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RESEARCH ARTICLE

Populism, Political Pressure and Central Bank (in)Dependence

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Abstract
This article analyses the relationships between inequality, political pressure, populism and central bank independence (CBI). If there is financial inequality across citizens, monetary policies yield distributional consequences. Political pressure on central bank will increase. A populist wave fuelled by large demand for redistribution with no regard to long term consequences may undermine actual CBI.

Keywords Populism · Monetary policy · Central bank Independence · Inequality · Political economics

JEL Classification D72 · D78 · E31 · E52 · E58 · E62 · P16

1 Introduction

Some researchers argue that the rise of populism may negatively affect the consensus in favour of central bank independence (CBI) evident from the late 1980s until the 2007–2008 Great Crisis (Buiter 2014, de Haan et al. 2018, Goodhart and Lastra 2018, Rajan 2017, Rodrik 2018). Empirically it has tested the relationship between one aspect commonly attributed to populism – namely nationalism – and CBI (Agur 2018). Here we explore the relationships between populism and CBI using a framework that links literature covering the effect of populism on economic policies with literature on the need to reconsider CBI in a systematic and novel way.

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The populist movements, given the claim that they protect the people from the elite,which share a demand for short-term protection, appear to be characterized by other two main properties (Guiso et al. 2017; Saint 2018): pander certain demand conditions and disregarding future consequences. The populist policies are both redistributive and myopic, which is a constant in the literature focused on the economic aspects of populism (Sachs 1989, Dornbush and Edwards 1991, Acemoglu et al. 2013, Chersterley and Roberti 2016).

By the time of the Great Crisis, the CBI had become the benchmark for evaluating the effectiveness of monetary institutions. Today, CBI has become again a relevant subject in academia, politics and the media, but in this most recent surge in the topic's popularity, some have noted that the critical voices dominate (Cecchetti 2013, Stiglitz 2013, Ball et al. 2016, Issing 2018, Rodrik 2018, Thiele 2018, Rogoff 2019).

The crucial question is whether the pendulum is going to swing in the other direction. Thus far, comparative analyses have not offered homogenous results (Bodea et al. 2017; de Haan et al. 2018; Masciandaro and Romelli 2018). Our paper wonders if populism can play any role, using the concept of political pressure - as a proxy of a potential demand for reforming the legal CBI, or as an indicator of the actual – as opposed to legal – CBI (Binder 2018b) - and then sheds light on the possible impact in terms of CBI.

The remainder of the paper is organised as follows. Section 2 presents how the economic system works and who are the relevant players: citizens, banks, the government and the central bank. Given a macro shock, Section 3 shows the corresponding optimal monetary policy, which is designed and implemented by a long-sight independent central bank. In Section 4 the political pressure comes in, explaining the role of the citizen inequality and highlighting the special cases of both left-wing and right-wing populism. Section 5 concludes.

2 The Economy

The model mimics an economy in which a systemic banking shock can occur. The policymakers can design a policy involving banking, fiscal and monetary aspects aimed at minimizing the spillovers of a shock into the real sector. The government define the banking and fiscal policies, while an independent central bank sets the monetary policy choices.

The economy consists of a population of citizens, a government, a central bank and a banking system.[1] For the sake of simplicity, we assume that the population size is normalized to one, such that total and per capita amounts are the same for all variables.

The sequence of events is as follows (see Fig. 1). At $t = 0$, banks engage in business with some level of risk (*normal times, NT*). The outcome of these activities determines the extent to which the bank's risk profile - i.e. its capacity to meet its obligations - is safe and sound. Without a bank crisis, the government does not need to issue debt and, consequently, there is no need to introduce distortionary taxation to service such debt.

[1] Alternatively, as in Gertler et al. (2017), we can assume that each household (family) consists of a continuum of members who can be either workers or bankers. Workers supply labour and earn wages for the household, while bankers manage a financially risky business and transfer the relative earnings back to the household. The number of bankers in each household is heterogeneous.

