

CENTRAL BANK INDEPENDENCE AS A FISCAL COMMITMENT TO PRICE STABILITY

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ABSTRACT, KEYWORDS, AND JOURNAL OF ECONOMIC LITERATURE (JEL) CODES

This dissertation examines Central Bank Independence from the perspective of the Fiscal Theory of the Price Level, an expansion of Monetarism which emphasizes inflationary consequences of unsustainable public finances. Outsourcing monetary policy to a technocratic institution free of political considerations is thereby understood as a fiscal commitment to price stability, but not a guarantee thereof as it can still be undermined by excessive government spending. By employing a new dataset on legal Central Bank Independence, I estimate its impact on annual inflation with a panel data approach for 190 countries between 1970 and 2020, while also incorporating different measures on Fiscal Sustainability. The existence of fiscal policy rules as well as Monetary Dominance are found to be of dis-inflationary effect, whereas legal Central Bank Independence remains statistically significant throughout. In fact, my findings suggest that operational and political autonomy of the monetary authority is crucial for price stability under almost all circumstances.

KEYWORDS: Central Bank Independence; The Fiscal Theory Of The Price Level; Fiscal Inflation; Fiscal Commitments, Fiscal Sustainability, Monetary Dominance.

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Lastly, I must acknowledge my incredible luck of timing that two academic contributions at the very centre of my chosen topic became available just shortly before starting my thesis. Davide Romelli of Trinity College Dublin released a new dataset of various measures on Central Bank Independence, not only larger in scope than anything that came before but also extended with previously disregarded criteria. Almost simultaneously, John Cochrane, currently Senior Fellow at the Hoover Institution at Stanford University, published the very first all-encompassing book on the Fiscal Theory of the Price Level, which was as much a mind-opening read as it laid out the groundwork for my thesis' theoretical framework.

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GLOSSARY

- **CBI** Central Bank Independence. iv, 1, 3–7, 13–15, 17–20, 22, 25, 27, 29, 31, 32, 44
- **CPI** Consumer Price Index. iv, 19, 32
- **CWN** Cukierman, Webb & Neyapti. iv, 15–17, 25, 32, 42
- FTPL The Fiscal Theory of the Price Level. iv, 1, 3, 7–14, 22, 27–29
- GDP Gross Domestic Product. iv, 20-22, 26, 27, 31
- GMT Grilli, Masciandaro & Tabellini. iv, 15, 16, 25
- IMF International Monetary Fund. iv, 18, 19, 21
- JEL Journal of Economic Literature. i, iv
- OLS Ordinary Least Squares. iv, 3, 14, 24, 25

1 INTRODUCTION

Ever since the Bank of England was granted full operational autonomy in 1997, Central Bank Independence (CBI) has become an institutional cornerstone of the monetary policy framework in most developed economies. Following the 1970's stagflation, when two successive oil shocks brought the previous decades of price stability and strong economic growth to an abrupt end, more and more academics started to question the hitherto prevalent faith in macroeconomic dirigisme. Instead, government intervention was increasingly seen as aggravating market imbalances or even the root cause thereof. Early Monetarists, most notably Milton Friedman, therefore departed from New Keynesian monetary policy and its emphasis on a countercyclical control of aggregate demand, and returned to the original understanding of classical economists that inflation is mainly driven by the quantity of money. Consequently, monetary policy became a more technical exercise, balancing between inflation and unemployment without much political consideration. Central Bank Independence thereby emerged as the solution to prevent short-sighted politics from jeopardizing long-term price stability. In the course of the Great Moderation between the mid-1980s and the Global Financial Crisis in 2008 a new model of central banks autonomously pursuing a set inflation target was adopted across advanced and to a lesser extent also developing economies.

After 2008, however, monetary policy was confronted with a yet unknown challenge: lacklustre productivity growth with stubbornly low inflation. When the effective zero lower bound was reached, central banks resorted to "unconventional" monetary policy as the only remaining option. Quantitative Easing in combination with Forward Guidance brought real interest rates somewhat down, though with barely any stimulating effect for the broader economy. Meanwhile, expansive fiscal policy, first to bail out a collapsing banking sector and then to boost consumption, arguably achieved little else than soaring public debt. Only once a global pandemic brought about supply chain constraints, while governments all over the world signed off generous relief packages to bolster demand, did inflation eventually return in 2022. To the surprise of many, however, the initially believed "transitory" rise in the price level turned out to be more persistent, leaving central banks with the strenuous task to regain control without triggering a recession. On fiscal policy, by contrast, governments show little interest in reversing their popular course of perpetual budget deficits, presumably in fear of political ramifications.

A fairly new economic theory, having emerged during the 1990s as a self-proclaimed heir to monetarism, understands the current situation as a conceptual failure of Central Bank Independence. The Fiscal Theory of the Price Level (FTPL) does not dispute the

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idea of outsourcing monetary policy to a technocratic and apolitical institution, it rather sees the logic conclusion not taken far enough. Based on financial economics, whereby the value of money is ultimately derived from the government's long-term financial viability, inflation is considered as much a monetary as it is a fiscal phenomenon. If public debt is not sufficiently covered by the discounted value of current and future budget surpluses, the price level must adjust in order to satisfy the government's intertemporal budget constraint. Hence, Central Bank Independence is only one side of the same coin, fiscal policy must equally be protected from political exploitation.

Nonetheless, public consent seems to pivot rather in the opposite direction. As price stability is commonly believed to be the monetary authority's sole responsibility, recent inflationary pressures have tainted the reputation of independently acting central banks, regardless of their actual culpability. In the ongoing US election, the Federal Reserve's sovereign decision on whether and when to lower interest rates again has become highly politicized, with open calls to retract its longstanding institutional autonomy. Further south, the Brazilian Central Bank, which only gained political independence in 2021, faces outright hostility from the new government despite its relative success during the pandemic as one of the first monetary authorities worldwide to react assertively. Meanwhile, both the US and Brazil continue piling up ever higher government debt, the latter even deliberately breaking its own constitutionally ordered debt rule. Much the same is true for the Eurozone and most of the developed world. One notable exception, however, is the new Argentinian government, which pledged to abolish their central bank altogether and fully dollarize instead. From a monetarist point of view, granting political and operational independence should be enough to cure the country's persistent and enduring runaway inflation. Yet, from the perspective of the Fiscal Theory of the Price Level, a subsequent return to fiscal recklessness would again undo all previous achievements, thus requiring more drastic measures to credibly signal long-term corrections.

In this thesis I will examine the importance of Central Bank Independence on price stability from the explicit viewpoint of the Fiscal Theory of the Price Level. Sustainable fiscal policy is thereby jus as important to control inflation as monetary policy, if not even more so. In the first section I will present the underlying theoretical framework, often referencing Monetarism as a guide to outline academic differences. After reviewing the historical and conceptual evolution of Central Bank Independence, I will explore the Fiscal Theory of the Price Level, which interprets the former as one of several fiscal commitments contributing to long-term price stability. Finally, I will empirically test my hypothesis, that an independent monetary policy can indeed be undermined by unsustainable fiscal policy. Panel data on a large country sample from 1970 to 2020 will allow me

to run Ordinary Least Squares (OLS) regressions on a fixed effects model, confronting annual inflation with measures on legal Central Bank Independence, fiscal metrics and established control variables. Different approaches will be applied to account for the somewhat imprecise concept of Fiscal Sustainability.

2 THEORETICAL FRAMEWORK

In this chapter I will first explore the theory behind institutional Central Bank Independence, which has become an established pillar of modern economic governance in most advanced and non-advanced economies alike. By detaching monetary policy from political interference with a clear mandate of price stability, central banks seek to improve market credibility so as to combat inflation more effectively. However, legal provisions only go so far, as *de facto* independence may still be undermined by fiscal policy. I therefore introduce the Fiscal Theory of the Price Level, which sees fiscal inflation as an inevitable consequence of unsustainable public finances. Although monetary policy can control the timing of inflation, it cannot prevent it altogether. According to the Fiscal Theory of the Price Level, Central Bank Independence is one of several possible fiscal commitments to strengthen a country's institutional framework, whereby the tempting option to inflate away public debt becomes politically more painful.

Monetarism will be a recurring narrative to guide through this debate. Milton Friedman was a pioneer in the academic contemplation of Central Bank Independence, anticipating many of its still disputed pros and cons. Accordingly, I will present the Fiscal Theory of the Price Level as a generalization of Monetarism; from its dogmatic departure, to conceptual differences and ultimately the modern-day interpretation as its more comprehensive successor. My main reference thereby is the recently published book of the same title by John Cochrane (2023), as well as several preceding papers of his. Henceforth I will frequently use the common abbreviations of CBI and FTPL for the two core concepts in this thesis.

2.1 Central Bank Independence

Over the past few decades, a universal understanding has emerged that a key prerequisite of price stability is the central bank's autonomy to conduct monetary policy as it sees fit. Government interference is to be avoided, in order to leave inflation control in the hands of apolitical technocrats. Among the first considerations on CBI was Milton Friedman's 1962 essay entitled "Should there be an independent monetary authority?". Following the imminent breakdown of the Bretton Woods system, Friedman explored new approaches to price stability from a monetarist viewpoint. His main concern was:

The problem to establish institutional arrangements that will enable government to exercise responsibility for money, yet will at the same time limit the power thereby given to government and prevent the power from being used in ways that will tend to weaken rather than strengthen a free society.

(Friedman 1962)

His essay was inspired by the New Liberal's proposal to outsource monetary policy to professional bureaucrats free of political ambitions, i.e. institutional Central Bank Independence. The main argument therein is to enhance the central bank's perceived credibility by the market as a way to disincentivize any potential speculation driven by suspicions of an undisclosed agenda. Whether a monetary authority is believed to genuinely pursue the announced inflation target is crucial for its ability to anchor expectations and hence achieve price stability. Park (2023) shows to what extend market perception affects macroeconomic stability, with volatility in both output gap and inflation increasing as a central bank's credibility deteriorates. Blinder (2000) finds that higher central bank credibility makes dis-inflation less costly and helps to keep inflation down once it is low. Moreover, the link between a central bank's credibility and its institutional independence is well established. In a survey of central bankers and distinguished economists on the determinants of central bank credibility, Blinder (2000) ranks "A history of living up to its word" first with CBI a close second. Likewise, Bordo & Siklos (2014) see autonomous monetary policy as one of the main institutional factors to improve credibility. Friedman (1962) ultimately agrees as well, arguing that "central bankers seem more likely to impose restrictions on irresponsible monetary power than the legislative authority itself."

Friedman goes on to demand that a central bank must be "both stable and free from irresponsible government tinkering". The reason behind this fear of political interference comes from a time-inconsistency problem between the central bank's long-term goal of price stability and short-sighted electoral gains for the presiding government. It is well understood how loose monetary policy can temporarily boost output to the expense of central bank credibility and in consequence long-term price stability (Kydland & Prescott 1977, Barro & Gordon 1983). In his remarks as Vice Chairman of the Board of Governors of the Federal Reserve System, Fischer (2015) outlines a so-called "inflationary bias" in the absence of CBI, while Berger et al. (2001) conclude that for a central bank to credibly keep inflation low it must be both free of political interference as well as "conservative".

Hawkishness, as it is commonly known, describes the degree to which a central bank is more averse to inflation than the general government.

In Rogoff's foundational 1985 model on "The Optimal Degree of Commitment to an Intermediate Monetary Target", central bankers ought to be more hawkish on inflation than society at large. While Friedman assumed that central bankers are in general "sound money men", De Haan & Eijffinger (2016) see it as a "serious shortcoming" that most studies on CBI neglect the possibility of varying degrees of inherent inflation bias among monetary authorities. The question thus becomes, how to measure hawkishness? Adolph (2013) produces an index of Central Banker Career Conservatism (CBCC), depending on how long individual central bankers were employed either in "conservative" jobs in the financial sector or finance ministry; or in "liberal" jobs in the central bank or the general government. He finds a strong negative correlation between inflation and CBCC.

