

Political Regimes and Informal Social Insurance*

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Abstract

Deliberate non-enforcement of the law has been analyzed as a policy tool to redistribute income. I show that it also responds to political incentives for the provision of insurance, resembling two well-known dimensions of social policy design. I analyze data from a large informal program of social insurance in the world: informal access to electricity service. Transmission and distribution losses (TDL) in the electricity sector are counter-cyclical because non-compliance and theft increase during economic crises. By exploiting variation in political institutions, I capture political motivations for the provision of informal insurance. Using a panel of 110 developing countries (1970-2014) and instrumental variables for business cycles and regime type, I show that unlike highly entrenched autocrats, democracies tolerate increases in electricity losses during negative income shocks. This paper expands the literature on “forbearance” showing how the provision of informal insurance varies across the developing world.

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1 INTRODUCTION

It is common wisdom that the state in developing countries cannot protect the population against poverty and social exclusion. An existing scholarship suggests that non-enforcement of the law often results from politically motivated decisions with the aim of providing imperfect substitutes for social protection (Feierherd, 2020, Holland, 2015). These contributions emphasize *redistributive* motivations by which politicians informally reallocate resources as a means of avoiding the costs of what otherwise would be a more economically costly and politically controversial action of formal redistribution. Here, I show that non-enforcement is also widely used to provide informal social *insurance* in highly volatile economies, resembling two well-known dimensions of (formal) social policy design. I analyze a large program of informal transfers in the developing world, namely, informal access to electricity service.

I exploit existing variation in political institutions as an strategy to capture incentives for the provision of informal insurance. On the one hand, informal insurance ameliorates immediate political effects of crises by building political support and weakening political opponents. On the other hand, informality and violations of property rights have negative long-term effects on productivity, growth, and potential future revenue. Depending on their time horizons, incumbents from different political regimes adopt different enforcement strategies to solve this trade-off between short-term benefits and long-term costs of informal insurance. I analyze data from 110 developing countries between 1970 and 2014 and find that electricity losses are highly counter-cyclical in democracies but not in autocracies, which supports the argument that leaders with short time horizons are more likely to provide insurance informally. The cumulative effect of a 1 percentage point deviation from the growth trend in democracies is associated with a cumulative effect of about 10 percent change in transmission and distribution losses. Among autocracies, only rulers with short time horizons behave similarly to their democratic incumbent counter-

parts. Moreover, results are robust after implementing instrumental variables for both the regime type and the business cycle. Borrowing from the literature on democratization waves, I instrument for democracy using spatial data on the year mean of democracy in a country's region. As a means of instrumenting for the business cycles I use the economic cycles occurring in a country's export destinies.

The paper contributes to different literatures. Both selectorate theory (Bueno De Mesquita et al., 2005) and theories of redistribution (Acemoglu and Robinson, 2003, Meltzer and Richard, 1981) predict that democracies make a larger effort in public goods provision. As incumbents are responsive to social demands they need to build larger coalitions to secure political support. These theories find significant differences in the *formal* provision of public goods and human development across political regimes (Ansell, 2008, Brown and Hunter, 1999, Stasavage, 2005). This is the first contribution showing how political regimes also affect provision of *informal* social insurance.

An important but scant literature has analyzed the politics of electricity supply in developing countries. Brown and Mobarak (2009) show that democratization shifts the provision of electricity from the industrial to the residential sector in developing countries, and Min (2015) shows that democracies provide more electricity to the poor than do autocracies. Min and Golden (2014) analyze local elections in India and demonstrate that power losses (due to irregular access and theft) follow political business cycles. Consistently, I also find that politicians manipulate enforcement against non-compliance with service fees when they have the incentives to do so. Finally, my contribution is closely linked to the scholarship building on the idea that one important causal channel for political non-enforcement is the presence of insurance motivations (Forteza and Noboa, 2021, López-Cariboni, 2019, Ronconi, 2012).

2 LINKING POLITICAL ECONOMY ACCOUNTS OF ENFORCEMENT TO SOCIAL POLICY DESIGN

Political explanations of enforcement posit that regulatory agencies are sensitive to the political environment because they act in a “fragile balance between the interests of economic activity on the one hand and the public welfare on the other” (Hawkins, 1984). Constraints to deterrence involve the political unacceptability of negative social and economic outcomes such as driving firms out of business (Mendeloff, 1979), harming economically vulnerable employers (Ayres and Braithwaite, 1992), or increasing the level of unemployment (Moe, 1985). Short (2019) shows that the political economy literature converges in identifying elected officials as actors who face incentives to manipulate enforcement. I compare regularly elected incumbents with non-elected ones to explain variation in the provision of informal insurance.

There are supply- and demand-side reasons for the deliberate political decision of not enforcing of the law (Becker, 1968). Recent scholarship suggests that non-enforcement often results from politically motivated decisions rather than being solely a function of state capacity (Brollo, Kaufmann and La Ferrara, 2020, Casaburi and Troiano, 2016, Dewey, 2018, Feierherd, 2020, Holland, 2016). This literature emphasizes redistributive motivations in which democratic incumbents *informally* reallocate resources between different groups. At the core of these accounts is the idea that incumbents not only decide on lowering enforcement but also on who is targeted with its benefits. While providing an insightful approach, these prominent explanations—and specially those oriented to ‘welfarist’ forbearance (Holland, 2015)—are rather static forms of redistribution. Yet, enforcement may be a “revocable” temporary action (Dewey, Woll and Ronconi, 2021, Holland, 2016) or a stable decision with variable and yet predictable consequences over time, as is the case of informal insurance. Thus, important dynamics at play remain still underexplored.

Yet, a broader view to the enforcement literature suggests that pressures for non-compliance can have different origins. One is the distributive interests of powerful actors. For instance, weak enforcement could protect workers from unemployment if informality buffers income volatility (Ponczek and Ulyseas, 2022), but it may also result from unmet de-regulation demands from the part of capitalists. The overall impact may be negative for workers since they lose mandated social benefits (Almeida and Carneiro, 2012). Likewise, informal transfers in the electricity sector may reflect fiscal and redistributive constraints such as political opposition against expensive projects involved in sustaining *formal* access. If any, the provision of informal social insurance is in itself a manifestation of the limits of redistributive politics in developing democracies (Ross, 2006).

I begin my argument by laying out assumptions about preferences for enforcement. Supply-side explanations of non-enforcement should assume some underlying structure of preferences. This is, why political incumbents would lower enforcement as a means of allowing more people to consume electricity during negative income shocks? A contribution of this paper is considering how different types of informal transfers involve different levels of *risk-pooling*, *rivalry*, and *externalities*. Depending on the specific combination of these three features a given informal transfer adopts, it will generate different corresponding individual motivations for, insurance, redistribution, and collective goods.

