the central bank independence indicators describe the same unobservable phenomenon.

Source: Compiled by the authors from a survey of existing research.

All these measures encompass the legal dimension of the central bank independence or legal independence, which reflects, in the first place, the level of independence that legislators meant to confer on the central bank. In the empirical literature, central bank independence is measured by Cukierman et al. (1992) index and GMT index. Table 3 reports these two indices by region. We can see an overall increase in these two indices from 1995 to 2010 (2015 for LVAU index). This indicates an increase in central bank independence around the world.

Although, they have been used in the empirical literature, the questions underlying these measures is that they do not include any reference to price stability. How price stability fits in this arrangement? In addition, linear scale averaging used to compute the indices introduces the notion that the gap between each type of institutional arrangement within a certain measure,

such as term of office, has an equal effect of independence or inflation fighting (Banaian, 2008). Further analysis show that a simple measure of central bank autonomy (i.e. the central bank is given final authority over issues clearly defined in the law as central bank objectives) is as useful a measure of central bank independence.

Table 3: Evolution of central bank independence indices around the world

	LVAU index			GMT (political)		GMT (economic)		GMT (overall)	
	1995-2007	2008-2010	2011-2015	1995-2007	2008-2010	1995-2007	2008-2010	1995-2007	2008-2010
East Asia & Pacific	0.45	0.50	0.52	0.21	0.21	0.67	0.71	0.44	0.46
Europe & Central Asia	0.64	0.74	0.75	0.76	0.83	0.80	0.83	0.78	0.83
Latin America & Caribbean	0.60	0.62	0.62						
Middle East & North Africa	0.42	0.47	0.48						
North America	0.49	0.49	0.49	0.50	0.50	0.88	0.88	0.69	0.69
South Asia	0.39	0.41	0.41						
Sub-Saharan Africa	0.47	0.52	0.52						
All region	0.54	0.58	0.59	0.54	0.58	0.78	0.80	0.66	0.69

Source: LVAU is Cukierman et al. (1992) index calculated by Bodea and Hicks (2015). GMT stands for Grilli, Masciandaro and Tabellini. The dataset is made available by Masciandaro and Roelli (2015).

Other researchers have used turnover rates as an alternative measure of central bank independence. This measure has two pitfalls. Firstly, is this a measure of independence or accountability? Secondly, this measure may be endogenous to economic performance (de Haan and Kooi, 2000; Dreher et al., 2006). For example, CEOs are replaced more often when inflation or political instability is high (Dreher et al., 2006). Adolph (2013) reports that central bank tenures are shorter when inflation (unemployment) is high under right (left)-wing governments. However, the implementation of reforms which strengthens central bank independence tends to lower governor turnover (Klomp and de Haan, 2010a).

Cukierman and Webb (1995) refined the turnover rate by distinguishing political and non-political turnover rates. Political (non-political) turnover is the likelihood that the central bank governor will be removed from office before (after) six months following a political transition. Despite this improvement, Keefer and Stasavage (2003) find that only multiple constitutional checks and balances and political polarization reduce the bank governor's risk of being fired within six months after elections took place. Dreher et al. (2010) show that political and regime instability and the occurrence of elections increase the probability of a turnover and Artha and de Haan (2015) find that financial crises increase the probability of a turnover.

Other scholars such as de Haan et al. (2003) proposed another way to aggregate the existing indices by using other computation techniques.

Key measures of central bank conservatism

The main measure of the conservativeness of the central bank is defined by $(1 - \lambda)/\lambda$ where λ is solution of the central bank following program

$$L = E_t[\lambda(\pi_t - \bar{\pi}_t)^2 + (1 - \lambda)(y_t - \bar{y}_t)^2]$$

λ is the preferences of central bank regarding the stabilization of inflation (π_t) around its target ($\bar{\pi}_t$), relative to the weight assigned to the stabilisation of the output gap ($y_t - \bar{y}_t$).

Table 4 below gives different measures of the Federal Reserve degree of conservativeness. As we could see, the federal reserve degree of conservativeness varies over time from an author to another. Since, the degree of central bank conservativeness is not likely to change radically in the short run, these estimates may differ because of the underline model used⁸. To overcome this bias, Levieuge and Lucotte (2014) proposed a new model-free measure of central bank conservatism. Their indicator 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.

Table 4: Measures of the conservativeness of the Fed

References	$(1 - \lambda)/\lambda$	Period of the study
Ozlale (2003)	0.49	1979Q3 – 1999Q1
Cecchetti and Ehrmann (2002)	0.35	1981Q1 – 1997Q4
Krause and Mendez (2005)	0.17	1978Q1 – 2000Q4
Dennis (2006)	0.00	1982Q1 – 2000Q2
Favero and Rovelli (2003)	0.00	1980Q3 – 1998Q3
Castelnuovo and Surico (2003, 2004)	0.00	1987Q3 – 2001Q1
Tachibana (2004)	0.00	1980Q1 – 2000Q4

Source: Levieuge and Lucotte (2014)

The results of their estimates are reported in Table 5. The results indicate an increase in central bank conservativeness between 1980s and 1990s.