However, as stressed by Blinder (1999), a central bank should not outright ignore a possible social preference for full employment over price stability. Given the wideranging impacts monetary policy can have on the wider economy, CBI comes with significant discretionary power on social welfare. A dilemma may emerge between the central bank's focus on price stability and its potential negative effects on different parts of society. De Haan & Eijffinger (2016) detect a principal-agent problem between the government and its central bank, which could be solved by optimizing contracts for monetary policy decision makers. As suggested by Walsh (1995) and Svensson (1995), responsibilities and objectives must be specified such that redistributional consequences are taken into consideration while also preventing inflation bias. In Friedman's words, monetary policy can be "rationalized by assimilating it to a species of constitutionalism" (1962).

Nonetheless, as pointed out by Fernández-Albertos (2015), even the most independent central bank does not operate in a political vacuum. The appointment of central bankers itself can be politically exploited. Adolph (2013) shows that governments from opposing ends of the ideological spectrum tend to appoint central bankers with different levels of inflation bias. The institutionalization of Central Bank Independence can even be regarded as an attempt of governments to extend their preferred monetary policy over the following legislative period by installing like-minded central bankers (Goodman 1991). Similarly, new governments may engage in the removal of previous appointees in conflict with their own political preferences. According to findings by Adolph (2013) and Dreher et al. (2008), conservative governments on average tend to shorten terms of central bankers during times of high inflation, whereas more left-leaning governments only do so in times of high unemployment. It is therefore crucial to prevent such politically motivated replacements of supposedly technocratic appointees. Klomp & de Haan (2010)

provide evidence that the turnover of central bank governors is lower with a higher degree of Central Bank Independence.

Despite all the above reasons for CBI, Friedman concluded his essay not in favour of an independent monetary authority, as he dreaded the lack of a democratic mandate. In his reasoning, a fully autonomous bureaucracy is not accountable to the electorate and thus incompatible with a free society. As a compromise, he suggested that the government shall set the policy objective, e.g. price stability or full employment, without interfering in the central bank's policy decisions to achieve such. The time-inconsistency problem would thus be solved by leaving the long-term politics with the elected government, while short-term policy is steered by technocratic professionals. Bernanke (2010) confirms in his speech at the *Institute for Monetary and Economic Studies International Conference* that:

A broad consensus has emerged [...] 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.

A legal provision is however not necessarily enough to factually guarantee the operational independence of monetary policy. For example, Fernández-Albertos (2015) cites the European Central Bank as arguably the most independent of its kind worldwide due to its statutes being part of the EU treaties, which would require unanimity among all EU members for an amendment. Yet, theory and reality are often far apart. The difference between *de jure* and *de facto* is stressed by Lewkowicz & Metelska-Szaniawska (2021) for government institutions in general, while many studies show a weak correlation between the two for Central Bank Independence in particular (De Resende 2007, Jasmine et al. 2019, Binder 2020). Possible explanations are found in the political economy, central bank balance sheets, and most crucially for this discussion, fiscal policy.

Looking at differences in institutional strength, Bodea & Hicks (2015) find that legal CBI has a greater effect on price stability when a country enjoys proper checks and balances, again based on central bank credibility. On a similar line of thought, Gavin & Manger (2023) see it undermined by the threat of populism resorting to political pressure in order to coerce interest rate concessions. Other studies find that de jure CBI has stronger positive effects in non-advanced economies, where political manipulation is otherwise taken for granted (Balls et al. 2018, Wachtel & Blejer 2020, Garriga & Rodriguez 2020). Following the 2008 financial crisis and subsequently mounting central bank losses, a very different threat to CBI has found attention. *Financial* Central Bank Independence has increasingly come into question as a consequence of Quantitative Easing, whereby central banks across most advanced economies resorted to buying-up long-term government debt at high costs and severe long-term risks. From this angle, Hall & Reis (2015) discuss how an expanded central bank balance sheet may ultimately lead to financial constraints. As a last resort to prevent insolvency, the monetary authority must either run an inflationary Ponzi scheme or ask the government for fiscal support, thereby clearly undermining its independence. Similarly, Jeanne & Svensson (2007) stress that central banks must avert negative equity particularly in times of zero interest rates. Financial CBI represents a key base for central bank credibility (Lonnberg & Stella 2008), as monetary policy would otherwise be self-restrained for financial reasons with clear limitations to operational autonomy (Martinez Resano 2004, Ivanović 2014).

Another explanation for the deviation between legal and factual independence will be the focus of the next section: the interplay between monetary and fiscal policy. The Fiscal Theory of the Price Level is a comprehensive critique of fiscal constraints to monetary policy. Once public debt becomes unsustainable, monetary policy can no longer maintain long-term price stability, whatever the measure. Even a central bank perfectly independent by law is ultimately tied to the government's fiscal policy decisions, with its operational autonomy subdued.

2.2 The Fiscal Theory of the Price Level

Widely acknowledged as the genesis of FTPL was Sargent and Wallace's 1981 paper on "Some Unpleasant Monetarist Arithmetic" (Sargent et al. 1981). By examining the deep interdependence between fiscal and monetary policy, they exposed a crucial link through *seigniorage*, i.e. the revenues generated by the central bank through money creation which are then passed on to the treasury. Under their assumption of *Fiscal Dominance*, the fiscal authority is first to choose its policies by setting a budgetary path, while monetary authority only then follows according to the circumstances. Large and sustained deficits may however provoke inflation, thus degrading the central bank to reactionary damage control. Accordingly, Sargent's 1980 review of "The End of Four Big Inflations" concluded that the historic hyperinflations in Germany, Austria, Hungary, and Poland during the interwar period only found an end after a combined effort of both monetary and fiscal policy.

Sargent (1982) further establishes the term *Ricardian Equivalence* to describe a government that finances budget deficits sustainably with subsequent surpluses, be it via constant revenue streams like taxes and seigniorage or one-off sales of public assets. If the underlying intertemporal budget constraint is however not satisfied, fiscal policy becomes inflationary and the central bank must adjust its original policies to take countering measures. Leeper (1991) goes on to diagnose a *passive* monetary policy regime when the central bank responds to government debt shocks, as opposed to a fully autonomous *ac*-*tive* monetary policy only driven by external shocks. Notably, however, Cochrane (2023) stresses that such labels inevitably come with interpretational flaws, as they fail to fully capture the nuances of real-life economics. Nonetheless, the notion that unsustainable public finances directly imperil price stability can be considered the foundation of FTPL.

The first to coin the "Fiscal Theory of the Price Level" was Woodford (1995), in a seminal paper on "price determinacy without control of a monetary aggregate". Yet, monetary economics long before recognized fiscal-monetary interactions. Friedman himself proposed a joint "fiscal and monetary framework for economic stability" (1949), while the basic intuition of FTPL can even be found all the way back in Adam Smith's writings (Cochrane 2023).

At its core, FTPL as presented by Cochrane (2023) is a backing theory in the tradition of financial economics. For most of history, paper money derived its value from real assets like gold or other tangible commodities. Since the collapse of Bretton Woods, however, most advanced economies introduced free-floating fiat money, seemingly only backed by common faith in its present and future value. FTPL, by contrast, understands money as an asset like any other, whose value derives from the residual claim to a future cashflow, in this case primary budget surpluses. Risk of repayment as well as its delayed nature must therefore be priced in (see Cochrane 2009). This asset pricing principle underlies FTPL's basic intertemporal government debt valuation equation (1), whereby the price level P adjusts so that the real value of nominal debt B equals the expected present value of future surpluses s. (Cochrane 2023, chapter 1&2)

$$\frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j s_{t+j} \tag{1}$$

This asset pricing approach to public finances was first suggested by Sargent (1982). Elaborating on his "initial working hypothesis that the government is like a firm", a vast literature followed this analogy to corporate finance and eventually culminated in modernday FTPL. In "Money as a Stock", Cochrane (2000) expanded the idea that public liabilities can be understood as issued equity on the government's balance sheet with primary surpluses as the parallel to net income. Accordingly, selling public debt that is ultimately repaid through future budget surpluses is equivalent to issuing new shares. By contrast, *Non-Ricardian* debt sales are comparable to a share split, increasing the amount of stocks while maintaining the same overall value. Just as stock prices adjust to bring the value of shares in line with the present value of dividends, the price level adjusts to bring the real value of nominal debt in line with the present value of primary surpluses.

Herein lies the pivotal deviation from Monetarism. Friedman only saw the quantity of money as the driver of inflation, thus assigning full control to the central bank. For FTPL, however, government bonds are not strictly distinct from money. The monetarist *Quantity Theory of Money* states that the price level is determined by money supply, the velocity of money, and output. MV = PY, as famously displayed on Friedman's car plate. In turn, the amount of money in circulation is provided by the monetary base plus inside money, created by the central bank and private banks respectively. The central bank is thus not in full command of money supply but has a unique role in stabilizing the price level through the control of the interest rate environment and the stock of reserves. (Friedman 1968*a*)

Contrary to the monetarist tradition, FTPL does not see a definite separation between "liquid" transaction-facilitating money, and "illiquid" interest-bearing bonds. In fact, the split between money and bonds is deemed irrelevant. Both are government liabilities, one on the balance sheet of the treasury and the other on the central bank's. If people have a liquidity preference for money, supply of that money must be passive. The difference is, however, that the treasury issues new bonds for the exchange of money, while the central bank issues money for the exchange of bonds. Since most central banks are prohibited from directly financing government debt, they must instead resort to open-market operations, thereby acting through private agents. Nonetheless, the quantity of money a central bank can inject in the economy is determined by the overall amount of outstanding government debt. Monetary policy in FTPL does not control the money supply, but rather the composition of government debt between bonds and money in order to satisfy money demand. (Cochrane 2023, chapter 10,11&13)

Since money and bonds are interchangeable in FTPL, open-market operations alone do not affect the economy. In the monetarist understanding, an open-market purchase lowers interest rates through an interest-elastic money demand. The simultaneous decline in government bonds is disregarded. Instead, FTPL requires that new bond issuances are not expected to be fully repaid through increased future budget surpluses, in order for changes in the composition of debt to be inflationary. Applying again the corporate finance analogy, only the treasury can issue new "equity", while the central bank on its own can merely perform a "share split".

