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Are Constitutional States Able to Drive the Global Technological Change?

By Krzysztof WASNIEWSKI †

Abstract. The present paper aims at assessing the possible efficiency of the principle of national contributions, assumed in the 2015 Paris Framework Convention on Climate Change. Strong historical evidence indicates that any significant development of constitutional states used to take place, in the past, on the rising tide of demographic growth. Presently, we are facing global demographic slowdown, and contesters argue that constitutional states are not the right address to write to if we want breakthrough technological change. This paper assumes that the capacity of constitutional states to carry out the obligations declared in the Framework Convention, i.e. to carry out deep technological changes in the global economy, depends on their economic power, which can be estimated as their capacity to appropriate capital. Empirical data, examined in this article, indicates that since the 1980s, constitutional states have been losing their economic power, and that the overall technological progress is more and more disconnected from that economic power of governments. Moreover, constitutional states seem to be losing their capacity to experiment with their own institutions.

Keywords. Institutions, Constitutional state, Political economy.

JEL. H00, H10, H30 H80.

1. Introduction

December the 12th, 2015, the Framework Convention on Climate Change was signed in Paris, under the auspices of United Nations. It marks an important step in facing the seemingly biggest challenge for our civilisation, namely the passage from fossil fuels to renewable energies, as well as the implications of the already happening climate change. The Framework Convention is based on the concept of nationally determined contributions, from the part of signatory states. Thus, constitutional state seems to be the pivotal structure of economic governance as the mankind is facing probably the biggest challenge in its history: the climate change. Yet, some contesters argue that the constitutional state is not really the best structure for handling significant, civilizational challenges (see for example: Heath, (1957); McCallum, (1970); Steinberg, Nyman, & Caraccioli, (2011); Friedman, & Taylor, (2010)). A general question emerges: will that philosophy of national contributions work as for handling the climate change? In other words, are the constitutional states really able to endorse the role of dominant social structures in facing that huge civilizational challenge that we are facing right now?

† Modrzewski Kraków University, Faculty of Management and Communication Sciences, Kraków, Poland.

☎. + 48 601 48 90 51

✉. kwasniewski@afm.edu.pl

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The most fundamental assumption behind this general question is that at the global scale we can talk about the state as a distinct type of social structure, different from corporate or cooperative structures. Thus, the actual outcomes of the 2015 Framework Convention in Climate Change depend on the general properties of that typical structure, and not just on a more or less random, individual capacities of each constitutional, national state taken separately. This specific point of view is essentially consistent with both the works of Max Weber (1978), and with the French historical school. The latter claims that in the European culture, significant institutional changes leading to the emergence of the presently known constitutional state took place on the rising tide of demographic revivals after major demographic slumps, associated with big waves of technological change. There were three such big revivals after big depressions (see for example: Braudel, (1981); Braudel, (1983)). The first one is to notice between 1100 and 1350, and it was that mounting flow of population that made the background for the first entity recognized as a modern state, namely to the kingdom of Two Sicilies under Frederick II (1194-1250). During this period, Europe developed its system of agriculture and food supply. That system reached the limits of its capacity about 1350. Between 1350 and 1450, the European continent experienced a significant demographic and economic depression. The trend reversed after 1450, and it was the turn of wind power and waterpower to be harnessed with the technology of mills. That technological wave was associated with another leap in the institutional development of the state: it was precisely when the three monarchs that Francis Bacon called 'Three Wise Men', namely: Henry VII Tudor, Louis XI of France, and Ferdinand of Spain, created really modern states, with armies, financial systems and distinct administrative structures. After 1650, until about 1750, Europe experienced still another demographic depression, and we can notice that the pattern of constitutional, republican state that we know today emerged only after 1750, and its emergence was associated with the development of large – scale industry. It is to notice that each of the big technological waves in question required an important reallocation of capital. The institutions of the state could be possibly an active participant in such reallocation. Some theorists even go to claiming that state as an institution mostly developed in order to provide accurate protection and robustness to private property rights (see for example: Schlatter, 1951).

Currently, we are living a period, which, fault of a better word, can be called 'global slowdown'. Some civilizational processes – demographic growth, economic growth, urbanization, productivity growth, human mobility, inflation - have been developing over many decades, and now, whilst still having some momentum, they seem to slow down. Demographic growth of the global population, as measured by the World Bank, was of 1,2% in 2014, as compared to 1,73% in 1990. On the other hand, the global capital stock, estimated currently at some 250 quadrillions of constant 2005 US\$, grows faster than the global GDP. In 1950, global capital stock made 2,43 times the global GDP. In 1990, that proportion climbed to 2,62 times, and reached 3,32 in 2011. On the other hand, aggregate depreciation of the capital stock makes a growing share of the global GDP. In 1990, it was 10,59%, and in 2011 that share was of 13,44%. The global economy accumulates more and more capital, and compensating the obsolescence of the corresponding assets gains in macroeconomic importance. The average, national, Total Factor Productivity (TFP), measured in constant prices of 2005, stopped growing consistently in the mid 1960s. Since then, the TFP oscillates and seems unable to break the ceiling of $TFP = 1,07$. Currently, it seems to be at around 1,04, on average, in the global economy. Thus, the prospects for consistently

increasing productivity through innovation seem quite vague¹. The current macroeconomic landscape seems disquieting. Economic growth is slow, and likely to slow down even more. Deflation, especially in the prices of raw materials and fossil resources, becomes a fact. On the whole, more threats than opportunities loom at the horizon (IMF, 2015). Some experts say directly that global growth falls short of expectations (World Bank, 2016a). According to the World Trade Organization, growth in global trade since 2011 through 2014, and in the first half of 2015, marked a historical slowdown. Up until 2010, global trade used to grow twice as fast as global GDP. Since 2011, that pattern seems to have been broken, and trade has been growing at a pace close to that of global output (WTO, 2015). Focused studies, conducted by the World Bank, regarding the global outcomes of digital technologies, show that the global diffusion of digital technologies is rather a somehow sluggish evolution, instead of being the so-called 'digital revolution'. Gains from the implementation of digital technologies have been clearly lagging behind the dissemination of technologies themselves. The quality of institutions that the experts call 'analog complements' significantly impacts the outcomes of digital technologies, and frequently prevents local populations from fully exploiting the benefits of information & communication technologies (World Bank, 2016b).

The socio – economic landscape looks very much like the Schumpeterian phase of 'prolonged depression' (Schumpeter, 1939). It is also quite close to the hypothetical state of negative return on investment, as described by John Maynard Keynes in Chapter 16 of his '*General Theory of Employment, Interest, and Money*', entitled '*Sundry Observations on the Nature of Capital*'. Keynes argued that in such a situation the state should intervene in order to create a new allocation of capital. Schumpeter demonstrated, with the example of economic developments observable in the 19th century, that governments can successfully leverage technological changes, but they have to give away some of the sovereign power to the benefit of private business structures (Schumpeter, (1939) op.cit., chapters VI – VIII).