When informal transfers involve the provision of rival goods, targeted beneficiaries support low-enforcement while non-beneficiaries are against forbearance. Hence, the perceived rivalry of an informally transferred good increases redistributive considerations often aligned with class-cleavages as in the case of street vending and squatting (Holland, 2015). The risk-pooling potential of a given informal transfer increases insurance motivations backing up its political support. Risk-pooling happens when those who face a negative shock are insured by an informal policy which is in turn financed by contributions of other members of the group. The broader the scope of the informal policy, the higher its risk-pooling potential. Thus, the support for the informal transfer may

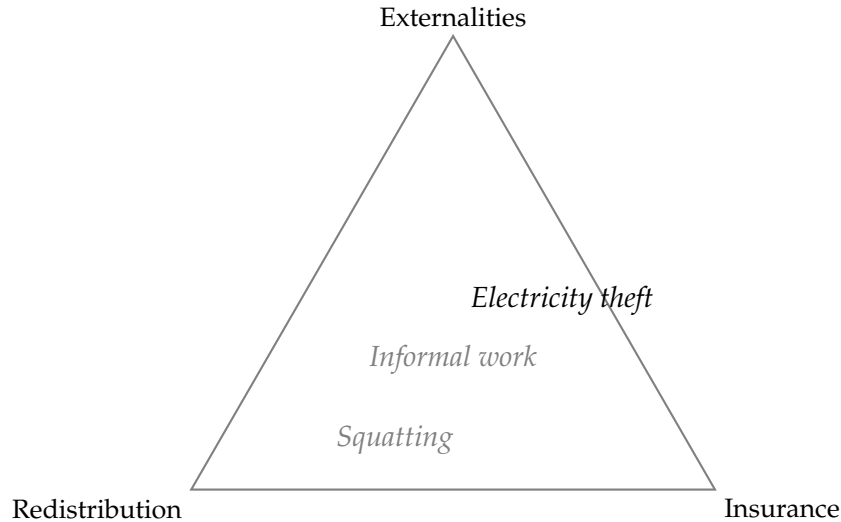


Figure 1: Theoretical Motivations Backing-Up the Provision of Different Forms of Forbearance

exceed the size of current beneficiaries since other high-risk non-beneficiaries derive positive utility from lower future uncertainty. Welfarist forms of non-enforcement always involve elements of both insurance and redistribution, as it happens with any other formal social policy (Moene and Wallerstein, 2001). In the case of insurance, politicians are less involved in resolving class-based conflicts. Consumption-smoothing informal transfers, such a electricity theft during crises, benefit the poor and the non-poor in risk of poverty. This reasoning parallels existing accounts on the politics of social security (Iversen and Soskice, 2001, Moene and Wallerstein, 2001) but it remains underdeveloped in the study of informal social policy. The third element is the perceived positive externalities of informal transfers. Weak-enforcement may ensure broad access to basic services which is key for general economic growth. The presence of positive externalities affect preferences in the direction of support for collective goods, which does not involve disagreement between members of society since everyone in the group wants to enjoy its benefits. Thus, I assume that popular support for informal social insurance increases with risk-pooling, low perceived rivalry, and positive externalities of broad consumption.

The diagram in Figure 1 helps to see how different forms forbearance activate de-

mands for redistribution, insurance, and public goods in different degrees. Legal violations ignored by governments such as squatting or allowing workers to work informally involve the three components simultaneously.¹ For instance, land invasions increase with negative income shocks (Hidalgo et al., 2010) while squatters also seek to feeling secure of their properties (Holland, 2017). Yet, squatting also activates strong perceptions of rival consumption between invaders and landowners. Theoretically, if rivalry in consumption is assumed to dominate, a distributive model of forbearance would apply to explain provision where a key predictor is the distribution of income. Weak enforcement against labor informality could help to sustain employment, but it may also negatively affect formal workers and benefit capital. Incumbents may thus consider both insurance and redistributive consequences of not enforcing labor contracts, as well its externalities (Feierherd, 2020). The goal here is not to accurately map different forms of forbearance (and this is ultimately and empirical question) but to emphasize that political economy explanations should consider the theoretical expectations about how the type of informal good being assigned affects social preferences. I explain below why I locate weak enforcement against electricity theft closer to positive externalities and insurance, de-emphasizing redistributive motives due to lower perceptions of rivalry in electricity consumption.

2.1 IRREGULAR ELECTRICITY ACCESS: RISK-POOLING AND EXTERNALITIES

Irregular electricity consumption and theft are economically important at the aggregate level (Smith, 2004). This phenomenon may manifest by fraud, stealing power from the grid, billing irregularities, and unpaid bills (Depuru, Wang and Devabhaktuni, 2011, Winther, 2012). The most important reason for irregular access to basic services is affordability. Electricity represents a considerable share of household expenditures. Around 2002-2003 households from the lowest income quintile spent only in electricity about 6.2% of their income in Argentina, 10.2% in Armenia, 10% in Colombia, 9.7% in Turkey, and

¹I thank an anonymous reviewer for point this out.

12% in Uruguay (Komives et al., 2005). Full enforcement in this policy area is a politically contentious issue (Min and Golden, 2014), which aggravates with bad macroeconomic conditions.

The perceived rivalry in consumption of electricity is however low if a marginal increase in irregular access to electricity does not prevent access by others. Of course, this only happens up to a given point in which electricity theft may result in power outages (Lewis, 2015). In many countries irregular consumption may expand access to basic services without substantially harming consumption opportunities of others in society.

Electricity provision is a collective good (Abbott, 2001, Min, 2015) with positive externalities for human development and economic growth (Abbott, 2001). Under formal provision users must comply with consumption tariffs, which makes it an excludable collective good.² Those affected by a negative shock may become temporarily unable to comply with the service fees and become excluded, unless they could access for free or informally. When sustaining access to electricity over the business cycle has enormous positive effects for everyone. Indeed, many scholars have also identified *secure access* to electricity as a public good (Alesina, Baqir and Easterly, 1999, Chhibber and Nooruddin, 2004). Abbot (2001, 32) asserts that "security [of electricity supply] is nonrival in public good terms. [...] Security of supply also appears to be nonexclusive in that it is difficult to exclude people from benefiting from that reduced risk."

Informal transfers through irregular electricity access has a strong mechanism of risk-pooling. The unbilled consumed energy is often translated into the electricity bill of regular clients, or alternatively, into revenue losses for the transmission and distribution electricity company. When companies are state-owned, electricity theft may be fully absorbed by the utility which is equivalent to a transfer from general tax revenue. Private providers often receive government compensation for non-compliance so that they can sell their

²Electricity provision can be seen as a collective good, an impure public good, such as those with non-rival consumption but excludable, or non-excludable but rival, depending on the specific conditions it is provided. See, for example, (Kotchen et al., 2006).

product to the residential sector below the marginal cost of production, indicating that these firms do not fully adjust prices to balance budgets (Burgess et al., 2020). Subsidies to electric utilities and electricity losses tend to go together (Di Bella et al., 2015), which implies that the costs of electricity theft are distributed across the economy as a whole (Lewis, 2015). Forbearance in this policy area is a far-reaching policy, and the benefits are not only captured by those in extreme poverty but also by the non-poor who facing a shock decide to consume informally. Thus, legal customers bear part of the cost through higher electricity prices (Jamil, 2013, Winther, 2012), while society may also distribute these costs through lower fiscal revenue or higher subsidies. This type of welfarist informal transfer may be used as an insurance mechanism in the benefit of broad segments a developing country population.³

I stress that the cyclical component of irregular electricity consumption captures the behavior of high-risk groups who make use of informal insurance as a means of sustaining their access to basic services, provided the state deliberately allows them to do so. In Latin America, a non-poor, low-income household has a probability of falling in poverty of 82.4% in the event of losing labor income (ECLAC, 2019). López-Cariboni (2019) documents that non-technical electricity losses (theft) negatively react to spikes in unemployment in both slums and residential neighborhoods in Montevideo, Uruguay. An informal social insurance policy is in place when the state implements actions for redistributing social risks. Table OA-2 (Section OA-C) shows that cycles in electricity losses, as measured in the main dependent variable, significantly affect citizens access to electricity such that they help to sustain coverage in democracies. In autocracies, a substantial fraction of citizens may perceive deterrence when losses go up restraining from accessing to electricity at all. Hence, in regimes where informal insurance is being implemented, irregular consumption is protecting vulnerable groups that otherwise would lose access

³When leaders can target informal transfers, for example to controlled districts by the ruling party, weak enforcement may take the form of a local public good as long as districts have heterogeneous risk-profiles. I thank an anonymous reviewer for rising this point. Section OA-M provides a more detailed discussion.

to the grid.

