



# Do societal values influence financial development? New evidence on the effects of post materialism and institutions on stock markets



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## ABSTRACT

In this paper we present new evidence on the effects of social values on stock market development. Using panel data for a heterogeneous set of 43 countries, we use the Inglehart post materialism index to identify the relation between the degree of post materialism and the size of stock markets. Controlling for a range of macro-economic and institutional country characteristics and accounting for endogenous relationships between the main variables of interest, we find a robust and sizeable positive effect of post materialism on stock markets. Legal, political and democratic institutions also promote the development of stock markets. Furthermore, we find that the effect of post materialism consists of a direct effect and a substantial indirect effect that runs via several types of institutions. This latter finding indicates that it is important to account for interrelationships between social values and institutions when estimating their full economic effects.

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## 1. Introduction

In the quest to identify structural determinants of long term growth, a substantial literature has developed on the relation between financial development and economic growth. Overall, the evidence indicates that the size, efficiency and level of access to financial institutions and services are positively associated with economic growth and that these relations are economically meaningful (Levine, 2005; Temple, 1999). In the context of these findings, recent research has shifted its focus towards obtaining more evidence on factors that influence financial development. Given the evidence that financial development promotes economic growth, it becomes important to understand the forces that obstruct or foster financial development (Levine, 2005; Ferguson, 2006).

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Focusing on stock markets, two broad sets of factors are usually seen as key drivers of the evolution of these markets. One set concerns macro-economic country characteristics and government policies such as income level, inflation, size of financial intermediaries and capital account openness (Garcia and Liu, 1999; Yartey, 2010). The other set of factors contains a variety of economic, judicial and democratic institutions. For example, Levine et al. (2000) find that legal origins matter for financial development, which in turn has a robust positive effect on economic growth. Chinn and Ito (2006) present findings showing that capital account openness only promotes the development of stock markets when countries possess sufficient levels of legal and other institutional development. La Porta et al. (1997) find that legal rules and the quality of law enforcement affect both the size and breadth of stock markets.

Another branch of the recent growth literature focuses on economic effects of culture and social values (Alesina and Giuliano, 2015; Guiso et al., 2006). An early contribution is Knack and Keefer (1997) who find that countries that are characterised by high levels of trust and civic cooperation experience higher growth rates. Controlling for model uncertainty and a range of econometric issues, Horvath (2013) presents important corroborating evidence on the positive effect of social trust on long term growth. For the EU, several studies have focused on the economic effects of social values at sub-national levels. Forte et al. (2015) and Beugelsdijk and van Schaik (2005) present a range of evidence showing that both trust and associational activities are positively related to regional growth. Akçomak and ter Weel (2009) find that trust has a positive effect on growth in EU regions via its enhancing effect on regional innovation.

Our paper is related to these two streams of research in two ways. First, although macro-economic characteristics, government policies and institutions are all associated with the development of capital markets, part of their evolution remains unexplained (Guiso et al., 2003). Given the strong evidence that culture and social values act as drivers of economic growth, we address the question whether social values offer an additional explanation for the development of stock markets. This relationship between social values and equity markets has received only limited attention in the literature. Evidence from the small number of studies that have examined this relationship indicates that social trust and sociability both exercise positive effects on the degrees that individuals own financial assets and participate on stock markets (e.g. Guiso et al., 2004; Hong et al., 2004).

Instead of trust and sociability however, we focus on another important type of social values in the form of post materialism. Starting from the seminal work by Inglehart (1977), a large body of research has developed studying transformations from materialistic to post materialistic societies. As an increasing number of countries have reached a stage where basic needs related to survival are met, other priorities besides physical security are becoming more prominent (Inglehart and Welzel, 2005). In particular, post materialistic societies are developing where priorities such as quality of life, self-expression, protection of the environment and independence are more important. Although it seems clear that such structural societal transformations are likely to affect social and economic processes, very little research has been conducted on the economic effects of the growing importance of post materialism. This is particularly striking given the large popularity of research into economic effects of other social values and beliefs (see e.g. Guiso et al., 2006; Klasing, 2013). We address this gap in the literature by providing novel evidence on the magnitude and nature of the effect of post materialism on stock markets.

Second, our paper contributes to the literature by examining interrelationships between post materialism and institutions. Following the framework by Williamson (2000), several studies try to determine whether social values and cultural aspects may act as explanatory force of the development of institutions. For example, Knack (2002) conducts a regional analysis for the US and identifies positive associations between several indicators of social capital and the quality of regional governments. For EU regions, Tabellini (2008) finds that trust and respect for others enhance the quality of government. Klasing (2013) conducts a comprehensive econometric study for a selection of countries, assessing the effect of a large number of social values and cultural characteristics on government quality. The findings indicate that individualism and acceptance of inequality of the distribution of power in society are most instrumental in affecting the quality of government.

In this paper we interpret the relation between social values and institutions in a slightly different way. If institutions matter for economic outcomes and social values influence institutions, it is very likely that (part of) the economic effect of social values is transmitted via their effect on institutions. Although intuitively appealing, the possibility that institutions act as a transmission channel of effects of social values has received only scant attention in the literature. Instead, recent research focuses on identifying patterns of co-evolution and relations between social values and institutions (Alesina and Giuliano, 2015). Examples of studies that are more in line with our interpretation of the relation between social values and institutions include Boulila et al. (2008) and Bjornskov and Méon (2015). Boulila et al. (2008) find for a sample of developed and developing countries that part of the positive growth effect of social capital is transmitted via institutions. Bjornskov and Méon (2015) find in their extensive study of the relation between trust and productivity that the positive effect of trust mainly runs via economic-judicial institutions. Our paper contributes to this literature by examining whether post materialism affects stock markets only directly or also indirectly via its relationship with institutions.

The remainder of the paper is constructed as follows. In section two we discuss in more detail why post materialism may affect stock markets, review the relevant literature and derive our hypotheses. Section three discusses the data, empirical model and estimation issues. Section four presents our main findings on the effects of post materialism, macro-economic country characteristics and a variety of institutions on the size of stock markets. It also presents the findings on the degree that the effect of post materialism on stock markets is transmitted via institutions. Section five summarises and concludes.

## 2. Post materialism, institutions and stock market development

The burgeoning literature on the role of social values and cultural dimensions in processes of economic growth is producing a growing body of evidence showing that they generate important effects on economic behaviour and outcomes (Guiso et al., 2006; Alesina and Giuliano, 2015). Although there is a large range of factors that is being studied, economic effects of post materialistic values and attitudes remain largely unexamined. This is striking, as it is very likely that post materialistic traits and attributes affect economic processes. Initiated by the seminal work of Inglehart (1977), there is a growing acceptance that cultural paradigms or societal values are shifting from materialistic to post materialistic ones. As citizens of a growing number of countries no longer need to worry about basic needs related to physical survival, post materialistic values including personal autonomy, self-expression and quality of life are becoming more prominent (Inglehart and Welzel, 2005). Given the structural nature of the changes in values and attitudes that these societal shifts entail, it is very likely that the growing importance of post materialism is affecting economic behaviour and outcomes.<sup>1</sup>

To be better able to assess the potential effect of the growing importance of post materialism on the evolution of stock markets, it is useful to examine studies that analyse the effects of other social values on stock markets. One interpretation of the effect of social values on stock market development focuses on the role of market participation costs. As Guiso et al. (2003) show, international differences in participation costs provide an important explanation for the variation in stock ownership across European countries. Hong et al. (2004) model participation costs as a function of the level of sociability of investors, where the costs decrease when investors interact with their peers. Using household data from the United States, they find that social households are significantly more likely to invest in financial assets.

Alternatively, Guiso et al. (2004, 2008) focus on the effect of social capital. They present a model where one of the factors that influence stock market participation is the degree of trust that investors have in brokers. The utility of brokers to abscond with their clients' funds is negatively related to the degree of social capital, implying that social capital exercises a positive effect on stock market participation. This proposed relation is corroborated by findings obtained from analysing Dutch and Italian household survey data. Georgarakos and Giacomo (2011) use household data from several European countries and also find that trust enhances stock market participation. In line with Hong et al. (2004), their estimations also reveal a positive effect of sociability on the level of stock ownership.

Turning to post materialism, it is not clear *a priori* whether its effect on stock markets is positive or negative. At first glance, one might expect that post materialism lowers the importance of stock markets. When values such as quality of life, autonomy and the protection of the environment become more important than the materialistic priority of income maximisation, the interest to participate in capital markets may decrease. On the other hand however, post materialistic values may also foster the willingness to invest in financial assets. One reason for this is that a higher sense of personal freedom and autonomy may lower participation costs of financial markets. In particular, one could argue that the psychological costs of trading financial assets are lower for citizens with post materialistic values, as it aligns with their priority of obtaining greater (financial) independence. Also, it may be that the rate of return on financial assets is higher in post materialistic societies. In addition to the expected economic rate of return, investors with post materialistic values may obtain additional returns in the form of a higher degree of autonomy and independence. Under the plausible assumption that the economic risk of financial assets is independent of the degree of post materialism, these additional returns would generate a positive relation between post materialism and stock market participation. Therefore, the nature of the effect of post materialism on stock markets is a matter of empirical verification. Consequently, the first hypothesis of our analysis is specified as follows:

**Hypothesis 1.** Post materialism affects the size of stock markets.

When trying to identify the effect of post materialism on stock market development, the special role of institutions needs to be accounted for. There is a variety of studies that find that institutions are important for the evolution of capital markets (Ferguson, 2006; Beck and Levine, 2005). Importantly, the large majority of these studies focus on identifying the effect of institutions on capital markets, without explicitly controlling for direct effects of social values and cultural dimensions. In a similar fashion, studies that examine the effect of social values on capital markets tend not to control for the direct effects of legal and economic institutions. An explanation for this rigid separation is that some argue that there is a certain degree of overlap between culture and social values on the one hand and institutions on the other hand (Alesina and Giuliano, 2015). By interpreting social values as norms and conventions that guide economic behaviour, they are often seen as a form of “informal” institutions. However, as Alesina and Giuliano (2015) argue, by focusing on legal, economic and democratic institutions it is possible to separate between the effects of institutions and social values on economic behaviour and outcomes. Therefore, the second hypothesis that we test is:

**Hypothesis 2.** Post materialism and institutions exercise independent effects on the size of stock markets.

<sup>1</sup> The limited available evidence suggests that post materialistic values influence economic and social outcomes. For example, Granato et al. (1996) conduct cross country growth regressions and find that post materialism is negatively associated with growth. Fairbrother (2013) finds that post materialistic values are positively associated with the willingness to pay to protect the environment. Uhlauer and Thurik (2007) find for a selection of countries that post materialism affects the degree of entrepreneurial activity.