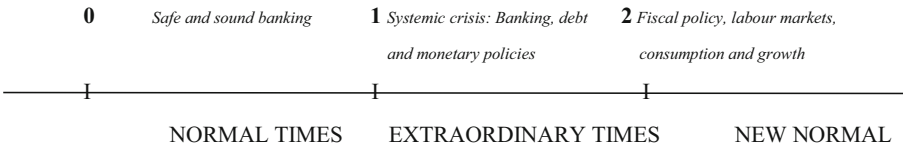

Fig. 1 The Time Horizon: Normal Times, Extraordinary Times and the "New Normal"

At $t = 1$, bank failures that trigger public externalities can occur and, consequently, the government has to design its strategy (*extraordinary times, ET*). The public policy involves two decisions, regarding the banking policy - i.e. the bailout amount – and the fiscal policy - i.e. how to finance such a bailout. The degree of fiscal monetization will depend on the central bank decisions. Given that the government issues public debt for the amount of the bailout and that government bonds can be purchased by either citizens or the central bank, the degree of monetization tell us the amount of public debt that the central bank subscribes.

At $t = 2$, the government introduces an income tax to repay debt and interest. The citizens make decisions about labour, consumption and income given the tax, and the central bank transfers payments for interest received on its bond purchases back to the government (*"new normal" times, NNT*). The equilibrium in the NNT reflects the intertemporal trade-off between minimizing tax distortions and smoothing out banking externalities. Given that the policies trigger heterogeneous effects on the country's citizens, different individuals have different views regarding those policies. This is crucial as long as the citizens' preferences are relevant in the political process. Therefore the final policy is not automatically equal to the socially optimal one.

Our model focuses on heterogeneity among citizens in terms of financial inequality, given that the mix between banking and monetary policies can produce the "three D" effects (Goodhart and Lastra 2018). The distributional effect results from changes in interest rates. The directional effect captures the impact of public policy on a certain sector and/or constituency, such as the banking industry (Brunnermeier and Sannikov 2013). The duration effect measures the monetary policy's effect on overall public-sector liabilities, including the central bank's balance sheet within the public sector. More monetization reduces the duration and is associated with monetary instability. The duration effect can move the spotlight to the fiscal implications of the central bank's balance sheet (Cavallo et al. 2017). The directional effect depends on banking policy choices, while the distributional effect and the duration effect are associated with the corresponding fiscal and monetary policies. Given that the first ring in the overall chain of events is a banking crisis, we start with banking activities.

2.1 Normal Times

For the sake of simplicity, we assume that there is only one bank, i.e. all banks are homogeneous and that the macro banking outcome is simply the sum of micro-level optimizing behaviour.

The systemic consequences of a banking crisis depends on the behaviour of the bank. Banking activity is measured using the variable r, which parameterizes the amount of risk that the bank bears. The bank's profits increase as a function of risk and so does the bank's overall equity value. Let this value be $\pi(r)$, with $\pi'(r) > 0$ and

$\pi''(r) < 0$. We normalize the number of bank shares to one, such that π also represents the market price of the bank shares. Let $(1+\lambda)\pi$ be the total amount of bank liabilities, where $\lambda > 0$ is the liability to capital ratio parametrizing the bank's financial leverage.

A banking crisis occurs if the bank is unable to meet its obligations. In this case the value of the bank's liabilities, $\pi(1+\lambda)$, falls to zero, and the bank's shareholders bear the full cost, π, of the crisis (bail-in). The probability, p, of a bank crisis increases in risk and such relationship is convex: $p'(r) > 0$ and $p''(r) > 0$.

When a crisis occurs, a bailout policy can be designed to injects fresh public capital in a proportion β of the bank's equity value and liabilities, π. Thus, $\beta \in [0, 1]$ is the policy variable that parameterizes a bailout, with $\beta\pi$ representing the bank's equity value after the bailout and $(1-\beta)\pi$ representing the cost for shareholders.

