

# **Resource Booms and Political Support: Evidence from Peru\***

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## **Abstract**

Resource abundance has been associated to poor democratic performance. Particularly, some scholars suggest that in resource-rich countries democracy faces constraints to consolidate and survive. Current theoretical explanations emphasize the role of politicians and elites in this regard assuming implicitly that citizens are always pro-democracy. However, historical and empirical evidence suggest that in countries where democracy is new or unconsolidated citizens are critical about its performance and willing to replace it with an authoritarian regime if they perceive this regime is better for delivering the policy outcomes they care about. In this paper, I study this issue exploiting sub-national exogenous variation across mineral-rich local governments in Peru related to the allocation of mineral resource rents during a recent boom in mineral prices. Using a difference in difference approach, I estimate a non-monotonic effect of natural resource rents on the perception about the effectiveness of democracy. For modest increases in rents a positive impact on citizens' support for democracy is observed whereas the opposite occurs in districts that experienced large transfers. These results are consistent with a model on citizen's learning about the effectiveness of democracy during a resource boom.

JEL: H5, H7, P16.

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## 1. Introduction

The relationship between resource abundance and democratic performance has been subject of significant debate in the literature over the past years. Since the seminal contribution of Ross (2001), there was a consensus among scholars and policy-makers around the idea that resource wealth hinders democracy (Watchenkon 2002, Jensen and Watchenkon 2004, Morrison 2007 and 2009), giving origin to a large literature on the political resource curse. Recent scholarship has questioned this consensus, either by showing that this relationship does not exist after all (Haber and Menaldo 2011) or by indicating that –under certain conditions- it can have the opposite sign (Dunning 2008 and 2009 for Latin America), although more sophisticated evidence is also available in support for the original thesis or some modified version of it (Aslaksen 2010, Ross 2009 and Tsui 2011). Consistent with some work in other areas of political economy (Acemoglu, Johnson and Robinson 2001, Easterly and Levine 2002), some scholars have suggested that these apparent contradictory results can be explained if countries' institutional framework are taken into account, being the political resource curse conditional to the quality of economic and political institutions (Robinson et al 2006, Mehlun et al 2006, Wantchekon 2002, Battacharyya and Hodler 2009)<sup>1</sup>.

A critical element in this debate is the idea that resource abundance may have a negative impact on the consolidation of democracy<sup>2</sup>. Some scholars suggest that resource abundance can weaken the democratic regime by leaving the door open for authoritarian regimes in case it collapses or by retarding its consolidation (Watchenkon 2002, Jensen and Watchenkon 2004, Morrison 2007 and 2009, Epstein et al 2006, Goldberg et al 2009, Gassebner et al 2008 and Ulfelder 2007). Although there are differences in terms of the proposed mechanisms, there exist a consensus that what matters in order to understand this relationship is the behavior of politicians and political elites<sup>3</sup>. For instance, Jensen and Wantchekon (2004) suggests that the key mechanism

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<sup>1</sup> A different view is provided by Dunning (2008), who suggests that a positive relationship between resource abundance can be found even in places with weak institutions such as Venezuela. The argument is that resource abundance can foster democracy in places with high level of inequality because the access to rents reduces the redistributive pressures on the elites. As a consequence, the elites have fewer incentives to overthrow democracy.

<sup>2</sup> According to Ulfelder (2007) and Ross (2009), the standard literature of the effect of resource abundance on democracy conflates two distinct issues: the survival of authoritarianism and the survival of democracies. The latter issue is the focus of this paper.

<sup>3</sup> In his seminal contribution, Ross (2001) suggests three channels, from which the first two fall in this category: a) a “rentier effect”, due to the use of patronage and low taxes as mechanisms to lower citizens’ accountability; b) a “repression effect”, expressed in the use of resources to increase internal security spending; and, c) a “modernization effect”, that suggest that resource wealth retards the adoption of social and cultural changes related to democracy.

to explain the resource wealth-democracy relationship is the “...incumbent’s discretion over the distribution of natural resource rents”. Consequently, it is not surprising that the vast majority of theoretical models developed in this literature implicitly assume that citizens are always pro-democracy, as is the case of recent contributions based on the work by Acemoglu and Robinson (2006) such as Robinson et al (2006), Aslaksen and Torvik (2006), Robinson and Torvik (2005), Dunning (2008) and Morrison (2007). In these works, it is only the elite's behavior what explains, for instance, the probability of a coup or, more generally, the prevalence of non-democratic regimes.

Although I agree on the critical role played by politicians and elites in any explanation of the political resource curse, it is a stinking fact that citizens’ attitudes towards democracy play no role in the standard theoretical explanations of this phenomenon. Political scientists have long recognized the importance of having high levels of political support for a political system, particularly the democratic regime, to function in a satisfactory way (Easton 1965, Linz and Stepan 1978)<sup>4</sup>. A political system with low levels of support is believed to be more unstable and less legitimate, and consequently prone to suffer governance crises, especially in countries with weak democratic institutions (Norris 2011 and Levi and Stoker 2000). Therefore, for democracy to survive, it must be the case that citizens’ political support for this system must be high. On the other hand, when support for democracy is low, citizens are more willing to support autocratic regimes<sup>5</sup>.

The evidence seems to be consistent with this claim: in countries in which support for democracy is low citizens are more willing to replace it with an authoritarian regime. Figure 1 uses country-level data from the Latin American Public Opinion Polls project to illustrate this point by

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<sup>4</sup> The concept of “political support” is highly contested among political scientists (Levi and Stoker 2000). For the rest of this paper, I will take the definition of political support provided by Norris (2011). This definition takes into account the following dimensions: a) Attitudes towards nation-state (national pride, patriotism, and identity); b) Agreement with core principles and values of political regime; c) Evaluation of overall regime performance; d) Confidence in regime institutions, and; e) Approval of incumbent office holders. The emphasis in this project will be in dimensions b), c) and d) of the Norris’ definition.

<sup>5</sup> One may argue that a reduction in political support is not necessarily associated to a regime failure. Citizens may feel unsatisfied with the performance of democracy but still believe that is the best regime. This is certainly true for the case of societies in which democracy is consolidated. However, in countries in which the democratic regime is not fully consolidated, this is not necessarily true. In words of Norris (2011): “In regimes which are classified as electoral autocracies or electoral democracies, which have not yet fully consolidated the transition from absolute autocracy, a serious and enduring lack of democratic legitimacy can be expected to have more serious consequences for political instability”. Bermeo (2003) presents historical evidence and country-cases analysis for several Latin American countries analyzing the role of changes in citizens’ perceptions and behavior in the breakdown of democracy.

showing a negative relationship between satisfaction with democracy and support for a coup d'état. This empirical fact is a puzzle for standard political economy models of democracy in general, and for political economy models of the resource curse in particular, since they assume that democracy is unambiguously preferred by citizens whereas evidence seems to suggest that this preference is conditional on citizens' satisfaction with the way democracy is "working" for them. This opens the door for, rather than alternative, complementary explanations of the political resource curse that take into account the role of citizens' views about the democratic system in explaining weak democratic governance and political instability; factors which can lead to the breakdown of democracy and the rise of authoritarian regimes often observed in these countries. If citizens in resource-rich countries are discontent with the ability of their democratic regimes for delivering the policy outcomes they care about, then this lack of support makes democracy highly vulnerable to non-democratic elites that can take advantage of this situation to overthrow it. Therefore, if political support has critical implications for the survival of democracy and its consolidation, then it is important to understand whether resource abundance is linked with lack of support for democracy and their political institutions<sup>6</sup>.

In this paper, I study the impact of resource abundance on political support for democracy. In doing that I take advantage of a simple theoretical framework based on the work by Brender and Drazen (2007 and 2009) and Caselli (2006) to explain this relationship by analyzing how an exogenous increase in natural resource rents affects the behavior of citizens and politicians in this regard. In this model, citizens face an inference problem about the effectiveness of democracy which depends on the policy outcomes they observe. Citizens also have limited information about the type of politicians under the democratic regime. In this context, politicians can influence citizens' beliefs about the effectiveness of democracy by providing public goods to citizens, allowing them to learn that "democracy works". However, politicians need to optimally decide the allocation of the budget between the public goods required for citizens to learn about the effectiveness of democracy and the rents they care about. Following some scholarship in political economy and political science, I argue that this investment will depend on the expectations politicians have regarding their ability of keeping power rather than an interest of contributing to

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<sup>6</sup> This argument is also consistent with the fact that the poorest tend to be more critical of democracy and more willing to accept authoritarian regimes compared to other groups in society as it happens for the Peruvian case (Carrion and Vera 2010). I can argue that, the poorer the median voter, the more relevant my argument is.

citizens' learning about the effectiveness of democracy. They will provide public goods as long as they are not challenged by potential competitors. This is explained by the nature of democracy for local politicians, which is basically perceived as a public good in this setting, lacking these politicians of incentives to contribute to citizens' belief about democracy. Therefore, the results would depend on how natural resource booms affect the electoral incentives of politicians.

I link this model with existing theoretical results from previous research regarding the impact of resource booms on the ability of incumbent politicians to keep power. In a companion paper (Maldonado 2014), I have shown theoretically and empirically that the relationship between resource booms and public good provision is non-monotonic. For low levels of rents, incumbents do not face substantial political competition, so they expand the provision of public goods to prevent entry of potential competitors. On the other hand, for high levels of rents, incumbents are not able to prevent competition due to the high value of holding office, having the incumbents the incentive of reducing public good provision. Since the provision of public goods is key to influence citizens' beliefs regarding whether "democracy works", it should be expected that natural resource booms are non-monotonically related to political support for democracy following the pattern in public good provision<sup>7</sup>.

This framework is taken to the data using district-level variation in Peru. Specifically, I exploit an exogenous variation in fiscal revenues of a set of mineral-rich local governments in order to claim causality. This exogenous variation is due to the interaction between the mining Canon rule, and the extraordinary rise of the international prices of mineral resources observed during the past years. This rule states that 50% of the income taxes paid by mining companies have to be allocated to the regional and local governments where mineral resources were extracted. As a result, these mineral-rich municipalities experienced a large increase of their fiscal revenues compared to those districts without these resources. By comparing the levels of confidence about the performance of different levels of government and the evaluation of performance of democracy

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<sup>7</sup> A key element of my theoretical framework is the idea that citizens learn about the effectiveness of democracy by observing policy outcomes (i.e. public goods). A large body of empirical evidence supports this claim. Since the seminal contributions of Kramer (1971) and Fair (1978), there is a well-established empirical fact in economics and political science about the effect of macroeconomic conditions on incumbent's re-election success. Recent contributions suggest that local and personal (or household) economic conditions matter for political support (Manacorda et al 2010, Elinder et al 2008 and Pop-Eleches and Pop-Eleches 2009). Consequently, to test the validity of the channels implied by the model I will use measures of personal and local welfare such as public goods distribution and household incomes. Evidence of (lack of) a positive effect of the resource boom on personal/familiar (e.g. household income) and local economic conditions (e.g. public goods) would be consistent with the model.

by citizens from local governments with and without mineral resources, before and after the increase of the prices of these resources, this paper shed light on the causal effect of an exogenous increase of local government revenues on citizens' political support for democracy<sup>8</sup>.

Using district-level data to study these issues have both advantages and disadvantages. The most important advantage of this design is its ability to control for institutional characteristics that may confound resource abundance and political support, making endogeneity a less contentious issue. A second advantage of this study over the previous literature is the use of variation in local revenues that depends on the movement of international prices of mineral resources, which are essentially exogenous to municipalities, avoiding any potential endogeneity concern. These advantages come with some costs: since I exploit within-country variation, some of the dimensions about the relationship between democracy and resource abundance cannot be addressed. Although this study is motivated by this relationship, its central goal consists in analyzing the effect of resource abundance on political support, which it is believed to have important implications for democratic consolidation in countries with weak democratic institutions.

Establishing a precise relation between natural resource abundance and political support has important theoretical and policy implications. As mentioned before, most of the current literature on the political economy of the resource curse has played attention to the “supply side” of the political markets by exploring the effects of resource abundance on the incentives of politicians. This paper complements this literature by studying the effect of resource abundance on the “demand side” of political markets, in particular its effect on voters' levels of political support, which is believed to have important implications in order to understand voters' behavior. With regard to policy implications, recent scholarship shows that when citizens exhibit high levels of political support they are more willing to allocate resources for policy goals (Chanley et al

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<sup>8</sup> Since the same (reduced-form) predictions can be obtained from different models, I provide additional evidence in order to reject alternative causal channels. In particular, a version of the “grievance” channel implied in the literature about conflict and resource abundance can be consistent with the empirical results (Collier and Hoeffler 2004, Gurr 1970). According to this literature, natural resource abundance can foster civil conflict by exacerbating the grievances associated with resource exploitation such as environmental degradation, land expropriation, labor migration and the emergence of “public bads” (prostitution, crime, etc). Therefore, a decrease in political support would be also consistent with the reduced-form results if these side-consequences of resource exploitation are linked to the performance of politicians by citizens. A large literature in economics and political science shows that voters tend to reward or punish politicians even for events that are out of their control such as a good performance of local college football games, natural disasters or even shark attacks (Wolfers 2009, Achen and Bartels 2004, Cole et al 2009, Healy et al 2010). Therefore, the grievance hypothesis provides an interesting alternative channel to contrast the theoretical and empirical evidence for my proposed mechanism.