2. The theoretical model of the state

We are a learning species, and we have the capacity to accumulate the outcomes of learning from generation to generation, although that accumulation is imperfect (see for example: Selten, (1975). As a species, humanity has collective intelligence through interaction and experimentation, i.e. it has the capacity to generate new, functional patterns of collective behaviour by experimenting with various strategies and sharing information about their outcomes. If two armies fight, and one of them loses, whilst the other wins, the fact of loss and victory is information, which is being shared across the society. It serves to organize more efficient armies in the future. When two businesses compete, they display various capacity of acquire capital, and to assure a return on it. The very fact of that variety is information, which is shared around and serves to optimize future business patterns. Thus, any social structure, the mankind as a whole included, has the capacity to adapt to natural (i.e. non-social) conditions, and any such structure, government included, can be considered as one more step in learning through experimentation. Collective learning is a game with imperfect information with the sharing of information: each set of institutions is an experiment with finite duration, and the outcomes of that experiment feed to another experiment. A sequence of

¹ These calculations were made on the grounds of Penn Tables 8.1, as introduced in: Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015), "The Next Generation of the Penn World Table" forthcoming in American Economic Review, available for download at www.gdpc.net/pwt

consecutive moves in the game is needed to work out the given functional pattern. Many sequences can be practiced in parallel. The more breakthrough that pattern is supposed to be, the greater is the uncertainty as for the number of moves in the sequence, and for the number of parallel sequences. The range of different sets of institutions, observable at a given moment, is the measure of experimentation taking place. The more different institutional patterns are there at the same moment, the more intense the experimentation is. The greater intensity of experimentation at a given moment, the greater is the likelihood of working out new functional patterns in a given time.

Institutions can do only what people actually do. Institutions rely on legal rules, combined with other types of social norms. All of these, in turn, come out from a linguistically logical grasp of reality (Hodgson, 1993; 2000; 2006; Searle, (2005). Consistently with Herbert Hart's theory of law (Hart, 1961), and with Talcott Parsons' sociological theory (Parsons et al., 1965), social norms are institutionalized patterns of behaviour, that manifest themselves in social strategies formed and used by individuals and social groups, in a context of imperfect information (see for example: Harsanyi 1953; 1966; 1967; 1968).

Constitutional states are able to do things that they are allowed to do, and have the material means to carry out. Thus, we are talking about equilibrium between legitimation and economic power, in the government. Institutions emerge in a discursive process of legitimation for the given pattern of political action (see for example: Habermas, 1975; 1979; 1996; Fraser, 1990). The political system itself has two speeds. On the one hand, political action provides for the interests of major social groups represented through current modification of institutions, and in that process the government appropriates capital in order to carry out the actual public mission (see for example: Weingast et al. 1981; Weingast, 1995). The capital possible to appropriate by the state may be considered as a rough equivalent of territory, with respect to Max Weber's theory (see for example: Weingast, 1981). On the other hand, the political system itself has significant inertia, as distinct political players in the system have to agree for the action to take (see for example: Tsebelis, 2002). Hence, institutions adapt imperfectly to their socio-economic and natural context (Andersen, 2004; Aoki, 2007).

Any constitutional state in place can be described with two types of rational variables, pertaining to the two fundamental functions of the state, namely appropriation of capital and creation of public goods. The former can be estimated with the proportion between public expenditures, and the available capital stock, and the latter, consistently with Braudel (1983) can find an expression in the proportion between demographic growth and the growth of public expenditures. Additionally, in the initially introduced context of this article (coping with climate change), measures of correlation between technological progress and public expenditures can be introduced as indirect indicators of public goods created by state. The temporarily expected values of those indicators (e.g. averages), in a cross-sectional approach, set the central trend of change in the economic role of the state. The temporary dispersion (e.g. variance, distance between quartiles' frontiers etc.) in the same variables can help to estimate the temporary diversity, hence the intensity of experimentation with public governance.

3. Empirical insight– the general landscape

The well-known statistical database of Penn Tables, in their 8.x generation, recently returned to measuring national capital stocks (see: Feenstra, Inklaar, & Timmer, 2015). That great source of information, covering a relatively long period, since 1950, seems appropriate to sketch the empirical landscape for this article.

Graph 1, in the Appendix, shows the trends of indexed values in two variables: the total capital stock in the global economy, and the total public expenditures. The correlation seems almost perfect up until 2002, when the global capital stock seems to gather value visibly faster than global public expenditures. On the other hand, both aggregates can be compared to each other, i.e. public expenditures can be computed as a share of the capital stock. Graph 2 (Appendix) shows the 1950-2011 trend of that ratio, in two alternative versions: aggregate and distributive average. Both measures seem to be strongly correlated and follow the same trends, with three distinct periods. From 1950 to the mid-1970s, governments appropriate a growing share of the capital stock accumulated. That period roughly corresponds to the widespread tendency to apply Keynesian economic policy in the developed economies. Between the mid-1970s and the mid-1980s, a short saddle is visible: the public sector first recedes, then advances. These are the first years of fashion for monetarism in economic policy. After 1985, when the so-called NCM model of economic governance starts to take root, the trend is clearly descending: the capital stock accumulates much faster than public sectors grow (see: [Taylor, 2011](#)).

It is interesting to descend at the level of cross-sectional comparison between countries, and Table 2 (Appendix) shows the average national ratios over 1950-2011. A pattern clearly comes out: the wealthier the country, and the bigger its economy, the lower that average, national ratio. The share of public expenditures in the national capital stock seems to target some kind of ceiling value, and not going above it. In other words, the public sector can appropriate a part of the total capital stock up to a point, and past that point capital accumulates in the private sector much faster than in the public one. It seems to be a case of target fiscal stance, according to the general concept formulated by Roubini & Sachs (1989). Formal econometric analysis in the data panel consisting of Penn Tables 8_1 yields allows a multiple, linear regression, explaining the share of public expenditures in the national capital stock with three input variables: GDP per capita, total GDP, and population (See Table 1, Appendix). With $N = 8278$ observations, that regression yields a linear equation with pretty good econometric fit ($R^2 = 0,465$, all coefficients significant at $p < 0,001$). The relative size of the national economy as measured by the GDP seems to discourage the appropriation of capital by the public sector. The bigger grows the output of the economy; the lower descends the appropriation of capital by the government. On the other hand, the demographic size of the country, and its relative wealth measured with GDP per capita both push the public appropriation of capital upwards.

Graph 3 (Appendix) shows the relative dispersion in the ratio of public expenditures to the national capital stock, as the spread between the 1st and the 99th percentile, from 1950 through 2011. Between 1950 and 1976, the spread had been growing sharply: there had been more and more experimentation as for the actual capacity of governments to appropriate capital. After 1976, the trend reversed, and since then dispersion has been decreasing, which suggests a lowering tendency to experimentation.