Rather than disentangling the separate effects of institutions and social values, recent studies focus on the relationships between the two concepts. This is in line with [Williamson \(2000\)](#), who envisages norms, customs, traditions, etc. as the highest form of social analysis. The next level consists of the institutional environment, on which culture and social values place certain constraints, followed by governance, resource allocation and employment. Following this framework, several studies try to identify the effect of culture and social values on institutions ([Alesina and Giuliano, 2015](#)). A well-known example is [Licht et al. \(2007\)](#) who examine the effects of a variety of cultural characteristics and find that societies that value autonomy and egalitarianism are characterised by higher levels of democratic accountability and less corruption. Another recent example of an extensive empirical study on the relation between a range of social values and institutional quality is [Klasing \(2013\)](#). [Tabellini \(2010\)](#) shows how historical institutions affect social values, which in turn influence the functioning of contemporary institutions in EU regions.

Another interpretation of the interrelationships between social values and institutions argues that institutions may act as transmission channel of (part of) the effect of social values on economic outcomes. In fact, given the relations between social values and institutions on the one hand and institutions and economic outcomes on the other hand, it is very likely that part of the economic effects of social values run in an indirect manner via institutions. So far, only a limited number of studies have examined this type of relationship ([Bjornskov, 2012](#)). The possibility that the economic effect of social values may be of an indirect nature is reflected in the findings by [Akçomak and ter Weel \(2009\)](#). In their analysis of regional growth in the EU, they examine the effects of social capital and innovation. Standard growth regressions show that both factors are positively associated with regional growth. However, three stage least squares (3SLS) estimations that account for the relation between social capital and innovation do not show an independent effect of social capital on growth, indicating that the growth effect of social capital runs via its effect on regional innovation.

[Boulila et al. \(2008\)](#) present more direct evidence that institutions act as transmission channel of economic effects of social values. Using standard cross-country growth regressions, they find a positive effect of social capital on economic growth. Findings from estimating a simultaneous equation model show that part of the positive effect of social capital on growth runs via institutional quality. Using similar data and 3SLS estimation techniques, [Bjornskov \(2012\)](#) finds that trust affects economic growth via education and the quality of governance measured by rule of law. [Bjornskov and Méon \(2015\)](#) conduct an extensive analysis of the effect of trust on productivity for a selection of countries and find that the positive effect of trust is mainly transmitted via economic-judicial institutions. In line with these studies that find that the economic effect of social values is (partly) transmitted via institutions, the third hypothesis of our analysis is:

**Hypothesis 3.** Institutions act as transmission channel of the effect of post materialism on stock markets

### 3. Model, data and estimation issues

#### 3.1. Post materialism and stock markets

To identify the effect of post materialism on stock market development at the country level, we specify a model on drivers of the size of stock markets. The majority of models on drivers of stock market development consist of augmented versions of the original behavioural structural model by [Calderon-Rossell \(1990, 1991\)](#). In essence, this model posits that stock market development is determined by income level and stock market liquidity. The augmented regression model that we estimate is specified as follows:

$$Mkt_{it} = \beta_0 + \beta_1 GDP/Cap_{it} + \beta_2 Mktliq_{it} + \beta_3 PM_{it} + \beta_4 X_{it} + \beta_5 Institutions_{it} + \vartheta_t + \alpha_i + \varepsilon_{it} \quad (1)$$

The model expresses the size of stock market  $Mkt$  for country  $i$  in period  $t$  as a function of income per capita  $GDP/Cap$ , the degree of market liquidity  $Mktliq$ , an indicator of post materialism  $PM$ , a set of macro-economic country characteristics captured by  $X$  and a set of institutional characteristics.  $\vartheta_t + \alpha_i$  capture time effects and time invariant country effects and  $\varepsilon_{it}$  is the idiosyncratic error term.

In our selection of countries, we are primarily driven by data availability to construct a country level indicator of the degree of post materialism. The indicator that we use is the well-known and broadly used 4-item Materialist/Post Materialist index developed by [Inglehart \(1977\)](#). We use information from the Eurobarometer Series, the European Value Studies and the World Value Surveys to construct this index. Starting in the 1980s, surveys have been carried out in a growing number of countries covering a variety of aspects of beliefs, culture and social values. As the change from materialism to post materialism is a slow and long term process, we try to capture as long a time frame as possible. For most countries in our sample, surveys were carried out in the 1980s, 1990s and 2000s, allowing us to calculate a post materialism index for each of these three decades. For 32 countries in the sample the survey data covers these three decades. To obtain a larger number of observations, we add another 11 countries for which survey data is available for the 1990s and 2000s. [Table A1](#) in the [Appendix](#) lists the countries in the sample and the availability of the post materialism index.<sup>2</sup>

<sup>2</sup> Given the changing number of surveyed countries, the use of unbalanced panel data is not uncommon in research using data from the European and World Value Surveys (see e.g. [Dearmon and Grier, 2009](#)). In the empirical section, we examine whether the unbalanced nature of the dataset affects our estimations.

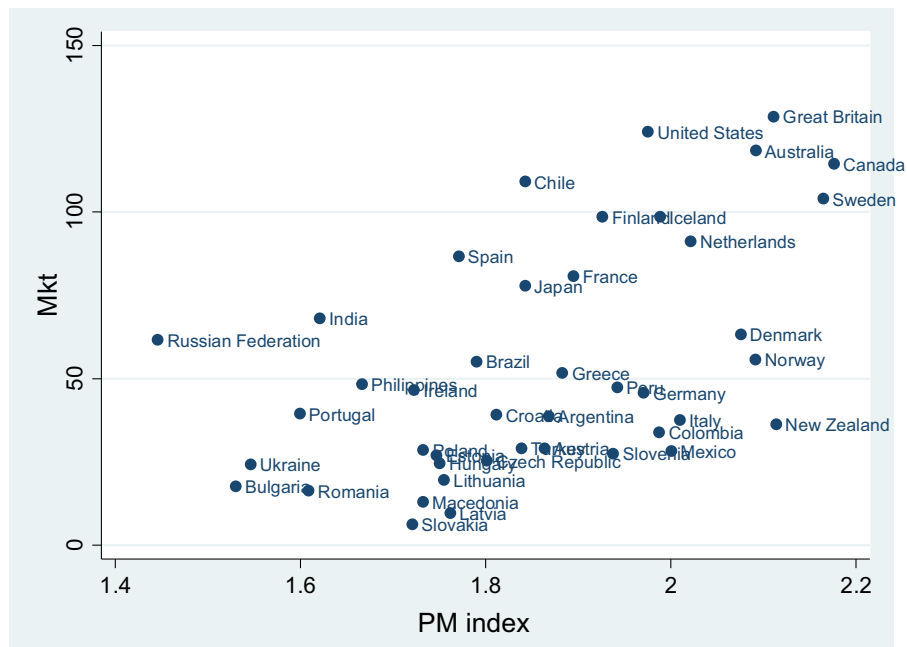


Fig. 1. Post materialism and stock markets: averages 1990–2010.

To calculate the PM index, we use the following rules. For the survey questions on the “first and second most important national priorities”, respondents that select both “maintaining order” and “fighting rising prices” are classified as having materialistic values. Respondents selecting both “giving people more say in important government decisions” and “protection of freedom of speech” are classified as having post materialistic values. Respondents selecting both a materialistic and post materialistic priority are classified as mixed. To obtain country level values, we average the scores of all the individual respondents.

For the dependent variable, we use information from the Global Financial Development Database, available from the World Bank.<sup>3</sup> This database contains a large number of indicators on financial institutions and markets, use of financial services, efficiency of financial systems and stability of financial institutions and markets.<sup>4</sup> Following the literature, we capture the size of stock markets by the variable market capitalisation (Levine, 2005). This variable is measured as the number of shares outstanding multiplied by the share price of listed companies as percentage of GDP. We also use the Global Financial Database for the variable market liquidity. This variable is measured as the total value of traded stocks as percentage of GDP.

Fig. 1 shows the scatter plot of the PM index and the size of stock markets. For the scatter plot we use average values for the period 1990–2010 to maximise the number of countries. As the figure shows, there are substantial differences between the countries regarding both the degree of post materialism and stock market size. The PM index ranges from a low level of about 1.45 for the Russian Federation to the highest score of 2.2 for Australia (standard deviation = 0.188). As for stock markets, Slovakia contains the smallest stock market, representing less than 6% of GDP. The country with the largest stock market is the United Kingdom, where the stock market represents almost 120% of GDP. Importantly, the scatter plot between the PM index and stock market size shows a clear positive relation between the two variables, suggesting that post materialistic values and beliefs foster stock ownership and participation on stock markets. A bivariate regression of the size of stock markets on the PM index produces a positive coefficient of 90.2 with a significance level of 1%.

### 3.2. Macro-economic and institutional control variables

$X_{it}$  contains a set of macro-economic variables that other studies have found to influence stock market development. We control for the size of the domestic banking sector as primary representative of intermediate financial services, measured as total private credit as percentage of GDP. There is some discussion in the literature as to whether the banking sector fosters or hinders equity markets, as banks may complement or substitute for stock market investment (Garcia and Liu, 1999). Therefore, we also include the squared term of private credit over GDP to the model. This squared term controls for

<sup>3</sup> The Appendix provides summary statistics, descriptions and sources of all the variables.

<sup>4</sup> For a detailed explanation of the database and its theoretical and empirical underpinnings, see Čihák et al. (2012).



the possibility that banks foster stock market development up to a point, after which their participation in the economy becomes so large that they start to act as substitute for equity investment.

Next, we include the savings rate, measured as gross savings as percentage of GDP. The stock market acts as a channel for investment from savings. Therefore, a larger share of savings in an economy is likely to result in a larger stock market (Naceur et al., 2007). Next to the availability of domestic capital we also need to control for the level of international investment (Yartey, 2010). We do so by including a variable capturing the level of inward FDI, measured as inward FDI flows as percentage of GDP. Finally, we control for the effect of macro-economic instability. A higher level of instability lowers the predictability of profitability and share prices of firms and increases the overall level of risk in the market, lowering the willingness to invest. To capture the overall level of macro-economic instability we include the inflation rate (Boyd et al., 2001; Andrianaivo and Yartey, 2009). Inflation is measured as the average change in the consumer price index.

As for institutions, we include variables that capture various aspects of the institutional characteristics of the countries in the sample. As our paper is the first to study the effects of post materialism and institutions on equity markets and their interrelationships, we do not confine the analysis to one particular type of institution. Instead, we prefer to explore the interrelationships and effects of post materialism and several political, democratic and legal institutions.