In sum, risk-pooling increases support for informal insurance among high-risk members despite their current beneficiary status. Non-rivalry in consumption, in turn, diminishes redistributive motivations and opposition among low-risk individuals who are net contributors. Positive externalities due to high service access increases demand as a public good and expands support across the board.

Extant literature observes non-enforcement as a form informal insurance in democratic countries from the developing world (Forteza and Noboa, 2021, Loayza and Rigolini, 2011, López-Cariboni, 2019). Forteza and Noboa (2021) argue that individuals in weak states demand state flexibility to evade taxes in the face of a negative economic shock. Internationally inspired trade shocks motivate non-enforcement of labor regulations and counter-cyclical labor informality (Loayza and Rigolini, 2011, Ronconi, 2012). Formal social policy equivalents in OECD were described as the “compensation hypothesis” (Garrett and Mitchell, 2001). As I explain below, when expanding taxes and borrowing from international credit markets are not available options, democratic incumbents from the developing world face large political incentives to provide social insurance *informally*.

However, alternative explanations to weak-enforcement should also consider the possibility that incumbents do not control the enforcement process, that other substitute policies such as subsidies are available, and that different actors such as private utilities can either increase deterrence or benefit from non-compliance. I explore these alternatives and provide further analyses in Section 6 below.

3 THE ARGUMENT: POLITICAL REGIMES AND INFORMAL SOCIAL INSURANCE

Based on selectorate theory of public goods provision (Bueno De Mesquita et al., 2005), scholars have explained electrification rates and provision of electricity service targeted to key political constituencies (Ahlborg et al., 2015, Brown and Mobarak, 2009, Min, 2015). Democracies are responsive to a larger coalition and are expected to expand more service

provision residential sector relative to provision to the industry (Brown and Mobarak, 2009). Thus, democratic leaders are more likely to have the goal of universalizing access. Autocracies privilege a narrower group such as the industrial sector and citizens who are likely to belong to the winning coalition. Yet, autocrats also consider service provision beyond this group when evaluating the productive gains of electricity access and its consequences on future growth and potential revenue (Acemoglu and Robinson, 2006). Electricity provision is a “productive good” with dramatic consequences on factors’ productivity and therefore on opportunities for extracting rents (Bueno De Mesquita and Smith, 2010). Hence, provision of electricity in autocracies, while lower than in democracies, may well exceed the size of the winning coalition.

Whether a political incumbent facing a negative income shock will provide insurance through deliberate non-enforcement of the law, I argue, is based on his calculation of the costs and benefits associated with such policy. On the one hand, informal insurance ameliorates the political effects of crises by building political support and weakening political opponents. On the other hand, informality and violations of property rights have negative long-term effects on productivity, growth, and potential future revenue. Political leaders give different weight to the costs and benefits of informal social insurance under different political institutions and they accordingly decide how to manage the level of enforcement. As I explain below, political regimes matter because they affect how incumbents make decisions in the face of a trade-off between the short-term political benefits and the long-term costs of weak enforcement.

Informal transfers serve as compensation to reduce political costs among dislocated groups. These can be considered the benefits of informal social insurance. The political consequences of negative shocks are magnified in the developing world because large swaths of the population are unprotected and cannot smooth-consumption over the business cycle. Singer (2013) shows that those uncovered by unemployment and social security protection are more likely to attribute responsibility to the government

for bad economic conditions and to electorally sanction incumbent politicians. Carreras and Castañeda-Angarita (2019) also argue that vulnerable socioeconomic groups are the most likely to mobilize and turnout against incumbents due to economic crises. Likewise, delivering growth matters for political survival and regime change. Przeworski and Limongi (1997) show that slow short-term growth increases transitions both to and from democracy. Geddes et al. (2018) also find that slow growth increases the chances of autocratic regimes breaking down and being followed by democratic transitions or a new autocratic regime.

However, income growth is something that even competent governments may fail to deliver due to developing countries' structural vulnerability against business cycles (Wibbels, 2006). While all leaders potentially have some degree of incentives to provide insurance in volatile economies, they often remain unable to do so. Unlike in developed countries, policy tools to stimulate the demand-side of the economy during the downside of the business cycle are almost inexistent (Talvi and Végh, 2005) and governments lack of access to international credit markets (Wibbels, 2006). This results in the absence of "decommodification" (Huber and Stephens, 2001), automatic stabilizers, and possibilities of implementing counter-cyclical social spending (Darby and Mélitz, 2008). Hence, unlike leaders from advanced democracies, developing country governments cannot provide formal consumption-smoothing mechanisms for lower income groups regardless of the political incentives.

Counter-cyclical policies such as anti-poverty programs are effective to sustain political support during economic slowdowns (Singer, 2011). Yet, developing country social security benefits do not reach outsiders and those in the informal sector. Even where social insurance programs are more developed, they have been traditionally targeted to a narrow group formal sector workers instead of a wider coalition (McGuire, 1999, Wibbels and Ahlquist, 2011). Consequently, welfare spending often has regressive effects (Goñi, López and Servén, 2011). Under conditions of truncated welfare protection (Holland and

Schneider, 2017) and pro-cyclical spending, informal transfers may be an effective policy tool to provide consumption-smoothing mechanisms reducing the political costs of economic slowdowns.

Political incumbents often seek for ways to lessen the domestic political consequences of economic fluctuations. Trade openness helps to reduce the amount of economic voting in democracies (Hellwig and Samuels, 2007), however, it takes substantial time for globalization to affect voting behavior. Likewise, autocrats often intend to prolong regime survival by the cooptation of potential rivals through their inclusion in institutions such as authoritarian legislatures (Gandhi and Przeworski, 2007, Wright and Escribà-Folch, 2012). However, autocrats may also need to offer material benefits to political and economic outsiders (Acemoglu and Robinson, 2003, Bueno De Mesquita et al., 2005). Provision of productive public goods, as defined by Bueno De Mesquita and Smith (2010), is such an strategy to avoid rebellion, although only promoting growth from which to extract rents in the long-term. Therefore, and given the aforementioned policy constraints in developing countries during extreme economic downturns, political leaders with a high share of citizens exposed to economic risks and volatility may need to look for cheaper alternatives. This is, they can provide informal insurance as a means of lengthening their tenures. An important case is irregular access to basic services, such as electricity, which generates monthly transfers to firms and households fitting the logic of informal provision of insurance.

H1 : Electricity losses are counter-cyclical in developing countries, increasing during economic downturns and decreasing during good economic times, but not in developed countries where the scope conditions for informal social insurance are less likely to hold.

Yet, deliberately eroding compliance to cushion negative shocks is not a cost-free strategy for incumbents. Clague et al. (1996) show that enforcing property rights laws stimulates long-term growth, which in turn leads to higher tax revenues. Hence, leaders

with long-term incentives respect property rights, as this increases their long-run revenue stream. Besley and Persson (2010) argue that investments in fiscal and legal capacity are complements in producing greater expected returns to office holding. Besley and Ghatak (2006) conceptualize market-supporting public goods, such as the enforcement of the law as key to promote investment and long-term prosperity.

Weak enforcement involves potentially large long-term risks. With economic crises, the recovery to previous levels of compliance takes much longer than the recovery of the economy. Moreover, informal social insurance may substantially erode the long-term conditions needed for promoting investment and growth. In an insightful work, Burgess et al. (2020) show that tolerated electricity theft and widespread nonpayment leads to electricity utilities to under-invest in infrastructure and ration energy supply. As a consequence, this generates further incentives for non-compliance since service quality gets de-linked from payment. This is, the state decision to forbear irregular access and non-payment involves the risks of undermining the long-term "fiscal contract", in the sense of Levi (1989), between consumers and the state.