2000), more likely to accept decisions of authorities (Tyler and Huo 2002), less likely to evade the payment of taxes (Scholz and Lubell 1998), less willing to tolerate corrupt behavior (Morris et al 2010), less likely to engage in clientelistic practices (Clearly and Stokes 2006), and more willing to obey to the law (Marien and Hooghe 2011)<sup>9</sup>. In addition, some scholars have found that trusting citizens are more willing to vote, follow politics, develop a sense of civic duty and to have a higher level of political knowledge (Mishler and Rose 2005); qualities that are considered relevant for the exercise of citizenship and related to the quality of democracy (Sen 1999). Therefore, whether resource abundance is associated with low levels of political support has relevant policy implications.

The Peruvian case offers an interesting setup for testing the implications of resource abundance on political support. Peru is one of the most important mineral producers of the world<sup>10</sup>, playing mining activity a fundamental role in the recent success of the Peruvian economy<sup>11</sup>; a phenomenon that some analysts are calling the “Peruvian miracle”. Despite the impressive economic growth performance over the past twenty years, Peruvian citizens are highly unsatisfied with democracy and their political institutions. Not only they are more willing to accept an authoritarian regime than the average Latin American, a striking fact given the recent history of massive corruption under the autocratic regime of Alberto Fujimori during the 90s, but also their levels of approval for participation in a coup d’état are among the highest in the continent<sup>12</sup>. The fact that Fujimori’s self-coup in 1992 received widespread political support (80% in Lima, the capital city) is often taken as evidence of the potential negative effects of citizens’ high levels of discontent with political institutions. Therefore, a growing economy highly dependent on mining along with citizens highly unsatisfied with the democratic system and political institutions offers a unique case study for those interested on the political consequences of resource abundance.

The basic results are as follows. Using different empirical specifications, I estimate a large reduction in the level of confidence in political institutions for the case of mineral producer district.

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<sup>9</sup> For instance, Lindstrom (2008) shows that low levels of political support is positively associated to the likelihood of buying liquor illegally in Sweden. Dalton (2004) argues that in US states with low levels of political support citizens are less willing to comply with the rule that considers compulsory the return of the census form.

<sup>10</sup> Currently, Peru is the 2<sup>nd</sup> producer of silver, 3<sup>rd</sup> of tin and zinc, 4<sup>th</sup> of copper and lead, and 8<sup>th</sup> of gold.

<sup>11</sup> Mining represents 6.5% of the gross domestic product, 62% of total exports and 40% of income taxes. So, the economic impact of mining is fundamental for the country.

<sup>12</sup> The last survey carried out by the Latin American Opinion Project (LAPOP) in 2010 shows that Peruvians have the lowest level of support for democracy in a sample of 25 countries of the American continent and are among the most unsatisfied with its functioning (Carrion and Zarate 2010). The support for an authoritarian regime is also among the highest in the continent (45%).

I found that after the increase of mineral prices the level of confidence in the local government lowers by 5.1 percentage points in mineral producer districts, representing this effect a 15.16% reduction in the average probability of being confident in the local government. I also found a negative effect on the levels of confidence in other political institutions such as the congress (40% reduction), the ombudsman office (35% reduction) and the judiciary (13% reduction).

In the case of support for democracy, I estimate a non-monotonic relationship between natural resource rents and citizens' support for democracy. For districts with modest increases in mining rents, there is evidence of an increase in political support for democracy. Consistent with our theoretical framework, this increase in citizens' support for democracy is related to increases in public good provision and living standards. However, for districts with very high levels of mining rents, there is a decrease in citizens' support for democracy that is also related with decreases in public good provision and living standards found in these areas. Since the average district receives modest mining rents, the marginal effect is positive, indicating that the resource boom is related to a positive impact on citizens' support for democracy. These results are robust to a set of placebo tests.

The rest of the paper is organized as follows. In section II, I provide an overview of the institutional background for this study. Section III discusses a simple theoretical framework. Section IV presents the data and the basic variables of the analysis and Section V presents the research design. Section VI introduces the econometric models and Section VII reports the results, robustness checks and causal channels. Section VIII presents conclusions.

## **2. Institutional background**

Democratic institutions are relatively new in Peru. Universal suffrage was lately introduced in 1980 along with open political competition. From 109 executive chiefs, only 4 were elected through universal suffrage since 1821; the year in which the country gained its independence from Spain. The last century, the country witnessed 48 years of authoritarian rule and no political regime—either authoritarian or democratic—lasted for more than 20 years. Some scholars argue that this political instability explains the fact that democratic beliefs and practices are not institutionalized in the country (Kenney 2004 and McClintock 1999).

During 90s the Peruvian party system collapsed giving origin to candidate-centered movements. As a consequence, the political system nowadays is highly fragmented; having these political organizations highly localized regional and political interests. The lack of strong political

parties is recognized as a critical problem for many political scientists since they serve as instruments for solving coordination problems and as discipline devices for politicians as well as means to solve informational problems about policy preferences and accountability of politicians for citizens (Levitsky and Cameron 2003, Roberts 2006). Therefore, politicians in Peru are less accountable and more short-sighted due to lack of established political parties, creating more incentives for rent-seeking behavior in office.

Along the weak democratic institutions, the country is also very centralized country and subnational governments are highly depended of transfers from the central government. From a fiscal perspective, 97% of taxes are collected by the central government (Polastri and Rojas 2007). Consequently, local governments are highly dependent from central government transfers. On average, transfers from central government represent 57% of local governments' budget. A significant part of transfers from central governments are allocated in the form of the municipal compensation fund (FONCOMUN) and the Glass of Milk program (56% and 10% of all intergovernmental transfers). These transfers are universally distributed among local governments. The rest is allocated as targeted transfers. From these targeted transfers, Canon transfers (including all sources of Canon such as oil, hydropower, forest and gas Canon) represent a 91% of the total targeted transfers, being the mining Canon the most important one (79% of all Canon transfers). Therefore, mining Canon represents a significant fraction of local governments' budget in mineral-rich areas.

Mining is an activity with long tradition in Peru since colonial times. Historically, it has been associated to exploitation and environmental degradation, which explains the negative perception that this activity has in areas where is performed. During the 90s, mining experienced a significant expansion because of a set of laws and regulations oriented to promote foreign direct investment in the sector as part of the market reforms introduced under the rule of Alberto Fujimori. As a consequence, mineral production grew at an average rate of 7.2% between 1992 and 2000 while the average GDP did so at a rate of 4.8%. This growth was mainly driven by the start of new large scale operations in copper, gold and silver production. Today, Peru is one of the most important producers of minerals in the world.

Along with the legal framework for promotion of mining activity, in 1992 the Central Government passed the first Mining Canon Law (DS 014-92 EM) which stated that a 20% of income tax should be allocated to the areas in which the profits were generated. In 2001, as part of

the decentralization process, this law was modified to increase the participation of these areas. The most important law is the Law 27506 (known as the Canon Law), which states that the 50% of income tax paid by mining companies will be allocated to the regional and local governments located in the areas where the minerals are extracted. This amount is distributed between the regional government (20%), the municipality of the district (10%), the municipalities located in the province (25%), and the municipalities located in the region where the resource is exploited (40%). In addition, a 5% is allocated to the public universities of the region. This distribution rule has been changed several times in order to precise the criteria used to allocate the transfers among the local governments located in the same province and region of the mineral producer districts, although there is no evidence that these changes were motivated by a link between national and local politicians from the same party (Barrantes et al 2010).

### **3. Theoretical framework**

The basic idea of the theoretical framework is that citizens' evaluation about effectiveness of democracy depends on how politicians use natural resource rents in order to provide public goods to citizens. This means that citizens' evaluation depends critically on the welfare effects of democracy compared to an alternative authoritarian regime<sup>13</sup>. Before proceeding, it is important to highlight some basic characteristics of the mining activity in order to understand how it can impact citizens' welfare in the face of a resource boom. Mining can affect welfare by two basic channels: a) a *direct effect* that can be either positive due employment and labor market opportunities related to mining production or negative because of environmental disamenities and the emergence of public "bads" (crime, prostitution, etc); and b) an *indirect effect* due to public goods provided by local governments funded with mining Canon revenues.

The first channel is a market effect because it depends on changes in production and prices in mineral-rich areas. The sign of this effect is ambiguous because it would depend on whether the benefits of this activity (labor and market opportunities) are higher than its costs (pollution and other disamenities). The second channel is a *political economy effect* because depends on how politicians use the transfers. The effect is also ambiguous because politicians can use mining rents for providing public goods (that can increase citizens' welfare and, as a consequence, their support

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<sup>13</sup> The idea that democracy is better than autocratic regimes in producing economic outcomes is extended but empirical evidence is not conclusive. For instance, in the case of economic growth Tavares and Wacziarg (2002) find that the overall effect of democracy on economic growth is moderately negative.

for democracy) but also to engage in corruption, patronage and other of malfeasance in office (which can lead to a decrease in political support). Then, what matters is understand how a resource boom can affect the way politicians and elites operate in a given institutional setting, and how this behavior affects citizens' views about effectiveness of democracy. In the context of this paper, the emphasis is given to the political economy effect. Although the first channel is critical, I control for it in the empirical section since it is not the main focus of this study<sup>14</sup>.

I consider a simple two-period decentralized democracy (see Appendix I for a full exposition) based on Bender and Drazen (2007 and 2009) and Caselli (2006). In this setting, there are elites, masses and politicians. Politicians can be local or national, but it is assumed that national politicians are incumbents (they are members of the government). Local politicians can be incumbents or potential competitors. It is assumed that the political system is fragmented, so national political parties are not relevant players in local politics. This assumption is consistent with our setting and may be also relevant for the case of other resource-rich countries. This basically implies that local politicians' decisions are mainly based on their ability to obtain or keep power in a given local political arena. It is also assumed that local governments are exclusively in charge of the provision of public goods and that the central government can only use direct transfers to specific groups as policy instrument.

The elite's problem is to decide whether to mount a coup or not. This decision depends on the opportunity cost of running a coup, which is in this setting any loss to elite's endowment and transfers from a centralized government who wants to buy them off as in Acemoglu and Robinson (2006). The centralized government can increase the opportunity cost of the elite by manipulating this transfer. It is assumed that this cost is increasing in citizens' support for democracy. Therefore, the higher the support for democracy, the less likely the elite to mount a coup.

Citizens face an inference problem regarding the effectiveness of democracy. They cannot distinguish whether current economic performance is a good predictor of long-term economic performance under democracy. They have subjective probabilities regarding the level of provision of public goods and idiosyncratic shocks. The provision of public goods can be used to affect the beliefs citizens have regarding the advantage of democracy with respect to non-democracy in terms of policy outcomes. Since citizens cannot fully observe the true level of public goods, then their

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<sup>14</sup> Maldonado (2014) finds that mineral production play no role in explaining political outcomes and public good provision for the Peruvian case analyzing the same boom.

levels of political support for democracy depends on a subjective distribution about the relative performance of democracy over non-democracy, which in turn depends on their beliefs about the level of public goods. Therefore, it can be established that public good provision can be used by local politicians to positively influence their beliefs about the effectiveness of democracy.

Although local politicians can influence citizens' attitudes towards democracy via the provision of public goods, there is no reason to believe that they would do so on purely altruistic grounds. The fact that politicians' incentives are local while the rules of the democratic game (political institutions) are defined at a national level creates a free-riding problem. In this setting, democracy is a public good for politicians; they prefer democracy over dictatorship because allow them to be elected and get rents but they don't internalize that, in countries with weak democratic institutions, in order democracy to work for citizens, they would need to collectively provide public goods to them. Therefore, politicians have to "invest" in democracy, at least until the point in which democracy is consolidated, but the public good nature of the latter create incentives for free-riding. If politicians could write a contract to commit themselves to provide the public goods needed for citizens to learn about the effectiveness of democracy, then citizens would learn that democracy "works" and political support would be high. In this scenario, democracy would be consolidated as the "only game in town". However, this type of contracts are difficult to enforce: it would be optimal for a single politician to deviate from this agreement, maximize his rents and still be able to run for office the next election since the impact of this deviation on aggregate political support would be minimal. Given the absence of enforcement technologies for such a contract, rational politicians would invest in public goods only in a way consistent with their own electoral incentives in their respective jurisdictions.

