



Regular Article

Economic freedom, post materialism and economic growth

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ARTICLE INFO

JEL classification:

A13 Relation of Economics to Social Values
 O43 Institutions and Growth
 O47 Empirical Studies of Economic Growth

Keywords:

Post materialism
 Economic freedom
 Economic growth

ABSTRACT

Whereas there is substantial evidence that economic freedom generates positive growth effects, much less is known about how social values impact the institutional framework underlying economic freedom. We address this gap in the literature, using panel data for a heterogeneous group of countries for the period 1980–2010 to examine whether post materialism influences the growth effect of economic freedom. Using instrumental variable estimation techniques within a three stages least square framework, we find that Fraser's economic freedom index and several of its components generate positive direct growth effects. Post materialism generates a negative direct growth effect. We also identify a positive indirect effect from post materialism that runs via economic freedom and its underlying components onto economic growth. These findings indicate that post materialism influences the institutional framework underlying economic freedom and that economic freedom acts as a transmission channel of economic effects of social values.

1. Introduction

Research on fundamental causes of economic growth is increasingly recognising the central importance of institutions (Jones & Romer, 2010; Lloyd & Lee, 2018). Within this research strand, a large number of studies estimate growth effects of economic freedom, capturing the degree that government policies and institutions provide solid property rights and support personal choice, voluntary exchange and freedom to compete (Gwartney, 2009). The majority of these studies identify clear positive effects on economic growth (de Haan et al., 2006; Hall & Lawson, 2014). The importance of economic freedom is further indicated by growing evidence that it also impacts other types of economic behaviours and outcomes, including entrepreneurship (Nyström, 2008) income inequality (Berg & Nilsson, 2010; Bjørnskov, 2017) and well-being (Pitlik et al., 2015).

Compared to the large body of evidence on growth effects of economic freedom, much less is known about factors that foster or hinder its development (Bologna & Hall, 2014; March et al., 2017; Lawson et al., 2020). So far, studies have focused primarily on the effects of democracy (De Haan & Sturm, 2003; Heckelman & Knack, 2009), foreign aid (Young & Sheehan, 2014) and economic or financial crisis (De Haan et al., 2009; Pitlik & Wirth, 2003). Therefore, a better understanding of what drives economic freedom has become of paramount importance (Hall, 2016). Research on drivers of other institutions suggests that social values may exercise important effects on economic freedom. In line with the notion of the hierarchy of institutions (North, 1990) and of

social analysis (Williamson, 2000), social values are often found to influence institutions and/or instigate institutional change (Alesina & Giuliano, 2015; Bjørnskov, 2018). For example, Licht et al. (2007) find that countries with high levels of autonomy and egalitarianism have higher levels of democratic accountability and lower levels of corruption. Similarly, findings by Tabellini (2008) show that trust is positively associated with the quality of government in EU regions. Furthermore, it is well-established that social values generate important economic effects themselves (Alesina & Giuliano, 2015; Guiso et al., 2006). In combination, this suggests that institutions may act as a transmission channel of indirect economic effects of social values (Bjørnskov, 2012; Jordaan et al., 2016).

The purpose of the present paper is to address the gap in the literature on determinants of economic freedom that does not consider the effects that social values may exercise on economic freedom. We do so by conducting an empirical study that brings together the literatures on the growth effects of economic freedom and social values, allowing us to assess whether social values act as a driver of economic freedom. We focus on the effect of post materialism, a type of social value that has received very limited attention in the literature on growth effects of social values (Jordaan & Dima, 2020). This omission is noteworthy, given findings in the fields of sociology and political science that identify socio-economic shifts towards an increased importance of post materialistic values and priorities (Abramson, 2014; Inglehart & Welzel, 2005). Furthermore, post materialists are often politically active in society, exerting pressure on the political establishment and other

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<https://doi.org/10.1016/j.ssaho.2023.100416>

Received 22 December 2022; Received in revised form 23 January 2023; Accepted 24 January 2023

Available online 27 January 2023

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organisations to change institutions to advance their beliefs and values (Welzel et al., 2003). This suggests that the institutional framework that underlies economic freedom may be affected by the growing importance of post materialism.

To examine the relationship between post materialism and economic freedom we adopt the approach by Jordaan and Dima (2020). They apply instrumental variable estimation techniques within a three stages least square (3SLS) framework on a cross-sectional dataset to estimate the impact of the relationship between post materialism and institutional quality on international income differences. Using their approach, we estimate the direct growth effects of post materialism and economic freedom and we assess whether economic freedom acts as a transmission channel of an indirect growth effect from post materialism. In doing so, our analysis also contributes to contemporary research that is attempting to identify factors that influence the development of economic freedom.

The paper is constructed as follows. Section 2 presents a literature review which we use to inform our research questions. Section 3 discusses the data, model specification and estimation strategy. Section 4 presents the main empirical findings, which can be summarised as follows. Findings from an initial set of estimations indicate that both post materialism and economic freedom (and several of its components) are positively associated with economic growth. Findings from 3SLS estimations with instrumental variables confirm the positive growth effect of economic freedom and its components. In contrast, the effect of post materialism becomes two-faceted. We identify a negative direct growth effect, indicating that post materialistic values have a dampening effect on economic growth. However, we also identify a smaller positive indirect growth effect that runs via economic freedom. This latter finding confirms that economic freedom acts as transmission channel of social values and that therefore values such as post materialism influence institutional development. Finally, section 5 summarises the findings and provides some suggestions for further research.

