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Budgetary change in authoritarian and democratic regimes

Frank R. Baumgartner[a], Marcello Carammia [b], Derek A. Epp[c], Ben Noble[d], Beatriz Rey[e] and Tevfik Murat Yildirim[f]

[a]Political Science, University of North Carolina, Chapel Hill, USA; [b]Institute for European Studies, University of Malta, Msida, Malta; [c]Rockefeller Center for Public Policy, Dartmouth College, Hanover, USA; [d]Politics, University of Oxford, New College, Oxford, UK; [e]Political Science, Syracuse University, Syracuse, USA; [f]Political Science, University of Missouri, Columbia, USA

ABSTRACT
We compare patterns of change in budgetary commitments by countries during periods of democracy and authoritarianism. Previous scholarship has focused almost exclusively on democratic governments, finding evidence of punctuated equilibria. Authoritarian regimes may behave differently, both because they may operate with fewer institutional barriers to choice and because they have fewer incentives to gather and respond to policy-relevant information coming from civil society. By analysing public budgeting in Brazil, Turkey, Malta and Russia before and after their transitions from or to democracy, we can test punctuated equilibrium theory under a variety of governing conditions. Our goal is to advance the understanding of the causes of budgetary instability by leveraging contextual circumstances to push the theory beyond democracies and assess its broader applicability.

Punctuated equilibrium theory (PET) describes how, as a consequence of disproportionate information processing, public policies alternate between long periods of stasis where negative feedback forces maintain the status quo and brief but dramatic periods of change. While the theory accurately describes a broad range of policy activities, studies of PET have looked almost exclusively at Western democracies, where the wide availability of public budgets and other policy indicators facilitate longitudinal analysis. For example, the 2009 article 'A General Empirical Law of Public Budgets' (Jones *et al*. 2009) focused on only European and North American democracies.

We test PET across different political regimes. First, in the context of authoritarianism and democracy, we analyse public budgeting in Russia from 1998 to 2014, Turkey from 1970 to 2004, and Brazil from 1964 to 2010 – periods

including episodes of democracy and non-democracy in each country. We then look at historical data from Malta during periods of colonial rule by the British (1826–1921), colonial self-government (1922–1936), and during a more recent period (2001–2011) since that country's 1964 independence.

Democratic and other regimes might differ with regard to budgeting in two opposite ways. On the one hand, autocrats face fewer public and formal checks and balances, possibly allowing them to respond quickly in reaction to shifting contexts; this could be called the 'institutional efficiency' hypothesis. One the other hand, democracies may have higher capacity to gather information about social and other issues because of mechanisms associated with electoral accountability, as well as stronger and more independent civil society organizations including the press; the 'informational advantage' hypothesis.

Under the efficiency hypothesis, an autocrat, working with few institutional constraints such as generating a majority in a democratically elected and independent legislature, should be able to shift spending priorities when advisors recognize the need to do so. This decision-making efficiency would lead us to expect fewer punctuations in regimes where power is concentrated in a decision-making élite who can operate with broad institutional latitude. Institutional and decision-making frictions are lower, so decisions should be more efficient. Indeed, 'making the trains run on time' is one of the main justifications for authoritarian rule, and democracies are often criticized for high decision costs if not deadlock and stalemate.

Democracies have an advantage however when it comes to gathering information: they have many uncensored sources of demands, information, and feedback about the impact of current policies through a more vibrant network of civil society organizations, including political parties staffed by officials anxious to 'feel the pulse' of various constituencies. Furthermore, a bureaucratic network gives democratic leaders the capacity to respond to information once it has been processed. By contrast, authoritarian regimes may be less capable of gathering, processing and responding to information about societal problems because they have fewer independent sources of information, and indeed they may suppress certain kinds of information or have highly focused policy priorities. Subsequently, we would expect that the magnitude of punctuation in public budgets during periods of authoritarianism would be greater, as governments either fail to gather or ignore signals for longer than would be possible in democracies, only acting when problems grow so large that they threaten the stability of the regime.

Budget data for each country is compiled from various public records and to our knowledge the datasets assembled here are the longest and most accurate publicly available account of budgeting in any, of the four countries. Empirical tests are straightforward and designed to distinguish between the two hypotheses. Using Freedom House scores, we classify regimes as either

'Not Free', 'Partly Free', or 'Free' for each year of data. Then, for each country, we draw a distribution of budgetary changes corresponding to the different freedom scores. (For Malta, where our data pre-dates the Freedom House scores, we consider the period of self-government as more politically open relative to the period of British colonial rule.) Since our tests are pre- and post-transition within four countries that have experienced changes in forms of government, we effectively control for many other factors, including culture, size of the budget and complexity of the social issues facing the nation.