Since local politicians are only interested in gaining or keeping power, it is required to analyze how they decide the level of public good provision in the face of a resource boom taking into account their electoral incentives. The intuition here is that resource boom have ambiguous effects on political outcomes: on the one hand, it increases political competition due to the increase of the value of holding office, but –on the other hand- increases the fiscal resources that the incumbent can use in order to affect the electoral outcomes. Therefore, the final impact is going to depend on which effect is more important. Since local politicians use public good provision as the most important policy instrument to influence political outcomes, then they indirectly affect the levels of political support for democracy.

To illustrate this, let's consider a very simple two-period local economy with a large number of unskilled workers and two talented agents, one of them being the current incumbent. In the first period, this economy is composed by two sectors: the natural resource and subsistence sectors. The mineral resource sector is assumed to provide an exogenous flow rents to the local government. It is assumed that production in this economy depends on the provision of public goods by the local government. Therefore, the incumbent politician can influence the level of output in this economy according to the level of public goods he decides to provide.

The talented agent has managerial skills that can be used either in the industrial sector or politics. The talented agent problem is to decide whether to become an industrialist in the second period or a challenger to the incumbent politician. She compares the net benefit of becoming a politician against her opportunity cost in the industrial sector. If she becomes a politician, she would face the result of an election in which she has some positive (exogenous) probability of winning. If she wins, she can extract rents from the municipality otherwise she would need to face the cost of losing the election. If she becomes an industrialist, she would hire unskilled workers to produce an industrial good that also depends on the stock of public goods.

Therefore, the incumbent politician problem is to maximize the net present value of his consumption taking into account the impact of his behavior on the decision of the talented agent of becoming an electoral challenger. A high level of consumption associated to a low provision of public goods reduces the opportunity cost for the talented agent of becoming a politician and increases the chance for the incumbent to face a competitor. The opposite is also true.

The game follows the next structure. During period 1, a level of mineral rents and public goods are given exogenously. The mayor is also exogenously determined in the first period. At the end of the first period the mayor decides his level of consumption with respect to public good provision for period 2. Once this level of public good is realized, the talented agent chooses whether to become an industrialist or a competitor for the incumbent. At the end of the second period there is an election.

The solution of this model delivers a non-monotonic pattern between mineral resource rents and political competition. In the presence of an increase in mineral resource rents per-capita, the value of holding power increases, making politics more attractive for the talented agent (reflected in an increase of the opportunity cost of involving in industrial production). Nevertheless, the mayor also has access to more mineral rents he can use to provide more public

goods to reduce the opportunity cost of becoming an industrialist. This implies that, for low levels of mineral rents, the mayor can successfully prevent the entry of the talented agent into politics. However, this strategy would become useless for very high levels of mineral rents associated to a mineral resource boom since the value of holding power would be higher than the level of profits the talented agent can obtain in the industrial sector. Therefore, the mayor cannot prevent the entry of the talented agent into politics. As a consequence, the mayor reduces his level of investment in public goods since his probability of reelection has been reduced.

Therefore, a natural resource boom have non-monotonic effects on public good provision. More specifically, the model predict that natural resource rents per-capita are non-monotonically related to public goods provision. Since public goods is also positively related to political support for democracy, the natural resource rents also non-monotonically affect citizens' support for democracy. This basic result constitutes the core prediction to be taken to the data in the rest of the paper.

#### **4. Data and variables**

The main data source for this research is the Encuesta Nacional de Hogares (ENAH), carried out yearly by Peru's national statistical agency. Starting in 2002, the statistical agency included a module on governance in which one randomly selected household member over 18 is asked several questions about perceptions on a set of governance issues. In this paper, I use the surveys over the period 2002-2006<sup>15</sup>. About 19,000 respondents of the governance module are available for each year. This period cover years where the international prices of mineral resources were stable (2002 and 2003) and years were these prices experienced an extraordinary rise (from 2004 to 2006). The full sample contains 91,150 observations for the period under analysis.

The set of dependent variables for the empirical analysis is composed by indicator variables of confidence in political institutions and attitudes towards democracy. These are constructed as dummy variables from the governance module. Specifically, I use as a proxy for confidence in political institutions a question which requires from the interviewed to answer whether she or he is confident on a set of institutions such as the local government, the congress, the judiciary, among others. The question considers the following levels of confidence: not at all, a little, more or less,

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<sup>15</sup> The governance module was changed in 2007 and many questions related to democratic performance were dropped. Questions about confidence in political constitutions remain but we restrict the analysis to the same period to ensure consistency.

a lot. I create a dummy variable equal to one for those who respond that they are more or less and a lot confident and zero otherwise. Similarly, I use questions about citizens' perceptions about democracy to approach their levels of confidence in the democratic system. Particularly, I use the question about performance of democracy. Here citizens are asked about whether democracy is working in the country. The categories to be chosen are very well, well, more or less, and bad. I create a dummy equal to one for those who respond that democracy is performing badly and zero otherwise. In this case, this variable only considers those who have a bad perception about the performance of democracy. I also create a similar variable for the question about whether democracy is not the best way of government. Finally, I also create a variable about whether citizens' belief an authoritarian regime would be preferable.

I report summary statistics for the respondents to the governance module in Table I. In general, the levels of confidence in political institutions are low in the country. On average, only 28% of those living in mineral-rich districts are confident in their local government. This contrast with the almost 40% observed in non-mining Canon recipient districts. The same pattern is observed in the level of confidence for political parties, the judiciary, the Congress and the Ombudsman office. Citizens in mineral rich districts are less confident in political institutions. This is also true for the case of the indicators about democracy; in general, citizens in mineral rich areas are less willing to support the democratic system. Not only are they less supportive about democracy but also more willing to support an authoritarian regime<sup>16</sup>.

Besides the measures of confidence in political institutions and democracy, the ENAHO survey also includes a large set of economic and demographic household characteristics. Descriptive statistics for a set of control variables for household characteristics and characteristics of the household head are also reported in Table I. In the first case, I include a set of dummies for capturing the possession of assets as well as the (log) of consumption, the number of wage earners and whether the household obtained its dwelling through an invasion. In most cases, these characteristics are similar between mineral and non-mineral rich districts. In addition, no significant changes are observed over time. The same applies in the case of the variables related to household head's characteristics, which includes age, gender, marital status and a set of

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<sup>16</sup> One potential concern with the data is the presence of non-response and/or underreporting in the variables used to construct the dependent variables. Previous research using this dataset suggests that this concern is marginal (Hunt 2007 and Herrera et al 2005).

educational dummies. Complementary, I also include some baseline characteristics constructed from the 1993 census.

Data on revenues and transfers from the central government at district level over the period 1998-2008 was collected from the Ministry of Economy and Finance. This includes detailed information from all type of transfers received by local governments as well as information about other regular sources of incomes (taxes, contributions, fees for services, among others). In this paper, I focus on the period 2001-2006.

Table I also presents basic summary statistics of mining Canon transfers. On average, mineral producer districts received 123 soles per-capita during the period under analysis. This amount represents a 25% of the average monthly income per-capita in these areas. Canon recipient districts (excluding producers) receive 43 soles on average. These numbers do not take into account the extremes inequalities in the distribution of mining Canon transfers. For instance, whereas the percentile 90 of mineral producers gets 134 soles per-capita, the percentile 99 obtains 1,726 soles (3.6 times the average income per-capita for these areas). This is evidence that, whereas a large number of districts receive this transfer, only few of them get it in large magnitudes.

Mining Canon represents a significant part of the budget of local governments in mineral-rich areas. On average, represents a 16% of producer districts' budgets. There is also significant variation here, ranging from to less than 1% to a maximum of 70% of local government budget. The fraction is less significant for non-producer districts in mineral rich regions (9%). It is important to mention here that mining Canon is by far most important than other sources of Canon in these districts: for instance, the gas and oil Canon per-capita are about 7 and 6 soles respectively, significantly lower than the 43 soles for mining Canon for recipient districts. One exception is the per-capita oil Canon for non-recipients which is slightly lower in magnitude than the average per-capita mining Canon for producer districts.

The information of prices and production covers the period 1998-2007 and was collected from the Ministry of Energy and Mines. This information is used to construct a measure of real value of mineral production. The data is available for producer districts.

## **5. Identification Strategy**

In order to establish a causal relationship between resource abundance and political support for democracy an exogenous source of variation in the former variable is needed to explain the latter. In this paper, I am be able to overcome issues about the endogeneity of political support by

exploiting an exogenous variation in local revenues of a subset of Peruvian local governments which were benefited by a spectacular increase of their fiscal resources (Maldonado 2014). This rise was due to favorable fluctuations of the international prices of mineral resources they produce. By comparing the level of political support for democracy of citizens from local governments with and without natural resources, before and after the rise of their international prices, I expect to uncover the causal effect of a positive shock on local revenues on political support for democracy and confidence in political institutions.

Historically, Peru has been a small and open economy highly dependent on the exports of primary products, characteristic that was reinforced by the liberal reforms based on the Washington Consensus during early 90s. For this reason, the country is basically a price-taker in the international markets of its most important exports and consequently highly sensitive to external shocks. This implies that movement of international prices can be considered exogenous to local economic dynamics in mineral-rich areas. In fact, some researchers (see, for instance, Dancourt 1999) have suggested that almost all the economic crises faced by the country since 1950 have been related with external shocks such as a fall in the terms of trade.

Graph 2 presents the evolution of the international prices of the 8 most important mineral resources produced by the country<sup>17</sup> during the period of reference. As shown in the graph, these prices were quite stable from 1995 to 2003 and then underwent an extraordinary rise until 2008. In almost all the cases the prices were multiplied by two or three times in relation to the average prices before 2003<sup>18</sup>. As a consequence, a significant exogenous variation in mineral prices is available in this setting to address issues of causality.

As a result of this exogenous rise of minerals prices, the country's exports experienced an extraordinary increase. Graph 3 shows the evolution of the country's total exports as well as its mineral resources exports. It is clear from the graph that there was a significant change in the value of Peruvian exports after 2003, which was mainly driven by the increase of mineral resources' exports. Since it is arguably that the rise of prices may have affected the production decisions in

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<sup>17</sup> These minerals are copper, zinc, lead, tin, gold, silver, iron and molybdenum.

<sup>18</sup> One potential concern with my identification strategy is the fact that the country is one of the most important producers of minerals in the world. Currently, Peru is the second producer of silver; third of zinc, copper and tin; fourth of lead and molybdenum and fifth of gold. It may be argued that past corruption and/or other events during the period may have affected the country's production levels and consequently the international prices. Nevertheless, there is no evidence that such internal factors have played an important role at explaining the recent rise of commodity prices. Experts have suggested that the recent rise of commodities prices is largely explained by the China's rapid industrialization process (Roubini 2006) as well as by the fall of interest rates (Frenkel 2008).

unobservable ways that may be potentially correlated with the treatment of interest, then concerns about the endogeneity of fiscal revenues may cast doubts about the credibility of my identification strategy. Nonetheless, there are no reasons to believe that such potential source of endogeneity of fiscal revenues may have played an important role during the period under analysis. Graph 3 shows the evolution of levels of production of the most important mineral products produced by the country over the period and contrast them with the evolution of prices. The data show that, in most of the cases, the production of minerals did not suffer a significant change during the period compared to the price changes. This fact allows me to argue that the increase of mineral exports, and consequently the fiscal revenues related with them, are mainly driven by an exogenous price shock and are not due to changes in production levels, at least for the period 2002-2006, the main focus of the empirical analysis due to data availability. I discuss in the empirical section several ways to address the potential endogeneity of mining Canon transfers related to endogenous responses in production related to the increase of prices.

The next step consists in understanding the connection between this shock and the increase of fiscal revenues of the local governments. I take advantage of a differential increase of revenues across local governments due to a set of laws that allow local and regional governments where mineral resources are extracted to have the right of a differential access to the income taxes paid by mining companies to the central government. Given the high growth rates experienced in the period, all instances of government faced an important increase in their budgets, but local governments in mineral areas faced an extraordinary increase in their budgets as it is showed in Graph 4, which presents the amount of transfers received by local and regional governments from these areas during the period under analysis. As it should be clear from the graph, the amount of transfers due to royalties and mining Canon were relatively low (roughly 67 and 95 million of nuevos soles) during 2001 and 2002, having a spectacular increase since then reaching the extraordinary number of 4.15 billion in 2007<sup>19</sup>.

This shock was heterogeneously distributed across the regions in the country. Since the distribution of mineral resources depends on the geographic characteristics, it should be observed that some areas are more suitable for the extraction of minerals. As a consequence, different areas are affected by different prices and then are benefited by the shock in revenues in different ways. The evolution of transfers from mining Canon shows two basic patterns are shown by this table:

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<sup>19</sup> For reference, the current exchange rate is 2.85 nuevos soles per US dollar.

a) there are huge differences in terms of mining Canon transfers among the departments, and b) there are disparities in terms of the evolution overtime of mining Canon transfers across departments (not shown). This suggests that the effects of the shocks may be heterogeneous.