The source for the institutional variables is the Worldwide Governance Indicators Project. Supported by the World Bank, this project provides for a large number of countries six main governance indicators that are derived from an extensive range of underlying data obtained from household surveys, commercial business information providers, public sector organisations and non-governmental organisations. Using this array of data, weighted averages are calculated to obtain composite governance indicators in units of a standard normal distribution, with mean zero and standard deviation of 1. The indicators range between  $-2.5$  and  $2.5$ , where a higher score indicates a better functioning institution.<sup>5</sup>

The variable and accountability captures aspects related to freedom of expression, freedom of association and participation in elections. Political stability and absence of violence captures perceptions of the likelihood of political instability and politically motivated violence. The indicator on government effectiveness relates to the quality of public services, the civil service and independence from political pressures. Regulatory quality captures the degree that governments are able to formulate and implement sound policies and regulations that promote private sector development. Rule of law reflects perceptions on the degree that citizens have confidence in and abide by the rules of society. Finally, the indicator on control of corruption indicates the degree to which public power is exercised for private gain.

### 3.3. Endogeneity of post materialism

Before we start discussing the findings from our analysis, we need to address the possibility that the estimated effect of post materialism on the size of stock markets may be affected by endogeneity. The estimation of regression model (1) is based on the premise that post materialism changes the willingness to invest in financial assets and operate on stock markets, resulting in a change in the size of stock markets. However, a change in the availability of financial assets and investment opportunities may also change the degree of materialistic and post materialistic beliefs and values. For instance, it may be that stock market development fosters the materialistic value of income maximisation, resulting in a decrease in the PM index.<sup>6</sup> If this is the case, it becomes difficult to interpret the estimated coefficient of the post materialism index. Furthermore, the estimated effect of the PM index may also be affected by measurement error and omitted variable bias.

To assess whether the estimated effect of the PM index in model (1) may be biased, we use an instrument variable approach. We use the following two instrumental variables. The first instrument is related to the mechanisms that underlie structural shifts towards post materialistic societies (Inglehart and Welzel, 2005). One mechanism is the scarcity hypothesis that holds that a citizen's socioeconomic environment has a direct impact on her priorities. When citizens do not face restrictions regarding security and survival, they are more likely to adopt priorities and values of a post materialistic nature. As such, the scarcity hypothesis captures a short term or direct effect of economic conditions on the degree of post materialism. The second mechanism captures a long term effect. The so-called socialisation hypothesis holds that the basic values that citizens adopt in their adult lives can to a considerable degree be explained by the economic conditions under which they grew up. This indicates a process of intergenerational change, where generations that grew up under affluent conditions are more likely to hold post materialistic views in their adult life.

To instrument the PM index we focus on the socialisation hypothesis. Instrumenting based on the scarcity hypothesis is problematic as it captures a contemporaneous relation between income and post materialistic values. This makes it difficult to find an income related variable that is only related to equity markets through its association with post materialism. To capture the socialisation mechanism, we use GDP per capita in 1950. This variable captures the process that previous income levels can partly explain future degrees of post materialism. Furthermore, historical GDP/Capita variable is not affected by future levels of capital market development and it seems plausible to assume that the time lag prevents a direct effect of historical GDP/Capita on the size of stock markets.

As second instrument we use characteristics of the official language of the countries in the sample. Linguistics is featuring prominently in the search for instruments to obtain unbiased associations between social values and economic outcomes

<sup>5</sup> For a detailed explanation, see Kaufman et al. (2010).

<sup>6</sup> See Bowles (1998) for arguments that culture and social values are affected by economic and political forces.

**Table 1**  
Relation between PM index and instruments.

Estimation method	Dep variable: PM		
	OLS	OLS	OLS
Data	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010
Historical GDP/Cap	0.057*** (0.02)		0.04*** (0.01)
Pronoun drop rule		–0.20*** (0.03)	–0.10** (0.04)
Constant	1.67*** (0.03)	1.99*** (0.02)	1.81** (0.06)
Nobs	99	94	94
Adj. R <sup>2</sup>	0.46	0.30	0.50

Notes: Robust standard errors in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05.

(Davis and Abdurazokzoda, 2015). This is linked to the linguistic relativity hypothesis that argues that a language influences a person's perceptions. From this, Kashima and Kashima (1998) have developed the argument that grammatical rules can influence people's cultural beliefs and values. In particular, linguistic characteristics can be linked to the cultural values of individualism and collectivism. A language where a personal pronoun can be dropped when used as a subject in a sentence is more likely to be associated with a society that places less emphasis on the individual and more on the collective. Languages that do not allow dropping the pronoun are more likely to be linked to societies with a stronger emphasis on the individual. Licht et al. (2007) and Tabellini (2008) successfully use the pronoun drop rule in their identification of the causal effect of social values on institutions. Davis and Abdurazokzoda (2015) provide further evidence on the relation between linguistic characteristics and social values.

In the present analysis, the pronoun drop rule may serve as an instrument for post materialism. Compared to materialistic values, post materialistic values such as concern for the environment, tolerance of minorities and social participation clearly reflect a stronger concern for the collective rather than the individual. As such, it is likely that post materialistic values will be more commonly held or can develop more rapidly in countries where collectivism is relatively strong. To capture this, we use Davis and Abdurazokzoda (2015) who provide a pronoun drop rule dummy variable for a large number of countries. The dummy variable takes the value of 1 when a country's language does not allow the pronoun to be dropped, representing countries where language fosters individualism.

Table 1 shows the results from simple OLS regressions of the post materialism index on the two instruments. As the results show, the instruments are significantly associated with the post materialism index, both in the bivariate regressions and in the specification that contains both instruments. The estimated effect of the historical GDP/Capita variable is positive. This is in line with the socialisation hypothesis that argues that historical economic conditions provide an explanation for the degree of post materialism in later years. The estimated effect of the pronoun drop rule is negative. This indicates that countries where individualistic values are more prominent are characterised by a lower degree of post materialistic beliefs and values.

## 4. Empirical findings

### 4.1. Post materialism and macroeconomic determinants of stock market development

Table 2 presents the findings from estimating several specifications of model (1). Columns (1)–(3) present the findings for long run averages of the variables. Column (1) shows the results from using long run averages for the period 1980–2010; columns (2) and (3) show the results when we use averages for the period 1990–2010 which increases the number of countries. Although the magnitude of the estimated effects differs somewhat between the two samples, the differences are minor, suggesting that there is no bias from using the sample that includes countries for which there is no information on the degree of post materialism for the 1980s.

Initial estimations using only GDP/Capita produced a negative coefficient of this variable. The addition of its squared term gives the positive significant effect of income per capita on stock markets as reported in the table. The negative coefficient of the squared income variable indicates that there is some non-linearity present in the sample regarding the relation between income and the size of stock markets.

The other macro-economic control variables carry coefficients with expected signs. The positive coefficient of the market liquidity variable indicates that a higher level of liquidity fosters the size of equity markets. The estimated positive effect of domestic credit and the negative effect of its squared term indicate that financial intermediaries foster the size of stock markets except when they are very large, when they become a substitute for stock market investment. The savings variable also carries a positive coefficient, as hypothesized. The effects of inward FDI and inflation are as expected but fail to reach significance.

Next to the effects of the macro-economic variables, the estimated effect of the post materialism index is significant and positive, indicating that countries with a high degree of post materialistic values are characterised by having larger stock markets. This suggests that individuals with such values are more inclined to invest in equity markets, as they attach

**Table 2**  
Post materialism and macro-economic determinants of stock markets.

Estimation method	Dependent variable: Mkt									
	1 OLS	2 OLS	3 OLS	4 OLS	5 OLS	6 RE	7 RE	8 RE	9 RE	10 RE
Data	Long run averages 1980–2010	Long run averages 1990–2010	Long run averages 1990–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010
PM index (PMindex) <sup>2</sup>	46.63** (23.77)	60.37** (18.15)	60.87** (19.08)	35.72** (15.55)	44.86*** (12.48)	31.28** (13.85)	35.45*** (12.22) –22.17 (29.88)	31.36** (12.55)	38.12** (19.31)	36.15** (15.52)
PM index GDP/Cap								0.64 (39.13)		
GDP/Cap	414.11** (212.22)	388.48* (219.53)	397.68 (259.91)	297.29*** (105.50)	252.84*** (85.30)	192.75** (76.06)	197.07*** (76.05)	192.89** (83.34)	–46.05 (176.08)	126.16* (70.77)
(GDP/Cap) <sup>2</sup>	–59.13** (28.50)	–56.41** (28.74)	–57.71* (33.99)	–43.11*** (14.55)	–37.57*** (11.89)	–28.84** (10.61)	–29.70*** (10.60)	–29.02** (11.31)	1.37 (22.92)	–19.46* (10.29)
Mktliq	0.68** (0.14)	0.63** (0.10)	0.64** (0.10)	0.52** (0.07)	0.56** (0.08)	0.50** (0.05)	0.51** (0.05)	0.50** (0.05)	0.43** (0.10)	0.49** (0.09)
Credit/GDP	0.59** (0.33)	0.73** (0.27)	0.70** (0.31)	0.79** (0.25)	0.71** (0.21)	0.83** (0.21)	0.83** (0.21)	0.83** (0.21)	0.76** (0.39)	0.56** (0.20)
(Credit/GDP) <sup>2</sup>	–0.001 (0.001)	–0.002** (0.001)	–0.002 (0.0014)	–0.002 (0.001)**	–0.002** (0.008)	–0.003** (0.0008)	–0.003*** (0.0008)	–0.003*** (0.0009)	–0.002 (0.0017)	–0.0017* (0.0009)
Savings	1.32** (0.69)	1.08** (0.47)	1.03** (0.49)	1.17** (0.50)	0.96** (0.38)	1.12** (0.40)	1.17** (0.41)	1.12** (0.42)	–0.15 (0.52)	1.79*** (0.54)
Inflation			–0.04 (0.07)	–0.012** (0.005)	–0.016** (0.007)	–0.018** (0.007)	–0.019** (0.007)	–0.018** (0.007)	–0.009 (0.007)	–0.025 (0.02)
FDI			0.43 (1.45)	1.87 (1.45)	0.82 (0.72)	1.08 (0.70)	1.07 (0.70)	1.08 (0.70)	0.94 (1.25)	1.39* (0.82)
Period dummies	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nobs	28	43	43	72	102	102	102	102	53	49
Goodness of fit	13.41	24.08	17.95	21.29	24.02	441.63	419.45	436.64	290.66	362.43
Adj. R <sup>2</sup>	0.82	0.78	0.78	0.76	0.77	0.75	0.75	0.75	0.78	0.81

Notes: Robust standard errors in parentheses. Columns (6)–(10) country clustered standard errors.

All estimations contain constant. Column 9 contains results for low income countries, column 10 contains results for high income countries.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.10.



