Hacienda Pública Española / Revista de Economía Pública, 187-(4/2008): 49-86

Towards a Puviani's Fiscal Illusion Index

PAULO REIS MOURÃO*
Economics Department; University of Minho

Recibido: Febrero, 2008
Aceptado: Octubre, 2008

Abstract

This paper presents an index of Fiscal Illusion for 68 democratic countries from 1960 to 2006. The theory of Fiscal Illusion studied relates to a wrong perception of government budget aggregates from the voters' and taxpayers' perspectives. In the construction of the index, methodological issues were carefully taken into account. The results obtained reveal that Fiscal Illusion varies greatly around the world. Countries such as Mali, Pakistan, Russia, and Sri Lanka have the highest average values over the time period considered, while Austria, Luxembourg, Netherlands, and New Zealand have the lowest. Regarding the time dimension, between 1980 and 1995 there was a significant decrease in the average value of the index across countries, suggesting a reduction in the adoption of Fiscal Illusion practices during this period. After 1995, the index remained stable in most countries.

Key words: Fiscal Illusion; Indexes/Indicators; Democracy.

JEL Codes: C82; E62; H11; H30

1. Introduction

Governance practices in democracies around the world have attracted an increasing interest among academics and policymakers in recent years. While some nations monitor the well-being of democratic institutions and the fulfilment of citizens' rights, some countries still do not monitor governance practices. This paper presents estimates of a Fiscal Illusion index that varies across countries and over time, allowing for an overall picture of Fiscal Illusion across the globe from 1960 onward.

* The author would like to thank two anonymous referees, and Domenico da Empoli, Linda Veiga, Michael Pickardt, Renato Flores, Francisco Diniz and seminar participants at Salamanca Public Economics Meeting (Salamanca, 7-8 February/08), at IV Conference of the Portuguese Political Science Association (Lisbon, 6-7 March/08), and at IO2008 Conference (Vila Real, 17-19 March/08) for useful comments and suggestions. All remaining errors are author's responsibility. The author acknowledges the support received from MCTES/FCT/BD.21612/05.

However, up to now, there has been no effort to measure the intensity of Fiscal Illusion practices. In addition, no work has made an evaluation of the evolution of this phenomenon possible. This paper intends to fulfil these scientific needs, presenting at last an index of the Fiscal Illusion observed for 68 countries since 1960.

Several studies analyze the status of transparency in democratic countries. These studies are variously concerned with specific regions (Alesina *et al.* 1996), with the bureaucratic quality (Kaufmann, Kraay, and Zoido-Lobatón 1999), with particular codes for good fiscal transparency practices (Hameed 2005), or with previously selected political dimensions (Bernoth and Wolff 2006). While these indicators are useful for understanding the status of governance for a single indicator or, at best, from a single perspective (e.g., rulers/incumbents/politicians), they cannot give us a complete measure of the overall well-being of a democracy because they do not take into account the quality of other institutions –voters, lobbying groups, and society as a whole.

This warning for observing "rulers" and "ruled" groups was first enunciated by Puviani (1903), the pioneer of the Fiscal Illusion debate. Some years after the Scottish enlightenment in Italy, Amilcare Puviani (1903) attempted to answer the question "How can a politician best use his powers of the purse to promote his political projects?" with his work *The Theory of Fiscal Illusion*. Puviani (1903) introduced the hypothesis of "Fiscal Illusion" as an observable answer to his question. With these terms, Puviani (1903) wanted to point out the opacity that could be imposed by public decision-makers in the levying of taxes or in public spending management. These kinds of illusions are the product of a relationship between electors and rulers; therefore, they can be studied only by considering both sides.

Puviani himself did not present a clear definition for Fiscal Illusion, nor do the most recent authors arrive at a consensus for defining it (as denounced by Mourao 2007). However, for operationality, I think that a non-polemical definition accurately describes Fiscal Illusion as a wrong perception of budget aggregates from the voters' and taxpayers' perspectives.

This paper builds an index for Fiscal Illusion to provide a clear benchmark. Such a benchmark, clearly recognized as an original effort in the literature, is useful for evaluating the political performance of democratic countries, for evaluating their performance across periods, for comparing the performance of groups of countries, and for determining the success of their efforts in order to replicate good governance practices and to eradicate Fiscal Illusion practices.

There are several problems in constructing such an index. First, the correct dimensions related to the methodological sense of Fiscal Illusion need to be selected. Therefore, data availability must be discussed, along with the processes of minimizing the lack of data for the observations, the extraction of efficient information with the provided values –not forgetting the nature of the values (time-series-cross-section data)– and the correct method of combining the variables into a single index. Additionally, this index must be useful and readable.

This paper is a response to the lack of a convenient methodology to measure Fiscal Illusion across the democratic world. Drawing on 68 democracies observed for more than 40 years, it provides a picture of democratic quality and of the persistence of illusory practices across the sample.

Section 2 provides a detailed description of the theoretical framework of the Fiscal Illusion theme. In Section 3 the rationale behind the construction of indexes for evaluating political and economic realities is described. Section 4 discusses data and methodological issues, and Section 5 explores the results of this analysis. Section 6 is a brief conclusion and discussion of future work.

2. A Theoretical Framework

This section attempts to highlight the deep complexity underlying the studies on the Fiscal Illusion theme, suggesting a vast related theoretical framework. For those interested in more theoretical developments, Mourao (2007) expands on these issues.

In 1967, James Buchanan signed the work *Public Finance in Democratic Process: Fiscal Institutions and Individual Choice.* Buchanan's chapter 10 is titled "The Fiscal Illusion". According to him, the discussion of Amilcare Puviani's (1903) main theoretical contribution –the original *Illusione Finanziaria*– that he had already promoted in *Fiscal Theory and Political Economy,* edited in 1960, remained the only available summary in English. Since Buchanan, other authors have used the term *Fiscal Illusion* for many purposes and in many different senses. This subsection will highlight the most prominent of these studies on Fiscal Illusion.

According to Puviani's original idea, the objective of the ruling group is to design the fiscal system so that the resistance of the dominated class is effectively minimized. Consequently, the rulers ask, "In order to minimize taxpayer resistance for any given level of revenues collected, how should the fiscal system be organized?" The answer relies on both sides of the budget—"illusions" are created through taxes and through public spending programs.

The most relevant side is the branch of public revenues. This branch can be subdivided into seven means of introducing Fiscal Illusion (Buchanan 1967):

- reducing the visibility of the individual shares in the opportunity cost of public outlays;
- utilization of institutions of payments planned to bind the requirement to a time period or an occurrence to which the taxpayer seems favorably disposed;
- charging explicit *fees* for nominal services provided upon the occurrence of impressive or pleasant events;
- levying taxes that will capitalize on sentiments of social fear, making the burden appear less than might otherwise be the case;

– use of "scare tactics" that have a propensity to make the alternatives to particular tax proposals appear worse than they are;
– fragmentation of the total tax weight on an entity into numerous small levies;
– opacity of the final incidence of the tax.

The dimensions suggested by Buchanan's lecture (1967) on Puviani (1903) generate the possibility of studying the Fiscal Illusion through analyzing some particular variables. These variables reflect the composition of public revenues (like Herfindahl indexes of public revenues; the observation of the weights of some revenues, like those generated in indirect taxes or collected from the transfers among private agents; or the relationship between indirect and direct taxes). Additionally, these variables reflect the relevance of public debt and the composition of public debt, observed as the dissuasive mechanism of voters' wrong perceptions regarding the relevance of public programs.

As observed by Lipford (2001), Twight (1994) and Alesina and Perotti (1996) outlined several ways that politicians make public budgets more opaque, thereby raising the transaction costs of checking fiscal conditions for a public subject to Fiscal Illusion or incomplete information: biased macroeconomic forecasts, biased estimates of the effects of policy changes on budgetary outcomes, strategic use of on- and off-budget expenditures and receipts, manipulation of budgetary baselines, and multi-year budgeting.

Additionally, the analysis suggested by Twight (1994) and Alesina and Perotti (1996) presented two items as evidence. Firstly, it illustrated that budget deterioration is a final consequence of Fiscal Illusion. Secondly, it showed that it becomes easier to achieve more significant political rents when the political agents act in contexts characterized by low quality of institutions and where the success of optimistic illusions is more probable, as alternatively denounced by Keefer and Knack (1997), Jensen and Vestergaard (1999), and Eusepi (2006).

Von Hagen and Harden (1995) developed a framework in which there is a failure to fully internalise the true economic costs of public expenditure –another kind of Fiscal Illusion. The interests of individual spending ministers dominate over the collectivist interest of the Minister of Finances. Consensus is achieved in the cabinet because the spending ministers, either explicitly or implicitly, back each other's bids, resulting in "something for everyone" and thus a sub-optimal overall level of spending. Overall, a government with a high number of ministries (assuming that it is more influenced by external lobbies) tends to achieve less efficient results. Therefore, the dimension of government will be included in the list of variables for analyzing Fiscal Illusion.

The opportunity to expand the assumption of (full) rationality in models of public economics prompted a reaction from several authors as synthesized in Wittman (1995). Wittman (1995) does not believe in models that assume homogeneous misinformed electors or consumers. The costs of decision making are either ignored or assumed not to distort choice. When outcomes are uncertain, then economists typically assume that individuals maximize

expected utility. In this neoclassical framework, anomalies (of the individual perception) are the exception rather than the rule. For instance, in numerous social areas, individuals do not have the "required skills," yet they are able to make correct decisions. Also, if mature voters have specific interests or concerns, they can consult special interest groups for information on the candidates' positions on issues. Thus, the maturity of democratic institutions is rather important to the study of Fiscal Illusion. This maturity can be observed in the volume of voter turnout or in the international credit risk of the country, as Weymouth (2008) observes.

Cohen and Percoco (2004) state that the most recent macroeconomic literature has focused on the effect of public spending contraction and has provided two alternative theories: the theory of asymmetric effects of public spending and the theory of Fiscal Illusion. In particular, fiscal adjustment can be thought of as illusory when it reduces the budget deficit but the government net worth remains unaffected. Easterly (2001) shows that under certain conditions, a government will lower the conventional deficit while leaving its path of net worth unchanged; and when required to lower its debt accumulation, the government will lower its asset accumulation or increase its hidden liability accumulation by an equal amount, which follows the structural argument from Easterly (1999). This particular evidence of Fiscal Illusion is more visible when there is an increasing trend in another variable suggested by these authors –the proportion of capital transfers in the aggregated capital outlays.

Sanz and Velasquez (2003) and García-Alegre and López-Casasnovas (2004) point out the need to observe Fiscal Illusion from the side of public expenditures. They suggest that a particular dimension should be specially checked –the dispersion of public expenditures, a determinant of political illusion in the budget aggregates. They reveal that a lower value of the Herfindahl index related to public expenditures allows a less assertive interpretation by taxpayers, and it additionally magnifies the opportunism of expenditures.

Wagner (2001) also recognized that Puviani (1903) gave most of his attention to taxation, which is precisely where the term *Fiscal Illusion* obtains its meaning. Consequently, politicians should make taxes seem less of a burden than they really are. In his work, Wagner (2001) identifies trade taxes as a good form of taxation because they are not easily perceived by voters.

Searching for the psychological foundations of Fiscal Illusion, Sanandaji and Wallace (2003) reported the Theory of Mental Accounting. The Theory of Mental Accounting studies the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities. According to this theory, physical money is more valuable than electronic checks, and there is evidence for a kind of "public hedonic editing" –voters actually prefer not to be reminded of the costs of public programs (see also Winter and Mouritzen 2001).

Therefore, this perspective offers both arguments that the underestimation of tax levels could be beneficial to a hedonist society, and also arguments that support the predictions from the public choice theory –tax illusions can be used to facilitate rent seeking (as already pointed out by Keefer and Knack, 1997) and can be harmful to the same society. These ar-

guments express that some other dimensions will be studied in the Fiscal Illusion problem. Namely, the ability of a society to inspect budget accounts and to inspect political agents will be analyzed in particular. This ability can be inferred, as Jones (2006) says, from the education level of the whole society, from civic intervention, from the development level of mass media, or from checking the electors' preferences.