Evidence strongly supports the information hypothesis, suggesting that any advantage authoritarian regimes gain through institutional efficiency is outweighed by informational constraints. We replicate these findings in the online appendix using alternative regime-classification systems to divide the data, rather than Freedom House. These include Polity IV's assessment of political competition, Unified Democracy Scores (U-Dem), Varieties of Democracy scores (V-Dem), and, finally, by simply using the historical record to identify periods of regime transition. Collectively the results favour the information hypothesis; evidence that our findings using Freedom House scores are robust.

The relative advantage that democratic regimes with a free system of the press and active social mobilizations have with regard to signal detection and problem recognition are poorly understood. Indeed, we know of no budgetary research that systematically compares political regimes with regard to these issues. Our contribution is to develop punctuated equilibrium theory by looking at the impact of institutional forms on patterns of budget reallocations. For all the regimes we examine there is a combination of policy stability and punctuations, implying that the distinction between authoritarianism and democracy (or different forms of democracy) is, in a sense, not fundamental for understanding budget allocations.[1] The levels of punctuation observed differ substantially, however. Theoretically we would expect democracies to have greater informational capacity than other political regimes, and this idea finds support in the data. Indeed, the findings suggest that democratic informational efficiency is more important than non-democratic institutional efficiency. Relative budgetary stability can be added to the long list of attributes that favour democratic governance over its alternatives.

Punctuated equilibrium

Baumgartner and Jones developed PET in 1993 through in-depth case studies of particular policy issues, such as nuclear energy and pesticide use. They found that policy changes in these areas were predominately incremental, but that occasionally radically new ideas would gain momentum, causing a tidal shift in government policies toward these issues. In later work (Jones

and Baumgartner 2005) they introduced a more generalized model to demon-
strate that government policy-making is a fundamentally erratic process; it is
characterized by long periods of equilibrium intermittently punctuated by
dramatic changes. Their argument was this: because policy-makers are
boundedly rational and the processing capacity of political institutions is con-
strained by rules, governments are disproportionate processors of infor-
mation. The effects on policy change are two-fold. On one hand, an
extreme allegiance to the status quo is built into the system. If attention is
scarce, most issues most of the time will be ignored, and it is difficult to
justify changing the status quo in the absence of attention. But, on the
other hand, issues cannot be ignored indefinitely; societal problems will
grow worse over time and eventually need to be addressed. When an issue
finally receives attention, policy-makers may be forced to enact dramatic
policy changes, if only to catch up for the lack of moderate adjustments
they failed to make as the problem slowly developed. Thus, the model
describes a system characterized by friction, where negative feedback
forces are predominant, but occasionally give way to periods of rapid self-rein-
forcing change. With policy-makers responding only to a limited number of
urgent problems at any given time, issues beneath a threshold level of
urgency are put on the back burner as attention is focused on the most press-
ing issues; there are always more issues that deserve attention than time to
attend to them.

The implications of the model are that policy changes will fall into one of
two categories: incremental when the status quo prevails; and dramatic
during rare periods of imbalance. Empirical support for this prediction is sub-
stantial. A long line of scholarship finds that distributions of changes in public
budgets display a punctuated equilibrium pattern, characterized by high
central peaks, 'weak shoulders', and very long tails (Baumgartner *et al.* 2009;
Breunig and Koski 2006; Breunig *et al.* 2010; Jones and Baumgartner 2005;
Jones *et al.* 2009; Jones *et al.* 2003; Robinson *et al.* 2014). This research
focuses on kurtosis, a summary statistic that measures the peakedness of a
distribution. Higher kurtosis is generally taken as evidence of greater friction
in the policy process that produced the given change distribution.

