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Populism and De Facto Central Bank Independence

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Abstract

Although central bank independence is a core tenet of monetary policy-making, it remains politically contested: In many emerging markets, populist governments are in frequent public conflict with the central bank. At other times, the same governments profess to respect the monetary authority's independence. We model this conflict drawing on the crisis bargaining literature. Our model predicts that populist politicians will often bring a nominally independent central bank to heel without having to change its legal status. To provide evidence, we build a new data set of public pressure on central banks by classifying over 9000 analyst reports using machine learning. We find that populist politicians are more likely than non-populists to exert public pressure on the central bank, unless checked by financial markets, and also more likely to obtain interest rate concessions. Our findings underscore that *de jure* does not equal *de facto* central bank independence in the face of populist pressures.

Keywords

central bank independence, populism, political economy, text analysis

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Introduction

Central bank independence—that is, the freedom of central banks to adjust interest rates and other policy tools to fight inflation without political interference—is a basic tenet of modern macroeconomic policy-making. Without it, politicians could be tempted to prime the pump of the economy to increase their chances of re-election, as predicted by the literature on the political business cycle going back to Nordhaus (1975). The canonical solution (Rogoff, 1985) is to appoint a central banker with more "conservative" (i.e., anti-inflation) preferences than the government, and to grant operational independence to the central bank to pursue monetary stability as an important or even overriding objective.

The benefits of central bank independence are manifold. Interest rates are set with an eye to price stability rather than the next election. The potential inflationary effects of fiscal policies are checked because an independent central bank will raise interest rates to compensate for excessive government spending (Bodea & Higashijima, 2017). Once achieved, central bank independence lowers inflation without any measurable reduction in economic growth, making it the "only free lunch in economics" (Alesina & Summers, 1993).

And yet, central bank independence remains politically contested. Populists, in the ascendant in many countries across the world, appear to deliberately seek conflict with central banks. Changes to their actual statutes, however, remain uncommon. Instances of public political pressure on monetary authorities to lower interest rates are far more frequent. But are populists more likely to pressure their central banks, or are they just more conspicuous? And do their pressure tactics succeed, or are they merely empty rhetoric?

In this paper, we model the interaction between the government, the central bank, and the financial market as a game that draws on the crisis bargaining literature (Kurizaki, 2007; Schultz, 1999). Our model predicts that a populist government willing to incur a high cost of public conflict will often obtain concessions from a nominally independent central bank without having to change its legal status. To test the model's predictions, we construct an original data set built on the Economist Intelligence Unit (EIU) country reports to identify political pressure on central banks.

Our findings show that while governments of many stripes try to influence their central bank, public pressure is far more likely under a populist regime. Moreover, economic outcomes reveal that when facing a determined populist government, central banks are often much more pliant than their legal status suggests. Public political pressure by populist governments on nominally independent central banks is associated with reductions in interest rates and upticks in inflation, but the same is not true for other types of government.

Financial market pressure, however, can dissuade politicians from interfering with the independence of their central bank.

Our study helps understand when and why the policies of legally independent central banks will become politically contested. While there is little doubt that central bank independence has reduced inflation in OECD countries, the effect in developing countries is more nuanced (Bodea & Hicks, 2015; Garriga & Rodriguez, 2020). Our paper therefore speaks to the mounting evidence (Baerg & Lowe, 2020; Clark & Arel-Bundock, 2013) that governments try to influence the actions of nominally independent central banks, and that central bankers have interests beyond their commitment to the bank's goals.

Populist Governments and Independent Central Banks

Taking a standard threshold of central bank independence as enshrined in law, the overwhelming majority of central banks today are legally independent. Financial markets appreciate this development: they may not care much about the details of microeconomic reforms, but they worry about the stability of a country's monetary regime (Grittersová, 2017; Mosley, 2003), and indications of the weakening of legal central bank independence affect sovereign credit ratings (Bodea & Hicks, 2018).

And yet, central bank independence is a thorn in the eye of populists. Central banks are just one institutional pillar of the state, but in the rhetoric of populist leaders, they are part of the technocratic elite that are the "enemies of the people." Unlike most mainstream politicians, populists from Poland's Prime Minister Jarosław Kaczyński to US President Trump have clamored for monetary policy measures to boost an often already growing economy.

This behavior is puzzling. Governments could also issue threats behind closed doors to make central bank policy more accommodating while maintaining the semblance of independence in public. They could change central bank laws to weaken independence and, in most countries, have the authority to dismiss the central bank governor. Public attacks could be merely rhetoric aimed at a domestic audience rather than strategic pronouncements. Either way, their vehemence and frequency require an explanation.

Whether populists are strategic or ideological is itself contested. Ideational and strategic views of populism concur that populists like to blame technocrats, policy experts, and a corrupt elite for political and economic ills that affect "the people" (Mudde & Rovira Kaltwasser, 2018, 1670). While the ideational view identifies populism by what populists say, the strategic view, following Weyland (2015), defines populism by how they rule: as "personalistic leadership that rests on direct, unmediated, uninstitutionalized support from large masses" (see also Kenny, 2018, 1). As Kenny (2017)

writes, "the direct mobilization of supporters by the leader through mass rallies and the mass media is critical to populist mobilization (…)."

From this follow two different interpretations of verbal attacks on the central bank. Proponents of an ideational view would argue that such public attacks are attempts to shift blame (Busby et al., 2019). If so, central banks could simply shrug off the noisy rhetoric. By contrast, if a populist leader's attacks on the central bank are strategic, they ought to have noticeable consequences—in particular, interest rates lower than we would otherwise observe.

Beyond expressing their anti-elitist views, why would populists prod the central bank to reduce interest rates? Empirical evidence supports that politicians of all stripes almost always prefer lower interest rates than the central bank because they prioritize economic growth (Ehrmann & Fratzscher, 2011). Populists are no different: While prominent Latin American leaders adopted a "populist" style of government in the 1980s and 1990s but implemented supply-side reforms (Weyland, 1996), the more recent populist upsurge is better called "redistributionist" (Copelovitch & Pevehouse, 2019, 170). Scholars find that after economic shocks, populists often gain votes in particularly economically deprived regions (Fernández-Albertos, 2018), and political austerity increases the support of both left- and right-wing populists (Baccini & Sattler, 2020). Finally, populism is often a response to economic inequality, and large cross-country surveys show that inequality makes citizens less averse to inflation (Kim, 2022). Lower interest rates thus appeal to populists. They boost the economy, support small businesses that do not borrow directly in international markets, and help indebted households.

While non-populists also have a preference for a softer monetary policy than the central bank, we submit that for an identical desired reduction of interest rates, populists will be more willing to publicly attack the central bank. For populists, an open attack is part of their political strategy, to rule directly on behalf of "the people" without institutional constraints and against the technocratic and financial elite. When populists berate the central bank, they do not bluff or argue over technicalities. They reveal their true colors by mounting their attack publicly, for the audience of the people to see. A public attack on the central bank is a display of resolve. Under threat, a central bank governor may consider monetary easing the price to pay for staying in the job and maintaining a façade of legal central bank independence. As a result, a populist may obtain concessions that a non-populist would not receive.

And yet, while lower interest rates have political benefits, they come with costs. Even the most ardent populists will evaluate the potential costs of undermining central bank independence, creating a tension between two competing goals: Personalistic rule without constraints or an appearance of financial probity as exemplified by respect for the central bank's autonomy.

Dismissal of the central bank governor or outright legal changes to reduce central bank independence are a last resort.