A pattern emerges: the observable growth or decline in public appropriation of capital is clearly correlated with the degree of experimentation with said appropriation. In that process of experimenting, countries from the upper percentiles visibly hit a ceiling, and bounced back. That ceiling seems to have been situated somewhere between 18% and 20% of the national capital stock 'vacuum cleaned' through public budgets, or, in terms of cross-sectional distribution, somewhere around 1,4 percentage point above the least appropriating governments.

The most fundamental demographic change is the change in size. Hence, the next step in our investigation is the basic comparison of trends in, respectively, population and aggregate public expenditures at the global scale. Graph 4

(Appendix) shows those trends as 1990-based indexed values, on the grounds of Penn Tables 8.1. From 1950 until the mid-1990s those two indexes had been following a very similar trajectory. After 1996, global public expenditures started to grow significantly faster. Graph 5 (Appendix) gives an idea of dispersion public expenditures per capita, as measured in constant 2005 US\$. Three periods can be distinguished. From 1950 to 1978, the spread between the 1st and the 99th percentile of that variable had been quickly growing, up to some 15 000 constant 2005 US\$. After 1978, through 2006, a period of quick changes in dispersion followed, as if some governments had recurrently attempted to break some kind of frontier, with changing success. After 2006, dispersion restarted to increase.

One measure has been chosen in the present article to appraise the overall technological progress of humanity: agricultural productivity. Innovation is commonly associated with the most advanced technologies, and agriculture does not really fit the bill. Yet, as we study the diffusion of innovation as a process of spill-over, from the most advanced fields of technology, down to the most day to day activities, agriculture is somewhere at the bottom of that fountain of new ideas. Farming is tough, and it requires all the necessary skills and resources to be grouped in one place, i.e. at the farm. When technological advances arrive to the agricultural sector, they must have been preliminarily, fully absorbed in the social structure. Agricultural productivity encompasses energy use as well, or, in other words, the ability to save energy. Agriculture consumes energy, both directly, and indirectly, in the form of fossil fuels, electricity, and embodied in intermediate goods. Agriculture yields rather a low value added, and every penny counts when it comes to counting the costs. Saving energy is important to any farmer. Thus, agricultural productivity is a measure of energy efficiency in human activities, as well. Graph 6, in the Appendix, shows the previously introduced share of global public expenditures in the global capital stock, against the trend in cereal yield (kg/ha), as published by the World Bank. Both measures are shown as trends indexed on the constant basis of 1990 values. Up until the early 1990s, those trends seem to have been strongly correlated. Since then, the correlation has broken, and agricultural productivity has been growing despite the shrinking participation of the public sector in the available capital stock. Graph 7, in the Appendix, completes the picture by showing the relative dispersion over time, in agricultural productivity, as the spread between the 4th and the 1st quartile. Interestingly, up until 2006 that spread had been increasing very gently: the most productive countries were quite close to the least productive ones. After 2006, some kind of technological revolution took place, and the upper quartile rocketed up, leaving far behind the followers.

The economic role of constitutional states has certainly evolved. It is interesting to put that economic change against the background of political institutions. In that respect, the Database of Political Institutions, (DPI), as published by the World Bank (Beck et al., 2001; Keefer, 2012) provides some interesting observations as for the intriguing period since 1975. Following Tsebelis (2002 op. cit.) it is assumed that political systems have two intertwined structures: the constitutional, and the partisan one. At the strictly constitutional level, the DPI distinguishes three basic systems: parliamentary, presidential, and those with assembly – elected presidents. In the same constitutional perspective, the DPI provides two variables, namely ‘LIEC’ and ‘EIEC’, which are rough estimates as for the degree of democracy in the appointment of respectively the legislative, and the executive bodies. The higher the value of ‘LIEC’ or ‘EIEC’ index, on a scale from 1 to 7, the greater the probability that democratic standards are respected. Since 1975, the DPI displays a growing average value in both indexes, and a decreasing variance. As rough as the sketch is, constitutional states seem to have been becoming

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consistently more and more democratic, and the degree of experimentation in that respect clearly declined. The 'POLARIZ' variable in the DPI shows the degree of partisan polarization in political systems, with respect to economic policy. The scale of polarization is highly discreet, ranging from '0' (no observable polarization), through '1' (moderate), to '2' (high). It is to notice, in the first place that the '0s' keep on prevailing in the DPI. Most political systems in the world, currently 109 out of the 145 reported, display no substantial partisan divergence in the matters of economic policy. Yet, since 1975, the share of '1s' and '2s' has increased. As astounding as it could seem, most flamboyant debates about economic policy, observable in national assemblies and the media, most frequently boil down to quite amorphous economic programs.

It is interesting to confront the data about political institutions with the relatively current fiscal developments, as reported by the International Monetary Fund in its World Economic Outlook database (WEO), as published in April 2015. The DPI and the WEO put together cover the period between 1980 and 2012, and allow an interesting insight into current the typical fiscal stance in typical political frames. In order to represent the basic constitutional structure of political systems, two variables have been selected in the rich structure of the Database of Political Systems. The first is the type of political system according to the presence and powers of the president, coded in the DPI as 'system'. The second is the type of electoral competitiveness in parliamentary elections, covered by the variables 'plurality', and 'proportionality' in the DPI.

The distinction between presidential systems, and the parliamentary ones takes into account two main categories of veto players: institutional, and partisan. In other words, veto players can emerge and change their relative impact upon the system following to patterns: the regulatory, constitutional definition of their role, and the discretionary freedom of political action offered by that role. In presidential systems, the president is a strong veto player, and tends to concentrate power in their hands. Conversely, parliamentary systems are based on diversified and dispersed political power, without that one central veto player in the presidential seat. Systems with assembly – elected presidents are an interesting hybrid of the two, probably prone to balance towards the concentration, or the dispersion of political power, following the personal talents of the president in place.

The general assumption is that regimes with a strong component of electoral plurality favour "winner-takes-it-all" elections. This, in turn, promotes the interests of big, strong political parties, making them strong veto players, and reduces the veto playing positions of small parties. In other words, plural electoral regimes tend to reduce the overall number of partisan veto players, but they confer important impact to the players who manage to enter the scene. On the other hand, proportionality in elections allows a broader representation of small political parties and non-partisan representatives in the legislative body. That creates more veto players with more disparate political power.

As for the partisan structure of the political system, the most general variable in the DPI seems to be political polarization, already mentioned. The detailed composition of the sample of observations studied is given in the Appendix (Table 3). Just as in the full contents of the DPI, the sample studied is dominated by three big clusters: plural electoral regimes in presidential systems with no observable polarization (N = 233 observations), plural electoral regimes in parliamentary systems, with no observable polarization as well (N = 205), and strongly polarized, parliamentary systems with proportional elections (N = 213). This clustering suggests that plural electoral regimes favour the formation of partisan structures around groups of interest rather than around ideological stances. That appears as a logical consequence of the "winner-takes-it-all" principle in plural elections, which

favours big electoral funds and robust campaigns, and clearly discourages ideological discords. An interesting pattern emerges: national political systems tend to stay quite firmly within one pattern of constitutional order, over the period of observation, yet they frequently move between various cases of partisan polarization.