Therefore, the costs and benefits of informal social insurance for political leaders are unevenly distributed over time: the benefits are immediate, as forbearance can strongly ameliorate political discontent for bad economic conditions, but the costs involve putting long-term growth and potential tax revenue at risk. I expect that facing negative economic shocks, political incumbent choices on the provision of informal social insurance depend on their time horizons. This is, politically insecure leaders should fear the short-term consequences of full enforcement while discounting the long-term benefits. In contrast, politically secure leaders should be willing to bear the short-term costs of enforcing the law and securing the long-term gains of doing so. Hence, only politically secure leaders have incentives to sustain high enforcement over the business cycle. Governments with shorter time horizons are more willing to tolerate violations because they need to ameliorate the costs of sudden economic shifts. Put differently, informal social insurance

through non-enforcement can help to lengthen leaders' tenure.

A key difference between incumbents in autocracies and democracies is their time horizons. In democracies, leaders are short-sighted because they depend on regular elections and executive turnover (Li, 2009). Leaders in autocracies, despite great variation are comparatively more entrenched in power and have longer time horizons (Li, 2009, Wright, 2008). The negative political impact of business cycle for a democratic leader is going to be realized in the following regular election. Thus, when evaluating informal social insurance, democratic leaders are more sensitive to the short-run gains of weak enforcement than the long-term costs. This is especially the case when the form of forbearance in question provides insurance against sudden shocks (risk-pooling), when it is noncontroversial between class-lines (non-rivalry), and when it faces low opposition among net contributors (positive externalities). On the contrary, autocratic leaders are less vulnerable to the short-term political costs of business cycles. Hence, in comparison to democratic leaders, autocrats are expected to be less sensitive and therefore more likely to sustain high enforcement as a means maximizing their long-term extractive capacity from the population. Therefore, authoritarian rulers are expected to be less tolerant in the face of increased irregular access to basic services during economic recessions. I posit, then, the following hypothesis.

H2 : Electricity losses are significantly more counter-cyclical in democracies than in autocracies.

Observing over-time variation in non-compliance may be indicative of enforcement but is not a measure of policy choices themselves. This is a common limitation of many enforcement studies from which this one is also not exempt. My work is similar to that of Hidalgo et al. (2010), in the sense that negative economic shocks are the main force reducing the costs of non-compliance and inducing more illegal behavior. The theoretical identification of differences in the supply-side of enforcement exploits leverage from

variation in political institutions. Political regimes determine different incentives for authoritarian rulers and democratic incumbents. Thus, differences in cyclical losses result from incumbents' incentives to enforce the law.

Importantly, the theory that democracies implement informal insurance does not necessarily require that political leaders are affecting enforcement levels across the business cycle. This logic already holds if democracies and autocracies present constant but different enforcement levels, such that significant differences in the cyclical losses occur. Since economic cycles change the cost of compliance, negative shocks augment the number of violations and therefore the amount of losses. Political regimes with lower enforcement curves can augment or diminish the automatic counter-cyclical behavior of electricity theft. This is equivalent to other social insurance programs, except that decommodification is informal. For instance, politicians do not implement unemployment insurance only during recessions. The policy may always be in place and economic shocks increase the number of workers claiming benefits. The same logic applies to non-enforcement that target informal transfers counter-cyclically. This is why political weak enforcement in access to basic services merits the label of *informal social insurance*. As argued in Section OA-A, if service consumers from democracies and autocracies alike show the same reaction against negative income shocks, differences in the cyclical losses emerge as a result of different enforcement levels.

4 DATA AND METHODS

4.1 POLITICAL REGIMES, ELECTRICITY LOSSES, AND BUSINESS CYCLES

I test the main theoretical prediction in a sample of 110 developing countries between 1970 and 2014. The panel structure depends on available observations in three variables: political regimes, business cycles, and electricity transmission and distribution losses. Figure OA-Q.1 presents data availability considering these variables and Section P lists the coun-

tries included in the analysis.

To estimate the cyclical nature of electricity losses, I relate deviations from the losses trend to the business cycle. The raw data for measuring the outcome variable are the country-year records of electricity losses measured as a percentage of the total power output.⁴ During transmission, transformation (stepping up and down of voltage) and distribution process to end-users, part of energy is lost. These are often called as transmission and distribution (T&D) losses in the electricity system. The T&D losses break up into technical and non-technical components (Lewis, 2015). Some energy is consumed in an irregular manner and remains unbilled. This part of electricity losses becomes non-technical losses generally termed as electricity theft. Figure OA-Q.2 shows the evolution of losses over time for every country in the sample, revealing some increases in volatility over time for both democracies and autocracies. Admittedly, this is not ideal data on irregular electricity consumption because involves other components of lost power. However, technical losses are a rarely changing component of overall losses because they depend on the infrastructure and structural characteristics of the electricity grid. So country fixed-effects capture most of this variation in technical losses. The substantial variation relevant for testing the outlined argument is the over-time variation around country-specific trends. Thus, the main dependent outcome variable here is described in Figure 2, and represents the evolution of T&D losses around their trend expressed as a percentage of the underlying trend.⁵ The data shows very similar distributions across regime type although autocracies exhibit a somewhat larger left-tail in losses declines.

For measuring regime type, I employ the binary measure of democracy developed by

⁴The data come from the World Bank and are collected by the International Energy Agency, Statistics, OECD/IEA 2018. The data have been used in related studies, see: Balza, Jimenez and Mercado (2013), Min (2015).

⁵I estimate the underlying trend following the suggested approach by Hamilton (2018) and by regressing of T&D losses at year $t+4$ on the two most recent values. Nevertheless using the alternative strategies of a Hodrick-Prescott filter (H-P) as renders the same result. Section OA-C confirms that this dependent variable strongly affects electricity access in democracies providing support to the idea that it reflects insurance to sustain access. In Section OA-K employs a simpler analysis using the levels of losses as the main dependent variable rendering the same substantive results.

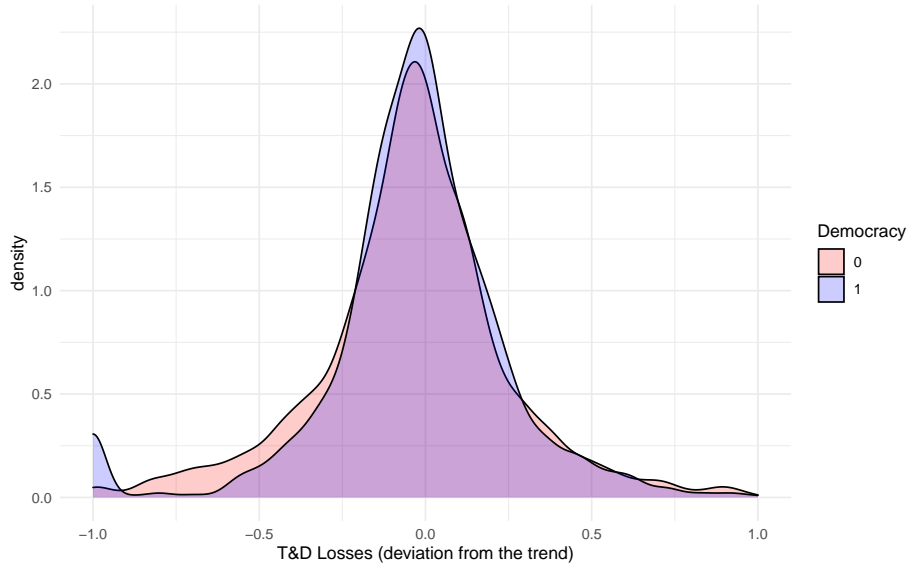


Figure 2: T&D Losses Deviations from the Trend in Democracies and Autocracies

Boix, Miller and Rosato (2013) (hereafter, BMR). Macroeconomic cycles are best measured by the output-gap, which is the difference between real GDP per capita and the underlying growth trend as a percentage of that trend. In an influential contribution, Hamilton (2018) argues against using the standard Hodrick-Prescott filter (H-P) and proposes a simple estimation of GDP trends.⁶ Thus, I measure the business cycle as the percentage deviation from the country-specific trend in constant GDP per capita in each country-year observation. Figure 3 displays the data for two selected countries, Philippines and Uruguay. The upper panel shows the measurement of the GDP Output-Gap (displayed in blue bars) resulting from the relative difference between the GDP per capita and the underlying GDP trend. The lower panel displays the over-time variation of electricity losses around the underlying country trend.

