

Share the Wealth? How Leaders Distribute Natural Gas Revenues in Peru

Abstract

How do political leaders distribute discretionary revenue? The scholarship on political economy suggests several ways in which political leaders with ‘the power of the purse’ use discretionary revenue to achieve opportunistic, partisan, or socially optimal (redistributive) goals. In this paper we use evidence from Peru to show that President Alan Garcia opportunistically distributed natural gas revenues – decentralized by the prior administration in 2004 – to improve his political legacy among Peruvian voters. Our findings support the claim that Garcia had lasting office-seeking, as opposed to policy-seeking, motivations for resource allocation. We present evidence in the form of subnational longitudinal data during Garcia’s second term (2006-2011) to show that Garcia used discretionary funds (1) to buy the support of the opposition who did not vote for his party (APRA) in the 2006 elections, and (2) to maintain local political linkages targeting supporters of APRA at the mayoral level.

Keywords: Discretionary revenue allocation – natural resource revenues – subnational politics – Presidentialism – natural gas

How do political leaders distribute discretionary revenue? The scholarship on political economy suggests several ways in which political leaders with ‘the power of the purse’ use discretionary revenue to achieve opportunistic, partisan and social optimum goals (Persson and Tabellini, 2000). In this paper we use evidence from Peru to address two complementary questions. First, we ask whether politicians use subnational revenues opportunistically (Downs, 1957; Meltzer and Richard, 1981) or accountably (Besley and Burgess, 2002; Besley, 2006). Second, we investigate whether the pattern of subnational revenue distribution was, in the case of President Alan Garcia (2006-2011), determined by short or long term motivations.

First, we assess whether or not politicians target revenue distribution for political reasons; that is, if constituents are targeted, or if instead revenue is distributed for socio-economic reasons such as redistribution and poverty reduction. If politicians are indeed accountable to their constituents, then revenue should be distributed to achieve some social optimum distribution of wealth. On the other hand, if politicians are opportunistic, then revenue should be targeted to improve electoral success. The fiscal reform implemented in Peru in 2004 – a reform which decentralized natural gas revenue to districts in the region of Cusco – offers an excellent opportunity to assess the strategies and motivations behind the Peruvian president’s decisions. Moreover, since most leaders with substantial natural resource deposits do not distribute resource wealth sub-nationally,¹ the answers to the questions posed in this study may have considerable implications for state decisions on the distribution of natural resource revenues.

Next, we explore presidential motivations for the distributive pattern identified in Peru. We question if a president who targets voters strategically does so in order to improve his popularity among voters in the short-term, or in order to create a political legacy that can extend over time. If politicians are indeed motivated by popularity, then revenue should be distributed to praise their actual supporters (core). On the other hand, if politicians are motivated by cultivating a legacy, then revenue should be targeted to non-supporters of the

president who need to be persuaded of his overall qualities. Since there is an inconclusive debate about the career aims of politicians in their last term in government, the answer to this question may help us understand why presidential behavior seems to be different in the beginning and the end of their terms, or in the first or second terms.

Our results suggest that President Alan Garcia (of the APRA party) used gas revenues opportunistically to build his political legacy among voters. Quantitative analysis indicates that Garcia targeted non-supporting voters from the presidential election – regardless of development and poverty levels – but concentrated allocations to his party’s supporting voters in the mayoral elections. Based on qualitative analysis of Peruvian newspapers, we interpret the patterns described above as evidence of Garcia’s aim to improve his long term legacy given the widespread belief that he had plans to run again in 2016.

Evidence to evaluate the two questions posed above is drawn from subnational data from Peru, where natural resource royalty reforms undertaken in 2004 allowed for direct revenue transfers to producing municipalities and regions (Law No. 27506 and Supreme Decree law No. 015-2004-PGM). In particular, the law dictates that revenues from mineral production are to be used to “maximize the well-being of local communities through economic growth, environmental protection, and social development in a sustainable way.”² Though the law covers all minerals revenues, in this paper we focus only on natural gas revenues.

The decision to focus solely on natural gas stems from two concerns – one normative and the other empirical. In Peru, the exploitation of natural gas reserves has resulted in painful negative externalities for the indigenous communities in producing regions, which are concentrated in the fragile ecosystems of the Andean basin and Amazon rainforest. In the first 20 months of the Camisea gas project – Peru’s largest gas field – there were five major spills of liquefied natural gas, each resulting in explosions and acres of burnt farmland and injured bystanders (Vences, 2006). To mollify these externalities, President Toledo (2001-2006) decreed law 015-2004-PGM in 2004 to direct gas revenues back to producing regions ostensibly to provide “gas reparations” to communities damaged by the production

of natural gas. This law has been the subject of much political debate, and its effectiveness in ameliorating damaged communities has been questioned by both lawmakers and indigenous groups (Haselip, 2011).

Empirically, this paper’s focus on natural gas is derived from its growing importance in Peruvian geography and political economy. Because of the petroleum price boom in the latter half of the 2000s, the percentage of Peru’s non-protected Amazon rainforest allocated to oil and gas exploration rose from 15% in 2004 to a staggering 72% in 2009 (Finer and Orta-Martinez 2010). Combining this with the protected portion of the Amazon basin, oil and gas concessions now cover 41% of the entire Peruvian Amazon (Haselip, 2011). Exploration in the Amazon has been particularly successful for the natural gas industry, propelling Peru from being a net gas importer to one of the top 20 gas exporters in the world on per capita terms (BP, 2012).

WHAT EXPLAINS ALLOCATION

There is an important debate in the distributive politics literature about how politicians strategically allocate government goods and services to geographic localities to ensure electoral success (Cox, 2006). The theoretical literature has provided contrasting explanations for politically motivated transfers, often denoted as “tactical redistribution”. On the one hand, incumbent politicians may use intergovernmental transfers to increase their (or their allies’) reelection probabilities at the central and local level, therefore allocating larger transfers to localities where swing voters are overrepresented (Lindbeck and Weibull, 1987; Dixit and Londregan, 1996). On the other hand, politicians may decide to use transfers to reward their core supporters (Cox and McCubbins, 1986). Irrespective of the degree of political competition, because local governments can claim some political credit for the resources they receive from the central government, the alignment between the two layers of government – that is, whether they belong to the same political coalition or not – is expected to increase the amount of transfers, because the central government has an incentive to favor

its (political) allies and penalize its (political) enemies.

In Latin America, the debate has focused not only on partisan and political strategies, but also on efficiency, redistribution, social mobilization, and corruption (Fox, 1994; Calvo and Murillo, 2004; Rovallion, 1998). The most convincing arguments, however, are still associated with how the national government has used distributive power to gain legislative and/or electoral benefits. There is wide consensus among scholars that incumbent parties are better positioned to establish clientelistic linkages with their core voters and to extract the highest returns from patronage (Stokes, 2005; Magaloni, Diaz-Cayeros and Estevez, 2007; Zucco, 2008; Greene, 2008; Nichter, 2008). Moreover, low-income voters are more susceptible to ‘selling’ their votes in exchange for material goods and are apt to support (and vote for) the government that provided such outcomes (Gervasoni, 1998; Brusco, Nazareno and Stokes, 2004; Reinikka and Svensson, 2004). Therefore, there should be a positive vote share effect on the allocation of resources. That is, municipal core voters should be a strong predictor of municipal discretionary transfers (Case, 2001; Golden, 2003; Larcinese, Rizzo and Testa, 2006; Ansolabehere and Snyder, 2006).

Another set of scholars have argued that minoritarian presidents in Latin America use their distributive powers for legislative coalition building (Snyder and Samuels, 2001; Auston and Mueller, 2006). According to this view, national politicians have incentives to distribute national resources favoring certain municipalities that help their political power. Given that the votes of legislators are essential to advance the presidential agenda, national politicians might favor municipalities in which coalition partners have constituents. Within this institutional arrangement, one should expect that presidents have strong incentives to allocate public goods, such as intergovernmental transfers, based on strategic electoral and legislative calculations to obtain legislative support (Sørensen, 1995; Gibson and Calvo, 2000; Giraudy, 2007; Bonvecchi, 2009).