However, open-market operations can still lower long-term interest rates by removing duration from the bond market. Through Quantitative Easing central banks buy long-term government bonds and in return issue short-term debt in the form of reserves. This change in the maturity structure has direct implications for the effectiveness of monetary policy. The announcement of a future interest rate change only impacts the value of debt with a maturity exceeding the effective date. Thus, Forward Guidance loses its power altogether once the guidance period exceeds the longest outstanding bond maturities. Notably, the rearrangement of the maturity structure alters the timing of policy effects. Long-term debt offers a buffer against immediate impacts of inflationary fiscal policy, just as it defuses financial strains for private firms. Short-term financing is evidently more sensitive to speculation, as investors may fear to not be able to roll-over government securities close to maturity. With long-term debt, however, shocks to expectations of future surpluses can be absorbed by bond prices today and expected future inflation, rather than an immediate adjustment in the price level. While short-term bond holders can forego expected future inflation by demanding higher nominal interest rates, long-term bond holders cannot escape the devaluation of their holdings that comes from future inflation. Long-term debt allows an unexpected interest rate rise with no change in surpluses to temporarily lower inflation, thereby giving monetary policy more room of action. According to FTPL, monetary policy cannot prevent inflation entirely but only smooth forward inflationary consequences. With long-term debt outstanding, the central bank controls the timing of fiscal inflation. (Cochrane 2001, 2023, chapter 3&7)

The maturity structure of government debt also matters for the price level effect of interest rate changes. In most New Keynesian models, predominant in central banks worldwide, a raise in nominal interest rates brings down inflation via the Philips curve due to sticky prices and other frictions. Contrarily, the monetarist Fisher Effect predicts that an interest rate increase actually leads to higher inflation (Friedman 1968b). FTPL can accommodate both, it all depends on the structure of government debt. With long-term debt outstanding, monetary policy may indeed temporarily offset a fiscal shock through raising interest rates. The central bank can substitute inflation today for inflation tomorrow. Sticky prices alone do not lead to a negative response, but draw out the dynamics. In comparison, with only short-term debt outstanding, the central bank has no room to change the timing of inflation. With sticky prices and instantaneous debt, a fiscal shock must be followed by a period of steady inflation, no matter the interest rate change. Additionally, monetary policy can have fiscal implications with indirect effects on inflation. Higher interest rates further worsen a fiscal imbalance, via changes in both the real discount rate and real interest costs of debt. Therefore, unless for an expected increase in surpluses, higher interest rates in FTPL can be inflationary. With today's elevated debt-to-GDP ratios and a tendency towards short-term public debt, monetary economics may look ever more Fisherian. (Cochrane 2018, 2023, chapter 5)

The increased indebtedness of modern economies is therefore of particular concern in FTPL. Although runaway inflation can be confronted with a fiscal contraction, poorly crafted austerity measures may actually have the opposite effect. Despite short-run budget improvements, depressed economic growth could eat away future surpluses and thus further destabilize the price level. The government's intertemporal budget constraint may prove a harsher trade-off than commonly appreciated, with the present value Laffercurve as an additional limit to fiscal adjustments. Instead of increasing revenues, higher marginal tax rates may disincentivize labour supply and thereby contrariwise shrink the tax base. Hence, FTPL emphasizes not only tax and spending policies, but also a broader array of regulatory, economic, financial, and institutional reforms. (Cochrane 2023, chapter 6)

Once more, monetary policy plays second fiddle to fiscal policy. Unsustainable public finances inevitably lead to inflation, which the central bank can at best smooth out over time. In recent years, government debt maturity continuously shortened, thereby weakening the central bank's tools. Cochrane (2023) proposes a way to avoid the inconvenient Fisher Effect: with a fiscal policy rule that reacts to inflation, higher interest rates can dis-inflate even with short-term debt. Such rules can however be changed at any given moment by politics. A more lasting solution to prevent inflationary fiscal policies might instead be institutional provisions to commit fiscal policy to long-term debt sustainability.

Institutions long outlast politicians and their promises. That is the point of institutions.

(Cochrane 2023, p.51)

2.3 Fiscal Commitments

In the Fiscal Theory of the Price Level, a shift in expectations alone can have inflationary consequences. If economic agents distrust future budget surpluses, even minor fiscal surprises can trigger significant adjustments in the price level today. Rational expectations theory requires fiscal policy to not only be predictable, but also believable (see Muth 1961, Lucas 1976). It took hundreds of years for governments to somewhat credibly promise repayment and thus issue paper currencies without immediate loss of value. Our modern understanding of public debt as risk-free is a relatively recent phenomenom. Historically, government debt has been a rather unsafe investment with even major economies like France and Britain frequently defaulting on their obligations. FTPL does not assume that governments always choose to pay off excessive debt through surpluses or printing money. Default is also an option, one with equally destabilizing consequences. Expected future default can trigger inflation today. (Sims 1997, Cochrane 2023, chapter 4&8)

In corporate finance, the probability of default determines the value of outstanding debt. In public finance, as understood by FTPL, it is the price level that adjusts to changes in risk perception. Unlike firms however, governments can issue debt in own currency. Again, the corporate equivalent of issuing equity. Such *nominal* debt is fully controlled by its issuer, who may choose to deliberately inflate away its value whenever convenient. A government can simply avoid default altogether by continuously financing budget deficits through inflation. Yet, this only works as long as investors are willing to buy new bonds denominated in increasingly risk-prone domestic currency. The more a government takes advantage of the privileges that come with nominal debt, the more expensive a risk premium it must pay to attract borrowers. Once all credibility is gone, the only financing option left is to issue bonds denominated in foreign currency. Such *real* debt cannot be inflated away and therefore must be repaid or defaulted on. Thus, like for a firm, government debt is consequently valued through creditworthiness, with the sustainability of public finances as the main determinant. Real debt therefore acts as a commitment, signalling fiscal prudence to the market. (Cochrane 2023, chapter 8)

The ultimate fiscal commitment using real debt is to surrender domestic currency altogether. After decades of inflationary policies, fiscal reputation may be deteriorated to a point where all faith in the value of money is gone. Equivalently, only large businesses with good corporate governance issue equity, whereas small or new businesses are forced to borrow. A less extreme form thereof would be a simple currency peg or board, whereby the central bank pledges to exchange domestic for foreign currency at a set rate for whatever quantity is demanded. As this requires sufficient foreign reserves, the real value of money must be backed by fiscal prudence at any costs. The treasury is delegated to a passive role, with its capability to issue new debt regulated by market forces.

However, real debt and exchange rate pegs are not the only fiscal commitments available. Debrun & Kumar (2007) explore a framework for fiscal governance with numerical fiscal rules to foster market credibility. A well-known example of this would be the Eurozone's *Maastricht Criteria*, which has been tested and challenged by many studies. Paniagua et al. (2017), for instance, found that Greece, Ireland, Portugal and Spain, all countries that were bailed-out during the most recent sovereign debt crisis, have nonetheless failed to react systemically to debt accumulation but instead only when under extreme circumstances. Political turnover is suggested by Debortoli & Nunes (2010) as a "natural limitation of the policymakers' commitment horizon", whereby plans made by one government are periodically revised by its successor. Agreeingly, Debrun & Kumar (2007) therefore recommend a "contract approach" via an independent fiscal council to credibly monitor debt sustainability, while Clymo & Lanteri (2020) make a case for designing institutional features that induce "realistic degrees of commitment" to fiscal policy.

In fact, such institutional provisions are just fiscal commitments in disguise. As surveyed above, modern monetary policy in most advanced economies envisions a clear separation between treasury and central bank, with each institution pursuing own and at times even conflicting goals. FTPL interprets this akin to a "Game of Chicken" in which monetary policy solely focuses on price stability, while fiscal policy is left on its own to keep public finances on a sustainable path. So-called Taylor rules, whereby central banks follow sophisticated econometric models to assess how to counteract inflation most effectively, further tie monetary policy to a technocratic and non-discretionary decision process. Though nowadays dismissed, Friedman's outdated fixed money growth rule had the same aim, yet through different means. From a FTPL perspective, legal Central Bank Independence is likewise an approach to bring monetary policy into the driver's seat while delegating fiscal policy to a more passive role. By institutionally forcing the monetary authority to foreswear any political consideration, inflationary fiscal policies inevitably provoke higher interest rates. The longer the treasury insists on excess spending, the harsher the final course correction must be. The only alternative, namely default, would come with even higher social and political costs. (Cochrane 2022, 2023, chapter 2&8)

Evidence for the positive effect of Central Bank Independence on fiscal prudence has been thoroughly gathered in recent years. Giordano & Tommasino (2011) find that countries with more independent central banks are less likely to default on their debt. Similarly, Papadamou et al. (2016) conclude that an independent central bank worsens the effect of primary deficits on overall debt. That the amount of sovereign debt a government is able to issue relies heavily on central bank credibility is acknowledged since Calvo (1988), while the link between a central bank's credibility and independence has already been established above. For Willems & Zettelmeyer (2022), central bank credibility can function like a fiscal asset, a form of reputational capital that is accumulated over time through low and stable inflation, itself a function of responsible fiscal policy. Nöh (2019), moreover, sees CBI as a reason why sovereign debt management focuses less on inflation risks and more on fiscal, refinancing and default risk. From an explicit FTPL perspective, De Resende (2007) looks into Fiscal Dominance, which in turn is positively correlated with common estimates of CBI. He concludes that the price level is only determined by the quantity of money alone when the degree of Fiscal Dominance is zero, i.e. when debt is fully backed by fiscal policy.

According to FTPL, Central Bank Independence as a fiscal commitment can help to improve fiscal prudence and therefore achieve the set inflation target. However, it is not a guarantee. At the end, fiscal policy is driven by political considerations, which often do not hold price stability paramount. Most countries do not impose legal restrictions to debt accumulation, hence no ultimate check on inflationary public spending. Even the most independent central bank, fully protected from political influence by law, cannot prevent inflationary fiscal policies. As discussed above, de jure independence does not necessarily translate into de facto independence. At a certain point public finances may become unsustainable to a degree where legal CBI alone might no longer be enough of a fiscal commitment to anchor market expectations necessary to maintain price stability.

Inflation is always and everywhere a monetary and fiscal phenomenon.

(Leeper 2024, 6:50)

3 EMPIRICAL ANALYSIS

To test my hypothesis, that Central Bank Independence may only be of importance for price stability when not undermined by unsustainable fiscal policy, I will compile panel data on as many countries for the longest timespan possible so to run simple OLS regressions. My linear fixed effects model (2) will test annual inflation per country (π) with time-varying measures on Central Bank Independence (*CBI*), Fiscal Sustainability (*F.sus*) as well as several control variables (*X*) suggested by the literature, while also dividing in sub-samples to better analyse different country categories and geographic regions.

$$\pi_{it} = \beta_1 CBI_{it} + \beta_2 F.sus_{it} + \beta_3 X_{it} + u_{it} \tag{2}$$

In this section I will first present the data chosen for my statistical analysis as well as my empirical strategy so to then estimate the most robust results possible for comparison with the above theory and preceding literature.

3.1 Data and Approach

3.1 De Jure Central Bank Independence

The first attempt to measure legal CBI was undertaken by Parkin & Bade (1978) with a qualitative assessment of central bank laws in twelve advanced economies. A more thorough investigation by Grilli et al. (1991) and followed shortly thereafter by Cukierman et al. (1992) resulted in well founded indices for a much larger sample of countries over several decades. While the *Grilli, Masciandaro & Tabellini (GMT) index* measured political and economic independence for 18 advanced countries, the *Cukierman, Webb & Neyapti (CWN) index* provided estimates on overall legal CBI for 72 advanced and emerging countries. Most recently, Garriga (2016) renews the CWN index for 182 countries between 1970 and 2012, while Romelli (2022) builds on both the GMT and the CWN indices for an extended estimate on 155 countries between 1923 and 2023.

Both indices rely on central bank statutes to measure *de jure* Central Bank Independence. Approaches to quantify *de facto* Central Bank Independence mostly rely on questionnaires (Cukierman et al. 1992, Blinder 2000), and the turnover rate of central bank governors (Cukierman & Webb 1995, De Haan & Siermann 1996). However, as Garriga (2016) points out, "questionnaires may not be the most reliable measure of CBI, particularly because of their narrow coverage, their problematic cross-sectional comparability, and their little within-country variation"; whereas on turnover, "endogeneity explains (why) central bankers unable to control inflation are replaced more often" (Dreher et al. 2008). Although de jure CBI does not account for all country differences, it is arguably evident that "statutory measures of CBI are useful to assess governments' institutional choices" (Garriga 2016).



FIGURE 1: Correlation between weighted and unweighted CWN indices as provided by Garriga (2016) and Romelli (2022)

For this analysis I will employ the most recent datasets by Garriga (2016) and Romelli

(2022), who both follow the approach laid out by Cukierman et al. (1992). The overall measure of Central Bank Independence is thereby comprised of four components: (1) CEO and board member characteristics like appointment, dismissal, and tenure; (2) policy formulation and decision process; (3) objectives; and (4) lending limitations to the public sector. Each component consists of several sub-categories, thus resulting in 16 dimensions in total (See appendices, tables 7 and 8). The final index can either be a mean average or a weighted average based on perceived relevance.