The military rule in Uruguay characterizes by a strong decline in electricity losses until the beginning of the financial crisis in 1982, which coincides with the years leading to the democratic transition in 1984. During the autocratic rule, negative income shocks

⁶As in the case of electricity losses, GDP is filtered by regressing the data at year $t+4$ on two year lags. The H-P filter implements long-run moving average to de-trend the output series. The results are substantially the same regardless of the type of filters used. Real per capita GDP come from World Bank, World Development Indicators.

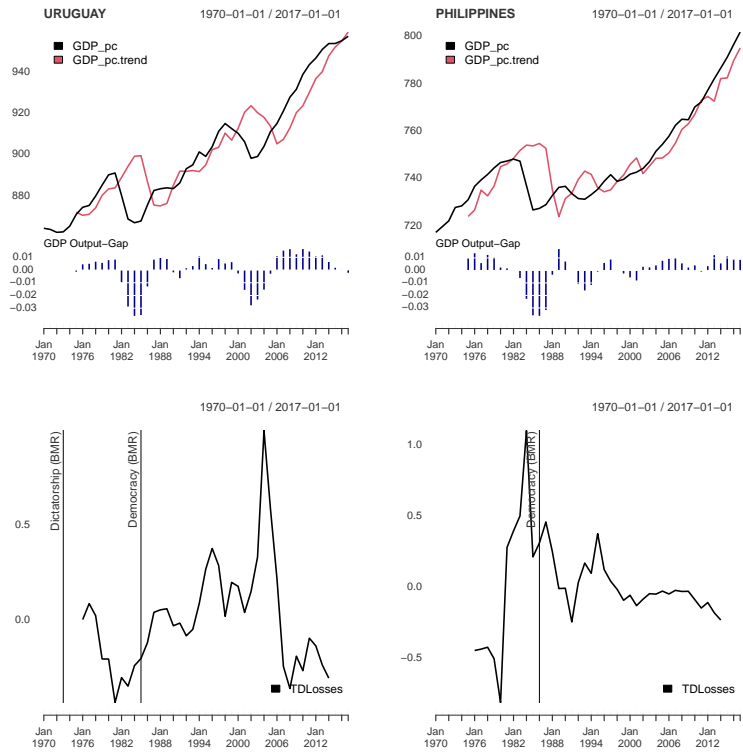


Figure 3: GDP cycles and Electricity T&D Losses

are followed by either reductions or only moderate increases in electricity losses. In stark contrast, and during the following democratic period, a large banking crisis takes place in 2002 which was followed by a dramatic increase in electricity losses in the country. Losses almost duplicated after the 2002 crisis. In Philippines, a large increase in electricity losses takes place during the financial crisis that hit the country in 1981, also a period where Ferdinand Marcos faces strong political mobilization against the autocratic regime to be finally deposed in February 1986. Marcos' regime implemented several infrastructure investments and expanded electrification covering about 46% of total households in 1986 (Llanto, 2002). The following variation in losses during the early 1990s also correspond to observed economic shocks in the country. These narratives suggest that not all economic crises automatically lead to increased power losses, while also highlight the potential relevance of politicians time horizons in their enforcement choices across the business cycle.

4.2 CONTROL VARIABLES

The most important and theoretically motivated control variable is the level of state capacity. State capacity may be a confounder related to both electricity losses and key independent variables: democracy and business cycles. I employ a measure of the latent dimension of state capacity developed by Hanson and Sigman (2021). Using indicators for different dimensions of state capacity such as coercive, fiscal, administrative, transformative/industrializing, relational/territorial, legal and political capacities, Hanson and Sigman implement a latent variable analysis and aggregate the different factors into a single measure. The inclusion and exclusion of this variable is, however, non-consequential for the obtained results. Section OA-J implements several robustness checks using disaggregated measures of state capacity as well as electricity sector-specific variables capturing reforms that potentially affect enforcement capacity.

Other control variables are the level of imports and exports as a percentage of the GDP, as integration to international markets may affect both upgrading in electricity network quality and the level of technical losses. The log the population size and population density are demographic covariates controlling for the consequences of country size and urbanization. Finally, the level electric power consumption (kWh per capita) may capture part of the movement in electricity losses as long as periods of higher consumption involve higher risk of overloading.

5 IDENTIFICATION STRATEGY AND RESULTS

The baseline estimation strategy focuses, first, on establishing a degree of cyclicity of electricity losses, and second, on estimating the heterogeneity of cyclicity across different political regimes. The main estimation modeling assumes the following data generating process:

$$\begin{aligned}
LossesCycle_{it} = & \beta_1 D_{i,t-1} + \beta_2 OutputGap_{i,t-1} + \beta_3 (D_{i,t-1} \times OutputGap_{i,t-1}) \\
& + \phi LossesCycle_{i,t-1} + X_{i,t-1} \theta + \alpha_i + \gamma_t + \epsilon_{i,t},
\end{aligned}$$

where for each country i , the $Losses_{it}$ is the dependent variable (deviations of losses from the underlying trend) at time t ; $D_{i,t-1}$ is the BMR's binary measure of democracy at time $t - 1$; $OutputGap_{i,t-1}$ is the GDP output gap at time $t - 1$; and $X_{i,t-1}$ is a set of time-varying control variables at time $t - 1$. Given the long structure of the data, the estimation controls for both country fixed effects and year-common shocks by including α_i and γ_t as well as the lagged outcome at $t - 1$. The lagged dependent variable addresses the presence of serially correlated deviations from the electricity losses trend. Importantly, β_2 captures the cyclical nature of electricity losses among authoritarian regimes, while β_3 is an estimate of the democratic difference in the cyclical nature of electricity losses. The GDP output gap is lagged one year since income shocks do not affect losses contemporaneously (see Section OA-K). The rest of independent variables are lagged one year to account for potential endogeneity concerns (see Section OA-K for an analysis with contemporaneous effects).

5.1 MAIN RESULTS

Table 1 shows that losses are counter-cyclical in developing countries (as indicated by the negative effect of GDP output Gap in the first model using the sample of *all* developing countries). In developed countries (OECD sample), however, losses are a-cyclical. This gives support to the first hypothesis that informal insurance exists where the scope conditions hold: strong business cycles and absence of consumption smoothing policies.