An episode from Thailand in April 2013 illustrates this tension. Since the 2008 reform of the central bank law, Thailand's officially inflation-targeting monetary authority has been rated as more independent than the Swedish *Riksbank*, Denmark's *Nationalbank*, or the (pre-ECB) *Nederlandsche Bank.* Yet despite its legal status, then-Finance Minister Kittiratt Na-Ranong, a key member of populist Prime Minister Yingluck Shinawatra's cabinet, told the Bangkok Post on April 19 that, unhappy with the current level of interest rates, he "thought about changing the BoT [Bank of Thailand] chief [Prasarn Trairatvorakul] everyday." While the deputy leader of the opposition Democrat Party Korn Chatikavanij warned that such pronouncements could erode investor confidence, the BoT duly and unanimously voted on May 29 to lower its main policy interest rate, the 1-day repurchase rate, by 25 basis points to 2.5%, taking real rates close to zero. Governor Trairatvorakul served out his full 5-year term.

To be sure, some conflicts with populists result in the removal of central bank heads—Turkish President Recep Tayyip Erdoğan, a self-declared "enemy of interest rates," dismissed four governors in the span of less than 2 years, suggesting some resistance to the President's badgering. But the Turkish experience is less common, as relatively few conflicts end with an irregular change of central bank governors. Indeed, our empirical results suggest that often, the central bank simply complies. Regardless, this variation calls for an explanation.

A number of studies delineate the scope conditions for central banks to pursue monetary policy from political interference. The most important domestic variables are democratic governance (Broz, 2002) and veto players (Gilardi, 2007; Keefer & Stasavage, 2003). Mukherjee and Singer (2008) find that often, central banks are given inflation targets when right-leaning governments are in power. When investigating "reversals" in central bank independence, the literature has mostly focused on changes to the legal status (Bodea et al., 2019; Meyer, 2020) rather than the actual policy conduct, or on the removal of central bank governors (Dreher et al., 2008).

By contrast, discussion of public attacks on central bank independence is rare in the literature. Froyen et al. (1997) submit that public pressure on the Federal Reserve seems to loosen monetary policy. Maier et al. (2002) conclude in a similar analysis of the Bundesbank that pressure was ineffective. More recently, Binder (2021) extends these results by classifying instances of political pressure from country reports published by the EIU and Business Monitor International. Binder finds that left and nationalist parties are more likely to pressure their central bank to loosen monetary policy. "Nationalist" parties in her data, however, are not right-wing parties of European populism, but parties like the Algerian *National Liberation Front* that define their

identity in opposition to Pan-Islamism, or parties that counter regionalist tendencies. To our knowledge, no other paper has investigated public conflict between populists and independent central banks.

To bring more clarity to this discussion, we put forward a formal model of conflict between the central monetary authority and a (potentially populist) government. Our model is not the first to consider potential conflict between politicians and central banks. Lohmann (1992) presents a model in which the central bank prioritizes low inflation over unemployment during normal times, but switches to prioritizing employment when faced with a negative output shock. While the government can override the central bank if necessary, in these studies grounded in an optimal institutional design framework (Walsh, 1995), the central bank accommodates the government's preferences just enough so that this never actually occurs in equilibrium. These models help us understand the trade-off between credibility and flexibility, but they are less useful in explaining observed patterns in conflict between politicians and their central bank.

Our model makes two contributions in this regard: First, we model why the central bank will, under certain conditions, successfully resist pressure from politicians. Second, we show why in particular populist politicians are more likely to utilize public pressure tactics and why they are more likely to succeed in bringing the central bank to heel. In spirit, our model is therefore closest to Waller (1991) who focuses on the theoretical implications in the form of negative output effects of conflict between governments and central banks.

Populists, Central Banks, and Financial Markets

We formalize the conflict over monetary policy in a crisis bargaining model with audience costs inspired by Schultz (1999). We draw on this framework because any conflict can be conceived as a bargaining situation, including the possibility of bargaining failure. Importantly, our model is agnostic regarding whether populists or non-populists have lower interest rate preferences. Rather, we make the minimal assumptions that the central bank has more hawkish interest rate preferences than the government, but that populists are more willing to publicly pressure their central bank to achieve their goals. We depict the bargaining space as the (normalized) difference between the preferred interest rates of a politician and its central bank. Even though the conflict we study is domestic, it is by its nature outside of the regular institutional and legal frameworks and thus resembles inter-state bargaining more than, for example, legislative bargaining. We therefore mirror normal practice in the international security literature where incomplete information is incorporated into the ultimate cost politicians and the central bank is willing to bear when bargaining fails. This is unlike typical bargaining models in

economics where incomplete information is instead incorporated into each agents' valuation of the good being bargained over.[1]

We focus on emerging markets because the effectiveness of legal central bank independence in developed democracies is now well-established (Bodea & Hicks, 2015) and because with the exception of the United States and Japan, we do not observe public pressure on central banks in developed countries in our data. Our argument applies to the majority of countries that keep their exchange rate at least partially flexible (Bearce, 2008; Guisinger & Singer, 2010), have a central bank that can set interest rates, and no longer impose capital controls that would break any link between international financial markets and domestic monetary policy (Clark & Hallerberg, 2000).

Today, most emerging market countries borrow in foreign and domestic currency, but they are still at the mercy of the "global financial cycle" (Rey, 2015), and individual countries are swept along with the tide in international markets. Politicians tempted to publicly pressure central banks to lower interest rates might weigh this against the current state of the financial markets. In the following, we formalize these assumptions and present the game.

A Formal Model of Populist Monetary Policy with Capital Mobility

We begin with a central bank governor and a politician, labeled CB and P, respectively, having a dispute over the conduct of monetary policy. The third actor in the game is the international financial market, although market intervention is assumed to be exogenous, as markets only react and do not behave strategically.[2] Politicians incur audience costs—a stylized version of voter disapproval—if they start a conflict with the central bank without obtaining the desired results. Central bank governors are concerned about their own careers and the nominal status of the central bank, but also have more hawkish preferences regarding inflation than the average politician.

Let i_{cb} and i_p be the ideal interest rates of the CB and P, respectively. We assume that $i_{cb} \geq i_p$, reflecting the idea that central bankers are more concerned about price stability than politicians, and that the difference between these ideal points is viewed by P as an opportunity to reward supporters and give the economy a short-term lift. Without loss of generality, we normalize $i_{cb} - i_p$ to 1.

Sequence of Moves and Payoffs. The extensive form of the game is shown in Figure 1. Prior to the first move, interest rates equal i_{cb} and have been set by an independent CB. The game opens with a decision by P to exert pressure on the CB to lower interest rates to i_p or to remain silent and accept the status quo. We assume that P could engineer the resignation of the CB governor if P's pressure is ignored, though not without cost.

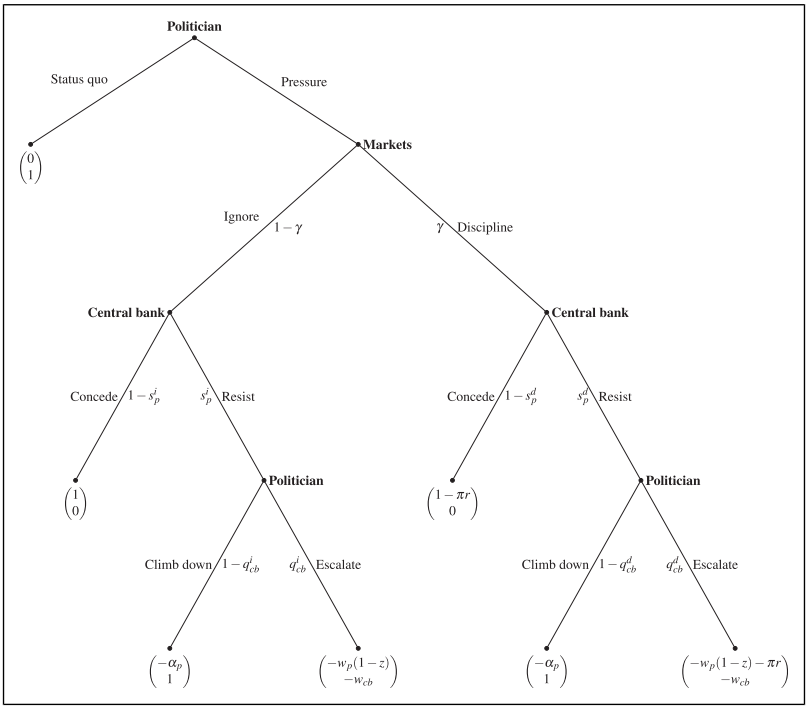

Figure 1. Game tree.