The next step of empirical investigation was to follow the disparities of typical fiscal aggregates across political systems. Fiscal aggregates have been divided into two categories, namely current and capital, following the basic intuitions of the present research. The structural fiscal balance, gross public revenues, and gross public expenditures are classified as current aggregates, i.e. rather flows than balances. Conversely, gross and net public debt is considered as capital measures (balances rather than flows). The differential between gross and net debt, namely the amount of financial assets held by the public sector, is included in this category too².

As for gross public revenues, parliamentary systems are clearly tax-greedier than the presidential ones (Table 4, Appendix). They also seem much more sensitive to political polarization: any increase in that respect is connected to significantly higher public revenues. Gross public expenditures follow a similar pattern, and yet, within each constitutional order, they seem much more sensitive than revenues to shifts in political polarization. The observation of structural fiscal balances seems to indicate that the shift from no observable polarization to moderate one has more impact than a further deepening of polarization from moderate to high.

Variables referring to capital accruals in the public sector display a significantly greater disparity across political systems than current flows do. In other words, the empirically observable differences between political systems as for their patterns of capital appropriation are noticeably more pronounced than differences referring to current fiscal management (Table 5, Appendix).

Following the observable clustering of political systems in the sample studied, three “big” types are defined for the purposes of further empirical investigation. They are:

- a) *Cluster #1*: Presidential systems with plural elections, and no observable political polarization: structural balance -2,651% of GDP, gross public indebtedness 55,186% of the GDP, financial assets held by the public sector 9,151% of the GDP
- b) *Cluster #2*: Parliamentary systems with plural elections, and no observable political polarization: structural balance -3,643% of GDP, gross public indebtedness 70,739% of the GDP, financial assets held by the public sector 23,165% of the GDP
- c) *Cluster #3*: Parliamentary systems with proportional elections and high political polarization: structural balance -3,089% of GDP, gross public indebtedness 62,025% of the GDP, financial assets held by the public sector 46,771% of the GDP

The definition of those 3 clusters shows even more sharply the explanatory power of capital appropriation as a characteristic of political systems. The interesting, general observation is that cluster #1, which hosts the least veto players in the system, seems to be the most frugal in fiscal terms, both with respect to

²The author is aware of the conceptual risk connected to that variable. Those financial assets include, for a large part, those held by central banks as monetary reserves. Thus, this could be a monetary variable rather than a fiscal one. Yet, the amount of those financial assets in public hands is not exclusively monetary, in the first place, and, secondly, it impacts significantly the fiscal, borrowing capacity of the government. Hence, this is a variable at the fringe of fiscal policy, and the rest of the economy.

current fiscal management, and to capital appropriation. Any shift from this cluster, thus any addition of veto players, through constitutional rules or partisan polarization, is clearly associated to more profusion in fiscal stances. Considering constitutional and partisan distinctions as an overall indicator of the number of veto players in the system, we can roughly consider clusters #1, and #3 as the opposite poles of the scale, with cluster #2 found somewhere in the middle. Cluster #1 has probably the least veto players, cluster #3 has the most of them, and cluster #2 is a medium case. Following this intuition, the presence of more veto players in the political system is associated most of all to a much greater tendency of the public sector to accumulate liquid financial assets.

4. Final discussion

The most general conclusion coming from the empirical investigation is that constitutional states, as a distinct category of social structures, are becoming simpler and more recurrent in their internal, political mechanics. Constitutional states do not really experiment a lot with themselves. It seems that whole societies clearly prefer bespoke to tailor made, as political systems come. We the humans clearly prefer well-rounded, ready-made patterns of collective organisation to uncertain outcomes of experimentation. It had not always been so. Between 1950 and 1980, constitutional states seem to have gone through a period of intense experimentation, chiefly on the tide of decolonisation and development of international organisations. Observation of long term trends suggest that it was precisely that period of intense experimentation that brought a temporary expansion of constitutional states in their economic power, thus in their capacity to implement any significant technological progress. When political experimentation started to turn into increased repetition of already known patterns, constitutional states progressively lost their grip upon the capital stock available. The relative position of national governments as economic players, vis a vis other types of social agents, seems to have settled as much weaker than in the 1990. Constitutional states, as a distinct category of social structures, are generally successful as guarantors as for the enforceability of claims and property rights. Yet, the same constitutional states generally failed to accumulate substantial capital on their own account. With rare exceptions of important state owned assets (e.g. Canada, Russia, Finland etc.), most governments can only achieve temporary retention of capital through a pattern of governance known as ‘budgetary slack’ (see for example: [Goldman, & Brashares, 1991](#)). For the last two decades, capital seems to accumulate chiefly outside the public sector. National economies experiment less and less, too, with the capacity of the state to appropriate capital. On the other hand, experimentation does go on as for the correspondence between public expenditures and population. Global public expenditures are growing faster than the number of people to spend money on, and that discrepancy is to notice since the 1990s. Public expenditures per capita, computed at the national level, display a growing cross-sectional dispersion. Some countries still attempt at maintaining the welfare state, but those attempts are becoming more and more isolated in comparison to the global average.

Constitutional states are progressively becoming superfluous in promoting technological progress. The latter seems to follow logically from the former: public expenditures disconnect from technological progress because there is more and more capital available outside the budgetary cycle of governments.

The state, as a type of social structure, develops on a rising tide of demographic growth. At first, in that process, public institutions are really functional regarding the needs of the growing population. Yet, the appropriation of capital by public

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agents progressively becomes autonomous regarding the strictly spoken demographic needs. The phenomenon of ‘pervasive state’ appears: appropriation of capital by public agents starts to be dysfunctional and self-propelled. The state progressively stops to redistribute capital, and starts creating undistributed pockets of capital with uncertain property rights, subject to discretionary power of politicians. Marginal productivity of capital suffers, probably because of the rising inflation and growing uncertainty as for the interest rates.

The state, as a functional social structure, builds up to a point, mostly determined by demographic factors. Past that point, the frontier between the state and the private sector becomes foggy. Institutions build up at the frontier between the public and the private, and they accumulate capital characterized by uncertain property rights. Those institutions become dysfunctional, as they de facto divert capital from both productive employment and social redistribution. This is the intuition expressed by many economists regarding the accumulation of public debt (see for example: [Meade, 1958](#); [Modigliani, 1961](#); [Diamond, 1965](#)). A point comes when the dysfunction of those foggy public institutions becomes so pronounced that the state loses its capacity to appropriate capital, and de facto backs off as a social agent.

Now, let’s return to the initial question of this article: are constitutional states able to assure the pivotal role in driving the mankind through the perils of climate change, as it is assumed in the Paris Framework Climate Agreement, 2015? The answer is: probably not, at least not now. Of course, constitutional states are able to experiment with themselves. Both the historical accounts, and the more recent trends prove that. Yet, the latest wave of experimentation, from the 1950s through the 1980s, required a prerequisite of two consecutive world wars. Constitutional states seem to be institutionally rigid, once they have settled into some precise form.