An alternative view has been developed arguing that incumbents lacking the support of a political machine are expected to pursue ‘selective distributive politics’. In this scenario,

incumbents can simultaneously target funds according to socioeconomic criteria, while seeking to implement, on the margins of social targeting, complex electoral investment portfolios (Rovallion, 1998; Lodola, 2005; Litschig, 2008). This literature finds that transfers are used to benefit places with obvious infrastructure deficits, where the poverty rate is high and development levels are low. These findings imply that presidents should implement a redistributive agenda, favoring the efficiency of spending, and promoting better welfare for the under-privileged population. Therefore, one should observe a positive and substantively significant effect of poverty on the likelihood of receiving municipal transfers.

A final group of research shows that transfers are politically manipulated, with the government targeting mayors who align with the president (Ames, 1994; Fachelli and Ronconi, 2004; Nazareno and Stokes, 2006; Brollo and Nannicini, 2011). They have shown that regions governed by mayors aligned with the central government are the main targets of particularistic spending on almost all local public goods. The argument, however, is not that this is a way to form coalitions. Rather, this literature argues that the president uses mayors as ‘brokers’ to maintain local power (Herzer and Pirez, 1989; Levitsky, 2003; Stokes, 2005; Arulampalam et al., 2009), or cut opposition disbursements as a way to tie mayors’ hands and consequentially to decrease their electoral chances in the next race (Brollo and Nannicini, 2011). The main implication of such explanations is that we must expect governments to provide particularistic spending to regions governed by loyal mayors, to avoid giving away potential electoral gains to the opposition (Armesto, 2009).

OPPORTUNISTIC VS. ACCOUNTABLE POLITICIANS

In this paper we have no new general theory of the preferences and behavior of presidents. We are interested in testing the predictions of the distributive politics theoretical models contrasting the trade-offs and empirical implications that each model emphasizes. This literature has furnished us with some elegant models of political choice, which assume that politicians have a small and well-defined set of objectives. In the simplest terms, we distin-

guish between (1) office-seeking and (2) policy-seeking models of political behavior.

As Mueller and Strøm (1999) defines, “office-seeking politicians maximize their control over political office benefits, that is, private goods bestowed on recipients of politically discretionary governmental or sub-governmental appointments.” The underlying motivations of an office-seeking politician can be summarized simply as the desire to get into government (Riker, 1962). For some politicians, the rewards of office may be valued intrinsically, in and for themselves. For others, office may be valued only instrumentally for the ability that it gives to influence policy outputs. Politicians could value office instrumentally for electoral reasons, too. Incumbency may be helpful in future elections, and politicians may seek office for this reason alone. At the executive level, the lure of office begins with the spoils that constitute cabinet portfolios. But office benefits may include a large number of sub-cabinet appointments, and these lower-level benefits may indeed swamp the value of cabinet appointments. Office benefits also include government contracts, preferential treatment, and whatever other rents accrue to political parties because of their legislative bargaining power (Persson and Tabellini, 2000).

On the other hand, the policy-seeking politician is defined by Mueller and Strøm (1999) as “the actor who seeks to maximize its impact on public policy.” At the heart of the policy-seeking model lies a belief in the reality and significance of the contest over public policy decisions that characterize democracy. Citizens of such systems become politically engaged because these choices matter, and they support certain politicians over others because these politicians make a difference for them. Politicians trade in promises of public policy, and the policy-seeking literature implicitly assumes that the ultimate outcomes that flow from such policies matter to them, such as the desire to produce a socially optimum outcome. But, like office, policy can have intrinsic or instrumental value as well. Politicians may seek certain policy goals because they think they can benefit in other ways or because they sincerely believe in them. In this way, we assume here that policy-seeking politicians are trying to be accountable to their constituents by fulfilling policy promises relevant to voter interests.

These two models are typically presented as supplements, rather than complements, for each other. That is to say, policy-oriented theory typically assumes, at least implicitly, that politicians seek office in part for instrumental reasons as a means toward policy influence. The literature portrays the policy-seeking politician as one who seeks government portfolios as well as ideologically compatible coalition partners. Here, however, we treat office- and policy-seeking politicians as mutually exclusive types that can be identified separately. This kind of theoretical approach, although limited, will allow us to disentangle the priorities of the Peruvian president, Alan Garcia. Moreover, this framework seems to fit the reality in Peru better given that politicians rarely have the opportunity to realize all of their goals simultaneously.

The same behavior that maximizes one of the president's objectives may not lead to the best possible outcome with respect to the others. In some cases policy pursuit may conflict with a politician's ability to capture office. When politicians use discretionary resources to try to maximize their maintenance in government, for example, they may often be asked to sacrifice some of their policy preferences in order to gain patronage at the cabinet. On the other hand, in order to be accountable to voters, presidents may need to dilute their policy commitments and thus potentially antagonize their own constituents. During the lifetime of a government in which presidents have had to make such compromises, policy conflicts may emerge over and over again. In other cases, the gains of being in office may be likely to carry a price in future elections, so that the trade-off is between office now or in the future. This trade-off between office now and votes in the future may lead presidents to conclude that the prospective electoral losses may be too heavy to justify the continuation of some allocation policy in government.

Presidents may also find that insisting on particular policy preferences implies an electoral liability. This is often a trade-off presidents face when they are drafting their electoral platforms or manifestos. If this platform contains everything that core voters want, then it will probably cause the presidents to fare poorly among the median voter (Downs, 1957;

Dixit and Londregan, 1996). On the other hand, an electorally optimal platform may imply policy sacrifices that are hard for the president to sustain publicly. Occasionally, presidents may find themselves in the fortunate situation that the strategies that maximize one of their objectives are also the best means to the others. These situations are rare, however, and it is more likely there are trade-offs between their different policy goals, and presidents find that they have to compromise on some goals in order to reach others. Our interest in this paper lies precisely in which kinds of compromises presidents are willing to make in order to achieve their ultimate goals.

In order to discuss trade-offs and compromises between different presidential objectives, we have to consider, as Mueller and Strøm (1999) do, the time horizons of presidents. Electoral costs and benefits, for example, are often not realized immediately. Typically, presidents concern themselves with elections that lie a few months to a few years ahead. They seldom actively look beyond the next election in which they will be involved. Nevertheless, the time horizons of politicians may differ, as some take a more long-term perspective than others. Politicians that cannot run for reelection due to term-limit constraints may be concerned with elections that lie far in the future. Presidents elected around a specific short-term issue may have little patience and little flexibility to postpone the realization of their goals. Such differences in time horizons may, in turn, affect the trade-offs and compromises they are willing to make. Presidents with a very short time horizon, for example, may be willing to incur more substantial electoral liabilities, particularly if the elections lie a few years down the road. Finally, as noted earlier, politicians may be more or less opportunistic in their pursuit of goals such as policy or office. Presidents may pursue policy goals either intrinsically, because they sincerely care about the policies in question, or opportunistically, as a means to the realization of some other goal, for example electoral support.

For presidents with long time horizons, the strategy pursued can be classified as “legacy-building”. The term legacy can be politically defined as whatever a politician leaves behind to be remembered by. A legacy can be built for ideological reasons or for instrumental ones.

Ideologues have very clear policy reasons to build a legacy. Given the difficulty in changing standards, habits, rules and procedures, when a *procedural* legacy is left by a president, for example, it will very likely influence the decisions that succeed it. Or to be more extreme, such actions might endure much longer than imagined, and transform the lives of people long after the legacy was established. The canonical American politics example is the procedural legacy left behind by George Washington and the Founding Fathers, with institutions, rules, and norms lasting well over 200 years. But a legacy can also be simply instrumental. Driven by legacy career goals, a politician might want to govern in the present expecting to be in power in the future (Stolz, 2003; Mattozzi and Merlo, 2008).

Popularity, on the other hand, can be distinguished from legacy for its short-term temporal features. Politically we can define popularity as the state or condition of being liked, admired, or supported by many people (usually voters). Note how popularity is defined as a state or condition (relatively temporary), whereas legacy is defined as something that lasts long after one has left office (relatively permanent). As with legacy, popularity can be sought after for both instrumental and ideological reasons. That is, we can think of popularity as being pursued as an end or as a mean. If a politician believes a good government needs to be associated with high levels of popularity, then his/her motivation for seeking better poll numbers is an end in itself. But if a politician believes his political career depends on high popularity, then building better poll numbers is simply a way to keep increasing the likelihood a politician will be successful in his/her career (Borrelli and Simmons, 1993; Kernell, 1977; Diermeier, Keane and Merlo, 2005; Woessner, 2005).