Figure 1 compares the results of the two datasets for both unweighted and weighted indices. Surprisingly, however, the respective correlations are rather low with 0.68 and 0.74. Hence, figure 2 looks into two specific examples, Brazil and Argentina, for their historic development over the estimated period. While the weighted (continuous) lines and unweighted (dashed) lines are mostly in parallel within each dataset (green and blue), only for Argentina do they also closely follow each other. In fact, Garriga's estimates for Brazil do not see any change at all between 1970 and 2012, whereas Romelli shows two significant upward jumps in 1987 and 2021. This would indeed reflect real-life events when the country adopted a new constitution after re-democratization and introduced political Central Bank Independence respectively (Kehoe & Nicolini 2022). Going forward I will therefore primarily employ Romelli's estimates, yet keep Garriga's for robustness checks later on.



FIGURE 2: Comparison of CWN indices by Garriga (2016) and Romelli (2022) for Brazil and Argentina

Romelli (2022) also constructs an *extended* measure on de jure Central Bank Independence, called CBIE henceforth, for which he joins both the CWN and GMT indices. In addition, he introduces two further components for (5) financial independence, and (6) reporting and disclosure requirements, as well as seven additional sub-categories within (1) on reappointment and qualification requirements for governors and board members. The result is a list of 42 dimensions, as presented in table 9 in the appendices. Figure 2 already included this measure on CBIE, largely weakening reform effects in the CWN index. Applying only CBIE, figure 3 compares the original Eurozone countries since the inception of the currency union in 1999. Despite sharing the same central bank statutes, there is still some notable deviation with two separate country groups as of 2023.



FIGURE 3: Extended measure on Central Bank Independence by Romelli (2022) for original Eurozone countries

The explanation for these seemingly contradictory estimates on Central Bank Independence within a currency union can be found in the additional criteria incorporated by Romelli (2022). In fact, they were chosen for this very purpose, as the CWN indices by both Garriga and Romelli do not outline any divergence within the Eurozone. Once again, Romelli's extended measurement approach seems more in line with reality, as it accounts for differences among the respective national central banks. For example, the slight drop for Austria from 2008 to 2009 reflects a reform of financial market supervision to redefine the cooperation between the Financial Market Authority (FMA) and the Austrian National Bank (FMA 2008).

For a broader comparison, Figure 10 in the appendices depicts the G7 countries, except for Italy and France, as well as the mean average of the entire sample. A slight uptick in overall CBI can be seen during the late 1990s, strongly represented by the Bank of England and the German Bundesbank. The latter also lives up to its reputation as one of the most autonomous central banks worldwide ever since.

The highest CBIE score historically achieved was at 0.929 by the Eurozone countries between 1998 and 2013, while the lowest mark goes to Brazil in 1987 at a meager 0.098. As already seen above, the mean average of the entire sample size has increased over the

last few decades. However, as Figure 11 in the appendices shows, this also came with an increase in variability, making it more interesting for empirical analysis.

3.1 Sub-Samples for Comparison

In order to further investigate possible differences among countries, I will divide my extensive dataset into several sub-samples based on established criteria. To distinguish between different levels of economic development, which may also indicate varying approaches towards Central Bank Independence, I follow the country categorization by the International Monetary Fund (IMF) in advanced, emerging and developing economies. For robustness checks I will additionally incorporate the World Bank's geographic regions. The respective country lists and world map can be found in the appendices.

Figure 4 compares the median CBIE estimate among these three country samples. While advanced economies clearly leapfrogged ahead around the turn of the millennia, emerging and developing countries only deviated after the financial crisis of 2008 to the detriment of the former. Erratic jumps before 1960 can be explained by smaller sample sizes, with new country entries having an outsized impact without actual changes in the institutional standing of central banks globally.



Median per Country Classifications

FIGURE 4: CBIE development for IMF sub-samples

Furthermore, figure 12 in the appendices shows the distribution within each country category as of 2023, the final year for which data is available. As above, the mean average is the highest for advanced, followed by developing and emerging economies. However, variability is also the highest, meaning that a significant number of advanced economies has a lower score on CBI than non-advanced countries.

3.1 Inflation

For the dependent variable of price stability I will use the annual Consumer Price Index (CPI) as the most common and universal measure. The data is taken from both the IMF and World Bank, with the former providing a broader time frame and the latter a larger sample size. Wherever the two datasets overlap, the mean average is calculated. In order to avoid skewed results through periodic hyperinflation, I will exclude statistical outliers and take the natural log, thereby following the example from similar studies (Klomp & de Haan 2010, Balls et al. 2018, Garriga & Rodriguez 2020). Notably however, this eliminates deflation from the data, which might carry important implications with it. For subsequent robustness checks I will therefore additionally calculate the modified inflation rate (3) suggested by Cukierman et al. (1992):

$$D = \frac{\pi}{(1+\pi)} \tag{3}$$

Figure 5 confronts the extended measure for CBI with annual inflation for 2020, while also distinguishing between the introduced sub-samples. Although there are less outliers towards the upper ranges of CBIE, an obvious correlation cannot easily be detected. Advanced economies are all showing moderate inflation, despite covering the whole CBIE spectrum. For emerging and developing economies, however, a clearer downward trend crystalizes with the strongest inflationary outliers in the middle range of CBIE.



Central Bank Independence and Inflation in 2020

FIGURE 5: Comparison of CBIE and inflation for IMF sub-samples

3.1 Control Variables

Recent literature has established a strong link between price stability and a country's institutional framework. To account for other inflationary factors, I will follow similar studies on the impact of Central Bank Independence on inflation by Garriga & Rodriguez (2020) and Balls et al. (2018). Both control for economic openness and prosperity, with data on trade as percentage of GPD as well as Gross Domestic Product (GDP) per capita taken from the World Bank's comprehensive dataset. Given the importance of democracy and the rule of law on macroeconomic stability, as emphasized by Acemoglu et al. (2008) and Bodea & Hicks (2015), the Polity IV score from the Center for Systemic Peace (2024) was further incorporated, providing a regime authority spectrum ranging from -10 (hered-itary monarchy) to +10 (consolidated democracy). Since then, the updated and enhanced Polity V version has been released, which I will use for my analysis.

Most studies on Central Bank Independence also account for capital controls and different exchange rate regimes, relying on the well-established Chinn-Ito index and the Ilzetzki, Reinhart, and Rogoff classification respectively (Chinn & Ito 2008, Ilzetzki et al. 2022). From the latter, Garriga & Rodriguez (2020) only apply a dichotomous variable for a currency peg, while Balls et al. (2018) use the coarse classification score from 1 to 6 between de-facto peg and freely floating. However, due to a lack of statistical significance for either of those two variables in my regressions, I will only control for capital account openness, using the updated Chinn-Ito dataset until 2023. Yet, currency pegs will resume on a later stage when I test for different fiscal commitments as suggested by Cochrane (2023).

Even though measures on CBI are available for most of the 20th century up until 2023, data limitations on the above control variables narrow the analysed timeframe to the interval between 1970 and 2020. Nonetheless, this still leaves almost five decades with major economic events like supply shocks, stagflation and several regional as well as global financial crises. Most importantly for this study, however, significant gloabl changes in both the monetary and fiscal framework took place during the reviewed timespan: the breakdown of the Bretton Woods System in 1973, an increasing number of independent central banks during the 1990s, and ever-growing public debt ratios in the aftermath of the Great Recession in 2008.

3.1 Fiscal Indicators

For the purpose of testing my hypothesis, I will further introduce fiscal data. This is where my analysis indeed expands on preceding research on Central Bank Independence and inflation control, most notably Grilli et al. (1991), Cukierman et al. (1992), Garriga & Rodriguez (2020) and Balls et al. (2018).

Arguably the most evident criteria for Fiscal Sustainability is the overall public debt accumulated by a country, which also captures longer-term developments as opposed to a government's annual budget balance. The debt-to-GDP ratio is taken from the IMF database for every country over the analysed period and further computed into (1) the percentage deviation from the average rate over the preceding ten years; (2) a dummy variable whether a country's debt-to-GDP ratio exceeds the global average that year; and (3) a dummy variable whether a country's debt-to-GDP ratio exceeds its individual average over the whole period.

A specific debt threshold for the whole sample was deliberately dismissed, since a country's ability to sustain high debt depends very much on its development level, debt structure, currency strength and several other factors that are impractical to control for (see Reinhart & Rogoff 2009). Luckily, the European Union established a very cleardefined rule aimed at ensuring long-term Fiscal Sustainability among members using the shared currency. The so-called *Maastricht Criteria* demand that overall debt be below 60% of GDP and annual primary budget deficits lower than 3% of GDP. I will therefore apply these thresholds for a sub-sample of Eurozone countries, assuming wide enough macroeconomic homogeneity to counter the caveats raised above. Rather than introducing a dummy variable for when the Maastricht criteria are fulfilled, I instead choose to divide all country-year observations into *fulfilled* and *not fulfilled*, as well as for when the two thresholds are exceeded individually. Whilst applying the Maastricht criteria for countries outside the Eurozone may be futile, there are still comparable fiscal policy rules in place elsewhere for which I can further test my hypothesis. Davoodi et al. (2022) from the IMF provides a comprehensive dataset with annual indicators for the existence of legal fiscal rules in general, as well as separate for expenditure, revenue, budget and debt rules. It also distinguishes between national and supranational rules, quantifies the number of co-existing rules, compares enforcement procedures, outlines possible escape rules, and marks out suspension periods. For this analysis I will only consider the existence of fiscal rules, so as to keep a limited scope.

Even though the concept of Fiscal Sustainability lies at the very heart of FTPL, there is admittedly no clear definition thereof, let alone a direct measure to test for it. Cochrane (2023) explicitly advises not to "look for a marker such as a precise value of debt-to-GDP ratio or sustained primary deficits" to identify long-term Ricardian Equivalence. Instead, FTPL requires indirect approaches by resorting to stand-ins or proxies. As established in the literature review, Central Bank Independence is an institutional provision to enforce fiscal prudence by discarding the option of monetary debt financing. Three more such fiscal commitments will thus be examined besides CBI. First, the average maturity of each country's outstanding sovereign debt, with long repayment schedules allowing the monetary authority to smooth out inflation over a prolonged period. Second, the share of sovereign debt denominated in foreign currency, which FTPL understands as "real" debt that cannot simply be inflated away. Third, returning to the exchange rate regime discarded before as a control variable, fixed currency pegs that further bind monetary policy to a predetermined target. The first two are taken from the World Bank's crosscountry database of fiscal space over the period 1990 to 2023 (Kose et al. 2022), while the third applies the already introduced Ilzetzki, Reinhart, and Rogoff classification (Ilzetzki et al. 2022), with a dummy variable to indicate the existence of a currency peg or board.

Like fiscal rules, however, these additional commitments mainly convey political intentions towards Fiscal Sustainability but are by no means a guarantee. As a final test, I will therefore employ available proxies for Fiscal Sustainability, each with a different approach. The most straightforward, but also least based on FTPL, would be a country's credit rating, corresponding to the perceived probability of default on newly issued government bonds. The World Bank's fiscal dataset accordingly provides an index on "market perception" based on long-term sovereign debt ratings, ranging from 1 to 21. As presented in the literature review, FTPL introduced the concept of Fiscal Dominance to describe a non-Ricardian regime where monetary policy becomes passive to fiscal policy decisions. De Resende (2007) provides "Cross-Country Estimates of the Degree of Fiscal Dominance" on 33 countries between 1970 and 2004, by looking at the proportion of current government debt that is backed by the present discounted value of current and future primary surpluses as opposed to seigniorage. The higher the estimate the higher is Monetary Dominance, with 1 representing perfect Ricardian Equivalence. From a rather different angle, Afonso & Jalles (2017) estimate time-varying coefficients of Fiscal Sustainability for eleven Eurozone countries based on the impulse response function of primary balances on lagged debt-to-GDP ratios.

