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Deciles' Average Income as a Variable to Anchor Politicians' Wage

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Abstract: *We propose deciles average income, deficit and natural resource rents as objective variables to measure politicians' economic performance. We begin by reviewing the literature linking politicians and their institutional choices to the macroeconomic environment. To continue, we review the relation between those macroeconomic variables and income percentiles. In order to evaluate how well they sum up politicians' performance, we then use the variables previously reviewed to throw a generalized least squares estimation from panel data in a set of countries. Our results point towards the possibility of using those variables to anchor an incentive contract for politicians.*

Keywords: *Incentives, Contracts, Wage, Politicians*

I. Introduction

Nestor Pitrola, an Argentinian politician, recently declared following an increase on governments wages: “a legislator should gain four minimum wages, and if he wants to gain more, then he shall raise that wage”. While his message might seem righteous, politicians’ well-being should be connected to the people’s welfare, the variable he would use to anchor their wage might not be adequate. An increase in the minimum salary will not forcefully signify an improvement in the population living conditions. Moreover, many studies have found that politicians pay attention to monetary incentives. Caselli and Morelli (2004) theorize that increasing the monetary reward will improve the selection of politicians and that bad candidates could want to lower the “honest” reward to decrease competition. Additionally, Ferraz and Finan (2009) conduct a natural experiment exploiting the wage difference of legislators in Brazilian municipalities and find strong evidence that higher wages not only increase political competition and quality of the legislators, but also that their performance is affected positively. In order to reduce their diverging interests, the first economist to theorize the possibility of an incentive salary for legislators was Gersbach (2002); he proposed that politicians that run for a second term should be paid depending on the success on their first term in order to encourage forward thinking policies. Nevertheless, Gersbach didn’t propose which variables should influence the legislator's wage; he gave unemployment as an example and let the door open for additional research.

This investigation seeks to find a mix of variables that, together, could fit into Gersbach (2002,2003) models. The variables we propose are average income inside each percentile to account for the present state of the economy, as well as natural resource extraction (or rents) and public deficit to account for future economic developments. The main object and

contribution of this research is to show why deciles average income might be an adequate variable adequate to anchor an incentive contract for politicians. More precisely, we will analyze the characteristics of an incentive wage for politicians and study if economic variables that politicians can control in the short run affect income percentiles. If percentiles can in fact be influenced by the legislators' decisions over the economy and can be considered a good picture of the present state of an economy, then they could be an acceptable variable to assess politicians' performance, and by extension to anchor their wage.

The logic behind the structure of our research is the following: we will review literature linking politicians' interest or their institutional choices to the macroeconomic environment in order to find the variables over which politicians have control. Since those variables can be manipulated by politicians, they are the variables we will later use for our regression; if the variables that politicians can manipulate are also the ones that define average income inside deciles then average income inside the deciles can be an adequate measure for their performance. Before throwing the regression, two procedures will be necessary. First, to review the economic literature linking those macroeconomic indicators to income percentiles in order to put a basis to our estimation. And secondly, we will enumerate the qualitative features an incentive contract for politicians needs to have and for each feature explain why income deciles might be a good choice to anchors politicians wage in accordance with Gersbach (2002,2003) models. Our estimation will include Co_2 emissions, inflation, unemployment, net trade, government consumption, natural resource rents and foreign direct investment. Then, we will present and discuss our results, which show evidence that income deciles are highly dependent on those variables and point towards the possibility of those anchored wages. To conclude, we will review technical considerations on the different features and forms that this incentive salary can adopt.

II. Literature Justifying the Variables used.

In this section, we will review some of the extensive literature on how diverging interests of legislators affect the economy, leading to non-optimal policies. The variables to be found influenced by politicians and their institutional choices will be the ones we later use for our income deciles estimation.

Starting with the budget, Buchanan and Wagner (1977) defend the theory of fiscal illusion where the electorate overestimates the advantages of running a deficit and do not foresee the tax burden in the future. Governments would take advantage of the myopic electors and follow expansionary policies during pre-electoral times.

Alesina and Tabellini (1990) theorize that governments, with the uncertainty of elections, may also over expend in providing for their political agenda, expecting the next government having to reduce the expenditures designated to their propositions in order to pay debt commitments.
Alesina and Perotti (1995) provide a more complete review of the relation of public choice and debt where they conclude that the electoral system is a determinant variable in the debt path of a country.
Politicians seem to be motivated by re-election and by ideology, Alesina (1989) shows that those motivations bring socially undesirable outcomes. Variables such as inflation, budget deficits, unemployment, and output may follow partisanship and electoral cycles. Therefore, conservative governments tend to fight inflation, and consequently, create recessions, especially if they have inherited a high inflation. While, left-wing governments tend to decrease unemployment until the inflation expectations catch up and produce a high inflation equilibrium.

In this same line, Aisen and Vega (2005) use a GMM estimator and a fixed effects estimator on panel data for 100 countries and a period of 39 years. They find strong evidence that political instability and variability affect inflation and unemployment. The idea behind is that, because political instability and variability increase the risk of finishing their term earlier or make re-election more unlikely, politicians' behavior might be affected to seek short termed goals, generating inflation and consequently, seigniorage.

The development of a country highly depends on its capacity to attract investment, and, as we will show, its attractiveness highly depends on institutional choices. While the negative relationship between taxes and investment is well known, Lawless (2012) finds that a 10% reduction in tax complexity has an equivalent elasticity with foreign direct investment as a one-percentage-point reduction in effective corporate taxes rate.

Overall, the World Bank has seven criteria for an Ease of doing business ranking: possibility of starting a business, facility of getting credit, investors protection, tax system, openness to trade, facility to enforce contracts, and resolving insolvency, all of them strongly connected to the rule at law and legislature. Canare et al. (2016) review the literature on all of them showing the importance of each of these institutional characteristics for investment.

Natural resource rents are known to distort politicians' behaviour by giving them less accountability and creating faction fighting for a share of the revenue. Abundance of natural resources is also known to promote a rent-seeking culture and a patron-client system of governance. Brollo et al. (2010) use random audits done on Brazilian municipalities and data on the funding of those municipalities to realize a regression discontinuity design. They find that there is a positive correlation between higher exogenous revenues and corruption; this would be due to higher revenues giving more space to politicians for being corrupt without disappointing voters. Additionally, they find that if corruption is more attractive to individuals with a worse outside option, then less prepared individuals will select themselves into politics.