For P. Jones (2006), Fiscal Illusion is asymmetric. Within overall government budgets, domestic programs are very likely to crowd out international programs. This asymmetric Fiscal Illusion is also evident in questionnaire responses on public expenditure priorities. In some polls (like the aforementioned *British Social Attitudes Survey*), health care and education are invariably considered first or second priority for additional expenditure. Overseas aid has remained at the bottom, with defense expenditure just a little higher. While the relative benefits of international programs are underestimated, the relative costs are exaggerated, according to Jones (2006), who also stated that this revelation of preferences should be interpreted as a process of signalling electors' priorities, which can be used by political agents for opportunistic ends.

Finally, Forte (2004) provides some different examples of illusions that arise by a nexus between monetary and fiscal factors: i) fiscal drag due to the automatic increase of real tax rates in personal income tax from the loss of value of monetary income, subject to the progressive rates and to the lump sum deductions from the taxable income; ii) taxation of revenues of capital in the income tax at their face value, which normally includes a compensation for the loss of value of the capital invested; iii) taxation of profits because depreciations allowances are based on the book value of the assets, and this value in most cases is not the actual value but the historical one; iv) the Maastricht rules based on nominal deficits rather than real deficits[1] (that is, identified with the formula *Index of Consumer Prices*Debt/GDP + Nominal Deficit)*, which works for countries with higher debt/GDP and a greater propensity for inflation (the obtained results from the imposition of budgetary restrictions of the Maastricht and Amsterdam Pacts are not sufficiently strong to improve the performances of those countries).

As observed, the earlier authors (like Puviani 1903 or Buchanan 1967) focused on the manipulation of taxes as an instrument of Fiscal Illusion. However, one should recognize that more recent authors (like Von Hagen and Harden 1995; Sanandaji and Wallace 2003; or Garcia-Alegre and Lopez-Casasnovas 2004) are studying a larger list of dimensions, including public expenditures and the institutional characteristics of the societies.

Therefore, the Fiscal Illusion Index will be a measure of the use of the instruments that generate the Fiscal Illusion phenomenon, considering those variables denounced by the earlier authors but not neglecting those variables that the most recent authors are pinpointing, such as those deeply concerned with the quality of democratic institutions.

Table 1 provides a summary of the theoretical framework behind the construction of an index related to the phenomenon of Fiscal Illusion. It is evident that the dimensions behind this phenomenon are numerous. Besides the traditional issues (composition of public revenues, money creation, composition of public debt, or relevance of certain revenue sources)

I also found governmental discourse manipulation, electorate beliefs, the immaturity level of the democracies, and the interaction between interest groups and political behavior, among others. In table 1, I have also reported the suggested variables to study the various faces of Fiscal Illusion according to the literature.

Table 1
AUTHORS AND THEIR FOCUS ON FISCAL ILLUSION

Authors	Dimensions studied by the authors	Suggested variables following the authors
Puviani (1903) Buchanan (1960 and 1967)	Composition of Public Revenues; Composition of Public Debt; Relevance of certain revenue sources	*Herfindahl Index* of Public Revenues; Percentage of taxes on goods and services in total tax revenues; Ratio between indirect and direct tax revenues; Percentage of Public Debt in the Gross National Income; Percentage of short-term public debt in the national public debt; Percentage of taxes on transfers, on inheritances and gifts in total tax revenues; Percentage of taxes on corporate profits in total tax revenues.
Von Hagen and Harden (1995)	Number of governmental Ministries	Size of cabinets.
Wittman (1995) Weymouth (2008)	Immaturity level of the democracies	Percentage of invalid votes in parliamentary elections. International country risk.
Twight (1994) Alesina and Perotti (1996) Forte (2004)	Effectiveness of public accounts (considering Money creation, inflation rates and public debt)	Real Public Budget, according to Forte (2004); M2 (annual growth rates)
Keefer and Knack (1997), Jensen and Vestergaard (1999), Eusepi (2006)	Governmental rent-seeking	Government confidence (in public polls); Percentage of public employees in the active population.
Easterly (1999 and 2001) Cohen and Percoco (2004)	Composition of Public Capital outlays	Percentage of expenditures on capital transfers in the total expenditures.
Wagner (2001)	Relevance of trade taxes	Openness of the economy; Percentage of trade taxes in total tax revenues.
Winter and Mouritzen (2001) Sanandaji and Wallace (2003) Jones (2006)	Electorate and Parliamentary supervision on governmental activity; Electorate preferences	Number of nonprofit organizations per one million people; Average value of radio receptors, tv sets and newspapers per capita; Percentage of education expenditures in the total expenditures; Percentage of higher school complete in the total population. Number of governmental checks and balances. Parliamentary power in the Democracy. Percentage of answers stating 'economic growth' as the most important national issue.
Sanz and Velasquez (2003) García-Alegre and López-Casasnovas (2004)	Public expenditures manipulation	*Herfindahl Index* of Public Expenditures; Percentage of capital and current transfers in the total expenditures

3. The rationale behind an index for the Fiscal Illusion

As observed by Mourao (2007), the Fiscal Illusion phenomenon is rather complex for several reasons: nowadays a large set of authors contribute to its study from different perspectives; it refers to a wide range of economic realities; and finally, its complexity is also derived from the methodological use given to Fiscal Illusion itself. As Mourao (2007) states, sometimes authors use Fiscal Illusion as an assumption; other researchers employ the term as relating to hypotheses for solving previous problems, and other economists identify Fiscal Illusion with the consequences of fiscal manipulation.

In these cases, the construction of an Index that combines the many different dimensions of the studied phenomenon is strongly suggested, as mentioned in Kaufmann, Kraay, and Zoido-Lobatón (1999), Nardo *et al.* (2005) or Mourao (2005). Obviously, a preliminary problem lies in the loss of information when working with indexes; however, as these authors claim, the advantages are more significant than the disadvantages, and the loss of information is often a question of (data) size, not a question of (data) quality if the correct methods are followed.

Kaufmann, Kraay and Zoido-Lobatón (1999) recognized that aggregate fiscal indicators are useful because they allow countries to be sorted into broad groupings according to levels of governance, and they can be used to study the causes and consequences of fiscal movements in a much larger sample of countries than is usually observed.

Nardo *et al.* (2005) also recognized that indexes, as composite indicators, provide simple comparisons of countries that can be used to illustrate complex and sometimes elusive issues in wide ranging fields. These indicators often seem easier for the general public to interpret than do common trends found in many separate indicators, and they have proven useful in benchmarking country performance.

Finally, Mourão (2005) pointed out that working with analytical indexes is better for understanding an economic phenomenon than for analyzing its individual components. Working with indexes also avoids the introduction of redundant variables into econometric models, which creates the common problem of losing degrees of freedom; and, finally, it is more suitable simply to confront the involved methodological complexity.

Additionally, evidence also suggests that studying indexes of complex political and economic realities is more efficient than analyzing isolated variables (Alesina *et al.* 1996; Kaufmann, Kraay, and Zoido-Lobatón 1999; Hameed 2005; Bernoth and Wolff 2006; Alt and Lassen 2006).

Alesina *et al.* (1996) collected information on the budget institutions of Latin American countries. They classified those countries as a function of the values returned from their Index of Budgetary Institutions and also as depending on the presence of budgetary control practices. Their Index incorporated ten basic dimensions: constitutional constraints, legal re-

quirement for the approval of a macro program, borrowing constraints, authority of minister of finances, amendments by the Congress, consequences of Congress's rejection of the budget, opportunity to modify the budget after Congressional approval, opportunity to cut spending by the government after Congress's approval, assumption by the government of other political agencies' debt, and the autonomy of these other agencies to borrow. They concluded that transparent procedures were associated with more fiscal discipline.

Kaufmann, Kraay, and Zoido-Lobatón (1999) used a simple variant of an unobserved components model to combine the information from different sources into aggregate governance indicators, intending to provide better information for further empirical studies. These authors illustrated the methodology by constructing aggregate indicators of bureaucratic quality, rule of law, and graft for a sample of 160 countries.

Hameed (2005) developed indices of fiscal transparency for a broad range of countries based on the IMF's *Code of Good Practices on Fiscal Transparency,* using data derived from published fiscal transparency modules of the Reports on the Observance of Standards and Codes. The indices cover four clusters of fiscal transparency practices: data assurances, medium-term budgeting, budget execution reporting, and fiscal risk disclosures. Hameed (2005) concluded that more transparent countries are shown to have better credit ratings, better fiscal discipline, and less corruption, after controlling for other socioeconomic variables.

Alt and Lassen (2006) constructed a transparency index based on 19 advanced industrialized OECD economies in the 1990s and on four distinct categories: independent verification (for example, independently audited in-year financial reports); easy access and monitoring governance practices by external agents; clear and pre-defined budget syntax; and the presence of more justification for decisions, which solidifies the basis for decision making. The index included 11 items, most of which were taken from OECD's Best Practises for Budget Transparency (OECD 2001). Then, Alt and Lassen (2006) aggregated the 11 items additively into an index, whose values range from a minimum of zero (Japan) to a maximum of 11 (New Zealand). They concluded that electoral cycles exist in low transparency countries and that such cycles are statistically and economically significant.

Bernoth and Wolff (2006) captured the concept of governmental informational transparency with two measures. One is an index of auditing that they developed, called *Audit.* This index is calculated on the basis of the answers collected by an OECD and World Bank survey conducted in 2003, also used by Alt and Lassen (2006). Their audit index measures whether governments are financially audited externally, how independently the auditing can be performed, and how well the obtained information is disseminated. To each question from the OECD and World Bank survey conducted in 2003, Bernoth and Wolff (2006) assigned a value between zero and four, where four indicates the response most conducive to fiscal "transparency." This index was computed as the simple sum of the responses to all individual questions. The second index is based on a part of the indicator developed in the seminal paper by von Hagen (1992) and updated in Hallerberg, Strauch, and von Hagen (2005). Bernoth and Wolff (2006) called this indicator *Transparency*, though it is a measure of being

an informative transparency of the budget draft; it includes an assessment of transparency given by government officials; shows the degree to which special funds are included in the budget draft; and gives information about whether the budget consists of one document, whether it is linked to national accounts, and finally, whether government loans are included. Bernoth and Wolff (2006) concluded that fiscal transparency is connected with lower risk premia in their posterior estimations.

However, Alesina *et al.* (1996), Hameed (2005), and Alt and Lassen (2006), among others, specially studied the *reverse* of Fiscal Illusion –which is Fiscal Transparency. Consequently, the dimensions they chose to analyze were the ones referring to governance practices. As the authors who specifically studied Fiscal Illusion noticed, this phenomenon is not restricted only to the ruler agents but is also verified in the ruled ones, electors and firms. Therefore, a good Index for Fiscal Illusion must contemplate this variety of agents and their behaviour.

4. Data and Methodology

In this section, the main steps behind the construction of the Fiscal Illusion Index will be discussed.

As Nardo *et al.* (2005) argue, economic or social indexes can send misleading policy messages if they are poorly constructed or misinterpreted. Therefore, it is very relevant to follow prudent steps in order to reach significant aims and to avoid simplistic conclusions.

4.1. Variables and sources of data

After identifying the theoretical framework, we need to find the equivalent variables and to select data. Table A1 in the appendix provides an overview of this effort. A range of twenty-six variables was selected, taking into account their use in the literature (see table 1), analytical soundness, measurability, country coverage, relevance to the phenomenon being measured, and relationship to each other, as specified by Nardo *et al.* (2005) to develop a robust index. The data is related to 68 countries, including developing and developed countries. The countries[2] were selected using the *Polity IV* filter[3], following Brender and Drazen (2004), who have chosen only those democracies with positive values from the filter. The period covered is from 1960 to 2006.