Figure 6 depicts the three different approaches to quantify Fiscal Sustainability for all countries on which either De Resende (2007) or Afonso & Jalles (2017) provide data.

To account for the different scales among these estimates, all three have been normalised to an index between 0 and 1. Hence, even though some countries experience Monetary Dominance above 1, meaning that the discounted value of current and future primary surpluses exceeds outstanding public debt, the maximum value in the charts below is still 1. Given their different timespans, moreover, Monetary Dominance (red) and Budget Response (green) can each only be compared directly to Sovereign Credit Rating (blue), by far the largest dataset which also includes many additional countries. Notably, clear differences in trend and volatility further prove the unprecise definition of the very concept of Fiscal Sustainability.



Normalised Sustainability Indicators

FIGURE 6: Comparison of different estimates on Fiscal Sustainability

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In summary, table I presents the panel data deployed in the subsequent OLS regressions for 190 countries between 1970 and 2020.

Statistic	N*	Mean	St. Dev.	Min	Max
Sub-Samples					
Advanced Economies	7,911	0.217	0.412	0	1
Emerging Economies	7,911	0.469	0.499	0	1
Developing Economies	7,911	0.292	0.455	0	1
Eurozone	7,911	0.112	0.316	0	1
CBI Measures					
CBIE	6,515	0.556	0.176	0.098	0.929
cbie board	6,515	0.487	0.192	0.000	0.940
cbie policy	6,515	0.491	0.205	0.000	0.800
cbie obj	6,515	0.507	0.342	0.000	1.000
cbie lending	6.515	0.513	0.312	0.000	1.000
cbie finindep	6,515	0.663	0.168	0.000	1.000
cbie report	6,515	0.675	0.219	0.000	1.000
CBI const	6,515	0.381	0.486	0	1
GMT (Romelli)	6.515	0.470	0.226	0.062	1.000
CWN (Romelli)	6.515	0.536	0.228	0.055	0.979
CWN (Garriga)	6,279	0.460	0.197	0.006	0.979
Inflation Measures	-,				
CPI (IMF)	3,761	13 610	89.520	-16 860	2,947,733
CPI (WB)	7,598	45,939	882.101	-72.729	65,374,080
CPI	7.565	14.830	52.229	-72.729	992.389
$\mathbf{D} = \pi/(1+\pi)$	7.358	0.679	1.471	-62.696	0.999
Control Variables	. ,				
Democracy (Polity IV)	6 537	2 047	7 182	-10	10
Capital Account Openness (Chinn-Ito)	7 046	0.462	0.363	0.000	1 000
GDPnC	7,040	8 724 223	14 925 960	20.655	123 678 700
Trade as % of GDP	6 538	76 551	48 160	0.021	437 327
Fiscal Indicators	0,550	70.551	40.100	0.021	-57.527
	(247	40.202	11 (05	0.002	(77.190
Debt as % of GDP	0,347 5,010	49.595	44.005	0.002	077.180
$\%$ - Δ Debt to 10 yr av.	5,010	-8/.128	0.484	-99.775	1/4./08
Debt > Giudai Av.	6 2 4 7	0.373	0.464	0	1
Debt > Country Av.	0,347 5.051	0.434	0.498	540.840	1
Primary Budget	5,051	-0.344	13.245	-549.840	43.554
Final Pala	4,482	0.609	0.488	0	1
Fiscal Rules	3,440	0.550	0.498	0	1
	3,440	0.198	0.399	0	1
Revenue Ruie	3,440	0.088	0.284	0	1
Duget Kule	3,440 2,440	0.483	0.500	0	1
Debt Rule	3,440	0.419	0.493	0 210	1
Av. Maturity	/1/	0.093	2.901	0.310	20.000
Currency Peg (Keinnart)	2,878	0./8/	0.409	0	I 100.000
Foreign Debt Share	2 102	/8.451	20.391	1.005	100.000
Monotory Dominance (Do Boosy de)	3,102	12.808	5.178	1.000	21.000
Monetary Dominance (De Kesende)	940 510	0.894	0.312	0.000	1.51/
Budget Kesponse (Afonso)	513	0.138	0.129	-0.146	0.540

TABLE I: Panel Dataset

Note:

*number of observations

3.2 Results

Before analysing whether unsustainable fiscal policy can indeed undermine monetary policy, it is crucial to first demonstrate the importance of Central Bank Independence for price stability in general. Table II shows OLS regressions on log inflation with country and year fixed effects for the different CBI measures introduced above: from Romelli (2022) (1) the extended estimate; (2) the GMT measure; as well as the weighted CWN measure by both (3) Romelli (2022) and (4) Garriga (2016). Although the estimates vary from about -1 to -1.5, all four are statistically significant alongside the control variables, suggesting that, on average, legal CBI contributes positively to low inflation. Table X in the appendices further shows that this is also true for the three employed sub-samples, though with a wider deviation from only -0.65 for advanced economies to a much higher -2.16 for emerging economies.

		Dependen	t variable:	
		log(CPI)	
	(1)	(2)	(3)	(4)
CBIE	-1.493*** (0.130)			
GMT		-1.191^{***} (0.112)		
CWN (Romelli)			-1.031*** (0.100)	
CWN (Garriga)				-0.982*** (0.113)
Democracy (Polity IV)	-0.007* (0.004)	-0.009** (0.004)	-0.007* (0.004)	-0.009** (0.004)
Capital Account Openness	-0.853*** (0.067)	-0.874*** (0.067)	-0.884*** (0.067)	-0.916^{***} (0.068)
log(GDPpC)	-0.356*** (0.024)	-0.374*** (0.023)	-0.371*** (0.024)	-0.299*** (0.025)
Trade as % of GDP	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.007*** (0.001)
Observations R ² Adjusted R ² F Statistic	4,457 0.257 0.234 298.840***	4,457 0.254 0.231 293.821*** (df = 5: 4224)	4,457 0.253 0.230 292.312*** (df = 5: 4224)	4,180 0.197 0.167 197.851***

TABLE II: Comparison of CBI Measures

Having such a strong testament in favour of monetary policy independence, I can now proceed to investigate the actual aim of this thesis by introducing fiscal data to my base regression. As discussed in the preceding section, I will settle on CBIE as the most reliable measure going forward.

Table III looks at public debt from four different angles, whereby CBIE remains statistically significant with a fairly unchanged and stable estimate of about -1.5. However, against all intuition and theory, the logarithmized debt-to-GDP ratio is found to be of positive impact on price stability, implying that higher public debt would in fact correlate with lower inflation. Similarly, countries that reach a higher debt-to-GDP ratio than their respective historical average seem to experience lower inflation than those with belowaverage ratios. The annual deviation from the preceding 10-year average, as well as the dummy variable for countries with debt-to-GDP above the global average are instead not statistically significant.

		Dependen	t variable:	
		log(CPI)	
	(1)	(2)	(3)	(4)
CBIE	-1.514*** (0.136)	-1.438*** (0.149)	-1.577*** (0.135)	-1.532*** (0.135)
log(Debt as % of GDP)	-0.087*** (0.024)			
%- Δ Debt to 10 yr av.		-0.0003 (0.001)		
Debt > Global Av.			0.060 (0.037)	
Debt > Country Av.				-0.097*** (0.029)
Democracy (Polity IV)	-0.003 (0.004)	-0.001 (0.005)	-0.004 (0.004)	-0.004 (0.004)
Capital Account Openness	-0.846*** (0.072)	-0.839*** (0.081)	-0.870*** (0.072)	-0.848*** (0.072)
log(GDPpC)	-0.362*** (0.026)	-0.467*** (0.034)	-0.356*** (0.026)	-0.364*** (0.026)
Trade as % of GDP	0.003*** (0.001)	0.003** (0.001)	0.003*** (0.001)	0.003*** (0.001)
Observations R ² Adjusted R ² F Statistic	3,878 0.268 0.245 229.335*** (df = 6; 3757)	3,196 0.247 0.217 167.912*** (df = 6; 3075)	3,878 0.266 0.243 226.890*** (df = 6; 3757)	3,878 0.268 0.244 228.909*** (df = 6; 3757)
Note:			*p<0.1; **p<	0.05; ***p<0.01

TABLE III: Public Debt

Note:

These counter-intuitive results may however be explained by factors not sufficiently captured by the control variables. For a country to be able to issue very high amounts of debt, macroeconomic stability is a prerequisite rather than a result. Furthermore, the average debt-to-GDP ratio since 1970 may be misleading, given that the period between the Global Financial Crisis in 2008 and the Global Pandemic in 2020 was marked by ever increasing public debt and yet stubbornly low inflation.

Overall, it seems evident that a simple measure of public debt might not be the best indicator for Fiscal Sustainability. Heterogeneity among countries in my large sample may be beyond the chosen control variables. Yet, within a currency union one may assume similar enough economies to indeed apply the same methodology. Table IV therefore only surverys Eurozone countries, which again reveals a positive impact of CBIE on price stability in general. However, when dividing into member states that fulfil the so-called Maastricht criteria and those that do not, the latter sub-sample no longer exhibits statistical significance for CBIE. This seems to support my hypothesis that Central Bank Independence only counts if fiscal policy is also sustainable. Moreover, when separating the two criteria, CBIE only loses some significance for countries of debt levels above 60% of GDP with a much-depressed estimate of a rounded –0.8.

		D	ependent variable	:	
			log(CPI)		
	(1)	(2)	(3)	(4)	(5)
	EZ Total	Fulfilled	Not Fulfilled	Debt>60%	PB<-3%
CBIE	-0.867***	-1.753***	-0.548	-0.781*	-1.839***
	(0.253)	(0.405)	(0.388)	(0.442)	(0.646)
Democracy (Polity IV)	0.036***	0.051***	0.017	-0.438^{***}	0.032*
	(0.012)	(0.014)	(0.023)	(0.154)	(0.017)
Capital Account Openness	-1.161***	-0.778**	-1.252***	-0.532	-1.816***
	(0.203)	(0.334)	(0.367)	(0.454)	(0.429)
log(GDPpC)	-0.207***	-0.255***	-0.204	-0.423*	0.118
	(0.072)	(0.094)	(0.168)	(0.241)	(0.173)
Trade as % of GDP	-0.007***	0.005	-0.015***	-0.017***	-0.002
	(0.002)	(0.004)	(0.004)	(0.005)	(0.005)
Observations	658	312	241	182	103
R ²	0.467	0.438	0.572	0.480	0.690
Adjusted R ²	0.448	0.401	0.538	0.436	0.614
F Statistic	111.057***	45.446***	59.445***	30.804***	36.494***
	(df = 5; 635)	(df = 5; 292)	(df = 5; 222)	(df = 5; 167)	(df = 5; 82)

TABLE IV: Maastricht Criteria (Eurozone)

Note:

*p<0.1; **p<0.05; ***p<0.01

Nevertheless, it should be noted that the Eurozone might not be the best case study to examine CBI from the perspective of FTPL. Despite slightly diverging estimates of Central Bank Independence from Romelli (2022), there is still only one shared central bank conducting monetary policy for all member states at once. Differences in national inflation levels should not arise from incoherent fiscal policies between national governments,

as FTPL understands a monetary union also as a fiscal union where only the aggregate primary budget balance matters. Hence, even if individual countries proved fiscally unsustainable on a stand-alone basis, there would be no change in the overall price level as long as the combined budget is balanced through other countries' surpluses. Fiscal inflation should always affect the entire currency union equally, which can then be confronted with a joint monetary policy reaction. For more reliable results, I will thus return to my overall sample of countries with full sovereignty on both fiscal and monetary policy.