⁸ Levieuge and Lucotte (2014) noted that the methodologies of the estimates are quite similar. Table 2 does not indicate a large variation in the time covered by the studies.

Table 5: Measure of central bank conservativeness of Leveuge and Lucotte (2014)

Country	1980–1984	1985–1989	1990–1994	1995–1998	Average 1980–1998
Australia	0.501	0.882	0.497	0.174	0.513
Austria	0.318	0.805	0.978	0.847	0.737
Belgium	0.717	0.630	0.967	0.888	0.801
Canada	0.487	0.993	0.733	0.962	0.794
Chile	0.693	0.655	0.612	0.981	0.735
Czech Republic			0.737	0.918	0.828
Denmark	0.428	0.971	0.972	0.964	0.834
Estonia			0.012	0.196	0.104
Finland	0.504	0.970	0.961	0.989	0.856
France	0.096	0.763	0.944	0.927	0.682
Germany	0.669	0.852	0.917	0.872	0.827
Greece	0.652	0.398	0.424	0.534	0.502
Iceland	0.022	0.571	0.388	0.994	0.494
Ireland	0.034	0.687	0.969	0.946	0.659
Israel	0.004	0.007	0.666	0.819	0.374
Italy	0.285	0.562	0.861	0.201	0.477
Japan	0.829	0.902	0.910	0.665	0.826
Korea Republic	0.038	0.693	0.352	0.953	0.509
Mexico	0.016	0.007	0.145	0.107	0.069
Netherlands	0.655	0.504	0.967	0.952	0.769
New Zealand	0.293	0.388	0.865	0.558	0.526
Norway	0.372	0.881	0.899	0.944	0.774
Poland			0.002	0.150	0.076
Portugal	0.449	0.651	0.78	0.886	0.691
Slovak Republic			0.383	0.564	0.473
Slovenia			0.002	0.399	0.200
Spain	0.678	0.784	0.961	0.833	0.814
Sweden	0.588	0.897	0.626	0.823	0.733
Switzerland	0.715	0.717	0.713	0.920	0.766
Turkey	0.001	0.032	0.113	0.158	0.076
United Kingdom	0.254	0.856	0.544	0.896	0.637
United States	0.572	0.873	0.774	0.911	0.782

Source: Leveuge and Lucotte (2014), Table 2, page 415.

3 Determinants of Central Bank Independence

The determinants of central bank governors' tenure show that central banks work together with elected governments and do not operate in a political vacuum (Fernández-Albertos, 2015). The independence of central banks is underpinned by time-inconsistency issue raised in the macro-literature in 1970s (Kydland and Prescott, 1977). However, “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.” (Bernhard et al., 2002).

Why is central bank independence so attractive? Which institution framework favours central bank independence? We summarise key contributions from excellent surveys by de Haan and Eijffinger (2016) and Fernández-Albertos (2015), among others.

According to Bernhard (1998), central bank independence is a way to facilitate the coexistence of actors with heterogeneous policy preferences within the executive. It is tentative answer to information asymmetries that create potential conflicts between different political actors. In particular, delegation of monetary policy to independent central banks alleviates the conflicts derived from the existence of informational asymmetries between ministers – who have greater information about the policy process – and coalition partners – who have less. Therefore, politically heterogeneous contexts (federal systems, strong systems of checks and balances, coalition governments) should be more welcoming to the emergence of independent monetary authorities as shown in the literature (Farvaque, 2002; Hallerberg, 2002; Gilardi, 2007; Pistoresi et al., 2011). However, without a political coalition that wishes to have monetary stability, legal independence of the central bank would not be granted.

Another strand of the literature argues that a large number of veto players leads to more autonomous bureaucracies. The more veto players, the more difficult it will be for the government to overturn the independence of the central bank (Keefer and Stasavage, 2003).