The literature in distributive politics and political economy has formulated contradictory arguments in explaining the pattern of national discretionary revenue distribution to localities. While there are several strategies a president can pursue, it is not yet clear which strategy he is most likely to choose. After more than a decade of research about the explanatory power of electoral incentives on how politicians allocate resources, the results are still inconclusive. In the sections that follow, we restrict our attention to the Peruvian case, show-

ing that the presidential administration of Alan Garcia provides a fitting context for a critical test of all aforementioned arguments. Garcia was facing the trade-offs identified above when he was inaugurated under new rules to allocate natural gas subnational revenues. Instead of a “free market” allocation system, Garcia was constrained to distribute resources to an area where he and his party had not performed well in the previous election: the gas-rich Cusco region mostly supported Garcia’s opponent (Ollanta Humala) in the 2006 presidential elections, and voted for parties other than APRA in the mayoral elections. At the same time, this constraint provided him a worthy opportunity to improve his image among non-supporting voters who were eager for infrastructure and public service investments. The focus on natural resource revenue distribution in Peru allows us to test the arguments above in a direct manner because this kind of revenue distribution is discretionary. That is, we do not look at how the government distributed tax revenues subnationally, because this decision is typically (not just in Peru but elsewhere) made by parliaments or parliamentary committees, whereas decisions on how to allocate non-tax revenues (such as gas transfers) are made by the executive. Though it is not the aim of our paper here, this distinction between tax and non-tax revenues has been emphasized in the literature on regime survival and democratization (Morrison, 2009; De Mesquita and Smith, 2010).

Within the Peruvian context, we will evaluate Garcia’s choices retaining the premise that presidents value one of two goals, office (opportunism) or policy (accountability), with either short time horizons (popularity-seeking) or long time horizons (legacy-seeking). To preview our results, we will argue that Garcia pursued opportunistic goals, with a long time horizon. With this case in mind, we formulate two hypotheses implied from the above arguments:

(H1) If state revenue is used to improve a politician’s electoral success, he/she is considered to be opportunistic. For the Peruvian case, Garcia would be classified as opportunistic if he allocated resources to target certain voters. That is, if his pattern of revenue allocation targeted voters not for redistributive or socially optimal reasons, but instead to foster an electoral linkage with voters.

(H2) If state revenue is used to praise voters who already support a politician, one can imply he is trying to maintain his popularity. On the other hand, if allocation arrives to voters who did not support a politician, one can imply she is trying to persuade voters about her qualities in an attempt to build a political legacy. For the case of Peru, Garcia would be classified a “legacy seeker” if revenues were targeted to non-supporters.

DISTRIBUTIVE POLITICS IN PERU

The local political situation Garcia faced when he took office in 2006 was considerably bleak. Most mayors across the country were from parties other than Garcia’s APRA party. Given this unfavorable context, how did Garcia allocate resources to Peruvian municipalities? Did he allocate revenues accountably – by distributing grants for socio-economic reasons or according to some social optimum – or did Garcia allocate revenues for political gain? To evaluate this question, we compare municipal and national executive election results to municipal-level observations of gas transfer allocations from 2006 to 2011. As noted above, the minerals revenue reform bill of 2004 provides a good testing ground to see if politicians are being accountable to their constituents or if they are simply using discretionary revenues to improve their political positions. Building on the principal-agent model proposed in Besley (2006), if indeed politicians are good agents to their principals (voters), elected officials will account for negative externalities which the market has not corrected. Toledo’s decision in 2004 to send money back to mineral-producing regions likely reflected the former president’s perceived accountability gap between voters and the Peruvian government. That is, voters had been demanding government action to the growing problems mentioned above – gas spills, explosions, water contamination, and flaring – but no action had been taken despite 30-plus years of production (gas exploration began in the early 1980s). What is of interest for this paper is not necessarily why the bill itself was proposed but whether the accountability link has persisted since the reform’s enactment. In other words, did the next president account for voters’ preferences in the years following the reform? Or did he take advantage

of the law to distribute rewards to his political supporters or try to buy off the opposition?

Before answering these questions, it is worth noting the political situation following the 2004 reforms. The presidential election of 2006 in Peru was largely seen as a choice between two evils: an unpalatable choice between Alan Garcia, whose previous presidency was marked by the violence of the war with leftist insurgents and disastrous economic policies that provoked massive shortages and hyper-inflation, and Ollanta Humala, a former army officer who had participated in a failed coup. With a margin of 52.6% percent to 47.4% percent in the second round of elections, Garcia narrowly defeated Humala and was ratified as “the lesser evil” (García and Lucero, 2008). His challenges as chief executive, however, did not end there. Because his first administration (1985-1990) ended unpopularity, Garcia was constantly doubted among voters. It was never clear if he would have the skills necessary to keep Peru in good standards (Saez and Díez, 2008). President Garcia was remembered as the politician who, although governed within the constitutional framework, generated a progressive deterioration of the political regime, along with an heterodox economic policy that nationalized banks, refused to pay the foreign debt, and fostered a period that hit 1,979% inflation in its worst moments (Belaunde and Praeli, 2008). To combat this scenario, Garcia opted for important reforms, a social agenda of redistribution (Núñez and Escobar, 2006) and the continuation of the decentralization processes initiated by Toledo (Dickovick, 2006). This agenda gave Garcia two years of significant popularity, bolstered by an economic policy of price controls and subsidies on staple goods and essential services, as well as increased natural gas production from Peru’s giant Camisea field (USGS 2012). At this point in time, Garcia was faced with abundant revenue in the region of Cusco that needed to be allocated across its districts. This is the specific setting that we start to explore now.

RESEARCH DESIGN, DATA AND ESTIMATION ISSUES

We start by first looking at the patterns of revenue transfers at the aggregate level. Figure 1 illustrates the total subnational transfers of natural gas revenues after the reforms. Note

that prior to the reforms there were no transfers, but municipalities began receiving funds immediately after the reforms were enacted. Note also that the aggregate increase in revenue distribution is a product of rising natural gas prices and increasing gas production. For the remainder of this paper we choose to focus only on the Garcia administration from 2006 to 2011. The reasons for this are twofold: (1) Garcia had no influence on the enactment of the gas reform bill, thus making the reform exogenous to Garcia's administration; (2) a two-year lag since the reform was established allows for a credible baseline we can use as a control for an exogenous initial allocation of discretionary revenues.

[Figure 1 here]

RESEARCH DESIGN

To answer the question of whether revenue is distributed opportunistically or accountably, we combine resource revenue allocation data with data on presidential and mayoral vote shares by district. This allows us to test two nested hypotheses: gas transfers are correlated with (1) presidential electoral support, and/or (2) mayoral electoral support.³ Since Peruvian parties are weak both nationally and locally, presidents may target voters not just for national-level support but also for local-level support. It is the opportunity to create personal linkages with voters that make the data we analyze here so interesting. A Peruvian president can use his discretion over resources to try to improve his image among voters, depending almost exclusively on himself.

Although this problem is faced by Peruvian presidents in the entire country, we will test the hypotheses stated above only in the region of Cusco, which has 108 districts (municipalities) nested in 13 provinces. The first reason for this choice relies on the fact that Cusco's municipal and regional elections of 2006 produced a geographic area almost exclusively populated by Garcia's adversaries. There is no district in Cusco that electorally supported Garcia with vote shares above 35%, whereas 60% of the districts had vote shares of 15% or less. Second, because of the exogeneity of the 2004 reforms, we can investigate the setting

in Cusco without the endogenous problem of a president who chooses a reform to get more votes, or a president who gets more votes and so chooses to reform.

DATA

Our outcome of interest is gas revenue distribution per capita to producing municipalities. Geographically, natural gas production is concentrated in Cusco. This geographical coincidence – that nearly all of Peru’s gas comes from one region – provides another reason for the appropriateness of these data to the questions at hand. By restricting our domain to an administratively homogeneous unit of analysis, we can effectively control against legal and institutional differences that exist across regions due to Peru’s high degree of administrative decentralization. These differences have become particularly acute since the 2002 constitutional amendment establishing three levels of government (national, regional, and local) instead of two levels (national and local).