While the Maastricht criteria cannot easily be employed to countries outside the Eurozone, it is still possible to test for the importance of fiscal policy rules in general. Table V introduces dummy variables for the existence of legally binding fiscal rules similar to the Maastricht criteria, but now for the entire sample.

			Dependen	t variable:		
			log(CPI)		
	(1)	(2)	(3)	(4)	(5)	(6)
CBIE	-0.841*** (0.163)	-0.918*** (0.157)	-0.956*** (0.160)	-0.862*** (0.163)	-0.948*** (0.166)	-0.936*** (0.164)
Fiscal Policy Rules	-0.188*** (0.056)					
Expenditure Rule		-0.490*** (0.062)				-0.478*** (0.063)
Revenue Rule			-0.064 (0.092)			0.009 (0.097)
Budget Rule				-0.152*** (0.057)		-0.171** (0.076)
Debt Rule					-0.023 (0.060)	0.162** (0.080)
Democracy (Polity IV)	0.003 (0.007)	-0.002 (0.007)	0.002 (0.007)	0.003 (0.007)	0.001 (0.007)	-0.002 (0.007)
Capital Account Openness	-1.023*** (0.100)	-1.015*** (0.098)	-1.090*** (0.099)	-1.035*** (0.100)	-1.080*** (0.099)	-0.978^{***} (0.100)
log(GDPpC)	-0.364*** (0.044)	-0.356*** (0.040)	-0.424*** (0.040)	-0.385*** (0.042)	-0.423*** (0.042)	-0.350*** (0.043)
Trade as % of GDP	0.002* (0.001)	0.004*** (0.001)	0.002 (0.001)	0.002* (0.001)	0.002 (0.001)	0.004*** (0.001)
Observations R ² Adjusted R ² F Statistic	2,333 0.236 0.206 115.298***	2,333 0.252 0.223 126.305***	2,333 0.232 0.202 112.951***	2,333 0.234 0.204 114.416***	2,333 0.232 0.202 112.878***	2,333 0.254 0.224 84.932***

TABLE V: Fiscal Policy Rules

Note:

*p<0.1; **p<0.05; ***p<0.01

Although the existence of fiscal policy rules overall is indeed found to be dis-inflationary, this only applies to expenditure and budget rules in particular. By contrast, when all four available policy rule types are tested in combination, debt rules too become statistically significant, yet surprisingly with the opposite effect. However, as the above exercise on the Maastricht criteria shows, the existence of fiscal policy rules does not guarantee their fulfilment. It could therefore simply be the case that debt rules are more likely to either be deliberately ignored or unintentionally missed, which then leads to higher inflation as a consequence. Most importantly for this thesis, CBIE remains statistically significant no matter the policy rule. Crucially however, the estimates are now much lower at only around –0.9, suggesting a weaker impact of CBI on price stability when fiscal rules are in place.

After testing for simple fiscal indicators such as public debt and fiscal policy rules, I will now approach my research question more explicitly from the perspective of FTPL. Following Cochrane (2023), who regards Central Bank Independence primarily as one of several fiscal commitments, table VI further includes the remaining ones.

		Dependent variable:	
		log(CPI)	
	(1)	(2)	(3)
CBIE	-4.649*	-2.066***	-1.995***
	(2.805)	(0.631)	(0.214)
Av. Debt Maturity	-0.039		
	(0.032)		
Share of Real Debt		-0.002	
		(0.006)	
Currency Peg			0.025
			(0.052)
Democracy (Polity IV)	0.002	0.012	0.002
	(0.034)	(0.021)	(0.006)
Capital Account Openness	0.225	-0.398	-0.687***
	(0.541)	(0.272)	(0.108)
log(GDPpC)	-0.470	-0.335***	-0.319***
	(0.355)	(0.114)	(0.042)
Trade as % of GDP	0.010*	0.008**	0.002*
	(0.006)	(0.003)	(0.001)
Observations	479	445	1,753
\mathbb{R}^2	0.028	0.079	0.253
Adjusted R ²	-0.186	-0.027	0.227
F Statistic	1.849* (df = 6; 392)	5.695*** (df = 6; 398)	95.632*** (df = 6; 1694)

TABLE VI: Fiscal Commitments

Neither (1) the average maturity of outstanding sovereign debt; nor (2) the percentage of "real" debt denominated in foreign currency; or (3) a dummy for when the exchange rate is fixed to a reference currency show statistical significance. However, the estimate for CBIE increases substantially to about -2 when accounting for real debt or a currency peg, while even to -4.6 in case of the maturity structure. Yet, the latter loses most of its statistical significance, thereby eroding its meaningfulness. Due to a lack of overlapping data it was not possible to test for all four fiscal commitments combined.

Whereas no other fiscal commitment could be identified as pivotal for inflation control, Central Bank Independence still remains on strong footing. My final attempt to challenge the importance of an autonomous monetary policy, see table VII, at last incorporates actual estimates of Fiscal Sustainability. However, it is important to emphasize once more that there is no simple and universally acknowledged measure for this rather vague concept but instead only somewhat restricted approximations.

	D	ependent variable	:
		log(CPI)	
	(1)	(2)	(3)
CBIE	-0.999***	-1.662***	-6.177**
	(0.191)	(0.433)	(2.412)
Sovereign Credit Rating	0.053***		
0 0	(0.012)		
Monetary Dominance		-1.079^{**}	
, , , , , , , , , , , , , , , , , , ,		(0.441)	
Budget Response			-0.387
			(1.195)
Democracy (Polity IV)	0.013	0.002	-0.167
	(0.010)	(0.013)	(0.186)
Capital Account Openness	-1.129***	-1.286***	0.219
	(0.112)	(0.161)	(0.530)
log(GDPpC)	-0.367***	-0.289***	0.613***
	(0.042)	(0.058)	(0.230)
Trade as % of GDP	0.001	0.008**	-0.023***
	(0.001)	(0.004)	(0.004)
Observations	2,160	652	376
\mathbb{R}^2	0.155	0.293	0.123
Adjusted R ²	0.108	0.258	0.047
F Statistic	62.326***	42.887***	8.073***
	(df = 6; 2046)	(df = 6; 620)	(df = 6; 345)
Note		*p<0.1: **p<0	05: ***p<0.01

TABLE VII: Fiscal Sustainability Indicators

The most straightforward of which, a country's sovereign credit rating, is indeed found to be of high statistical significance. Yet again, the evidently positive correlation with inflation is diametrically opposed to expectations, insinuating that increased perceived creditworthiness corresponds with higher inflation. By contrast, the estimated primary budget response to lagged debt-to-GDP does not reveal any statistical significance itself, but skews the estimate for CBIE to an immense –6. One important caveat to note is that this estimate is only available for Eurozone countries and therefore faces the same restrictions as the exercise on the Maastricht criteria. Table XI in the appendices shows that statistically significant negative effects for both can be found when additionally control-ling for a currency peg, debt maturity and the share of real debt.

Lastly, the estimate for the degree of Monetary Dominance, i.e. the inverse of Fiscal Dominance, is found to be statistically significant with a negative impact on inflation. This result indeed strongly supports the Fiscal Theory of the Price Level, with the share of public debt backed by current and future budget surpluses having, on average and all else equal, a dis-inflationary effect. Contrary to my hypothesis however, CBIE remains of high significance with even a stronger impact of almost -1.7. For my sample, Central Bank Independence is found to be crucial for price stability under almost all circumstances.

3.3 Robustness Checks

By using different approaches, my empirical analysis has yielded some decent results in support of the Fiscal Theory of the Price Level. Particularly for the dis-inflationary effects of Monetary Dominance and fiscal policy rules in addition but not as a replacement for Central Bank Independence. To further scrutinize these findings I will close my thesis with some robustness checks, by employing different sub-samples or alternative measures for CBI and inflation.

First, table VIII separates advanced from non-advanced economies, whereas the latter combines both emerging and developing countries. A further sub-division is not possible as De Resende (2007) does not provide estimates on Monetary Dominance for enough developing economies. Notably, Monetary Dominance is only confirmed to be of positive impact on price stability for advanced economies, while non-advanced economies for this sample even miss statistical significance for CBIE. The explanation might be found, however, in the much reduced sample size for the available data on Monetary Dominance, not only in the number of countries but also the decreased timespan. By contrast, the much larger dataset on fiscal policy rules allows for an extended sample size and high significance for CBIE and the existence of fiscal policy rules. Advanced economies of both CBIE and the existence of CBIE. This would indeed confirm intuition, that formal commitments are less required for countries

where institutions are already believed to be strong counterweighs to political pandering, in this case a possible inflation bias.

		Dependen	t variable:	
		log(CPI)	
	(1)	(2)	(3)	(4)
	Advanced	Non-Advanced	Advanced	Non-Advanced
CBIE	-1.643***	0.543	-0.491*	-1.385***
	(0.478)	(0.968)	(0.270)	(0.226)
Monetary Dominance	-2.008*** (0.702)	-0.789 (0.597)		
Fiscal Rules			0.033 (0.096)	-0.300*** (0.069)
Democracy (Polity IV)	0.031**	-0.103***	0.004	0.011
	(0.016)	(0.024)	(0.030)	(0.008)
Capital Account Openness (Chinn-Ito)	-0.900***	-1.632***	-0.951***	-1.209***
	(0.208)	(0.251)	(0.221)	(0.118)
log(GDPpC)	-0.359***	-0.045	-0.306***	-0.305***
	(0.074)	(0.109)	(0.086)	(0.053)
Trade as % of GDP	-0.009	0.015***	-0.005**	0.004***
	(0.006)	(0.005)	(0.002)	(0.002)
Observations	393	259	856	1,477
R ²	0.401	0.251	0.205	0.267
Adjusted R ²	0.369	0.201	0.171	0.237
F Statistic	41.557***	13.505^{***}	35.251^{***}	86.163***
	(df = 6; 372)	(df = 6; 242)	(df = 6; 820)	(df = 6; 1418)

TABLE VIII: Sub-Samples

Note:

*p<0.1; **p<0.05; ***p<0.01

Next, log CPI is being replaced by the modified inflation measure suggested by Cukierman et al. (1992), thereby also allowing for deflation to be taken into account. Table IX largely replicates the previous findings, though notably with different estimates due to the modified response variable. However, not only is the significance level decreased for all relevant estimates, but indeed even lost altogether for CBIE in advanced, and fiscal policy rules in the non-advanced economies samples. Perhaps deflation is more of a factor than initially assumed for this analysis.

Returning to the base measure of log inflation and the total sample size, table XII in the appendices compares the alternative CBI measures discussed above and ultimately dismissed in favour of CBIE. Still, the original Grilli, Masciandaro & Tabellini as well as the Cukierman, Webb & Neyapti indices, both supplied by Romelli (2022), confirm statistical significance besides Monetary Dominance. On the other hand, the CWN estimate by Garriga (2016) and the dummy variable for CBI under constitutional law are instead irrelevant, while still highlighting the importance of Monetary Dominance.