2. Literature review and research questions

2.1. Post materialism

Comprehensive surveys by Alesina and Giuliano (2015) and Bjørnskov (2018) discuss large bodies of empirical evidence showing that social values are important drivers of economic growth. Given the variety of social values that is examined, it is noteworthy that post materialism is lacking from this research strand. Following the seminal work by Inglehart (1977, 1997), researchers in the fields of sociology and political science have consistently found that post materialistic values such as personal freedom, autonomy and social equality are replacing materialistic values geared towards maximising production and income (Abramson, 2014; Inglehart & Welzel, 2005). Given the abundance of evidence that social values play important roles in economic growth processes, it is very likely that post materialistic values also impact upon economic behaviours and outcomes (Jordaan et al., 2016).

The growing prominence of post materialism can be explained by two mechanisms, commonly labelled the *scarcity* and the *socialisation* hypotheses (Inglehart, 1997; Jordaan & Dima, 2020). The scarcity hypothesis is based on the premise that citizens value their most pressing needs. When income levels become high enough for physical security and survival to no longer constitute the most important needs, values such as social equality, quality of life and autonomy become more important (Inglehart & Welzel, 2005). The socialisation hypothesis explains why the growing importance of post materialism materialises as a structural and long term process. To a large extent, a person's values and beliefs are formed during the person's pre-adult years. This implies that an adult with post materialistic values grew up under economic conditions that allowed for such values to be important. The growing prevalence of post materialism can then be seen as a structural process of

intergenerational change, with each generation containing more citizens that grew up in conditions favouring post materialistic values (Abramson, 2014; Welzel & Inglehart, 2005).

As post materialists attach less value to materialistic goals, the common assumption is that post materialism has a dampening effect on economic growth (Inglehart, 1997). The actual evidence of such a direct negative effect is limited and inconclusive, however. For a small cross-section of countries, Granato, Inglehart, and Leblang (1996) present evidence of a negative association between post materialism and economic growth. Edwards and Patterson (2009) re-examine these results and find that the estimated negative association is very sensitive to sample selection and choice of appropriate econometric estimators. In addition, some studies present more indirect evidence that post materialism can generate negative growth effects. For instance, Uhlaner and Thurik (2010) find that post materialists do not appear to value the status of being an entrepreneur, nor are they motivated by income maximisation goals. Fairbrother (2013) reports that post materialists are more inclined to support and pay for environmental protection, reflecting the decreased importance of production and income maximisation.

Other evidence suggests that certain elements of post materialism may also foster economic growth. For instance, post materialists value individualism and autonomy. Gorodnichenko and Roland (2011; 2017) provide sets of findings for a cross-section of countries showing that individualism constitutes the main cultural driver of long run growth, innovation and total factor productivity. Another example can be found in findings showing that individualism and self-expression exercise positive effects on social trust (Welzel, 2010) and social capital (Allik and Realo, 2004). As trust and social capital exercise positive effects on economic growth (Horvath, 2013), post materialism may indirectly generate positive growth effects.

2.2. Economic freedom and post materialism

The joint examination of growth effects of post materialism and economic freedom that we conduct in this paper creates several advantages. One advantage is that it allows for a more accurate identification of their effects. Williamson and Mathers (2011) conduct panel data growth regressions, estimating the effects of economic freedom and a principal component variable comprised of trust, respect for others, self-determination and obedience. Independently, both the variables are positively associated with economic growth. However, when examined together, the size of the estimated effect of the principal component variable decreases substantially. Similar findings showing that the effect of trust or social capital decreases in size when also controlling for institutions are presented by Ahlerup et al. (2009) and Tabellini (2010). Therefore, by including economic freedom and post materialism in the same estimation framework, it is less likely that their estimated effects will be affected by omitted variable bias.

The second advantage of jointly estimating the effects of post materialism and economic freedom is that it allows us to assess how they are related and whether this relationship impacts on economic growth. So far, trust is the only type of social value that has been examined in relation to (components of) economic freedom. In particular, Heineman and Tanz (2008) find that countries with a high level of trust are characterised by a higher degree of economic freedom, fostering in particular the quality of legal structures and regulation. Leibrecht and Pitlik (2015) and Berggren and Bjørnskov

(2017) present findings indicating that trust fosters deregulation, thereby enhancing economic freedom.

In addition, several studies link (elements of) post materialism to components of the institutional framework underlying economic freedom. Kravtova et al. (2017) analyse data from the

World Value Survey and report a negative association between post materialism and bribery disapproval, suggesting that post materialism lowers corruption. Welzel and Inglehart (2005) examine the effect of

post materialistic liberty aspirations and identify a positive association with civil and political freedom. Pitlik and Rode (2017) analyse the relationship between individualism and government intervention and find that self-determination is negatively associated with government intervention, suggesting that individualism fosters the creation of non-interventionist market friendly institutions.

Finally, combining the evidence that social values and institutions both generate economic effects with findings that social values influence institutions logically suggests that institutions may act as a transmission channel of indirect effects of social values (Jordaan and Dima, 2020). Although no evidence is available on whether economic freedom plays such a role, findings from studies that show that other institutions transmit effects of social values are suggestive. Bjørnskov (2012) estimates a simultaneous equation model on the growth effect of trust and finds that this effect runs via institutional quality. In extension of this, Bjørnskov and Méon (2015) use 3SLS techniques to conduct an extensive empirical analysis of the relation between trust and productivity and provide evidence that trust exercises a positive impact on productivity via influencing legal and bureaucratic institutions. Jordaan and Dima (2020) also apply 3SLS estimation techniques to estimate the effects of post materialism and institutional quality on international income differences. Their findings show that both post materialism and institutional quality are important and that post materialism exercises a positive effect on a country's income level by impacting institutional quality.

2.3. Research questions

We distil the following two research questions from the literature review. The first research question is whether economic freedom and post materialism both generate growth effects. Given existing evidence, we expect a positive growth effect of economic freedom, although the size of the effect may be influenced by the inclusion of post materialism. As for post materialism it is less clear what to expect, as there are arguments supporting both a positive and a negative effect on economic growth.