Policy-making in authoritarian regimes

To date, Lam and Chan (2015) and Chan and Zhao (2016) have conducted the
only tests of PET in the context of non-democracies (see also Pauw [2007] on
South Africa; other tests have been in Western democracies). Looking at the
case of Hong Kong, Lam and Chan propose that non-democracies are charac-
terized by less friction than democracies because the institutional design of
these regimes centralizes power at the highest level of government, and
yet, at the same time, the absence of these friction-including institutions

also reduces external interferences to political processes. According to them, in the absence of electoral and participative mechanisms that are character- istic of democratic governments, officials lack the same incentives to monitor and respond to the external environment. Within such a system, Lam and Chan argue, under-response or stasis is extended; changes are reduced to prolong stability through mechanisms of negative feedback. However, the authors predict that pressure for change can build up to danger- ous levels, especially when it reaches levels high enough to threaten the auth- ority of the regime. The result of the two dynamics is a highly punctuated policy process 'in which the policy-making process is too insulated to react until the built-up pressures can no longer be resisted. But once it happens, the policy response can be radical and extremely forceful' (Lam and Chan 2015: 552). Chan and Zhao (2016) continue this inquiry, drawing on evidence from the People's Republic of China. They find that informational restrictions are the main drivers of punctuated equilibrium, and also that there is a nega- tive correlation between the level of punctuation across Chinese regions and the level of labour disputes – a proxy for regime threat. In other words, Chinese policy-makers face informational disadvantages when compared to their democratic counterparts, but they become more responsive to signals from society when the regime's existence is threatened.

Of course, much scholarly attention outside of the PET framework has been dedicated to non-democratic governance, and these studies help form our hypotheses. In non-democratic systems, without free and fair elections, the durability of the ruling élite is threatened only when problems have grown to such an extent that unrest, either within the regime or society at large, appears imminent. This erodes the informational capacity of authoritarian governments on two fronts.[2] First, it creates fewer incentives for leaders to seek out information. Indeed, structures that facilitate the flow of information in democracies, such as freedoms of speech and press, are often missing in authoritarian regimes and information is frequently censored or manipulated in favour of the regime. Although popular pictures of non-democracies might include elaborate mechanisms for observing the lives of citizens – from the Stasi's data-collection architecture in the German Democratic Republic to the Kremlin's heavy reliance on polling (Petrov et al. 2014) – the efficacy of such projects is fundamentally limited.[3] Schedler (2013: 37) writes of the 'structural opacity of authoritarian regimes' – that is, the informational uncer- tainty generated by, among other things, the incentives for citizens not to reveal their sincere preferences for fear of adverse responses from the regime. Second, whatever information is received by policy-makers can more easily be ignored – in the short-run, at least. Moreover, even when there is a desire to respond, the necessary bureaucratic capacity may be lacking, as many of the civil institutions through which democracies implement their policies are missing in non-democratic societies (Tsebelis

[2002]). In particular, democracies may be better at delegation, whereby numerous semi-autonomous bureaucrats work together to promote the social welfare; a level of cooperation that is often impossible for highly centralized regimes.

Another set of institutional features of democracies and authoritarian systems works potentially in another way. The autocrat controls the levers of government; the democratic leader may have to negotiate more compromises. So, whereas democratic leaders may get more signals and be more aware of changing social demands or trends, they may not have the capacity unilaterally to respond. An independent legislature, a judicial body, or members of rival parties sharing control of a coalition government may refuse to cooperate; in sum, a democratic regime typically has some institutional barriers to action, and these are usually much greater than what would exist in an autocracy.[4] To be sure, autocrats are not entirely free from institutional constraints, including intra-élite constraints (Roeder 1993; Tsebelis 2002). Our argument is simply that these constraints should be less than are typically associated with democracies. Furthermore, many autocrats are likely to have grander ambitions than preventing civil unrest and may therefore be responsive to information under certain conditions. For example, autocrats sometimes create nominally democratic institutions in order to gather information, placate the opposition, or share power (for reviews, see Art 2012; Brancati 2014; Gandhi and Lust-Okar 2009; Magaloni and Kricheli 2010; Morse 2012; Pepinsky 2014). Authoritarian regimes may therefore combine information search with the institutional freedom to act rapidly in order to solve developing social problems, thus greatly reducing overall levels of friction.

Hypotheses

We propose two competing hypothesis. The first is the 'informational advantage' hypothesis.[5] Every government has a certain threshold of institutional response. Below the threshold policy-makers ignore problems; above the threshold they attempt to solve them. Non-democracies have fewer reliable mechanisms to gather information about societal problems, so the response threshold may be higher than in democracies. Policy-makers in authoritarian regimes can ignore problems to the point at which social discontent threatens regime stability. In democracies, problems can be safely ignored only until representatives worry that their constituents will vote them out of office. Voting is much less costly than revolt, so in general we can expect democracies to be more responsive to information.[6] Thus, we hypothesize:

> Public budgeting in democracies will show lower levels of kurtosis than other political regimes.