Moreover, because his opponents are now of lower quality, a low-quality individual can afford to grab more rents while increasing its re-election probabilities. Many mechanisms have been identified for natural resources to affect, through politicians, a countries growth and stability. To review the strong influence of politics on the 'resource curse' or the 'political resource curse', please refer to Deacon (2011).

Environmental agreement on Co2 emissions are born under the hypothesis that legislators have some control over this variable. Dietz et al. (2015) show that states in the US where elected had been more time in the environmentalist movement tend to decrease their emissions despite their populations or affluence. They manage to show a causality between the politicians' green record and environmental protection, concretely, with Co2 emissions.

Another area where the preaching of economists and the practice of politicians differ is international trade. Very often pressure groups can manipulate politicians to over regulate imports to avoid international competition. One of the most accepted theories for this divergence comes Grossman and Helpman (1992) that theorize it comes from lobbies' interests becoming a reality fuelled by their political contributions. Caves (1976) shows that politicians would tend to create barriers to trade in industries having a larger number of employees since those employees are also voters; it would be a type of clientelism. The literature on this relation is extensive, for an empirical review of all the mechanisms at play, refer to Gawande and Krishna (2005).

Dimant and Tosato (2018) do a state-of-the-art review on institutional, jurisdictional, societal, and economic problems affecting corruption and its consequences backed on theoretical and empirical research. Among the causes, they find natural resource endowment, where a higher endowment leads to higher corruption, this supports the hypothesis that its extraction should be limited in some way, without even taking environmental factors into account. Trade openness, economic prosperity, education and transparency are negatively correlated with corruption;

while, government stability is U-shaped, because a government that stays too long in power can create long-term relationships with the private sector. Consequences of corruption are many: bureaucratic inefficiency, worsening of investment climate through inefficient public investing, reduction of civil and human rights, decrease of foreign investment and economic growth, loss of human capital due to lower education and, even brain drain, due to outcomes of corruption inducing skilled labor migration. Corruption seems to impact society at all levels.

Politicians often seem to follow a different agenda from the rest of the country and have an important impact on the overall well-being of the citizens. As it was shown in this section, politicians' behavior will reflect on important indicators; very often sub-optimal policies will be followed. If those indicators are what drives income deciles, then an incentive to maximize them could motivate legislators to have a better management of those variables. Following these insights, the next section will put a basis to our estimation by focusing on the existing studies on deciles and their functioning.

III. Interaction Between Macroeconomic Indicators and Income Deciles

In order to have some precedents for our estimation, we will review research done on income deciles. Generally, those studies are done indirectly by using the Gini index or the 9^{th} to 1^{st} ratio.

A famous study on this matter comes from Garbinti, Goupille, and Piketty (2017). They use fiscal data, national accounts, and household surveys to observe the evolution of inequality in the long term (more than a hundred years). They employ measures related to deciles such as the shares of income of the bottom half of society. They show through numerous graphics and historical analysis that inequality trends depend mainly on institutional change and public policies.

Results of studies focusing on the Gini index must be interpreted differently. Sarel (1997) realize a cross-country analysis of the, until then, vastly unknown relation between the Gini coefficient and other macroeconomic variables. His data are based on household surveys covering the totality of the population and all income source. One of his more interesting findings is that inflation and public spending do not affect income distribution. This does not forcefully mean that these indicators do not affect income, only that they affect every decile by a similar percentage.

Maestri and Roventini (2012) study some inequality indicators such as the Gini index or the 9^{th} to 1^{st} proportion over time. They focus on a small set of countries to identify common patterns as well as country specificities. They organize their study as follows: they test for the stationarity of the inequality series to test for shocks having permanent effects finding that indeed inequality series tend to be non-stationary. This would imply that deciles functioning cannot be captured in individual time series. Then, they search for possible cointegration relationships between the macroeconomic series and inequality data where they find few results, and finally, test for Granger causality between the variables. As expected, unemployment effectively affects inequality, which makes sense since in general it will be present in the last deciles. While, they find that in some Europeans countries, a higher government consumption could be granger causal for more inequality. They theorize this could be due to institutional differences between countries.

Deyshappriya (2017) use a GMM estimation of some macroeconomic variables on income share of the quintiles of 33 Asian countries for 20 years. His main findings are that an initial GDP increase redistributes the share of the poorest quintile to the others, while further increase decrease the share of the richest quintile to redistribute it to the rest. In addition, inflation would affect the share of those at the bottom in favor of the share of the rich. Then, unemployment affects all quintiles, except the richest, negatively. Moreover, improving terms of trade favors

the richest and third quintile. Another interesting finding is that education decreases inequality. One could expect that these results could be similar to the ones in our study; the fundamental difference resides in the fact that we focus on levels rather than on shares. We are measuring richness and not inequality. In Deyshappriya's benchmark every improvement or worsening for any quintile must mean the opposite for another, while in our regression it does not forcefully have to happen. Our results will show that in absolute terms, an indicator can affect all deciles in the same direction.

On the following section, before passing to our estimation, we will review the necessary features for an incentive wage for politicians to be feasible, and, how deciles income could fit into this scheme.

IV. Specificities of an Incentive Wage for Politicians

To be able to analyse the variables we propose, we need to refer to Tirole (1974) where he gives a list of reasons for politicians to have low powered incentives. We will discuss each of his points in the interest of justifying why we propose those variables as an adequate measure:

- *The multidimensionality of their task:* a legislator does not only have economic objectives, they are also to be judged by their social and cultural policies. Gersbach (2002) idea is that since social and cultural policies cannot possibly be assessed, we can let their salary depend on economic performance. In the meanwhile, the rest of their tasks could be controlled by the already existing incentives described by Laffont (2000); the legislative and executive branch being regulated by the judiciary branch (with limited power due to incentives reasons) and by the re-election mechanism.

- *Heterogeneity of tastes:* even by reducing the scope of the salary to economic performance only, voters might not all agree on which economic variables should be the most important, and even in which direction should they go. We expect that the preferred sign and direction of macroeconomic indicators depends on the different interests of the population. For this reason, we propose income percentiles where there is no ambiguity that a higher level means a better outcome. On the other hand it is desirable to achieve this goal by using the least possible natural resources and minimizing the deficit (maximizing surplus). With these variables there would be consensus on the sign; therefore, the only heterogeneity of tastes would arise from the importance given to each variable in the determination of the salary. This difficulty leads us to the next argument.