The main sources of data are Barro and Lee (2000), *Cross-National Time-Series Data Archive* (2006), *Database of Political Institutions* (2004), *Government Finance Statistics* (2006), *International Country Risk Guide* (2006), *International Financial Statistics* (2006), *International Labour Organization Statistics* (2006), *Voter Turnout since 1945* (2002), and *World Development Indicators* (2006). The Web sites http://www.worldvaluessurvey.org/ and http://www.idealist.org also provide data. Table A.1 lists the sources for each variable.

Following Shi and Svensson (2002) and Nardo *et al.* (2005), missing values were filled in with the national average values of the variables.

Therefore, let X_{iT} be the random variable associated to country i to be analyzed for T years, i.e., $X_{iT}=\{x_{i1},x_{i2},...,x_{iT}\}$. Let r be the number of recorded or non-missing values on X_{iT}, and T-r the number of missing values. The *unconditional mean* is then given by

$$\overline{x}_i = \frac{1}{r}\sum_{recorded} x_{it} \tag{4.1}$$

The literature on the analysis of missing data is extensive, and it is in rapid development. More comprehensive surveys can be found in Little and Schenker (1994), Little (1997), and Little and Rubin (2002). As Nardo *et al.* (2005) show, the *unconditional mean imputation* is a well-used method classified in a single imputation group with explicit modelling. In the single imputation group, the predictive distribution must be generated by employing the observed data either through implicit or explicit modelling. Implicit modelling uses past or similar observations, and explicit modelling makes the distribution based on a formal statistical model with explicit assumptions.

Nguyen, Wang, and Carroll (2004) also recognized that the *unconditional mean imputation* is a simple method that is statistically better than some naïve methods, like replacing the missing values with zeros (or a positive constant) as do Alizadeh *et al.* (2000). This method is also recognized for minimizing index biases because combining several variables reduces the singular bias of each isolated variable[4]. Additionally, it is also demonstrated that this method minimizes the bias compared with alternative procedures when data evidence a cyclical component, as happens with some of the variables used in this work.

Wilks (1932), as quoted by Jackson (2003), also suggests replacing each incidence of a missing value with the average of all available data in the sample for that particular variable and obtaining the correlation matrix for this adjusted set of data. Jackson (2003) clearly refers to this as one of the most popular techniques for estimating correlation matrices in the presence of incomplete data.

But if simplicity is its main appeal, an important limitation of this single imputation method is its systematic underestimation of the variance of the estimates. Therefore, this method cannot be considered as a panacea that will entirely solve the problem of missing values. As Nguyen, Wang, and Carroll (2004) or Nardo *et al.* (2005) observe, the researcher must solidify the analysis with sensitivity and by means of uncertainty checks on the final products (final indexes), proceedings followed in this research as later described. Additionally, the researcher must be aware that the *unconditional mean imputation* fits better when it is used with a large number of variables (like the number used here) and with variables related to large cross-sectional data samples (and, of course, with a few of the missing points) that, when combined, will substantially minimize the pointed biases.

In this step, almost all the variables were used with their provided values or were enriched with the previously discussed suggestions *(unconditional mean imputation)* of Shi and Svensson (2002) and Nardo *et al.* (2005).

The exceptions were the variables built upon Herfindahl Indexes or growth rates. In the former case, the Herfindahl Index of a referred fiscal dimension (public expenditures or public revenues) followed Pommerehne and Schneider (1978) or Becker (1983), and it was defined in the simplest way as the sum of the squares of the shares of each individual component of that fiscal dimension[5]. In the latter case, the growth rates were computed as the difference of two consecutive observations of the logarithmized variable, observed yearly.

4.2. Methodology

Preprocessing

When there are many variables to be combined into one posterior indicator, Nardo *et al.* (2005) write metaphorically that the researcher must avoid "adding up apples and oranges." Therefore, an effort of normalization is required prior to any data aggregation as the indicators in a data set often have different measurement units. Additionally, Kroonenberg (2008) states that collected data may not be useful unless the raw values are pre-processed in an appropriate way. Then it is time for pre-processing the application of techniques to a data set before a model is fitted, especially centering, normalization, and standardization. Jolliffe (2002) also recognizes that when a variable is used to monitor a process over time (as in our case), its successive values are likely to be correlated unless the spacing between observations is large. According to Wold (1994) one possibility for taking into account this autocorrelation is to plot the normalized values of the ones observed.

Freudenberg (2003) and Jacobs *et al.* (2004) point out the existence of a large range of normalization methods. Considering the nature of the data previously described and the limitations of the alternative methods (see Nardo *et al.,* 2005), the normalization method chosen for each (country-year) observation is the percentile rank[6], taking into account all observations from each variable and the expected effect on Fiscal Illusion by the rise of a variable[7]. This method allows for the expression of prior units with different measures into normalized (and more likely comparable) variables. Additionally, Zimmerman and Zumbo (2005) showed that using percentiles markedly increased the power of "t" tests for skewed distributions and that percentiles were also the most efficient for symmetric distributions (as already pointed out in Ferguson, 1976).

The percentile rank is classified as a categorical scale normalization method. In this case, the top 1% received a score of 1, the top 2% received a score of 0.99, and so on. This method is very useful in economic and social research because it supplies results that allow us to see the effort of convergence among the cases, from the worst (year-case observation)

to the best, rewarding the best performing countries and penalising the worst (see Angell 2005 or Kaufmann, Kraay, and Mastruzzi 2006 for elucidative examples on governance and fiscal institutions quality).

For instance, suppose that the normalized variable X for country C and year Y has the value 0.840, and suppose that X for C and year Y+5 has the value 0.780. Therefore, I am able to suggest that during the period from Y to Y+5, the country C has enlarged its distance to (has diverged from) the country-year observation with the highest value of X. In spite of their notable advantages, categorical scales exclude non-negligible amounts of information about the variance of the transformed indicators; this exclusion reinforces the need for re-normalization of the combined values (Musgrove and Walsh 2005) and for performing posterior sensitivity and uncertainty examinations.

Multiway Data Analysis

To avoid the criticism of "indicator rich but information poor" that is common when indicators are selected in an arbitrary manner with little attention paid to the interrelationships between them, the data was observed through multivariate analysis. Giving arbitrary weights to the indicators that constitute an index (usually, all indicators have the same weight) may lead to indices that overwhelm, confuse, and mislead decision-makers and the general public.

Although there are a number of available methods (see Nardo *et al.,* 2005), the chosen method to explain the variance of the observed data through a few linear combinations of the original data was a specific technique belonging to the group of the Multivariate Analysis –the Multiway Principal Components Analysis (MPCA).

Before moving to an explanation of MPCA, it is important that one understand the concept of Principal Components Analysis (PCA). Some interesting references on this method are Hair *et al*. (2005), Kent, Bibby, and Mardia (2006), and Johnson and Wichern (2007). PCA is a dimensionality reduction technique. It produces a lower dimensional representation in a way that preserves the correlation structure between the process variables, and, as argued by Russell, Chiang, and Braatz (2000), it is optimal in terms of capturing the variability in the data.

When the process involves more than two dimensions (for instance, variables observed for some countries in various periods), the *PCA* method generates the *Multiway Principal Components Analysis (MPCA)*. This can be achieved considering a situation in which $x=1,2,...,X$ variables are recorded at $t=1,2,...,T$ periods throughout the sample of N countries. This results in a three-way data matrix $M\ (X*T*N)$.

In order to decompose the matrix M, I used the Tucker3 model (Tucker, 1966). In sum notation, it becomes:

$$m_{xtn} = \sum_{p=1}^{P} \sum_{q=1}^{Q} \sum_{r=1}^{R} g_{pqr}(a_{xp} b_{tq} c_{nr}) + e_{xtn}$$

where *g* is the *p*qr* matricized core array, *c* is an *n*r* column-wise orthonormal matrix consisting of country components, and *e* is the *x*tn* matrix of residuals. If the data and the solution are normalized, the scale components become loadings (variable-component correlations; principal coordinates), according to Kroonenberg (2008).

Because I used MATLAB and the N-way Toolbox version 2, the preferred model was a 4-1-1 (4 variable components, 1 country component, and 1 time component)[8].

In accordance with the relative importance of the component scores, the variability in the dimensions *country* and time is small, indicating a strong, stable time trend and stable country groupings. Therefore, I will focus on *variable* components' scores.

Table 2 shows that four components were retained (for economy of space, the other non-significant factors were omitted; the selection was made on the observation of the convex hull derived from the cross-plots of the residual sum of squares and the related degrees of freedom, available upon request). These components account for more than 80% (81.07%, to be precise) of the total variation.

Table 2
COMPONENT LOADINGS FOR FISCAL ILLUSION VARIABLES

Component	Eigenvalue	Difference	Proportion	Explained variability
1	12.64945	4.17212	0.4080	0.4080
2	8.47733	6.02921	0.2735	0.6815
3	2.44812	0.88984	0.0790	0.7605
4	1.55827	0.50874	0.0503	0.8107

Table 3 reveals the varimax component solution for Fiscal Illusion variables, a powerful suggestion of the weights that will calibrate each variable in the aggregate index[9]. These results were achieved through the rotation of the component space.

Table 3
VARIMAX COMPONENT SOLUTION FOR FISCAL ILLUSION VARIABLES

Variables	1	2	3	4
trd	**0.92504**	0.15369	0.12477	0.15922
icrg	0.43434	0.38172	**0.71098**	0.00244
inv_vot	**0.78653**	**0.55043**	0.08307	0.01592
pub_employ	0.18532	**0.93288**	0.25430	0.06257
pres_parl	0.02962	0.16898	0.34620	0.28901
checks	0.02336	0.01468	0.11139	0.36003
highedu	0.06366	0.14337	0.31790	0.11634

Table 3 ***(continuación)***
VARIMAX COMPONENT SOLUTION FOR FISCAL ILLUSION VARIABLES

Variables	1	2	3	4
gov_confid	**0.98835**	0.05771	0.02640	0.03472
higprefer	0.27676	**0.89509**	0.31793	0.00737
npopmilli	0.09355	0.17254	0.18554	0.04467
mediacs	0.08509	0.22399	0.38645	0.22323
cabin_size	**0.69747**	0.25477	0.26530	0.23952
money	**0.65390**	**0.50930**	0.36216	0.22573
shortdebt	0.09845	0.46136	0.26501	**0.51703**
pccaptransf	**0.80430**	0.28685	0.06437	0.27005
pctransfpart	0.16092	**0.94149**	0.26535	0.02251
pcgood	**0.79165**	0.46705	0.10527	0.09330
pcinttrade	**0.83732**	0.44819	0.14381	0.18450
txherfind	**0.84163**	0.14843	0.03391	0.25341
pceduc	0.06191	0.43404	0.17245	0.07932
herfdesp	0.04717	0.26357	0.05646	0.11338
ratcurcap	**0.78792**	0.26162	0.07167	0.20566
pcprofit	**0.56727**	**0.59957**	0.14311	0.24502
pcinherita	0.43490	0.45362	0.15586	0.42078
realbud	0.11555	0.16247	0.44526	0.17898
gnidebt	0.22851	**0.83302**	0.22043	0.15045

Legend - *Herfindahl Index* of Public Revenues [txherfind]; Percentage of taxes on goods and services in total taxes revenues [pcgood]; Ratio between indirect and direct taxes revenues [ratcurcap]; Percentage of Public Debt in the Gross National Income [gnidebt]; Percentage of short-term public debt in the national public debt [shortdebt]; Percentage of taxes on transfers, on inheritances and gifts in total taxes revenues [pcinherita]; Percentage of taxes on corporate profits in total taxes revenues [pcprofit]; Size of cabinets [cabin_size]; Percentage of invalid votes in parliamentary elections [inv_vot]; International country risk [icrg]; Real Public Budget, according to Forte (2004) [realbud]; M2 (annual growth rates) [money]; Government confidence (in public polls) [gov_confid]; Percentage of public employees in the active population [pub_employ]; Percentage of expenditures on capital transfers in the total expenditures [pccaptransf];Openness of the economy [trd]; Percentage of trade taxes in total taxes revenues [pcinttrade]; Number of nonprofit organizations per million of people [npopmilli];Average value of radio receptors, tv sets and newspapers per capita [mediacs]; Percentage of education expenditures in the total expenditures [pceduc]; Percentage of higher school complete in the total population [highedu]; Number of governmental checks and balances [checks]; Parliamentary power in the Democracy [pres_parl]; Percentage of answers stating 'economic growth' as the most important national issue [higprefer]; Herfindahl Index of Public Expenditures [herfdesp]; Percentage of capital and current transfers in the total expenditures [pctransfpart].