The counter hypothesis is that any information gains provided by democratic institutions are outweighed by the frictions that accompany such institutions. This is the 'institutional efficiency' hypothesis, which suggests that authoritarian leaders may be better situated to act to resolve social issues than their democratic counterparts. The institutional efficiency hypothesis thus states:

> Public budgeting in autocracies will show lower levels of kurtosis than other political regimes.

Established PET studies seem to provide support to the institutional efficiency hypothesis. There is ample evidence, both within (Jones *et al.* 2003) and across countries (Baumgartner *et al.* 2009), that centralized institutions reduce decision-making costs, resulting in less punctuated patterns of policy change. Existing comparative research, however, is mostly focused on democratic regimes. As such, it did not take into account significant variation in another key variable: censoring of information versus leaving it free and open. The existence of widely dispersed sources of information typical of democracies generates a greater ability to respond (Baumgartner and Jones 2015), and stronger incentives to do so. We can expect the informational advantage of democracy to be greater than the decision-making advantage of authoritarianism. Indeed, many of the elements of governance often portrayed as impediments to efficient decision-making in multiparty democracies featuring separation of powers or the need to placate multiple veto-players actually serve to bring in greater amounts of information to the system. Thus, we expect our empirical tests to show greater levels of efficiency in democracies compared to authoritarian regimes.

We acknowledge that classifying regimes in a binary fashion – as either democratic or authoritarian – can be problematic, given the variety that this masks. In addition, and more broadly, any regime classification exercise is complicated by the persistent disagreements amongst scholars about typologies, measures and relevant data. Our claim is only that the political freedoms and institutional structures typical of democratic governance affect patterns of budgetary change systematically. Drawing simple distinctions between regimes that are more or less democratic should be sufficient to capture these systematic differences. Building on this foundation, further research could undertake a nuanced exploration of how specific structures across regimes affect public budgets.

Budget data

Previous scholarship has focused almost exclusively on Western democracies because these countries make longitudinal data readily available. Using original source documents, we introduce four new datasets: public budgets in Russia from 1998 to 2014; Turkey from 1970 to 2004; Brazil from 1964 to

2010; and Malta from 1827 to 1936 and from 2001 to 2011.[7] These budget series are significant in that they span periods of authoritarian and democratic rule, allowing a unique test of PET theory. The focus on Russia, Turkey, Brazil and Malta is governed principally by data availability; our empirical approach requires budgetary records that cover a regime transition and exist over a sufficiently long period of time to draw statistically meaningful distributions. Few countries fit these requirements and to our knowledge the data we assemble here are the most comprehensive in this regard (excluding the budget data from Hong Kong that have already been tested by Lam and Chan [2015] and data from China that were tested by Chan and Zhao [2016]). The analysis gains from the dissimilarities – both geographic and political – between the four countries by allowing a test of the hypotheses under a variety of sociopolitical circumstances. Table 1 provides a summary of the data.[8]

Note that for Russia, Brazil and Malta, inconsistencies in the reporting and management of public records preclude the use of uninterrupted time series. Another limitation is that budget authority is unavailable for Malta; we use annual expenditures instead. Budget authority measures the amount of authorized spending, rather than the amount that was actually spent in a given year, and is therefore a better measure of governmental decision-making. However, budget authority is often unavailable and scholars have substituted it with expenditures. This does not appear to have a meaningful effect on findings: when both budget authority and expenditures are available, distributional analysis has revealed similar levels of kurtosis across these measures.

We also proceed with some caution as to the reliability of the budgetary record during periods of authoritarian government. Authoritarian regimes are known to repress or alter information, which may compromise the integrity of any budget data that are made public. A symptom of this is inconsistency in the use of budget categories during the authoritarian periods (although we find that such reclassifications are also relatively common during periods of democratic rule). Categories are often redefined from one year to the next, which limits our ability to assess longitudinal changes in budgetary priorities. This is more problematic in Russia and Brazil in particular, where our data cover lengthy periods of authoritarian rule, and less so for Turkey, which sees only relatively brief military interventions during our period of study, and Malta, where the British kept accurate accounting records, known as 'Colonial Blue Books'. We do not claim that the data we

Table 1. Data characteristics.