The bank chooses the risk profile, r^*, that maximizes its own expected equity value, while taking both the crisis event and the bailout into account:

$$r^* \in Arg\max_{r} \{\pi(r)(1-p(r)) + \beta^*\pi(r)p(r)\}, \tag{1}$$

where $\beta* = S(\pi)$ is the optimal bailout policy that the government implements. This policy depends on the size of the bailout and ultimately, on the amount of risk π undertaken by the bank. The condition that pins down the optimal level of risk is:

$$\left(\pi'(1-p) - p'\pi\right) + S \cdot \left(\pi' p + p'\pi\right) + S_\pi \cdot \pi'\pi p \leq 0 \tag{2}$$

where strict inequality implies $r* = 0$. The first bracketed term in eq. (2) represents the marginal effect of the risk on the equity value. Without the bailout option only this term will appear in the LHS of eq. (2). The second and third terms represent the moral hazard arising from the bailout policy.

2.2 Extraordinary Times

The second ring in our narrative is the government's behaviour. When a bank fails, the government faces a trade-off: let the bank fail or rescue it by injecting new capital. In the latter case, the government issues public debt for the amount of the bailout. Public bonds can be purchased by either citizens or the central bank. The central bank's purchases represent fiscal monetization.

The government defines the optimal bailout policy, β^*. If a bailout policy is implemented, the government supports both the bank's shareholders and its depositors. Thus $\beta\pi(1+\lambda)$ represents the fresh injected in the bank. It finances the bailout by issuing new debt in ET and charges a linear income tax, τ, for servicing the debt in NNT. The new debt becomes an asset in the portfolios of citizens and the central bank. The overall government budget constraint is:

$$\beta(1+\lambda)\pi(1+i(1-\delta)) = \tau y, \tag{3}$$

where τ is the tax rate, y is the income of the citizens before the taxes, i is the interest paid on the government bond and $\delta \in [0, 1]$ is the share of the debt purchased by the central bank. The term $i(1-\delta)$ represents the per-dollar cost of debt issued. It assumes

that the government does not bear any interest cost of servicing the debt purchased by the central bank. The level of monetization will have both a distributional effect - i.e. the consequences for interest rates - and a duration effect - i.e. monetary instability risk - of the bailout policy.

The interest rate on public bonds is determined according to a no-arbitrage condition with respect to a perfect, long-term, risk-free interest rate, which we normalize to zero. The cost of debt, $i(1-\delta)$, is negatively associated with monetization. When a central bank is less accommodative - i.e. lower δ- a larger portion of the debt will be sold to citizens. The government fully internalizes the consequences of the central bank policy, which in turn shapes the distributional and duration effects of the bailout policy. Therefore, given the monetization, δ, the government can determine its bailout policy, β. The taxation policy is determined residually through the budget constraint (3). Consequently the tax policy, τ, is a function T(.) of δ and β: $\tau = T(\beta, \delta)$.

The government's policy will influence the economy through the behaviour of the citizens, which is the third and final ring in our chain of events.

2.3 New Normal Times

Labor supply depends on government's policies, i.e. the tax rate. Higher taxes will reduce incentive to work and determine distortionary effects of policy. The governement's policies also shape individual's financial portfolios. Disposable income and the value of financial asset determine individuals' consumption possibilities.

Citizens are risk neutral, and they draw utility from consumption and disutility from labour. They use their net labour income and their financial assets to buy consumption goods. We assume heterogeneity in the composition of their portfolios, while labour income is the same for all the individuals. These assumptions enable us to zoom on the consequences of financial inequality.

Starting with labour income, let individual net utility be:

$$l(1-\tau)-U(l). \tag{4}$$

Labour productivity and population size are normalized to one. Then $l(1-\tau)$ is the after-tax (net) labour income. $U(l)$ is an increasing and convex effort function. After observing τ, each citizen chooses how much to work in order to maximize (4). The optimality condition yields the labour-supply function:

$$L(\tau) = U_l^{-1}(1-\tau). \tag{5}$$

$L(\tau)$ is decreasing in the tax rate: $L_\tau < 0$. Labour supply also represents individual and total income because population and productivity are normalized to one: $y = L(\tau)$. By (5) income and labour supply in equilibrium will depend on the tax policy, which is determined by the bailout option thought the government's budget constraint, (3).

The government's decisions influence the value of financial assets held in individuals' portfolios. Four asset types are present: bank shares; bank deposits, which is the only medium of exchange; government bonds; other financial assets.