The second research question is whether economic freedom acts as a transmission channel of an indirect growth effect of post materialism. Circumstantial evidence linking elements of post materialism to elements of the institutional framework of economic freedom suggests that this relationship may be important. Therefore, the indirect growth effect of post materialism via economic freedom needs to be empirically established, even more so as post materialism may either support or work against economic freedom.

3. Data, regression model and estimation strategy

3.1. Data & regression model

To address the research questions we estimate a variety of models based on the following general specification:

$$\Delta \left(\frac{GDP}{Cap} \right)_i = \beta_0 + \beta_1 EF_{it} + \beta_2 PM_{it} + \beta_3 X_{it} + \rho_t + \alpha_i + \varepsilon_{it} \quad (1)$$

This model posits average growth of GDP/Capita of country i in period t as a function of economic freedom EF, post materialism PM, a vector X containing a standard set of variables that are commonly included in this type of growth regression model (see De Haan & Sturm, 2000), period effects ρ, time-invariant country effects α and an idiosyncratic error term. We use data from the Penn World Table version 9.0 (Feenstra et al., 2015) to calculate decadal average growth rates for the 1980s, 1990s and 2000s. Due to the unavailability of data for some of the countries for the first decade(s), we create an unbalanced panel to maximise the number of observations. Vector X contains GDP/Capita at the start of the periods, investment, government consumption, inflation,

human capital and international trade. Table 1 lists all the variables, definitions and data sources.

EF is the economic freedom index provided by the Fraser Institute (Gwartney et al., 2018). This index is composed of a range of indicators related to Size of Government, Legal System and Property Rights, Sound Money, Freedom to Trade and Regulation. Given that we want to identify the growth effect of economic freedom and its relation with post materialism, in the empirical analysis we estimate the effect of the aggregate economic freedom index as well as its five main component variables.

Next, we use information from the World Values Survey and the

Table 1
Variables, descriptions and data sources.

Variable	Description	Source
EF	Economic Freedom index; 1985, 1995, 2005	Fraser institute; longitudinal dataset
Government size	Index capturing Government consumption; transfers and subsidies; government enterprises and investment; top marginal tax rate	Fraser institute; longitudinal dataset
Legal System & Property Rights	Index capturing judicial independence; impartial courts; protection of property rights; military interference in rule of law and politics; integrity of legal system; legal enforcement contracts; regulatory costs sale real property; reliability of police; business costs of crime	Fraser institute; longitudinal dataset
Sound Money	Index capturing money growth; standard deviation of inflation; inflation; freedom to own foreign currency bank accounts	Fraser institute; longitudinal dataset
Freedom to Trade	Index capturing tariffs; regulatory trade barriers; black-market exchange rates; controls of capital and people	Fraser institute; longitudinal dataset
Regulation	Index capturing credit market regulations; labour market regulations; business regulations	Fraser institute; longitudinal dataset
Inglehart index	Country average of values assigned to respondents: materialist (1), mixed values (2), post materialistic (3)	World Values Survey ^(a) & European Values Study ^(b)
GDP/Cap initial	Gross Domestic Product/Population; 1980; 1990; 2000	Penn World Table 9.0
Human capital	Human capital index; based on years of schooling and returns to education ^(c)	Penn World Table 9.0
Population growth	Population growth ^(c)	Penn World Table 9.0
Investment	Share of gross capital formation at current PPPs ^(c)	Penn World Table 9.0
Government consumption	Share of government consumption at current PPPs ^(c)	Penn World Table 9.0
Inflation	Annual change consumer prices ^(c)	World Bank Open Data
International trade	Trade as % of GDP ^(c)	World Bank Open Data
Pronoun drop rule	Dummy variable; value of 1 when pronoun cannot be dropped when used as subject in a sentence	Davis and Abdurazokzoda (2016)
Genetic distance	Genetic distance to New Zealand	Calculated with data taken from Spolaore and Wacziarg (2009)

Aggregate File Producer: JDSYSTEMS, Madrid SPAIN.
^a WORLD VALUES SURVEY 1981–2014 LONGITUDINAL AGGREGATE v.20150418. World Values Survey Association (www.worldvaluessurvey.org).
^b <http://www.europeanvaluesstudy.eu>; data obtained from the Leibniz Institute for the Social Sciences - <https://www.gesis.org/en/en/home/>.
^c Averaged for 1980s, 1990s & 2000s.

European Value Study to calculate a country-level indicator of post materialism. These surveys contain a set of two questions on national priorities that are frequently used to calculate indicators of post materialism (Inglehart, 1977, 1997; Jordaan et al., 2016). Respondents are asked to select two national priorities from a list of four. A respondent that selects “maintaining order” and “fighting rising prices” is classified as having materialistic values. A respondent selecting “protection of freedom of speech” and “giving people more say in important government decisions” is classified as having post materialistic values; a respondent that selects one of each of the two subsets of answers is classified as having mixed values.

We calculate the Inglehart index (Inglehart, 1977) for each country and survey wave as follows. Respondents with materialistic values are assigned the score 1, respondents with mixed values receive the score 2 and respondents with post materialistic values receive the score 3. To calculate the country level indicator of post materialism, we sum the scores and average them across the respondents.

Fig. 1 shows how post materialism and economic freedom have developed. Considering first post materialism, the figure shows a steady increase from the mid-1980s up to the early 2000s. The initial decrease of post materialism during the first half of the 2000s is caused by an increase in the number of countries where the WVS and EVS were applied; countries characterised by a lower level of post materialism. The continuation of the decrease in the second half of the 2000s is related to the financial crisis of 2007, reflecting the increased importance of materialistic concerns due to growing economic insecurity. As for economic freedom, there is a clear and ongoing increase over the entire period. The rate of growth of economic freedom decreases in the second half of the 2000s, which is also likely to be the result of the occurrence of the financial crisis in 2007.