Profile plots of district-level gas revenue distribution per capita (logged to account for skew) are shown in Figure 2, faceted by province. The trend of gas revenue transfers is fairly constant over time across districts and provinces, despite districts starting at different initial values. One province that stands out is La Convencion, where the majority of Peru’s gas is produced from the Camisea gas fields. These trends indicate that there is considerable temporal and spatial correlation, which we will have to address when modeling the data statistically.

[Figure 2 here]

The predictors of interest are Garcia’s electoral vote share and the presidential party’s mayoral vote share at the district level in the 2006 elections. Since Peru is a multiparty system, vote share is measured as the votes won by the president’s party (*Partido Aprista Peruano*, or APRA) divided by total votes cast. For this analysis, data are gathered at the district level. The choice to focus only on presidential elections is due to the structure

of authority over subnational revenue distribution: how much money is sent to individual districts is determined by the executive, with parliamentary approval. The president is thus the “agenda setter” with the legislature playing only a “veto player” role.⁴

Other predictors include baseline gas revenue distribution as set by the 2004 reforms (this serves as a proxy for natural gas production by district since these data are not readily available); baseline district-level development index measured in 2004, similar to HDI (ranges from 0 to 15, mean = 7.56, sd = 1.81); and a district-level poverty index measured in 2006 and 2010 (ranges from 0 to 1, mean = 0.12, sd = 0.06). All data are drawn from the Peruvian statistical bureau (ENEI), except for electoral data which are drawn from the electoral commission (ONPE). We also include district-level controls for political competitiveness (effective number of parties, and a competitiveness index) and demographics (voter age, gender, and education levels).

[Figure 3 here]

Before turning to a more rigorous analysis of the data, it is worth looking at bivariate correlations between the outcome and the predictors of interest. In particular, we can observe the patterns between gas transfers and presidential and mayoral electoral support during the Garcia administration (2006-2011), two years after Toledo enacted the gas reform law. Figure 3 shows scatterplots of these relationships for each year after the 2006 election, with mayoral and presidential vote shares overlaid on the same plot. The graphs all show that there is a clear negative correlation between gas transfers and presidential vote share (votes for Garcia) but a flat or slightly negative correlation between gas transfers and mayoral vote share (votes for mayors in Garcia’s APRA party). One explanation for these patterns from the literature is that the president uses discretionary resources to target opposition voters rather than reward core supporters (Dixit and Londregan, 1998; Stokes, 2005). As for mayoral support, where vote shares for APRA were low, the amount of resources invested in these districts are the same regardless of the difference between party performance in the local vs. national elections. On the other hand, in districts where mayoral vote shares

for APRA were high, more resources are targeted to these districts than to areas where presidential vote shares were high but mayoral vote shares were low. In the former cases, Garcia is rewarding supporters of the party at the local level, but not supporters of the party who only voted for APRA at the national level. This is quite telling of the Peruvian political system – it appears that “split ticketing” is prevalent, where voters choose one party to represent them at one level of government but choose a different party for local representation. This is but a simple analysis of the data, yet it reveals interesting patterns inherent in the Peruvian case.

ESTIMATION ISSUES

The data have a multilevel structure, as observations over time are nested within districts which are nested within provinces. As such, one approach to analyzing these data is to use multilevel models. While these data could be modeled with classical linear regression techniques, the large number of groups (108 districts, 13 provinces, 9 years) makes this approach complex and unwieldy since we would have to estimate 107 additional coefficients even for the simplest case of a varying-intercept model (that is, if we allow the intercepts to vary by district). Instead, a multilevel approach allows us to model these intercepts (and slopes, if necessary) directly, giving each coefficient its own distribution (see Gelman and Hill (2007)).

To estimate the multilevel model, we use the Restricted Maximum Likelihood (REML) Random Intercept model with district/province group effects.⁵ Because longitudinal data in general have non-zero correlations across observations of the same subject over time, these correlations must be included when modeling the data. A district’s gas revenue transfers in one year are likely to be highly correlated with past and future years. For these reasons, we use the Random Intercept and Autoregressive-Moving Average (1,2) [RI+ARMA(1,2)] covariance model to account for temporal correlation within subjects and over time. Visually we can see the RI+ARMA(1,2) pattern in the profile plots presented above in Figure 2, which

suggest random intercepts but not random slopes, and also suggest temporal correlation within subjects with moving averages. In an online appendix we show a more rigorous test of model specification, with comparisons to other covariance structures using BIC as a test statistic for fit ().

We use district *and* province random effects because districts within a given province are likely to be correlated since natural gas deposits are geographically contiguous. For example, the presence of natural gas reserves in the Chinchero municipality suggests that there might also be gas reserves in neighboring Maras municipality since both are in the Urubamba province. Models with nesting only at the province level or only at the district level are run and show nearly identical results.

The convention in the study of longitudinal analysis in the social sciences is to include time and/or spatial (e.g. region, country, province, municipality, etc.) “fixed effects” in the regression model. Instead, we use covariance modeling and spatial random effects. This is done for three reasons. The first is that year and spatial fixed effects make interpretation of covariate coefficients difficult, and in some cases, meaningless (Bafumi and Gelman (2006)). Consider a model that just uses province fixed effects (no year effects included). The reported β is an estimate only for the province which is not included as a dummy; estimating the effect for the average province is quite difficult, particularly when there are multiple other covariates in the model. One cannot simply take an average of the province fixed coefficients and add them to the intercept, since the intercept will also be taking into account the other covariates in the model. By modeling the covariance structure of how residuals change and are correlated with one another over time, we free ourselves from adding time fixed effects into the model and make covariate coefficients much easier to interpret. By allowing for random intercepts, we similarly make the interpretation of provincial and district effects much clearer because the estimated β is the effect for the average province or district (Weiss (2005)).

A second concern when using time and/or spatial fixed effects is over-fitting the regression

model. Adding up to 648 (108 districts, 6 time periods) different fixed effects in one model can be quite tenuous if we want to properly allow for correlation across time, correlation across space, and correlation within spatial units over time. Furthermore, by adding both time and spatial fixed effects, as is common in many political economy studies, we forfeit the very richness of longitudinal data because we lose the ability to measure how specific units change over time. In these cases, we are simply comparing all province- or country-year units to each other as if each is an individual unit. Instead, by estimating the residual covariance structure, we again avoid the use of year and province/district dummies in the model. And in using spatial random effects (modeling varying intercepts) we take advantage of what is called partial pooling. As Bafumi and Gelman (2006, 4) note, “With partial pooling, outlying groups provide some information toward parameter estimation but also are shrunk to the mean. The extent of information they provide and, inversely, the extent of their shrinkage, is determined by the amount of data in their (and in other) groups.”

A third and final concern is the bias in standard errors when using time and/or spatial fixed effects in longitudinal data analysis. The problem here is that standard errors for the province fixed effects are biased by the temporal correlation among observations within a province over time (Weiss (2005)). This concern is somewhat addressed by using panel-corrected standard errors (Beck, Katz and Tucker (1998)), but this is simply a “band-aid” fix to a much larger problem of spatial and temporal correlation. Though we do not show the results here, models with province fixed effects instead of random effects give the same coefficient estimates as the random effects models, though the fixed effect models give much lower standard errors. Similarly, when running maximum likelihood models without estimating the covariance structure and instead including time fixed effects, the coefficient estimates of the primary explanatory variables are similar and statistically significant.

The model we estimate is specified as follows:

$$Y_{i,j} = \mathbf{x}'_{i,j}\alpha + \eta_{k(i)} + \beta_i + \epsilon_{i,j}$$

$$\eta_{k(i)} \sim N(0, D_\eta)$$

$$\beta_i \sim N(0, D_\beta)$$

$$\epsilon_{i,j} \sim N(0, \Sigma(\theta))$$

Where $Y_{i,j}$ are gas transfers per capita (logged) for district i (in province k) at time j ; $\mathbf{x}'_{i,j}$ is a matrix of covariates (baseline gas transfers, poverty index, and development index); α is a vector of fixed effects; $\eta_{k(i)}$ is the random effect for districts i clustered in province k ; β_i is the district random effect, and $\epsilon_{i,j}$ is error. The random effects are assumed to be normally distributed with mean zero and fixed but unknown variance-covariance matrix D . The residual has covariance matrix $\Sigma(\theta)$, which here we model as Random Intercept plus Autoregressive Moving Average (1,2) as discussed above.