		Dependen	t variable:	
		$D = \pi$	/(1+π)	
	(1)	(2)	(3)	(4)
	Advanced	Non-Advanced	Advanced	Non-Advanced
CBIE	-0.308**	0.072	-0.264	-0.744**
	(0.143)	(0.300)	(0.297)	(0.337)
Monetary Dominance	-0.414^{**}	-0.178		
,	(0.210)	(0.185)		
Fiscal Rules			0.086	0.055
			(0.105)	(0.103)
Democracy (Polity IV)	0.007	-0.015**	-0.004	0.021*
	(0.005)	(0.007)	(0.033)	(0.011)
Capital Account Openness (Chinn-Ito)	-0.154**	-0.085	-0.264	-0.237
	(0.062)	(0.078)	(0.242)	(0.178)
log(GDPpC)	-0.052**	-0.043	-0.170^{*}	-0.087
	(0.022)	(0.034)	(0.093)	(0.079)
Trade as % of GDP	-0.003	0.004**	-0.003	-0.001
	(0.002)	(0.001)	(0.002)	(0.002)
Observations	396	260	912	1,531
\mathbb{R}^2	0.183	0.057	0.031	0.010
Adjusted R ²	0.139	-0.005	-0.007	-0.029
F Statistic	13.970***	2.467**	4.729***	2.414**
	(df = 6; 375)	(df = 6; 243)	(df = 6; 876)	(df = 6; 1472)

TABLE IX: Modified Inflation

Note:

*p<0.1; **p<0.05; ***p<0.01

Since the CBIE index by Romelli (2022) is comprised of different supplementary components, I can also test for each individually. Table XIII in the appendices finds disinflationary effects for the independence of (1) central bank board members; (2) the policy formulation process; (3) monetary policy objectives; as well as (4) limits to directly financing the government; and (6) reporting requirements. Surprisingly however, (5) financial independence is found to be inflationary, at least on a stand-alone basis. Monetary Dominance maintains its dis-inflationary significance throughout.

Lastly, I control for possible regional biases within my worldwide sample, by following Garriga & Rodriguez (2020) to exclude each geographic region one-by-one. Table XIV in the appendices shows that both CBIE and Monetary Dominance lose statistical significance once *Europe & Central Asia* is disregarded. As this is not the case for any other region, my findings may not necessarily apply to all countries. Crucially however, estimates on Monetary Dominance are only available for a modest list of 33 advanced and emerging economies. Thus, regions with more developing economies are rather underrepresented, most notably Sub-Saharan Africa. For a more comprehensive analysis, estimates on Monetary Dominance would be necessary for a much larger sample size.

4 CONCLUDING REMARKS

In this thesis I have examined Central Bank Independence from the viewpoint of the Fiscal Theory of the Price Level, which emphasizes the necessary interplay between monetary and fiscal policies to jointly maintain price stability. An independent central bank is thereby not the ultimate cure to inflation, but rather just one of several fiscal commitments to signal long-term fiscal prudence. When monetary policy is outsourced to a technocratic institution, unsustainable fiscal policy not only has inevitable inflationary consequences, but may in fact also cause a recession by provoking unnecessarily high interest rates. A central bank exclusively bound to an inflation target cannot take political considerations into account, which in turn pushes the responsibility back to the treasury for a fiscal course correction. On the other hand, common belief that inflation is solely a monetary phenomenon may ultimately turn public perception against the central bank's independence. Recent events suggest this might already be taking place.

After a condensed introduction to the theory, I have conducted an empirical analysis on the importance of Central Bank Independence for low inflation, while also controlling for factors of institutional strength. My hypothesis that the autonomy of monetary policy is only crucial for price stability if indeed not undermined by unsustainable fiscal policy is based on the Fiscal Theory of the Price Level as presented by John Cochrane. Given that the very concept of Fiscal Sustainability lacks any precise definition, I attempted different approaches to establish a broadest possible view. While simple measures of public debt did not appear to provide a sound enough proxy, the existence of fiscal policy rules revealed a dis-inflationary effect. For the Eurozone alone, Central Bank Independence was only found to be of statistical significance for countries that fulfil the explicit Maastricht criteria. However, this is in fact my only result wholly in favour of my hypothesis, albeit with a sizeable caveat given the homogeneous nature of currency unions. By contrast, throughout all other examinations, Central Bank Independence consistently proved to be important for price stability, no matter the fiscal dimension. Yet, the estimate varied quite significantly in size, ranging mostly from -0.8 to -2.

When introducing actual approximations for Fiscal Sustainability, an estimate for Monetary Dominance rendered the most robust results. Even when using different measures for Central Bank Independence or inflation, the share of public debt backed by current and future discounted budget surpluses maintained its positive effect on price stability. This is the clearest evidence I found in support of the Fiscal Theory of the Price Level, even though it does not replace Central Bank Independence as a critical factor.

4 CONCLUDING REMARKS

My findings considerably demonstrate the mutual importance of solid monetary and fiscal policies. While no ideal approach to empirically test my hypothesis could be found, I still believe to have contributed with new insights into the relevance of Central Bank Independence. This was of course only a limited examination, which longs to be extended into many directions. The World Bank's dataset on fiscal rules would warrant much more detailed research, looking in-depth into different rule types, enforcement procedures and suspension periods. Likewise, public debt may offer more conclusive results when analysed as time-series with lags on a country-specific basis. Perhaps most intriguing, the very limited estimates on Monetary Dominance and Budget Response could be enlarged to a much broader country sample and for a longer period. My results proved most robust when employing my full sample size of 190 countries over five decades.

Finally, this thesis also invites for further theoretical as well as practical considerations. Much evidence has been found on how monetary policy also relies on fiscal policy to succeed in its goal of price stability. Rather than surrender to unsustainable government spending and return central banks to political subjugation, one can also conclude the opposite way and explore possibilities to institute a more technocratic fiscal policy. Legal limits to primary budget deficits and public debt are already a first step, but as the examples of Brazil and the Eurozone show, they severely lack enforceability. Independent oversight institutions such as the United Kingdom's *Office for Budget Responsibility* increase transparency and public scrutiny, but again have no legal power of sanction. In any case, in times of soaring public debt, an aging population and ever more rapid financial innovation, a rethinking of our current policy framework is essential.

Cochrane accordingly suggests a whole range of institutional adjustments to improve and strengthen coordination between monetary and fiscal policy. Inflation targets are a political agreement whereby the central bank only focuses on price stability, while the treasury promises to pay off debt at the agreed inflation rate. So far, only the monetary commitment is written in law, whereas the fiscal commitment is merely implicit. A more dynamic fiscal rule, specifying when and how fiscal policy shall react to inflation, may signal a much stronger commitment to foster credibility. Alternatively, a more drastic proposal of his is to swap the inflation target for a spread target between nominal and real debt, thus targeting expected inflation directly. The central bank could implement such by offering to trade nominal for real debt at any maturity, thereby directly anchoring long-run inflation expectations. Both the nominal and real interest rate would then no longer be determined by the central bank but instead through market forces. By liberating the most important real price in the economy, the Fiscal Theory of the Price Level can offer a monetary framework that is more free-market in the spirit of the Chicago School of Economics than original Monetarism.

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APPENDICES

CWN Index

Variable number	Description of variable	Weight	Numerical coding
1	Chief executive officer (CEO)	0.20	
	a. Term of office		
	Over 8 years		1.00
	6 to 8 years		0.75
	5 years		0.50
	4 years		0.25
	Under 4 years or at the discretion of appointer		0.00
	b. Who appoints CEO?		
	Board of central bank		1.00
	A council of the central bank board, executive		1100
	branch and legislative branch		0.75
	Legislature		0.50
	Executive collectively (e.g. council of ministers)		0.25
	One on two members of the evecutive branch		0.25
	Dismissal		0.00
	C. Dismissai		1.00
	No provision for dismissal		1.00
	Only for reasons not related to policy		0.83
	At the discretion of central bank board		0.67
	At legislature's discretion		0.50
	Unconditional dismissal possible by legislature		0.33
	At executive's discretion		0.17
	Unconditional dismissal possible by executive		0.00
	d. May CEO hold other offices in government?		1.12121
	No		1.00
	Only with permission of the executive branch		0.50
	No rule against CEO holding another office		0.00
2	Policy formulation	0.15	
2	Whe formulation	0.15	
	a. who formulates monetary policy:		1.00
	Dank alone		1.00
	Bank participates, but has little influence		0.67
	Bank only advises government		0.33
	Bank has no say		0.00
	b. Who has final word in resolution of conflict? ^a		
	The bank, on issues clearly defined in the law as		
	its objectives		1.00
	Government, on policy issues not clearly defined		
	as the bank's goals or in case of conflict		a - 1223
	within the bank	1 5	0.80
	A council of the central bank, executive branch,		
	and legislative branch		0.60
	The legislature, on policy issues		0.40
	The executive branch on policy issues, subject to		
	due process and possible protest by the bank		0.20
	The executive branch has unconditional priority		0.00
	c. Role in the government's budgetary process		
	Central bank active		1.00
	Central bank has no influence		0.00
0.			
3	Objectives	0.15	
	Price stability is the major or only objective in		
	the charter, and the central bank has the final		
	word in case of conflict with other government		
	objectives		1.00
	Price stability is the only objective		0.80
	Price stability is one goal, with other compatible		
	objectives, such as a stable banking system		0.60
	Price stability is one goal, with potentially conflict-		5100
	ing objectives, such as full employment		0.40
			v. IV

FIGURE 7: Criteria employed by Cukierman et al. (1992), part I

Variable number	Description of variable	Weight	Numerical coding
	No objectives stated in the bank charter		0.20
	Stated objectives do not include price stability		0.00
4	Limitations on lending to the government		
	 Advances (limitation on nonsecuritized lending) 	0.15	
	No advances permitted		1.00
	Advances permitted, but with strict limits (e.g.,		
	up to 15 percent of government revenue)		0.67
	Advances permitted, and the limits are loose		
	(e.g., over 15 percent of government revenue)		0.33
	No legal limits on lending		0.00
	b. Securitized lending	0.10	
	Not permitted		1.00
	Permitted, but with strict limits (e.g., up to 15		
	percent of government revenue)		0.67
	Permitted, and the limits are loose (e.g., over 15		
	percent of government revenue)		0.33
	No legal limits on lending	0.10	0.00
	c. lerms of lending (maturity, interest, amount)	0.10	1.00
	Controlled by the bank		1.00
	Specified by the bank charter		0.6/
	Agreed between the central bank and executive		0.33
	Decided by the executive branch alone	0.05	0.00
	a. Potential borrowers from the bank	0.05	1.00
	All louds of management (and a sector)		1.00
	The second state as well as central)		0.07
	Those mentioned above and public enterprises		0.33
	Public and private sector	0.025	0.00
	Currency amounts	0.025	1.00
	Shares of central bank demand liabilities or capital		0.67
	Shares of government revenue		0.33
	Shares of government expenditures		0.00
	f Maturity of loans	0.025	0.00
	Within 6 months	0.025	1.00
	Within 1 year	20	0.67
	More than 1 year		0.33
	No mention of maturity in the law		0.00
	g. Interest rates on loans must be	0.025	0.00
	Above minimum rates	0.00	1.00
	At market rates		0.75
	Below maximum rates		0.50
	Interest rate is not mentioned		0.25
	No interest on government borrowing from the		0.00
	central bank		0.00
	n. Central bank prohibited from buying or selling	0.025	
	government securities in the primary market?	0.025	1 00
	Ies		1.00
(and	NO		0.00

Note: The ranking under each criteria indicates the degree of independence of central banks—the higher the code, the more independent the central bank. a. Often the law does not contain a separate provision on the resolution of conflict. In those cases, the variable was coded on the basis of the impression from reading the law in its entirety. If the law gives the impression that the government formulates policy guidelines that the bank simply follows, then the ranking is low.

Source: Various central bank laws, Aufricht (1961, 1967); Bank for International Settlements (1963); Effros (1982); and the IMF's computerized files on central bank laws.