- *Variables weights:* even with some variables to anchor the salary on, it is necessary to choose the importance of each variable on the final wage. A potential theoretical solution would be to maximize aggregate utility in dependence of politicians' utility function. In practice, as Gerbach (2002) proposed, it could be translated by politicians offering themselves, before the election, the weights for their salary to be indexed; and in a second step, voters would choose the politicians that proposed the salary that fits best their preferences. The economic success of a policy depends on which is the measure of its success, this idea would allow us to have a measure of success democratically chosen by society. Additionally, our variables fit into this scheme more than macroeconomic indicators directly controlled by politicians because putting weights on indicators would require a lot of technical knowledge, while the weight given to each decile would depend on personal preferences. The knowledge requirements would be transferred to lawmakers, who would be incentivized to maximize deciles income. Because, as we will show, deciles already capture the tradeoff between indicators. One could argue that politicians would choose higher weights on deciles that are easier to raise. As Gerbach (2003) notes: "Standard Bertrand argument suggests that two politicians competing for office would

offer a first-best contract". In addition, if voters tend to vote for putting weights in their own decile, then politicians end up with a wage equally distributed for all deciles, and this would be the welfare function of that society. The cost of this scheme is additional noise than by anchoring it directly on the macroeconomic indicators, therefore the risk bared by politicians increase. These insights guide us to our next consideration.

- *Impossibility to compare* using yardstick competition or relative performance evaluation, as in the private sector, makes politicians vulnerable to exogenous shocks. Apart from natural disasters, we can hardly imagine percentiles decreasing dramatically without the government having some degree of responsibility. Moreover, as in contract theory, having a fixed part in the salary could decrease the risk that they would bare. The fixed part would have to depend on the legislators' risk aversion, how much control they actually have over income deciles, and the wage being anchored on variables growth or levels. Gersbach (2003) finds that incentive contracts for the second term will also be helpful despite the noise in between terms as long as re-election chances decline with poor past performances.

-*Dispersed ownership of parties:* with parties presenting a clear objective for an outcome, rather than a mean to achieve not forcefully spoken outcomes (clientelism), the political spectrum might become clearer. Therefore, the median voter rule would gain validity, since people will be able to vote on their outcome preferences instead of voting in policies of which they do not completely understand the effects. Also, since their wage would depend on achieving their objectives, it would represent a more credible promise. Having a more credible commitment would allow political parties to deviate from inadequate policies that they implement anyway because it looks from their side of the spectrum or they have incentives to do so.

Additionally to Tirole's remarks on the specificities that an incentive salary for politicians should have, the main characteristics of any incentive salary include that its variables should:

-Be as objective and have as low manipulability as possible: inflation and unemployment levels strongly depend on the methodology used to measure them. Income deciles have fewer ways to be measured and once you agreed on one measure they will be clear and less affected by external factors.

- Not provide perverse incentives, as an example, anchoring the wage on unemployment could lead politicians to raise inflation. This is also a reason why we do not index the salary directly on the studied macroeconomic indicators: income deciles capture the tradeoffs between indicators. To illustrate, society can hardly propose an indexation on inflation, and unemployment that would lead to an optimal level, while anchoring it on percentiles would allow having the right balance between conflicting indicators: the ones maximizing income deciles.

- Objectively sum up the work of the employee even if he does not have complete control over the outcomes. For example, in contract theory, very often profits follow statistical laws. We will test this characteristic quantitatively. On the next section we will present the data and methodology used.

V. Data and Methodology

On the following section we portray the employed data and the methodology used to analyze deciles income before passing to the presentation of our results. We use data on share of the GDP per deciles from the World inequality and income database (WIID) to find the average income of each decile. We select all countries available based on the next criteria: quality of data, coverture of all country and not only urban or rural areas, and for the same country, the data must belong to the same source. We use 42 countries from Europe and the Americas (list

of countries in annex 1) from the year 2005 to 2014. We rule out selection bias because we do not consider there is a correlation between the way these indicators affect deciles and their availability. Different countries might have data from different sources but following as closely as possible the guidelines on the use of secondary data by Atkinson and Brandolini (2001), we follow the same source through the years for a country indicator. To find the average income of each percentile we use population and deciles' share of GDP data from the WIID and the GDP data from the World Bank. Our dependent variable to approach average income inside the deciles is:

$$D_i avg = \frac{GDP * ShareD_i}{Population/10} \qquad (1)$$

Where GDP is the countries' gross domestic product in current US dollars (2017) converted using single year exchange rates and $ShareD_i$ is the share of GDP possessed by the i^{st} decile. The main assumption of our model is that the deciles respond to the indicators, while the indicators are not affected by the deciles; there is no reverse causality. The explanatory variables we will use, are, as we have seen earlier, the ones over which politicians have consistent control. In table 1 are available the variables we use, their explanation and a reminder of the paper that justifies its choice.

Table 1: ***Variables for the Estimation***

Name	Variable	Justification
Co2Em	Refers to the emissions of Co_2 in metric tons per capita. Existence of environmental agreements imply that politicians have control over this variable.	Dietz et al. (2015)
Infl	Inflation in percentage points for annual consumer prices, reflects the price change for a given basket of goods.	Alesina (1989) Aisen and Vega (2005)
Unemp	Unemployment in percentage points of labor force.	
lnNr	Log of total natural resource rents, as the sum of the rents of oil, natural gas, coal, and forest rents. It is used as a proxy for natural resources expropriation, where higher rents indicate a higher expropriation.	Deacon (2011) Brollo et al. (2010) Dimant and Tosato (2018)

lnGovCons	Log of expenditure on government consumption, includes all expenditure for goods and services, including employees' compensation	Buchanan and Wagner (1977) Alesina (1989) Alesina and Tabellini (1990) Alesina and Perotti (1995) Dimant and Tosato (2018)
lnTaxes	Log of net taxes on products, or indirect taxes, this variable indicates the sum of taxes on products collected minus subsidies. Relate to production, sale or purchase of goods and services.	
lnFDI	Log of foreign direct investment if positive, or, minus log of the absolute value if negative. Includes net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than the investor.	Lawless (2012) Canare et. Al (2016) Dimant and Tosato (2018)
lnTrade	Log of net trade if positive, or, minus log of the absolute value if negative, includes the net trade of goods and services. Is derived by offsetting imports against exports.	Grossman and Helpman (1995) Caves (1976) Gawande and Krishna (2005) Dimant and Tosato (2018)

We do not consider additional variables under politicians' control, because they would affect deciles already through their affection on indicators as showed for corruption by Dimant and Tosato (2018). To begin our estimation, we perform a Hausman test (annex 2). It indicates that fixed effects are more appropriate for our analysis than random effects with a 99% confidence level. This is favorable since for the objective of our study it is more interesting to study evolution over time rather than a comparison between countries.