3.2. Estimation strategy

The growth effects of economic freedom and post materialism are captured by coefficients β_1 and β_2 . The interpretation of these coefficients is not straightforward, as it is very likely that the dependent variable impacts on economic freedom and post materialism. Countries that are experiencing rapid growth may be in a better position to further improve economic freedom. As for post materialism, the scarcity hypothesis identifies a clear positive link between rising income and post materialism (Inglehart, 1977).

We adopt the instrumental variable approach by Jordaan and Dima

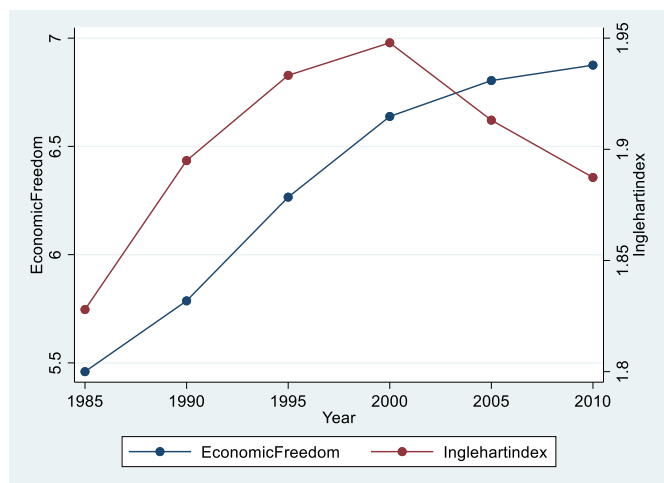


Fig. 1. Post materialism and economic freedom: 1985–2010
Source: Authors’ calculations, based on data taken from the Fraser Institute (Economic Freedom) and the World Value Survey and the European Value Study (Inglehart index); various years. Data points are averaged across the countries in the dataset.

(2020) to obtain unbiased estimates of the effects of economic freedom and post materialism. Following research that uses social values as instruments for institutions, they instrument institutional quality with post materialism. In similar vein, we instrument economic freedom with post materialism. Post materialists value autonomy, personal freedom and freedom of expression. Therefore, they can be assumed to value elements of economic freedom. As mentioned earlier, post materialists are politically active and try to change and improve institutions to advance their values. This may impact economic freedom, suggesting that we can exploit this association between post materialism and economic freedom to identify the growth effect of economic freedom. Fig. 2 presents a scatterplot between the Inglehart index and EF, showing a clear positive association. A bivariate regression of EF on the Inglehart index produces a coefficient of 2.24 with a t-statistic of 5.85.¹

Next, we use two instrumental variables for post materialism. The first instrument is the so called “pronoun drop rule” variable. Kashima and Kashima (1998) argue that a language where the pronoun cannot be dropped from a sentence when used as a subject (e.g. English) is more likely to be associated with a society characterised by a high level of individualism, compared to a country where grammatical rules do allow the pronoun to be dropped (e.g. Spanish). Findings by Kashima and Kashima (1998) and more recently Davis and Abdurazokzoda (2016) show that the pronoun drop rule is significantly associated with individualism.

The link between the pronoun drop rule and individualism suggests that this grammatical rule can be used to instrument other social values. Licht et al. (2007) use the pronoun drop rule as instrument in their estimations of the effect of various cultural dimensions on the rule of law, corruption and democratic accountability. Tabellini (2008) uses the pronoun drop rule as an

instrument to estimate the effect of trust and respect on the quality of government. In a similar way, we use the pronoun drop rule as instrument for post materialism (see Jordaan et al., 2016). We take the pronoun drop rule variable from Davis and Abdurazokzoda (2016).

The second instrumental variable is based on genetic distance between countries. Spolaore and Wacziarg (2009) find that genetic

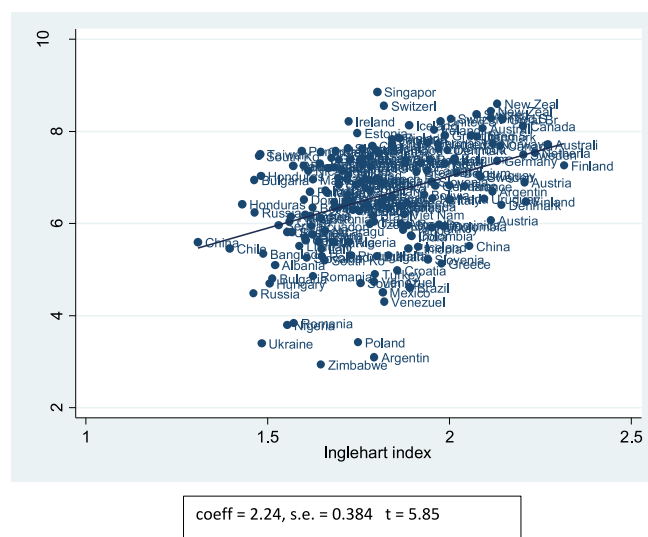


Fig. 2. Scatterplot Inglehart index and Economic Freedom.