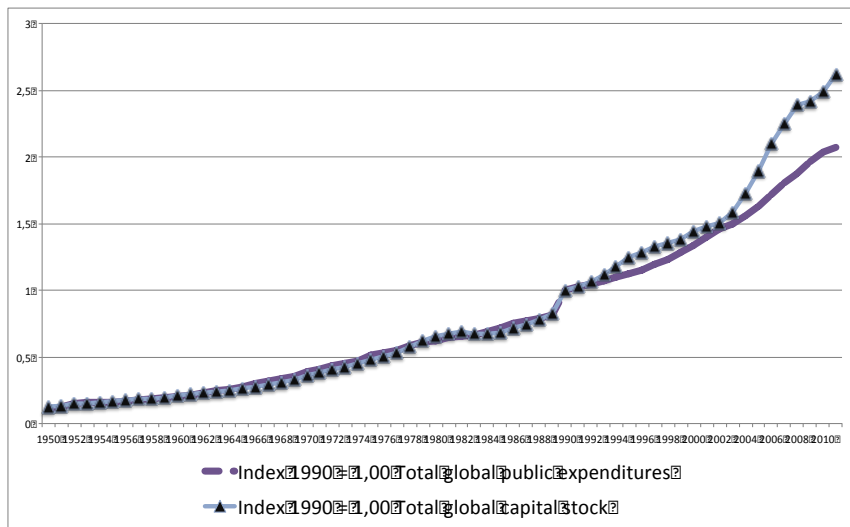
Appendix

Table 1.

Explained variable: $\ln(1 + \text{share of public expenditures in the national capital stock})$, linear OLS regression
 N = 8278
 R2 = 0,465

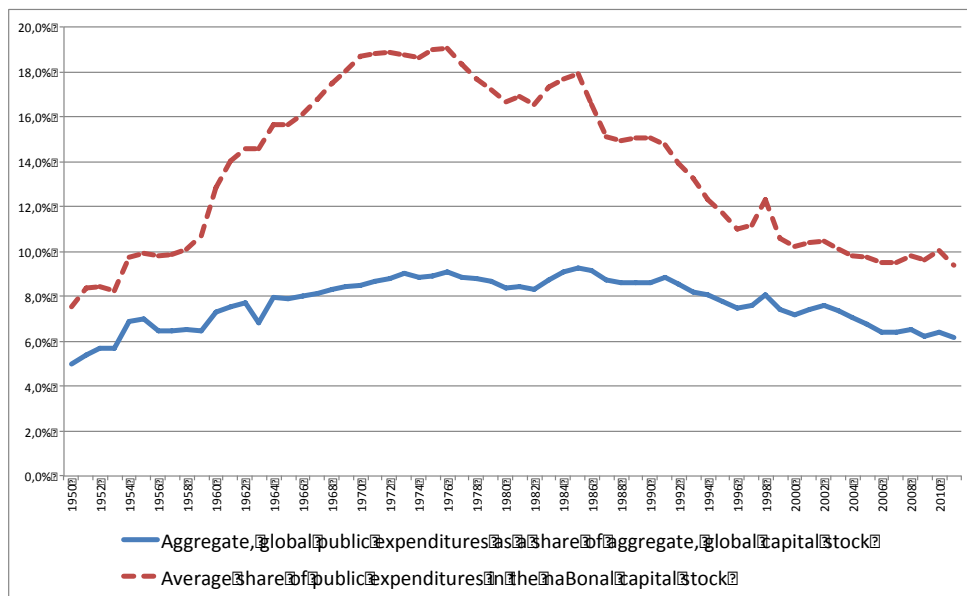
Explanatory variable	Coefficient	Standard error	t-statistic	p-value
$\ln(1 + \text{GDP per capita})$	0,089	0,004	23,159	0,000
$\ln(1 + \text{GDP})$	-0,084	0,004	-20,092	0,000
$\ln(1 + \text{population})$	0,101	0,005	20,057	0,000

Source: author's, on the grounds of data from Penn Tables 8.1., Feenstra, Inklaar and Timmer (2015)



Graph 1.

Source: Feenstra, Inklaar & Timmer (2015)



Graph 2.

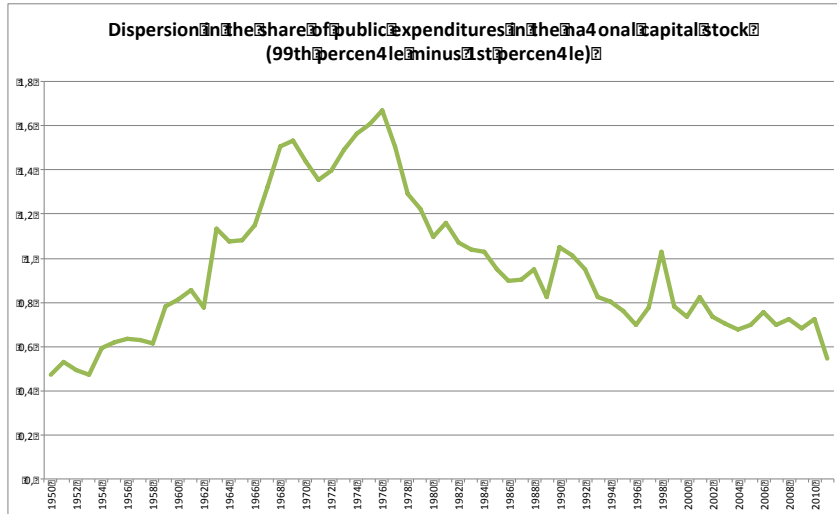
Source: Feenstra, Inklaar & Timmer (2015)

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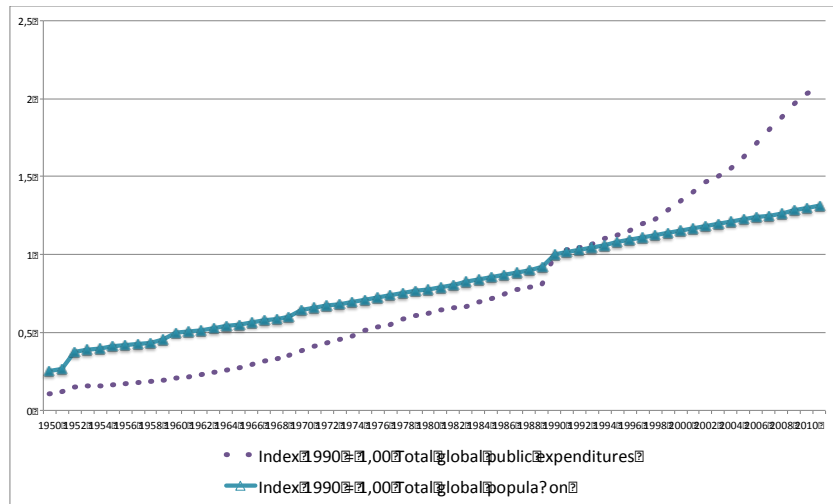
Table2.