FINDINGS

The results from estimating this model using six different covariate specifications are shown in Table 1. We are particularly interested in the coefficients for vote share for mayors and presidents. The results indicate that districts with lower support for Garcia received higher levels of gas transfers, but that districts with higher support for Garcia's mayoral partisans received higher transfers. The same result holds when using vote margins instead of vote shares, though the interpretation is reversed since margins are positive differences between Garcia and the winning party (Garcia did not win outright in any district); similarly, when using vote ratios (Garcia's vote over the winner's vote) we see the same result of Garcia rewarding non-supporters but also rewarding those who support his party's mayors. The presidential vote share coefficient estimates are robust to adding different covariates, controlling for political competitiveness and controlling for demographics such as gender balance, literacy rates, and percentage of voters between the ages of 20 and 55 (working population). Mayoral vote share coefficients on the other hand are not statistically robust

to different specifications, though the sign of the coefficient remains the same throughout different models. To check for temporal effects, we also run interactions between vote shares and time (results shown in the last column) but the interaction terms are not statistically significantly different from zero at conventional levels.

[Table 1 here]

Using the results from model (1), we can visualize the substantive effects of vote shares on gas transfers with the partial regression plots in Figure 4. Even controlling for baseline gas transfers and socio-economic variables, the pattern we saw in Figure 3 above remains: Garcia rewarded non-supporters on the presidential ballot but rewarded supporters on the mayoral ballot. For non-supporters of APRA at the presidential level, per capita gas transfers were allocated in the range of 6.2 logged units or roughly S/. 500 real Peruvian Nuevo Sol (about \$180 in 2011 USD); for supporters this figure is closer to 5.9 logged units or roughly S/. 360. On the other hand, for supporters of APRA at the mayoral level, per capita transfers were higher (S/. 550) than for non-supporters (S/. 450).

[Figure 4 here]

Looking to the proxy variables to test the accountability hypothesis, the results indicate that gas transfers are not significantly correlated with overall development, but are correlated with poverty levels. Districts with low poverty index scores – that is, districts with extreme poverty – receive higher transfers than districts with high poverty scores (rich districts). Taken at face value, these findings provide evidence for both hypotheses: Garcia used discretionary revenues opportunistically and accountably. But correlation between the poverty index and gas transfers is not necessarily strong evidence of the accountability hypothesis. It could be that Garcia was simply targeting cheap voters, and not necessarily targeting poor districts. That is, Garcia was sending revenues to districts with voters whose support is “easy to buy”.

[Figure 5 here]

Nonetheless, to determine the magnitude of the poverty and vote share effects, we need to again visualize the results. Figure 5 shows predicted point estimates (with uncertainty bands) for four categories of districts: APRA-supporting districts, poor and rich, and non-APRA-supporting districts, poor and rich, where support refers to districts with above average vote shares for Garcia. The graphic shows that the highest level of transfers are allocated to non-supporting, poor districts, and the lowest levels are allocated to supporting, rich districts, with non-supporting rich districts and supporting poor districts in the middle. The large gap between poor districts that are APRA-supporters and those that are not APRA-supporters illustrates the primacy of political aims in distributing gas revenues. This is further evident in our finding that non-APRA-supporting, rich districts are receiving more money than APRA-supporting, poor districts.

We can also plot the predicted natural gas revenue allocation for the complete range of values for poverty and vote share, instead of four sample cases. Figure 6 presents a contour plot with estimated values for gas transfers from our fitted model. The values in the contour plot are consistent with the political opportunism hypothesis: gas transfers are inelastic to poverty, but elastic with respect to vote share. At low levels of vote share, the transfers a district receives do not vary by poverty level (as indicated by the vertical lines and the orange zones in the plot). For example, a district that had 10% vote share gets about S/. 700 (per person) regardless of the poverty level in that district. On the other hand, gas transfers to extremely poor districts (close to 0 on the poverty index) vary widely by vote share: supporters get somewhere between S/. 200 to 300 per person, while non-supporters get between S/. 600 to 800 per person.

[Figure 6 here]

Overall the statistical findings point to the “opportunistic” or office-seeking hypothesis of presidential behavior: Garcia distributed discretionary revenues for political aims, specif-

ically trying to buy the support of the opposition who did not vote for the APRA party in the 2006 elections. That Garcia prioritized investments in opposition districts may imply he was oriented toward a long time horizon. As we discussed before, politicians who target opposition voters do so for one of two reasons: either to build a political legacy or to maintain or improve political popularity. The evidence we provide here and in the next section offers support to the argument that the Peruvian president was driven by his desire to establish a lasting legacy, especially because the Peruvian system bars presidents from reelection in consecutive terms. At the same time, our findings show that Garcia targeted supporters of APRA at the mayoral level, suggesting that he was also willing to target core voters who supported his allies at the local level. This would be particularly helpful to Garcia, given his interests in running for office in 2016, a topic to which we now turn.

GARCIA'S LEGACY

The evidence presented thus far suggests that gas revenues were used by Garcia to praise core voters at the mayoral level, but opposition voters at the presidential level. We interpret these findings as Garcia allocating resources strategically in order to maintain the support his local allies received in the regional elections, and to build support among voters who did not cast ballots for APRA in the presidential election. In other words, we see this evidence as suggestive of a president who was looking for ways to build a political legacy. In this section of the paper, we discuss why and how Garcia pursued a “legacy-building” strategy motivated by instrumental, as opposed to ideological, reasons.

Garcia is a good example, we argue, of a politician who sought to build a political legacy for instrumental reasons. In 1985, Garcia won his first term as president of Peru. Despite his initial popularity among Peruvian voters, Garcia's term in office was marked by bouts of hyperinflation, thereby profoundly destabilizing the Peruvian economy. During his administration, the per capita annual income of Peruvians fell to \$720 (below the level of 1960) and Peru's GDP dropped 20% (Belaunde and Praeli, 2008). By the end of his

term, national reserves suffered from a \$900 million deficit. To deepen his problems, the social condition of Peruvian citizens had deteriorated by the time he took office: around the start of his presidency, 42% of Peruvians lived in poverty. In 1991, the last year of his term, this figure had increased to over 55%. His economic policies were no less incendiary: Garcia made attempts to nationalize the banking and insurance industries, and subsequently incurred the wrath of the International Monetary Fund and the financial community by unilaterally declaring a limit on debt repayment equal to 10% of GNP, thereby isolating Peru from international financial markets (Belaunde and Praeli, 2008).

This economic turbulence exacerbated social tensions in Peru and contributed in part to the rise of the violent rebel movement known as *Sendero Luminoso*, whose insurgency spearheaded internal conflict in Peru; notably, the group began attacking electrical towers, causing a number of blackouts in Lima. This new wave of internal strife significantly damaged Garcia's political standing in the public: using monthly presidential approval data for the period between 1985 and 1991, Arce (2003) has shown that political violence was a significant negative predictor of presidential approval during Garcia's term. Moreover, Garcia's critics claim his many poor decisions set the stage for the rise of an authoritarian leader in his successor, Alberto Fujimori. Adding insult to injury, after the end of his term Garcia was indicted on multiple charges of corruption.⁶ His approval rating over time aptly summarizes his presidency: in 1985 his approval rating peaked at 90%, whereas in 1989 he started the year with a 9% approval rating, and finished his term with an approval rating of 14% (Encuestas Peru, 1990).

When he came back to power in 2006, Garcia's main challenge was to create a political image different than the one he left power with (Drinot, 2011). He had won the 2006 election against Ollanda Humala based on a political campaign that portrayed Garcia as a more "experienced" politician to handle the country's economic and social problems. His core supporters were found mostly in Lima and the northern coast, but Garcia failed to break through in Humala's strongholds in the southern region (mostly impoverished, but including

major cities such as Cuzco and Arequipa) and the rainforest areas. A third of the voters said that voting for him was “voting for the lesser of two evils”: although many Peruvians had a negative impression of Garcia after his first term, they were scared by rumors that Humala would create a government based on Fidel Castro’s Cuba and would turn Hugo Chavez, President of Venezuela, into the virtual ruler of Peru due to Chavez’s connections to Humala’s party (Saez and Díez, 2008). With this political opportunity in hand – a rare second chance in presidential politics – Garcia aimed to govern to improve his image among the sectors that did not support him, in order to extend the political opportunities of his career.