This is clearer in Map 1. This shows that only 4 regions (Ancash, Cajamarca, Moquegua and Tacna) got a disproportionate access to mining Canon transfers in 2006. Districts from these regions obtained 75% of the mining Canon transfers distributed that year meanwhile the remaining districts only got modest transfers. This suggests that few districts get a lot of resources and that a differential effect of the mining Canon transfers may be expected.

## 6. Empirical model

The empirical strategy is based on a difference-in-difference model (DD). The basic specification is as follows:

$$(1) y_{ijt} = \alpha_j + \lambda_t + \beta F(MC_{jt}) + X'_{ijt} \delta + \varepsilon_{ijt}$$

where  $y_{ijt}$  is the outcome of interest for household  $i$  who lives in the district  $j$  in period  $t$ .  $\alpha_j$  and  $\lambda_t$  are respectively district and years fixed effects.  $MC_{jt}$  is a measure of mining Canon transfers per-capita allocated to district  $j$  in period  $t$ .  $X'_{ijt} \delta$  includes district, household and individual characteristics and  $\varepsilon_{ijt}$  is an error term. The parameter of interest is  $\beta$  which recovers the causal effect of interest and it is estimated using a linear probability model.

The function  $F(\cdot)$  is introduced to account for the existence of non-monotoncities. I consider linear and quadratic specifications in the empirical analysis, consistent with the theoretical framework and previous literature (Maldonado 2014). The time fixed-effects accounts for the time-series changes in the measures of political support. The district fixed-effects controls for time-invariant characteristics at district level and the  $MC_{jt}$  accounts for changes in dependent variable in treated districts associated to the movement of mining Canon revenues after the increase of mineral prices. Identification in this setting requires controlling for any systematic shock to the political support measures of the districts affected by the increase of prices of mineral resources that are potentially correlated with, but not a consequence of, the revenues shock<sup>20</sup>. This

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<sup>20</sup> Formally, this is known as the common trends assumption. In terms of counterfactuals, this implies an additive structure for the potential outcomes for the untreated districts (without considering covariates) as follows:  $E(y_{ijt} / j, t) = \alpha_j + \lambda_t$ . For a discussion, see Angrist and Pischke (2009), chapter 6.

specification is a generalization of the standard two period-two groups DD approach (see, for instance, Bertrand, Duflo and Mullainathan 2004 and Hansen 2007) extended to incorporate non-monotonic responses in a parametric way.

As pointed out by several authors (Moulton 1986), inference without accounting for within-group dependence can severely underestimate standard errors. This is what Angrist and Pischke (2009) call the “Moulton problem”. In addition, and particularly relevant for DD estimation, there is a potential serial correlation problem, as highlighted by Bertrand, Duflo and Mullainathan (2004)<sup>21</sup>. To deal with both issues, I cluster the standard errors at district level using the generalization of the White (1980) robust covariance matrix developed by Liang and Zeger (1986). This solution controls for clustering and heteroskedasticity, and it is valid as long as a large number of clusters are available; which is the case in the context of this paper<sup>22</sup>.

The use of this continuous treatment variable is problematic since does not control for the fact that there may exist endogenous responses in production. I address this issue by directly controlling for the level of mining production. Alternatively, I study alternative robustness checks to evaluate whether the basic results are robust to changes in the composition of the sample.

The key assumption for the identification strategy is that, in the absence of the positive shock in local revenues, there are no differential changes in political support for democracy correlated with initial levels of mining Canon revenues. For instance, if the increase of local revenues due to mining Canon was concentrated in areas that were expected to change their political support levels, then this assumption would be violated. I provide reasons for what this is not the case. Using placebo tests, I show that the results of this paper are robust to a set of alternative specifications and that evidence against the basic identification assumptions is not available.

Along with the specification (1), I also estimate the following empirical model:

$$(2) \ y_{ijt} = \alpha_j + \lambda_t + \beta(Canon_{jt} \cdot HighP_t) + X'_{ijt} \delta + \varepsilon_{ijt}$$

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<sup>21</sup> According to these authors, this is due to the following reasons: a) usually estimates are based long time series, b) the dependent variable is usually highly positively serially correlated, and c) the treatment variable changes very little within the treatment unit over time. In the context of this paper, a) is not a big issue since only 5 years are available. The other two issues will be controlled for in the empirical analysis.

<sup>22</sup> For a discussion for the case of a small number of clusters, see Angrist and Pischke (2009). Cameron, Gelbach and Miller (2007) propose bootstrap-based solutions. Particularly, the wild cluster bootstrap appears to perform well in a set of simulations studied by the authors.

where  $Canon_{jt} \cdot HighP$  is a dummy variable for observations after the rise of international prices (which in this case takes the value of one for years 2005 and 2006<sup>23</sup>) in treated districts. The logic here is to test whether being a mining Canon recipients matters rather than the magnitude of the transfer itself<sup>24</sup>.

I use two different ways to specify the treatment variable in (2). In the first place, I consider as a treated observation to any household located in a district benefited from mining Canon transfers. One disadvantage of this approach is that around 70% of districts in the country get these transfers even in modest magnitudes<sup>25</sup>. Since it is arguably that such as a low level of transfers should have not any effect on political support for democracy, to consider districts like this as treated units may lead to incorrectly underestimate the effect of mining Canon revenues on political support. This calls for an alternative way to define the treated districts in the analysis. Since a significant part of the transfers are allocated to the mineral producer districts, it is expected that the effect of transfers should be important in these areas. Using mineral producer districts as treated units has the advantage of providing a clear connection between the shock in prices and its impact on local revenues. However, any estimate for this group should be consider as a lower bound of the effect of the revenues shock on political support since districts in the province where the mineral producer is located are also affected by the shock in revenues<sup>26</sup>. Therefore, using these districts as counterfactuals for mineral producers leads to an underestimation of the effect of revenues on political support.

## 7. Results

### 7.1 Confidence in political institutions

I first estimate (2) in order to study the effect of the increase of prices in the mineral-rich areas on the level of confidence in local governments, the level of government entitled with the access to a part of the rents derived from the mining activity. I start by using the specification in which the treatment is defined for the case of mineral producer districts. The simplest specification

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<sup>23</sup> I take account of the fact that there is lag between the occurrence of this increase of mineral prices and the moment in which taxes collected from mining companies are allocated to districts benefited from mining Canon.

<sup>24</sup> This specification is similar to Thorton (2008) which also test whether the fact of being recipient of a transfer matter along with the magnitude of the transfer.

<sup>25</sup> For instance, the Municipality of Vista Alegre in the region of Amazonas received 3.61 Nuevos Soles (about 1 U.S. dollar) as mining Canon transfers in 2006 while the Municipality of Ilabaya in the region of Moquegua received about 59 millions of Nuevos Soles (21 million U.S. dollar) for the same reason.

<sup>26</sup> As mentioned before, districts in the province where the mineral producer district is located share 25% of the total transfers due to mining Canon. This implies that the increase in their revenues over the period must also be substantial.

estimates this relationship without controls (Column 1 in Table II). The coefficient associated to the interaction is negative and statistically significant at 1% confidence level with a magnitude of -0.051 (standard error 0.015). This result implies that after the increase of mineral prices the level of confidence in the local government lowers by 5.1 percentage points, representing this effect a 15.16% reduction in the average probability of being confident in the local government (baseline of 0.34). After adding a set of controls (column 2) for the most important sources of revenues, urbanization level, household/individual characteristics and mineral production, the coefficient associated to the interaction shows a small reduction but it is still negative and significant at 1% confidence level with a magnitude of -0.045 (standard error 0.016). Column 3 of Table II estimates the same relationship using as treatment variable whether the observation lives in a Canon recipient district. Although the coefficient has the same sign, it is not statistically significant. This is not surprising since the level of per-capita transfers is really low for many of these local governments.

Columns 4 to 8 estimate versions of (1). Columns 4 and 5 estimates a linear specification of (1) with and without controls respectively whereas columns 6 and 7 do so for the case of the quadratic model. Column 8 considers a specification in which producer districts are dropped from the sample with the intention of controlling for potential endogenous production responses. No evidence of the role of the magnitude of mining Canon transfers is found. This suggests that the factors driving the results may be associated to the magnitude of the transfers but only in the extensive margin.

Since the local governments are the units of the government that receive the rents associated with the mineral activity in form of mining Canon, it is expected that citizens from mineral-rich areas are evaluating the performance of their local authorities taking into account this fact. The negative effect of mining Canon transfers on the confidence in the local government may reflect citizens' dissatisfaction about the way in which local governments in these areas are using this large increase of fiscal resources in terms of providing public goods that can benefit them. I discuss these issues later. However, it is possible that other units of the government as well as other political institutions can be negatively affected because the existence of spillover effects of this decrease of the level of confidence in local governments in these areas even though they have no relation with the generation or the use of these transfers<sup>27</sup>.

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<sup>27</sup> The literature of political support provides previous examples in which level of disapproval for a particular political institution can have spillover effects on citizens' support for other institutions. See Norris (2011) for details.

I test for this possibility using the same specification used before. In particular, I use the specification with and without all control variables in (2)<sup>28</sup>. The results are presented in Table III. The political institutions considered in the analysis are political parties, the congress, the judiciary, and the ombudsman office. Overall, there is a negative effect of mining Canon transfers on the level of confidence in political institutions, except for the case of the political parties. The estimated effect is strongly significant in all the cases with a confidence level of 1%, except for the judiciary (confidence level of 5%). The estimated coefficients are similar in magnitude to those obtained for the case of the local governments (around 6 to 8 percentage points), except for the ones for the judiciary (3 percentage points) and the ombudsman office (13 percentage points). In all the cases, the effects are large and represent an important reduction in the average confidence level in political institutions. For instance, this reduction is 40% for the congress, 35% for the ombudsman office and 13% for the judiciary.

Overall, the empirical analysis suggests a negative effect of resource booms on the level of confidence in political institutions. These results are strongly statistically significant, robust to different set of controls and are large in magnitude. Although the transfers are targeted to local government, other institutions are also negatively affected by the increase of transfers even though they have no influence in the generation or in the use of these resources. These spillover effects can have important policy implications. It is important to note, however, that these results are driving for producer districts which represent a small fraction of the districts in the country (about 100 out of 1,836 districts) and are the ones that receives significant levels of transfers. For the average mining Canon recipients, it seems that there are not relevant effects.

## **7.2 Attitudes towards democracy**

In the previous section I found a negative effect of the transfers on the level of confidence in political institutions. In this section, I explore the effect of transfers on political support for democracy. As in the previous section, I estimate the standard DD model of equations (1) and (2).

I first estimate the impact of mining Canon transfers on the perception about the (lack of) effectiveness of democracy. The dependent variable is a dummy equal to one if the interviewed person considers that the democracy does not work and zero otherwise. Table IV presents the results of the empirical exercise using this dependent variable. The coefficient associated with the

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<sup>28</sup> Complete results for all the specifications are available upon request. Since these are robust to changes in the specification, I use the specification that includes all the control variables.

standard DD interaction is positive and statistically significant at a 1% confidence level (column 1) and it is robust after controlling for other type of transfers, urbanization, mineral production and individual/household characteristics (column 2). The magnitude of the estimated coefficient (0.061) is important (standard error 0.016) and represents a 44% increase in the average perception of the lack of effectiveness of the democratic system in these areas. In column 3 the alternative definition of treated district (mining Canon recipient) is used and no effect is found.

Columns 4 to 8 are based on equation (1). The specification in levels (columns 4 and 5) is not significant but the quadratic specification delivers evidence consistent with non-monotonicities in the relationship between mining Canon transfers and support for democracy. Consistent with our theoretical framework, districts that receive low levels of transfers show an increase in political support for democracy whereas in areas that got larger levels of transfers a reduction in political support is observed (column 6). This relationship is robust after controlling for other type of transfers, urbanization, mineral production and individual/household characteristics (column 8). These results are robust to the exclusion of mineral producer districts (column 9).

In order to interpret these results, it is required to evaluate the impact for the average district in terms of mining Canon transfers. Since the average level of transfer is low (41 nuevos soles per capita), this implies that the net effect would be negative (-0.051). This implies that, for the average district, the recent resource boom is related to a decrease in the negative perception regarding the effectiveness of democracy.

These results suggest that, after the increase of prices, citizens from the average district have the perception that the democratic system is more effective. Could this imply a decrease of the willingness to support for democracy by the citizens from mineral-rich areas? After all, citizens may feel satisfied about the way democracy is working but still be unsupportive to the idea that is the best way to organize the society. In order to explore this possibility, I run the same empirical model as above using as a dependent variable two measures of the approval of core regime principles: firstly, a measure of whether democracy is the best way of government and, secondly, an indicator of whether democracy is important for the interviewed. Table V and VI present the results of the analysis.