If the banking policy, β, is implemented in ET, the *average* value of a citizen's portfolio will be influenced. Its composition in NNT will be the following:

$$\beta\pi + \beta\lambda\pi + \beta(1+\lambda)(1-\delta)\pi(1+i) + [w-\beta(1+\lambda)(1-\delta)\pi]. \quad (6)$$

The first term is the value of the bank share, the second term is the value of the bank deposits, the third term is the value of the government bonds inclusive of interest payments, while the fourth term represents the difference between the initial wealth, w, and the value of the purchased bonds. The bailout option influences the average portfolio value through two channels: the value of the bank's liabilities - direction effect- and the interest payments on public bonds - distributional effect.

Disposable income and the portfolio assets finance consumption. Citizens draw utility from consumption, c. The budget constraint of a citizen is then:

$$c = l^*(1-T(\beta,\delta)) + w + \beta(1+\lambda)\pi(1+i(1-\delta) \equiv C(\beta,\delta), \quad (7)$$

where l^* is the optimal labour supply, which depends on the selected tax policy, such that $l* \equiv L(\tau)$.[2]

Finally the crisis triggers financial and monetary externalities. Let the financial externalities be:

$$\frac{\varepsilon}{2}[(1-\beta)(1+\lambda)\pi]^2 \equiv E(\beta). \quad (8)$$

The externalities are increasing and convex in the amount of bank liabilities that evaporate; they depend on the bailout option, β: the smaller the bailout policy is, the lower the direction effect and the greater the externalities.

The bailout option also triggers monetary consequences. We assume that the costs of monetary instability, $I = I(\beta,\delta)$ - the duration effect - are quadratic in the degree of accommodation δ:

$$\frac{\phi}{2}\delta^2\beta(1+\lambda)\pi \equiv I(\beta,\delta). \quad (9)$$

The monetary instability costs include as a particular case the inflation costs, which are usually used to justify the optimality of institutional settings with CBI. Summmig up, an average citizen draws utility from consumption and disutility from labour (cf. eq. (5) and (7)), he/ she bears the cost of financial instability and systemic externalities (eq. (8) and (9)); thus the indirect utility function $V(\beta,\delta)$ is:

$$V(\beta,\delta) = C(\beta,\delta) - U(l^*) - E(\beta) - I(\beta,\delta). \quad (10)$$

[2] Note that consumption utility is linear in consumption and the latter is linear in income. An alternative specification, in which utility is concave in consumption and/or the latter is concave in income, would not change our results regarding the redistributive effects. At the cost of increased complexity, such an alternative specification would uncover an additional distortionary channel: more generous bailouts - higher taxation - would have stronger impact on utility because, due to concavity, consumption -and utility - would decrease by a larger amount at the margin. Finally note that, despite our assumption that consumption utility is linear in income, individual's optimization problem is concave because *U(l)* in (4) is convex.

As the population size is one, $V(\beta, \delta)$ also represents the social welfare function.

3 Independent Central Bank and its Optimal Monetary Policy

Given the social-welfare function, $V(\beta, \delta)$, the normative benchmark is identified as follows. We are in a monetary dominance regime: the central bank, being a long-sighted and independent player, acts as a social planner and, − taking into account the relationship between the tax policy, τ, and the labour supply - simultaneously sets the monetary policy, δ^* and the banking policy, β^*. By (3) and (5), the budget constraint becomes:

$$\beta(1+\lambda)\pi(1+i(1-\delta)) = \tau L(\tau). \tag{11}$$

This yields the relationships between the three economic policies: by differentiating (11) and introducing the labour supply elasticity $\eta(\tau) \equiv -\tau L_T/L$ to highlight the tax-distortion effect, we obtain:

$$T_\beta = \frac{(1+\lambda)\pi(1+i(1-\delta)}{l^*(1-\eta(\tau))} > 0 \tag{12}$$

and

$$T_\delta = \frac{\beta(1+\lambda)\pi i}{l^*(1-\eta(\tau))} < 0, \tag{13}$$

where tax policy and monetization are inversely associated, given that monetization lowers the debt-servicing costs and consequently the tax distortions. Using the welfare function (10), the two optimality conditions are:

$$V_\beta = C_\beta(\beta, \delta) - E_\beta(\beta) - I_\beta(\beta, \delta) \leq 0 \tag{14}$$

and

$$V_\delta = C_\delta(\beta, \delta) - I_\delta(\beta, \delta) \leq 0, \tag{15}$$

where strict inequality implies the corner solution (i.e. $\beta* = 0$ or $\delta* = 0$). The central bank addresses the trade-off between two public goals - externality smoothing and tax-distortion minimization – taking into account the monetary instability costs. By solving the FOC system (14–15) and using (7–9), the socially optimal policies are:

$$\beta^* = 1 - \frac{1}{\varepsilon(1+\lambda)\pi}\left[\frac{\eta}{1-\eta}(1+i(1-\delta^*)) + \frac{\phi}{2}\delta^{*2}\right] \tag{16}$$

and

$$\delta^* = \frac{\eta}{1-\eta}\frac{i}{\phi}. \tag{17}$$

By (17) the optimal level of accommodation $\delta*$ increases η, i, and ϕ:

- When labour supply is relatively elastic (higher η) then the corresponding tax-distortion is high; there is an incentive to increase the share of the bailout that is passed on to the central bank.
- If the cost of debt servicing is high (higher i) monetization is more attractive.
- If the monetary instability costs are low (lower ϕ) then the government will choose to monetize a relatively large share of the bailout.

By (16), for any given monetization policy, δ, the optimal amount of bailout is decreasing in the same parameters, η, i, and ϕ:

- When labor elasticity is higher, a bailout is more costly because it yields a larger tax distortion. The government dislikes a large bailout. Given the bailout, the government chooses to monetize a larger share of it.
- A higher interest rate makes the bailout more costly: the government chooses a small bailout and a large monetization.
- If the instability cost of monetization is large, the bailout is small. Since passing the burden of the bailout onto the central bank is costly in terms of instability, the government dislikes a large bailout, choosing a small monetization.

Summing up, if both the distributional effect and the duration effect are low, the central bank accommodation is high; higher levels of the optimal bailout policy, $\beta*$, will increase the overall amount of monetization - direction effect - notwithstanding the monetization parameter $\delta*$ is held constant.

4 Citizen Inequality, Political Pressure and Populism

Economic policies have relevant redistributive effects, but the central bank is only concerned about efficiency. When it comes to the effects of such policies for individual citizens, the situation is completely different, as the net transfers implied by efficient policies can be different. The redistributive effects are a relevant issue as long as the policies are chosen through the political process. Here we consider majority voting with voter preferences that are associated with the financial wealth distribution.[3]

The political pressure can be considered a proxy for a contingent demand of CBI reform; such as interpretation can be confirmed observing that the political pressure is uncorrelated with legal CBI (Binder 2018b). Populism can be considered a special case of political pressures when the incumbent government would like to please the voters implementing policies that are both redistributive and myopic.

[3] The relationship between voting and financial wealth distribution has been explored in Masciandaro and Passarelli (2013) in analysing the policy dilemma between financial regulation and taxation.

4.1 The Political Pressure

In our economy, voter heterogeneity depends on financial inequality and has three possible sources: bank shares, bank deposits and bond holdings. We assume that, given a macroeconomic shock, the voters are rational, i.e. they vote consistently with the redistributional consequences of every policy strategy. In other words, we do not consider the possibility of psychological biases.

Given a voter j, let $\pi + \pi^j$ be the amount of banking shares in j's portfolio in NT. Depending on $\pi^j > 0$ or $\pi^j < 0$, voter j will be a *bank owner* relative to the average. Let $F(\pi^j)$ be the distribution of the bank's ownership across the population, if the median value of this distribution is positive than the majority of the population hold more bank shares than the average.