More importantly, the first and second models from Table 1 split the sample between developing country autocracies and democracies. Notably, the GDP output gap has a

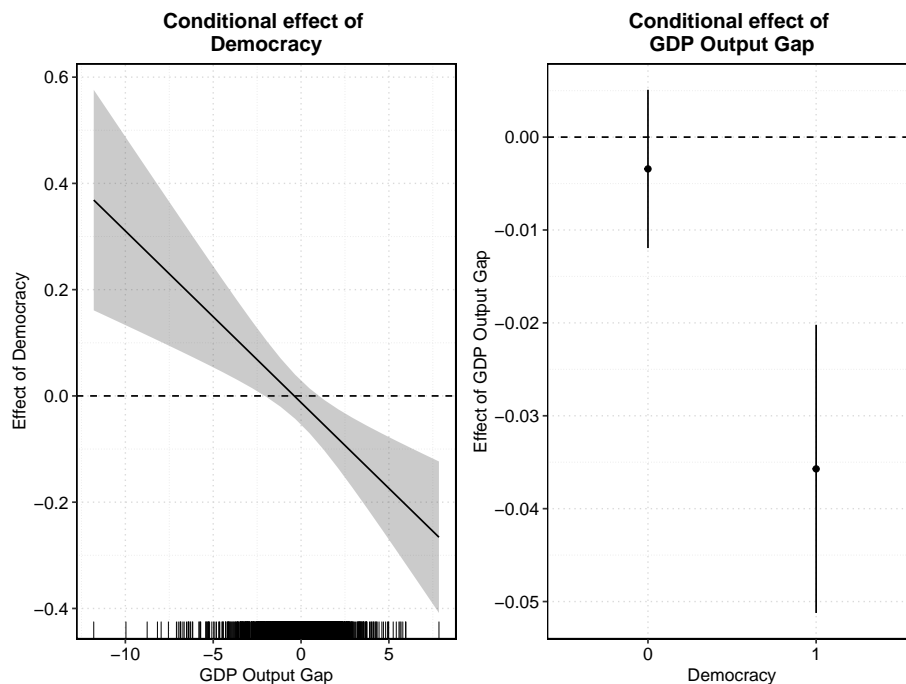


Figure 4: Effects of the Output-Gap on Electricity Losses conditional on Regime Type

strong negative effect on the evolution of electricity losses in democracies and exerts no substantial effect among authoritarian regimes. The third specification analyzes the full sample by adding the regime type variable. The fourth model corresponds to the main interactive specification. The effect of business cycles among autocracies has a negative sign, although it is substantially small and insignificant. The interaction effect between GDP output-gap and the democracy variable is highly negative and significant. This effect is robust to the inclusion and exclusion of several control variables such as state capacity and further controls. Figure 4 reports point estimates and 95% confidence intervals for the interaction term, displaying the marginal effects of democracy across the output-gap, and vice-versa, the marginal effect of output-gap across different regimes. Provided that the estimation model involves a dynamic auto-regressive process, the substantive cumulative effect of the output-gap on electricity losses within democracies, $CE_{democracy} = \frac{\beta_2 + \beta_3}{1 - \phi}$, computed from the baseline result from Model 4 in Table 1, equals -0.10. This is, a negative economic shock of a -1 percent deviation from the GDP growth

trend renders a cumulative effect of 10 percent increase in electricity losses above the trend. This is an economically sizable effect.⁷

	Developing countries						OECD
	(Democracies)	(Autocracies)	(All)	(All)	(All)	(All)	
Losses Cycle _{t-1}	0.65*** (0.02)	0.60*** (0.02)	0.65*** (0.01)	0.65*** (0.01)	0.64*** (0.01)	0.63*** (0.01)	0.57*** (0.03)
GDP Output Gap _{t-1}	-0.04*** (0.01)	-0.00 (0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.01 (0.01)
Democracy _{t-1}			-0.01 (0.02)	-0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)	
Democracy _{t-1} × GDP Output Gap _{t-1}				-0.03*** (0.01)	-0.03*** (0.01)	-0.02*** (0.01)	
State Capacity _{t-1}					-0.07*** (0.02)	-0.08*** (0.03)	-0.04 (0.03)
Imports _{t-1}						0.00** (0.00)	0.00 (0.00)
Exports _{t-1}						-0.00** (0.00)	-0.00 (0.00)
Population (log) _{t-1}						0.14** (0.07)	0.04 (0.08)
Real GDP per capita (log) _{t-1}						0.01 (0.03)	-0.01 (0.05)
Electricity Consumption _{t-1}						-0.00 (0.00)	-0.00 (0.00)
Population Density _{t-1}						-0.00 (0.00)	0.00* (0.00)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	65	82	110	110	108	106	21
Adj. R ²	0.48	0.35	0.42	0.42	0.42	0.42	0.32
Num. obs.	1460	1810	3270	3270	3203	2964	889

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

Table 1: Ciclicity of Electricity Losses in Autocracies and Democracies (1971 - 2014)

Hence, *only within democratic regimes* electricity losses are highly counter-cyclical. The fact that the cyclicity of losses depends on political institutions suggests that political incumbents are way more tolerant against illegal behavior during bad times in democracies than in autocracies. This is suggestive evidence of the presence of informal provision of social insurance in democratic regimes.

An interesting finding from Table 1 is that the different patterns of cyclicity of electricity losses across political regimes remain stable even after state capacity is included. The state capacity variable, as expected, has a large strong negative effect on the evolution

⁷Baseline models suffer from a small Nickel bias (Hsiao, 2022) of order $1/T$, with $T = 30$. Section OA-O indicates that results are robust to estimating the model by Generalized Method of Moments (GMM) rendering somewhat larger long-run effects.

of losses. This provides further confidence in the mechanisms proposed by the argument, by which democracies expand the counter-cyclicality of losses when holding overall state capacity constant.

5.2 INSTRUMENTAL VARIABLES

A potential concern is that both democracy and business cycles are either endogenous or simultaneously determined with enforcement decisions. Moreover, there is considerable debate about the link between democracy and economic growth (Acemoglu et al., 2019, Doucouliagos and Ulubasoglu, 2008), and growth is itself one determinant of regime transitions (Przeworski and Limongi, 1997). Hence, I provide a hard test to the theory by instrumenting for both business cycles and democracy. Importantly, provided that the main specification is about heterogeneous effects of the business cycle across political regimes, I instrument for both the endogenous variables and their interaction term.

I exploit the regional democratic diffusion as an instrumental variable (IV) for the domestic level of democracy. This is, I rely on Huntington (1991), who argues that democratization occurs in regional waves that are not only explained by economic trends. The logic is that neighbor countries regimes only affect a country evolution of electricity losses indirectly, by inducing a regime change in that country. The use of regional democratic diffusion to instrument for democracy is being increasingly adopted in the literature (Acemoglu et al., 2019, Stasavage, 2005). Second, I also instrument for the domestic business cycles with the economic cycles occurring in a country's export destinies. This is, the increased demand in a country's trade partners can be taken as an exogenous growth shock to the country's domestic economy. This instrument is justified by the fact that business cycles are substantially synchronized by international bilateral trade (Kose, Prasad and Terrones, 2003). The instrument is thus the weighted average of country *i*'s export destinies countries' business cycles for a given year. Section OA-F provides a detailed justification and explanation of measurement for both instruments.

	Democracy IV	OutputGap IV	Both IV	Both IV
Losses Cycle _{t-1}	0.64*** (0.01)	0.64*** (0.01)	0.62*** (0.02)	0.61*** (0.02)
GDP Output Gap _{t-1}	0.00 (0.01)	-0.01 (0.03)	0.02 (0.05)	0.01 (0.03)
Democracy _{t-1}	0.04 (0.10)	-0.01 (0.02)	0.03 (0.10)	-0.05 (0.11)
Democracy _{t-1} × GDP Output Gap _{t-1}	-0.06** (0.03)	-0.05** (0.03)	-0.14* (0.08)	-0.12* (0.07)
State Capacity _{t-1}				-0.06 (0.04)
Imports _{t-1}				0.00*** (0.00)
Exports _{t-1}				-0.00** (0.00)
Population (log) _{t-1}				0.05 (0.10)
Real GDP per capita (log) _{t-1}				-0.01 (0.07)
Electricity Consumption _{t-1}				-0.00 (0.00)
Population Density _{t-1}				-0.00 (0.00)
Democracy Instrument F-stat.:	70.25		51.29	33.39
Output Gap Instrument F-stat.:		34.87	28.79	31.01
Output Gap X Democracy Instrument F-stat.:	212.05	204.88	38.18	27.97
Year dummies	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes
Number of countries	110	110	110	106
Num. obs.	3249	3252	3231	2925
Adj. R ²	0.42	0.41	0.39	0.38

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

Table 2: 2SLS Results: Instrumenting for Democracy and GDP Output Gap

Results from Table 2 remain robust in the two-stage least squares estimation. Instrumenting for either democracy or the output gap (first two models) renders similar and significant effects than in the baseline analysis. The last two columns from Table 2 include both instruments at the same time. In all IV estimates the effect magnitudes are somewhat larger, possibly due to the local nature of the estimates (Angrist, Imbens and Rubin, 1996). In short, robustness across both ordinary least squares and IV strategies should enhance confidence in the main finding that democratization increases the provision of informal social insurance.