Economic freedom of the countries has been found to be positively correlated with the choice of central bank with greater independence (Banaian and Luksetich, 2001). In this vein, Iversen (1999) argues that changes in the economic and institutional context since 1980s have increased the political and economic appeal of independent central banks. Some scholars suggest that exchange rate pegs – adopted usually after hyperinflation episode in some countries – justify the choice of independent central bank (Frieden and Stein, 2001; Broz, 2002). Indeed, exchange rate commitment is an alternative way to solve the credibility problem of monetary policy. The political system's degree of openness and transparency indicate how credible the delegation to an independent monetary authority will be perceived by markets (Broz, 2002). In open and democratic contexts, delegation to an independent central bank will be seen as credible while in less transparent domestic political context, the only way for governments to gain monetary credibility is by tying monetary policy to an exchange rate commitment. Exchange rate commitment and central bank independence are substitutes in this perspective (Copelovitch and Singer, 2008). This is supported by O'Mahony (2007) who suggests that governments who dislike the distributive consequences of a conservative monetary policy might consider the adoption of an exchange rate peg to take monetary policy away from the central bank. This perspective is not entirely true as there is room for some overlap between these two institutional choices (Bodea, 2010). Further investigations pointed out that internationally exposed firms tend to be more favourable toward fixed exchange rates when central banks are more independent (Fernández-Albertos, 2012).

4 Benefits of central bank independence

The first benefit of central bank independence is low inflation. There is evidence from a negative and significant relationship between central bank independence measures and inflation. To put it differently, countries with an independent central bank on average have

lower inflation than countries where the central bank is controlled by the government (Grilli et al. 1991, Alesina and Summers, 1993). But, there is a debate regarding the significant effect of central bank independence on inflation. This debate comes from an identification issue (Mas, 1995). Indeed, the low inflation observed in countries with independent central banks could have less to do with the institutional innovation itself than with more profound and structural social and political factors. Oatley (1999) shows that many results of the literature are not robust to the inclusion of institutional variables in the estimation. This issue is not solved in the empirical literature (see Crowe and Meade 2007, de Haan et al. 2008, Alesina and Stella 2010). However, recent meta-analysis by Klomp and de Haan (2010b) corroborates the negative relationship between central bank independence and inflation after controlling for publication bias as well as labour market characteristics.

We check the relationship between inflation (measured by consumer price index) and central bank independence by using robust regression. The results of the estimates are presented in Table 6. We consider four central bank independence indices in Table 3. We test the effects of the level, the first lag and the second lag of each index on inflation (each at a time). Lag values help to reduce the reverse causality bias. We also control for time (common potential shocks) and country effects (potential unobservable variables). R-squares of the regression (not reported) vary from .69 to .92. Central bank independent reduce inflation rate.

Table 6: Effects of central bank independence on inflation

	LVAU	GMT political	GMT economic	GMT overall
Level	-5.352*** (0.575)	-2.262*** (0.600)	-4.204*** (0.667)	-4.382*** (0.748)
First lag	-5.745*** (0.555)	-2.405*** (0.587)	-4.391*** (0.653)	-4.120*** (0.697)
Second lag	-6.170*** (0.537)	-2.276*** (0.577)	-4.354*** (0.655)	-4.040*** (0.697)

Note: This table reports the estimates of inflation on central bank independence indices by using robust regression. We control for time (common potential shocks) and country effects (potential unobservable variables). Each regression uses the level, the first lag or the second lag of each index (in column) as independent variable. Therefore, each cell is one regression. *, ** and *** indicate the parameter is statistically significant at 10%, 5% and 1% levels, respectively. Robust standard error in parentheses.

Other studies conclude that delegating monetary policy to an independent central bank increases debt sustainability (Giordano and Tommasino, 2011) and fosters fiscal discipline (Bodea, 2013; Bodea and Higashijima, 2015). If a central bank is sufficiently independent and conservative, the incentives for the government to default are lower.

In addition, Eichler and Littke (2018) showed that an increase in the availability of information about monetary policy objectives decreases exchange rate volatility. This effect is more pronounced for countries with a lower level of central bank conservatism.

Nevertheless, price stability may not enough to ensure financial stability. According to the Schwartz's conventional wisdom, by focusing on the objective of price stability, policymakers

contribute not only to achieving high levels of economic activity and employment, but also foster financial stability. This is the so-called “divine coincidence” (Blanchard and Gali, 2007). But, because real imperfection matters in practice, a single inflation goal is not enough. Recent analysis shows that the more conservative the central bank, the higher the financial instability (Levieuge et al., 2017).

5 The governance of central banks

Almost all the central banks make decisions by committee. The question is: How are these committees structured and what is the optimal size of each committee? The answer to these questions differ according to the type of central bank autonomy (see Table 1) and the number of committees.

Each central bank has one or more boards. Based on a survey, Lybek and Morris (2004) found that 63 per cent of the surveyed laws of central bank charters provided for one board and the remaining provided for two to three boards. The Bank for International Settlements found that around one third of the central banks have a single board, with a significant proportion of boards having multiple functions (BIS, 2009). Lybek and Morris (2004) identified six types of boards, namely policy board, implementation board, advisory board, supervisory board, audit committee and management board (see Table 7).