**Table 3**  
Effect of Post materialism on stock markets: individual components of PM index and IV estimations.

Estimation method	Dependent variable: Mkt							
	1 RE	2 RE	3 RE	4 RE	5 RE	6 IV RE	7 IV RE	8 IV RE
Data	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010
PM index					32.15** (15.23)	103.65** (45.21)	78.81* (48.46)	97.67** (43.31)
Protection freedom of speech	52.58** (26.15)							
More say in government decisions		69.65*** (21.89)						
Maintaining order			–21.43** (11.08)					
Fighting price increases				–30.78* (19.05)				
GDP/Cap	137.28*** (53.21)	172.02** (63.03)	141.28** (54.86)	195.30*** (72.50)	223.58** (91.71)	261.03** (114.70)	216.35** (102.66)	235.87** (110.20)
$(GDP/Cap)^2$	–19.77*** (7.41)	–25.68*** (8.93)	–19.81** (7.62)	–27.93*** (9.96)	–33.82*** (12.23)	–42.10*** (15.84)	–34.37** (14.11)	–38.56** (15.06)
Mkqliq	0.45*** (0.06)	0.52*** (0.05)	0.67*** (0.05)	0.51*** (0.04)	0.46*** (0.06)	0.48*** (0.07)	0.48*** (0.06)	0.47*** (0.07)
Credit/GDP	0.62*** (0.18)	0.85*** (0.20)	0.43*** (0.14)	0.81*** (0.17)	1.01*** (0.20)	0.82*** (0.25)	0.82*** (0.22)	0.92*** (0.24)
$(Credit/GDP)^2$	–0.002** (0.0008)	–0.003*** (0.0008)	–0.0014*** (0.0006)	–0.003*** (0.0007)	–0.004*** (0.0008)	–0.003*** (0.001)	–0.003*** (0.001)	–0.003*** (0.001)
Savings	0.95*** (0.34)	1.36*** (0.39)	0.81** (0.33)	1.21*** (0.42)	1.40*** (0.44)	1.53*** (0.51)	1.08** (0.49)	1.33** (0.55)
Inflation	–0.017** (0.0006)	–0.02*** (0.0007)	–0.02*** (0.0007)	–0.02*** (0.0007)	–0.02** (0.01)	–0.012 (0.013)	–0.015 (0.012)	–0.013 (0.013)
FDI	1.38* (0.74)	0.64 (0.69)	0.82 (0.60)	1.13 (0.74)	1.04 (0.97)	2.15* (1.30)	1.56 (1.03)	2.20* (1.33)
Period dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nobs	99	101	97	97	88	88	88	88
Goodness of fit	391.23	413.53	397.25	481.39	212.78	157.61	196.54	156.40
Adj. R <sup>2</sup>	0.75	0.75	0.80	0.74	0.73	0.68	0.73	0.70
First stage goodness of fit						72.00	61.00	70.00
Anderson LM statistic						12.96***	9.44***	14.52***
Sargan								1.49 (0.22)

Notes: Standard errors in parentheses.

All estimations contain constant. Instruments in IV estimations: historical GDP/Cap (6), pronoun drop rule (7), historical GDP/Cap & pronoun drop rule (8).

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.10.

greater importance to financial autonomy and independence. The estimated coefficient is also economically meaningful. The reported coefficient of the PM index for the full sample of countries in column (3) implies that a one standard deviation of the post materialism index from its mean value generates an increase in the size of the stock market of almost 11%.<sup>7</sup>

Next, we use the full information from the panel dataset, using average values of the variables for the separate time (decade) periods. We estimate the model with a pooled OLS estimation, including dummies for the time periods but omitting any time invariant country effects. Column (4) contains the results from using only the countries for which we have information on post materialism for all three periods; column (5) contains the results for the full sample of countries. Again, although there are some differences in the magnitude of the estimated coefficients, overall the nature of the effect of the control variables is similar in both estimations. Except for the effect of inward FDI, all the macro-economic control variables carry significant coefficients with expected signs. In both estimations, the effect of the PM index is positive and significant.<sup>8</sup> Given the similarity in findings, we use the unbalanced panel dataset in the remainder of the paper as it maximises the number of countries in the sample.

The main drawback of the pooled OLS estimation is that country effects are assumed to be part of the error term. If these country effects are related to the dependent or independent variables, the estimated coefficients will be biased and inefficient. Unfortunately, the variance of the PM index between the three time periods is limited, not allowing us to estimate the model with a standard fixed effects specification. The fixed effects estimation wipes out all the variation between the cross-sections, affecting the estimated effect of the post materialism index that changes too little over time for most of the countries in the sample.

To capture the effect of time invariant characteristics, we resort to estimating the model with a random effects specification with clustered standard errors at the country level. The findings from this estimation are shown in column (6). The estimated positive effect of the post materialism index persists, be it that the magnitude of the coefficient is smaller in size compared to the pooled OLS estimation. This indicates that some part of the estimated effect of the PM index is linked to time invariant country effects. In the remainder of our analysis we estimate the model with the random effects specification with clustered standard errors, as this allows for the inclusion of time invariant country effects given the nature of the post materialism index.

Next, we assess whether the relation between post materialism and stock markets may be characterised by non-linearity. Several studies on the growth effects of trust or social capital find evidence that the relation between social values and growth can have a non-linear dimension (Peiró-Palomino, 2016; Horvath, 2013; Roth, 2009). For instance, Peiró-Palomino (2016) analyses the effect of social capital on regional growth in the EU and finds that this relationship can be characterised as an inverted U shape. To ascertain whether the effect of post materialism on stock markets is non-linear, we square the PM index and add it to the model. As the findings in column (7) indicate, the inclusion of the squared PM index does not affect the positive effect of the original PM index. The effect of the squared term is negative, which would suggest that the relation between stock markets and post materialism is also characterised by an inverted U shape. However, the estimated effect of the squared term is not significant, indicating that the relation between post materialism and the size of stock markets is best characterised as linear.

Finally, we assess whether the effect of post materialism is conditional on the income level of the countries. In their study on the growth effects of trust, Zak and Knack (2001) report a significant effect of the interaction between income and trust. In the present study, income may also influence the effect of post materialism, as post materialistic values become much more prominent when a level of income is achieved that makes concerns regarding physical security less relevant. This suggests that the effect of post materialism may be more pronounced in countries with a relative high level of income. To assess whether this is the case, we add an interaction variable between post materialism and income level to the model. A significant coefficient of this interaction variable would constitute as evidence that the effect of post materialism changes with increasing income. The drawback of this approach is that if the effect of any of the other control variables also differs between high and low income countries, the interaction variable between post materialism and income level may pick up the effect of the other variable(s). Therefore, we also estimate the model separately for high and low income countries. For this, we classify the countries as high and low income countries based on whether their level of GDP/capita is lower or higher than the sample median value. We do this for each of the three decades to allow for the possibility that the income status of countries changes during the 30 year period.

Column (8) contains the results from adding the interaction variable between the degree of post materialism and income per capita. The estimated effect of the interaction variable is positive, suggesting that the effect of post materialism on stock markets in countries is stronger in countries with a higher income level. However, the estimated effect of this variable is insignificant. Similarly, the findings from estimating the model separately for high and low income countries shown in the last two columns suggest that there are no structural differences in the effect of post materialism between the two sets of countries. The estimated effect of the PM index is positive and significant and the magnitude of the effect is the same for both groups of countries.

<sup>7</sup> The difference between the estimated effect of the PM variable between the restricted (1) and full sample (3) is not significant;  $F=0.67$  (0.42).

<sup>8</sup> The difference between the coefficient of PM in estimations (4) and (5) is not significant;  $F=0.54$  (0.46).

#### 4.2. Endogeneity of post materialism

So far, the evidence indicates that post materialism has a positive and meaningful effect on stock markets that is robust to the inclusion of a variety of macro-economic controls. To further assess the robustness of this finding we address the issue that the estimated effect of the PM index may be affected by simultaneity and endogeneity concerns.

Before turning to the instrumental variable estimations we look at the relation between the individual elements of the PM index and the dependent variable. The PM index consists of four different components, which in combination are taken to capture the degree of post materialism. If the relation between the PM index and stock markets is driven by only one or two of these components, there may be an issue with our choice of instruments, as we try to instrument for the general concept of post materialism rather than its individual components. The findings for the four components of the PM index are shown in the first set of columns in Table 3. The coefficients of all four individual components carry the correct sign. The components of the Inglehart index capturing “freedom of speech” and “giving people more say in important government decisions” are seen as positive elements of the PM index. Both variables are positively associated with the size of stock markets at either the 1 or 5% significance levels. The variables “maintaining order” and “fighting price increases” which are linked to materialistic values both carry the correct negative sign, significant at 5 or 10%. Therefore, all the four components of the post materialism index drive its association with stock markets. It is not the case that one or two elements of the PM index exclusively drive the results, which could have affected the suitability of our instruments.

Next, we turn to the instrumental variable estimations. As discussed earlier, we use historical GDP per capita and the pronoun drop rule as instruments for post materialism. As the instruments are not available for Estonia, Latvia, Slovakia and the Ukraine, there is an unavoidable drop in the number of observations. To assess whether this affects our results, we re-estimate model (1) from Table 2 using only those countries for which we have observations on the instruments. The results are shown in column (5). The estimated effects of the PM index and the other control variables are fully in line with the findings presented in Table 2, indicating that the drop in observations does not introduce a bias in our findings.

The findings from the IV random effects estimations are shown in columns (6)–(8). Columns (6) and (7) contain the findings from using historical GDP per capita or the pronoun drop rule as instrument, whereas column (8) shows the results from using both instruments. The first stage goodness of fit and the Anderson LM statistic on under-identification are satisfactory and the Sargan statistic of the estimation with both instruments does not reject the validity of the over-identifying restrictions. Looking at the estimated effect of the instrumented PM index, its magnitude is much larger compared to the findings in Table 2, implying that stock market development exercises a negative effect on the degree of post materialism. This would suggest that larger equity markets foster materialistic values of profit and income maximisation, resulting in lower levels of post materialism. Controlling for this effect, the IV estimations identify a larger positive effect of post materialism on stock market development.

#### 4.3. Post materialism, institutions and stock markets

To assess whether the effect of post materialism is robust to the inclusion of the effect of institutions, we proceed by augmenting the regression model with variables capturing a variety of institutional characteristics. Due to the high degree of correlation between the governance indicators, we estimate the model separately for each of the six governance indicators. To control for the endogenous component of the relation between post materialism and stock markets, we instrument the PM index with historical GDP/Capita and the pronoun drop rule.