Suspecting there may be autocorrelations between error terms and that the variance of the residuals may not be the same across countries, we realize two tests. First, we test for serial autocorrelation using the method proposed by Wooldrige (2002) and formally tested and implemented by Drukker (2003), who asserts that the test is adequate for reasonably sized samples, confirming that the residuals must be treated (annex 3).

Then, an LR test indicates us the presence of heteroscedasticity (annex 4). Therefore, we use a GLS transformation similar to a Cochrane-Orcutt estimator, but without first differencing, and

we correct our variances for heteroscedasticity. We use an AR (1) process including the independent variables variation in the following form (annex 5 presents the proof that it meets Gauss Markov Assumptions):

$$D_{i,t}avg = \rho_i D_{i,t-1}avg + \beta(X_{i,t} - \rho_i X_{i,t-1}) + v_t \qquad (2)$$

Where $u_t = \rho_i u_{i,t-1} + v_{i,t}$ and $-1 < \rho < 1$.

We represent our set of independent variables levels as $X_{i,t}$ where i=1…10 represents the decile, t=1…9 represents time, β represents the coefficients and ρ is the autocorrelation term.

VI. Results

Table 2: ***Regressions deciles 1 to 5.***

	(1) D1avg	(2) D2avg	(3) D3avg	(4) D4avg	(5) D5avg
Co2Em	1181.3***	1939.3***	2292.7***	2588.8***	2881.7***
	(17.52)	(18.48)	(18.33)	(18.08)	(17.99)
Infl	-41.07	-83.04	-98.11	-103.7	-104.5
	(-1.60)	(-1.95)	(-1.94)	(-1.82)	(-1.66)
Unemp	-194.2***	-305.8***	-346.5***	-387.9***	-419.5***
	(-5.15)	(-5.12)	(-4.85)	(-4.74)	(-4.57)
lnTrade	15.38**	27.13***	31.32***	33.30**	34.85**
	(3.16)	(3.49)	(3.37)	(3.17)	(2.99)
lnFDI	12.95*	30.66***	39.00***	43.92***	48.53***
	(2.48)	(3.81)	(4.01)	(3.93)	(3.89)
lnNr	-407.1***	-554.5***	-693.2***	-852.5***	-996.6***
	(-3.78)	(-3.29)	(-3.52)	(-3.81)	(-4.04)
lnGovCons	1017.5*	2439.0**	2868.5**	3254.5**	3647.9**
	(2.20)	(3.18)	(3.18)	(3.20)	(3.24)
lnTaxes	-978.5*	-2368.2**	-2771.4**	-3130.7**	-3499.8**
	(-2.08)	(-3.04)	(-3.03)	(-3.03)	(-3.06)
N	387	387	387	387	387

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 3: ***Regressions deciles 6 to 10.***

	(1) D6avg	(2) D7avg	(3) D8avg	(4) D9avg	(5) D10avg
Co2Em	3190.9***	3507.6***	3918.5***	4522.3***	6204.3***
	(17.83)	(17.38)	(17.12)	(16.74)	(13.59)
Infl	-103.5	-97.07	-91.64	-86.28	-32.34
	(-1.50)	(-1.28)	(-1.09)	(-0.91)	(-0.22)
Unemp	-454.7***	-485.1***	-525.8***	-617.2***	-1028.5***
	(-4.45)	(-4.24)	(-4.09)	(-4.14)	(-4.32)
lnTrade	35.55**	35.80*	34.92*	31.53	21.24
	(2.76)	(2.52)	(2.21)	(1.75)	(0.76)
lnFDI	53.78***	59.97***	65.47***	71.41***	102.4**
	(3.85)	(3.84)	(3.76)	(3.59)	(3.28)
lnNr	-1138.2***	-1309.8***	-1499.7***	-1720.2***	-2568.0***
	(-4.16)	(-4.30)	(-4.36)	(-4.27)	(-3.81)
lnGovCons	3983.0**	4330.7**	4841.3**	5568.1**	9203.9**
	(3.22)	(3.17)	(3.17)	(3.15)	(3.23)
lnTaxes	-3805.1**	-4114.1**	-4572.0**	-5193.5**	-8274.8**
	(-3.03)	(-2.96)	(-2.95)	(-2.89)	(-2.85)
N	387	387	387	387	387

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Before going into the interpretation of our results, we need to mention that because of the structure of the estimation, literal interpretation of the coefficients is not possible without knowing ρ_i for each regression (from 0,61 to 0,7 in annex 6). Additionally, each coefficient represents the importance of the exogenous variable growth and not its level, which allow us to assert that politicians can control them. Nevertheless, these coefficients are all comparable between them, and their significance is valuable. The autocorrelation coefficient ρ_i also represents the percentage of the deciles income not explained by the growth of our explanatory variables. From 60% to 70% of deciles income level is explained by its past level, while the rest, including its growth, is explained by the independent variables. Politicians may not have complete control over variable levels, but as shown before, they have control over their growth and direction. The possibility to manipulate 40% of a decile (or more since they can grow) through those variables seems to be more than enough to anchor their salary and even, not incur

too much risk relatively to other professions, since deciles are at least 60% as big as the year before. Furthermore, the autocorrelation coefficient seems to be increasing with deciles, which is evidence that poorer deciles depend more on political decisions (percentually).

At first glance, most of the coefficients seem to have a significance above 95% at least. They also seem to grow with each decile. This seems reasonable since the dependent variables are in absolute terms, if we used the logarithmic level of deciles (annex 7) you could see that coefficients are decreasing, because one more dollar in the richest deciles represents a lower percentage. This result highlights the importance of the salary to be anchored on absolute levels rather than on relative levels, since then an additional unit of currency would have a different effect on the salary not only depending on its weight but also on its relation to others, which would increase tradeoff between deciles without offering any advantage to it.