The standard DD approach (columns 1 to 4 of Table V) shows a not statistically significant association between the increase of natural resource rents and citizens' perception about democracy being the best way of government. However, this result does not hold when estimating

the DD model in (1). In this case, mining Canon transfers are negatively associated to the probability of considering that democracy is not working. Column 4 shows that this result is valid even in the simplest specification without controls and column 5 suggests that it's robust to controlling for other type of transfers, urbanization, mineral production and individual/household characteristics. Including the square of mining Canon transfers suggest the presence of non-monotonicities consistent with our theoretical framework (column 6), although the results disappear when other controls are included (column 7). However, dropping observations from mineral producer districts (column 9) does not affect the results obtained in column 6.

Results in Table VI for the importance of democracy are consistent with those obtained in Table V. Again, the specification in (2) is not significant, suggesting that being a mineral producer or a mining Canon recipient is not important (column 1 to 3). The non-monotonicities are more important here; whereas the linear inclusion of per-capita mining Canon transfers has no effect on considering democracy unimportant (columns 4 and 5), the addition of the square of mining Canon transfers becomes the relationship strongly statistically significant and with the expected signs (columns 6 and 7). These results are robust to dropping mining producer districts from the sample (column 8).

### **7.3 Robustness checks**

In order to test the robustness of my previous results, I construct placebo treatments taking advantage of my DD design. As discussed in the identification strategy, I take advantage of the evolution of mineral prices, which were stable before 2003/2004 and experienced a large increase afterwards, and compare beliefs between mineral and non-mineral rich areas due to the differential access to mineral resource rents established in the Canon Law. Therefore, I can exclude observations for the years 2005 and 2006, in which the high mineral prices translated on higher mining Canon transfers for mineral-rich districts, and create placebo treatments for years of stable mineral prices. For my identification strategy to be valid, it must be the case that no effect of transfers on the outcome variables should be found.

The placebo treatment is defined as an indicator variable equal to one if the observation comes from a mineral producer district in 2004 and zero otherwise. Since observations from 2005 and 2006 are dropped from the sample, no change in terms of local revenues occurred during the period under study. Correspondingly, all the interactions in the DD analysis are adjusted to this new definition of the treatment variable. Using these new variables, I re-estimate the econometric

models reported in Table II and Table IV for analyzing the impact of mining Canon transfers on the level of confidence on political institutions and on attitudes towards democracy respectively. The results are presented in Table VII and Table VIII.

I find no effect of the placebo treatment on my outcome variables using the DD model in Table II. For instance, none of the reported coefficients for the local government is statistically significant (Table VII). The same is valid for the case of the effect of the increase of mining Canon transfers on attitudes towards democracy (Table VIII). These results suggest that there is a real effect of the large increase of mining Canon transfers on the level of confidence in political institutions and on attitudes towards democracy.

#### **7.4 Causal channels**

A general picture emerges from the results previously discussed: in producer districts, the resource boom is related to a reduction of the level of confidence in political institutions. Also, support for democracy shows a non-monotonic relationship with mining Canon transfers implying that areas with large level of transfers show a large reduction in political support whereas places in which this increase was modest show an increase in support for democracy. These results are consistent with the theoretical framework discussed in section 3 and Appendix I.

According to our theoretical framework, a non-monotonic pattern between natural resource rents and public good provision should be observed. I test this relationship in Table IX. I include a set of local public goods like access to water, access to public light, garbage collection, security services and access to library. In most cases, there is strong evidence of the non-monotonic pattern suggested by the theoretical framework. For the average district in terms of mining Canon transfer, the evidence suggest that the resource boom is related to a positive impact on public good provision. For district with very high levels of transfers, there is a negative impact on public good provision. These patterns are consistent with the observed pattern in terms of citizens' support for democracy.

These results are consistent with the literature about economic voting that emphasizes the role of material benefits. As it has been documented by an extensive literature (see Manacorda et al 2011 and Brunner et al 2010 for recent contributions), citizens' political behavior is responsive to economic shocks and policies that affect directly their well-being. Therefore, whether or not this increase of transfers has an effect on citizens' well-being is critical in order to explain these results.

To complement the analysis, I also analyze the role of resource booms on living standards. I estimate the same empirical model as in Table II using (log of) household consumption per-capita levels as proxy of well-being. The results are shown in Table X. Although I do not find a clear pattern for the specification in (2), the evidence of non-monotonic effects on consumption per-capita is strong. The effect is positive for the specification in levels (column 4 and 5) but stronger for the case of the quadratic specification (columns 6 and 7). The results are robust to the exclusion of producer districts (column 8).

These results are consistent with our theoretical framework. Living standards follow the pattern of distribution of public goods. Therefore, in places where there were increases in public good provision and living standards, citizens are more willing to support the democratic regime. The opposite happens for very rich districts in terms of mining Canon rents. In these areas, the resource boom is related to reductions in public good provision and living standards, which in turn is related to low levels of citizens' political support for democracy.

These results differ from existing evidence in the empirical literature. For instance, previous work in Brazil (Caselli and Micheals 2013) and Cajamarca, one of the most important gold producer regions in Peru (Aragon and Rud 2013), find no evidence of increase in well-being associated to the increase of mineral resource rents<sup>29</sup>. Maldonado (2014) shows that these results are inconsistent with theoretical models that highlight the existence of non-monotonic effects.

## **8. Conclusions**

In this paper, I have explored the impact of resource booms on political support for democracy. The basic motivation was to provide a conceptual framework and a credible empirical analysis to study one important dimension of the political resource curse literature: how resource abundance can negatively affect the consolidation of democracy often observed in resource-rich developing countries. Rather than focusing exclusively on the behavior of politicians, the behavior of citizens is incorporated in a simple extension of the Bender and Drazen's (2007) piece. The basic idea of the model is that citizens' support for democracy in resource-rich areas critically depends on the way politicians use natural-resource rents to provide public goods that help them

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<sup>29</sup> Aragon and Rud (2013) study the case of Yanacocha, the second largest gold mine in the world and responsible of production of 45% of the gold exported by the country. They find that despite its magnitude and the fact the company has a policy oriented to increase the participation of local firms and workers, a 10% increase in the mine's activity was only associated to an increase of 1.7% in household real incomes. They also find that this effect is not explained by the impact of mining Canon transfers on household welfare.

to learn that democracy “works”. The model predicts that, when a resource windfall occurs, the incentive of politicians for providing public goods is non-monotonically related to the level of mining rents. Since local politicians only care about the reelection incentives, they invest in public goods as long they expect to be able to get reelected, otherwise they underprovide public goods and increase their rents. This pattern affects citizens’ support for democracy. When mining rents are too high, local politicians cannot prevent competition, being their optimal response to reduce the provision of public goods, which in turn negatively affects support for democracy. For places with modest increases, the pattern is the opposite.

Using sub-national exogenous variation in the level of natural resource rents, I test empirically the basic results of this simple model. I find a significant reduction in the level of confidence in political institutions for the case of mineral producer districts, which typically are districts that receive large mining Canon transfers. Also, I found evidence on non-monotonic effects of mining rents, implying that areas that experienced a large increase of natural resource rents show a significant reduction in political support for democracy whereas the opposite happens in areas in which transfers were modest. A set of placebo tests suggest that no evidence against the identification assumptions of the empirical exercise is available so far. Evidence on causal channels are consistent with the theoretical framework in terms of public good provision and living standards.

This paper offers a complementary explanation to the political resource curse literature by exploring the role of citizens’ perception about democracy as a factor that can have important implications for the consolidation of democracy. Although the role of citizens in democratic breakdown has been explored by many scholars (Bermeo 2003, and Linz and Stepan 1978), this is the first study –at least to my knowledge- analyzing this issue exploiting sub-national variation. My contribution is focused on suggesting that the risk of democratic failure and misgovernance is higher when citizens are more dissatisfied with the democratic system in the face of a resource boom. In this scenario, governance problems may arise leading to an increase in political instability and conflict. However, for places in which the resource boom is modest, natural resource rents are related to an increase of political support for democracy.

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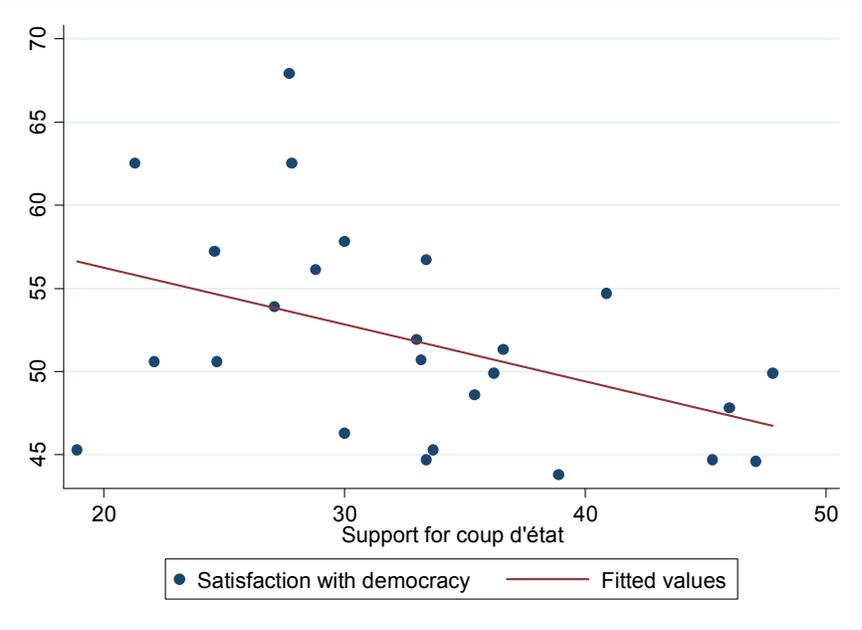
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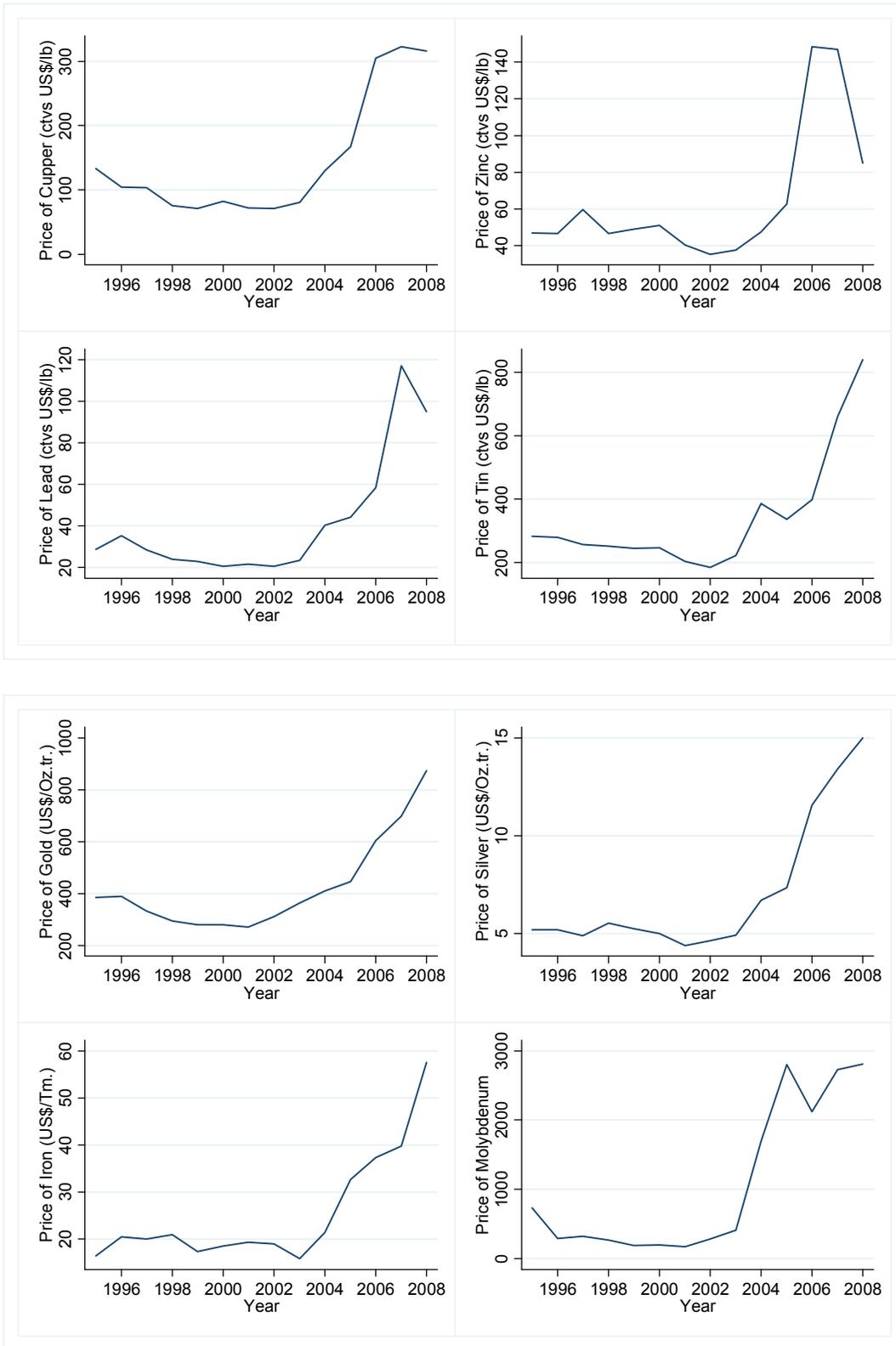
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**Graph 1: Satisfaction with democracy and political support for a coup d'état in Latin America countries, 2010**



Source: LAPOP, 2010. The vertical axis is the fraction of citizens satisfied with democracy in their country. The horizontal axis is the fraction of citizens supporting a coup d'état in their country.