The findings are shown in Table 4. Looking at the set of findings, we can see that the instrumented PM index carries a significant positive coefficient in all estimations, confirming its independent positive effect on stock markets. As for the institution variables, all six variables carry positive coefficients, indicating that good institutions foster equity markets. Looking at the relative importance of the institutions, the level of significance of the estimated effect of regulatory quality indicates that the effect of this type of institution is most precisely estimated, followed by political stability and government effectiveness.

Given that the high degree of correlation between the governance indicators prevents us from including more than one institutional variable in each of the estimations, we also estimate the model using institution control variables that we obtain via principle component analysis. We obtain the first principal component of all six governance indicators (PCA.4.1) and of the three variables capturing political stability, government effectiveness and regulatory quality (PCA.4.2). The last two columns of Table 4 show the results from using these alternative institution control variables. The estimated effect of PCA.4.1 is positive, be it only significant at the 10% level. The estimated positive effect of PCA.4.2 is larger in magnitude and is significant at the 5% level, suggesting that the common element of political stability, government effectiveness and regulatory quality is most important in fostering the size of stock markets.<sup>9</sup>

<sup>9</sup> See the Appendix for the results from the principal component analysis. The first principal component of all six governance indicators explains almost 90% of their variance. The first principal component of political stability, government effectiveness and regulatory quality explains about 87% of the variance.

**Table 4**  
Post materialism and institutional determinants of stock markets.

Type of Institution	Dependent variable: Mkt							
	1 Voice and accountability	2 Political Stability	3 Government effectiveness	4 Regulatory quality	5 Rule of law	6 Control of corruption	7 PCA.4.1	8 PCA.4.2
Data	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010	Panel 1980–2010
Estimation method	IV RE	IV RE	IV RE	IV RE	IV RE	IV RE	IV RE	IV RE
PM index	112.92** (46.84)	120.17** (50.42)	98.09** (43.84)	101.02** (45.97)	111.07** (48.21)	112.02** (55.21)	103.47** (45.28)	102.61** (44.10)
Institution	6.07 (9.53)	8.85* (5.10)	11.65* (6.83)	17.92** (7.90)	6.86 (6.72)	3.01 (6.69)	4.39* (3.74)	8.32** (3.64)
GDP/Cap	195.18* (110.39)	192.81* (111.29)	192.36** (101.75)	170.98* (100.97)	207.79* (110.44)	185.28* (109.16)	196.22** (104.27)	186.24* (101.59)
$(GDP/Cap)^2$	-33.58** (15.29)	-35.36** (15.59)	-33.87** (14.06)	-31.98** (13.92)	-35.65** (15.40)	-32.05** (15.02)	-34.91** (14.50)	-34.84** (14.17)
Mktliq	0.42*** (0.07)	0.43*** (0.07)	0.41*** (0.07)	0.40*** (0.07)	0.41*** (0.07)	0.42*** (0.07)	0.41*** (0.07)	0.41*** (0.07)
Credit/GDP	0.56** (0.29)	0.62** (0.28)	0.47* (0.27)	0.44* (0.27)	0.53* (0.28)	0.57** (0.28)	0.49* (0.28)	0.48* (0.27)
$(Credit/GDP)^2$	-0.0016 (0.001)	-0.0018 (0.0012)	-0.001 (0.001)	-0.001 (0.001)	-0.0015 (0.0012)	-0.0017 (0.0012)	-0.0013 (0.0012)	-0.001 (0.001)
Savings	1.20** (0.56)	1.23** (0.58)	1.02** (0.54)	0.96* (0.54)	1.11** (0.58)	1.18** (0.61)	1.06** (0.55)	1.02** (0.54)
Inflation	-0.003 (0.01)	-0.004 (0.013)	-0.004 (0.012)	-0.014 (0.013)	-0.004 (0.013)	-0.003 (0.0013)	-0.005 (0.01)	-0.008 (0.01)
FDI	2.37* (1.32)	2.17* (1.31)	2.25* (1.21)	1.85 (1.25)	2.32* (1.31)	2.49* (1.35)	2.12* (1.25)	1.91 (1.21)
Period dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nobs	88	88	88	88	88	88	88	88
Goodness of fit	152.49	147.57	178.67	180.59	155.69	152.03	169.94	177.93
Adj. R <sup>2</sup>	0.70	0.69	0.73	0.73	0.71	0.70	0.72	0.72
First stage goodness of fit	61.00	60.00	60.00	56.00	58.00	56.00	59.00	59.00
Anderson LM statistic	11.42***	10.49**	11.23***	10.27**	10.63***	8.53**	10.90**	11.26***
Sargan	0.01 (0.90)	0.01 (0.92)	0.30 (0.58)	0.20 (0.65)	0.11 (0.73)	0.11 (0.74)	0.18 (0.67)	0.20 (0.65)

Notes: Country clustered standard errors in parentheses.

All estimations contain constant. PM instrumented with historical GDP/Cap and pronoun drop rule.

PCA.4.1 is first principle component of all six institution variables; PCA.4.2 is first principle component of political stability, government effectiveness and regulatory quality.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.10.

**Table 5**  
Post materialism, institutions and stock markets: three stage least squares estimations.

1st stage			2nd stage			3rd stage			1st stage			2nd stage			3rd stage		
Dependent variable			Dependent variable			Dependent variable			Dependent variable			Dependent variable			Dependent variable		
PM	Voice and accountability	Mkt	PM	Political stability	Mkt	PM	Government Effectiveness	Mkt	PM	Government effectiveness	Mkt	PM	Control corruption	Mkt	PM	Regulatory quality	Mkt
PM	2.43 <sup>***</sup> (0.33)	85.37 <sup>***</sup> (27.71)	PM	3.10 <sup>***</sup> (0.55)	105.18 <sup>***</sup> (32.39)	PM	3.99 <sup>***</sup> (0.44)	61.84 <sup>***</sup> (26.24)	PM	3.03 <sup>***</sup> (0.38)	55.99 <sup>**</sup> (28.22)	PM	4.02 <sup>***</sup> (0.50)	78.81 <sup>***</sup> (25.77)	PM	3.03 <sup>***</sup> (0.38)	55.99 <sup>**</sup> (28.22)
Voice and accountability		40.26 <sup>**</sup> (21.26)	Political stability		22.58 (13.54)	Government Effectiveness		24.58 <sup>***</sup> (13.11)	Regulatory quality		37.11 <sup>*</sup> (21.93)	Rule of law		22.19 <sup>**</sup> (11.83)	Control corruption		37.11 <sup>*</sup> (21.93)
Ethnic	-1.27 <sup>***</sup> (0.26)		Ethnic	-2.28 <sup>***</sup> (0.42)		Ethnic	-1.62 <sup>***</sup> (0.34)		Ethnic	-1.23 <sup>***</sup> (0.29)		Ethnic	-2.01 <sup>***</sup> (0.39)		Ethnic	-1.23 <sup>***</sup> (0.29)	
Hist. GDP/Cap	0.005 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.005 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.0039 <sup>***</sup> (0.0008)		Hist. GDP/Cap	0.0045 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.004 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.0045 <sup>***</sup> (0.0009)	
Pronoun drop	-0.01 (0.04)		Pronoun drop	-0.01 (0.04)		Pronoun drop	-0.07 <sup>**</sup> (0.037)		Pronoun drop	-0.046 (0.04)		Pronoun drop	-0.06 <sup>**</sup> (0.03)		Pronoun drop	-0.046 (0.04)	
Goodness of fit	76.65	85.47	Goodness of fit	76.88	207.83	Goodness of fit	82.93	285.79	Goodness of fit	82.57	288.72	Goodness of fit	82.16	251.95	Goodness of fit	82.57	288.72
Adj. R <sup>2</sup>	0.47	0.37	Adj. R <sup>2</sup>	0.47	0.68	Adj. R <sup>2</sup>	0.46	0.77	Adj. R <sup>2</sup>	0.46	0.75	Adj. R <sup>2</sup>	0.46	0.74	Adj. R <sup>2</sup>	0.46	0.75
1st stage			2nd stage			3rd stage			1st stage			2nd stage			3rd stage		
Dependent variable			Dependent variable			Dependent variable			Dependent variable			Dependent variable			Dependent variable		
PM	PCA_5.1	Mkt	PM	PCA_5.2	Mkt	PM	PCA_5.1	Mkt	PM	PCA_5.2	Mkt	PM	PCA_5.1	Mkt	PM	PCA_5.2	Mkt
PM	11.42 <sup>***</sup> (1.35)	71.53 <sup>***</sup> (26.61)	PM	9.41 <sup>***</sup> (1.11)	70.30 <sup>***</sup> (26.89)	PM	11.42 <sup>***</sup> (1.35)	71.53 <sup>***</sup> (26.61)	PM	9.41 <sup>***</sup> (1.11)	70.30 <sup>***</sup> (26.89)	PM	11.42 <sup>***</sup> (1.35)	71.53 <sup>***</sup> (26.61)	PM	9.41 <sup>***</sup> (1.11)	70.30 <sup>***</sup> (26.89)
PCA_5.1		10.23 <sup>**</sup> (4.71)	PCA_5.2		13.83 <sup>***</sup> (6.27)	PCA_5.1		10.23 <sup>**</sup> (4.71)	PCA_5.2		13.83 <sup>***</sup> (6.27)	PCA_5.1		10.23 <sup>**</sup> (4.71)	PCA_5.2		13.83 <sup>***</sup> (6.27)
Ethnic	-4.83 <sup>***</sup> (0.99)		Ethnic	-3.83 <sup>***</sup> (0.82)		Ethnic	-4.83 <sup>***</sup> (0.99)		Ethnic	-3.83 <sup>***</sup> (0.82)		Ethnic	-4.83 <sup>***</sup> (0.99)		Ethnic	-3.83 <sup>***</sup> (0.82)	
Hist. GDP/Cap	0.004 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.0043 <sup>***</sup> (0.0008)		Hist. GDP/Cap	0.004 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.0043 <sup>***</sup> (0.0008)		Hist. GDP/Cap	0.004 <sup>***</sup> (0.0009)		Hist. GDP/Cap	0.0043 <sup>***</sup> (0.0008)	
Pronoun drop	-0.05 (0.038)		Pronoun drop	-0.05 (0.038)		Pronoun drop	-0.05 (0.038)		Pronoun drop	-0.05 (0.038)		Pronoun drop	-0.05 (0.038)		Pronoun drop	-0.05 (0.038)	
Goodness of fit	80.58	104.10	Goodness of fit	80.44	259.01	Goodness of fit	80.58	104.10	Goodness of fit	80.44	259.01	Goodness of fit	80.58	104.10	Goodness of fit	80.44	259.01
Adj. R <sup>2</sup>	0.47	0.37	Adj. R <sup>2</sup>	0.47	0.74	Adj. R <sup>2</sup>	0.47	0.73	Adj. R <sup>2</sup>	0.47	0.74	Adj. R <sup>2</sup>	0.47	0.73	Adj. R <sup>2</sup>	0.47	0.74

Notes: Standard errors in parentheses.