High and moderate loadings (>0.50) indicate how the sub-indicators are related to the principal components.

The first component has high positive coefficients (loadings) with openness of the economy (0.93), percentage of invalid votes (0.79), confidence in government (0.99), government size (0.70), money creation (0.65), percentage of capital transfers in public capital expenditures (0.80), percentage of indirect taxation in public revenues (0.79), percentage of trade taxes in total tax revenues (0.84), Herfindahl Index of public revenues (0.84), ratio between indirect and direct taxation (0.86) and percentage of taxes on corporate profits in total

tax revenues (0.57), indicating that Component 1 may be due to Fiscal Illusion in its *strictus sensu*, motivated by fiscal manipulation used by incumbents. In a very interesting side note, it can be observed that this component especially points to the variables already suggested by the first generation of authors.

Component 2 is mainly dominated by political-economic variables characterizing the electorate, mostly suggested by the most recent authors: percentage of invalid votes (0.55), percentage of public employees in the active population (0.93), percentage of answers indicating "economic growth" as the most important national issue (0.90), growth rate of M2 aggregate (0.51), percentage of capital and current transfers in the total expenditures (0.94), percentage of taxes on corporate profits in total tax revenues (0.60) and percentage of public debt in the Gross National Income (0.83).

Components 3 and 4 are mainly subject to short-term debt restrictions and to the government's ability to persuade economic agents and to get more significant political rents (reflected in a higher country risk as pointed out by Keefer and Knack 1997).

Weights

In the last step of the production of the Fiscal Illusion Index, it is time to deal with the construction of the weights from the matrix of factor loadings after rotation, given that the squares of factor loadings represent the proportion of the total unit variance of the indicator, which is explained by the factor. The approach used by Nicoletti, Scarpetta, and Boylaud (2000) is to group the sub-indicators with the highest factor loadings into *intermediate* composite indicators, whose number is equal to the number of factors. Therefore, each normalised variable with a significant factor loading (greater than 0.7) will have a weight equal to the square of the factor loading divided by the explained variation by the factor[10]. At the end, each intermediate composite indicator will have a weight equal to its proportion of the variance as explained by all the variables components[11]. Finally, since the component scores related to the country and to the year are stable, it is advisable not to re-compute the final value, considering these stable dimensions (Jolliffe 2002; Kroonenberg 2008).

In our case, the final value given to each country-year observation is re-scaled, again using the percentile rank but now considering all weighted values. Therefore, the Fiscal Illusion Index as a percentile ranking indicates how a country-year observation performs compared to the other country-year observations in its position. The Fiscal Illusion Index ranges from a low of 0.01 (lowest level of Fiscal Illusion)[12] to a high of 0.99 (highest level of Fiscal Illusion)[13]. A 0.50 ranking is an average performance. It is implicit that lower levels are associated with a less intense Fiscal Illusion. This case (lower level of Fiscal Illusion) is better for the majority of voters/taxpayers, which follows the literature that has mainly pointed to Fiscal Illusion as a source of disutilities for most individuals.

Table A.2 shows values for the first (1960) and last (2006) years of the Fiscal Illusion Index for each of the countries. The remaining values are available upon request.

4.3. Sensitivity analysis

At the end of the production of the Fiscal Illusion Index, an uncertainty and sensitivity analysis must be done, an essential step in finding out about composite indicators. This step is widely applied for the robustness assessment of composite indicators and has proven to be useful in dissipating some of the controversy that may surround the interpretation. For this purpose, the three-step methodology of Giglioli and Saltelli (2000) and Nardo *et al.* (2005) was followed.

In the first step, for the Fiscal Illusion Index case study, five main sources of uncertainty inputs have been addressed: inclusion-exclusion of one variable at a time, imputation of missing data, different distribution functions characterising the variables for each country during the sample period, different weighting schemes, and different aggregation schemes. For a detailed explanation see Nardo *et al*. (2005).

The second step involves randomly generating N combinations of uncertainties. For each trial sample, the computational model can be evaluated, generating values for the scalar output variable (the value of the rank assigned by the composite indicator to each country-year observation or the averaged shift in that rank).

The third step closes the loop over the combinations and analyzes the resulting output vector. The sequence of this final output vector, such as the variance and higher order moments, can be estimated with an arbitrary level of precision that is related to the size of the simulation.

Observing the previous steps and referring to the software SimLab 1.1, the final output vector evidences the simulated distribution for each country-year observation embodying the described uncertainty factors. Figure A.1 shows the correlation between the raw values of the reference Fiscal Illusion Index and the central values of the output generated by SimLab 1.1 (after running 10,000 simulations). As can be observed, there is a high pattern of correlation, indicating robustness of the Fiscal Illusion Index values. Figure A.1 shows the cases for only two years (1960 and 2006), although the simulation was carried out for all years in the sample, and is available upon request.

The margins of error for the aggregate Fiscal Illusion indicator are displayed in the two panels of Figure A.2, where countries are organized in ascending order according to their point estimates of the Fiscal Illusion Index in 1960 and in 2006 on the horizontal axis; and on the vertical axis, I plot the raw values of the index and the associated 90% confidence intervals (right label) and the amplitude of the intervals (left label). These intervals indicate the range in which it is 90% likely that the true score falls. As observed, the ranges are not sig-

nificantly large, indicating reasonable estimates. It is also observed that the amplitude of the intervals tends to diminish between 1960 and 2006.

Composite indicators, like the Fiscal Illusion Index, often measure concepts that are linked to well-known and measurable phenomena or to other indexes. These links can be used to test the explanatory power of a composite. Simple cross-plots are often the best way to illustrate such links.

Figure A.3 illustrates this aspect. There it is confirmed that higher GDP per capita, government transparency, and good governance practices are negatively associated with Fiscal Illusion, while a higher international risk is positively associated with Fiscal Illusion, being in accordance with prior expectations (that Fiscal Illusion reduces economic growth, happens more in countries with low levels of development and with less transparent governance practices, and worsens the competitiveness of a country in the international markets).

Synthesizing the methodological steps that produced the Fiscal Illusion Index, I can state the following: First, the index is the result of a construction that aimed to measure the degree of national Fiscal Illusion through a combination of the various instruments (variables) that produce the phenomenon according to the literature. This combination followed a detailed set of steps, from the theoretical framework to sensitivity tests on final results. At last, an index was achieved. This index reflects the multiplicity of dimensions studied by the authors, like tax manipulation (particularly studied by the earliest authors) or the relevance of the social-economic pattern of the electorate (particularly studied by the most recent authors). The values cover a large period (1960-2006) for a considerable set of countries (68).

The following section suggests some lessons from these values.

5. Fiscal Illusion across the democracies-some comments on the Results

As mentioned, table A.2 shows two values (1960 and 2006, the first and the last years) of the Fiscal Illusion Index for each one of the studied countries. Higher values of the index reveal higher patterns of Fiscal Illusion. Table A.2 also identifies the national improvement (third column, difference between the percentile rank of 1960 and that of 2006) and each country's average and standard deviation values (fourth column).

The decrease in the values of the Fiscal Illusion index for all countries between 1960 and 2006 reveals that there has been a generalized reduction in Fiscal Illusion over time. Therefore, I can infer that democratic maturity improves good governance practices, consequently reducing *Fiscal Illusion* levels.

However, this reduction was not equal across countries. The most significant improvements occurred in countries like Belgium, Italy, Portugal, or Spain, with a decrease of more than fifty percent. Although more work needs be done in order to clarify the particular rea-

sons behind this variety of behaviors, some general determinants can be pointed out. These determinants are related to the deep changes in the significant reduction of the percentage of invalid votes (reflecting a more assertive electorate) and to the significant integration into the world markets (which promotes an additional need for evidencing better fiscal results as a source of competitiveness). These were especially noticed in the last years of the sample (end of the 1990s and beginning of the 21st century).

It is also interesting to analyze the central value for each country, shown in the fourth column from table A.2. The countries with the highest values are El Salvador, Guatemala, Honduras, India, Madagascar, Mali, Pakistan, Philippines, Russia, and Sri Lanka. Conversely, Austria, Luxembourg, Netherlands, and New Zealand are some of the countries with the lowest average values.

For purposes of identifying group patterns, figure 1 presents the average value for each year for different selections. Countries were grouped according to two dimensions: age of democracy (old/new democracies) and degree of development of the country (developed/developing). Following Brender and Drazen (2004), developed countries include the OECD Economies that were members of the organization during the entire sample period, plus Spain, Portugal, Greece, and Turkey, examples of "new" democracies. Twenty-four countries in our sample belong to this group and the other 44 are classified as developing countries. Old democracies include the established democracies (that is, all countries which were in a sample of democracies using the POLITY filter, excluding the new democracies). In our sample and following Brender and Drazen (2004), 32 countries were considered as "old" democracies and the other 36 as "new." Table A.3 identifies this selection.

Figure 1 shows a downtrend of the Fiscal Illusion level for all of the samples. This downtrend follows Wittman (1995), among other authors who have been studying the institutional

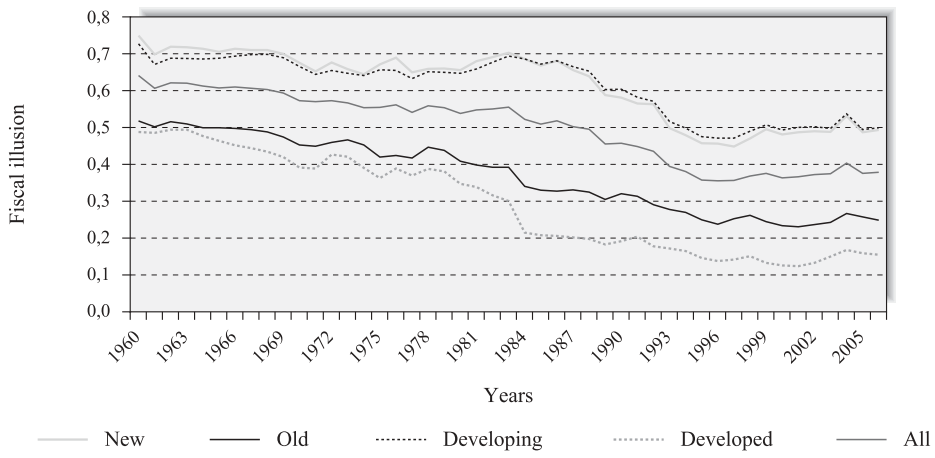

Figure 1. Fiscal Illusion across the democracies

changes produced by democratic maturity. Wittman (1995), for instance, revealed that the maturity of a democracy tends to be associated with a decreasing level of Fiscal Illusion.

However, it is important to stress that in 2006 new democracies or developing countries had a level of Fiscal Illusion equivalent to the one characterizing old democracies or developed countries in 1960 (0.50). This fact suggests that new democracies or developing countries, on average, are exhibiting the Fiscal Illusion dimensions that the developed world had forty years ago.

Briefly analyzing the series, it can be observed that the Fiscal Illusion level of new democracies/developing countries remained stable until 1984/1985, years that signal the beginning of a period of diminishing values. After a period of a more significant decrease (1984-1995), the level of Fiscal Illusion stabilized until the last temporal observation. In this period, the most favorable evolution was verified in the openness of the economies (a rise of 20 percentage points, on average), in the reduction of cabinet sizes (about 25% of the initial values, on average), in the evolution of the proportion of revenues collected from indirect taxes (a reduction of 3 percentage points, on average), and in the ratio between indirect and direct taxes (a reduction of 23 percentage points, on average).