**Graph 2: Evolution of commodity prices**



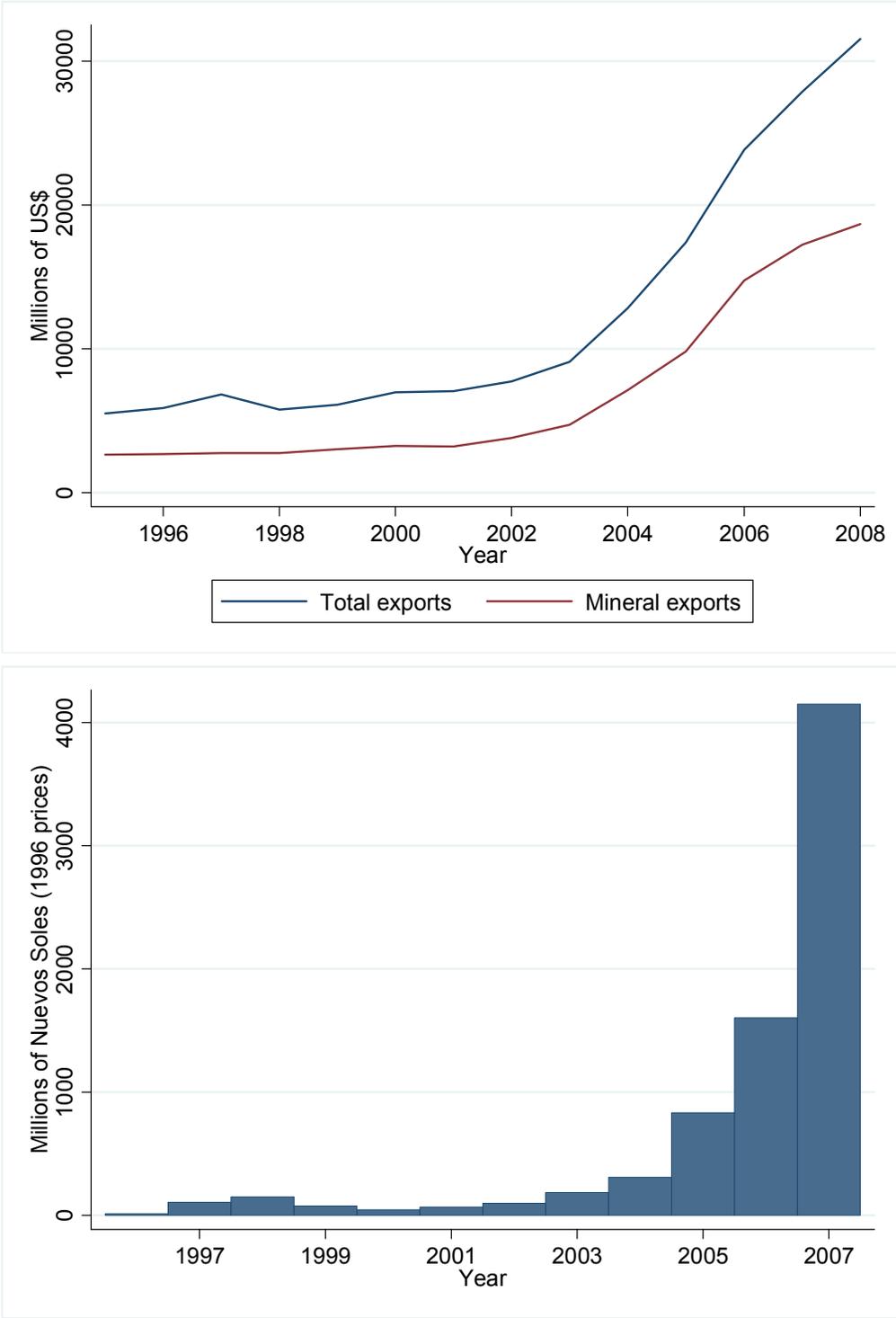
Source: Ministry of Energy and Mines.

**Graph 3: Evolution of mineral production and prices**



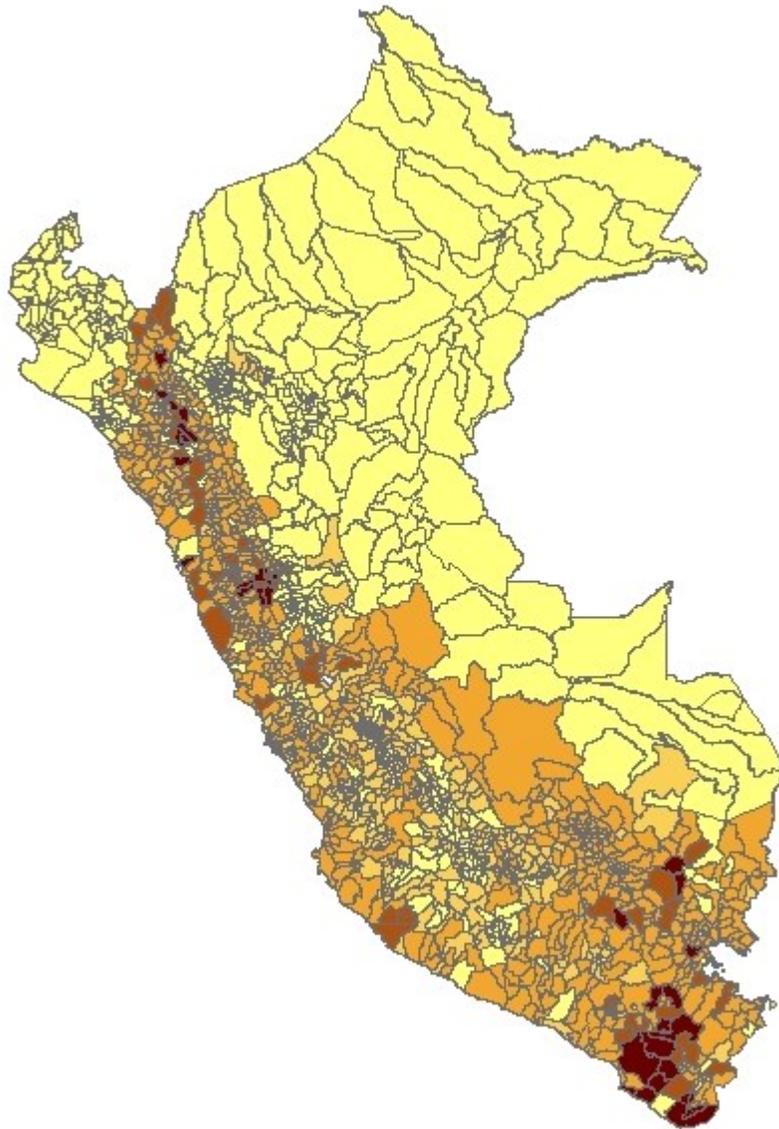
Source: Ministry of Energy and Mines.

**Graph 4: Evolution of total exports, mineral exports and Mining Canon transfers**



Source: Ministry of Economic and Finance.

**Map 1: District Allocation of Mining Canon Transfers, 2006**



Source: Own elaboration using data from the Ministry of Economic and Finance.

**Table I: Summary Statistics**

	Recipients	Producers	Non-recipients
<b>Dependent variables</b>			
<i>Trust in political institutions</i>			
Local government	32.0%	28.0%	39.7%
Political parties	10.3%	9.4%	13.1%
Judiciary	20.2%	17.9%	28.6%
Ombudsman office	34.3%	30.8%	44.6%
Congress	14.6%	11.9%	21.3%
<i>Support for democracy</i>			
Autocracy is the best way of government	22.5%	24.9%	19.8%
Democracy is not working	14.8%	15.6%	12.8%
Democracy is not the best way of government	8.3%	6.3%	5.7%
<b>Transfers</b>			
Mining Canon (per-capita)	43.11	122.68	-
p10	0.11	2.53	-
p25	0.92	8.37	-
p50	7.04	44.28	-
p75	39.13	82.14	-
p90	94.18	134.06	-
p99	414.64	1,725.65	-
Municipality Revenues (per-capita)	363.45	487.20	397.45
Net Municipality Revenues (per-capita)	320.34	364.52	397.45
Share of Mining Canon (%)	9.63	16.79	0.00
<b>Other Canon Sources (per-capita)</b>			
Oil Canon	5.79	0.00	93.26
Hydropower Canon	9.95	10.41	0.00
Forestral Canon	0.07	0.18	0.55
Fishing Canon	1.52	2.46	0.08
Gas Canon	6.37	0.46	0.43
FOCAM Canon	1.81	1.22	5.45
<b>District Characteristics: Census 1993</b>			
Population	12,339	10,788	22,618
% Rural Population	57.76	55.32	59.08
% Children (0-15 years old)	40.68	40.58	45.14
Malnutrition rates for Children	55.61	53.02	55.64
% Population without wastepipe-latrine	41.81	41.60	53.91
% Population without water	51.20	49.84	67.13
% Population without electricity	74.16	65.27	68.55
Female illiteracy rate	33.60	29.39	23.90
Altitude	2,326	2,720	498
<b>Household characteristics</b>			
Household members	4.33	4.08	4.71
Wage earners	1.96	1.77	2.07
Per-capita monthly income	353.47	476.26	334.43
Per-capita monthly consumption	353.54	442.07	333.47
<i>Assets</i>			
Bike	27.5%	27.3%	27.0%
Car/Van	7.3%	8.4%	4.2%
Tricycle	4.2%	4.8%	2.4%
Motor bike	2.1%	9.6%	5.3%

Truck	0.7%	0.8%	0.6%
Mototaxi	1.2%	2.1%	3.3%
<b>Household head characteristics</b>			
Age	48.8	46.1	47.7
Male	78.5%	81.3%	81.1%
Married	71.7%	73.4%	74.9%
Employed	86.0%	88.8%	86.8%
Unemployed	3.1%	2.7%	3.3%
Inactive	10.8%	8.5%	9.9%
Incomplete primary	32.0%	28.7%	32.1%
Complete primary	18.1%	14.7%	19.3%
Incomplete secondary	13.2%	16.0%	14.9%
Complete secondary	18.9%	21.4%	18.7%
Incomplete college	4.8%	5.6%	4.0%
Complete college	13.1%	13.5%	11.1%

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Source: Household survey data from ENAHO 2002-2206. Census data from Census 1993.  
Transfer data from Ministry of Economics and Finance.

**Table II: Impact of Mining Canon Transfers on the Confidence in Local Governments**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If confident in the local government							
Treatment (1= Producer district after increase of prices)	-0.051*** (0.015)	-0.045*** (0.016)						
Treatment (1= Canon Recipient after increase of prices)			-0.019 (0.015)					
Mining Canon Transfers				0.001 (0.004)	-0.001 (0.005)	0.008 (0.020)	-0.006 (0.021)	-0.011 (0.035)
Mining Canon Transfers^2						-0.001 (0.002)	0.000 (0.002)	0.000 (0.002)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable	0.34							
Observations	73,783	69,464	69,464	69,642	69,403	69,642	69,403	65,046
R-Squared	0.071	0.071	0.071	0.069	0.071	0.069	0.071	0.068

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

**Table III: Impact of Mining Canon Transfers on the Confidence in Regime Institutions**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If confident in political institution							
	Political Parties		Congress		Judiciary		Ombudsman	
Treatment (1= Producer district after increase of prices)	0.001 (0.013)	0.004 (0.016)	-0.050** (0.019)	-0.046** (0.019)	-0.035*** (0.012)	-0.032** (0.013)	-0.109*** (0.020)	-0.103*** (0.023)
Transfer controls	No	Yes	No	Yes	No	Yes	No	Yes
Urbanization control	No	Yes	No	Yes	No	Yes	No	Yes
Household level controls	No	Yes	No	Yes	No	Yes	No	Yes
Individual level controls	No	Yes	No	Yes	No	Yes	No	Yes
Mineral Production control	No	Yes	No	Yes	No	Yes	No	Yes
Mean dependent variable	0.11		0.16		0.22		0.36	
Observations	73,095	68,833	69,804	65,692	71,500	67,309	64,375	60,569
R-Squared	0.031	0.030	0.051	0.052	0.041	0.042	0.040	0.046

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining production is measured as the real value of production using 2001 international prices.