5.3 MECHANISMS

The argument linking political regimes to decisions about informal social insurance implies that more insecure leaders, i.e., those with shorter time horizons, weight more the short-term political benefits of weak enforcement than its long-term costs, since a primary concern is ameliorating the political negative consequences of negative growth volatility.

I examine whether different autocratic time horizons affect rulers' choices with respect to informal insurance. I consider two relevant strategies to capture a ruler's time horizons that exist in the literature. Some scholars proxy them with a measure of regime duration (Cao and Ward, 2015, Li, 2009). Another approach is using predicted probabilities of regime failure (Cheibub, 1998, Wright, 2008) where greater predicted values indicate a shorter the time horizon. One advantage of autocratic regime durability is theoretical. Cao and Ward (2015) argue that durable regimes increase time horizons because they provide the conditions for the ruler to get important agents in society to conditionally cooperate and invest in productivity. Second, institutional settings constrain leaders, even those in authoritarian regimes, so that their time horizons are often associated with regime stability. Empirical justifications to use regime durability are also important. Model based estimates such as predicted probabilities have greater uncertainty and vary depending on discretionary decisions from one study to another. Duration measures at the leadership may capture the consolidation of power by a leader but not the effective sharing of it with regime insiders (Gandhi and Sumner, 2020). Moreover, individual leadership tenure depends on ruler's life which is different than political time horizons when power is shared. Thus I use the logged regime duration years under the assumption that the most critical period for autocrats is the beginning of their rule and that more prolonged tenure has positive but decreasing marginal effects on expected time horizons.⁸ I use the commonly

⁸I admit, however, that there is no perfect way to measure a ruler's time horizon. Section OA-L presents a larger explanation for why duration may be a better measure than the alternative of using predicted probabilities of regime failure. The section also provides evidence that the log regime duration strongly reduces the probability of regime failure.

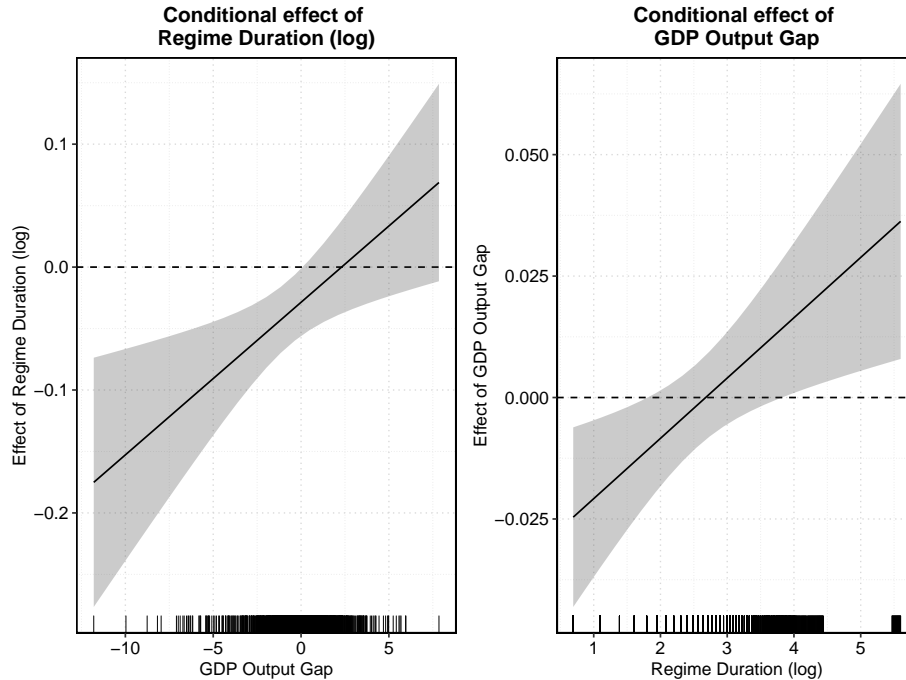


Figure 5: Effects of the Output-Gap on Electricity Losses conditional on Autocratic Regime Duration

used regime duration measure (the "gwf_duration" variable) in the Geddes, Wright, and Frantz's Autocratic Regimes dataset (2012).

Results from Table 3 show that there exists significant variability in electricity losses cyclicity depending on the length of leaders' tenure. Figure 5 reports point estimates and 95% confidence intervals for the interaction term. The right panel in Figure 5 shows that less entrenched regimes with shorter expected time horizons (as proxied by regime duration) exhibit significantly more counter-cyclical electricity losses than long-lasting regimes. Moreover, the plot from the left panel indicates that regime duration contributes to a-cyclical (not counter-cyclical) electricity losses because its effect is highly negative only during bad economic conditions (negative values of output-gap). Hence, the implied mechanisms about leaders' time horizons also seems to have some explanatory power within the variety of autocratic regimes. Rulers that anticipate more risks for their political survival are more likely to tolerate losses as a means of providing informal social insurance.

	(1)	(2)	(3)
Losses Cycle _{t-1}	0.60*** (0.02)	0.60*** (0.02)	0.58*** (0.02)
GDP Output Gap _{t-1}	-0.03*** (0.01)	-0.03** (0.01)	-0.03** (0.01)
Regime Duration (Log) _{t-1}	-0.03** (0.01)	-0.03** (0.01)	-0.03* (0.02)
Duration (Log) _{t-1} × GDP Output Gap _{t-1}	0.01*** (0.00)	0.01*** (0.00)	0.01** (0.01)
State Capacity _{t-1}		-0.06* (0.03)	-0.07* (0.04)
Imports _{t-1}			0.00 (0.00)
Exports _{t-1}			-0.00 (0.00)
Population (log) _{t-1}			0.11 (0.14)
Real GDP per capita (log) _{t-1}			0.01 (0.05)
Electricity Consumption _{t-1}			-0.00 (0.00)
Population Density _{t-1}			0.00 (0.00)
Year dummies	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes
Num. obs.	1556	1556	1369
Number of countries	79	79	76
Adj. R ²	0.37	0.37	0.37

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

Table 3: Ciclicity of Electricity Losses in Autocracies Moderated by Regime Duration

Do democratic leaders' time horizons also affect the propensity to provide informal insurance? One possibility is that that proximity to elections matters for electricity losses (Min and Golden 2014). For this logic to occur within democracies, however, leaders should exhibit important variation in their time horizons so that a significant portion of them would behave as if negative income shocks do not affect their prospects. An important difference between enforcement varying with electoral cycles and varying with business cycles is the nature of the policy itself. Only the latter is related to insurance against risks. Section OA-A, shows that informal insurance is already in place even when politicians set a constant but lower enforcement level. Hence, if democratic politicians are not sufficiently heterogeneous in their time horizons, their motivations to provide informal insurance may be similar despite proximity of elections. In Section OA-N, I show that fixed term incumbents implement informal insurance while non-fixed term ones do not. However, only 3% of incumbents do not face fixed terms in the sample. While this increases uncertainty and renders a non-significant difference, it also reminds us that democratic incumbents are homogeneously exposed to periodic electoral accountability. The analysis also shows that the cyclicity of losses may be higher when incumbents are facing their last two years of the mandate, yet this difference is again non-significant. In sum, there is no strong evidence of an interaction between electoral business cycles and the provision of informal insurance.