Voters can be big or small depositors. Let $(\lambda + \lambda^j)\pi$ be the amount of bank deposits in j's portfolio at time 0. Depending on $\lambda^j > 0$ or $\lambda^j < 0$, individual j holds more or less *bank deposits* relative to the average. Let $L(\lambda^j)$ be the distribution of the bank's liabilities across the population. The median of $L(.)$ will tell us whether those holding more deposits than the average represent the majority – positive median - or a minority - negative median - of the population.

Finally, voters can be heterogeneous as government bond holders. Let $(\beta + b^j)(1 + \lambda)(1 - \delta)\pi$ be the amount of bonds in j's portfolio at time 0. Depending on $b^j > 0$, then voter j will be a *government bond holder* relative to the average. Let $G(b^j)$ be the distribution of bond holdings across the population. The average of $G(b^j)$ is zero. The median of this distribution signals whether the bond holders represent the majority - positive median - or a minority – negative median - of the population.

Given the general individual utility function (10) and the above definitions of π^j, λ^j, b^j, the voter j's utility $V^j(\beta, \delta)$ can be defined as

$$V^j(\beta.\delta) = V(\beta.\delta) + \beta\pi^j + \beta\pi\lambda^j + b^j(1 + \lambda)\pi i(1-\delta) \tag{18}$$

The last three terms account for the three forms of financial heterogeneity of voter j The preferences voter's can differ from those of the central bank because of these three terms. For instance, if say the first term is positive, voter j is more interested than the central bank in preserving the value of bank's shares. If the sum of the last three terms is positive, this voter is more interested in saving the bank than the central bank.

The individuals are heterogeneous only in their financial portfolios. As it comes to income their preferences are the same. Thus policy preferences reflect the financial preferences of the voters and are expressed using majority rule. Voters vote sequentially voting on δ and β. Given $V^j(\beta, \delta)$, the corresponding FOC and the social optimality condition V_δ, the equilibrium monetary policy for the voter j is:

$$V_\delta^j = V_\delta - b^j(1 + \lambda)\pi i \leq 0. \tag{19}$$

Assuming eq. (19) holds as an equality, solving it yields:

$$\delta^j = \left(\frac{\eta}{1-\eta} - \frac{b^j}{\beta}\right)\frac{i}{\phi}. \tag{20}$$

By comparing eq. (20) with the optimal monetization policy given by (17), it is immediately evident that, for any given level of bailout, $\beta \neq 0$, voters who hold relatively more bonds than the average ($b^j > 0$) would prefer monetization to be below the socially optimal level because they want the earnings of their government bonds not to be negatively affected by monetization. We can solve the voting game. Call $m\delta$ the median voter when it comes to voting on δ. Specifically, $b^{m\delta}$ is the median of $G(b^j)$. Here the median voter theorem applies, and policy preferences regarding δ are single peaked. The accommodation $\hat{\delta}$ chosen by the majority of voters will be:

$$\hat{\delta} = \delta^* - \frac{b^{m\delta}}{\beta}\frac{i}{\phi} \equiv D(\beta). \tag{21}$$

δ^* is defined by (17) and the distance $\left|\hat{\delta} - \delta^*\right|$ represents the political distortion, i.e. the distance between the monetary policy that is chosen through voting and the efficient monetary policy. The political distortion will reflect four features of the economy: the level of monetary accommodation will be socially too low - $\hat{\delta} < \delta^*$) - if the majority are bond holders; the inefficiency is higher if a) the interest rate is higher -higher i) - b) the monetary stability costs are higher higher ϕ - and c) the banking policy is more conservative -i.e. lower β.

Let variable x^j - defined by (22) below - summarize the features of any financial portfolio, j, given the monetization preferences, and highlights the role of bank stakeholders:

$$x^j \equiv \pi^j + \lambda\pi^j - b^j(1+\lambda)\pi i D_\beta. \tag{22}$$

The features of the average portfolio are described by:

$$\bar{x} \equiv V_\delta D_\delta. \tag{23}$$

while $x^{m\beta}$ describes the "median" portfolio; i.e. the characteristics of the portfolio of the voter that casts the decisive vote. The political distortions related to the monetary and banking policies are intertwined. Following the same steps as above and given the social optimality condition, V_δ defined by (14), the condition that pins down the banking policy, $\hat{\beta}$, chosen by the majority of voters is:

$$V_\delta + \bar{x} + x^{m\beta} \leq 0, \tag{24}$$

If (22) holds with equality then $\hat{\beta}$ is an interior optimum. By (24), if $x^{m\beta} > -\bar{x}$ then the majority of voters prefer too generous bailout policy.