¹ The Online Appendix contains scatterplots and results from bivariate regressions of the five Area variables on the Inglehart index. The scatterplots and the estimations show significant associations between post materialism and the Area variables.

differences between countries impact on long run growth. They interpret genetic distance as a “summary statistic capturing divergence in the whole set of implicit

beliefs, customs, habits, biases, conventions, etc. that are transmitted across nations – biologically and/or culturally (Spolaore & Wacziarg, 2009, p. 471). This suggests that we can use genetic distance as instrument for post materialism. Importantly, our use of genetic distance as instrument is unrelated to the literature on growth effects of genetic diversity. The ‘Out of Africa’ hypothesis – positing that historically-driven cross-country variation in genetic diversity impacts on contemporary international income differences (Ashraf & Galor, 2013) - has sparked an intense debate in the literature with several researchers strongly rejecting the existence of such an effect (Rosenberg & Lang, 2015; Gelman, 2013; Feldman, 2014; D’Alpoim GuedesBestor et al., 2013; Caraher & Ash, 2018). We interpret genetic distance to indicate the degree of dissimilarity of intrinsic social values between countries. Using this interpretation, we assume that two countries that are genetically close are more likely to have a similar level of post materialism compared to two countries that are genetically more distant. This interpretation is in line with findings presented by Desmet et al. (2011), who identify a positive effect of genetic proximity between EU countries on a large range of answers on values, norms and cultural characteristics taken from the World Value Survey.

New Zealand is the country in our dataset with the highest level of post materialism. If the genetic composition of the population of New Zealand fosters post materialistic values, then countries that are genetically close to New Zealand should also be characterised by a high level of post materialism, *ceteris paribus*. We use the dataset from Spolaore and Wacziarg (2009) to calculate genetic distance between New Zealand and the other countries in our sample and use this distance variable as instrumental variable for post materialism, expecting that genetic distance to New Zealand is negatively associated with post materialism.

Table 2 presents the findings from regressing the Inglehart index on the two instrumental variables. The first column reports the results on the association between post materialism and the pronoun drop rule. The estimated effect of the pronoun drop rule is negative, confirming that countries where the pronoun cannot be dropped when used as a subject have a lower level of post materialism. The second column shows the results from regressing the Inglehart index on a country’s genetic distance to New Zealand. The estimated effect of genetic distance is significant and negative, indicating

that countries that are genetically further removed from New Zealand have a significantly lower level of post materialism.

Combining regression model (1) with the instrumentation of economic freedom with post materialism and post materialism with the pronoun drop rule variable or genetic distance to New Zealand results in the following system of equations:

$$\Delta \left(\frac{GDP}{Cap} \right)_i = \beta_0 + \beta_1 EF_{it} + \beta_2 PM_{it} + \beta_3 X_{it} + \rho_t + \alpha_i + \epsilon_{it} \tag{2a}$$

$$EF_{it} = \vartheta_0 + \vartheta_1 PM_{it} + u_{it} \tag{2b}$$

Table 2
Post materialism, pronoun drop rule, and genetic distance Dep. variable Inglehart index.

	1	2	3
Pronoun drop rule Genetic distance to New Zealand	-0.20*** (0.03)	-0.052*** (0.009)	-0.16*** (0.03) -0.03*** (0.001)
F	42.22	33.90	24.78
adj. R ²	0.21	0.12	0.23
N	178	178	178

***p < 0.01. Robust standard errors in parentheses.

$$PM_{it} = \delta_0 + \delta_1 PronounDrop_{it} + \delta_2 GenDistance_{it} + \gamma_{it} \tag{2c}$$

By estimating this system of equations, we can identify the direct growth effects of economic freedom and post materialism. Furthermore, as we instrument the economic freedom index (or its components) with post materialism, findings of significant associations between economic freedom and economic growth then also provide evidence whether economic freedom acts as transmission channel of an indirect growth effect of post materialism.

4. Empirical findings

4.1. Post materialism, economic freedom and economic growth

Table 3 presents the findings from estimating several specifications of regression model (1). The slow changing nature of post materialism prohibits the use of standard fixed-effects estimations, as this wipes out all the variation between the cross-sections and absorbs the effect of post materialism. We follow the approach taken in other studies that face similar problems with limited time variability of social values (Graafland & de Jong, 2022; Ianc & Baudassé, 2021; Jordaan et al., 2016) by using a random effects specification with clustered standard errors. Overall, judging from the estimated effects of the control variables besides economic freedom and post materialism, the model functions well. All the coefficients carry the expected signs and the estimated effects of initial GDP/Cap, investment, government consumption, population growth, inflation and trade are statistically significant.

The first two columns present the findings from estimating the model when we control for either post materialism or economic freedom. Both variables carry positively signed coefficients, suggesting that they contribute to economic growth. The effect of EF in column 2 needs further examination. Some of the other control variables may relate to components of economic freedom, including inflation, government size and trade. To examine whether the effect of EF is influenced by this, we conducted a set of estimations where we omit the variables government consumption, inflation and trade. Inflation is the only variable whose inclusion in the model affects the estimated effect of EF. We report this in column 3, where the omission of inflation increases the coefficient of EF. In the remainder of the analysis, we therefore exclude inflation from the model.

Column 4 reports the results from estimating the model that contains both EF and post materialism. The estimated effect of EF is unaffected by the inclusion of the Inglehart index. In contrast, the estimated effect of post materialism becomes smaller. This is in line with other studies that also find that the effect of social values decreases in size when controlling for institutions (Tabellini, 2010; Williamson & Mathers, 2011). Having said this, it is not the case that the estimated effect of post materialism turns insignificant or negative due to the inclusion of the EF variable.

To assess whether the unbalanced nature of the dataset influences the estimated effects, we re-estimate the model on restricted samples. Using a restricted sample containing countries with at least two observations – column 5 – produces a similar coefficient for the post materialism variable and a slightly smaller coefficient for economic freedom. The fully balanced panel – column 6 – gives a slightly smaller coefficient for the Inglehart index and a larger coefficient for economic freedom. As the sign of the estimated effect of the two variables is the same with the unrestricted and restricted samples and the differences in size of the effects are modest, we proceed using the unbalanced panel for our main estimations.