FIGURE 8: Criteria employed by Cukierman et al. (1992), part II

CBI Extended Index

Criteria	GMT	CWN	CBIE
Governor and central bank board			
Who appoints the governor	*	*	*
Term of office of the governor	*	*	*
Reappointment option for the governor			*
Dismissal of governor		*	*
Governor allowed to hold another office in government		*	*
Qualification requirements for governor			*
Who appoints the board members	*		*
Term of office of board members	*		*
Reappointment option for board members			*
Dismissal of board members			*
Board members allowed to hold another office in government			*
Qualification requirements for board members			*
Staggering term of office for board members			*
Government representatives in the board	*		*
Monetary policy and conflicts resolution			
Who formulates monetary policy	*	*	*
Central bank responsible to fix key policy rates	*		*
Banking sector supervision	*		*
Central bank role in government's budget and/or debt	*		*
Final authority in monetary policy	*	*	*
Objectives			
Central bank's statutory goals	*	*	*
Limitations on lending to the government			
Direct credit: not automatic	*	*	*
Direct credit: market for lending		*	*
Who decides financing conditions to government		*	*
Beneficiaries of central bank lending		*	*
Direct credit: type of limit	*	*	*
Direct credit: maturity of loans	*	*	*
Direct credit: interest rates	*	*	*
Prohibition from buying government securities in primary market	*	*	*
Financial independence			
Payment of the initial capital of the central bank			*
Authorized capital of the central bank			*
Central bank financial autonomy			*
Arrangements for automatic recapitalization			*
Transfers of money from the treasury			*
Central bank approves its annual budget			*
Central bank adopt its annual balance sheet			*
Auditing agency			*
Allocation of net profits			*
Allocation of profits to a general reserve fund			*
Partial payments of dividends before the end of the fiscal year			*
Unrealized profits included in the calculation of distributable profits			*
Reporting and disclosure			
Central bank reporting			*
Central bank financial statements			*
Sentra Sank marcial statements			

Note: The table summarizes the set of information collected in the GMT, CWN and CBIE indices of CBI.

FIGURE 9: Criteria employed by Romelli (2022), based on Grilli et al. (1991) and Cukierman et al. (1992)

Additional Graphs



FIGURE 10: Development of CBIE of G7 countries, except for Italy and France



FIGURE 11: Boxplots of CBIE for each decade since 1960



FIGURE 12: CBIE variability for IMF sub-samples

Country Samples

Advanced Economies: Andorra, Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, South Korea, Latvia, Lithuania, Luxembourg, Macao, Malta, Netherlands, New Zealand, Norway, Portugal, Puerto Rico, San Marino, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States.

Emerging Economies: Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Azerbaijan, Bahrain, Barbados, Belarus, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei, Bulgaria, Cape Verde, Chile, China, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eswatini, Fiji, Gabon, Georgia, Grenada, Guatemala, Guyana, Hungary, India, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kosovo, Kuwait, Lebanon, Libya, Malaysia, Maldives, Marshall Islands, Mauritius, Mexico, Micronesia, Mongolia, Montenegro, Morocco, Namibia, Nauru, Macedonia, Oman, Pakistan, Palau, Panama, Paraguay, Peru, Philippines, Poland, Qatar, Romania, Russia, Samoa, Saudi Arabia, Serbia, Seychelles, South Africa, Sri Lanka, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Thailand, Bahamas, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Ukraine, United Arab Emirates, Uruguay, Vanuatu, Venezuela, West Bank and Gaza.

Developing Economies: Afghanistan, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Republic of Congo, Ivory Coast, Djibouti, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Haiti, Honduras, Kenya, Kiribati, Kyrgyzstan, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Moldova, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Papua New Guinea, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, South Sudan, Somalia, Sudan, Tajikistan, Tanzania, Timor-Leste, Togo, Uganda, Uzbekistan, Vietnam, Yemen, Zambia, Zimbabwe.

Geographical Regions



FIGURE 13: Source: https://datatopics.worldbank.org/sdgatlas/archive/2017/the-world-by-region.html

Additional Regressions

		Dependent variable:	
		log(CPI)	
	(1)	(2)	(3)
	Advanced	Emerging	Developing
CBIE	-0.651^{***}	-2.163***	-0.897^{***}
	(0.197)	(0.239)	(0.280)
Democracy (Polity IV)	0.043***	-0.008	-0.017^{**}
	(0.010)	(0.006)	(0.007)
Capital Account Openness	-1.004***	-1.037***	-0.242
	(0.144)	(0.090)	(0.166)
log(GDPpC)	-0.447***	-0.233***	-0.568***
	(0.045)	(0.032)	(0.060)
Trade as % of GDP	-0.002	0.005***	0.006***
	(0.002)	(0.001)	(0.002)
Observations	1,193	2,119	1,145
\mathbb{R}^2	0.448	0.223	0.186
Adjusted R ²	0.431	0.199	0.157
F Statistic	187.477*** (df = 5; 1157)	118.060*** (df = 5; 2053)	50.465*** (df = 5; 1104)
Note:		*p<	<0.1; **p<0.05; ***p<0.01

TABLE X: CBIE for Subsamples

		Depende	nt variable:	
		log	(CPI)	
	(1)	(2)	(3)	(4)
CBIE	-4.491	-3.866	-5.930*	-5.369*
	(4.058)	(4.015)	(3.142)	(3.135)
Budget Response		-4.152**		
		(1.837)		
Sovereign Credit Rating				-0.162*
0 0				(0.089)
Currency Peg	0.432***	0.414***		
	(0.156)	(0.154)		
Av. Debt Maturity			0.039	0.038
,			(0.042)	(0.042)
Share of Real Debt			-0.039**	-0.034^{*}
			(0.018)	(0.018)
Democracy (Polity IV)	0.090	0.041	0.020	0.018
• • • •	(0.208)	(0.206)	(0.033)	(0.032)
Capital Account Openness	-0.139	-0.253	0.366	0.949
	(0.689)	(0.681)	(0.585)	(0.664)
log(GDPpC)	0.214	0.176	-1.279***	-0.844
	(0.374)	(0.369)	(0.490)	(0.543)
Trade as % of GDP	-0.0002	0.003	0.009	0.009
	(0.008)	(0.008)	(0.010)	(0.010)
Observations	173	173	207	207
R^2	0.057	0.088	0.079	0.097
Adjusted R ²	-0.053	-0.026	-0.143	-0.128
F Statistic	1.556 (df = 6; 154)	2.099** (df = 7; 153)	2.022* (df = 7; 166)	2.209** (df = 8; 165)
Note:			*p<0.1	; **p<0.05; ***p<0.01

TABLE XI: Some Data Mining

		Depender	nt variable:	
		log((CPI)	
	(1)	(2)	(3)	(4)
GMT	-1.440^{***} (0.342)			
CWN_R		-1.296*** (0.293)		
CWN_G			-0.374 (0.330)	
CBI_const				0.020 (0.252)
Monetary Dominance	-1.147^{***} (0.441)	-1.096** (0.439)	-0.975** (0.410)	-0.899** (0.445)
Democracy (Polity IV)	-0.003 (0.012)	0.005 (0.013)	-0.008 (0.013)	-0.013 (0.012)
Capital Account Openness (Chinn-Ito)	-1.325*** (0.156)	-1.318*** (0.156)	-1.403*** (0.140)	-1.483*** (0.154)
log(GDPpC)	-0.279*** (0.058)	-0.276^{***} (0.058)	-0.311*** (0.055)	-0.284*** (0.059)
Trade as % of GDP	0.008** (0.004)	0.008** (0.004)	0.011*** (0.003)	0.004 (0.003)
Observations R ² Adjusted R ² F Statistic	652 0.297 0.261 43.585*** (df = 6; 620)	652 0.299 0.264 44.018*** (df = 6; 620)	719 0.281 0.244 44.524*** (df = 6; 683)	652 0.277 0.240 39.498*** (df = 6; 620)

TABLE XII: Fiscal Dominance - different CBI measures

Note:

*p<0.1; **p<0.05; ***p<0.01

			Dependen	t variable:		
			log(CPI)		
	(1)	(2)	(3)	(4)	(5)	(6)
cbie_board	-1.622^{***} (0.364)					
cbie_policy		-0.834*** (0.297)				
cbie_obj			-0.499*** (0.192)			
cbie_lending				-0.798^{***} (0.248)		
cbie_finindep					1.182** (0.536)	
cbie_report						-1.992*** (0.473)
Monetary Dominance	-1.020** (0.438)	-0.960** (0.441)	-1.070** (0.446)	-1.027** (0.442)	-0.960** (0.443)	-0.988** (0.438)
Democracy (Polity IV)	0.005 (0.013)	-0.010 (0.012)	-0.002 (0.013)	-0.005 (0.013)	-0.015 (0.012)	-0.002 (0.012)
Capital Account Openness	-1.181^{***} (0.166)	-1.408^{***} (0.155)	-1.366*** (0.160)	-1.386*** (0.156)	-1.512^{***} (0.154)	-1.374*** (0.154)
log(GDPpC)	-0.311*** (0.059)	-0.253*** (0.060)	-0.278*** (0.059)	-0.296^{***} (0.059)	-0.249*** (0.061)	-0.289*** (0.058)
Trade as % of GDP	0.006* (0.003)	0.005 (0.003)	0.007* (0.004)	0.007* (0.004)	0.004 (0.003)	0.007** (0.003)
Observations R^2 Adjusted R^2 F Statistic (df = 6; 620)	652 0.299 0.264 44.059***	652 0.286 0.250 41.313***	652 0.284 0.249 41.046***	652 0.288 0.253 41.887***	652 0.282 0.246 40.614***	652 0.297 0.262 43.586****

TABLE XIII: Fiscal Dominance - CBI components

Note:

*p<0.1; **p<0.05; ***p<0.01

			D	Dependent variable:			
				log(CPI)			
	East Asia	Europe &	Latin America	Middle East &	North	South	Sub-Saharan
	& Pacific	Central Asia	& Carribbean	North Africa	America	Asia	Africa
	(1)	(2)	(3)	(4)	(5)	(9)	(2)
CBIE	-1.294^{***} (0.482)	-1.243 (0.822)	-1.972^{***} (0.417)	-1.576^{***} (0.439)	-1.887^{***} (0.440)	-1.663^{***} (0.438)	-1.708^{***} (0.447)
Monetary Dominance	-1.873^{***} (0.680)	-0.122 (0.608)	-1.469^{***} (0.439)	-0.731 (0.449)	-1.505^{***} (0.445)	-1.076^{**} (0.446)	-1.100^{**} (0.451)
Democracy (Polity IV)	-0.010 (0.017)	-0.024 (0.018)	0.025* (0.013)	0.004 (0.013)	-0.005 (0.013)	0.003 (0.013)	0.004 (0.013)
Capital Account Openness	-1.398^{**} (0.182)	-1.408^{***} (0.209)	-1.052^{***} (0.181)	-1.298^{***} (0.164)	-1.317^{***} (0.162)	-1.273^{***} (0.163)	-1.256^{***} (0.169)
log(GDPpC)	-0.220^{***} (0.068)	-0.226^{***} (0.082)	-0.374^{***} (0.061)	-0.277^{***} (0.060)	-0.248^{***} (0.061)	-0.299^{***} (0.060)	-0.310^{***} (0.061)
Trade as $\%$ of GDP	0.001 (0.005)	0.006 (0.004)	0.010^{***} (0.004)	0.004 (0.004)	0.013^{***} (0.004)	0.008^{**} (0.004)	0.009** (0.004)
Observations D 2	516 0.302	411 0.205	562 0 337	593 0.300	589 0.316	621 0.300	620
Adjusted R ² F Statistic	0.267 35.364***	0.162	0.298	0.264 40.198***	0.281 0.281 43.070***	0.265 0.265 42.224***	0.261 0.261 41.388***
	(df = 6; 490)	(df = 6; 389)	(df = 6; 534)	(df = 6; 563)	(df = 6; 559)	(df = 6; 590)	(df = 6; 589)
Note:						*p<0.1; **p<0.	.05; *** p<0.01

TABLE XIV: Geographic Regions Excluded