After P exerts pressure, markets respond by either disciplining or ignoring the pressure. Let γ be the probability inferred by P that markets will discipline attempts to pressure. As markets do not behave strategically, and P possesses no ability to reliably predict the reaction of markets, P infers the value of γ from its judgment of the general market sentiment in the lead up to P's decision to pressure. When markets discipline, we assume they impose an interest rate premium, r, on each unit of the state's foreign debt. Denoting the share of a country's public debt that is foreign as $\pi \in [0, 1]$, the additional interest cost from market discipline equals πr. When markets ignore, no interest rate penalty is imposed.

Upon observing the reaction of markets, the CB decides whether to concede to P's pressure and implement P's preferred interest rate of i_p or to resist. If the CB concedes, the CB receives a payoff of 0 and P receives a payoff of 1 if markets ignore, and $1 - \pi r$ if markets discipline.[3] If the CB resists, P can choose to climb down or escalate its pressure on the CB. When P climbs down, interest rates remain at i_{cb} and P incurs audience costs of $-\alpha_p$. However, when P escalates, the result is open hostilities

between P and the CB. Here, P and the CB incur conflict costs of $-w_p$ and $-w_{cb}$, respectively, and P incurs the interest penalty $-\pi r$ if markets discipline.[4]

The model incorporates a politician's degree of populism through the parameter $z \in [0, 1]$. Consistent with Kenny (2017), z embodies P's relative hostility toward elites and independent institutions, with higher values of z implying greater hostility. In other words, z shifts the probability distribution from which w_p is drawn.

Information and Beliefs. We provide complete and incomplete information variants of the model. Full details of the solutions to both variants of the model are shown in the online appendix in section A-1. Under incomplete information, both P and the CB observe their own conflict cost, but not the conflict cost of their rival. We assume that w_p and w_{cb} are drawn from probability distributions over the positive real numbers with cumulative probability functions F_p and F_{cb}, respectively. These probability distributions are common knowledge.

Incomplete Information Equilibria. The equilibria of this game consist of strategy sets described by cut-points along the continuum of types w_p and w_{cb}, and beliefs over the strategies of their rival.[5] The perfect Bayesian equilibria of the game are solved for by backward induction.

Assuming P reaches its final node, P will escalate if the payoff from doing so is at least as great as the audience costs incurred by climbing down. Letting k_p^i be the threshold at which P is indifferent between escalating and climbing down given that markets have already ignored P's prior pressure, P will escalate if

$$w_p \leq \frac{\alpha_p}{1-z} \equiv k_p^i \tag{1}$$

Letting k_p^d define the analogous threshold given that markets have disciplined, P will escalate if

$$w_p \leq \frac{\alpha_p - \pi r}{1-z} \equiv k_p^d \tag{2}$$

Moving up one level to the CB's decision rule, let k_{cb}^i be a threshold level of w_{cb} such that when markets ignore, the central bank will resist if $w_{cb} \leq k_{cb}^i$. To find k_{cb}^i, let q_{cb}^i be the CB's posterior belief that P will escalate given that it resisted and markets ignored. Using Bayes' rule, let $q_{cb}^i = F_p(k_p^i)/F_p(b_p)$.[6] Following pressure from P and markets ignoring, the CB will resist if the expected payoff from resisting is greater than the certain payoff from conceding. That is, the CB will resist if

$$w_{cb} \leq \frac{F_p(b_p) - F_p(k_p^i)}{F_p(k_p^i)} \equiv k_{cb}^i \tag{3}$$

Letting k_{cb}^d define the analogous threshold given that markets have disciplined, the CB will resist if

$$w_{cb} \leq \frac{F_p(b_p) - F_p(k_p^d)}{F_p(k_p^d)} \equiv k_{cb}^d \tag{4}$$

At P's initial node, P first infers whether the CB is likely to resist its pressure under each type of market reaction. Define $s_p^d = F_{cb}(k_{cb}^d)$ as P's prior belief that the CB will resist if P pressures and markets discipline. Let $s_p^i = F_{cb}(k_{cb}^i)$ be the analogous probability when markets ignore. Furthermore, define b_p as the threshold level of w_p at which P will be indifferent between pressuring and the status quo. For P's strategy to be sequentially rational, b_p must be consistent with P's beliefs about s_p^d and s_p^i and the CB's beliefs about q_{cb}^d and q_{cb}^i. Rearranging equation (4), we obtain an expression for b_p[7]

$$b_p = F_p^{-1}\left[F_p\left(k_p^d\right)\left(1 + k_{cb}^d\right)\right] \tag{5}$$

Values for the thresholds k_p^i, k_p^d, k_{cb}^i, k_{cb}^d, and b_p and beliefs s_p^i, s_p^d, q_{cb}^i, q_{cb}^d define the equilibrium of the game. The game has four possible outcomes: P choosing the status quo, the CB conceding to P's pressure, and P either climbing down or escalating after facing resistance from the CB. Figures 2 and 3 map these outcomes across the continuum of types w_p and w_{cb} when markets discipline and ignore, respectively.

Analyzing the outcomes of the game allows us to distinguish between a CB that successfully resists public attacks from one that is independent in name only. Given that the CB begins the game as *de jure* independent, we claim that the CB is *de facto* independent when the game reaches a terminal node where the CB sets monetary policy according to its preference. The shaded regions of Figures 2 and 3 depict these outcomes.[8] Conversely, we claim that the CB is no longer *de facto* independent when the game ends with the CB conceding to P's pressure or obviously, when P and the CB engage in open hostilities, for example, with P replacing the governor or changing central bank legislation.

Predictions. These results allow us to derive predictions regarding how changes in P's degree of populism affect behavior and outcomes in the game. Two observable outcomes are considered: the ex-ante probability that P will pressure the CB and the probability that the CB attains *de facto* independence, conditional on having been pressured.

The model identifies populism as a hostility toward elites and independent institutions, which is expressed through the parameter z. We capture this notion in the model by assuming that the distribution from which P draws its type is effectively re-scaled according to P's appetite for populism.[9] Recall that under incomplete information, w_p is drawn from a probability distribution over the positive real numbers. By introducing $1 - z$ as a multiplicative term on P's type, higher levels of populism re-scale the distribution from which P's type is drawn down. This implies that

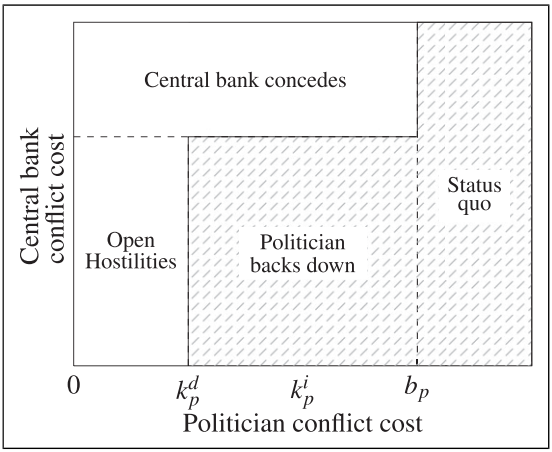

Figure 2. Outcomes when markets discipline. *Notes*: shaded regions depict *de facto* independence.