Finally, the last set of columns contains the results from replacing EF with the five component variables. Post materialism exercises a significant positive growth effect in all these estimations. As for the component variables, the estimated effects of Government Size and Legal System & Property Rights are statistically insignificant. In contrast,

Table 3
Post materialism, economic freedom and economic growth.

	1	2	3	4	5	6	7	8	9	10	11
Sample	Full	Full	Full	Full	Restricted	Restricted	Full	Full	Full	Full	Full
Inglehart index	0.044 *** (0.01)			0.027 *** (0.01)	0.027 *** (0.008)	0.03 *** (0.007)	0.04 *** (0.01)	0.039 *** (0.01)	0.028 *** (0.01)	0.031 *** (0.01)	0.028 *** (0.01)
EF		0.01 *** (0.002)	0.015 *** (0.003)	0.014 *** (0.03)	0.011 *** (0.0025)	0.016 *** (0.002)					
Government size							0.002 (0.0014)				
Legal system & Property rights								0.003 (0.002)			
Sound money									0.006 *** (0.001)		
Freedom to trade										0.006 *** (0.002)	
Regulation											0.011 *** (0.003)
GDP/Cap initial	-0.04 *** (0.005)	-0.03 *** (0.004)	-0.033 *** (0.004)	-0.034 *** (0.004)	-0.035 *** (0.004)	-0.05 *** (0.006)	-0.034 *** (0.005)	-0.04 *** (0.006)	-0.032 *** (0.004)	-0.04 *** (0.006)	-0.036 *** (0.005)
Human capital	0.035 *** (0.01)	0.015 ** (0.008)	0.01 (0.09)	0.01 (0.009)	0.01 (0.007)	0.008 (0.007)	0.027 *** (0.01)	0.03 *** (0.01)	0.011 (0.008)	0.03 *** (0.01)	0.018 * (0.01)
Population growth	-0.07 ** (0.035)	-0.12 *** (0.03)	-0.13 *** (0.03)	-0.14 *** (0.03)	-0.12 *** (0.03)	-0.08 * (0.045)	-0.11 *** (0.03)	-0.10 *** (0.03)	-0.14 *** (0.03)	0.09 *** (0.03)	-0.16 *** (0.04)
Investment	0.17 *** (0.05)	0.14 (0.04)	0.13 *** (0.04)	0.13 *** (0.04)	0.11 *** (0.04)	0.07 * (0.04)	0.16 *** (0.04)	0.15 *** (0.04)	0.09 ** (0.04)	0.14 *** (0.04)	0.14 *** (0.04)
Government consumption	-0.19 *** (0.06)	-0.13 ** (0.05)	-0.12 ** (0.05)	-0.11 ** (0.05)	-0.13 (0.04)	-0.12 ** (0.05)	-0.11 ** (0.06)	-0.14 ** (0.05)	-0.11 ** (0.05)	-0.16 *** (0.06)	-0.17 *** (0.06)
Inflation	-0.005 *** (0.01)	-0.003 *** (0.007)									
International trade	0.016 *** (0.003)	0.006 (0.004)	0.004 (0.004)	0.007 * (0.004)	0.005 (0.006)	0.006 (0.004)	0.014 *** (0.003)	0.018 *** (0.004)	0.012 ** (0.004)	0.014 *** (0.004)	0.01 * (0.006)
Nobs	175	170	170	172	148	102	171	172	172	171	171
Wald Chi(2)	116.39 (0.00)	148.34 (0.00)	132.85 (0.00)	139.43 (0.00)	156.83 (0.00)	331.80 (0.00)	102.36 (0.00)	94.58 (0.00)	157.52 (0.00)	111.51 (0.00)	127.34 (0.00)
R-squared overall	0.35	0.47	0.41	0.42	0.51	0.66	0.31	0.28	0.44	0.33	0.32

***p < 0.01; **p < 0.05; *p < 0.10. Standard errors in parentheses. Regression 4 omits countries with 1 observation; regression 5 omits countries with 1 or 2 observations.

Sound Money, Freedom to Trade and Regulation carry statistically significant and positively signed coefficients, indicating that these components drive the estimated positive growth effect of economic freedom.²

4.2. Findings from 3SLS estimations

Next, we turn to estimating the system of equation (2)a-(2)c. In the first stage, we use either the pronoun drop rule or genetic distance to New Zealand to instrument the Inglehart index. We estimate the systems of equations separate for EF, Sound Money, Freedom to Trade and Regulation.

The top of Table 4 shows the results for the Inglehart index and EF. In the first stage, the pronoun drop rule and genetic distance to New Zealand are significantly associated with post Materialism, which in turn is significantly associated with economic freedom in the second stage. The third stage results reveal an important difference with the findings presented in Table 3, as the estimated effect of post materialism turns negative. This indicates that, after controlling for the relation between post materialism and economic freedom, post materialism exercises a direct negative effect on economic growth. This negative effect confirms that post materialistic values exercise a dampening effect on economic

² Table A1 in the Online Appendix presents additional findings. With the restricted dataset the estimated effect of International Trade is estimated less precisely. Estimations with an alternative indicator of post materialism – the share of respondents in a country that are classified as having post materialistic values – produce similar findings.

growth. The estimated effect of EF persists to be positive, in line with the earlier findings. Within the system of equations that we estimate, the significant association between post materialism and economic freedom and the significant effect of economic freedom on growth also indicate that economic freedom acts as a transmission channel of an indirect growth effect of post materialism.

The remainder of Table 4 shows the results from replacing EF with the three component variables. In all the estimations we identify significant positive associations with economic growth.