Before presenting the types of boards, it is appropriate to present the central governance body of central banks which is the Board of Directors. The Board of Directors of the central bank typically include the chairperson (who may be or may not be the Governor of the Central Bank – and this is one important issue⁹), other directors (mainly non-executive directors) appointed by the Minister of Finance, or the Treasury, or the executive head of government, from among persons with professional or academic experience in business or financial matters and who are not officials or employees of the Bank. In most countries, a high rank official from the Treasury is an ex-officio member of the Board and without power to vote.

The Policy board determines the monetary policy and exchange rate policy (if applicable) to be followed by the central bank. It may comprise of management representatives and qualified external members. The presence of external members may alleviate concerns of so-called democratic deficit which arises from the fact that policy decisions have been delegated to a non-elected central banker.

The implementation board makes decisions on how to implement the target(s). In the case of goal and target autonomy, the implementation board is often the same as the policy board. It might also be the management board. In the case of instrument autonomy, the decisions of the implementation board are the highest priority of the central bank. This decision can be delegated to a board, but can be taken by one person, as in New Zealand. The governor is often the chairman of the implementation board.

⁹ **Error! Reference source not found.** gives the list of countries (or central banks) and the chairperson of the Board of Directors.

The role of the advisory board is to advise the policy boards, implementation boards, or even management. Such board can contribute by providing a more balanced view. It can be composed of regional representatives, representatives from different economic sectors, or include former governors. This may also include experts without any right to vote.

The supervisory board is responsible for overseeing and addressing any problems regarding the following conditions: (i) achieving objectives, tasks, and functions, (ii) the financial condition of the central bank, (iii) effective internal controls, and, in some cases, also (iv) efficient use of its resources. The composition of the supervisory board can help depoliticize the supervisory process, provided its tasks and powers are clearly defined. The supervisory board may be composed of the government officers, legislators or politicians.

The audit committee assists in performing the supervisory function. It is mainly an Anglo-Saxon tradition for corporations having only one board. These boards are usually large and seek for special expertise to address issues of internal control and financial disclosure.

The management is responsible for the day-to-day operations of the central bank. This responsibility is delegated to one person usually named as governor, chairman, president, or general manager. He is always the chairman of the management board, usually the chairman of an implementation board, and in most cases the chairman of a policy board. In principle, the governor should not be chairman of the supervisory board to avoid conflicts of interest. However, in practice, the governor also chairs the supervisory board. The governor is assisted by one or more deputy or vice governors, a general manager, or a board comprising directors of various departments of the bank.

Table 7: Governing board and management

Type of boards	Description
Board of Directors	The Board of Directors of a central bank is the overall authority in which all the power of the bank is vested. It is responsible for formulation of the policy that shapes the vision and mission of the central bank.
Monetary policy board	It determines the monetary policy and exchange rate policy (if applicable) to be followed by the central bank. In the case of goal autonomy, a policy board determines which objective to give priority. In the case of target autonomy, it specifies the target within a defined primary objective. A country with instrument autonomy would not have a policy board, as the policy is set by the government. However, in a few low-income countries, the governor plays a strong role in both the formulation and implementation of monetary policy
Implementation board	It makes decisions on how to implement the target(s). In the case of goal and target autonomy, the implementation board is often the same as the policy board. It might also be the management board. The governor is often the chairman of the implementation board. In the case of instrument autonomy, the decisions of the implementation board are the highest priority of the central bank.
Advisory board	It advises the policy boards, implementation boards, or even management.

Supervisory board	It is responsible for overseeing and addressing any problems regarding the following conditions: (i) achieving objectives, tasks, and functions, (ii) the financial condition of the central bank, (iii) effective internal controls, and, in some cases, also (iv) efficient use of its resources. The composition of the supervisory board can help depoliticize the supervisory process, provided its tasks and powers are clearly defined.
Audit committee	It assists in performing the supervisory function.
Management	The primary responsibility of the management is the day-to-day operations of the central bank. This responsibility is delegated to one person usually named as governor, chairman, president, or general manager. The governor is assisted by one or more deputy or vice governors, a general manager, or a board comprising directors of various departments of the bank.

Source: Compiled by the authors from Lybek and Morris (2004).

The optimal size of each board remains an open question. Blinder and Morgan (2005) determined that each committee should be composed of five individuals based on artificial monetary policy experiment. This was supported by Sibert (2006). In practice, however, the size of the committees exceeds five members: 19 policymakers participate in meeting of the Federal Open Market Committee of the Federal Reserve (Crowe and Meade, 2007), 50 per cent of the central banks have seven to nine members (Lybek and Morris, 2004) and the actual Governing Council of the European Central Bank comprises 25 officials.

Table 8: Who chairs the Board of Directors of the Central Bank?