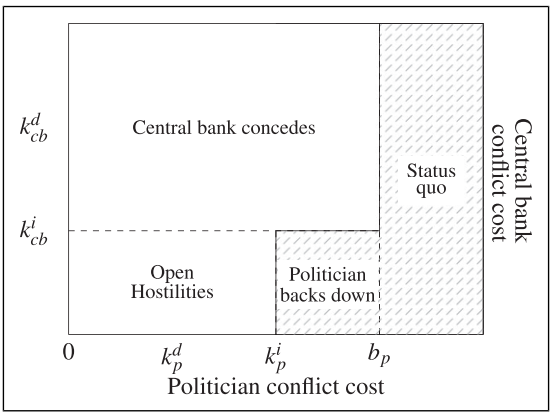

Figure 3. Outcomes when markets ignore. *Notes*: shaded regions depict *de facto* independence.

a P with more populist leanings will incur lower costs, on average, when they escalate their pressure on the CB, relative to a P with less populist leanings.

Figure 4 shows how the ex-ante probability of pressure and how the conditional probability of the CB retaining *de facto* independence vary as a function of populism, holding all other parameters constant. The figure is divided into six cases, each corresponding to a different configuration of the model's parameters.[10] The parameter values z_1 through z_5 denote the levels of populism that define the boundary points between each of the six cases.[11]

In Figure 4, the ex-ante probability of pressure is $F_p(b_p)$ and is derived from (5).[12] Intuitively, this probability is equivalent to the probability that P's type, re-scaled by P's degree of populism, is drawn to the left of b_p in Figures 2 and 3. Figure 4 shows that the ex-ante probability that the politician will pressure the central bank is weakly increasing in populism. This result accords with basic intuition. Consider that P never pressures in Case 6. This is because there is a zero probability that P will escalate at its final node if faced with CB resistance. But as populism increases and we move into Case 5, the probability that P escalates at its final node turns positive. This, in turn, translates into a positive probability that P will pressure at the beginning of the game. This process continues until we reach Case 1, where P always pressures because P knows it will always escalate at the final node of the game. This leads to the first hypothesis.

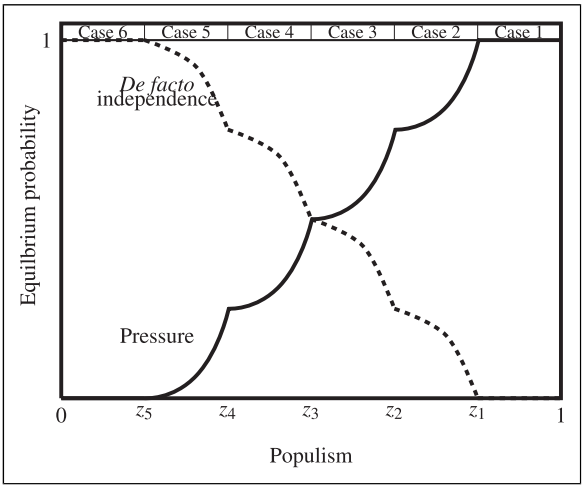

Figure 4. Predicted outcomes as a function of populism.

Hypothesis 1: *More populist governments are more likely than their non-populist counterparts to exert public pressure on central banks to ease monetary policy.*

The second observable outcome is whether the central bank asserts its independence after coming under pressure, equal to the probability that the politician climbs down at the end of the game, conditional on having pressured, irrespective of whether markets have ignored or disciplined. This probability is equal to the sum of the non-shaded regions divided by the sum of the areas to the left of b_p in Figures 2 and 3.[13] Figure 4 shows that this conditional probability is weakly decreasing in populism. Beginning in Case 6, the central bank knows that P will always choose the status quo. Given this, the CB's best response is to always choose resist, as this preserves the CB's *de facto* independence with probability 1. However, as we move into Case 5, the probability that P will pressure increases with P's degree of populism. As a result, there is a positive probability that the CB either concedes or resists, only to have P escalate at the final node of the game. Regardless, the positive probability that the CB will ease monetary policy and lower interest rates to P's preferred level implies that the CB has a lower probability of attaining *de facto* independence after being pressured. Analogous to hypothesis 1, this process continues until we reach Case 1, where P always pressures, and the CB always concedes. This leads to the second hypothesis.

Hypothesis 2: *Conditional on pressure occurring, the more populist the government, the more likely central banks are to ease monetary policy.*

Measuring Pressure on Central Banks

To test the predictions of our model, we build a narrative measure of public pressure on central banks. We rely on the country reports by the EIU. Country reports are published monthly or, for some low-income countries, on a quarterly basis. The reports are often highly similar in structure over long periods of time as analysts keep following the same country, offering an unrivaled consistency in language that facilitates quantitative text analysis. This makes the EIU reports much more suitable for the development of a quantitative measure than, for example, newspaper reports or analyst evaluations from diverse sources.

EIU reports have been used elsewhere in the literature: Binder (2021) has similar goals—documenting evidence of public pressure on central banks—and codes EIU reports as well as those from the Business Monitor International for the period 2010–2018. Although our objectives are related, our approaches differ: Binder focuses on reports of the "central bank resisting or attempting to resist" pressure (Binder, 2021, 6) and codes from the reports when the bank succumbs to such pressure or the government directly controls bank policy by ordering money printing. We worry that even using a

high-quality source and error-free coding, this method ultimately relies on the subjective judgment of the central bank's behavior by the analyst.

We prefer a more cautious approach: We code a "pressure event" whenever an EIU report states that a member of the government or a governing party has *publicly* demanded that the central bank lower interest rates, but we do not use the EIU reports' judgment on whether the central bank complies. We reason that public pressure on the central bank is readily observable because it is reported by newspapers and broadcast media. To measure the central bank's *reaction,* we prefer to rely on directly observable changes in interest rates. Likewise, we do not consider the many related actions governments propose to boost the economy, from trying to affect the exchange rate to using central bank reserves or, in autocratic contexts, to simply order the central bank to directly finance government, as it is not conceptually meaningful to speak of legal central bank independence in this context (as done in Binder's paper). Finally, governments often simply oust central bank governors or weaken central bank independence. We explore whether these alternative choices are also affected by a government's populist stance, but these are not counted as pressure events in our data.

The EIU country reports are available in a consistent electronic format since January 1996. Fortunately for our analysis, the number of legally independent central banks prior to that date is relatively small. Data constraints force us to end our analysis period with the year 2016. Nonetheless, a period of 20 years with monthly reports on over 180 countries, and only considering those that actually have a national central bank, we still have over 9000 reports to analyze.

Text Classification Through Supervised Machine Learning

To make this task manageable, we draw on the approach developed by Katagiri and Min (2019) and use supervised machine learning to classify the texts. From the set of 9000 reports, we draw a random sample of 2100. We then read these 2100 reports, and classify each as whether it reports *public pressure on the central bank* to ease monetary policy. We find that public pressure is not uncommon, occurring in approximately four percent of country-months.

The human-classified sample of reports is then used to train and validate our machine learning model. Before doing so, we undertake a number of standard text pre-processing steps described in the online appendix in section A-2.2. We focus on relevant sections by creating excerpts of a window of 25 words around any of the terms "central bank," "monetary," "interest rate," and "lending." We then split our training data so that 75% of the texts are used to train the model, with the remaining 25% held out for the validation of the

model. Trying various classification models, we find that the best performing model is a linear support vector machine.

Validation

How good is our model at classifying the texts? As is standard in machine learning, validation means verifying what percentage of observations in the test data are correctly classified by the model compared to the true (i.e., human) understanding. The test data has not been used to train the model itself, so the validation is an out-of-sample prediction. Table 1 provides an overview. Given our binary classification, we can check the sensitivity and specificity in analogy to a medical diagnostic test. Sensitivity is the proportion of positive results out of the number of samples which were actually positive, which in our case is 58%. Conversely, specificity is the proportion of negative results out of the number of samples that were actually negative. Here, it means that if there is no evidence of pressure on the central bank, then 98% of these cases are correctly classified.