Country	Time period	N	Budget type
Russia	1998–2003; 2004–2006; 2010–2014	1,260	Budget authority
Turkey	1970–2004	1,046	Budget authority
Brazil	1964–1985; 1995–2010	1,810	Budget authority
Malta	1827–1937; 2001–2011	3,074	Expenditures

assemble for the authoritarian periods are complete in the sense that it records every allocation made by these regimes; rather, only that it is the most complete account that can be compiled from public records. That being said, we have no reason to believe that authoritarian regimes systematically repress either very small or very large allocations; censorship should be neutral with respect to the shape of budget distributions, although this claim should be tested in future work.[9] We are also careful to only include those budget categories which are consistently defined between two years; that is, we exclude to the best of our ability from the analyses any budget changes which might reflect a shift in the definition of the stated budget category rather than a substantive reallocation.[10] Crucially, then, the changes we report below are real, not artefacts of shifting category definitions. (See the online appendix for explanations of the data sources used, as well as descriptions of the budgeting process over time for the four country cases.)

Results

Freedom House attempts to quantify the political rights and civil liberties citizens enjoy. Based on these composite elements, Freedom House assigns countries a rank of 'Worst of the Worst', 'Not Free', 'Partly Free' or 'Free'. These aggregate scores are available annually from 1972 to 2014, and the first step in our analysis is to assign each year of budgetary data its corresponding freedom score. For Brazil and Malta, budget data are available prior to 1972. Indeed, Maltese budgets are available as far back as 1827. Our main analysis excludes any year where we cannot assign a Freedom House score, but in the appendix (available online) we use the full time series when dividing the data based on regime transitions. For example, Malta transitioned from colonial rule to a period of colonial self-government in 1922. We find that results are highly consistent.

Having assigned Freedom House scores, we then calculate annual percent change values for each spending category. As discussed, there is some inconsistency across budget categories. If a category had a change in its substantive definition in a certain year or was not reported, we do not calculate a percentage change value for that year in that category. We also take a new approach to accounting for inflation. The data span years of political and economic turmoil; each country introduced at least one new currency or experienced a significant currency revaluation during our period of study. This makes inflation adjustments difficult and in many cases there is no consensus within the scholarly community about how such adjustments should be made.[11] Rather than adjusting for inflation prior to calculating percentage changes (the standard approach in the literature), we calculate changes relative to total government growth in that year. For example, if a budget category saw an annual increase of 10 per cent and the total budget for that

year grew by 7 per cent, we consider that a 3 per cent increase for that category in that year. If instead the budget category saw a 10 per cent decrease, then that would be counted as a 17 per cent decrease after factoring in overall budget growth. While atypical, this approach is both necessary, given the historical context of our study, and, most importantly, it preserves the essential element of the analysis, which is to assess how governments reprioritize problems. Crucially, it has no practical effect on the shape of the budget change distributions, which is our concern. It simply centres the change on an annual value of zero per cent growth, whereas in fact the average growth could have been higher. As our concern is whether the shape is close to normal or has high kurtosis, shifting the mean in this manner is not a concern. And it comes with the substantial advantage of allowing us to compare cases with wildly divergent currency values and inflation rates.
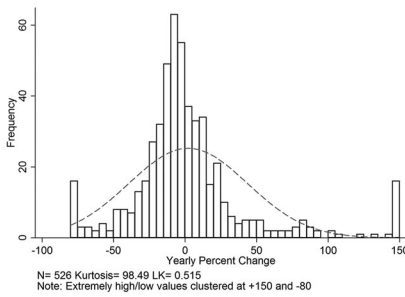
We pool percentage change values into distributions for each country and each Freedom House score. The histogram bars simply represent the number of cases in which a given budget was changed by x per cent, compared to its value in the previous year and the rate of overall government growth. Table 2 summarizes the results and Figure 1 presents the corresponding distributions. Budgeting in each country follows a punctuated equilibrium pattern, with a tall central peak (indicating the predominance of incremental changes) and very wide tails (indicative of dramatic spending changes). This pattern is especially pronounced in Turkey during the 'Partly Free' period and least pronounced in Brazil during the 'Free' period, where the budget distributions come closest to the normal. L-kurtosis is a standardized version of kurtosis that is robust against the disproportionate effects of outlying values. A normal distribution has an L-kurtosis of 0.123, with higher values indicating greater leptokurtosis. Looking at the L-kurtosis values in Table 1 confirms the visual evidence from the figures: budgeting is leptokurtic.