Country/Institution	Governor	Independent	Country/Institution	Governor	Independent
Afghanistan	✓		Macedonia	✓	
Albania	✓		Madagascar	✓	
Algeria	✓		Malawi	✓	
European Central Bank	✓		Malaysia	✓	
Angola		✓	Maldives	✓	
Eastern Caribbean Central Bank	✓		Mauritania	✓	
Argentina	✓		Mauritius	✓	
Armenia	✓		Mexico	✓	
Australia	✓		Micronesia	✓	
Azerbaijan	✓		Moldova	✓	
Bahamas	✓		Mongolia	✓	
Bahrain		✓	Montenegro	✓	
Bangladesh	✓		Morocco	✓	
Barbados	✓		Mozambique	✓	
Belarus	✓		Myanmar	✓	
Belize		✓	Namibia	✓	
BCEAO	✓		Nepal	✓	
Bhutan	✓		New Zealand		✓
Bolivia	✓		Nicaragua	✓	

Bosnia and Herzegovina	✓		Nigeria	✓	
Botswana	✓		Norway	✓	
Brazil	✓		Oman	✓	
Brunei	✓		Pakistan	✓	
Bulgaria	✓		Palestine	✓	
Burundi	✓		Panama		✓
Cabo Verde	✓		Papua New Guinea	✓	
Cambodia	✓		Paraguay		✓
BEAC	✓		Peru	✓	
Canada	✓		Philippines	✓	
Chile	✓		Poland	✓	
China	✓		Qatar	✓	
Colombia	✓		Romania	✓	
Comoros	✓		Russia	✓	
Democratic Republic of the Congo	✓		Rwanda		
Costa Rica	✓			✓	
Croatia	✓		Samoa	✓	
Cuba	✓		Sao Tome and Principe	✓	
Czech Republic	✓		Saudi Arabia	✓	
Denmark	✓		Serbia	✓	
Djibouti	✓		Seychelles	✓	
Dominican Republic	✓		Sierra Leone	✓	
Ecuador	✓		Singapore		✓
Egypt	✓		Solomon Islands	✓	
El Salvador	✓		Somalia	✓	
Eritrea	✓		South Africa	✓	
Eswatini (former Swaziland)	✓		South Korea	✓	
Ethiopia		✓	South Sudan	✓	
Fiji	✓		Sri Lanka	✓	
Gambia	✓		Sudan	✓	
Georgia	✓		Suriname	✓	
Ghana	✓		Sweden	✓	
Guatemala	✓		Switzerland	✓	
Guinea	✓		Syria		✓
Guyana	✓		Taiwan		✓
Haiti	✓		Tajikistan	✓	
Honduras	✓		Tanzania	✓	
Hungary	✓		Thailand	✓	
Iceland	✓		Timor-Leste	✓	
India		✓	Tonga		✓
Indonesia	✓		Trinidad and Tobago	✓	
Iran	✓		Tunisia	✓	
Iraq	✓		Turkey	✓	
			Uganda	✓	

Israel	✓	Ukraine	✓
Jamaica	✓	United Arab Emirates (UAE)	✓
Japan	✓	United Kingdom (UK)	✓
Jordan	✓	United States of America (USA)	✓
Kazakhstan	✓	Uruguay	✓
Kenya	✓	Uzbekistan	✓
Kosovo	✓	Vanuatu	✓
Kuwait	✓	Venezuela	✓
Kyrgyzstan	✓	Vietnam	✓
Lebanon	✓	Yemen	✓
Lesotho	✓	Zambia	✓
Liberia	✓	Zimbabwe	✓
Libya	✓		

Note: Governor means that Central Bank Governor also chairs the board and Independent is an independent chair of the Board. European Central Bank covers 22 countries including Monaco, Vatican City and San Marino. Eastern Caribbean Central Bank and BCEAO (*Banque Centrale des États de l’Afrique de l’Ouest* or Central Bank of West African States) cover 8 countries respectively. BEAC (*Banque des États de l’Afrique Centrale* or Bank of Central African States) covers 6 countries. It is worth noting that the Federal Reserve (United States of America) controls three tools of monetary policy – open market operations, the discount rate, and reserve requirements. The Board of Governors of the Federal Reserve System is responsible for the discount rate and reserve requirements, and the Federal Open Market Committee (FOMC) is responsible for open market operations. The chairperson of the Board of Governors is different from that of FOMC. We were not able to classify the following countries due to lack of information: Turkmenistan, Tuvalu, North Korea, Marshall Islands and Laos. The following countries use foreign currencies: Australian dollar (AUD) is used in Kiribati and in Nauru; Palau uses United States Dollar (USD); and Liechtenstein uses Swiss franc (CHF).

An important governance issue is the question of who chairs the Board of Directors of the central bank. In Table 8, we report the results of a web search for central banks across the world. We note two main variations: One, where Governor of the central bank also acts as the Chairperson of the Board of Directors of the same central bank; two, where the Chairperson of the Board of Director of the central bank is an independent person and the Governor is only a member of the same Board. It is shown in Table 8 that the majority of central banks follow the first variation rather than the second one.