In general, the median voter's preferences, i.e. the features of his/ her financial portfolio - determines the actual overall equilibrium. The more the politicians in charge accommodate the demand for a level of fiscal monetization that differs from the optimal level chosen by the central bank, the more a political pressure will be in action on the central bank to change such as policy. The political pressure can be considered a proxy for a demand to change the existing CBI.

4.2 The Populist Pressure

Given the above-mentioned definition of populism (Guiso et al. 2017; Saint 2018), we call populist any policy that guarantees short-term protection without regard for long-term distortions. In other words the populist policy is at the same time a myopic and redistributive action.[4]

Note that we are also providing a theoretical rationale for one more definition of populism (Kaltwasser 2018): the populist is a autocratic politician who seeks to remove the democratic checks and balances – in this case through a pressure that wishes to the reduce the CBI - in order to fulfil electoral promises. In this sense our framework also encompasses politicians acting as autocratic policymakers (Goodhart and Lastra 2018), where in fact empirically autocracy seems to be inversely correlated with CBI (Bodea et al. 2017).

Our framework is different from the standard analysis of the relationships between policies and CBI, which is based on the following four elements (Fischer 2015): the CBI is an institutional device used to avoid distortionary inflation tax given the political pressure to boost real output, and this device is implemented using time-inconsistent monetary policies. Here, 1) the trigger is financial inequality, not the unemployment rate, and 2) the tool is the interaction among the three policies, rather than the monetary action per se. Further, 3) the inefficient macro outcome is the overall taxation design, not just the inflation tax, 4) which is produced without any particular assumptions about the players' expectations or their information sets.

Table 1 presents all of the possible equilibria and sheds light on when and how a populist pressure can emerge. The columns show what happens when the decisive voter, $m\beta$, owns a portfolio whose characteristics $x^{m\beta}$ are smaller/equal/larger than $-\bar{x}$, while the rows show what happens when the decisive voter in voting for monetization is a larger/equal/smaller bond holder (i.e. $b^{m\beta} \leq \geq 0$); the difference between mean and median is a measure of financial inequality (Meltzer and Richard 1981).

In every combination, the policy outcome is compared with the optimal policy. The outcome can be characterized as *efficient* if it is equal to the benchmark, *conservative* if it is more restrictive and *lax* if it more expansive. A lax banking policy is a situation of financial dominance (Smets 2013), while a lax monetary policy is a case of fiscal dominance (Sargent and Wallace 1981).

Three relevant facts can be highlighted. First, voters' preferences are consistent with the socially optimal policies if and only if the financial portfolios are homogeneous ($b^{m\beta} = 0$ and $x^{m\beta} = x\_$). The chain of events is as follow. When a banking crisis occurs, the policy design to address and fix such event influences the citizens. Being independent, the central bank sets the efficient monetary policy, with its fiscal and banking consequences. With hetereogeneous citizens such policy produces financial wealth distribution. The greater the financial heterogeneity, the more the equilibria differ from efficient ones.

Second, populism policies can emerge. In general the financial redistribution is a politically relevant issue as long as the financial wealth distribution is associated with voters' preferences. The discrepancy between the preferred policy and the efficient one becomes a source of a demand of political pressure. Specifically we have populism

[4] In Guzzo and Velasco (1999) and Lippi (2002) a populistic monetary policy is just myopic.

pressure when the preferred policies produce both redistributive and myopic effects. Both lelf-wing and right-wing populisms can be considered.

On the one side (Table 1, bottom-right corner) we have a left- wing populism when both banking and monetary policies are accomodative. The citizens prefer policies with large bailout and monetary accomodation when the median voter is a depositor, and/or an unsophisticated investor, and/ or the middle-lower class people. On the other side (Table 1, top-left corner) we have right-wing policies when both policies are conservative. The citizens prefer policies with large bail-in and monetary restriction when the median voter is a bond- holder, and/or a sophisticated investor, and/ or the upper class people.