Nobs = 88 for all estimations.

PCA\_5.1 is first principle component of all six institution variables; PCA\_5.2 is first principle component of voice and accountability, government effectiveness, regulatory quality and rule of law.

Third stage estimations also include (not shown in table) constant, period dummies and the macro-economic control variables.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.10.

**Table 6**  
Institutions as transmission channel of effect of post materialism.

Estimation method	Dependent variable 3rd stage: Mkt		
	3SLS Direct effect PM index ( $\beta_3$ )	3SLS Total effect PM index ( $\beta_5\delta_1 + \beta_3$ )	% transmitted via institutions
Voice and accountability	85.27*** (27.71)	213.30*** (71.14)	71.4
Government effectiveness	61.84** (26.24)	188.59*** (58.44)	75.30
Regulatory quality	55.99** (28.22)	193.40*** (65.38)	77.5
Rule of law	78.81*** (25.77)	199.27*** (63.81)	71.7
PCA.5.1	71.53*** (26.61)	191.11*** (56.46)	72.7
PCA.5.2	70.30*** (26.89)	204.49*** (61.35)	74.4

Notes: Standard errors in parentheses.

Nobs = 88 for all estimations.

PCA.5.1 is first principle component of all six institution variables; PCA.5.2 is first principle component of voice and accountability, government effectiveness, regulatory quality and rule of law.

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.10.

#### 4.4. Institutions as transmission channel of the effect of post materialism

Although the results in Table 4 indicate that both post materialism and several institutions exercise positive effects on stock markets, the findings need to be treated with considerable caution. In particular, the literature shows that it is very likely that relations between institutions and economic outcomes are affected by endogeneity, warranting the use of instrumental variable estimation techniques (Guiso et al., 2006). Importantly, cultural values and social beliefs are often used as instruments to identify causal effects of institutions on economic outcomes (Alesina and Giuliano, 2015). We exploit the feature that social values and beliefs are used as instrument for institutions to obtain further evidence on the effect of institutions on equity markets. Furthermore, doing so also allows us to address the question whether (part of) the effect of post materialism on stock markets is transmitted via institutions.

We follow the approaches by Akçomak and ter Weel (2009) and Bjornskov and Méon (2015) who identify relations between social values, institutions and economic outcomes within the framework of systems of equations. We set up the following system of equations:

$$Mkt_{it} = \beta_0 + \beta_1 GDP/Cap_{it} + \beta_2 Mktliq_{it} + \beta_3 PM_{it} + \beta_4 X_{it} + \beta_5 Institutions_{it} + \vartheta_t + \alpha_i + \varepsilon_{it} \quad (2a)$$

$$Institutions_{it} = \delta_0 + \delta_1 PM_{it} + Ethnic_{it} + \gamma_{it} \quad (2b)$$

$$PM_{it} = \theta_0 + \theta_1 HistGDP/Cap_{it} + \theta_2 Pronoundrop_{it} + \mu_{it} \quad (2c)$$

Equation (2b) expresses the institutional variables as a function of the degree of post materialism.<sup>10</sup> For the required second instrument we use the well-known association between the degree of ethnic fractionalisation and institutions (e.g. Mauro, 1995; Butkiewicz and Yannikkaya, 2006). We use data on the country level degree of ethnic fractionalisation provided by Alesina et al. (2003). Eq. (2c) posits the degree of post materialism as a function of the instruments historical GDP/Capita and the linguistic variable as discussed earlier. The appealing feature of this system of equations is that we instrument institutions with the post materialism variable, which itself is also instrumented. This allows us to identify the causal elements of the relations between post materialism, institutions and stock markets. If we find that institutions affect equity markets and post materialism affects institutions, we can conclude that institutions act as transmission channel of the effect of post materialism on stock markets.

We estimate the system of equations with 3SLS. The main findings are presented in Table 5. To save space, we report the results from the first, second and third stage of the estimations on the relation between post materialism and the various institutions and the effects of post materialism and institutions on stock markets.<sup>11</sup> For example, the results in the top left of Table 5 show the findings from estimating the system of equations with the institutional variable of voice and accountability. The estimated relation between the instrumented variable post materialism and the institutional variable is positive and significant, indicating that post materialistic values have a causal positive effect on the institution of voice and accountability. The negative effect of ethnic fractionalisation indicates that fractionalisation exercises a negative effect on this institution. The third stage of the estimation shows that both post materialism and voice and accountability are positively correlated with stock markets. Within the system of equations that we estimate, this indicates that both variables

<sup>10</sup> The Appendix presents scatter plots of post materialism and the governance indicators and the results from bivariate regressions of the governance indicators on post materialism. The scatter plots and the regression results reveal a positive relation between the PM index and the institutional variables.

<sup>11</sup> The effects of the other control variables are in line with those presented in the previous tables. The full results underlying Table 5 are available upon request.



exercise significant effects on stock markets and that part of the effect of post materialism is transmitted via the institution of voice and accountability, given the findings of the second stage estimation.

The remainder of Table 5 shows the results from estimating the system of equations with the other institution variables. In all second stage estimations, post materialism and ethnic fractionalisation are significantly associated with the institution variables. The third stage estimations confirm that post materialism has a significant positive association with stock markets. Furthermore, judging from the estimated significance of the relation between the institution variables and stock markets, government effectiveness, rule of law and to a lesser extent also regulatory quality exercise significant effects on stock markets. Not only do these findings confirm that institutions are important for the development of equity markets, they also indicate that the indirect effect of post materialism on stock markets runs via legal, political and democratic institutions.

Of course, we need to interpret these findings with the necessary caution as we can only include one governance indicator in each of the estimations. To obtain some indication of the overall importance of institutions, the last two blocks of findings in the bottom of Table 5 show the results from replacing the individual governance indicators with their first principal components. The estimation with PCA\_5.1 uses the first principal component of all six institution variables, whereas the estimation with PCA\_5.2 is obtained using the first principle component of the variables voice and accountability, government effectiveness, rule of law and regulatory quality. The findings for both principle components variables clearly confirm the importance of institutions as driver of stock market development and as transmission channel of the effect of post materialism on capital markets.

To complete the analysis, we obtain some indication of how much of the effect of post materialism is transmitted via the various institutions. For this, we use the approach of residual generated regressors (Pagan, 1984; Gomanee et al., 2005; Papyrakis and Gerlagh, 2004). The main difference with previous research is that we control specifically for the endogenous components of the relations between the variables of interest.

We first regress the individual institution variables on the PM index, where we instrument the degree of post materialism with historical GDP/Capita and the pronoun drop variable to obtain the causal effect of post materialism on institutions:

$$Institutions_{it} = \delta_0 + \delta_1 PM_{it} + \gamma_{it} \quad (3a)$$

The residuals of this model capture the elements of the institution variables that are not related to the instrumented post materialism index.

To recall, the fully specified model including institutions is:

$$Mkt_{it} = \beta_0 + \beta_1 GDP/Cap_{it} + \beta_2 Mktliq_{it} + \beta_3 PM_{it} + \beta_4 X_{it} + \beta_5 Institutions_{it} + \vartheta_t + \alpha_i + \varepsilon_{it} \quad (3b)$$

Substituting (3a) into (3b) gives:

$$Mkt_{it} = (\beta_0 + \beta_5 \delta_0) + \beta_1 GDP/Cap_{it} + \beta_2 Mktliq_{it} + (\beta_5 \delta_1 + \beta_3) PM_{it} + \beta_4 X_{it} + \beta_5 \gamma_{it} + \vartheta_t + \alpha_i + \varepsilon_{it} \quad (3c)$$

$(\beta_5 \delta_1 + \beta_3) PM_{it}$  captures the total effect of post materialism on stock markets. This consists of the direct effect  $\beta_3$  of post materialism and the indirect effect  $\beta_5 \delta_1$  that runs via institutions. Estimating the system of equations using (3c) gives the same results as equation (3b), except potentially for the coefficient of the post materialism index in equation (3c). Any difference in the magnitude of the estimated effect of the PM index can be taken as evidence that institutions act as transmission channel of the effect of post materialism.<sup>12</sup>

Given the findings shown in Table 5, we estimate the systems of equations with equation (3c) for the institution variables voice and accountability, regulatory quality, government effectiveness and rule of law. The main findings on the estimated coefficients of the PM index are presented in Table 6. A comparison of the estimated effect of the PM variable obtained with the original 3SLS estimations (direct effect) and with the residual generated regressors (total effect) clearly shows that the effect of the post materialism index has increased in size for all four governance indicators. This confirms our finding that institutions act as transmission channel of the effect of post materialism on stock markets.

To assess the relative importance of the transmitting function of institutions, we use the information on the direct and total effect of post materialism to calculate the degree that the effect of post materialism is transmitted via institutions. Regulatory quality appears to act as the most important transmission channel, as 77.5% of the effect of post materialism on stock markets is transmitted via this institution. Government effectiveness has the second largest share with 75.3%, followed by rule of law with 71.7% and voice and accountability with 71.4%. In addition, we also use the first principal component of all 6 institution variables and of the four selected institution variables. The finding from using the principal component of all six institution variables indicates that 72.7% of the effect of post materialism is “transmitted” via the first common factor of the institutions. With the first principal component of the variables capturing voice and accountability, regulatory quality, government effectiveness and rule of law we obtain 74.4%. Overall therefore, the findings clearly indicate that institutions transmit a substantial part of the effect of post materialism on stock markets and that there appear to be various different types of institutions that play such a role.

<sup>12</sup> The estimated effect of  $\gamma_{it}$  in equation (3c) captures the effect of institutions on stock markets. To ensure this to be the case we instrument  $\gamma_{it}$  with ethnic fractionalisation.

## 5. Summary and conclusions

In this paper we conduct an empirical analysis of the effect of social values on equity markets. We focus on post materialism, a type of social value that so far has received markedly limited attention in the burgeoning literature on the effects of social values on economic behaviour and outcomes. We examine whether countries with a high degree of post materialistic beliefs and values are characterised by larger stock markets. In extension of this, we assess whether post materialism and institutions both exercise independent effects on stock markets and whether part of the effect of post materialism on equity markets is transmitted via institutions.

The main findings from our analysis are three-fold. First, we find clear evidence that post materialism is positively associated with the size of stock markets. The explanation for this finding is that citizens with post materialistic beliefs value autonomy and financial independence, fostering the willingness to own financial assets and invest in stock markets. The estimated positive effect of post materialism is robust to the inclusion of a range of macro-economic control variables, various model specifications and the use of instrumental variable estimation techniques.