**Table IV: Impact of Mining Canon Transfers on Evaluation of Regimen Performance**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If consider that Democracy does not work							
Treatment (1= Producer district after increase of prices)	0.061*** (0.016)	0.067*** (0.015)						
Treatment (1= Canon Recipient after increase of prices)			-0.009 (0.013)					
Mining Canon Transfers				-0.013 (0.009)	-0.011 (0.008)	-0.055** (0.024)	-0.044* (0.024)	-0.085*** (0.021)
Mining Canon Transfers^2						0.004** (0.002)	0.003* (0.002)	0.006*** (0.001)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral Production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable	0.14							
Observations	77,585	73,208	73,208	73,428	73,150	73,428	73,150	68,399
R-Squared	0.008	0.010	0.010	0.007	0.010	0.007	0.010	0.010

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

**Table V: Impact of Mining Canon Transfers on Approval of Core Regime Principles**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If does not consider Democracy as the best way of government							
Treatment (1= Producer district after increase of prices)	-0.010 (0.011)	-0.008 (0.012)						
Treatment (1= Canon Recipient after increase of prices)			0.004 (0.011)					
Mining Canon Transfers				-0.009** (0.004)	-0.005* (0.003)	-0.032** (0.014)	-0.015 (0.014)	-0.047* (0.025)
Mining Canon Transfers^2						0.002** (0.001)	0.001 (0.001)	0.003* (0.002)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral Production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable	0.08							
Observations	65,779	61,967	61,967	62,149	61,915	62,149	61,915	57,902
R-Squared	0.001	0.007	0.007	0.001	0.007	0.001	0.007	0.008

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

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**Table VI: Impact of Mining Canon Transfers on Approval of Core Regime Principles**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If does not consider Democracy as important							
Treatment (1= Producer district after increase of prices)	-0.006 (0.007)	-0.011 (0.008)						
Treatment (1= Canon Recipient after increase of prices)			0.000 (0.009)					
Mining Canon Transfers				-0.008 (0.005)	-0.006 (0.004)	-0.034*** (0.010)	-0.027*** (0.010)	-0.037*** (0.013)
Mining Canon Transfers^2						0.003*** (0.001)	0.002*** (0.001)	0.002** (0.001)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral Production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable	0.05							
Observations	76,964	72,659	72,659	72,879	72,600	72,879	72,600	67,880
R-Squared	0.001	0.004	0.004	0.001	0.004	0.001	0.004	0.005

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

**Table VII: Placebo Treatment**  
**Impact of Mining Canon Transfers on the Confidence in Local Governments**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If confident in the local government							
Treatment (1= Producer district after increase of prices)	-0.010 (0.029)	-0.006 (0.029)						
Treatment (1= Canon Recipient after increase of prices)			0.037 (0.026)					
Mining Canon Transfers				-0.160 (0.143)	-0.196 (0.160)	-0.075 (0.371)	-0.138 (0.397)	-0.235 (0.405)
Mining Canon Transfers <sup>2</sup>						-0.139 (0.409)	-0.097 (0.476)	-0.244 (0.485)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral Production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable	0.43							
Observations	39,015	36,224	36,224	36,275	36,163	36,275	36,163	34,160
R-Squared	0.036	0.038	0.038	0.036	0.038	0.036	0.038	0.037

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

**Table VIII: Placebo Treatment**  
**Impact of Mining Canon Transfers on Approval of Core Regime Principles**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: 1=If consider that Democracy does not work							
Treatment (1= Producer district after increase of prices)	0.003 (0.017)	0.013 (0.017)						
Treatment (1= Canon Recipient after increase of prices)			0.004 (0.011)					
Mining Canon Transfers				-0.010 (0.080)	0.035 (0.081)	0.100 (0.237)	0.156 (0.236)	0.180 (0.267)
Mining Canon Transfers^2						-0.169 (0.271)	-0.187 (0.276)	-0.329 (0.298)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral Production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable	0.15							
Observations	45,498	42,536	42,536	42,630	42,478	42,630	42,478	39,982
R-Squared	0.009	0.012	0.012	0.010	0.012	0.010	0.012	0.011

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

**Table IX: Causal Channel**  
**Impact of Mining Canon Transfers on Public Goods Provision**

	Difference in Differences Estimates							
	Access to Water Network	Access to Public Light	Garbage Collection		Security Services			Access to Library
			In Capital	Rest	Access	Personnel	Stations	
Mining Canon Transfers	0.007 (0.010)	0.027** (0.011)	0.054* (0.028)	0.103*** (0.035)	0.052*** (0.013)	0.154*** (0.056)	0.093*** (0.035)	-0.015 (0.011)
Mining Canon Transfers <sup>2</sup>	0.000 (0.000)	-0.001** (0.000)	-0.002** (0.001)	-0.004*** (0.001)	-0.001*** (0.000)	-0.004 (0.003)	-0.002 (0.002)	0.000 (0.000)
Transfer controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Urbanization control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mineral Production control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Excluding producer districts	No	No	No	No	No	No	No	No
Mean dependent variable	0.76	0.88	0.94	0.55	0.15	6.1	1.3	0.41
Number of observations	5,566	8,644	9,014	8,781	14,117	12,825	10,026	14,237
R2	0.242	0.264	0.017	0.113	0.115	0.242	0.078	0.013

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the district is located in urban areas according to INEI's definition. Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

**Table X: Causal Channels**  
**Impact of Mining Canon Transfers on Household Consumption**

	Difference in Differences Estimates							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: Log (1+Household consumption per-capita)							
Treatment (1= Producer district after increase of prices)	0.048* (0.026)	0.042 (0.029)						
Treatment (1= Canon Recipient after increase of prices)			-0.021 (0.031)					
Mining Canon Transfers				0.041** (0.016)	0.039*** (0.013)	0.136*** (0.036)	0.113*** (0.030)	0.177*** (0.041)
Mining Canon Transfers^2						-0.010*** (0.003)	-0.007*** (0.002)	-0.010*** (0.003)
Transfer controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Urbanization control	No	Yes	Yes	No	Yes	No	Yes	Yes
Household level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Individual level controls	No	Yes	Yes	No	Yes	No	Yes	Yes
Mineral Production control	No	Yes	Yes	No	Yes	No	Yes	No
Excluding producer districts	No	No	No	No	No	No	No	Yes
Mean dependent variable (level)	347.20							
Observations	91,149	84,534	71,538	84,534	86,475	84,471	86,475	84,471
R-Squared	0.493	0.633	0.634	0.633	0.471	0.633	0.471	0.633

Note: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Huber-White standard errors clustered at the district level. All the specifications include district and year fixed effects. Transfers controls includes all intergovernmental transfers from the central government and includes the Fondo de Compensacion Municipal and dummy variables for whether the local government receives Canon transfers from oil, hydro power, forestal, fish, and gas exploitation. It also includes mining royalties and Camisea's development fund (FOCAM) transfers. Urbanization control is a dummy variable for whether the household is located in urban areas according to INEI's definition. Household's characteristics includes dummy variables for asset ownership (bike, car or van, tricycle, motorbike, truck and mototaxi), household consumption, number of earners, and a dummy for whether the dwelling was obtained through occupation. Individual controls include age, sex, a dummy variable for married and dummies for education level (complete primary, incomplete secondary, complete secondary, incomplete college and complete college). Mining Canon transfers are measured in thousands of new soles per-capita in prices of Lima in December 2001. Mining production is measured as the real value of production using 2001 international prices.

## Appendix I: Model

Consider a simple two-period decentralized democracy with  $n$  local governments inspired in Bender and Drazen (2009) and Caselli (2006). For simplicity, I normalized the size of districts to one. There are two classes, the elites  $E$  and the masses  $M$  which sizes are also normalized to unity. We have two types of governments in this setting: a centralized government which single function is to provide exogenous transfers to the elites and masses funded with taxes and local governments that provide public goods and receive natural resource rents. Given the intuition that citizens learn about democracy's effectiveness from the provision of public goods, it is assumed that only decisions made by local governments are relevant in this regard. This assumption is made for simplicity just to illustrate the role of subnational governments in affecting political support for democracy. Even if I allow a centralized government to intervene in affecting political support, the idea is that governance problems would be more acute than a situation in which subnational governments are supportive with democracy.

We assume that subnational governments do not have connections with the national government. This assumption is motivated by the lack of national political parties in Peru, due to the collapse of the national party system in early nineties. As a consequence, national politicians do not have links with local ones. In this scenario, only local politics matter and local politicians only care about their ability of keeping power in their respective political arena.

The intuition is then, when national political parties are weak, the fact that politicians' incentives are local while the rules of the democratic game (political institutions) are defined at a national level creates a free-riding problem. In this setting, democracy is a public good for politicians; they prefer democracy over dictatorship because allow them to be elected and get rents but they don't internalize that, in a country with weak democratic institutions, in order for democracy to work for citizens, they would need to collectively provide public goods in a level that allows citizens to learn about its effectiveness. Therefore, politicians have to "invest" in democracy, at least until the point in which democracy is consolidated, but the public good nature of the latter create incentives for free-riding. If politicians could write a contract to commit themselves to provide the public goods needed for citizens to learn about the effectiveness of democracy, then citizens would learn that democracy "works" and political support would be high. In this scenario, democracy would be consolidated as the "only game in town". However, this type of contracts are difficult to enforce: it would be optimal for a single politician to deviate from this agreement, maximize their rents and still be able to run for office the next election since the impact of this deviation on aggregate political support would be minimal. Given the absence of enforcement technologies for such a contract, rational politicians would deviate and to invest in public goods as long is consistent with their individual reelection incentives as I discuss below.

### 1. Elite's problem

The elite's problem is to choose whether to organize a coup against democracy. As in Acemoglu and Robinson (2006), the elite compares the benefits and costs of running a coup. This basically implies that the net benefit of non-democracy is higher than the net benefit under

democracy. If the elite decides to organize a coup, they would get a (constant) flow endowment to  $y^E$  but face a cost  $\phi$  that represents a fraction of the endowment that gets destroyed because of the coup. It is assumed that this cost is increasing in the degree of support for democracy, so  $\phi(\mu)$  where  $\mu$  is an index of political support such that  $0 < \mu < 1$  and  $\phi'(\mu) > 0$ . On the other hand, if the elite supports democracy, they would get transfer  $T^E$  from the central government to buy-off their support to democracy besides their endowment. There are also specific taxes for each group ( $\tau^E$  and  $\tau^M$  respectively). Therefore, given a discount factor of  $\beta$ , the two-period condition for an elite to mount a coup is the following:

$$(A.1) \quad [1 - \phi(\mu)][1 - \beta]y^E > (1 - \tau_1)y^E + T_1^E + \beta E_1^E [(1 - \tau_2^E)y^E + T_2^E],$$

where  $E_1^E$  is the expectation regarding the policy. Consequently, for a coup not to be mounted by the elite, it must be true that:

$$(A.2) \quad \phi(\mu) \geq \frac{\tau_1 y^E - T_1^E + \beta E_1^E [\tau_2^E y^E - T_2^E]}{[1 + \beta]y^E},$$

Where the term in the numerator is the sum of the current net tax and the discounted expected value of the net tax in the second period whereas the denominator recovers the present value of endowment. This condition says that the cost of mounting a coup has to be higher than the ratio between the present expected value of the net tax and the present value of the endowment. The intuition is straightforward: the higher the support for democracy (higher values of  $\mu$ ), the more costly for the elite to mount a coup.

Of course, taxes and transfers can be used by the central government to influence the cost of a coup by affecting the opportunity cost of the elite. This result is consistent with previous literature regarding the use of transfers to buy-off the elite in order to prevent a coup (Acemoglu and Robinson 2006, Dunning 2008). Since our interest is to highlight the role of citizens' political support, the emphasis is given to the behavior of the  $\mu$  parameter. To do so, it is required to model how citizens solve the inference problem regarding the performance of democracy with respect to a non-democratic regime.

## 2. Citizen's inference regarding performance of democracy

In an unconsolidated democracy, citizens need to infer whether current economic performance is a good predictor of long-term economic performance. This inference problem can be modeled by decomposing the citizen's endowment in the following way:

$$(A.3) \quad y_t^M = y^D + g_t + \varepsilon_t,$$

where  $y_t^M$  is the citizen's observed income,  $y^D$  is the "underlying" performance under democracy (which is assumed to be constant for simplicity),  $g_t$  is the provision of public goods and  $\varepsilon_t$  is a shock to the current economic performance. Citizens' only observe  $y_t^M$  and make

inferences regarding  $y^D$ . That also requires to consider the subjective probability distributions over  $g_t$  and  $\varepsilon_t$ .