6 ROBUSTNESS CHECKS AND ALTERNATIVE EXPLANATIONS

6.1 MEASUREMENT, LINEARITY IN INTERACTION TERMS

I obtain consistent results using an alternative measure for political regimes. Section E from the Online Appendix, re-analyzes the data using the "polity2" variable from the PolityIV database (Marshall, Jaggers and Gurr, 2011). The results remain the same, in the sense that the interaction between political regimes and the GDP Output Gap is highly

negative. Another potential concern is the existence of strong non-linearity in the interaction effect between the output gap and democracy, which could result in that a few extreme values in the output gap data are driving the main results. Therefore, I employ careful examination of the possibility of a nonlinear marginal effect of democracy across the output gap (as the moderating variable). To this end, I implement the same specification model but estimate the interaction effect by a flexible kernel estimation, as suggested by Hainmueller, Mummolo and Xu (2018). The results from Section OA-D suggest that non-linear interactions are not present in this case.

6.2 PRIVATIZATION

Democracies are more likely to privatize state-owned utilities (Urpelainen and Yang, 2019). If private providers are powerful harmed actors due to non-compliance, they may pressure for higher enforcement and/or higher electricity prices, leading to alternative theoretical mechanisms.⁹ Alternatively, the firm may simply disinvest. Underinvestment is risky for a democratic government because it threatens the goal of expanding access. Yet, the literature highlights that private participation in the electricity sector has a rather mild *improvement* of affordability of electricity (Balza et al., 2020, Brown and Mobarak, 2009). Moreover, democratic governments often allocate subsidies to private utilities to compensate for electricity losses (Di Bella et al., 2015). This suggests that the costs of non-compliance are transferred to society through fiscal policy without increasing electricity prices. Section OA-G discusses how political leaders retain control on enforcement and prices even after privatization. Table 4 shows that the main results remain after controlling for a measure privatization of state-owned electric utilities.

⁹I thank an anonymous reviewer for point out these possibilities.

6.3 ENFORCEMENT CAPACITY

While democratization increases state capacity (Wang and Xu, 2018) the electricity sector may present different dynamics. Privatization may increase incentives for detection of theft. Electric utilities measure losses at geographical aggregates, for which sub-stations collect information of power supply that is then compared to revenues. In developing countries, the detection of fraud almost always involves participation of on the ground inspectors (Depuru, Wang and Devabhaktuni, 2011). When fraud is detected, utilities may interrupt service, impose fines, and even send the case to judicial courts. This opens the possibility for corruption and/or politically motivated bureaucracies (Scholz, Twombly and Headrick, 1991, Winther, 2012). Structural reforms implied corporatization of public utilities and the adoption of independent regulatory agencies. These reforms may have increased transparency, lowered corruption, and limited the power of bureaucracies. The analysis from Table OA-8 controls for Corporatization and Independent regulatory agencies and finds that this does not affect the main results although they seem to reduce losses. This echoes existing research showing that privatization has moderately lowered electricity losses (Andres et al., 2008, Balza et al., 2020, Balza, Jimenez and Mercado, 2013). Section OA-J also demonstrates results are robust after controlling for monopoly of the force, the coercive capacity by military personnel, and the public sector corruption. More generally, in this sample, democracies have increased access but not the level of electricity losses (see Figure OA-B.1), while controlling for access in Table 1 from Section OA-B.1 does not alter the results. Overall, it may seem that democracies do not have lower enforcement capacity than autocracies.

Democracies may be more willing to accept concession areas such as slums that buffer against expensive housing and services prices during crises (Glaeser and Steinberg, 2017, Wallace, 2013). While after a negative income shock some households transition from formal to informal consumption (i.e., by altering their meters, or tapping wires), others are forced to move to slums or poor neighborhoods. Slums formation and their growth is

fundamentally concerned with democratization and electoral politics (Álvarez-Rivadulla, 2017, Alves, 2018). Politicians can also make slums relatively more attractive (Auerbach, 2015). Hence, enforcement in the electricity sector may also be part of broader provision of public goods and enforcement policies concerning housing, taxation, and other basic services. This suggests that enforcement by electric utilities has limitations and general measures of state capacity are relevant to capture the room of maneuver of incumbents for affecting across the board. In this regard, Figure OA-J.1 provides evidence suggesting the possibility that in societies at the highest level of state capacity politicians cannot create the conditions for weak enforcement and dislocated citizens cannot find exit opportunities for informal access.

6.4 PRICES AND SUBSIDIES

If prices are higher in democracies then the benefits of noncompliance are also higher, invalidating the theoretical logic that requires electricity prices in democracies being lower or equal than in autocracies. Table OA-5 presents an analysis controlling for electricity prices in the residential sector, while OA-6 adds a number of controls that are likely to build domestic prices of electricity. The results confirm that losses are only counter-cyclical in democracies. Despite this evidence, I further discuss in section OA-H the extent to which subsidies to electricity and informal insurance may be alternative or complementary policies. I argue that this depends on both the generosity and the targeting of subsidies, concluding that consumer subsidies serve to different goals than forbearance. Provider subsidies, instead, are regular transfers to cover revenue shortfalls from electricity losses. This type of subsidies often allocated to private utilities suggest the existence of complementarities.

7 CONCLUSIONS

Given the inability of developing countries to smooth consumption of their populations, one possibility is to simply expect that both democratic and authoritarian governments abandon dislocated groups during crises (Wibbels, 2006). Some evidence suggests that democracies often neglect the economic interests of the lower class and those in the informal sector as much as authoritarian rulers do (Ross, 2006). This fact, however, introduces the important puzzle of how political leaders build electoral support during bad economic times to secure political survival.

I have shown that political incumbents alter the level of enforcement to provide informal social insurance by allowing counter-cyclical movements in irregular electricity consumption. Based on the analysis of panel data from 110 developing countries and instrumental variables estimation, the results indicate that transmission and distribution losses of electricity are highly counter-cyclical in democracies but not in autocracies. This evidence is consistent with the hypothesis that leaders with shorter time horizons are more likely to provide informal social insurance.

The approach has nevertheless some important limitations. Admittedly, I do not directly observe enforcement but the result of violations (electricity losses). The empirical strategy is in fact indirect: it exploits changes in political institutions as a strategy to capture political motivations for the provision of informal insurance. More research and other methodological approaches are needed to further investigate the provision of informal transfers using enforcement data.

Another relevant question is how informal insurance affects voting behavior. The argument relates informal insurance to strategies of blame avoidance in a context of strong economic voting Singer (2013), and low opposition due to positive externalities. However, other non-welfarist forms of forbearance could result in counter-cyclical transfers. Clientelist exchanges between voters and politicians also take part in the case of electricity

theft. They often require active rather than passive participation of incumbents in allocating resources as well as organized social groups that translate demands to local politicians, or criminal organization (Rufín, De Miranda and Moskowicz, 2020) that constraint incumbents' capacity to affect enforcement. More research should be dedicated to analyze how counter-cyclical informal service access affects voting behavior in democracies.

The conclusions of this paper have important implications for the development of the welfare state in developing democracies. A large literature in comparative political economy attributes the expansion social insurance to exogenous income shocks and exposure to risk in OECD countries (Cameron, 1978, Rodrik, 1998). Similar shocks in developing countries were not followed by expanded unemployment insurance programs or more generous pensions systems (Wibbels, 2006). I identify a robust finding suggesting that political leaders strongly react to negative income shocks by eroding enforcement in developing countries as a means of allowing for informal transfers. While "truncated welfare states" are said to be a reason for forbearance and low preferences for redistribution (Holland and Schneider, 2017), it is also plausible that the existence of expanded forms of informal social insurance contributes to an equilibrium of low provision of formal social protection in developing democracies.

8 SUPPLEMENTAL MATERIAL

Replication materials and code can be found at López-Cariboni (2022).

9 DECLARATION OF CONFLICTING INTERESTS

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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