Second, we estimate the effects of institutions and post materialism in a system of equations framework that accounts for the interrelations between these variables, where post materialism acts as instrument for institutions. Using 3SLS, we find that post materialism and several institutions exercise independent positive significant effects on stock markets. Voice and accountability appears to generate the strongest effect, followed by regulatory quality, government effectiveness and rule of law.

Third, the 3SLS findings also provide evidence that several of the institutions act as transmission channel of part of the effect of post materialism on stock markets. Using the method of residual generated regressors and explicitly taking into account the endogenous components of the relations between post materialism, institutions and stock markets, we find that the total effect of post materialism is much larger than its direct effect. Accepting the caveat that we can only control for one institutional characteristic in each of the individual models that we estimate, our results show that a substantial part of the effect of post materialism is transmitted via legal, political and democratic institutions.

Finally, we derive two main conclusions from our findings with regard to future research. First, our findings underline the importance of the research line that interprets social values as an important explanatory factor of economic behaviour and outcomes. Importantly, we identify the economic effect of a type of social value that has been given only scant attention in this research line. On-going processes where citizens of a growing number of countries are adopting post materialistic values indicate that such societal shifts constitute an important empirical phenomenon and as such need to be incorporated more prominently in research on the economic effects of culture and social values. One logical extension from our study could be to study the effect of post materialism on other aspects of financial development, as we focus exclusively on stock markets in our analysis. Another extension could be to assess the effects of post materialism on processes of economic growth, a topic popular in contemporary research on the effects of other social values. In any case, we take our findings to indicate that there is a clear need to search for and introduce new aspects of social values such as post materialism into research on drivers of economic behaviour and outcomes.

Second, our findings bear relevance to the debate on the importance of institutions as explanatory factor in economic and socio-economic processes. We find that institutions exercise direct effects on stock markets and that they also act as transmission channel of a substantial part of the effect of post materialism. As our paper is the first to study the relations between post materialism, institutions and equity markets, we have focused on obtaining evidence on the existence and nature of these relations. Clearly, more research is needed to clarify which particular institutions are most important in transmitting economic effects of post materialist values. In this context, it also becomes important to develop a better understanding of how institutions respond to changing cultures and social values. Our finding that institutions act as transmission channel of values that capture structural societal shifts underlines the importance of institutions being able to adapt, respond to and incorporate changing social values. Therefore, new research will benefit from addressing how societal shifts generate institutional changes and how such changes in turn affect economic behaviour and outcomes.

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## Appendix

See [Tables A1–A5](#) and [Fig. A1](#)

**Table A1**  
List of countries & availability post materialism index.

Country	PM index	Country	PM index
Argentina	1	Japan	1
Australia	2	Latvia	1
Austria	1	Lithuania	1
Brazil	2	Macedonia	2
Bulgaria	2	Mexico	1
Canada	1	Netherlands	1
Chile	1	New Zealand	2
Colombia	2	Norway	1
Croatia	2	Peru	2
Czech Republic	1	Philippines	2
Denmark	1	Poland	1
Estonia	1	Portugal	1
Finland	1	Romania	2
France	1	Russian Federation	1
Germany	1	Slovakia	1
United Kingdom	1	Slovenia	2
Greece	2	Spain	1
Hungary	1	Sweden	1
Iceland	1	Turkey	1
India	1	Ukraine	2
Ireland	1	United States	1
Italy	1		

1 = PM available for 1980s, 1990s and 2000s; 2 = PM available for 1990s and 2000s.

**Table A2**  
Description and sources of variables.

Variable	Description	Source
Mkt	Market capitalisation of listed companies as% GDP	Global Financial Development Database; World Bank
PM index	4-item Inglehart Index	Based on Eurobarometer Series, European Value Studies, World Value Survey
GDP/Cap	Ln Gross Domestic Product per Capita	World Bank
MktLiq	Market Liquidity; stocks traded as% of GDP	Global Financial Development Database; World Bank
Credit/GDP	Domestic credit provided by banking sector	Global Financial Development Database; World Bank
Savings	Gross savings as% of GDP	World Bank
Inflation	Consumer price index; average change	World Bank
FDI	Net Foreign Direct Investment inflows as% of GDP	World Bank
Voice and Accountability	Freedom in electing government, freedom of expression & association	Worldwide Governance Indicators; World Bank
Political Stability	Political stability & absence of violence/terrorism	Worldwide Governance Indicators; World Bank
Government Effectiveness	Quality of public services, civil service, policy formulation and implementation	Worldwide Governance Indicators; World Bank
Regulatory Quality	Ability of government to formulate and implement regulations that promote private sector development	Worldwide Governance Indicators; World Bank
Rule of Law	Extent to which agents have confidence in and abide by rules of society	Worldwide Governance Indicators; World Bank
Control of Corruption	Extent to which public power is exercised for private gain	Worldwide Governance Indicators; World Bank
Historical GDP/Cap	Gross Domestic Product per Capita 1950	The Maddison-Project <a href="http://www.ggd.net/maddison/maddison-project/home.htm">http://www.ggd.net/maddison/maddison-project/home.htm</a>
Pronoun drop rule	Dummy variable taking value 1 if pronoun can be dropped from sentence	<a href="#">Davis and Abdurazokzoda (2015)</a>
Ethnic	Ethnic fractionalisation index	<a href="#">Alesina et al. (2003)</a>

**Table A3**  
Summary Statistics.

Variable	Mean	Standard deviation	Minimum	Maximum
Mkt	41.95	33.75	0.40	135.4
PM Index	1.86	0.19	1.44	2.27
GDP/Cap	4.06	0.35	2.81	4.69
MktLiq	28.41	41.06	0	255.2
Credit/GDP	67.05	46.73	4.56	208.1
Savings	22.25	5.78	3.7	36.10
Inflation	37.36	153.38	-0.19	1400
FDI	2.56	2.37	0	13.10
Voice and accountability	0.85	0.64	-0.89	1.69
Political stability	0.38	0.088	-2.39	1.66
Government effectiveness	0.88	0.86	-0.79	2.26
Regulatory quality	0.90	0.70	-0.84	2.02
Rule of law	0.75	0.93	-0.93	1.97
Control of corruption	0.77	1.08	-1.09	2.52
Historical GDP/Cap	3691.46	2301.43	619	9561
Pronoun drop rule	0.57	0.49	0	1
Ethnic	0.28	0.19	0.01	0.71

**Table A4**  
Summary of findings principle component analysis PCA.4.1, PCA.4.2, PCA.5.1 and PCA.5.2.

Principle component analysis PCA.4.1 & PCA.5.1			
Component	Eigenvalue	% of variance	% cumulative
1	5.39	0.90	0.90
2	0.33	0.05	0.95
3	0.13	0.02	0.97
4	0.08	0.01	0.98
5	0.03	0.006	0.99
6	0.03	0.005	1.00
Principle component analysis PCA.4.2			
Component	Eigenvalue	% of variance	% cumulative
1	2.63	0.87	0.87
2	0.27	0.09	0.96
3	0.09	0.03	1.00
Principle component analysis PCA.5.2			
Component	Eigenvalue	% of variance	% cumulative
1	3.75	0.94	0.94
2	0.13	0.03	0.97
3	0.08	0.02	0.99
4	0.03	0.008	1.00

Rho PCA.4.1 & PCA.5.1 = 0.89; Rho PCA.4.2 = 0.87; Rho PCA.5.2 = 1.00.

PCA.4.1 & PCA.5.1: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law & control of corruption.

PCA.4.2: political stability, government effectiveness & regulatory quality.

PCA.5.2: voice and accountability, government effectiveness, rule of law & regulatory quality.

**Table A5**  
Bivariate regressions institution variables on post materialism.

Estimation method	Dependent variable					
	Voice and accountability	Political stability	Government effectiveness	Regulatory quality	Rule of law	Control of corruption
OLS	OLS	OLS	OLS	OLS	OLS	OLS
PM index	1.72 <sup>***</sup> (0.35)	1.60 <sup>***</sup> (0.54)	2.83 <sup>***</sup> (0.34)	2.08 <sup>***</sup> (0.36)	2.83 <sup>***</sup> (0.40)	3.77 <sup>***</sup> (0.41)
Nobs	116	116	116	116	116	116
Goodness of fit	10.40	8.88	26.49	13.01	20.08	32.38
Adj. R <sup>2</sup>	0.31	0.15	0.43	0.34	0.36	0.46

Notes: Robust standard errors in parentheses.

Estimations contain constant and period dummies.

<sup>\*\*\*</sup> p < 0.01.