Evidence supports the information hypothesis rather than the institutional hypothesis in all three cases. In each country the transition toward greater freedom (and a more open system of government) corresponds with a
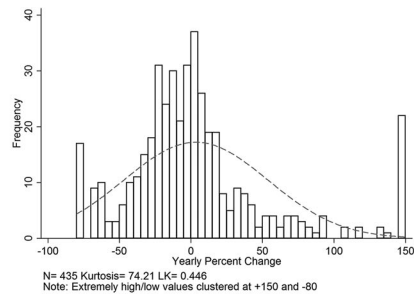
Table 2. Kurtosis by Freedom House rankings.

Country	Time period	N	Kurtosis	L-kurtosis
Russia				
Partly Free	1998–2003	435	74.21	0.446
Not Free	2004–2006; 2010–2014	526	98.49	0.515
Turkey				
Partly Free	1970–1972; 1979–2004	746	457.00	0.706
Free	1973–1978	161	95.39	0.657
Brazil				
Partly Free	1972–1985; 1995–2001	979	87.36	0.354
Free	2002–2010	575	231.39	0.321

A) Russia, Not Free.

N= 526 Kurtosis= 98.49 LK= 0.515
Note: Extremely high/low values clustered at +150 and -80

B) Russia, Partly Free.

N= 435 Kurtosis= 74.21 LK= 0.446
Note: Extremely high/low values clustered at +150 and -80

C) Turkey, Partly Free.

N= 746; K= 457; LK= 0.706
Note: Extremely high/low values clustered at +150 and -80

D) Turkey, Free.

N= 161; K= 95.38; LK= 0.657
Note: Extremely high/low values clustered at +150 and -80

E) Brazil, Partly Free.

N= 979 Kurtosis= 87.36 LK= 0.354
Note: Extremely high/low values clustered at +150 and -80

F) Brazil, Free.

N= 575 Kurtosis= 231.39 LK= 0.321
Note: Extremely high/low values clustered at +150 and -80
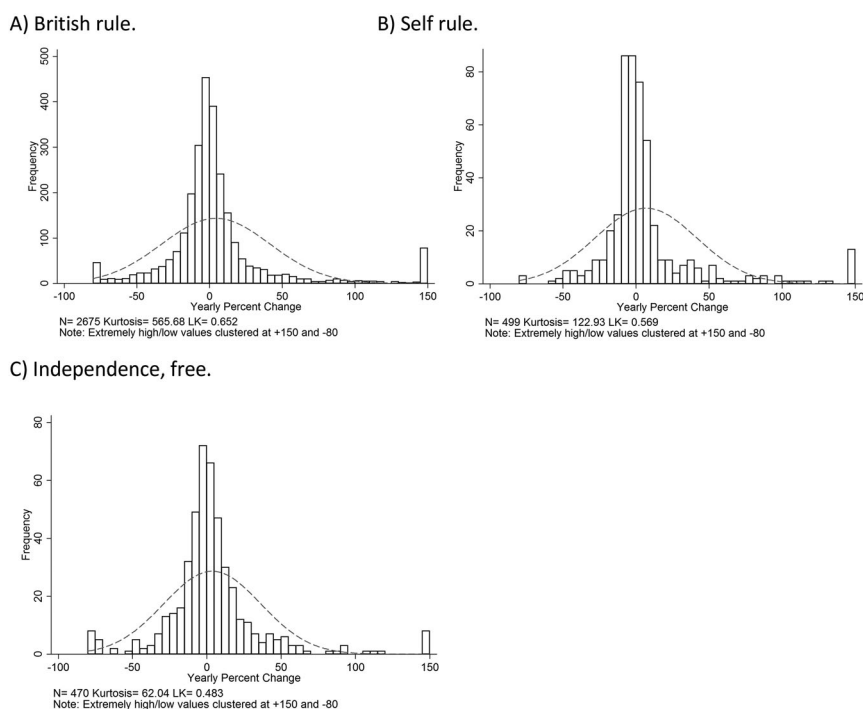
Figure 1. Change distributions by Freedom House rankings.

drop in L-kurtosis, indicating a lower magnitude of punctuation during these periods. While the differences in L-kurtosis are only modest, they all point in the same direction. Furthermore, these findings are consistent with evidence presented by Lam and Chan (2015) that L-kurtosis is lower during periods of democratic governance. Collectively the results are compelling and suggest that democratic structures provide a powerful informational advantage, which conditions the policy-making process.[12] Note, however, that greater freedom is not so important as to outweigh other inter-country differences.