A different pattern is verified with old democracies/developed countries. In these cases, the convergence with the best country-year observation kept a permanent rhythm from 1960 until 1990, when a period of stabilization began. For these cases, the variables that show the most significant convergence pattern are the percentage of invalid votes (reduction of 4 percentage points, on average), the cabinet sizes (reduction of 35% of the initial number of ministries, on average), the proportion of capital transfers on capital expenditures (reduction of 14 percentage points, on average) and the ratio between indirect and direct taxes (reduction of 22 percentage points, on average).

These periods of slightly constant levels can be interpreted as periods of unchanging patterns in the dimensions that produced the Fiscal Illusion Index. This reveals that in spite of the national and international economic, social, and political convulsions, there are institutions in each country and in each group of countries that maintain the fiscal and political practices leading to a certain value of Fiscal Illusion.

6. Conclusion

This paper reports a method for building an index of Fiscal Illusion that can be used in much the same manner as the recently cited Transparency Indexes. Because the original sense of Fiscal Illusion encompasses both electoral sides (voters and politicians), the index is relevant for measuring the democratic status of the countries.

An extremely comprehensive database is used to estimate an index for Fiscal Illusion, which enables the development of a large portrait of the vitality of the 68 democracies studied since 1960.

After the identification of the theoretical framework, twenty-six variables have been chosen according to their use in the cited literature. Considering the nature of the data and the limitations of the alternative methods, the percentile rank (as a normalization method) was chosen for each (country-year) observation, taking into account all observations from each variable. The chosen method to explain the variance of the observed data through a few linear combinations of the original data was a specific technique belonging to the group of the Multivariate Analysis –the Multiway Principal Components Analysis (MPCA). Therefore, each normalized variable with a significant factor loading (greater than 0.7) had a weight equal to the square of the factor loading divided by the explained variation by factor. At the end, each intermediate composite indicator had a weight equal to its proportion of the variance as explained by all the factors.

In our case, the final value given to each country-year observation is re-scaled, again using the percentile rank but now considering all weighted values. Therefore, the Fiscal Illusion Index, as a percentile ranking, indicates how a country-year observation performs compared to the other country-year observations in its position.

Although it was confirmed that there has been a generalized movement of convergence to the observation with the lowest level of Fiscal Illusion, the Fiscal Illusion Index shows that the situation varies greatly around the world. It was verified that the countries with the highest average values are Mali, Pakistan, Russia, and Sri Lanka. Conversely, Austria, Luxembourg, Netherlands, and New Zealand are some of the countries with the lowest average values. It was also observed that the Fiscal Illusion level of new democracies/developing countries remained stable until 1984/1985, years that signal the beginning of a period of diminishing values. After a period of significant decrease (1984-1995), the level of Fiscal Illusion had stabilized by the last temporal observation. A different pattern was verified with old democracies/developed countries. In these cases, the convergence with the best country-year observation had kept a permanent rhythm from 1960 until 1990, when a period of stabilization began. These periods of slightly constant levels reveal that in spite of the national and international economic, social, and political convulsions, there are institutions in each country and in each group of countries that maintain the fiscal and political practices leading to a certain value of Fiscal Illusion.

The Fiscal Illusion Index allows for research on the role of illusory practices by politicians to achieve their particular aims of deceiving specific electorates. It additionally shows that despite being an old idea, first suggested in 1903, Fiscal Illusion is a phenomenon that persists in democratic countries, conditioning their economies, mainly their fiscal aggregates. However, more research needs to be done on the relationship between Fiscal Illusion, economic conditions, and political realities.

Notes

1. Hahn (1949) had already studied this kind of illusion in a different context (Keynesian policies during post-II World War).

2. Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Dominican, Ecuador, El Salvador, Estonia, Fiji, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea, Lithuania, Luxembourg, Madagascar, Malaysia, Mali, Mauritius, Mexico, Nepal, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Trinidad and Tobago, Turkey, United Kingdom, United States of America, Uruguay, and Venezuela.

3. See http://www.systemicpeace.org/polity/polity4.htm.

4. Additionally, it is anticipated that through the Multiway Principal Components Extraction used, the less significant components belong to the variables with the smallest number of non-missing values, strengthening the minimization of eventual biases due to the chosen imputation methods when the factor loadings are used as weights of the variables for generating an index.

5. Although the use of Herfindahl Indexes has intuitive appeal, it is far from being a perfect measure of tax or public spending complexity, since it assumes that different types of taxes have the same potential to deceive individuals and create illusions, as clearly enunciated by Ovaska (2003), among others. Therefore, a measure of Fiscal Illusion should combine the different dimensions proposed by the literature, minimizing the bias induced by recurring to isolated (raw) variables that are identified with the phenomenon itself.

6. The percentile rank of a country-year observation *(it)* of variable *x* is: $\tilde{\text{pc}}_{\text{xit}} = 100 * \frac{\text{cfi}_{\text{it}} + 0,5\text{fi}_{\text{it}}}{\text{N}_{\text{it}}}$, where cf_{it} is the cumulative frequency for all scores lower than the country-year score of interest, f_{it} is the frequency of the score of interest, and N_{it} the number of country-year observations (N_{it} is the product between the number of countries and the number of annual observations).

7. If the expected effect was negative, then the rank was re-ordered, considering the difference between 1 and the (raw) percentile rank. Otherwise, the rank was not modified.

8. The number of components for the analysis was determined by examining deviance plots for the Tucker3 model. On the vertical axis the residual sum of squares is shown, and on the horizontal axis the associated degrees of freedom are plotted. The preferred models lie on a convex hull. Deviance plots and more technical details of the dimensionality selection are available upon request.

9. As Kroonenberg (2008, p. 226) refers, each squared coefficient indicates the explained variability that is used instead of its predictor. See, please, for a full explanation of the factor loadings Hair *et al*. (2005), Kent, Bibby and Mardia (2006), or Johnson and Wichern (2007).

10. Using data from tables 2 and 3, the Factor 1 Intermediate Indicator (F1) for country *i* at year *t* is:
$$\text{F1}_{\text{it}} = \frac{0.925^2}{0.408}\text{ltrd}_{\text{it}} + ... + \frac{0.568^2}{0.408}\text{pcprofit}_{\text{it}},$$
and so on until F4. Therefore, F1_{it} is a weighted average of the normalised variables with a significant factor loading (greater than 0.7) for each country-year observation.

11. The (raw, not re-scaled) *Fiscal Illusion Indicator (FI)* considering only the variables components is:
$$\text{FI}_{\text{it}} = \frac{0.408}{0.811}\text{F1}_{\text{it}} + ... + \frac{0.050}{0.811}\text{F4}_{\text{it}}$$

12. This observation is for New Zealand, 2002. Some of the variables' values are Herfindahl Index of Public Revenues (0.449); percentage of taxes on goods and services in total tax revenues (19.4%); ratio between indirect and direct tax revenues (0.360); percentage of taxes on corporate profits in total tax revenues (9.30%); average value of radio receptors, TV sets, and newspapers per capita (30,450); percentage of education expenditures in the total expenditures (13.9%); percentage of higher school completed in the total population (16.0%); percentage of invalid votes in parliamentary elections (0.66%); International Country Risk (13.65); number of non-profit organizations per million people (29.58); percentage of public employees in the total active population (5.1%); and Herfindahl Index of Public Expenditures (0.715).

13. This observation is for Sri Lanka, 1988. Some of the variables' values are: Herfindahl Index of Public Revenues (0.209); percentage of taxes on goods and services in total tax revenues (35.2%); ratio between indirect and direct tax revenues (2.501); percentage of taxes on corporate profits in total tax revenues (7.62%); average value of radio receptors, TV sets, and newspapers per capita (1987); percentage of education expenditures in the total expenditures (8.50%); percentage of higher school completed in the total population (0.8%); percentage of invalid votes in parliamentary elections (5.45%); International Country Risk (0.00); number of non-profit organizations per million people (2.76); percentage of public employees in the total active population (8.23%); and Herfindahl Index of Public Expenditures (0.228).

References

Alesina, A. and Perotti, R. (1996), "Fiscal Discipline and the Budget Process", *American Economic Review Papers and Proceedings,* 86: 401-407.

Alesina, A.; Haufman, R.; Hommes, R. and Stein, E. (1996), "Budget institutions and Fiscal performance in Latin America", *NBER Working Papers Serie,* Working Paper, 5586.

Alizadeh, A. *et al.* (2000), "Distinct types of diffuse large B-cell lymphoma identified by gene expression profiling", *Nature*, 403: 503-511.

Alt, J. and Lassen. D. (2006), "Fiscal Transparency, Political Parties, and Debt In OECD Countries", *European Economic Review,* 50 (6): 1.403-1.439.

Angell, A. (2005), "Democratic governability in Chile", Conference Paper for *Democratic Governability in Latin America*, Kellogg Institute, University of Notre Dame.

Barro, R. and Lee, J. (2000), "International Data on Educational Attainment: Updates and Implications", manuscript, Harvard University.

Becker, G. (1983), "A Theory of Competition Among Pressure Groups for Political Influence", *Quarterly Journal of Economics,* 47 (3): 371-400.

Bernoth, K. and Wolff, G. (2006), "Fool the markets? Creative accounting, fiscal transparency and sovereign risk premia", *Deutsche Bundesbank Discussion Paper* 19/2006.

Brender, A. and Drazen, A. (2004), "Political Budget Cycles in New versus Established Democracies", *NBER Working Papers Series,* Working Paper 10539.

Buchanan, J. (1960), *Fiscal theory and Political Economy,* The University of North Carolina Press, Chapel Hill: 59-64.

Buchanan, J. (1967), *Public Finance in democratic process: fiscal institutions and individual choice,* The University of North Carolina Press, Chapel Hill

CNTSDA (2006), *Cross-National Time Series Data Bank, 1815-1999*, Databanks International, Jerusalem.

Cohen, R. and Percoco, M. (2004), "The Fiscal Implications of Infrastructure Development", Actas da Conferencia *La inversion en infraestructura en América Latina y el Caribe: Perspectivas y problemas de segunda generación,* Washington.

DPI (2004), *Database of Political Institutions,* World Bank, Washington.

Easterly, W. (1999), "When is fiscal adjustment an illusion?", *Policy Research Working Paper Series,* 2109, The World Bank.

Easterly, W. (2001), "Growth Implosions, Debt Explosions, and My Aunt Marilyn: Do Growth Slowdowns Cause Public Debt Crises?", *World Bank Policy Research Working Paper* 2531, The World Bank.

Eusepi, G. (2006), "Public Finance and Welfare: From the ignorance of the veil to the veil of ignorance", *Journal of Economic Behavior and Organization,* 59: 460-477.

Ferguson, G. (1976), *Statistical Analysis in Psychology and Education,* 4th Edition, McGraw-Hill, New York.

Forte, F. (2004), "Fiscal and Monetary Illusion and the Maastricht rules", *XVI Conference SIEP-Società Italiana di Economia Pubblica*, Pavia.

Freudenberg, M. (2003), *Composite indicators of country performance: a critical assessment,* OECD, Paris.

García-Alegre, E. and López-Casasnovas, G. (2004), "The effects of poor financial information systems on the long term sustainability of local public services - Empirical evidence from the Catalan Municipalities.", UPF *Working Paper* 746, Universitat Pompeu Fabra.

GFS (2006), *Government Financial Statistics,* International Monetary Fund, New York.

Giglioli, N. and Saltelli, A. (2000), "SimLab 1.1, Software for Sensitivity and Uncertainty Analysis, tool for sound modelling", mimeo, available from http://arxiv.org/abs/cs/0011031

Hahn, A. (1949), *The Economics of Illusion-A Critical analysis of contemporary economic theory and practice,* Fraser Publishing Company, New York.

Hair, J. *et al.* (2005), *Multivariate Data Analysis* (6th Edition), Prentice Hall, New York.

Hallerberg, M.; Strauch, R. and Von Hagen, J. (2005), "Fiscal Rules in the European Union 1991-2001: Updating the Von Hagen Fiscal Index," mimeo.