It may be argued that the first variation confers more independence to the central bank, precisely in the sense that by chairing the Board of Directors which considers the vision and mission of the central bank including the appointment of senior officials of the institution, the Governor is better placed to exert her/his authority and to pursue the inflation objective without interference from the political masters. But, it may well be plausible to argue that an independent Chairperson of the Board of Directors, as in variant II, provides checks and balances or perhaps a moderating influence to the role of the Governor with respect to the vision and mission of the central bank or in terms of strategic issues; after all, the independent Chairperson has no incentive to serve as a conduit of political interference more than the Governor can be – especially if the appointment of the Governor and the Chairperson the of the Board must be ratified by parliament of the Head of State.

There are several promising avenues for undertaking empirical work, including experimental research, in order to investigate the central bank governance associated with the Chair of the Board of Directors of the central bank. One is to explore the incentive compatibility in the principal-agent behaviour of the Board Chair, be it Governor or independent. The second is to investigate empirically whether inflation discipline, money supply discipline or financial stability are uniquely associated with one of the two variants. The third is to examine the governance dynamics under each variant in order to establish whether the two variants are actually distinct.

6 Concluding remarks

Central bank independence means that monetary policy is delegated to officials (central banks) other than government and that the government has a limited influence on monetary policy implementation.

Measurement of central bank independence focused on a set of legal characteristics. The legal indices are related to four dimensions of central bank independence. Firstly, a secure tenure and independent appointment of central bank's management protect central bank from political pressure and increase its independence. Secondly, the lower the government's participation in decision making, the higher the independence of the central bank. Thirdly, an increase in the central bank independence goes hand-to-hand with a restriction on the direct lending to governments. Fourthly, the independence is greater when a clear defined objective for monetary policy has been specified in the legal mandate of the central bank. Based on these aspects of a central bank's independence, Arnone et al. (2007) draw four consensus views of monetary policymakers from global trend as follows¹⁰:

1. Set price stability as the primary objective of monetary policy
2. Curtail direct lending to governments
3. Ensure full autonomy for setting the policy rate
4. Ensure non-government involvement in policy formulation.

Although the government's influence on monetary policy is restricted, it does not mean that independent central bank not operate in a political vacuum. In one way or another, politicians or governments put pressure on central banks especially when they disagree with the central bank's policy (Ehrmann and Fratzscher, 2011). Therefore, the political economy of the central bank is an important dimension.

Central bank independence is associated with positive economic outcomes. First, the greater the independence of the central bank, the lower the level and the volatility of inflation. While, there is a controversial debate regarding this relationship in the literature, the evolution of central banking (reforms) in the world can be seen as a testimony of the positive effects of central bank independence and inflation. Second, independent central bank increases debt sustainability and may foster fiscal discipline which are useful for gaining credibility in the domestic and international markets.

Nevertheless, greater central bank independence needs to be reconciled with the requirements of institutional and personal accountability (Crowe and Meade, 2007)¹¹. In addition, financial regulation should be strengthened in the mandate of the central bank and the setting of monetary policy should take into account price developments, the evolution of credit and the emergence of bubbles (Fernández-Albertos, 2015). Indeed, in practice, the Schwartz's

¹⁰ This section heavily draws on Banaian (2008, 42-43).

¹¹ In 2005, the Governor of the Central Bank of Italy was under investigation for improprieties associated with a bank merger.

conventional wisdom does not work and the objective of price stability does not necessarily foster financial stability.