Moreover, Co_2 seems to have an important impact on a country's income distribution, it is important to remember the unit used to measure this variable to avoid exaggerating its importance. This result seems to be logical, a higher level of emissions indicates a higher level of industrialization. If it was the other way around environmental agreements would not be necessary. Since Co_2 is a global pollutant, the electorate might not feel its reduction as advantageous, especially if other countries also do not reduce it either. Therefore, individually, a country's population would prefer not to include it on the contract. International agreements could try to give personal incentives to those who sign it by including into the agreement that a part of the wage must be indexed on this variable, bringing politicians to have an additional incentive to honor those commitments between countries.

The insignificance of inflation appears strange at first, however considering that income deciles are in "current US dollars", therefore corrected from inflation, it just adds to the economic theory of neutrality of money, inflation does not seem to have any effect on purchasing power.

Another possibility is that, depending on the situation of the country, inflation can have opposite effects which net out in a cross-country benchmark. It is however appealing that if we extend the confidence level to 90%, it would be significant until the 5th poorest decile. This result is interesting since one of the dangers of this incentive salary would be that politicians could be motivated to increase inflation in order to increase their salary, which in this case would have an opposite effect, especially if it is highly anchored on the poorest half of the population. Furthermore, it would be interesting to make a similar study with the variables in local currency units.

Then, we can see that, confirming the natural resource curse, whether it is due to the Dutch disease, or to political reasons, the more a country has natural resource rents, the lower will the income of each decile be. Besides all the social problems resource extraction brings to society, the rents it brings do not seem to be helpful; there is an evident need to limit its use. Having a part of the wage negatively indexed on this variable would not only help to protect the environment, but judging on these results, would also be positive for growth. Furthermore, we note that unemployment is negative for every social class, while it might affect the poor mostly, it is the product of firms firing their employees, it is a good indicator of an economies' shape. However, it is an indicator that we could have expected to have opposite directions depending his side on the deciles scale. This is also a positive result for our purpose since it reduces the tradeoff between deciles; no matter the weights, legislators would have an interest in managing the indicators in the same direction.

For the rest, there are no surprises in the sign of the coefficients; we see investment and government consumption are important, as taxes should be minimized. We allow ourselves to hypothesize that private investment would go in a similar direction as foreign direct investment. The coefficients for government consumption and taxes might seem too strong compared to foreign direct investment, but we can see that in absolute values, the tax' coefficients are pretty

close (still lower for all deciles) from the government consumption, subtracting one from another we could see their real value of public consumption in the absence of deficit. Interestingly, trade affects in its majority the middle deciles; it could be that the middle class lives more from exports and imports. Anyway, as most of economic theory predicts, additional openness to trade brings additional income to the country, while often, internal pressures will motivate politicians to put barriers to trade.

The most important result for our purpose is that income deciles depend on the most important macroeconomic indicators that are at some degree controlled by politicians and that they have the same sign for all. Therefore, the tradeoff between deciles is minimized and, while an incentive salary might not maximize the revenue of some deciles depending on their weights, it should not affect them negatively.

We conclude this section by remarking that deciles average income is dependent on variables controlled by politicians and that they seem to be a possible measure for the performance of an economy. For these reasons, it seems income percentiles are a possible variable to anchor lawmakers' wage, improving their monetary incentives, and possibly reducing their moral hazard.

VII. Additional Considerations

We are now going to discuss some of the practical features and characteristics of this anchored wage and resume some of the elements before discussed.

To begin the discussion, we must explain through which mechanism this salary may affect corruption. While this salary may not create a direct incentive for bad politicians to stop being corrupt, since the potential gains are much bigger than any salary politically feasible in a

democracy, anchored wages would make each politician dependent on the decisions of his neighbour. As Gonçalves (2018) shows, using the perception of corruption as a proxy and ethnic heterogeneity as an instrumental variable, without corruption the PIB per capita in Brazil would be 30% higher and the income per capita in each country of Latin America would be on average 3.000$ higher. This mechanism would create an additional incentive, besides group reputation, for honest politicians to further investigate their colleagues and even to improve institutions and transparency. It is important to note that the higher the salary is anchored, the higher the fluctuations, and therefore the monetary incentives, will be.

Two pertinent remarks are necessary, first percentiles do not need to be measurable in the short run, the politician's wage could change only once per year. Secondly, there could be a threshold in between the 'legal salary' put at the beginning of the term, wages could only surpass or go under the threshold during the term. Entering politicians do not have to pay or to gain from their previous colleagues' performance.

The wage could be indexed in two different ways. It could be directly dependent on deciles level. Then, it would be of the following form at the beginning of the term:

$$\sum_{1}^{10} \gamma_i X_i = W \qquad (3)$$

Where γ_i are the weights, X_i are percentiles levels and W an arbitrarily decided wage, it could also be a threshold for the wage to be in. Politicians would choose their weights in order for this equation to be equal to some initial threshold, then, during the term, weights stay the same while percentiles levels would vary, and therefore the wage varies. This method would have the advantage that it makes sure the weights put on the salary will not have an exaggerated variability.

Another method would be to choose an initial wage that varies with deciles growth:

$$W + \sum_{1}^{10} \gamma_i Z_i \qquad (4)$$

Where W is still an initial wage, γ_i are the weights, and Z_i represents percentiles growth in absolute terms after the elected officials assume their positions (both methods have a wage that is initially equal to W since Z_i begins at 0). The advantage of this way is that it allows choosing the relative importance of each decile without having to worry that the initial weights multiplied by percentiles level are equal to the given initial salary. Moreover, the wage must be anchored on absolute levels since anchoring it on relative levels between deciles would allow politicians to increase their salary by decreasing the salary of those at the top (increasing the salary of the poorest deciles relatively to the richest).

For the sake of the example, using income deciles threshold in adults equal split per household, with the first method if we take $\gamma_1 = 8.4$ and all other weights $\gamma_i = 0$, then, W = 33.763 R$ which was in 2014 the wage of a legislator in Brazil. By 2015 the salary would have decreased to 15.093 R$ per month. If, we used the second method, keeping the same W, and we gave equal weights to all deciles $\gamma_i = 1$ then their salary would also have decreased by more than a half to 15.086 R$. Overall, their salary would have strongly decreased for any possible combination, while what actually happened is that their compensations have only increased.