Hameed, F. (2005), "Fiscal Transparency and Economic Outcomes", *IMF Working Paper*, WP/05/225.

ICRG (2006), *International Country Risk Guide (2006),* The Political Risk Services Group, New York.

IFS (2006), *International Financial Statistics,* International Monetary Fund, New York.

ILO (2006), *International Labour Organization Statistics,* International Labour Organization, Geneva.

Jackson, J. (2003), *A User's Guide to Principal Components,* John Wiley & Sons, Wiley-Interscience, New Jersey.

Jacobs, R.; Smith, P. and Goddard, M. (2004), "Measuring performance: an examination of composite performance indicators", *Centre for Health Economics Technical Paper Series,* 29.

Jensen, F. and Vestergaard, N. (1999), "Regulation of Renewable Resources in Federal Systems-the case of fishery in EU", *Working Papers 3/99*, Department of Environmental and Business Economics, University of Southern Denmark.

Johnson, R. and Wichern, D. (2007), *Applied Multivariate Statistical Analysis,* 6th Edition, Prentice Hall, New York.

Jolliffe, I. (2002), *Principal Component Analysis,* 2nd edition, Springer Science, New York.

Jones, P. (2006), "Taking self-interest into account-a Public Choice analysis of international cooperation", in Kaul, I. and P. Conceiçao (2006), *The New Public Finance,* Oxford University Press, Oxford: 304-323.

Kaufmann, D.; Kraay, A. and Mastruzzi, M. (2006), "Governance Matters V: Aggregate and Individual Governance Indicators for 1996-2005", The World Bank.

Kaufmann, D.; Kraay, A. and Zoido-Lobatón, P. (1999), "Aggregating Governance Indicators", *Policy Research Working Paper,* 2195, The World Bank.

Keefer, P. and Knack, S. (1997), "Why don't poor countries catch up? A cross-national test of institutional Explanation", *Economic Inquiry,* 35 (3): 590-602.

Kent, J.; Bibby, J. and Mardia, K. (2006), *Multivariate Analysis (Probability and Mathematical Statistics),* Elsevier, New York.

Kroonenberg, P. (2008), *Applied Multiway Data Analysis,* John Wiley & Sons, Wiley Interscience, New Jersey.

Lipford, J. (2001), "How transparent is the US Budget?", *The Independent Review,* 5 (4): 575-591.

Little R. (1997), "Biostatistical Analysis with Missing Data", in Armitage, P. and Colton, T. eds. (1997), *Encyclopedia of Biostatistics,* Wiley, London.

Little R. and Rubin, D. (2002), *Statistical Analysis with Missing Data,* Wiley Interscience, J. Wiley &Sons, Hoboken, New Jersey

Little, R. and Schenker, N. (1994), "Missing Data", in Arminger, G.; Clogg, C. and Sobel, M. eds (1994), *Handbook for Statistical Modeling in the Social and Behavioral Sciences,* Plenum, New York, 39-75.

Mourao, P. (2005), "A importância do desenvolvimento regional na localização das equipas de futebol profissionais. O caso português 1970-1999", *Revista Portuguesa de Estudos Regionais,* vol. 8: 31-45.

Mourao, P. (2007), "The Economics of Illusion –a discussion based on Fiscal Illusion", *Journal of Public Finance and Public Choice,* 25 (1): 67-86.

Musgrove, T. and Walsh, R. (2005), "Utilizing multiple agents in dynamic product recommendations", *Nineteen International Joint Conference on Artificial Intelligence Paper,* Edinburgh, Scotland.

Nardo, M. *et al*. (2005), "Handbook on Constructing Composite Indicators: Methodology and User Guide", *OECD Statistics Working Papers,* 2005/3,OECD Publishing.

Nguyen, D.; Wang, N. and Carroll, R. (2004), "Evaluation of Missing Value Estimation for Microarray data", *Journal of Data Science,* 2 (4): 347-370.

Nicoletti, G.; Scarpetta, S. and Boylaud, O. (2000), "Summary indicators of product market regulation with an extension to employment protection legislation", OECD, *Economics department working papers,* 226.

OECD (2001), "OECD Best Practices for Budget Transparency", *Public Management Committee,* PUMA/SBO(2000)6/FINAL

Ovaska, T. (2003), *Essays on International Political Economy,* PhD Dissertation, West Virginia University.

Pommerehne, W. and Schneider, F. (1978), "Fiscal Illusion Political Institutions and local spending", *Kyklos,* 31: 381-408.

Puviani, A. (1903), *Teoria della illusione finanziaria,* Sandron, Palermo.

Russell, E.; Chiang, L. and Braatz, F. (2000), "Fault detection in industrial processes using canonical variate analysis and dynamic principal component analysis", *Chemometrics and Intelligent Laboratory Systems,* 51: 81-93.

Sanandaji, T. and Wallace, B. (2003), "Fiscal Illusion and fiscal obfuscation: an empirical study of tax perception in Sweden", *M. Sc. Thesis in Economics*, Stockolm School of Economics, Stockolm.

Sanz, I. and Vélasquez, F. (2003), "Fiscal illusion, fiscal consolidation and government expenditure composition in the OECD: a dynamic panel data approach", *European Economy Group Working Paper 21/2003,* Universidad Complutense de Madrid.

Shi, M. and Svensson, J. (2002), "Political budget cycles in developed and developing countries", *manuscript,* Institute for International Economic Studies, Stockholm University.

Tucker, L. (1966), "Some mathematical notes on three-mode factor analysis", *Psychometrika*, 31: 279-311.

Twight, C. (1994), "Political Transaction-Cost Manipulation: An Integrating Approach", *Journal of Theoretical Politics*, 6: 189-216.

Von Hagen, J. (1992), "Budgeting Procedures and Fiscal Performance in the European Communities", *Economic Papers,* 96.

Von Hagen, J. and Harden, I. (1995), "Budget Processes and Commitment to Fiscal Discipline", *European Economic Review,* 39: 771-779.

VTs1945 (2002), *Voter Turnout since 1945: a global report,* International Institute for Democracy and Electoral Assistance (eds: Rafael López Pintor and Maria Gratschew), Stockolm.

Wagner, R. (2001), "From the Politics of Illusion to the High Cost of Regulation", *Of public interest,* 3 (8).

WDI (2006), *World Development Indicators,* Word Bank, Washington.

Weymouth, S. (2008), "Political institutions and property rights: financial sector evidence", Available at SSRN: http://ssrn.com/abstract=1103533

Wilks, S. (1932), "Certain generalizations in the analysis of variance", *Biometrika,* 24: 471-494.

Winter, S. and Mouritzen, P. (2001), "Why people want something for nothing: The role of asymmetric illusion", *European Journal of Political Research*, 39: 109-143.

Wittman, D. (1995), *The myth of democratic failure: why political institutions are efficient,* The University of Chicago Press, Chicago.

Wold, S. (1994), "Exponentially weighted moving principal components analysis and projections to latent structures", *Chemometrcis Intell. Lab. Syst.*, 23: 149-161.

Zimmerman, D. and Zumbo, B. (2005), "Can Percentiles replace raw scores in the statistical analysis of test data?", *Educational and Psychological Measurement,* 65 (4): 616-638.

Cited Electronic Sites:
http://www.idealist.org/
http://www.worldvaluessurvey.org/

Resumen

Este trabajo presenta un índice de la ilusión fiscal en 68 países democráticos desde1960 a 2006. La teoría de la ilusión fiscal estudiada se relaciona con una opinión incorrecta de los agregados del gobierno por parte de los votantes y de los pagadores de impuestos. En la construcción del índice, las etapas metodológicas fueron consideradas cuidadosamente. Los resultados obtenidos revelan que la ilusión fiscal varía grandemente en todo el mundo. Países tales como Malí, Paquistán, Rusia, y Sri Lanka tienen el valor medio más alto. Austria, Luxemburgo, Países Bajos, y Nueva Zelandia tienen el más bajo. En relación con la dimensión del tiempo, entre el ano 1980 y 1995 había una disminución significativa del valor medio del índice a través de países, sugiriendo una reducción de la ilusión fiscal durante este período. Después de 1995, el índice sigue a siendo estable en la mayoría de los países.

Palabras clave: Ilusion Fiscal; Índices/Indicadores; Democracia.

JEL Codes: C82; E62; H11; H30.

ANNEXES

Table A.1
DIMENSIONS OF FISCAL ILLUSION, RELATED VARIABLES AND DATABASES

Dimensions studied	Variables, [short denomination]	Expected effect on nacional Fiscal Illusion (by a rise of the variable)	Source	Number of non-missing values (1960-2006, 68 countries)	Notes on missing values
Composition of Public Revenues	*Herfindahl Index* of Public Revenues, [txherfind]	-	GFS	1431	a)
	Percentage of taxes on goods and services in total taxes revenues, [pcgood]	+	GFS	1592	a)
	Ratio between indirect and direct taxes revenues, [ratcurcap]	+	GFS	1518	a)
Composition of Public Debt	Percentage of Public Debt in the Gross National Income, [gnidebt]	+	WDI	3060	
	Percentage of short-term public debt in the national public debt, [shortdebt]	-	WDI	3060	
Relevance of certain revenue sources	Percentage of taxes on transfers, on inheritances and gifts in total taxes revenues, [pcinherita]	+	GFS	1470	a)
	Percentage of taxes on corporate profits in total taxes revenues, [pcprofit]	+	GFS	1590	a)
Number of governmental Ministries	Size of cabinets, [cabin_size]	+	CNTSDA	3055	
Immaturity level of the democracies	Percentage of invalid votes in parliamentary elections, [inv_vot]	+	VTS1945	1088	a)
	International country risk, [icrg]	-	ICRG	2914	a)
Effectiveness of public accounts (considering Money creation, inflation rates and public debt)	M2 (annual growth rates), [money]	+	IFS	3112	
	Real Public Budget, according to Forte (2004), [realbud]	+	IFS	3189	c)
Governmental rent-seeking	Government confidence (in public polls), [gov_confid]	+	http://www.world-valuessurvey.org/	1592	a)
	Percentage of public employees in the active population, [pub_employ]	+	ILO	2048	
Composition of Public Capital outlays	Percentage of expenditures on capital transfers in the total expenditures, [pccaptransf]	+	GFS	1298	a)
Relevance of trade taxes	Openness of the economy, [trd]	-	IFS	2653	
	Percentage of trade taxes in total taxes revenues, [pcinttrade]	+	GFS	1592	a)

Table A.1 ***(continued)***
DIMENSIONS OF FISCAL ILLUSION, RELATED VARIABLES AND DATABASES

Dimensions studied	Variables, [short denomination]	Expected effect on nacional Fiscal Illusion (by a rise of the variable)	Source	Number of non-missing values (1960-2006, 68 countries)	Notes on missing values
Electorate and Parliamentary supervision on governmental activity	Number of nonprofit organizations per million of people, [NPOpmilli]	-	http://www.idealist.org	3196	
	Average value of radio receptors, tv sets and newspapers per capita, [mediacs]	-	CNTSDA	3055	
	Number of governmental checks and balances, [checks]	-	DPI	3196	a)
	Parliamentary power in the Democracy, [pres_parl]	-	DPI	3196	a)
	Percentage of education expenditures in the total expenditures, [pceduc]	-	GFS	898	a)
	Percentage of higher school complete in the total population, [highedu]	-	Barro e Lee (2000)	2726	b)
	Percentage of answers stating 'economic growth' as the most important national issue, [higprefer]	+	http://www.world-valuessurvey.org/	2068	a)
Public expenditures manipulation	*Herfindahl Index* of Public Expenditures, [herfdesp]	-	GFS	3194	a)
	Percentage of capital and current transfers in the total expenditures, [pctransfpart]	+	GFS	898	a)

Legend – CNTSDA: Cross-National Time-Series Data Archive (2006); DPI: Database of Political Institutions (2004); GFS: Government Finance Statistics (2006); ICRG: International Country Risk Guide (2006); IFS: International Financial Statistics (2006); ILO: International Labour Organization Statistics (2006); VTS1945: Voter Turnout since 1945 (2002); WDI: World Development Indicators (2006).
Notes – a) Due to the scarcity of data in some of the variables provided by the databases, the missing values were substituted by the national average values of the pointed variable, following previous proceedings of Shi and Svensson (2002) or Nardo et al. (2005). b) Barro and Lee (2000) database provides data in each five years since 1960; therefore, the interstitial missing values were substituted by the value from the previous provided year. c) According to Forte (2004), the Real Public Budget is equal to Index of Consumer Prices*Debt/GDP + Nominal Deficit.