References

- Adolph, C. (2013). *Bankers, bureaucrats, and central bank politics: The myth of neutrality*. Cambridge: Cambridge University Press.
- Alesina, A. (1988). *Macroeconomics and politics*. NBER Macroeconomics Annual, 3: 13-52.
- Alesina, A. and Stella, A. (2010). *The Politics of Monetary Policy*, Handbook of Monetary Economics, in: Benjamin M. Friedman & Michael Woodford (ed.), Handbook of Monetary Economics, edition 1, volume 3, chapter 18, pages 1001-1054 Elsevier.
- Alesina, A. and Summers, L. H. (1993). Central bank independence and macroeconomic performance: some comparative evidence. *Journal of Money, Credit and Banking*, 25(2): 151-162.
- Arnone, M., Laurens, B. J., Segalotto, J. F. and Sommer, M. (2009). *Central bank autonomy: Lessons from global trends*. IMF Staff Papers, 56(2): 263-296.
- Artha, I. K. D. S. and de Haan, J. (2015). Financial crises and the dismissal of central bank governors: new evidence. *International Journal of Finance and Economics*, 20(1): 80-95.
- Bade R., and Parkin, M. (1982). *Central bank laws and monetary policy*. Unpublished.
- Banaian, K. (2008). *Measuring Central Bank Independence: Ordering, Ranking, or Scoring?* In The design and use of political economy indicators (pp. 33-55). Palgrave Macmillan, New York.
- Banaian, K. and Luksetich, W. A. (2001). Central bank independence, economic freedom, and inflation rates. *Economic Inquiry*, 39(1): 149-161.
- Barro, R. J. and Gordon, D. B. (1983). Rules, discretion and reputation in a model of monetary policy. *Journal of Monetary Economics*, 12(1): 101-121.
- Berger, H., de Haan, J. and Eijffinger, S. C. (2001). Central bank independence: an update of theory and evidence. *Journal of Economic Surveys*, 15(1): 3-40.
- Bernanke, B.S. (2010). *Central Bank Independence, Transparency, and Accountability*. Speech of Chairman Ben S. Bernanke at the Institute for Monetary and Economic Studies International Conference, Bank of Japan, Tokyo, Japan May 25, 2010.
- Bernhard, W. (1998). A political explanation of variations in central bank independence. *American Political Science Review*, 92(2): 311-327.
- Bernhard, W., Broz, J. L. and Clark, W. R. (2002). The political economy of monetary institutions. *International Organization*, 56(4): 693-723.
- BIS (2009). *Issues in the Governance of Central Banks: A report from the Central Bank Governance Group*. Switzerland: Bank for International Settlements Press & Communications.
- Blanchard, O. and Galí, J. (2007). Real wage rigidities and the New Keynesian model. *Journal of money, Credit and Banking*, 39(s1): 35-65.
- Blinder, A. S. and Morgan, J. (2005). Are two heads better than one? Monetary policy by committee. *Journal of Money, Credit and Banking*, 37(5): 789-811.
- Bodea, C. (2010). Exchange rate regimes and independent central banks: a correlated choice of imperfectly credible institutions. *International Organization*, 64(3): 411-442.
- Bodea, C. (2013). Independent central banks, regime type, and fiscal performance: the case of post-communist countries. *Public Choice*, 155(1-2): 81-107.

- Bodea, C. and Hicks, R. (2015). Price stability and central bank independence: Discipline, credibility, and democratic institutions. *International Organization*, 69(1): 35-61.
- Broz, J. L. (2002). Political system transparency and monetary commitment regimes. *International Organization*, 56(4): 861-887.
- Copelovitch, M. S. and Singer, D. A. (2008). Financial regulation, monetary policy, and inflation in the industrialized world. *The Journal of Politics*, 70(3): 663-680.
- Crowe, C. and Meade, E. E. (2007). The evolution of central bank governance around the world. *Journal of Economic Perspectives*, 21(4): 69-90.
- Cukierman, A. (1993). Central bank independence, political influence and macroeconomic performance: a survey of recent developments. *Cuadernos de Economía*, 30(91): 271-291.
- Cukierman, A., and Webb, S. B. (1995). Political influence on the central bank: international evidence. *World Bank Economic Review*, 9(3): 397-423.
- Cukierman, A., Web, S.B. and Neyapti, B. (1992). Measuring the independence of central banks and its effect on policy outcomes. *World Bank Economic Review*, 6(3): 353-398.
- de Haan, J. and Eijffinger, S. C. (2016). *The politics of central bank independence*. DNB Working Paper No. 539.
- de Haan, J. and Kooi, W. J. (2000). Does central bank independence really matter?: New evidence for developing countries using a new indicator. *Journal of Banking & Finance*, 24(4): 643-664.
- de Haan, J., Leertouwer, E., Meijer, E. and Wansbeek, T. (2003). Measuring central bank independence: A latent variables approach. *Scottish Journal of Political Economy*, 50(3): 326-340.
- de Haan, J., Masciandaro, D. and Quintyn, M. (2008). Does central bank independence still matter? *European Journal of Political Economy*, 24(4): 717-721.
- de Haan, Jakob and Eijffinger, S. C. W. (2016). *The Politics of Central Bank Independence*. De Nederlandsche Bank Working Paper No. 539.
- Dreher, A., de Haan, J. and Sturm, J. E. (2006). *When is a central bank governor fired? evidence based on a new data set*. Working Paper 06-143. KOF Swiss Economic Institute, ETH Zurich.
- Dreher, A., Sturm, J. E. and de Haan, J. (2010). When is a central bank governor replaced? Evidence based on a new data set. *Journal of Macroeconomics*, 32(3): 766-781.
- Ehrmann, M. and M. Fratzscher (2011). Politics and Monetary Policy. *The Review of Economics and Statistics*, 93(3): 941-960.
- Eichler, S. and Littke, H. C. (2018). Central bank transparency and the volatility of exchange rates. *Journal of International Money and Finance*, 89: 23-49.
- Eijffinger, S. C. and Hoerberichts, M. M. (2008). The trade-off between central bank independence and conservatism in a New Keynesian framework. *European Journal of Political Economy*, 24(4): 742-747.
- Eijffinger, S. C. W. and Schaling, E. (1992). *Central bank independence: criteria and indices*. Research Memorandum No. 548. Department of Economics, Tilburg University, processed.
- Farvaque, E. (2002). Political determinants of central bank independence. *Economics Letters*, 77(1): 131-135.
- Fernández-Albertos, J. (2012). Exchange rate regime preferences of the international sector. Firm-level evidence. *Economics Letters*, 116(1): 26-30.
- Fernández-Albertos, J. (2015). The Politics of Central Bank Independence. *Annual Review of Political Science*, 18(1): 217-237