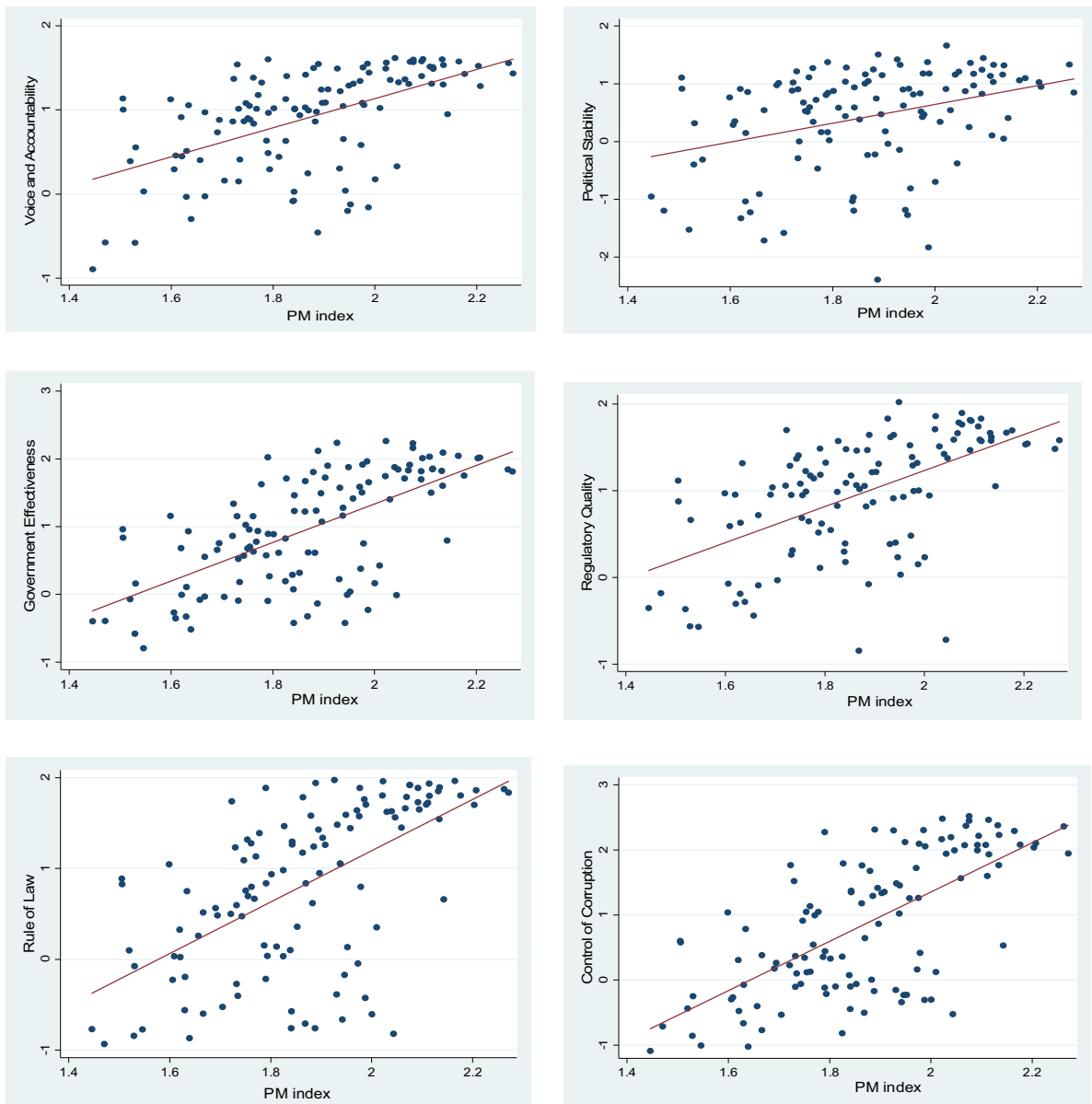


Fig. A1. Relation post materialism and institutions.

## References

- Čihák, M., Demirgüç-Kunt, A., Feyen, E., Levine, R., 2012. *Benchmarking Financial Systems Around the World*. World Bank Policy Research Working Paper No. 6175. World Bank, Washington, DC.
- Akçomak, S., ter Weel, B., 2009. Social capital, innovation and growth: evidence from Europe. *Eur. Econ. Rev.* 53 (5), 544–567.
- Alesina, A., Giuliano, P., 2015. Culture and institutions. *J. Econ. Lit.* 53 (4), 898–944.
- Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., Wacziarg, R., 2003. Fractionalization. *J. Econ. Growth* 8 (2), 155–194.
- Andrianaivo, M., Yartey, C.A., 2009. *Understanding the Growth of African Financial Markets*. IMF Working Paper Series, WP/09/182. International Monetary Fund, Washington, DC.
- Beck, T., Levine, R., 2005. Legal institutions and financial development. In: Menard, C., Shirley, M.M. (Eds.), *Handbook of New Institutional Economics*. Springer, The Netherlands.
- Beugelsdijk, S., van Schaik, T., 2005. Social capital and growth in European regions: an empirical test. *Eur. J. Pol. Econ.* 21 (2), 301–324.
- Bjornskov, C., Méon, P.-G., 2015. The productivity of trust. *World Dev.* 70 (c), 317–331.
- Bjornskov, C., 2012. How does social trust affect economic growth? *South. Econ. J.* 78 (4), 1346–1368.
- Boullila, G., Bousrih, L., Trabelsi, M., 2008. Social capital and economic growth: empirical investigations on the transmission channels. *Int. Econ. J.* 22 (3), 399–417.
- Bowles, S., 1998. Endogenous preferences: the cultural consequences of markets and other institutions. *J. Econ. Lit.* XXXVI, 75–111.
- Boyd, J.H., Levine, R., Smith, B.D., 2001. The impact of inflation on financial sector performance. *J. Monetary Econ.* 47, 221–248.

- Butkiewicz, J., Yannikkaya, H., 2006. Institutional quality and economic growth: maintaining the rule of law or democratic institutions, or both? *Econ. Modell.* 23 (4), 648–661.
- Calderon-Rossell, R.J., 1990. The structure and evolution of world stock markets. In: Rhee, S.G., Rosita, P.C. (Eds.), *Pacific Basin Capital Markets Research Proceedings of the First Annual Pacific Basin Finance Conference*. Taipei, China, North Holland: Amsterdam.
- Calderon-Rossell, R.J., 1991. The determinants of stock market growth. In: Rhee, S.G., Rosita, P.C. (Eds.), *Pacific Basin Capital Markets Research Proceedings of the Second Annual Pacific Basin Finance Conference*. Taipei, China, North Holland: Amsterdam.
- Chinn, M.D., Ito, H., 2006. What matters for financial development? Capital controls, institutions and interactions. *J. Dev. Econ.* 81, 163–192.
- Davis, L.S., Abdurazokzoda, F., 2015. Language, culture and institutions: evidence from a new linguistic dataset. *J. Comp. Econ.*, <http://dx.doi.org/10.1016/j.jce.2015.10.015>.
- Dearmon, J., Grier, K., 2009. Trust and development. *J. Econ. Behav. Org.* 71, 210–220.
- Fairbrother, M., 2013. Rich people, poor people, and environmental concern: evidence across nations and time. *Eur. Sociol. Rev.* 29 (5), 910–922.
- Ferguson, L., 2006. Institutions for financial development: what are they and where do they come from? *J. Econ. Surv.* 20 (1), 27–43.
- Forté, A., Peiró-Palomino, J., Tortosa-Ausina, E., 2015. Does social capital matter for European regional growth? *Eur. Econ. Rev.* 77, 47–64.
- García, V., Liu, L., 1999. Macroeconomic determinants of stock market development. *J. Appl. Econ.* 11 (1), 29–59.
- Georgarakos, D., Giacomo, P., 2011. Trust, sociability and stock market participation. *Rev. Finance* 15 (4), 693–725.
- Gomanee, K., Girma, S., Morrissey, O., 2005. Aid and growth in Sub-Saharan Africa: accounting for transmission mechanisms. *J. Int. Dev.* 17, 1055–1075.
- Granato, J., Inglehart, R., Leblang, D., 1996. The effect of cultural values on economic development: theory, hypotheses and some empirical tests. *Am. J. Pol. Sci.* 40 (3), 607–631.
- Guiso, L., Haliassos, M., Jappelli, T., 2003. Equity culture: theory and cross-country evidence. *Econ. Policy*, 123–170.
- Guiso, L., Sapienza, P., Zingales, L., 2004. The role of social capital in financial development. *Am. Econ. Rev.* 94 (3), 526–556.
- Guiso, L., Sapienza, P., Zingales, L., 2006. Does culture affect economic outcomes? *J. Econ. Perspect.* 20 (2), 23–48.
- Guiso, L., Sapienza, P., Zingales, L., 2008. Trusting the stock market. *J. Finance Am. Finance Assoc.* 63 (3), 2557–2600.
- Hong, H., Kubik, J.D., Stein, J.C., 2004. Social interaction and stock market participation. *J. Finance Am. Finance Assoc.* 59 (1), 137–163.
- Horvath, R., 2013. Does trust promote growth? *J. Comp. Econ.* 41 (3), 777–788.
- Inglehart, R., 1977. *The Silent Revolution*. Princeton University Press, Princeton, NJ.
- Kashima, E.S., Kashima, Y., 1998. Culture and language: the case of cultural dimensions and personal pronoun use. *J. Cross-Cult. Psychol.* 2 (9), 461–487.
- Kaufman, D., Kraay, A., Mastruzzi, M., 2010. *The Worldwide Governance Indicators: Methodology and Analytical Issues*. World Bank Policy Research Working Paper No. 5430. World Bank, Washington, DC.
- Klasing, M.J., 2013. Cultural dimensions, collective values and their importance for institutions. *J. Comp. Econ.* 41 (2), 447–467.
- Knack, S., Keefer, P., 1997. Does social capital have an economic pay-off? A cross-country investigation. *Q. J. Econ.* 112 (4), 1251–1288.
- Knack, S., 2002. Social capital and the quality of government: evidence from the States. *Am. J. Pol. Sci.* 46 (4), 772–785.
- La Porta, R., Lopez-de-Silanes, F., Schleifer, A., Vishny, R.W., 1997. Legal determinants of external finance. *J. Finance* 52 (3), 1131–1150.
- Levine, R., Loayza, N., Beck, T., 2000. Financial intermediation and growth: causality and causes. *J. Monetary Econ.* 46, 31–77.
- Levine, R., 2005. Finance and growth: theory and evidence. In: Aghion, P., Durlauf, S.N. (Eds.), *Handbook of Economic Growth*, Chapter 12.
- Licht, A., Goldschmidt, C., Schwartz, S.H., 2007. Culture rules: the foundations of the rule of law and other norms of governance. *J. Comp. Econ.* 35, 659–688.
- Mauro, P., 1995. Corruption and growth. *Q. J. Econ.* 110 (3), 681–712.
- Naceur, S.B., Ghazouani, S., Omran, M., 2007. Does stock market liberalization spur financial and economic development in the MENA region? *J. Comp. Econ.* 36, 673–693.
- Pagan, A., 1984. Econometric issues in the analysis of regressions with generated regressors. *Int. Econ. Rev.* 25, 221–247.
- Papayrakis, E., Gerlagh, R., 2004. The resource curse and its transmission channels. *J. Comp. Econ.* 32, 181–193.
- Peiró-Palomino, J., 2016. Social capital and economic growth in Europe: nonlinear trends and heterogeneous regional effects. *Oxf. Bull. Econ. Stat.*, <http://dx.doi.org/10.1111/obes.12131>.
- Roth, F., 2009. Does too much trust hamper economic growth? *Kyklos* 62 (1), 103–128.
- Tabellini, G., 2008. Presidential address institutions and culture. *J. Eur. Econ. Assoc.* 6 (2–3), 255–294.
- Tabellini, G., 2010. Culture and institutions: economic development in the regions of Europe. *J. Eur. Econ. Assoc.* 8 (4), 677–716.
- Temple, J., 1999. The new growth literature. *J. Econ. Lit.* 37 (1), 112–156.
- Uhlaner, L.M., Thurik, A.R., 2007. Post materialism: a cultural factor influencing total entrepreneurial activity across nations. *J. Evol. Econ.* 17 (2), 161–185.
- Williamson, O.E., 2000. The new institutional economics: taking stock, looking ahead. *J. Econ. Lit.* XXXVIII, 595–613.
- Yartey, C.A., 2010. The institutional and macroeconomic determinants of stock market development in emerging economies. *Appl. Financial Econ.* 20, 1615–1625.
- Zak, P.J., Knack, S., 2001. Trust and growth. *Econ. J.* 111, 295–321.