Concerning the interaction between tasks Holmstrom and Milgrom (1991) find that when there is interaction between tasks you should raise or decrease the incentives on the measurable task depending on them being substitute or complementary. In this case, it can go both ways: having a good economy raise probabilities of re-election, but some cases may present a tradeoff between popularity and wage increase. Another of their findings is that activities non-considered in an incentive scheme will be neglected. We need to point out that this wage would come only as an additional incentive, all the existing incentives, such as re-election would be maintained. Education and health care, while could improve percentiles level in the long term, would have to still rely on current incentives scheme.

One of the most important topics discussed in this paper is the reasons to why create noise attaching the wage to percentiles instead of directly to macroeconomic indicators. Subsequently, a summary of the reasons: Percentiles do not conflict with taste heterogeneity since there is consensus that the higher they are, the better. Additionally, the population would need a lot less technical knowledge to choose a weight on percentiles, since it would mainly depend on personal preferences. Even economists have trouble to agree on the optimal level of inflation. In this way we would have a two-step process, deciles maximization defines the optimal level of the variables, then the public choose which percentiles of the country are to be given priority. Finally, the possible methodologies used to capture percentiles are much less than for other indicators, much more understandable by the common citizen and more precise.

VIII. Conclusion

We proposed to modify politicians' incentives using a pay-for-performance contract anchored on deciles average income or income deciles, public deficit, and natural resource rents. We have reviewed politicians' incentives and some of their effects in society to show that they are the managers of the macroeconomic environment of a country. We chose our variables based on previous research showing how politicians can manipulate macroeconomic indicators. After analyzing the literature focusing, directly or indirectly, on income deciles, and, reviewing the specific characteristics needed by an incentive contract for politicians, we did our own estimation. We found strong evidence that all deciles are dependent in the same direction on macroeconomic indicators affected by politicians. More importantly, almost all coefficients were highly significant for all deciles, which would make them an adequate variable to judge politicians' present performance. Besides the proposed scheme that can be beneficial for the

population of each country individually, we theorized that including some weight to be anchored on Co_2 in international agreements could give them additional credibility. To finish, we reviewed some practical considerations of this scheme. Gersbach (2003) puts the theoretical basis to this idea by considering politicians facing multitasks problems and shows that competition for elections with incentives contracts might alleviate political inefficiencies. Nevertheless, there is still a lot of research to be done to confirm that this could be implemented one day. It would be interesting to re-run this estimation using instrumental variables that are directly affected by politicians (such as the number of bureaucratic procedures to open a business) on the macroeconomic variables (such as investment). Moreover, a theoretical model that already considers these variables for the wage to be anchored and whether such an incentive wage, considering costs and benefits, is likely to perform better than just voting with a fixed wage would be the next step in this topic. Furthermore, a model studying the mechanism through which it would decrease corruption and an expansion on the discussion of the practical issues would help to understand better the possibilities and technical considerations. Undoubtedly, all these issues deserve further investigation. However, it arises as natural that, if we want to improve competition in our society, one possible path is by improving it around those who manage it.

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Annexes

Annex 1 : ***List of Countries***

Argentina	Denmark	Hungary	Panama	Uruguay
Austria	Dominican Republic	Island	Paraguay	Venezuela
Belgium	Ecuador	Italy	Peru	
Bolivia	El Salvador	Latvia	Poland	
Brazil	Estonia	Lithuania	Portugal	
Bulgaria	Finland	Luxembourg	Slovakia	
Colombia	France	Malta	Slovenia	
Costa Rica	Germany	Mexico	Spain	
Cyprus	Greece	Netherlands	Sweden	
Czech Republic	Honduras	Norway	United Kingdom	

Annex 2 : ***Hausman Test***

	Coefficients			
	(b) xfe	(B) xre	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Co2Em	-229.6796	371.2406	-600.9201	56.76196
Infl	20.70293	-16.6692	37.37213	.
Unemp	-127.474	-90.79991	-36.67405	.
lnTrade	3.221959	9.357955	-6.135995	.
lnFDI	4.358233	7.264583	-2.90635	.
lnNr	582.1627	324.687	257.4757	.
lnGovCons	1874.987	2418.032	-543.0447	.
lnTaxes	446.644	-314.6338	761.2777	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 185.95
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

Annex 3 ***: Test for Serial Autocorrelation***

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      38) =     41.600
           Prob > F =      0.0000
```

Annex 4 ***: LR test for heteroskedasticity***

```
Likelihood-ratio test                                 LR chi2(39) =    785.01
(Assumption: . nested in hetero)                      Prob > chi2 =    0.0000
```

Annex 5 : ***Demonstration that Equation 3 meets Gauss-Markov assumptions with first order serial autocorrelation***

$$D_{i,t}avg = \beta_i X_{i,t} + \mu_t$$

$$(=)\ D_{i,t}avg = \beta_i X_{i,t} + \rho_i u_{i,t-1} + v_{i,t}$$

$$(=)\ D_{i,t\text{-}1}avg = \beta_i X_{i,t\text{-}1} + u_{i,t-1}$$

$$(=)\ \rho_i D_{i,t\text{-}1}avg = \rho_i \beta_i X_{i,t\text{-}1} + \rho_i u_{i,t-1}$$

$$(=)\ D_{i,t}avg \text{ - } \rho_i D_{i,t-1}avg = \beta(X_{i,t} - \rho_i X_{i,t-1}) + v_t$$

$$(=)\ D_{i,t}avg = \rho_i D_{i,t-1}avg + \beta(X_{i,t} - \rho_i X_{i,t-1}) + v_t$$

Annex 6: ***Detailed Estimations:***

```
Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.6159)