Estimated Instances of Pressure on Central Banks

Our model predicts extremely well when there is no evidence of public pressure, but is less certain when it detects potential evidence of pressure. We use our model to classify the remaining texts, and again in analogy with a medical test, we submit these to further scrutiny: We read the full report of all cases where the model has predicted pressure. Where needed, we correct the model classification to either zero or one. In several instances, we also adjust the timing, as the report cites pressure having occurred in a previous month, setting the pressure variable to one there and to zero in the month of the report, unless the pressure is explicitly noted as ongoing or recurring. In our replication data, we provide the relevant quotes from the reports for all instances of our manual classification for full transparency.

Limited data for some control variables leaves us with a sample of 35 low- to upper middle-income countries, as shown in Table 2. Not all countries are in the data for the entire analysis period because of changes in the exchange rate regime: We use the Ilzetzki et al. (2017) exchange rate classification to exclude country episodes when they are in a "hard" currency peg, a monetary union, or when they

Table 1. Measures of Model Accuracy.

Cohen's κ	Accuracy	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
0.54	0.78	0.58	0.98	0.56	0.98

are experiencing hyperinflation with an exchange rate in free-fall when monetary policy has by definition little effect.[14] We also drop countries that do not have legally independent monetary authorities, using the usual cut-off of 0.4 in the Garriga (2016) index of central bank independence. In our online appendix, we show that none of our results depend on these choices: All our findings hold when we include these countries, but we believe that they do not fall into the scope conditions of our model because they do not have an independent monetary policy.

Empirical Tests

Are more populist governments more likely to put public pressure on central banks to lower interest rates, per our Hypothesis 1? And if so, are they more successful in obtaining reductions in interest rates from the monetary authority than less populist governments, according to Hypothesis 2? To test our first hypothesis, we estimate reduced form models of the probability of pressure on the central bank. Our dependent variable (pressure) is binary, so that we estimate a probit model while accounting for the duration dependence by including cubed time terms (Carter & Signorino, 2010). In alternative specifications, we use Poisson count models of the pressure in the previous quarter, linear probability models with an instrumental variable, and multinomial probit models of alternative outcomes. We adjust the standard errors to account for the clustering of our sample within country panels. Summary statistics are shown in Table A1 of the online appendix.

To test our second hypothesis, we rely on local projections (Jordà, 2005). While ideally we would estimate our model directly using statistical backward induction (Bas et al., 2008), to do so, we would have to rely on unobservable outcomes—whether the central bank has caved in—an approach we find problematic. Using local projections allows us to only rely on observable outcomes.

Operationalizing Populism

Despite the growing interest in populist politics, there is little agreement on how to measure populism (see Kenny, 2017, 2020). We draw on the

Table 2. Countries Examined.

Albania	Argentina	Bolivia	Botswana	Chile	Colombia	Costa Rica
Dominican Rep.	Georgia	Ghana	Guatemala	Indonesia	Israel	Kenya
Malaysia	Mauritius	Mexico	Moldova	Mongolia	Nicaragua	Nigeria
Paraguay	Peru	Philippines	Poland	Romania	Russia	Sri Lanka
Thailand	Tunisia	Turkey	Ukraine	Uruguay	Venezuela	Zambia

comprehensive V-Party dataset (Lührmann et al., 2020) and its continuous populism variable that ranges from zero to one. The data is defined by term dates of executives. In robustness checks, we also use the measure by Hawkins et al. (2019).

Control Variables

Left- and right-leaning parties have traditionally been seen to have different tolerances for inflation (Scharpf, 1991), so we control for the economic ideology of the main governing party using the left-right scale from the V-Party dataset (Lindberg et al., 2022). In addition, we explore to what extent populism may interact with this measure of economic liberalism.

For the role of financial markets, we follow Rey (2015) and, drawing on the IMF's Balance of Payments statistics, use capital outflows. Furthermore, considering what information the actors have at the point of decision, we assume that reports about capital outflows only arrive with a quarter lag. We use the gross outflows of portfolio and debt securities[15] and scale this variable to GDP.

Even if capital flows are considered a control variable and our results ought to (and do) hold with and without it, capital flows could be endogenous. To address this, we construct an instrument based on the existence of a "global monetary policy cycle" of gross capital flows (Brooks et al., 2015; Bruno & Shin, 2013; Forbes & Warnock, 2012) that is primarily determined by monetary policy in the United States. We calculate the country's share of global net capital flows and exclude the country's immediate neighbors (defined by geographic contiguity or in the case of island nations, proximity of capitals), again scaled to country GDP. We use this variable (also lagged) as instrument for the country-specific flows. At the same time, capital flows to neighbors may themselves be affected by country conditions, so that to satisfy the exclusion restriction we subtract these flows. This approach is therefore a shift-share (Bartik) design (Adão et al., 2019).

Following our model, we include the debt stock to GDP, as lower debt should shield a country from the effects of financial market volatility. We expect fewer threats to central bank independence in democracies because decision-making is more transparent (Broz, 2002), and because checks and balances are important for the credible delegation of authority to a central bank (Keefer & Stasavage, 2003). We use the Polity IV measure of democracy (Marshall & Jaggers, 2008). These variables are only available at annual frequency.

We obtain data on election months from Scartascini et al. (2018). Political business cycle theory predicts that an approaching poll might tempt governments to lean on the central bank to pump prime the economy. This variable equals 1 when either legislative or executive elections (depending on

the system) occur within 12 months. Furthermore, we include a dummy if an IMF arrangement is in effect in the month in question that explicitly calls for the government to improve the independence of the central bank, drawing on data by Kern et al. (2019).

Finally, we control for the lag of the logged change of the consumer price index because persistently high inflation may deter the government from pressing for further easing (Dreher et al., 2010), and the first difference of the log of the exchange rate because rapid exchange depreciations are unpopular with voters (Steinberg, 2022), may cause inflation, and may therefore dissuade a government from leaning on the central bank. Furthermore, following Lohmann (1992), we need to consider that a negative GDP shock may be associated with more public pressure. We therefore control for the lagged first difference of the log of GDP. Data for the economic variables is from the World Development Indicators and supplemented by country sources.

Although our data on public pressure and on populist governments and their terms is available at monthly frequency, our control variables are typically only available quarterly, so that we collapse our data to quarterly frequency to avoid artificially small standard errors.

Populist Governments and Pressure on the Central Bank

Table 3 shows our results. Model (1) is a probit model including only the populism score, showing that the conclusions are not driven by any particular choice of control variables (Lenz & Sahn, 2021). Model (2) includes the political control variables while model (3) is the full specification with all the economic control variables. Model (4) includes the interaction of the populism variable with the economic left-right scale. Model (5) (our preferred specification) adds the uninstrumented lagged financial outflows to this model. Model (6) is a Poisson model with the count of pressure events in the quarter as dependent variable. We instrument the lagged financial outflows variable with the constructed global shares variable described above in model (7), where we rely on a linear probability model. The first stage results for the IV model are in table A3 in the online appendix. Overall there is little indication that financial outflows are endogenous to political pressure on the central bank, but the results hold either way. Finally, model (8) shows the results for our full probit model using only the hand-coded observations and excluding the machine-predicted observations. Although this is a small sample of just 415 observations, the coefficient on populism is bigger, correctly signed, and statistically significant at the one percent level. Our results are therefore unlikely to be the result of the automatic classification, but the larger data set allows us to cover far more cases.