Let's define  $y_t^A$  as the performance under autocracy and be  $x_t = g_t + \varepsilon_t$  a new random variable with subjective cumulative distribution represented by  $H^M(x_t)$ . The probability that  $y^D$  is no less than  $y^A$  is  $H^M(y_t^M - y^A)$ <sup>30</sup>.

The question now is how public goods can be used in order to influence citizens' beliefs regarding the performance of democracy over autocratic regimes. To answer this, I assume here that  $g_t$  is chosen before  $\varepsilon_t$  is observed and that the actual distribution of  $\varepsilon_t$  is  $J(\varepsilon)$ . Then, the government's expectation<sup>31</sup> of the probability that citizens believe that  $y^D \geq y^A$  as a function of  $g_t$  is  $\int_{\varepsilon} H^M(y^D - y^A + g_t + \varepsilon_t) dJ(\varepsilon)$ . I additionally assume that  $y^A$  differs across individuals according to the distribution  $F(y^A)$ . In this case, the index  $\mu$  (as seen by the government) can be defined as the expected fraction of the population who believe that the underlying performance of democracy is better than non-democracy in the following way:

$$(A.4) \quad \mu(g_t) = \int_{y^A} \int_{\varepsilon} H^M(y^D - y^A + g_t + \varepsilon_t) dJ(\varepsilon) dF(y^A) > 0.$$

The basic implication is that changes in political support for democracy as a function of the public good provision depends on the distribution of  $H(\cdot)$ , which in turn depends on citizens' beliefs regarding  $g_t$ . Since citizens cannot observe  $g$  directly, the effect of an increase in public good provision on citizens' support for democracy is the following:

$$(A.5) \quad \frac{d\mu}{dg_t} = \int_{y^A} \int_{\varepsilon} h^M(y^D - y^A + g_t + \varepsilon_t) dJ(\varepsilon) dF(y^A) > 0.$$

This establishes a key result. Public good provision affects positively citizens' beliefs regarding the performance of democracy. Notice that it should not be any impact if citizens were full informed regarding  $g$ . The next step is to understand how local politicians choose  $g$  and the incentives they face at choosing it in the context of a natural resource boom.

### 3. Incumbent's choice of the level of public good provision

I discuss now how incumbents decide the level of public good provision in a face of a resource boom and how that affects citizens' political support. Recall that, for a local politician, democracy is a public good and their decisions regarding public good provision are going to be determined by their goal of keeping power rather than solving the learning problem citizens' face

<sup>30</sup> This follows from the fact that:

$$\Pr(y^D \geq y^A | y_t^M) = \Pr(y_t^M - x_t \geq y^A) = \Pr(x_t \leq y_t^M - y^A) = H^M(y_t^M - y^A).$$

<sup>31</sup> For simplicity, I assume that both the central and local government have the same expectation regarding citizens' beliefs.

about the effectiveness of democracy. So, I follow Caselli (2006) in modelling the electoral incentives of incumbents during a resource boom. I relate this to political support for democracy below.

The basic logic of this section is to model the interaction between an incumbent and a potential competitor. The incumbent politician decides the present value of his consumption by allocating the local government budget between political rents and public goods. He faces the potential competition of an entrepreneur who has to decide whether to work in the industrial sector or to become a challenger for the incumbent. Production of industrial goods depends on the level of public goods. Therefore, the incumbent can avoid political competition by providing more public goods to citizens in the face of a resource boom, making the opportunity cost of becoming a political challenger high. However, this boom also makes more profitable for the entrepreneur to become a challenger since the value of holding power is higher as well. Hence, there is a threshold value of natural resource rents after which it is optimal for the incumbent underinvest in public goods. This is due to the fact that, from the point of view of the entrepreneur, the potential rents of controlling office are higher than the level of profits he would make given the provision of public goods. Then, the incumbent cannot prevent entry and therefore he maximizes the present value of his consumption by underinvesting in public goods. As a result, the model predicts a non-monotonic relationship between the level of natural resource rents and the level of political competition which is a consequence of a non-monotonic relationship between these rents and public goods provision. This non-monotonic relationship between public goods and natural resource rents also implies a non-monotonic relationship between rents and citizens' support for democracy given the results summarized in the previous section (equation A.5).

Consider a two-period simple local economy. In the first period, this economy has two sectors: a) a natural resource sector and b) a subsistence sector. The natural resource sector produces a per-period flow rent  $C$  which will be assumed to be exogenous and is completely appropriated by the local government (controlled by the incumbent mayor). Each agent in this economy can produce in the subsistence sector. For simplicity, the output  $w_t$  depends on the stock of a public good  $g_t$  provided by the local government. Under the assumption of a linear production function,  $w_t = \rho_x g_t$  where  $\rho_x$  is an exogenous technological parameter. In the second period it is possible to engage in industrial production. This activity is assumed to be more efficient but requires management skills or talent<sup>32</sup>. A talented agent can hire  $l_t$  workers and produce an output  $q_t = \rho_y g_t l_t$ .

The incumbent mayor seeks to maximize the present value of his own consumption. In the first period the mayor in power is exogenously given. The other  $N + 1$  individuals are either talented or untalented. The talented individuals can choose between producing in the subsistence sector; becoming an entrepreneur and hiring workers for producing in the industrial sector; or

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<sup>32</sup> We assume that  $\rho_x < \rho_y$  to capture the idea that producing industrial goods is more efficient than producing subsistence ones.

becoming a challenger to the incumbent mayor and running for office. It is assumed that the skills needed for being an entrepreneur are the same for engaging in politics. The untalented can work either in the subsistence sector or be employed as workers for talented individuals. For simplicity, I assume that there is just one talented individual to avoid strategic interactions among talented agents in this basic setting. If the talented agent runs for election he wins office with (exogenous) probability  $\gamma$ . With probability  $(1-\gamma)$  he loses the election and has to incur in a cost  $D$ . The incumbent politician stays in office if the talented agent decides not to run for office or if he loses the election. All agents are assumed to be risk-neutral.

The timing of the game is as follows. The incumbent, the initial level of public goods and mining canon rents are exogenously given in period 1. Then, the incumbent maximizes the present value of his consumption with respect to the level of investment in public goods for period 2. At the beginning of period 2, the talented agent decides to become an entrepreneur or to become a challenger to the incumbent mayor. At the end of period 2 an election takes place. If the talented agent decides not to become a challenger, or if he loses the election, the period-1 mayor continues in office. Otherwise, the talented agent becomes the new mayor.

The model is solved by looking first at the competitor problem. He basically compares the cost and benefit of running for election. In particular, he will run for election if the utility of being the mayor is higher than the profits of being an industrialist:

$$(A.6) \quad \gamma[C + \tau\rho_x g_2 N] - (1-\gamma)D > (1-\tau)\rho g_2 N,$$

where  $\tau$  is a producer tax. The left-hand side term is composed by two expressions. The first one is the local government revenue for period 2 weighted by the probability of winning the election. The second term represents the expected cost of losing the election. The right-hand term is the level of profits after tax of becoming an entrepreneur in the industrial sector where  $\rho = \rho_y - \rho_x$ . After rearranging these expressions we find that the talented agent will run for election if and only if:

$$(A.7) \quad \gamma c - [(1-\tau)\rho - \gamma\tau\rho_x]g_2 > (1-\gamma)d,$$

where  $c = C/N$  is mining Canon revenues per-capita and  $d = D/N$ . It is clear that the role of public goods depends on the level of tax, the probability of winning the election and the productivity parameters. The second term in the left-side hand of equation 2 recovers the difference between the opportunity cost (profits) and the return from running for election. After re-arranging terms, I establish the following lemma:

**Lemma 1:** *the talented agent will run for election if  $g_2 < g^*$ , where*

$$(A.8) \quad g^* = \frac{\gamma c - (1-\gamma)d}{(1-\tau)\rho - \gamma\tau\rho_x}.$$

This solution shows that the incumbent politician has incentive to invest in public goods since by this mean the opportunity cost of the talented agent can be increased<sup>33</sup>. On the other hand, Lemma 1 also suggest that the required level of public good is increasing in  $c$ . This implies that larger levels of  $c$  make more likely that the incumbent mayor will face more political competition and, as a consequence, he will need to invest more in  $g$  to prevent political competition.

The incumbent politician's problem is to maximize the present value of consumption with respect to public good investment  $I$ . Therefore, his objective function is the following:

$$(A.9) \quad c + \tau\rho_x g_1 + Z(c + \tau\rho_y g_2) + (1-Z)(1-\gamma)(c + \tau\rho_x g_2) - I,$$

where

$$Z = \begin{cases} 1 & \text{if } g_2 \geq g^* \\ 0 & \text{if } g_2 < g^* \end{cases}$$

subject to

$$g_2 = g_1 + I$$

$$I \leq \tau\rho_x g_1 + c$$

$$g_1, c \text{ given.}$$

The first two elements are the (exogenous) local government's revenues for period 1. The third and fourth terms are the second-period revenues which depend on whether the talented agent runs for election (recovered by the indicator function  $Z$ ) and his probability of winning it. The first constraint is the production function for the public good which is assumed to be linear. The second constraint is the budget constraint for period 1.

In period 1 the incumbent politician solves this problem by comparing the costs and benefits of investing in public good  $g$ . Notice that if the incumbent expect the talented agent to become a challenger, then one unit of resources invested in providing the public good yield a return of  $(1-\gamma)\tau\rho_x$ . On the other hand, when no challenger is expected, this return will be equal to  $\tau\rho_y$ . I impose the assumption that  $\tau\rho_y > 1$  which basically means that the return of investing in  $g$  is higher than its opportunity cost. I also assume that  $(1-\gamma)\tau\rho_x < 1$ , which essentially implies that if the incumbent politician does not expect to be able to prevent a challenger then he does not invest in public goods at all. Using these two assumptions, the problem can be solved. Hence, the resulting lemma is the following:

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<sup>33</sup> This requires that  $(1-\tau)\rho > \gamma\tau\rho_x$ . This assumption implies that local economic development reduces political competition which seems plausible.

**Lemma 2:** *Whenever  $g^h \geq g^*$  the incumbent politician uses all its resources in period 1 to provide public goods and there are no incentives for the talented agent to become a challenger in period 2. When  $g^h < g^*$  the incumbent politician makes no investment in public goods in period 1 and the talented agent becomes a challenger in period 2.*

This key result establish a non-monotonic relationship between public good provision and incumbent's electoral incentives. The next step is to link this result with the level of natural resource rents per-capita in the following way:

**Proposition 1:** *If  $c > \frac{(1-\gamma)d + g_1(1+\tau\rho_x)[(1-\tau)\rho - \gamma\tau\rho_x]}{\gamma - (1-\tau)\rho + \gamma\tau\rho_x} \equiv c^*$ , then the incumbent makes no*

*investment in public goods in period 1 and faces a challenger in period 2. Otherwise, the incumbent uses all his resources in period 1 to provide public goods and the talented agent does not choose to become a challenger in period 2.*

This constitutes the basic result of this simple model. It establishes a non-monotonic relationship between public good provision and natural resource rents per-capita.

#### 4. Natural resource booms and political support for democracy

I collect the results from previous sections to summarize the relationship between political support for democracy and natural resource booms. I have shown in section 2 that public good provision affects citizens' perceptions regarding the effectiveness of democracy (equation A.5). In section 3, I have established that natural resource rents are non-monotonically related to public good provision (Proposition 1). It is natural to link both results in the following way:

**Proposition 2:** *If  $c > \frac{(1-\gamma)d + g_1(1+\tau\rho_x)[(1-\tau)\rho - \gamma\tau\rho_x]}{\gamma - (1-\tau)\rho + \gamma\tau\rho_x} \equiv c^*$ , then the incumbent makes no*

*investment in public goods in period 1 and citizens' political support for democracy is low in period 2. Otherwise, the incumbent uses all his resources in period 1 to provide public goods and citizens' political support for democracy is high in period 2.*

Notice that this result is due to the fact that local incumbent politicians do not internalize the effect of their decisions regarding public good provision on support for democracy. They choose  $g$  to affect political competition because they are interested in their own political survival. Even if they care, the public good nature of democracy creates a free-riding problem.

The empirical content of this result suggests that natural resource boom have a non-monotonic relationship with political support. For modest booms, the incumbent does not face significant competition since rents are used to prevent entry of competitors via a higher provision of public goods. This in turn indirectly increases the level of citizens' support for democracy. On the other hand, for large increases in natural rents per-capita, the incumbent cannot prevent entry, being his optimal response to underinvest in public good provision. As a consequence, citizens' political support for democracy will be lower.