<i>country</i>	Average share of public expenditures in the national capital stock over 1950 - 2011	<i>country</i>	Average share of public expenditures in the national capital stock over 1950 - 2011	<i>country</i>	Average share of public expenditures in the national capital stock over 1950 - 2011
Albania	5,9%	Finland	4,6%	Oman	10,3%
Angola	17,9%	France	5,9%	Pakistan	10,4%
Antigua and Barbuda	38,9%	Gabon	7,6%	Panama	11,0%
Argentina	4,0%	Gambia	15,9%	Paraguay	9,7%
Armenia	8,1%	Georgia	11,5%	Peru	8,2%
Australia	3,9%	Germany	4,6%	Philippines	8,7%
Austria	7,0%	Ghana	4,4%	Poland	9,5%
Azerbaijan	11,3%	Greece	4,6%	Portugal	5,9%
Bahamas	12,1%	Grenada	31,1%	Qatar	10,0%
Bahrain	8,8%	Guatemala	9,9%	Republic of Korea	5,8%
Bangladesh	6,9%	Guinea	8,5%	Republic of Moldova	7,3%
Barbados	13,5%	Guinea-Bissau	5,7%	Romania	11,0%
Belarus	7,8%	Honduras	7,3%	Russian Federation	6,3%
Belgium	5,6%	Hungary	10,4%	Rwanda	49,4%
Belize	39,9%	Iceland	4,9%	Saint Kitts and Nevis	16,3%
Benin	25,2%	India	8,2%	Saint Lucia	37,7%
Bermuda	29,1%	Indonesia	8,4%	Sao Tome and Principe	7,5%
Bhutan	8,2%	Iran (Islamic Republic of)	5,9%	Saudi Arabia	5,8%
Bolivia	8,9%	Iraq	10,4%	Senegal	11,6%
Bosnia and Herzegovina	16,0%	Ireland	7,2%	Serbia	7,1%
Botswana	14,4%	Israel	16,6%	Sierra Leone	59,7%
Brazil	6,4%	Italy	5,1%	Singapore	6,1%
Brunei Darussalam	10,5%	Jamaica	8,0%	Slovakia	9,4%
Bulgaria	11,5%	Japan	7,8%	Slovenia	6,2%
Burkina Faso	12,1%	Jordan	29,4%	South Africa	8,0%
Burundi	9,8%	Kazakhstan	6,7%	Spain	5,0%
Cambodia	4,9%	Kenya	11,3%	Sri Lanka	14,9%
Cameroon	13,0%	Kuwait	9,4%	St. Vincent and the Grenadines	44,4%
Canada	5,4%	Kyrgyzstan	14,3%	Sudan	21,8%
Cape Verde	4,7%	Lao People's Democratic Republic	10,1%	Suriname	8,2%
Central African Republic	6,9%	Latvia	10,2%	Swaziland	13,8%
Chad	100,1%	Lebanon	6,2%	Sweden	9,4%
Chile	11,7%	Lesotho	9,5%	Switzerland	2,4%
China, People's Republic of	14,1%	Liberia	4,9%	Syrian Arab Republic	16,6%
China: Hong Kong SAR	2,9%	Lithuania	14,8%	Taiwan	22,4%
China: Macao SAR	4,6%	Luxembourg	4,4%	Tajikistan	10,7%
Colombia	3,6%	Madagascar	16,9%	Thailand	7,6%
Comoros	12,9%	Malawi	7,6%	The Former Yugoslav Republic of Macedonia	9,6%
Congo	31,2%	Malaysia	5,8%	Togo	8,4%
Costa Rica	11,1%	Maldives	16,9%	Trinidad and Tobago	10,5%
Croatia	7,1%	Mali	29,0%	Tunisia	13,5%
Cyprus	3,3%	Malta	9,7%	Turkey	5,3%
Czech Republic	8,7%	Mauritania	12,7%	Turkmenistan	7,9%
Côte d'Ivoire	16,2%	Mauritius	15,0%	Uganda	14,0%
Democratic Republic of the Congo	5,0%	Mexico	4,3%	Ukraine	4,8%
Denmark	6,5%	Mongolia	12,2%	United Kingdom	7,6%
Djibouti	16,4%	Montenegro	10,2%	United Republic of Tanzania: Mainland	26,5%
Dominica	91,9%	Morocco	18,5%	United States	4,6%
Dominican Republic	7,6%	Mozambique	5,4%	Uruguay	9,1%
Ecuador	7,7%	Namibia	9,2%	Uzbekistan	35,0%
Egypt	69,9%	Nepal	17,5%	Venezuela	8,4%
El Salvador	25,1%	Netherlands	6,4%	Viet Nam	13,9%
Equatorial Guinea	82,0%	New Zealand	7,4%	Yemen	38,0%
Estonia	12,1%	Niger	6,2%	Zambia	24,2%
Ethiopia	19,9%	Nigeria	14,1%	Zimbabwe	42,8%
Fiji	13,0%	Norway	5,8%		

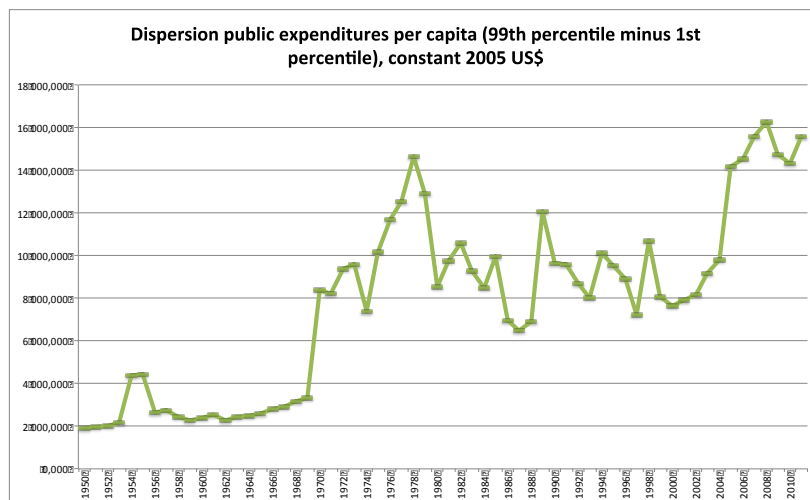
Source: Feenstra, Inklaar & Timmer (2015)