His second term in office was remarkable distinct from his first term. Although Garcia’s government faced two political scandals involving his cabinet members, strong economic growth gave Garcia a stable environment in which to govern. GDP growth in 2006 reached almost 8% and for the next two years, the figure ranged close to 9%. Due to the effects of the global crisis in 2009 the Peruvian economy shrunk to just over 1%, but in 2010 bounced back to 9% growth. Of course, increasing mineral production and favorable global prices were partly responsible for Peru’s economic success, but voters gave credit to Garcia for turning the economy around. Because of his economic success in the first years of his government (before the crash), a barrage of questions arose about Garcia’s political future. While during some interviews he rejected the possibility of running again in the future – “If a [mandate] leaves bad memories and then another leaves a good one, why would a politician risk a third time?” (Frecuencia Latina, 2007) – in others, however, he stated desire to run again, presumably in 2016. In the last year of his term he announced, “What I want is that the next government is very good, so we can build a third government of excellency next time” (Trome, 2010).

The impossibility of a reelection in 2011 is what makes us believe Garcia was governing to create a lasting legacy, in support of our second hypothesis. While the first government was a disaster, the second gave him a great opportunity to restore his image and re-energize

his political career. The newspapers in Peru and in the region have repeatedly speculated about his third government, and as we pointed out before, he has never outright rejected this possibility. On the contrary, on several occasions he himself announced the desire to pursue a third term in the presidential palace.

CONCLUDING REMARKS

In sum, this paper describes the patterns of subnational revenue distribution in Peru and analyzes the motivations and consequences of President Alan Garcia's second term in office. First, the data analysis presented here posits support to the argument that subnational revenue was distributed for political reasons as opposed to socio-economic reasons, a distinction which we denote using the terms "office-seeking" or "opportunistic" versus "policy-seeking" or "accountable". The evidence indicates that after the passage of Toledo's 2004 gas reform bill, the accountability linkage has worn off under Garcia's watch: we find that Garcia targeted discretionary gas revenues to districts where he did poorly in the 2006 elections, thus targeting non-supporting voters, but also to districts in which his local allies (in the APRA party) did strongly in the 2006 municipal elections. The combination of targeting opposition voters in Garcia's second term, his disastrous first term in the late 1980s, and the inability to run again in 2011 points to evidence for our second hypothesis that Garcia's subnational revenue allocations were motivated by the desire to establish a lasting political legacy.

Two findings from this paper deserve further study. The first is Garcia's support for mayoral allies. With data on the 2011 mayoral elections – which are not yet readily available – we could test the connections between mayors whose districts received revenues and mayors who were reelected in 2011. It should be the case that districts receiving gas transfers on average supported incumbents in the following elections, but evidence otherwise may indicate that voters at the municipal are not retrospective but rather prospective. That is, voters may be choosing whom to support not based on past success but rather perceived performance in the future. A second piece worth further investigation is based on our main finding

that Garcia target districts not based on poverty or development levels but rather based on political support. If indeed Garcia will run again in 2016, it would be interesting to see how these districts will reward or punish him. Will Garcia lose the support of poor voters? Will supporters realize the advantages of not supporting Garcia? Or will the gas transfers improve Garcia's overall position in producing districts, where he was unable to win during the 2006 elections? The answers to this last question in particular will be especially insightful for leaders who are contemplating subnational resource revenue distribution. If gas transfers are targeted politically, as the results of this paper imply, then it should be the case that subnational revenue transfers bear political gain in the future.

NOTES

¹Consider that only four of the world's top 25 oil and gas producers have decentralized revenue sharing arrangements (Ahmad and Mottu (2003))

²See Alfredo Gurmendi (2010) "The Mineral Industry of Peru", in the United States Geological Survey *2010 Minerals Yearbook*.

³There are actually four hypotheses: transfers are correlated with presidential but not mayoral support; mayoral but not presidential support; both mayoral and presidential support; or neither. Theoretically, the direction of correlation can run either way: presidents can reward supporters for their votes in prior elections, or presidents can target opposition voters to buy their support for the next election.

⁴A geographical visualization of the vote share data is presented in an online appendix, alongside a geographical mapping of natural gas revenue transfers.

⁵REML estimation is used to account for the likely bias in estimating the variance-covariance parameter θ , which is unknown. Standard ML estimation calculates θ using a computational algorithm that does not account for the correlation across units over time that is common in longitudinal data. The REML likelihood function takes this into account and is specified as:

$$L(\theta|Y) = \frac{|Var(\hat{\alpha})|^{\frac{1}{2}}}{\prod_{i=1}^n |\Sigma_i \theta|^{\frac{1}{2}}} \exp\left\{-\frac{1}{2} \sum_i^n [Y_i - X_i \hat{\alpha}(\theta)]' \Sigma_i(\theta)^{-1} [Y_i - X_i \hat{\alpha}(\theta)]\right\}$$

Where $\theta = (\sigma_{11}, \sigma_{12}, \dots, \sigma_{1T}, \sigma_{22}, \sigma_{23}, \dots, \sigma_{2T}, \dots, \sigma_{TT})$ are the unique unknown parameters of the variance-covariance matrix Σ and $\hat{\alpha}(\theta)$ are parameter estimates of *alpha* given θ .

⁶See press notes on *Peru this Week* and *Hoy.es*

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TABLES

<i>Natural gas transfers per capita (Nuevo Sol)</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
Baseline gas transfers	0.445 (0.021)	0.297 (0.024)	0.446 (0.020)	0.430 (0.028)	-0.018 (0.061)	0.443 (0.022)
Development index	-0.000 (0.031)	0.012 (0.025)	0.015 (0.029)	-0.009 (0.032)	-0.042 (0.026)	-0.000 (0.031)
Poverty index	-0.700 (0.231)	-0.701 (0.228)	-0.691 (0.230)	-0.696 (0.232)	-0.773 (0.228)	-0.700 (0.230)
Time	0.329 (0.006)	0.329 (0.006)	0.329 (0.006)	0.329 (0.006)	0.329 (0.006)	0.335 (0.016)
Vote share _{pres}	-3.102 (1.092)			-3.072 (1.102)	-3.301 (0.917)	-3.316 (1.163)
Vote share _{pres} × time						0.060 (0.117)
Vote share _{mayor}	1.336 (0.700)			1.322 (0.703)	0.266 (0.574)	1.700 (0.744)
Vote share _{mayor} × time						-0.105 (0.074)
Vote margin _{pres}		2.972 (0.375)				
Vote margin _{mayor}		-0.220 (0.397)				
Vote ratio _{pres}			-2.471 (0.498)			
Vote ratio _{mayor}			0.332 (0.204)			
Political competitiveness				0.864 (0.751)		
Effective number of parties				0.035 (0.048)		
Percent female voters					6.116 (1.452)	
Literacy rate					-0.453 (0.546)	
Percent working population					4.757 (0.940)	
Observations (District-years)	636	636	636	636	636	636
<i>Districts</i>	106	106	106	106	106	106
<i>Provinces</i>	13	13	13	13	13	13
BIC	-41.32	-82.71	-49.55	-27.00	-77.10	-25.18
Log Likelihood	59.34			58.60	86.86	57.69

Table 1: *Natural gas transfers to Cusco region, 2006-2011. Coefficient estimates and standard errors reported from REML model with Random Intercept plus Autoregressive Moving Average (1,2) covariance structure. All models run with province and district random effects. Log Likelihoods given for nested models only (1,4,5 and 6).*