- Frieden, J. A. and Stein, E. (2001). *The currency game: exchange rate politics in Latin America*. Washington, DC: Inter-American Development Bank.
- Gilardi, F. (2007). The same, but different: Central banks, regulatory agencies, and the politics of delegation to independent authorities. *Comparative European Politics*, 5(3): 303-327.
- Giordano, R. and Tommasino, P. (2011). What determines debt intolerance? The role of political and monetary institutions. *European Journal of Political Economy*, 27(3): 471-484.
- Goodman, J. B. (1991). The politics of central bank independence. *Comparative Politics*, 23(3): 329-349.
- Grilli, V., Masciandaro, D. and Tabellini, G., 1991. Political and monetary institutions and public financial policies in the industrial countries. *Economic policy*, 6(13): 341-392.
- Hallerberg, M. (2002). Veto players and the choice of monetary institutions. *International Organization*, 56(4): 775-802.
- Hefeker, C. and Zimmer, B. (2011). The optimal choice of central bank independence and conservatism under uncertainty. *Journal of Macroeconomics*, 33(4): 595-606.
- Iversen, T. (1999). Political Economy of Inflation: Bargaining Structure or Central Bank Independence? *Public Choice*, 101(3-4): 285-306.
- Keefer, P. and Stasavage, D. (2003). The limits of delegation: Veto players, central bank independence, and the credibility of monetary policy. *American Political Science Review*, 97(3): 407-423.
- Klomp, J. and de Haan, J. (2010a). Do central bank law reforms affect the term in office of central bank governors? *Economics Letters*, 106(3): 219-222.
- Klomp, J. and de Haan, J. (2010b). Inflation and central bank independence: a meta-regression analysis. *Journal of Economic Surveys*, 24(4): 593-621.
- Kydland, F. E. and Prescott, E. C. (1977). Rules rather than discretion: The inconsistency of optimal plans. *Journal of Political Economy*, 85(3): 473-491.
- Levieuge, G. and Lucotte, Y. (2014). A simple empirical measure of central banks' conservatism. *Southern Economic Journal*, 81(2): 409-434.
- Levieuge, G., Lucotte, Y. and Pradines-Jobet, F. (2017). Central banks' preferences and banking sector vulnerability. *Journal of Financial Stability*. <https://doi.org/10.1016/j.jfs.2017.10.008>
- Lohmann, S. (1998). Federalism and central bank independence: the politics of German monetary policy, 1957-92. *World Politics*, 50(3): 401-446.
- Lybek, M. T. and Morris, M. J. (2004). *Central bank governance: A survey of boards and management*. Working Paper No. 4-226. International Monetary Fund.
- Mas, I. (1995). Central bank independence: A critical view from a developing country perspective. *World Development*, 23(10): 1639-1652.
- Masciandaro, D. and Romelli, D. (2015). Ups and downs of central bank independence from the Great Inflation to the Great Recession: theory, institutions and empirics. *Financial History Review*, 22(3): 259-289.
- Oatley, T. (1999). Central bank independence and inflation: Corporatism, partisanship, and alternative indices of central bank independence. *Public Choice*, 98(3-4): 399-413.
- O'Mahony, A. (2007). Escaping the ties that bind: Exchange rate choice under central bank independence. *Comparative Political Studies*, 40(7): 808-831.
- Pistorisi, B., Salsano, F. and Ferrari, D. (2011). Political institutions and central bank independence revisited. *Applied Economics Letters*, 18(7): 679-682.

- Rogoff, K. (1985). The optimal degree of commitment to an intermediate monetary target. *Quarterly Journal of Economics*, 100(4): 1169-1189.
- Sibert, A. (2006). Central banking by committee. *International Finance*, 9(2): 145-168.
- The Economist (2017). *The battle of three centuries, the history of central banks: Contemporary criticisms of central banks echo debates from times past*. April 27.