Across all models, we find consistent support for Hypothesis 1: The more populist a government, the more likely it is to put public pressure on a central

Table 3. Probit, Poisson, and IV-LPM Models of Pressure on the Central Bank.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Degree of populism	0.785**	0.863***	0.873***	0.738**	0.724**	1.037**	0.065	0.638***
	(0.304)	(0.262)	(0.263)	(0.245)	(0.250)	(0.321)	(0.034)	(0.140)
Economic left-right scale				−0.259***	−0.263***	−0.276*	−0.015	−0.019
				(0.071)	(0.071)	(0.110)	(0.010)	(0.104)
Populism × economic left-right scale				0.490**	0.470**	0.526	0.025	0.015
				(0.172)	(0.173)	(0.291)	(0.019)	(0.276)
Lagged capital outflows to GDP					−0.001*	−0.001**	−0.000	−0.002*
					(0.000)	(0.000)	(0.000)	(0.001)
Democracy		−0.064	−0.060	−0.059	−0.062	−0.079	0.002	−0.027
		(0.043)	(0.047)	(0.044)	(0.045)	(0.086)	(0.005)	(0.078)
Less than 12 months to election		−0.231	−0.229	−0.234	−0.212	−0.330	−0.019	−0.239
		(0.174)	(0.172)	(0.166)	(0.168)	(0.299)	(0.013)	(0.198)
IMF CB conditions		−0.471	−0.495	−0.527	−0.541	−0.695	−0.028	−0.341
		(0.421)	(0.424)	(0.450)	(0.452)	(0.699)	(0.025)	(0.245)
Debt-to-GDP ratio			−0.004	−0.006	−0.004	−0.014	0.001	−0.049
			(0.011)	(0.011)	(0.010)	(0.022)	(0.001)	(0.031)
Lagged inflation			0.013	0.014	0.005	−0.047	−0.011	0.096
			(0.066)	(0.066)	(0.066)	(0.080)	(0.007)	(0.088)
Lagged Δ exchange rate			1.391	1.185	0.246	0.365	−0.333	5.729
			(4.400)	(4.519)	(4.690)	(7.772)	(0.493)	(5.516)
Lagged Δ GDP			2.837	2.753	3.551	4.753	0.355	5.509
			(3.574)	(3.623)	(3.328)	(6.440)	(0.288)	(7.764)

(continued)

Table 3. (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
t	−0.178***	−0.181***	−0.181***	−0.180***	−0.181***	−0.344***	−0.020***	−0.170**
	(0.021)	(0.022)	(0.023)	(0.022)	(0.022)	(0.058)	(0.004)	(0.054)
t^2	0.004***	0.005***	0.004***	0.004***	0.004***	0.009***	0.000***	0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.003)
t^3	−0.000***	−0.000***	−0.000***	−0.000***	−0.000***	−0.000**	−0.000***	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo-R^2	0.315	0.328	0.330	0.338	0.345	0.339		0.356
Chi-square	181	270	380	509	549	713		19837
Log-likelihood	−217	−213	−212	−210	−207	−265		−89
N	2000	2000	2000	2000	2000	2000	2000	415
Number of clusters	35	35	35	35	35	35	35	17

Huber-White standard errors clustered by country. First stage of the instrumental variable model is shown in the online appendix.
*$p < 0.05$,**$p < 0.01$,***$p < 0.001$.

bank. To interpret the coefficients, we can calculate the average marginal effect over all observations on the probability of pressure on the central bank.[16] In our full probit model, the probability of pressure in our model is around 3.7 times greater when we move from the lowest to the highest populism score in the sample. This effect size holds approximately across all specifications. We also find that governing parties that are ideologically further to the right on economic issues are less likely to attack the central bank, which accords well with their likely preference for lower inflation. The coefficient on the interaction between populism and the economic left-right scale is statistically significant, indicating that sufficiently populist right-wing parties are most likely to attack the central bank, while very economically left-wing parties are only likely to do so when they are not very populist, as shown in the contour plot in Figure 5. However, this finding is at best suggestive and could be a type-1 error (Esarey & Sumner, 2018): When we conduct pairwise tests (code provided in the replication data) adjusted for multiple comparisons (Šidák, 1967), we find that the differences between combinations of values of populism and the economic left-right scale are only

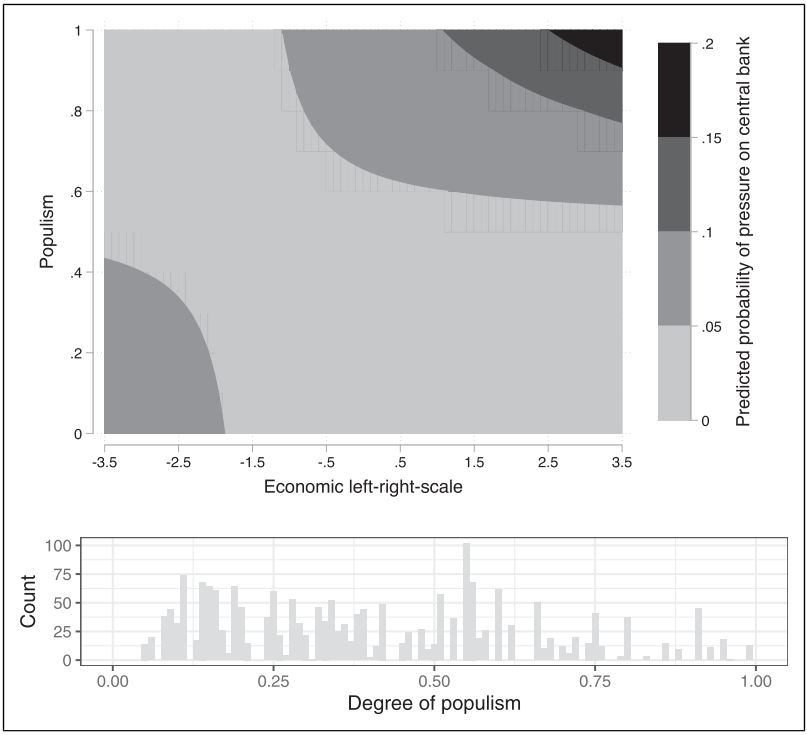

Figure 5. Contour plot of the marginal effects: Probit model (5).

statistically significant at extreme values that are barely represented in the data, as the histogram shows. In the sample of hand-coded data, there is no evidence of an effect of the economic left-right scale or its interaction with populism. Plots of the marginal effects of populism for different values on the economic left-right scale for models (5) and (7) are shown in the online appendix in Figure A2 in the online appendix.

Turning to the effect of international financial markets, if capital outflows as percentage of GDP increase from the sample average to one standard deviation above, the probability of public pressure on the central bank decreases by around 45 percent—a noticeable but substantively modest effect of financial market discipline.

Our variable counting the time since the first pressure event or the entry into the sample—usually, the granting of independence to the central bank—is negative and statistically significant at the $p < 0.001$ level. The squared and cubed terms are positive and negative, respectively, and significant as well. Substantively, it suggests that the longer the central bank independence has been respected by previous governments, the more stable this institution and the less likely a future public attack.

While the remaining control variables generally have the correct sign, they are rarely statistically significant in any of our full specifications. This should not be seen as a rejection of political economy models of monetary policy-making, but simply reflects that they are slow-moving.

Public pressure is not the only choice in our bargaining model: In line with our "all out conflict" equilibria, governments could also replace the central bank governor or weaken legal central independence directly. To estimate the relative probability of these outcomes, we construct data as follows: we use the irregular central bank governor turnover provided by Dreher and collaborators (Dreher et al., 2008, 2010; Sturm & de Haan, 2001) and extract the exact date of the event from their data. For legal steps to weaken central bank independence, we draw on Garriga (2016). In both cases, we locate the precise event date in the EIU reports if needed. We then estimate a multinomial probit model with "no event" as base category.