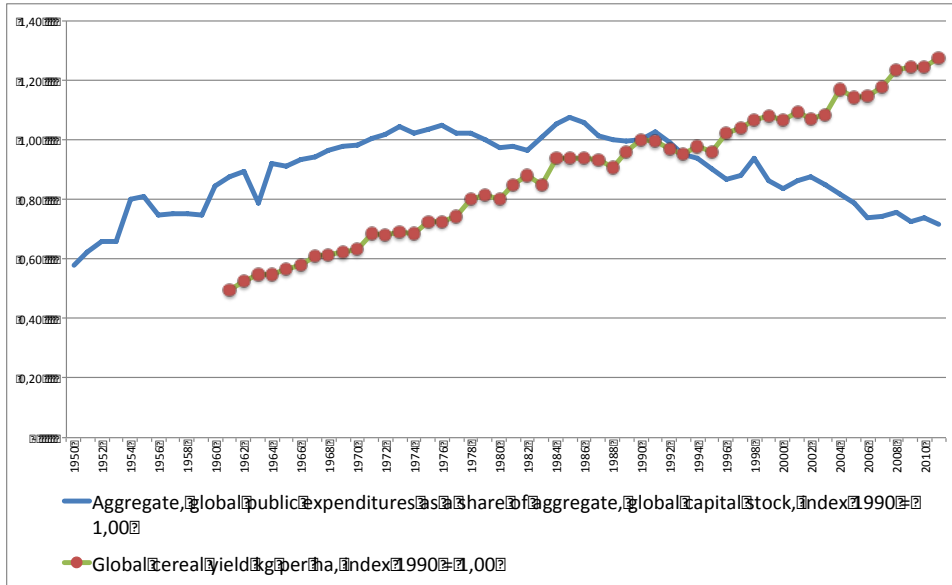
Graph 3.
Source: Feenstra, Inklaar & Timmer (2015)



Graph 4.
Source: Feenstra, Inklaar & Timmer (2015)

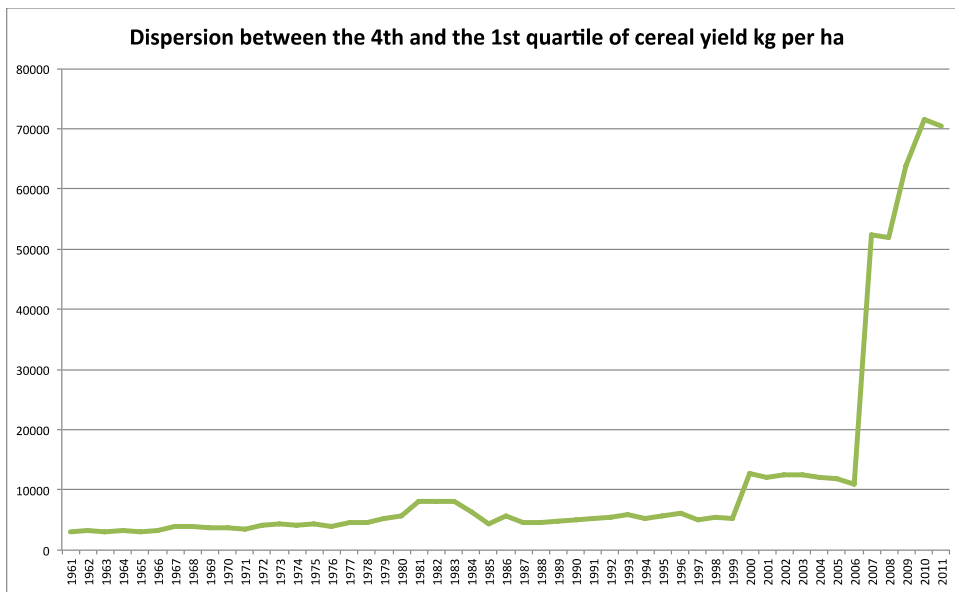


Graph 5.
Source: Feenstra, Inklaar & Timmer (2015)



Graph 6.

Source: Penn Tables 8.1. Feenstra, Inklaar & Timmer (2015), World Bank Database of Social Development Indicators



Graph 7.

Source: Feenstra, Inklaar & Timmer (2015), World Bank Database of Social Development Indicators

Table 3.

Electoral regime	Political system			
	Presidential	Assembly – Elected President	Parliamentary	
Plural elections	<p>POLARIZ = 0 N = 233</p> <p>Bahrain 2003 – 2012; Bolivia 2006 – 2012; Chile 2002 – 2009; Egypt 2006 – 2011; Ghana 2005 – 2001; Islamic Republic of Iran 1996 – 2012; Jordan 1990 – 2009; Kazakhstan 2009 – 2007; Kenya 1998 – 2007; Korea 2005 – 2012; Lithuania 2000, 2004; Malawi 2005 – 2012; Maldives 1997 – 2009; Mali 2000 – 2002; Mexico 1998 – 2000; Morocco 1996 – 2012; Nigeria 2000 – 2012; Pakistan 2003 – 2008; Panama 2003 – 2012; Poland 1998 - 2007; Swaziland 2007 – 2012; Syria 1990 – 2010; United States 2001 – 2010; Yemen 2000 – 2012; Zambia 2005 – 2011</p> <p>POLARIZ = 1 N = 35</p> <p>Bolivia 2003 – 2005; Brazil 2007 – 2012; Chile 1993, 2010 – 2012; Korea 2001 – 2004; Mexico 2001 – 2006, 2010 – 2012; Niger 1995, 1996; Poland 2011 – 2012; Ukraine 1998 – 99, 2000 – 2002</p> <p>POLARIZ = 2 N = 33</p> <p>Bolivia 2000 – 2002; Brazil 2000 – 2006; Chile 1994 – 2001; Ghana 2001 – 2004; Maldives 2010 – 2012; Mexico 2007 – 2009; Poland 2008 – 2010; United States 2011, 2012</p>	<p>POLARIZ = 0 N = 25</p> <p>Egypt 2004 – 2005; Greece 1980 – 1986; Lebanon 2000 – 2012; Yemen 1999</p> <p>POLARIZ = 1 No records</p> <p>POLARIZ = 2 N = 4</p> <p>Pakistan 2009 - 2012</p>	<p>POLARIZ = 0 N = 205</p> <p>Australia 1989 – 2010; Belize 2002 – 2012; Canada 1981 – 2004, 2012; Ethiopia 1996 – 2000, 2006 – 2012; Fiji 2000 – 2001; France 1983 – 1986, 2003 – 2012; Greece 1987 – 1999; Hungary 2007 – 2012; Italy 1995 – 96, 2002 – 2008; Japan 1981 – 83, 1987 – 2012; Lesotho 2000 – 2002, 2008 – 2012; New Zealand 1985 – 1994; Spain 1985 – 93, 2001 – 2004, 2012; Trinidad and Tobago 2001 – 2012; United Kingdom 1980 – 2010;</p> <p>POLARIZ = 1 N = 12</p> <p>Hungary 2005 – 06; Italy 1994 , 1997 – 2001; Latvia 2007 – 2010</p> <p>POLARIZ = 2 N = 104</p> <p>Australia 1999 – 2012; Canada 1980, 2005 – 2011; France 1987 – 2002; Germany 1991 – 2012; Greece 1993; Italy 2009 – 2012; Japan 1980, 1984 – 86, 1994 – 96; New Zealand 1995 – 2012; 1994 – 2011; Trinidad and Tobago 2000; United Kingdom 2011 - 2012</p>	
	Proportional elections	<p>POLARIZ = 0 N = 59</p> <p>Algeria 2003 – 2007; Cape Verde 2002 – 2011; Kazakhstan 2008 – 2012; Liberia 2000 – 2003; Namibia 2006 – 2012; Niger 2010 – 2011; Peru 2000 – 2012; Poland 1998 – 2006; Ukraine 2011 – 2012; Uruguay 2005 – 2012</p> <p>POLARIZ = 1 N = 17</p> <p>Algeria 2001, 2002, 2008 – 2012; Cape Verde 2012; Israel 2001; Peru 2001 – 2006; Poland 1996 – 97</p> <p>POLARIZ = 2 N = 7</p> <p>Colombia 1999 – 2002; Israel 2000; Uruguay 2003 - 2004</p>	<p>POLARIZ = 0 N = 25</p> <p>Bulgaria 2000 – 2001; Estonia 1996 – 1999; Guyana 2007 – 2012; South Africa 2000 – 2012;</p> <p>POLARIZ = 1 No records</p> <p>POLARIZ = 2 N = 2</p> <p>Estonia 2000 - 2001</p>	<p>POLARIZ = 0 N = 29</p> <p>Bulgaria 2010 – 2012; Ireland 1980 – 81, 2007; FYR Macedonia 2003 – 2011; Portugal 2006 – 2009; Turkey 2003 – 2012</p> <p>POLARIZ = 1 N = 62</p> <p>Finland 1991 – 95, 2003 - 2011; Iceland 1988 – 91, 2000 – 2007; Ireland 1988 – 94, 1998 - 2012; Israel 2002 – 2003; Italy 1988 – 1993; Latvia 2000 – 2006</p> <p>POLARIZ = 2 N = 213</p> <p>Austria 1988 – 2012; Belgium 1980 – 2012; Denmark 1995 – 2012; Finland 1980 – 90, 1996 – 2002, 2012; Iceland 1982 – 99, 2008 – 09; Ireland 1982 – 87, 1995 – 97; Israel 2004 – 2012; Netherlands 1995 – 2012; Norway 1980 – 2012; Portugal 1997 – 2012; Sweden 1993 – 2012; Turkey 2002</p>