For example, the budget distribution during the 'Not Free' period in Russia is still closer to the normal than the distribution for the 'Free' period in Turkey. Political freedoms are important, but we still have a long way to go in explaining budgetary patterns across countries.

Colonial and independent Malta

Malta was part of the British Empire from 1826 until 1964 and because the British kept detailed management records of all their colonies, it is possible to assemble budget data for Malta during almost the entire colonial period. This is what we do. We assembled the dataset referencing the original colonial 'Blue Books' for the period 1827–1936. To our knowledge, this is the first test of PET in a colonial setting. It also provides a further test of our hypotheses. Malta was granted home-rule by the British in 1921, so while still a colony, this marked an important transition toward a more open and participatory form of government. We can therefore divide the colonial era into two periods, with the expectation that political freedoms should be greater during the period when the Maltese people could run their own government. Finally, we complement our analysis of the colonial period with recent data

Figure 2. Colonial budgeting in Malta.

covering the decade 2001–2011 that we obtained from Malta's National Statistics Office. We can thus compare colonial with independent Malta, a fully free country – and for most of the time covered, also a member of the European Union. In this way, we can replicate the study of the effect of transition to full democracy on the case of Malta. Figure 2 shows change distributions for these three periods.[13]

During the period of British rule, the L-kurtosis associated with the distribution is 0.652, but when the Maltese gain greater autonomy through the transition to home rule L-kurtosis is 0.569. L-kurtosis is even lower (0.483) during the 2001–2011 period, after full consolidation following independence and transition to democracy.[14] This continues the trend established by the previous analysis. As governments transition toward greater freedom, their budgetary processes gain stability. Gains in informational capacity provided for by democratic structures seem clearly to outweigh any institutional efficiency afforded by authoritarian government. Our information hypothesis is confirmed and we can reject the efficiency hypothesis.

Conclusion

A robust literature has now explored PET with regard to budgeting, but that literature has almost exclusively been focused on advanced industrial democracies, with some attention to subnational budgets (e.g., states, municipalities and school districts) within these nations. Here we present just the second example of detailed attention to the shape of budgetary change in non-democratic settings, building on the work of Lam and Chan (2015) and Chan and Zhao (2016). This focus has revealed systematic differences in the way that democracies and non-democracies process and respond to information. Studies of Western governments have taken findings of budgetary punctuations as evidence for the disproportionate processing of information by policy-makers and we find that these punctuations are even more pronounced in the context of non-democracy. This suggest that when it comes to information processing and response, democratic governance has an advantage over more authoritarian forms.

We hope to expand on the analysis presented above, which must first start with more data collection in non-democratic systems, as well as exploring the various mechanisms democratic and authoritarian regimes use to gather information and act on it. In particular, as we collect more data from different types of regimes, it may be possible to pinpoint particular institutions or civil rights that affect the informational capacity of governments, and subsequently their decision-making processes. In addition, we hope to collect more nuanced data on other variables of interest – particularly economic instability – in order to exclude alternative explanations for distribution

differences across regime types. We also note that there is great inter-state variation in the shape of budgetary change distribution – variation that a focus on political regimes appears insufficient in explaining. Ultimately, we would hope to gain a better understanding of all factors – political, social or economic – that affect the stability of government agendas.

Notes

1. Existing PET scholarship underscores the fact that electoral change is not the only – or even primary – driver of policy change: 'policy changes frequently stem from the emergence of new information or changes in the social or economic environment that are not so simply related to the electoral process' (Baumgartner *et al.* 2011: 948). That these processes are also found in non-democratic systems should temper any surprise at the distributional similarity of budget allocations across regime types.
2. Recent literature on information in non-democracies has focused on authoritarian élites' proclivity for opacity, with measures of regime transparency drawing on the extent of fiscal information disclosure (see Boix and Svolik 2013; Hollyer *et al.* 2011; Wehner and de Renzio 2013). In other words, the existing literature has looked predominately at data dissemination, rather than information collection.
3. To be sure, all regimes – regardless of electoral conditions – are interested in monitoring societal conditions, as well as the opinions of its citizens. Moreover, all attempts to collect and analyse data are hampered by doubts about whether reports by subjects reflect sincere attitudes. However, there are good reasons to believe that non-democratic regimes face particularly acute epistemic limitations.
4. Existing PET scholarship shows how much these institutional barriers matter when it comes to policy punctuations. Studies show that kurtosis is substantially higher for outcomes produced at latter stages of the policy process, where the cumulative effect of institutional friction is greatest (Baumgartner *et al.* 2009; Jones and Baumgartner 2005).
5. Chan and Zhang (2016) make the same point, but write of the information disadvantage of authoritarianism, rather than the informational advantage of democracies.
6. An alternative specification of the theory, with identical empirical expectations, would be as follows: in any complex system of government, decision-makers under-respond to information signals from their environment that are below some threshold of urgency. Above that threshold, where their attention is focused, they over-respond. The result of this under- and over-response to signals based on their intensity generates a punctuated-equilibrium pattern of high stability in most policy domains most of the time (e.g., hyper-incrementalism) and large changes in a few domains where the signal suggests a possible crisis or need to 'catch up'. As democratic regimes have an informational advantage (meaning they receive more signals), the degree of kurtosis there will be lower.
7. These dates correspond to calendar years of budget law passage, rather than fiscal years for planned budget spending. In the United States (US), the Office