Although the difference between the magnitudes of the estimated coefficients is modest, Regulation appears to exercise the largest positive effect. The estimated effect of post materialism is negative in all the estimations, confirming that the direct effect of post materialism dampens economic growth.

Again, differences between the estimations are small; post materialism carries the largest negative coefficient when the model contains the variable Sound Money.³

4.2.1. Use of alternative instruments

As a robustness test we re-estimate the system of equations with two alternative instruments for post materialism. One alternative instrument

³ Table A2 in the Online Appendix presents findings from additional 3SLS estimations, replacing the Inglehart index with the population share of post materialists, using the balanced panel dataset and instrumenting post materialism with both the pronoun drop rule and genetic distance to New Zealand in the first stage. There are only modest variations in the magnitudes of the estimated effects; overall the additional findings are fully in line with those presented in Table 4.

Table 4
Post materialism, economic freedom and economic growth: 3SLS findings.

1st stage			2nd stage			3rd stage			1st stage			2nd stage			3rd stage		
Dependent variable									Dependent variable								
Inglehart index			EF			$\Delta GDP/Cap_{it}$			Inglehart index			EF			$\Delta GDP/Cap_{it}$		
Inglehart index			3.43 *** (0.45)			-0.044 *** (0.01)			Inglehart index			3.27 *** (0.43)			-0.049 *** (0.01)		
EF						0.007 *** (0.002)			EF						0.009 *** (0.002)		
Pronoun drop	-0.23 *** (0.03)								Genetic distance	-0.06 *** (0.01)							
Goodness of fit Chi2	60.93 (0.00)		58.91 (0.00)			15.38 (0.00)			Goodness of fit Chi2	33.53 (0.00)		55.76 (0.00)			21.68 (0.00)		
1st stage			2nd stage			3rd stage			1st stage			2nd stage			3rd stage		
Dependent variable									Dependent variable								
Inglehart index			Sound Money			$\Delta GDP/Cap_{it}$			Inglehart index			Sound Money			$\Delta GDP/Cap_{it}$		
Inglehart index			6.15 *** (1.01)			-0.047 *** (0.01)			Inglehart index			5.86 *** (0.97)			-0.051 *** (0.01)		
Money						0.004 *** (0.01)			Money						0.0055 *** (0.01)		
Pronoun drop	-0.23 *** (0.03)								Genetic distance	-0.06 *** (0.01)							
Goodness of fit Chi2	58.80 (0.00)		36.85 (0.00)			24.70 (0.00)			Goodness of fit Chi2	34.12 (0.00)		36.13 (0.00)			37.84 (0.00)		
1st stage			2nd stage			3rd stage			1st stage			2nd stage			3rd stage		
Dependent variable									Dependent variable								
Inglehart index			International Trade			$\Delta GDP/Cap_{it}$			Inglehart index			International Trade			$\Delta GDP/Cap_{it}$		
Inglehart index			4.71 *** (0.59)			-0.036 * (0.01)			Inglehart index			4.82 *** (0.58)			-0.039 *** (0.01)		
Trade						0.0034 * (0.002)			Trade						0.0043 ** (0.0017)		
Pronoun drop	-0.22 *** (0.03)								Genetic distance	-0.06 *** (0.01)							
Goodness of fit Chi2	57.80 (0.00)		63.52 (0.00)			7.78 (0.02)			Goodness of fit Chi2	35.69 (0.00)		68.86 (0.00)			9.60 (0.00)		
1st stage			2nd stage			3rd stage			1st stage			2nd stage			3rd stage		
Dependent variable									Dependent variable								
Inglehart index			Regulation			$\Delta GDP/Cap_{it}$			Inglehart index			Regulation			$\Delta GDP/Cap_{it}$		
Inglehart index			4.07 *** (0.51)			-0.025 ** (0.012)			Inglehart index			3.46 *** (0.50)			-0.028 ** (0.013)		
Regulation						0.002 (0.002)			Regulation						0.0038 ** (0.019)		
Pronoun drop	-0.23 *** (0.03)								Genetic distance	-0.057 *** (0.01)							
Goodness of fit Chi2	63.67 (0.00)		62.98 (0.00)			3.73 (0.15)			Goodness of fit Chi2	30.97 (0.00)		48.33 (0.00)			5.78 (0.05)		

p < 0.05; *p < 0.01; robust standard errors in parentheses. Estimations also include the other control variables as listed in regression model (2a).

is the regional historical prevalence of pathogens, taken from Murray and Schaller (2010). According to the parasite stress theory of sociality (Thornhill & Fincher, 2014), regional differences in the prevalence of infectious diseases form an important explanation for cultural differences. Collectivism functions as a defence mechanism against pathogens, generating strong in-group and out-group distinctions and prioritising conformity (Fincher et al., 2008). In contrast, low pathogen levels allow for an increased importance of individualism. Given that the positive (negative) association between the historical prevalence of infectious diseases and collectivism (individualism) is confirmed in several studies (e.g. Cashdan & Steele, 2013; Fincher et al., 2008; Murray & Schaller, 2010), we use historical prevalence of pathogens as an alternative instrument.

The second alternative instrument is historical rainfall variation. Climatic characteristics and their variability can be linked to social values. A well-known example is Giuliano and Nunn (2021), who find that the stability of average temperatures is linked to cultural traits and traditions. Another example is Davis (2016), who presents econometric evidence that the historical variation of monthly rainfall is positively associated with collectivism, as higher rainfall variation generates larger community risks for agricultural output. Ager and Ciccone (2018) also relate rainfall data to risk in their analysis of historical agricultural production in US counties. Their findings show that rainfall is significantly associated with the development of religious communities. In the present estimation, we use a variable capturing the variation of yearly temporal rainfall – averaged for the period 1901–2010 - provided by Jordaan and Dima (2020).