Estimated covariances      =        40          Number of obs      =       387
Estimated autocorrelations =         1          Number of groups   =        40
Estimated coefficients     =         8          Obs per group: min =         6
                                                               avg =     9.675
                                                               max =        10
                                                Wald chi2(8)       =   1241.16
                                                Prob > chi2        =    0.0000
```

Dlavg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	1181.258	67.40908	17.52	0.000	1049.139	1313.377
Infl	-41.0684	25.59908	-1.60	0.109	-91.24168	9.104884
Unemp	-194.1579	37.69575	-5.15	0.000	-268.0402	-120.2756
lnTrade	15.37604	4.858374	3.16	0.002	5.853805	24.89828
lnFDI	12.95214	5.220473	2.48	0.013	2.720201	23.18408
lnNr	-407.054	107.6686	-3.78	0.000	-618.0805	-196.0275
lnGovCons	1017.477	462.7442	2.20	0.028	110.5148	1924.439
lnTaxes	-978.5191	469.7109	-2.08	0.037	-1899.136	-57.90278

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6206)

Estimated covariances	=	40	Number of obs	=	387
Estimated autocorrelations	=	1	Number of groups	=	40
Estimated coefficients	=	8	Obs per group: min	=	6
			avg	=	9.675
			max	=	10
			Wald chi2(8)	=	1857.50
			Prob > chi2	=	0.0000

D2avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	1939.304	104.9276	18.48	0.000	1733.65	2144.958
Infl	-83.0378	42.68688	-1.95	0.052	-166.7026	.6269512
Unemp	-305.8243	59.71889	-5.12	0.000	-422.8712	-188.7775
lnTrade	27.12802	7.777155	3.49	0.000	11.88508	42.37097
lnFDI	30.65993	8.052721	3.81	0.000	14.87689	46.44298
lnNr	-554.5447	168.4367	-3.29	0.001	-884.6745	-224.4149
lnGovCons	2438.969	766.4156	3.18	0.001	936.8218	3941.116
lnTaxes	-2368.187	778.0023	-3.04	0.002	-3893.043	-843.3303

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6134)

Estimated covariances	=	40	Number of obs	=	387
Estimated autocorrelations	=	1	Number of groups	=	40
Estimated coefficients	=	8	Obs per group: min	=	6
			avg	=	9.675
			max	=	10
			Wald chi2(8)	=	1927.00
			Prob > chi2	=	0.0000

D3avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	2292.662	125.0667	18.33	0.000	2047.535	2537.788
Infl	-98.11475	50.67663	-1.94	0.053	-197.4391	1.209626
Unemp	-346.4598	71.43767	-4.85	0.000	-486.4751	-206.4446
lnTrade	31.31896	9.291204	3.37	0.001	13.10854	49.52939
lnFDI	38.99918	9.736012	4.01	0.000	19.91695	58.08141
lnNr	-693.1911	196.7082	-3.52	0.000	-1078.732	-307.6501
lnGovCons	2868.507	901.9069	3.18	0.001	1100.802	4636.212
lnTaxes	-2771.378	915.5897	-3.03	0.002	-4565.901	-976.8554

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6154)

Estimated covariances	=	40	Number of obs	=	387
Estimated autocorrelations	=	1	Number of groups	=	40
Estimated coefficients	=	8	Obs per group: min	=	6
			avg	=	9.675
			max	=	10
			Wald chi2(8)	=	1911.33
			Prob > chi2	=	0.0000

D4avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	2588.824	143.1793	18.08	0.000	2308.197	2869.45
Infl	-103.7252	57.09145	-1.82	0.069	-215.6224	8.171971
Unemp	-387.9422	81.80071	-4.74	0.000	-548.2686	-227.6157
lnTrade	33.29705	10.50089	3.17	0.002	12.71568	53.87842
lnFDI	43.91797	11.18226	3.93	0.000	22.00113	65.8348
lnNr	-852.5255	223.5481	-3.81	0.000	-1290.672	-414.3793
lnGovCons	3254.456	1017.46	3.20	0.001	1260.272	5248.64
lnTaxes	-3130.693	1033.039	-3.03	0.002	-5155.411	-1105.974

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6178)

Estimated covariances	=	40	Number of obs	=	387
Estimated autocorrelations	=	1	Number of groups	=	40
Estimated coefficients	=	8	Obs per group: min	=	6
			avg	=	9.675
			max	=	10
			Wald chi2(8)	=	1913.80
			Prob > chi2	=	0.0000

D5avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	2881.659	160.1412	17.99	0.000	2567.788	3195.53
Infl	-104.5446	63.10773	-1.66	0.098	-228.2334	19.14432
Unemp	-419.5341	91.80708	-4.57	0.000	-599.4726	-239.5955
lnTrade	34.85367	11.67459	2.99	0.003	11.97189	57.73545
lnFDI	48.52717	12.48112	3.89	0.000	24.06463	72.98971
lnNr	-996.5635	246.6524	-4.04	0.000	-1479.993	-513.1337
lnGovCons	3647.929	1125.907	3.24	0.001	1441.192	5854.666
lnTaxes	-3499.805	1143.092	-3.06	0.002	-5740.224	-1259.387

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6206)

Estimated covariances	=	40	Number of obs	=	387
Estimated autocorrelations	=	1	Number of groups	=	40
Estimated coefficients	=	8	Obs per group: min	=	6
			avg	=	9.675
			max	=	10
			Wald chi2(8)	=	1872.23
			Prob > chi2	=	0.0000

D6avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	3190.892	178.9645	17.83	0.000	2840.128	3541.656
Infl	-103.4812	69.04788	-1.50	0.134	-238.8126	31.85013
Unemp	-454.7193	102.2191	-4.45	0.000	-655.0651	-254.3736
lnTrade	35.55118	12.8701	2.76	0.006	10.32625	60.77611
lnFDI	53.77686	13.95087	3.85	0.000	26.43366	81.12006
lnNr	-1138.162	273.5978	-4.16	0.000	-1674.404	-601.9198
lnGovCons	3983.044	1236.003	3.22	0.001	1560.522	6405.566
lnTaxes	-3805.133	1255.015	-3.03	0.002	-6264.917	-1345.349

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6260)

Estimated covariances	=	40	Number of obs	=	387
Estimated autocorrelations	=	1	Number of groups	=	40
Estimated coefficients	=	8	Obs per group: min	=	6
			avg	=	9.675
			max	=	10
			Wald chi2(8)	=	1805.10
			Prob > chi2	=	0.0000

D7avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	3507.571	201.7651	17.38	0.000	3112.118	3903.023
Infl	-97.06606	75.96935	-1.28	0.201	-245.9633	51.83114
Unemp	-485.0625	114.4453	-4.24	0.000	-709.3712	-260.7538
lnTrade	35.79661	14.22178	2.52	0.012	7.922429	63.6708
lnFDI	59.9727	15.60662	3.84	0.000	29.38428	90.56112
lnNr	-1309.797	304.8566	-4.30	0.000	-1907.304	-712.2887
lnGovCons	4330.749	1366.554	3.17	0.002	1652.353	7009.145
lnTaxes	-4114.11	1387.833	-2.96	0.003	-6834.213	-1394.008