of Management and Budget categorizes government expenditures into broad functional and more detailed sub-functional categories. The data for Russia, Turkey, Brazil and Malta are grouped into categories that are roughly analogous to the US sub-functions; that is, the categories relate to relatively specific programmatic areas. For example, in Malta there are categories dedicated to 'care of the elderly' and 'airport development'. The online appendix includes more details about data sources and composition.

8. The number of observations reported in Table 1 relate to the number of spending category figures available, whereas the number of observations reported in later tables relate to percentage change figures.

9. One possibility that cannot be discounted with the data currently available is that authoritarian regimes hide major shifts in spending (either increases or cuts) by repressing budgetary records for the year in question. As Table 1 makes clear, there are gaps in our times series. If anything, it seems more plausible that regime elites would be more likely to censor unpopular major shifts than incremental spending changes, although we have no evidence to back up this assumption. As a result, even if these same elites were to publicize popular major shifts in expenditures, the exclusion of unpopular large shifts would work against our expectations regarding the level of kurtosis. Put differently, it is plausible to assume that observed kurtosis levels would be even higher in authoritarian regimes if we were to include currently unavailable data.

10. Another option would be to aggregate upward by combining smaller programmatic areas of the budget into broad categories such as defence, social welfare and agriculture. We found, however, that this leaves too few observations of budgetary change to draw reliable distributions.

11. The exception is Brazil, where there is an agreed upon 'roadmap' for adjusting historic currency values for inflation. For Brazil, we therefore calculate percentage changes using inflation adjusted amounts; the standard practice. Results for Brazil are robust to these specification issues.

12. The online appendix replicates these findings for Brazil and Turkey after excluding periods of economic turmoil from the data. (For Russia, periods of economic upheaval are an approximate match to the periods of missing data.) A concern would be if budgetary instabilities correspond with economic distributions and that in turn these disruptions are more likely during authoritarian governance. We find that excluding these potentially problematic years does not substantively change the results.

13. For Malta, kurtosis scores associated with the democratic period are highly sensitive to the inclusion of small expenditure values. This is always a concern when estimating the kurtosis of percentage change distributions. It is easier for policymakers to make a large change to a small base value, but these instabilities are less reflective of true policy punctuations than random fluctuations around a small number. Frequently, analysts will address this problem by excluding small base values and this is what we do here, dropping expenditures less than $1 million euros from the Malta analysis. Similar diagnostics are conducted for each country, but in these cases kurtosis scores are robust to this issue.

14. That the data are unbalanced in the sense that there is sometimes more data for the non-democratic periods (Russia, Brazil and Malta) and sometimes more for the democratic periods (Turkey) should not affect the results. There are sufficient observations in each period to draw statistically meaningful distributions and thus any systematic differences in budgetary behaviour should reveal themselves.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Frank R. Baumgartner is the Richard J. Richardson Professor of Political Science at the University of North Carolina, Chapel Hill.

Marcello Carammia is a senior lecturer at the Institute for European Studies of the University of Malta.

Derek A. Epp is a postdoctoral fellow in the Nelson A. Rockefeller Center at Dartmouth College.

Ben Noble is a junior research fellow at the University of Oxford, New College.

Beatriz Rey is a graduate student in political science at Syracuse University.

Tevfik Murat Yildirim is a graduate student in Political Science at the University of Missouri in Columbia.

ORCID

Marcello Carammia http://orcid.org/0000-0002-3864-8756

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