Coefficient estimates are shown in Table 4, where we omit non-significant control variables for clarity. Our model predictions are again confirmed: Populism increases the probability of public pressure on the central bank, but not the probability of irregular central bank governor turnover or a weakening of legal CBI. Although the latter are rare events, they are associated with a high debt-to-GDP ratio, a rapid weakening of the exchange rate, and economic contractions. Perhaps CB governors lose their job not because of high inflation but because of poor economic outcomes, avenues for future research.

In this model, the evidence for the relationship between populism and economic right-wing ideology is stronger. The pairwise comparisons of the marginal effects are statistically significant for higher values of populism and

Table 4. Multinomial Probit Models.

	(8)
Pressure on CB	
Degree of populism	1.067**
	(0.345)
Economic left-right scale	−0.394***
	(0.102)
Populism × economic left-right scale	0.685**
	(0.243)
Lagged capital outflows to GDP	−0.001*
	(0.000)
Irregular governor turnover	
Degree of populism	0.306
	(0.332)
Economic left-right scale	0.073
	(0.114)
Populism × economic left-right scale	−0.352
	(0.213)
Lagged Δ GDP	−6.949**
	(2.440)
Weakening of CBI	
Degree of populism	0.687
	(0.715)
Economic left-right scale	0.630
	(0.335)
Populism × economic left-right scale	−1.235***
	(0.352)
Lagged capital outflows to GDP	−0.001*
	(0.000)
IMF CB conditions	−11.418***
	(0.891)
Debt-to-GDP ratio	0.039***
	(0.010)
Lagged Δ exchange rate	18.119***
	(3.797)
Log-likelihood	−460
N	2000
Number of clusters	35

Multinomial probit model with Huber-White standard errors clustered by country, base category is "no pressure." Statistically not significant controls omitted.
*$p < 0.05$,**$p < 0.01$,***$p < 0.001$.

the economic left-right scale. We show the marginal effects in Figure 6. Panel 1 shows the graphs for the effect on the probability of pressure across the range of populism for hard left-wing and right-wing populists. We do not find any statistically significant relationship between populism, the economic left-right scale, or their interaction with the probability of irregular CB governor turnover or legal changes to CBI—even though the coefficient of the interaction is significant for changes to the legal status, pairwise comparisons reveal that the differences between the marginal effects of any combination of values are not statistically significant. Accordingly, panels 2 and 3 in Figure 6 just show the marginal effect of populism with the other variables held at their observed values. In summary, the multinomial probit model indicates that populists leaning to the right on the economy are most likely to publicly attack the central bank.

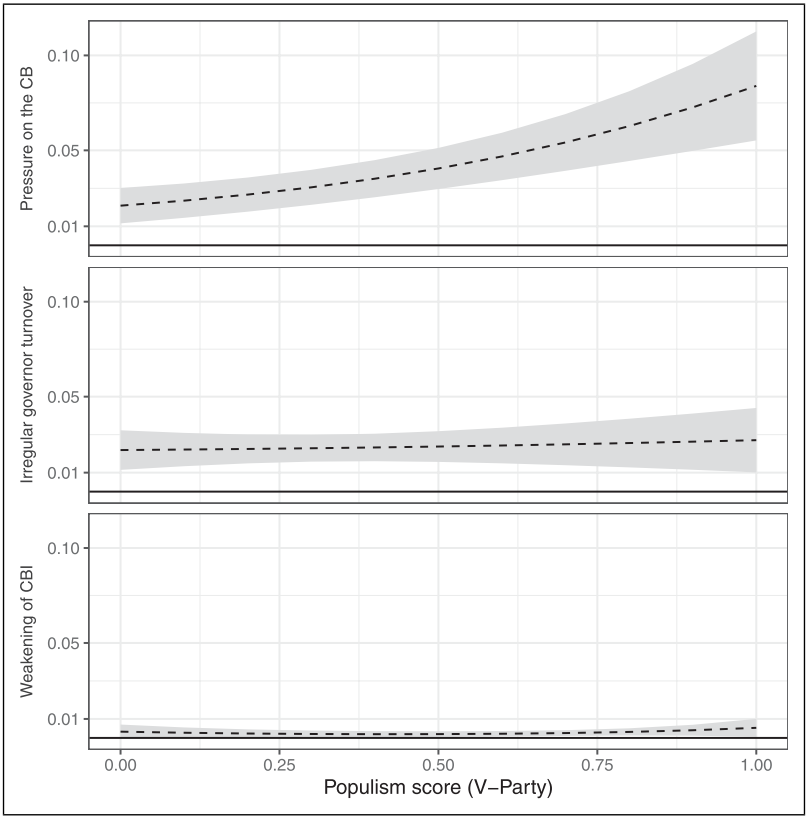

Figure 6. Effect of populism on predicted probabilities: Multinomial probit model.
Notes: Ribbons denote 95% confidence intervals.

The Effect of Government Pressure on Interest Rates

We have strong evidence that populist governments are more likely to issue public calls on central banks to reduce interest rates. But how do central banks react? According to our hypothesis 2, central banks should also be more likely to cave in to such pressure when facing a populist government. To test this hypothesis, we focus on realized policy effects. This permits us to rule out the alternative explanation described above, whereby populist attacks are merely empty rhetoric: In that case, we should see no difference in monetary policy after public pressure.

Such a test is challenging because even a pliant central bank might want to avoid a situation in which inflation spirals out of control because it would be apportioned blame. Moreover, in small, open economies, interest rates, inflation, and the exchange rate are endogenous.

The two standard approaches in macroeconometrics to deal with such endogenous time series are parametric vector autoregressions (VARs) and semi-parametric local projections (Jordà, 2005). The advantage of the local projection method is that it is robust to misspecification, asymptotically valid even with non-stationary data (Montiel Olea & Plagborg-Møller, 2020), and easily extendable to the large T, small N panel setting we are dealing with. Both estimate the effect of "shocks" in one variable on various related variables in the form of an impulse response function.

We use a narrative approach (Ramey, 2011), whereby the first instance of a shock (in our case, public pressure on the central bank) is treated as exogenous. Following Ramey and Zubairy (2018), we consider two "states of the world," in our case a populist and a non-populist government, and shift the threshold between the states along the range of the populism score. The state-dependent model for each horizon h of the projection, omitting country subscripts, looks as follows

$$\begin{aligned} x_{t+h} = {} & I_{t-1}\left[\alpha_{A,h} + \psi_{A,h}(L)z_{t-1} + \beta_{A,h}\ \text{pressure}_t\right] \\ & + (1 - I_{t-1})\left[\alpha_{B,h} + \psi_{B,h}(L)z_{t-1} + \beta_{B,h}\ \text{pressure}_t\right] + \varepsilon_{t+h} \end{aligned} \tag{6}$$

where x is the variable of interest (the monetary rate or inflation), z is a vector of controls, $\psi_h(L)$ is a polynomial in the lag operator of order 2, and *pressure* is the pressure event. Our control variables are the first differences of the (logged) inflation rate or the monetary policy rate set by the central bank, the (logged) exchange rate as response variables, and the net flows to GDP. In addition, z includes lags of the pressure variable to control for serial correlation. We furthermore use the Huber-White correction, clustered at the country level, to allow for serially correlated error terms.

These estimates reveal that once the populism score approaches the middle of its range (0.5), there is a statistically significant difference between central

bank's reaction between the two states: Over the horizon of our projections, the estimated coefficient for the impulse response of the monetary policy rate is lower for populist than for non-populist government. If we raise the threshold to the upper quartile of the populism score, the effect is even more pronounced. This means that, for example, Benjamin Netanyahu's in his fourth term as prime minister of Israel (2015–19) or Nestor Kirchner, President of Argentina from 2003 to 2007, are still "low-populist governments" with scores of (0.647) and (0.659), respectively, but the subsequent Férnandez de Kirchner government (0.869) or Turkey under President Erdoğan (0.962) are "high-populist governments."