Source: Database of Political Institutions

Table 4. Average values of current fiscal aggregates, % of the GDP

Gross public revenues			
Electoral regime	<i>Presidential</i>	Political system <i>Assembly – Elected President</i>	<i>Parliamentary</i>
<i>Plural elections</i>	POLARIZ = 0 26,827	POLARIZ = 0 24,471	POLARIZ = 0 36,904
	POLARIZ = 1 26,918	POLARIZ = 2 13,579	POLARIZ = 1 41,829
	POLARIZ = 2 26,736		POLARIZ = 2 40,563
<i>Proportional elections</i>	POLARIZ = 0 29,308	POLARIZ = 0 29,818	POLARIZ = 0 34,338
	POLARIZ = 1 31,545	POLARIZ = 2 35,298	POLARIZ = 1 42,733
	POLARIZ = 2 28,757		POLARIZ = 2 48,972
Gross public expenditures			
Electoral regime	<i>Presidential</i>	Political system <i>Assembly – Elected President</i>	<i>Parliamentary</i>
<i>Plural elections</i>	POLARIZ = 0 29,052	POLARIZ = 0 34,103	POLARIZ = 0 40,072
	POLARIZ = 1 28,707	POLARIZ = 2 20,113	POLARIZ = 1 46,832
	POLARIZ = 2 30,884		POLARIZ = 2 42,453
<i>Proportional elections</i>	POLARIZ = 0 30,156	POLARIZ = 0 31,55	POLARIZ = 0 37,476
	POLARIZ = 1 33,067	POLARIZ = 2 34,134	POLARIZ = 1 45,796
	POLARIZ = 2 32,029		POLARIZ = 2 49,926
Structural fiscal balance			
Electoral regime	<i>Presidential</i>	Political system <i>Assembly – Elected President</i>	<i>Parliamentary</i>
<i>Plural elections</i>	POLARIZ = 0 -2,651	POLARIZ = 0 -16,676	POLARIZ = 0 -3,643
	POLARIZ = 1 -2,155	POLARIZ = 2 n.a.	POLARIZ = 1 -4,305
	POLARIZ = 2 -4,247		POLARIZ = 2 -1,726
<i>Proportional elections</i>	POLARIZ = 0 -1,913	POLARIZ = 0 -2,607	POLARIZ = 0 -4,108
	POLARIZ = 1 -2,676	POLARIZ = 2 n.a.	POLARIZ = 1 -3,159
	POLARIZ = 2 -2,036		POLARIZ = 2 -3,089

Source: Author's

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Table 5. Average values of capital fiscal aggregates, % of the GDP

Gross public debt			
Electoral regime	Political system		
	<i>Presidential</i>	<i>Assembly – Elected President</i>	<i>Parliamentary</i>
<i>Plural elections</i>	POLARIZ = 0 55,186	POLARIZ = 0 112,071	POLARIZ = 0 70,739
	POLARIZ = 1 48,927	POLARIZ = 2 60,978	POLARIZ = 1 75,684
	POLARIZ = 2 55,383		POLARIZ = 2 53,648
<i>Proportional elections</i>	POLARIZ = 0 90,934	POLARIZ = 0 40,553	POLARIZ = 0 42,491
	POLARIZ = 1 39,432	POLARIZ = 2 4,954	POLARIZ = 1 53,612
	POLARIZ = 2 63,105		POLARIZ = 2 62,025
Net public debt			
Electoral regime	Political system		
	<i>Presidential</i>	<i>Assembly – Elected President</i>	<i>Parliamentary</i>
<i>Plural elections</i>	POLARIZ = 0 46,036	POLARIZ = 0	POLARIZ = 0 47,574
	POLARIZ = 1 31,829	POLARIZ = 1	POLARIZ = 1 65,77
	POLARIZ = 2 41,441	POLARIZ = 2	POLARIZ = 2 35,039
<i>Proportional elections</i>	POLARIZ = 0 70,994	POLARIZ = 0	POLARIZ = 0 34,581
	POLARIZ = 1 18,32	POLARIZ = 1	POLARIZ = 1 18,165
	POLARIZ = 2 56,36	POLARIZ = 2	POLARIZ = 2 15,254
Financial assets held by the government (gross debt minus net debt)			
Electoral regime	Political system		
	<i>Presidential</i>	<i>Assembly – Elected President</i>	<i>Parliamentary</i>
<i>Plural elections</i>	POLARIZ = 0 9,151	POLARIZ = 0	POLARIZ = 0 23,165
	POLARIZ = 1 17,098	POLARIZ = 1	POLARIZ = 1 9,915
	POLARIZ = 2 13,942	POLARIZ = 2	POLARIZ = 2 18,609
<i>Proportional elections</i>	POLARIZ = 0 19,94	POLARIZ = 0	POLARIZ = 0 7,91
	POLARIZ = 1 21,112	POLARIZ = 1	POLARIZ = 1 35,447
	POLARIZ = 2 6,745	POLARIZ = 2	POLARIZ = 2 46,771

Source: Author's

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