Third, if the incumbent policymaker is a politician who would like to please the median voter, he/she will supply the political pressure on the central bank, influencing its actual degree of independence.

5 Conclusion

This article discussed the relationships between citizen inequality, political pressure and CBI. Assuming that a shock occurs and that an independent central bank maximizes the welfare function, the majority of citizens can prefer monetary policies that are different from the efficient ones. If financial and voting preferences are correlated and the incumbent government pleases the voters, the political pressure measures the difference between the government wishes and the central bank choices. If we define as populist any policy that guarantees redistribution without regard for longer term distortions, a populist pressure can arise on the degree of CBI.

The discussion can be further enriched in many fruitful directions:

a) Financial wealth and monetary instability. Here we assumed that monetary instability is a social cost that is borne equally by all individuals. If we were to associate monetary instability with specific inflation risks, we would assume that portfolios are heterogeneous in size and in terms of the yield's ability to match monetary instability (Fujiwara et al. 2019). Allowing for this kind of heterogeneity would lead to the prediction that the smaller is the mass of individuals with these characteristics, the stronger will be the political pressure to monetize. It can be explored the relationships between inequality, inflation and demand for CBI reform (Binder 2018).

Table 1 Median Voter Preferences and Policy Outcomes

	$x^{m\beta} < -\bar{x}$	$x^{m\beta} = -\bar{x}$	$x^{m\beta} > -\bar{x}$
$b^{m\delta} > 0$	Conservative banking policy Conservative MP	Efficient banking policy Conservative MP	Financial dominance Either conservative CBI or fiscal dominance
$b^{m\delta} = 0$	Conservative banking policy Conservative MP	Efficient banking policy Efficient MP	Financial dominance Fiscal dominance
$b^{m\delta} < 0$	Conservative banking policy Either conservative MP or fiscal dominance	Efficient banking policy Fiscal dominance	Financial dominance Fiscal dominance

b) Income. In general, income distribution (Aggeborn and Persson 2017) or labour distribution (Algan et al. 2017) can explain the demand for populist policies. Further, the channels of monetary policy redistribution can affect the aggregate demand when winners and losers are heterogeneous (Ampudia et al. 2018; Bunn et al. 2018; Samarina and Nguyen 2019), i.e. they have different incomes (Oikawa and Ueda 2018), or different marginal propensities to consume (Cairò and Sim 2018, Aucleart 2019), or different productivities and/or skills (Dolado et al. 2018; Turdaliev 2018). Income can be correlated with other forms of heterogeneity, such as portfolio size or the size of a bank stake in an individual's portfolio, or differences in terms of inside and outside money (Gahvari and Micheletto 2019), leading to interesting trade-offs, that outline promising directions for exploring how microeconomic heterogeneity can lead to macroeconomic shocks (Kaplan and Violante 2018).

c) Initial public debt and tax pressure. We assumed that the government debt is only issued to address the macro shocks, while taxes are raised only to service that debt. The insertion of initial taxation and debt - as well as its distribution - would increase the complexity of the analysis, but without any substantial consequence for the overall rationale.

d) Foreign debt and foreign ownership of the bank. The framework can be extended to account for the existence of foreign investors, and to investigate the association between external debt and populism (Dovis et al. 2016).

e) The existing empirical analysis on political pressure (Binder 2018b) notes that left wing executives, nationalist parties, or executive facing few checks and balances, or weak electoral competition are more likely to pressure the central bank. We might wonder how such nationalist parties show preferences which are consistent with our definition of populist policies.

f) In parallel, empirical and/or institutional analyses designed to shed light on the associations among financial wealth distribution, voters' geographical locations (Inglehart and Norris 2016; Algan et al. 2017) and economic policy preferences would be illuminating.

g) Finally, such explorations could be fruitfully correlated with the empirical results on the concrete distributional implications of recent monetary policy actions, (Casiraghi et al. 2016; Furceri et al. 2018; Amaral 2017; Auclert 2019), both conventional and unconventional ones.

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