FIGURES

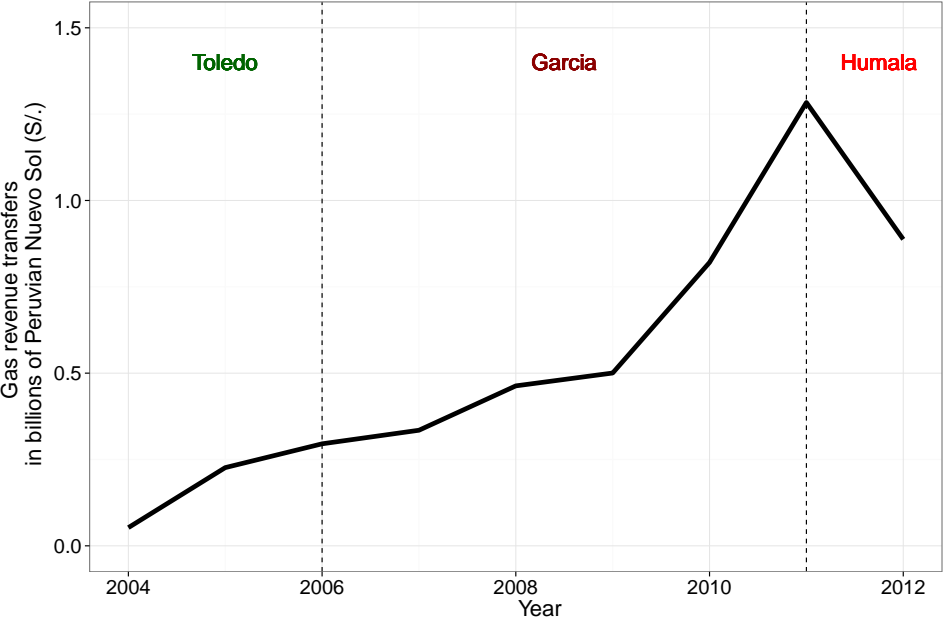


Figure 1: Total subnational transfers of natural gas revenue, 2004-2012. Dashed lines indicate election years in 2006 and 2011, with the incumbent presidential administration names annotated at the top of the graph: President Alejandro Toledo (2001-2006), President Alan Garcia (2006-2011), President Ollanta Humala (2011-present). Colors represent each president’s political party: Toledo (Peru Posible), Garcia (APRA), and Humala (PNP). Source: ENEI.

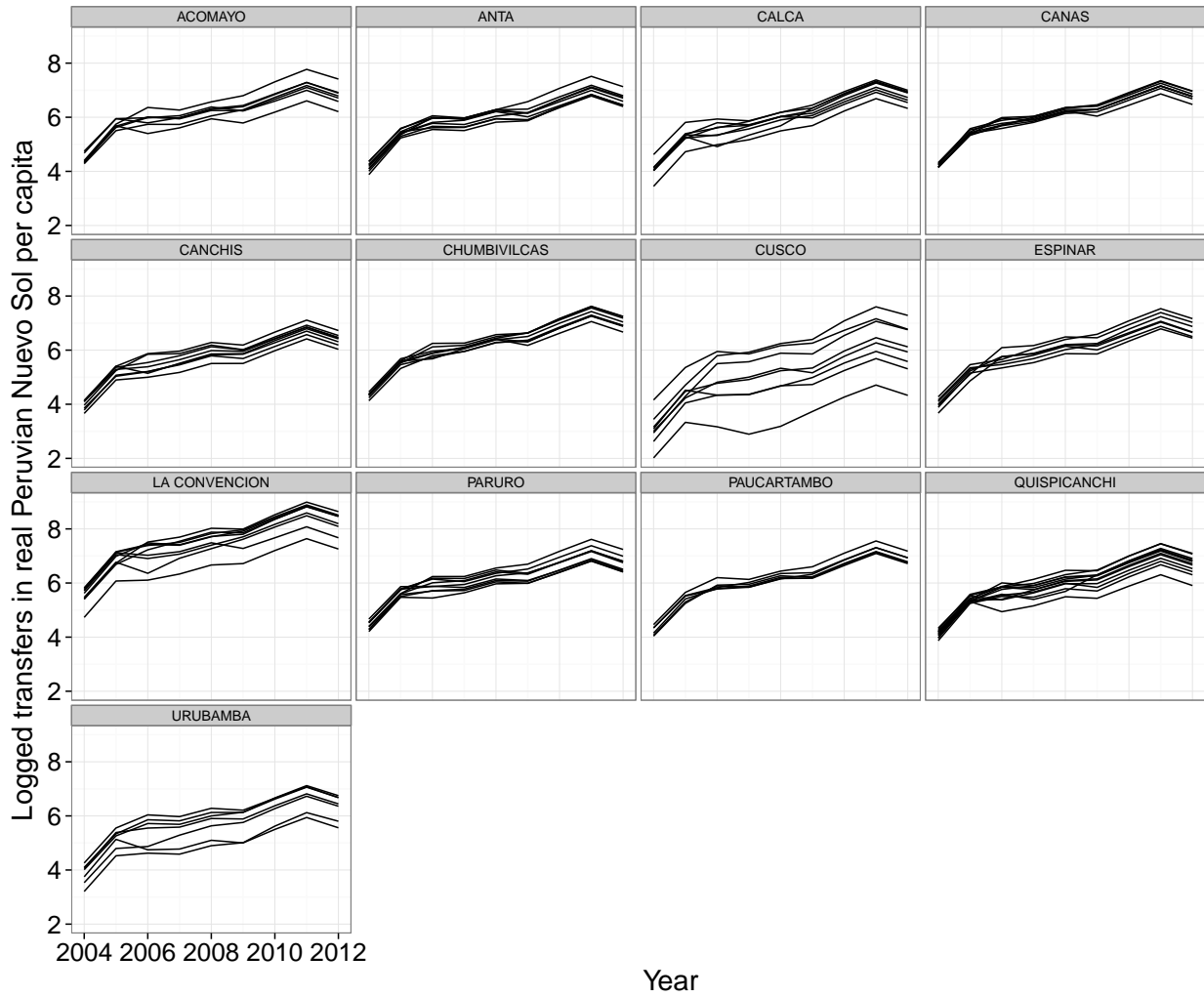


Figure 2: *Subnational transfers of natural gas revenue per capita by district, grouped by province in the Cusco department, 2004-2012. Note that the Cusco department has 13 provinces with a total of 108 districts. Source: ENEI.*

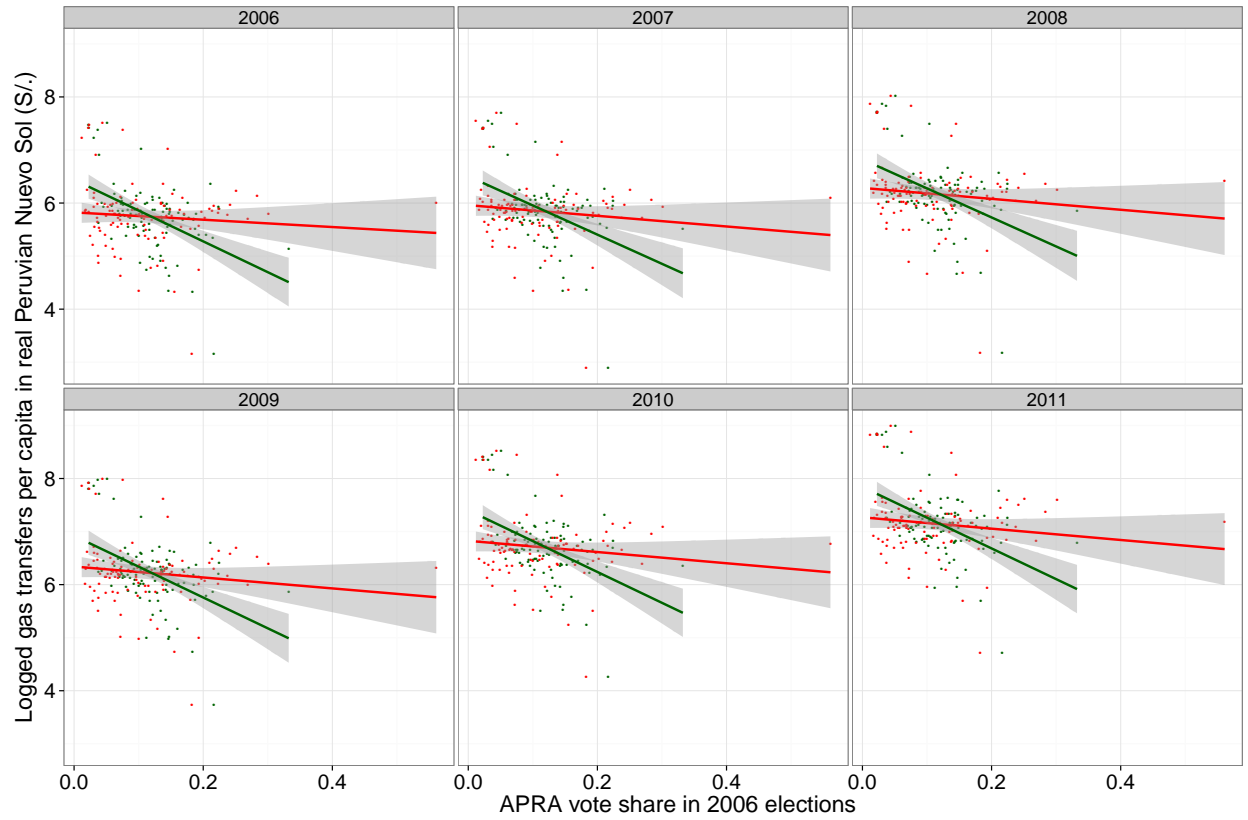


Figure 3: *Subnational gas transfers per capita and 2006 presidential vote shares (green) and 2011 mayoral vote shares (red) during the Garcia administration (2006-2011). Sources: ENEI, ONPE.*