Table A.2
FISCAL ILLUSION (FI) INDEX, 1960 AND 2006

Country	Year	FI	FI06-FI60	FI (Mean/sd)
ARGENTINA	1960	0,841		0,492
ARGENTINA	2006	0,401	–0,44	(0,2041)
AUSTRALIA	1960	0,496		0,362
AUSTRALIA	2006	0,270	–0,226	(0,1465)
AUSTRIA	1960	0,481		0,173
AUSTRIA	2006	0,088	–0,393	(0,1386)
BELGIUM	1960	0,754		0,360
BELGIUM	2006	0,250	–0,504	(0,205)
BOLIVIA	1960	0,776		0,647
BOLIVIA	2006	0,564	–0,212	(0,130)
BRAZIL	1960	0,551		0,459
BRAZIL	2006	0,366	–0,185	(0,113)
BULGARIA	1960	0,477		0,325
BULGARIA	2006	0,283	–0,194	(0,092)
CANADA	1960	0,439		0,203
CANADA	2006	0,116	–0,323	(0,127)
CHILE	1960	0,848		0,501
CHILE	2006	0,327	–0,521	(0,166)
COLOMBIA	1960	0,875		0,654
COLOMBIA	2006	0,598	–0,277	(0,129)
COSTA_RICA	1960	0,756		0,324
COSTA_RICA	2006	0,300	–0,456	(0,161)
CYPRUS	1960	0,770		0,565
CYPRUS	2006	0,474	–0,296	(0,155)
CZECH_REP	1960	0,474		0,396
CZECH_REP	2006	0,243	–0,231	(0,196)
DENMARK	1960	0,339		0,183
DENMARK	2006	0,121	–0,218	(0,093)
DOMINICAN	1960	0,845		0,615
DOMINICAN	2006	0,311	–0,534	(0,212)
ECUADOR	1960	0,600		0,475
ECUADOR	2006	0,349	–0,251	(0,115)
EL_SALVADOR	1960	0,979		0,836
EL_SALVADOR	2006	0,569	–0,41	(0,137)
ESTONIA	1960	0,421		0,401
ESTONIA	2006	0,380	–0,041	(0,041)
FIJI	1960	0,523		0,457
FIJI	2006	0,395	–0,128	(0,173)
FINLAND	1960	0,438		0,155
FINLAND	2006	0,070	–0,368	(0,115)
FRANCE	1960	0,533		0,512
FRANCE	2006	0,433	–0,100	(0,097)
GERMANY	1960	0,496		0,222
GERMANY	2006	0,117	–0,379	(0,155)

Table A.2 ***(continued)***
FISCAL ILLUSION (FI) INDEX, 1960 AND 2006

Country	Year	FI	FI06-FI60	FI (Mean/sd)
GREECE	1960	0,912		0,674
GREECE	2006	0,447	–0,465	(0,178)
GUATEMALA	1960	0,963		0,837
GUATEMALA	2006	0,799	–0,164	(0,080)
HONDURAS	1960	0,913		0,886
HONDURAS	2006	0,859	–0,054	(0,047)
HUNGARY	1960	0,756		0,635
HUNGARY	2006	0,551	–0,205	(0,091)
ICELAND	1960	0,441		0,187
ICELAND	2006	0,147	–0,294	(0,106)
INDIA	1960	0,928		0,876
INDIA	2006	0,833	–0,095	(0,056)
IRELAND	1960	0,580		0,239
IRELAND	2006	0,105	–0,475	(0,172)
ISRAEL	1960	0,492		0,399
ISRAEL	2006	0,306	–0,186	(0,119)
ITALY	1960	0,811		0,489
ITALY	2006	0,312	–0,499	(0,196)
JAPAN	1960	0,619		0,424
JAPAN	2006	0,346	–0,273	(0,188)
KOREA	1960	0,878		0,625
KOREA	2006	0,426	–0,452	(0,163)
LITHUANIA	1960	0,668		0,487
LITHUANIA	2006	0,294	–0,374	(0,106)
LUXEMBOURG	1960	0,170		0,174
LUXEMBOURG	2006	0,177	0,007	(0,026)
MADAGASCAR	1960	0,906		0,857
MADAGASCAR	2006	0,849	–0,057	(0,047)
MALAYSIA	1960	0,678		0,568
MALAYSIA	2006	0,480	–0,198	(0,136)
MALI	1960	0,929		0,936
MALI	2006	0,943	0,014	(0,024)
MAURITIUS	1960	0,817		0,692
MAURITIUS	2006	0,649	–0,168	(0,079)
MEXICO	1960	0,797		0,543
MEXICO	2006	0,455	–0,342	(0,212)
NEPAL	1960	0,550		0,623
NEPAL	2006	0,696	0,146	(0,102)
NETHERLANDS	1960	0,368		0,122
NETHERLANDS	2006	0,062	–0,306	(0,103)
NEW ZEALAND	1960	0,227		0,052
NEW ZEALAND	2006	0,022	–0,205	(0,055)
NICARAGUA	1960	0,886		0,752
NICARAGUA	2006	0,594	–0,292	(0,116)

Table A.2 ***(continued)***
FISCAL ILLUSION (FI) INDEX, 1960 AND 2006

Country	Year	FI	FI06-FI60	FI (Mean/sd)
NORWAY	1960	0,551		0,249
NORWAY	2006	0,145	-0,406	(0,154)
PAKISTAN	1960	0,967		0,951
PAKISTAN	2006	0,935	-0,032	(0,064)
PANAMA	1960	0,698		0,608
PANAMA	2006	0,518	-0,18	(0,117)
PAPUA	1960	0,588		0,617
PAPUA	2006	0,646	0,058	(0,091)
PARAGUAY	1960	0,990		0,824
PARAGUAY	2006	0,712	-0,278	(0,169)
PERU	1960	0,935		0,778
PERU	2006	0,768	-0,167	(0,123)
PHILIPINES	1960	0,889		0,817
PHILIPINES	2006	0,685	-0,204	(0,076)
POLAND	1960	0,986		0,890
POLAND	2006	0,767	-0,219	(0,092)
PORTUGAL	1960	0,791		0,461
PORTUGAL	2006	0,276	-0,515	(0,199)
ROMANIA	1960	0,863		0,738
ROMANIA	2006	0,646	-0,217	(0,257)
RUSSIA	1960	0,999		0,931
RUSSIA	2006	0,830	-0,169	(0,091)
SLOVAKIA	1960	0,422		0,412
SLOVAKIA	2006	0,337	-0,085	(0,092)
SLOVENIA	1960	0,479		0,536
SLOVENIA	2006	0,592	0,113	(0,110)
SOUTH_AFRICA	1960	0,627		0,563
SOUTH_AFRICA	2006	0,396	-0,231	(0,129)
SPAIN	1960	0,617		0,278
SPAIN	2006	0,090	-0,527	(0,199)
SRI_LANKA	1960	0,992		0,970
SRI_LANKA	2006	0,927	-0,065	(0,031)
SWEDEN	1960	0,370		0,163
SWEDEN	2006	0,069	-0,301	(0,128)
SWITZERLAND	1960	0,242		0,125
SWITZERLAND	2006	0,102	-0,14	(0,090)
TRINIDAD	1960	0,762		0,711
TRINIDAD	2006	0,666	-0,096	(0,068)
TURKEY	1960	0,838		0,590
TURKEY	2006	0,401	-0,437	(0,199)
UK	1960	0,633		0,328
UK	2006	0,232	-0,401	(0,183)
US	1960	0,381		0,221
US	2006	0,219	-0,162	(0,087)
URUGUAY	1960	0,933		0,780
URUGUAY	2006	0,760	-0,173	(0,120)
VENEZUELA	1960	0,796		0,583
VENEZUELA	2006	0,487	-0,309	(0,143)

Table A.3
COUNTRIES AND VALUES FROM VARIABLES "OLD" AND "DEVELOPED"

Country	Old	Developed
ARGENTINA	0	0
AUSTRALIA	1	1
AUSTRIA	1	1
BELGIUM	1	1
BOLIVIA	0	0
BRAZIL	0	0
BULGARIA	0	0
CANADA	1	1
CHILE	0	0
COLOMBIA	1	0
COSTA_RICA	1	0
CYPRUS	1	0
CZECH_REP	0	0
DENMARK	1	1
DOMINICAN	0	0
ECUADOR	0	0
EL_SALVADOR	0	0
ESTONIA	0	0
FIJI	0	0
FINLAND	1	1
FRANCE	1	1
GERMANY	1	1
GREECE	0	1
GUATEMALA	0	0
HONDURAS	0	0
HUNGARY	0	0
ICELAND	1	1
INDIA	1	0
IRELAND	1	1
ISRAEL	1	0
ITALY	1	1
JAPAN	1	1
KOREA	0	0
LITHUANIA	0	0
LUXEMBOURG	1	1
MADAGASCAR	0	0
MALAYSIA	1	0
MALI	0	0
MAURITIUS	1	0
MEXICO	0	0
NEPAL	0	0
NETHERLANDS	1	1
NZ	1	1
NICARAGUA	0	0

Table A.3 ***(continued)***
COUNTRIES AND VALUES FROM VARIABLES "OLD" AND "DEVELOPED"

Country	Old	Developed
NORWAY	1	1
PAKISTAN	0	0
PANAMA	0	0
PAPUA	1	0
PARAGUAY	0	0
PERU	0	0
PHILIPINES	0	0
POLAND	0	0
PORTUGAL	0	1
ROMANIA	0	0
RUSSIA	0	0
SLOVAKIA	0	0
SLOVENIA	0	0
SOUTH_AFRICA	1	0
SPAIN	0	1
SRI_LANKA	1	0
SWEDEN	1	1
SWITZERLAND	1	1
TRINIDAD	1	0
TURKEY	0	1
UK	1	1
US	1	1
URUGUAY	0	0
VENEZUELA	1	0

Coefficient of correlation between "Old" and "Developed" = 0,537.