```
Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.6362)

Estimated covariances      =        40          Number of obs      =       387
Estimated autocorrelations =         1          Number of groups   =        40
Estimated coefficients     =         8          Obs per group: min =         6
                                                                 avg =     9.675
                                                                 max =        10
                                                Wald chi2(8)       =   1820.24
                                                Prob > chi2        =    0.0000
```

D8avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	3918.458	228.9259	17.12	0.000	3469.771	4367.145
Infl	-91.63984	84.00902	-1.09	0.275	-256.2945	73.01481
Unemp	-525.8445	128.5999	-4.09	0.000	-777.8956	-273.7934
lnTrade	34.91872	15.80168	2.21	0.027	3.947991	65.88945
lnFDI	65.46739	17.39784	3.76	0.000	31.36825	99.56653
lnNr	-1499.718	343.5974	-4.36	0.000	-2173.157	-826.2799
lnGovCons	4841.348	1527.728	3.17	0.002	1847.056	7835.641
lnTaxes	-4572.024	1551.973	-2.95	0.003	-7613.836	-1530.212

```
Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.6545)

Estimated covariances      =        40          Number of obs      =       387
Estimated autocorrelations =         1          Number of groups   =        40
Estimated coefficients     =         8          Obs per group: min =         6
                                                                 avg =     9.675
                                                                 max =        10
                                                Wald chi2(8)       =   1846.72
                                                Prob > chi2        =    0.0000
```

D9avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	4522.32	270.2041	16.74	0.000	3992.73	5051.91
Infl	-86.27936	95.31001	-0.91	0.365	-273.0836	100.5248
Unemp	-617.2167	149.0604	-4.14	0.000	-909.3697	-325.0637
lnTrade	31.52837	18.06688	1.75	0.081	-3.882065	66.9388
lnFDI	71.40605	19.90279	3.59	0.000	32.39729	110.4148
lnNr	-1720.156	402.7607	-4.27	0.000	-2509.552	-930.7593
lnGovCons	5568.15	1770.144	3.15	0.002	2098.731	9037.569
lnTaxes	-5193.488	1799.061	-2.89	0.004	-8719.584	-1667.393

Coefficients: generalized least squares
Panels: heteroskedastic
Correlation: common AR(1) coefficient for all panels (0.6970)

Estimated covariances	=	40	
Estimated autocorrelations	=	1	
Estimated coefficients	=	8	
Number of obs	=	387	
Number of groups	=	40	
Obs per group: min	=	6	
avg	=	9.675	
max	=	10	
Wald chi2(8)	=	1758.28	
Prob > chi2	=	0.0000	

D10avg	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Co2Em	6204.258	456.5074	13.59	0.000	5309.52	7098.996
Infl	-32.34355	146.4435	-0.22	0.825	-319.3675	254.6804
Unemp	-1028.486	238.0992	-4.32	0.000	-1495.152	-561.82
lnTrade	21.24475	27.8192	0.76	0.445	-33.27988	75.76938
lnFDI	102.4494	31.20281	3.28	0.001	41.29298	163.6058
lnNr	-2567.975	674.1986	-3.81	0.000	-3889.38	-1246.57
lnGovCons	9203.948	2845.789	3.23	0.001	3626.304	14781.59
lnTaxes	-8274.815	2898.76	-2.85	0.004	-13956.28	-2593.35

Annex 7 : ***Logarithmique Regressions***

	(1) lnD1	(2) lnD2	(3) lnD3	(4) lnD4	(5) lnD5
Co2Em	0.139***	0.129***	0.122***	0.116***	0.111***
	(13.73)	(15.32)	(15.47)	(15.50)	(15.49)
Infl	0.00327	0.00231	0.00221	0.00241	0.00341
	(0.69)	(0.65)	(0.68)	(0.81)	(1.22)
Unemp	-0.0244***	-0.0121*	-0.00984*	-0.0102*	-0.00976*
	(-4.01)	(-2.49)	(-2.16)	(-2.34)	(-2.31)
lnTrade	0.00123	0.000917	0.000805	0.000801	0.000804
	(1.57)	(1.44)	(1.35)	(1.43)	(1.49)
lnFDI	0.000964	0.000795*	0.000679	0.000559	0.000471
	(1.94)	(1.99)	(1.78)	(1.52)	(1.33)
lnNr	-0.155***	-0.120***	-0.107***	-0.0982***	-0.0919***
	(-8.13)	(-7.44)	(-6.98)	(-6.64)	(-6.45)
lnG	0.358***	0.319***	0.317***	0.337***	0.346***
	(3.58)	(3.99)	(4.34)	(4.92)	(5.31)
lnT	-0.0490	0.0136	0.0259	0.0146	0.0131
	(-0.48)	(0.17)	(0.35)	(0.21)	(0.20)
N	387	387	387	387	387

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

	(1) lnD6	(2) lnD7	(3) lnD8	(4) lnD9	(5) lnD10
Co2Em	0.105***	0.0970***	0.0872***	0.0734***	0.0468***
	(15.10)	(14.01)	(12.71)	(10.93)	(7.07)
Infl	0.00384	0.00448	0.00491*	0.00469*	0.00522**
	(1.45)	(1.78)	(2.07)	(2.18)	(2.66)
Unemp	-0.0102*	-0.0109**	-0.0103**	-0.0111**	-0.0117***
	(-2.47)	(-2.74)	(-2.73)	(-3.21)	(-3.69)
lnTrade	0.000857	0.000841	0.000758	0.000591	-0.0000148
	(1.63)	(1.65)	(1.57)	(1.31)	(-0.04)
lnFDI	0.000535	0.000581	0.000501	0.000443	0.000188
	(1.55)	(1.76)	(1.63)	(1.62)	(0.77)
lnNr	-0.0857***	-0.0761***	-0.0635***	-0.0433***	-0.0254*
	(-6.15)	(-5.64)	(-4.85)	(-3.54)	(-2.27)
lnG	0.346***	0.344***	0.339***	0.318***	0.325***
	(5.49)	(5.67)	(5.88)	(6.03)	(7.02)
lnT	0.0213	0.0330	0.0480	0.0834	0.110*
	(0.33)	(0.54)	(0.82)	(1.55)	(2.34)
N	387	387	387	387	387

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001