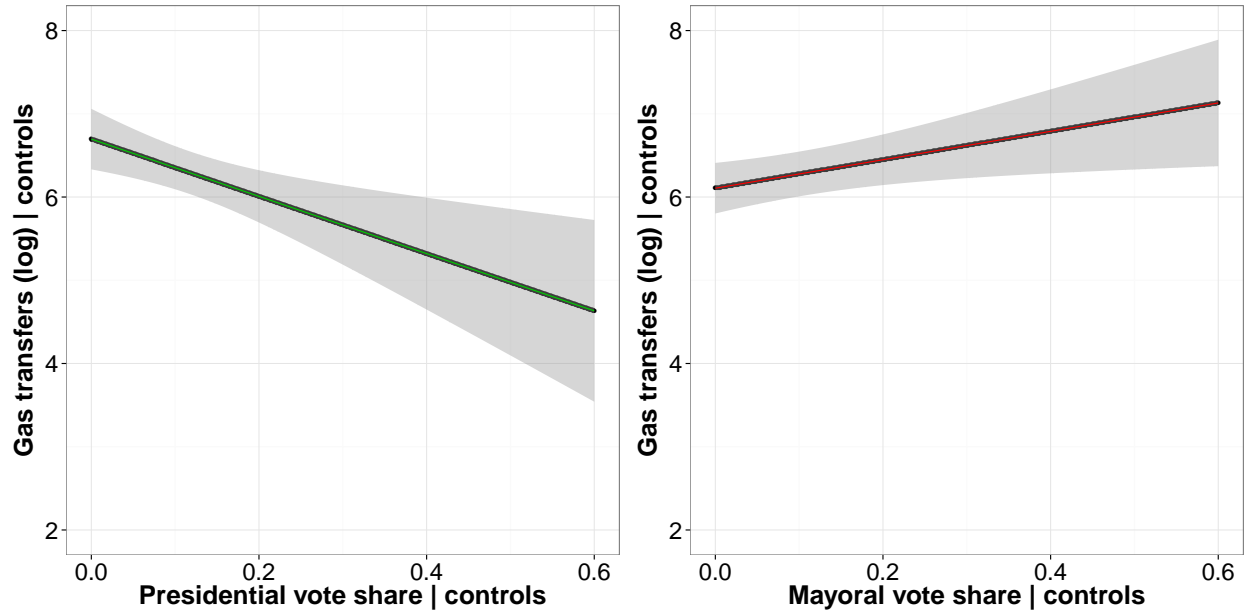


Figure 4: *Partial regression plots for presidential and mayoral vote share variables, estimated using results from the RI+ARMA(1,2) model in column 1 in Table 1.*

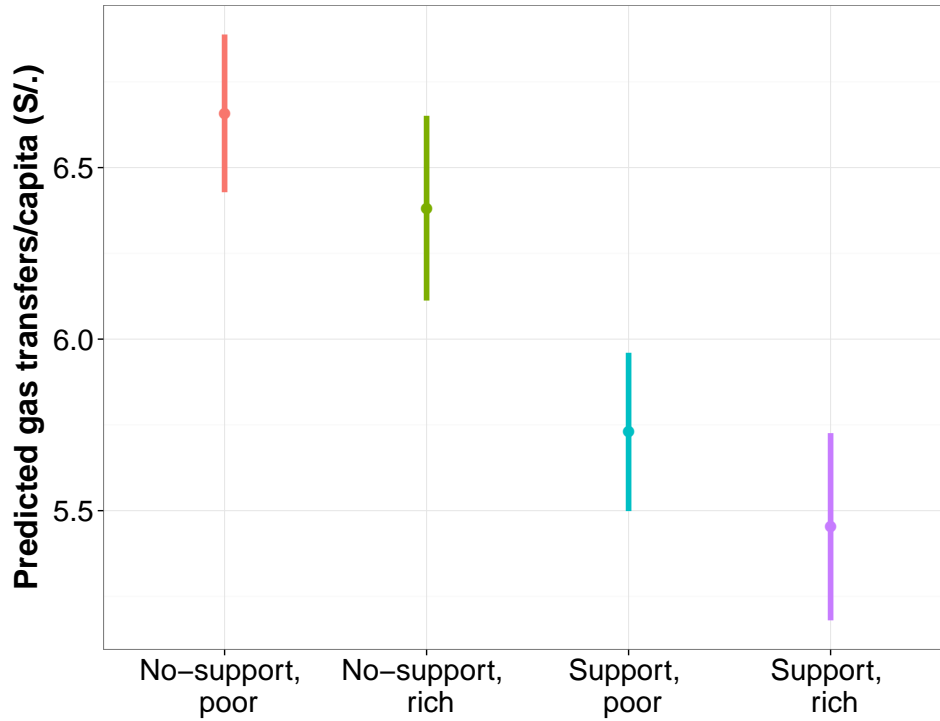


Figure 5: *Predicted natural gas revenue transfers for four selected municipal categories. “Support” indicates voteshare for Garcia equal 30%, “No-support” for voteshares equal 3%, “Poor” indicates poverty index equal 12%, “rich” for poverty index of 55%. These numbers reflect the extremes of both variables in our data set. Predictions estimated using results from the RI + ARMA(1,2) model in column 1 in Table 1.*

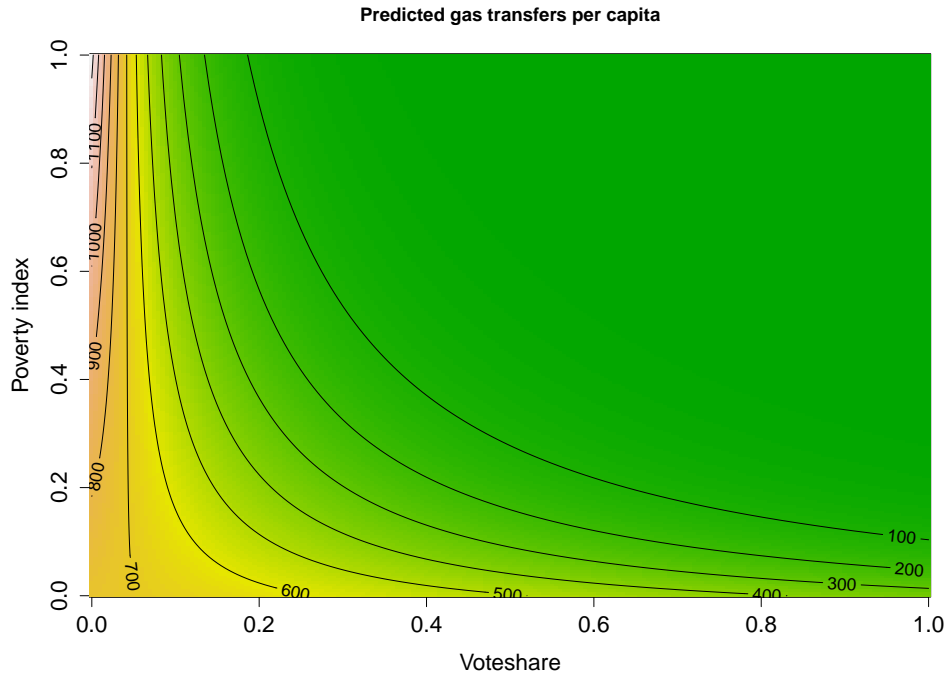


Figure 6: *Predicted natural gas revenue transfers for artificial values of vote share and poverty. Predictions estimated using results from the RI + ARMA(1,2) model in column 1 in Table 1.*