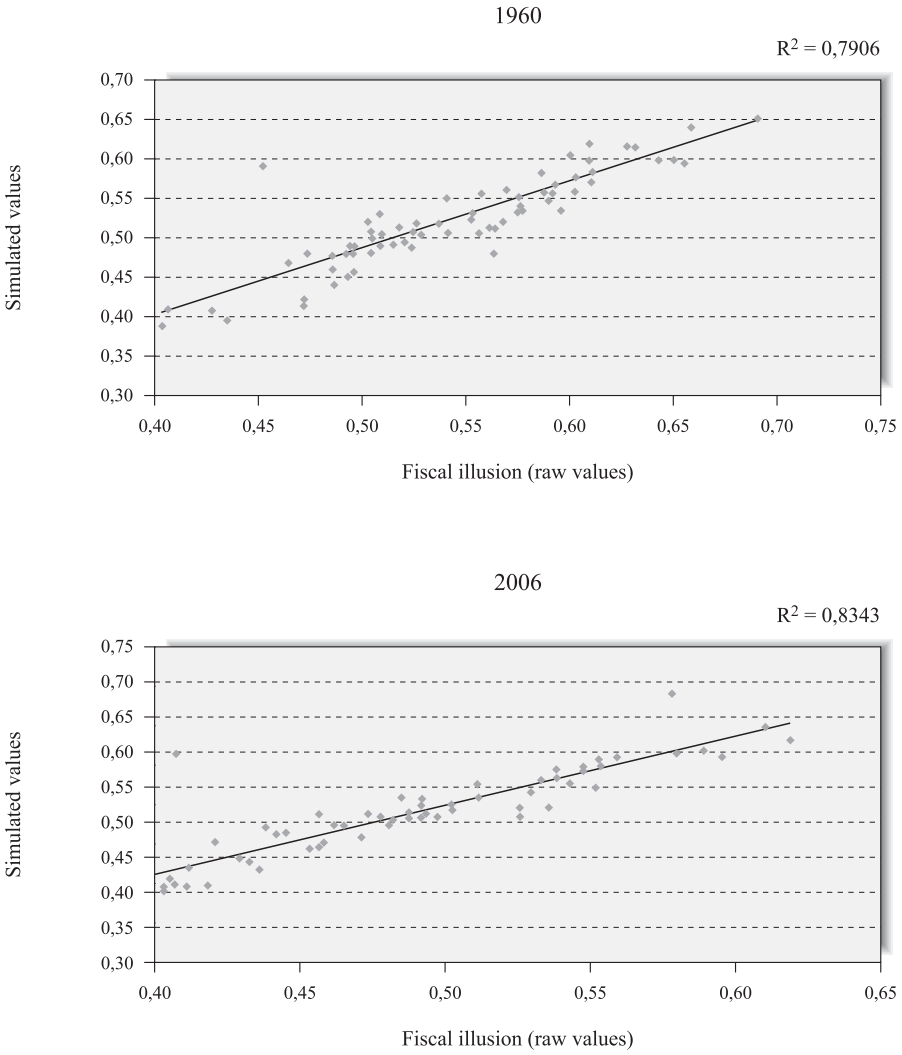

Figure A.1. Fiscal Illusion Index and simulated values, 1960-2006

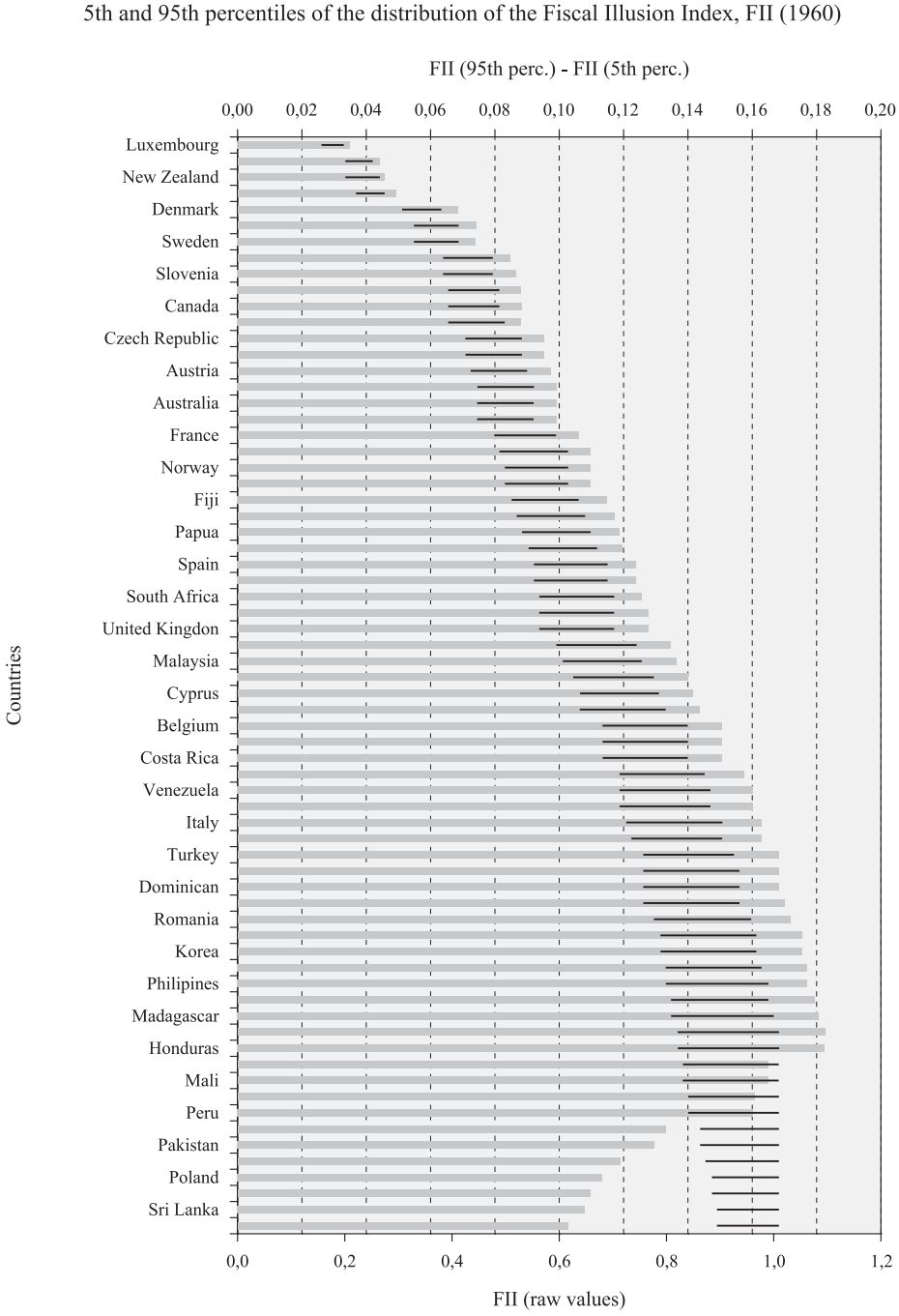

Figure A.2(a). 90% confidence intervals of the Fiscal Illusion Index

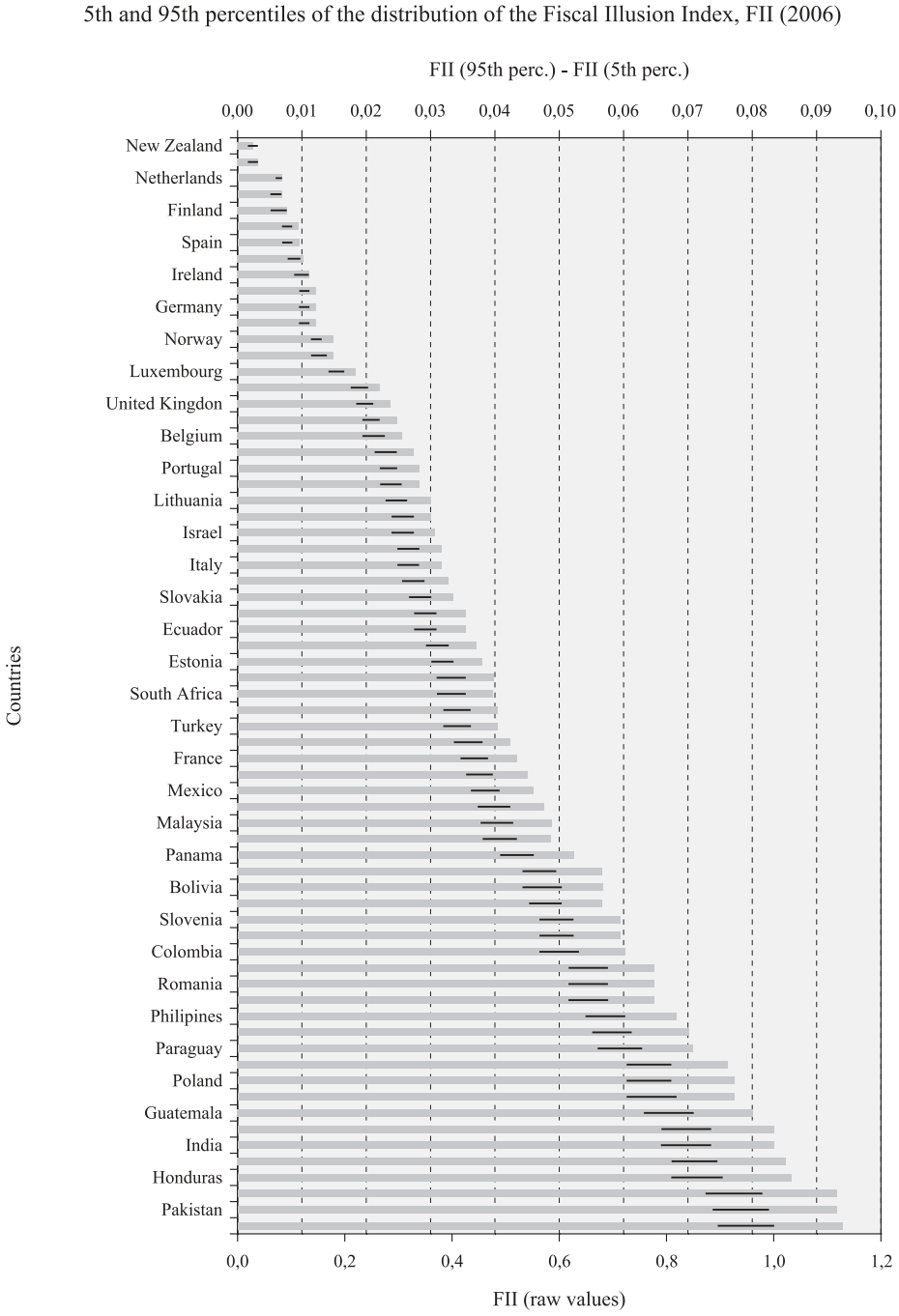

Figure A.2(b). 90% confidence intervals of the Fiscal Illusion Index

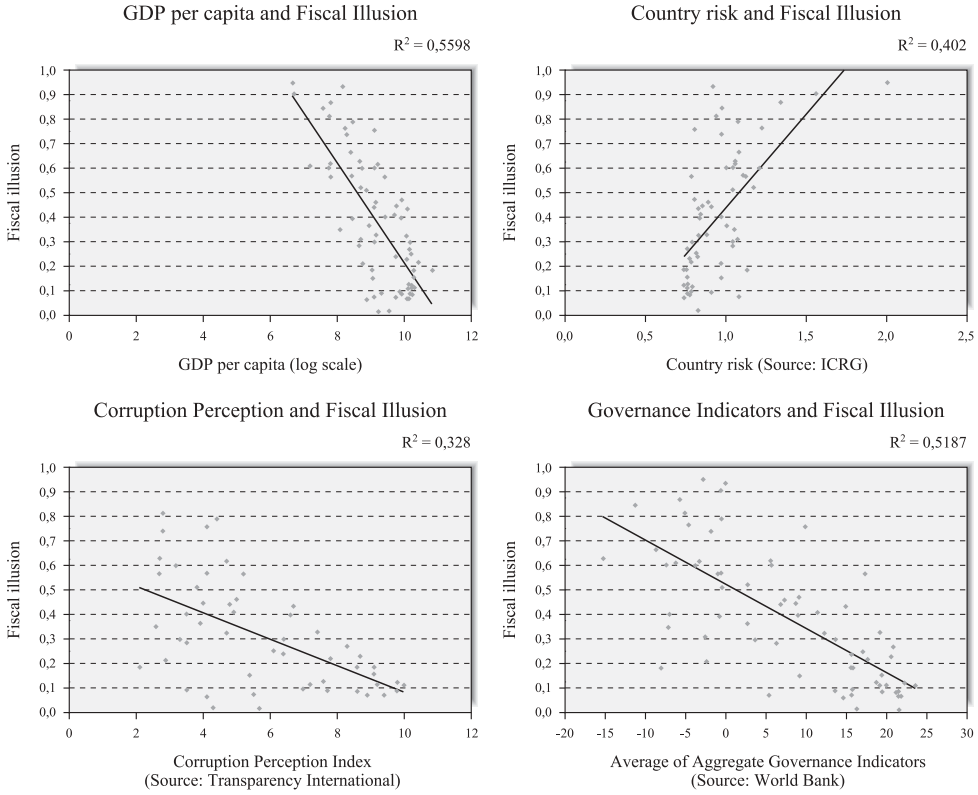

Figure A.3. Links between Fiscal Illusion Index values and GDP per capita, Country risk, Corruption Perception and Governance Indicators (year: 2000)