Using this threshold, the top panel in Figure 7 shows the impulse responses of the monetary policy rate to government pressure on the central bank. For a single pressure event, high-populism governments obtain a reduction of the monetary policy rate of about 0.3 percentage points on average after three quarters. There is no evidence that central banks cave in to pressure from low-populist governments, as the 95% confidence interval always includes zero.

Furthermore, not only do central banks lower monetary rates in response to high-populist governments' pressure, but they cause upticks in inflation as a result. The bottom panel in Figure 7 shows that a high-populist pressure shock causes inflation to increase 0.5 percentage points faster after six quarters. These differences are significant at the 5% level after three quarters. There is no evidence that public pressure by low-populist governments has this effect,

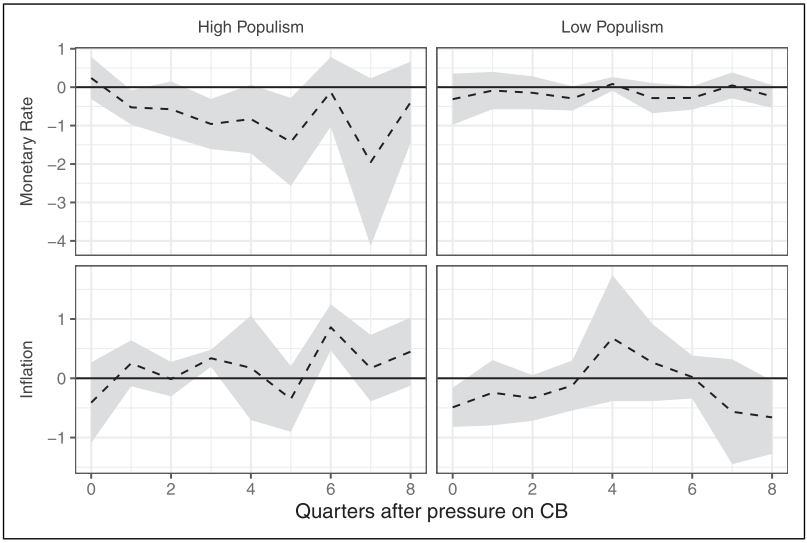

Figure 7. Impulse response of the monetary policy rate and inflation to pressure shocks. *Notes:* Ribbons denote 95% confidence intervals.

as shown in the bottom right panel. The coefficient estimates with standard errors and *p*-values for the tests of difference of coefficients are shown in Table A-3.5 in the online appendix.

Further corroboration is that the response to the inflation rate follows the monetary rate reduction with a lag. The time it takes from a pressure event to a reduction of the monetary policy rate and possibly an increase economic activity may also explain why we do not observe a political business cycle effect. Either way, as predicted by our hypothesis 2, sufficiently populist governments will obtain interest rate concessions from the central bank, while less populist governments do not achieve this even when they criticize the central bank publicly. The price is an uptick of the inflation rate.

Overall, we therefore find considerable support for our model. Testing our hypothesis 1, we find that populists are far more likely to exert pressure on a nominally independent central bank. Probing hypothesis 2, we show that public pressure on the central bank often leads to reductions in the monetary policy rate and increases in inflation when highly populist governments are at the helm, but not so when less populist governments criticize the central bank.

Finally, in Table A3 of the online appendix, we show a number of robustness checks. We include developed countries, cases of country-years that experience hyperinflation or a freely falling currency, and all countries that have their own currency whether in a fixed exchange rate or not, to show that our results are not driven by our sample selection. We also replace the V-Party populism score with the populist speech measure from Hawkins et al. (2019). Our results are substantively the same. In the replication materials, we provide code for a variety of additional checks that we describe in the online appendix.

Conclusion

Despite the well-established economic benefits of central bank independence, populists frequently seek public conflict with nominally independent monetary authorities. As our study shows, such instances of public pressure are not merely "playing to the gallery," but strategic attempts to obtain interest rate concessions. Because strongly populist governments are willing to incur considerable costs in such conflicts, central banks are more likely to concede to them. We do not observe this when less populist governments criticize their central banks. When populists are in power, their determination and strategic use of public attacks clearly threatens the *de facto* independence of the central bank, even if the façade of legal independence is maintained. There is little evidence that institutional guarantees can prevent this outcome, but even the fleeting glances of international markets can impose some discipline on populists. We also find that populists are no more or less likely to remove central bank governors or change central bank laws than other governments. Finally, we

find weak evidence that populists that are leaning to the right on economic issues are more likely to attack the central bank.

Our results advance the literature in two ways. First, we document that political pressure on central banks is a recurring practice of populists around the world, despite the widespread diffusion of *de jure* central bank independence and strong norms against such pressure. Second, we find that financial market discipline matters, helping central bankers to pursue an independent monetary policy even when legal foundations are not respected.

Our results also suggest new avenues of research: Although we find that governments appear to watch financial markets, our paper does not investigate how these markets react. There is evidence that left-leaning governments face greater scrutiny from international investors (Sattler, 2013), but we do not know if the same is true for populists. We also do not know when politicians install central bank governors who are closer to their preferences (Ennser-Jedenastik, 2014).

As events such as tweets by former US President Trump chiding decisions by Federal Reserve Chairman Powell have shown, political pressure on central banks can appear in advanced and emerging market economies alike. In mature democracies, the institutional foundations appear sound, so that for the time being, central bank independence is not under serious threat. The same cannot be said for many emerging markets. With the wave of populist governments around the world not yet breaking, the freedom of central banks to pursue monetary policy free from political interference cannot be taken for granted on the bases of legal statutes alone, and the "repoliticization" of central banking (Fernández-Albertos, 2015, 232) is a genuine possibility.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. See Fey and Kenkel (2021) for further details on this distinction.
2. Making the market reaction endogenous complicates the game considerably and results in identical predictions and testable hypotheses. We thus present the simpler version of the model here and the strategic-markets version of the game as an extension in the online appendix.
3. The 1 in these payoffs is the normalized interest rate differential, $i_{cb} - i_p$.
4. The model is agnostic regarding the course of interest rates under open hostilities. As in Schultz (1999), w_p and w_{cb} embody the expected value of conflict, which we assume will be a net negative for both players.
5. As in many games of this type, there is in fact an infinite number of equilibria in the game because each combination of the parameters leads to a unique equilibrium. The online appendix outlines six cases that cover the entire parameter space.
6. b_p is defined below.
7. Note that (3) could also be used to derive b_p.
8. Figures 2 and 3 correspond to case 3 in the online appendix.
9. We say effectively because, strictly speaking, z is a multiplicative term that is applied only after w_p is drawn. However, given that both P and the CB know P's payoff structure, the distribution from which P's conflict cost is drawn effectively includes the multiplicative effect of z.
10. Figure 4 was constructed with the following parameter assumptions: $\alpha = 0.15$, $r = 0.1$, $\gamma = 0.25$, and $\pi = 0.3$, but the general shape of Figure 4 does not depend on these specific parameter values.
11. Details on the derivation of these boundary points are found in the online appendix.

12. To obtain closed-form expressions for $F_p(b_p)$ and the probability that the CB will attain de facto independence, we assume that P's and the CB's conflict costs are drawn from the standard uniform distribution. This assumption is without loss of generality.
13. Formally this probability is: $\gamma F_{cb}(k^d_{cb})[1 - F_p(k^d_p)] + (1 - \gamma)F_{cb}(k^i_{cb})[1 - F_p(k^i_p)]$.
14. This means we include only countries with exchange rate regimes in categories 3–14 in the Ilzetzki et al. (2017) "fine-grained" classification.
15. This is the same variable concept as in Copelovitch and Singer (2017).
16. The average marginal effect is based on the actually observed values, unlike the marginal effect with the remaining variables held at the sample mean that may not be representative of actual values in the data.

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