The full findings with the alternative instruments are shown in the online Appendix. Historical prevalence of pathogens is negatively associated with post materialism in Table A3, capturing the negative effect of infectious diseases on individualism or autonomy. The use of this alternative instrument does not alter our finding that post materialism generates a negative effect and economic freedom a positive effect.

The findings in Table A4 with variation in average rainfall as instrumental variable are very similar. The estimated negative effect of the rainfall variable in the first stage indicates the negative effect of communal risk on individualism. Again, the third stage findings confirm the negative effect of post materialism and the positive effect of economic freedom. Overall, these additional findings clearly support our main findings presented in Table 4.⁴

4.3. Direct and indirect effect of post materialism

We use the approach of residual generated regressors (Jordaan et al., 2016; Pagan, 1984) to examine the relative magnitudes of the direct and indirect effect of post materialism. To do so we regress EF on the Inglehart index:

$$EF_{it} = \vartheta_0 + \vartheta_1 PM_{it} + u_{it} \tag{3a}$$

⁴ Although the Chi square statistics of the three stages in Table 4 (and Tables A3 and A4 in the Online Appendix) indicate that the instruments are sufficiently correlated with the endogenous variables, the issue of instrumental variable validity remains a concern. In the Online Appendix, Table A5 present first and second stage results from random effects IV estimations where we instrument economic freedom, sound money, international trade and regulation with the Inglehart index, the pronoun drop rule, genetic distance to New Zealand, average rainfall variation and historical prevalence of infectious diseases. For economic freedom, sound money and regulation the results are satisfactory: the Sargan test statistic indicates that the over-identifying restrictions are not rejected and the Anderson and Stock-Wright statistics reject that the instruments are weak and that the estimation suffers from under-identification. The results with trade are weaker: the Sargan test statistic rejects the over-identifying restrictions and the F-test on excluded instruments and the Anderson statistic are less favourable. This indicates that we need to interpret the results for trade with caution.

where *uit* represents the part of the variation of economic freedom that is not explained by post materialism. The full equation that we estimate to identify the effects of post materialism and economic freedom is:

$$\Delta \left(\frac{GDP}{Cap} \right)_{it} = \beta_0 + \beta_1 EF_{it} + \beta_2 PM_{it} + \beta_3 X_{it} + \rho_t + \alpha_i + \varepsilon_{it} \tag{3b}$$

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

$$\Delta \left(\frac{GDP}{Cap} \right)_{it} = (\beta_0 + \beta_1 \vartheta_0) + \beta_1 u_{it} + (\beta_2 + \beta_1 \vartheta_1) PM_{it} + \beta_3 X_{it} + \rho_t + \alpha_i + \varepsilon_{it} \tag{3c}$$

In this equation, the full effect of post materialism ($\beta_2 + \beta_1 \vartheta_1$) consist of a direct effect β_2 and an indirect effect $\beta_1 \vartheta_1$. The direct effect of economic freedom is captured by $\beta_1 u_{it}$.

Table 5 presents the results on the direct and total growth effects of post materialism.

Although the total effect of post materialism is negative, it is smaller than the direct effect. This implies that the indirect effect that runs via EF and the three component variables must be positive. Therefore, the findings in Tables 4 and 5 indicate that post materialism generates a dual effect. There is a negative direct effect, which can be explained by the decreased importance of production and income maximisation. Post materialism also creates an indirect positive effect via economic freedom; as

discussed previously, a likely explanation for this positive effect is that post materialists change institutions to advance their non-materialistic values.⁵

On aggregate, the negative direct effect is larger than the positive indirect effect. This is an important difference with Jordaan and Dima (2020). They focus on the effects of institutional quality and post materialism on long run economic development in a cross-sectional setting, finding that the positive indirect effect of post materialism outweighs its direct negative effect. This difference with our findings suggests that the growth effects of post materialism are affected by the time horizon of the analysis. Our estimations capture more dynamic and short run effects compared to Jordaan and

Dima (2020) and show that in a more dynamic framework the positive indirect effect of post materialism does not outweigh its negative direct growth effect.

Table 5
Direct and total effects of post materialism.

Instrument for Inglehart index in 1st stage	Pronoun drop rule		Genetic distance to New Zealand	
	Direct effect Inglehart index (β_1)	Total effect Inglehart index ($\beta_1 + \beta_3 \delta_1$)	Direct effect Inglehart index (β_1)	Total effect Inglehart index ($\beta_1 + \beta_3 \delta_1$)
Economic freedom variable in model				
EF	-0.044 *** (0.012)	-0.027 *** (0.01)	-0.049 *** (0.01)	-0.0266 ** (0.011)
Sound Money	-0.047 *** (0.01)	-0.029 *** (0.01)	-0.051 *** (0.012)	-0.029 *** (0.01)
International Trade	-0.036 *** (0.01)	-0.027 *** (0.01)	-0.039 *** (0.013)	-0.028 ** (0.012)
Regulation	-0.025 ** (0.012)	-0.02 ** (0.01)	-0.028 ** (0.013)	-0.019 * (0.012)

Results for full sample. **p < 0.05; ***p < 0.01; standard errors in Parentheses. The direct effects of the Inglehart index are taken from Table 4.

⁵ Table A6 in the Online Appendix reports the results from additional estimations with the alternative indicator of post materialism, using both instrumental variables and with the balanced sample. These additional results are very similar to those reported in Table 5.

To conclude the analysis, we use information from Tables 4 and 5 to calculate the relative magnitude of the effects of post materialism and economic freedom. We use the estimated coefficients to calculate the effects on economic growth from one standard deviation increases of post materialism and economic freedom, using the results with genetic distance as instrument for post materialism. The top left of Table 6 shows the results for the system of equations that controls for the effects of post materialism and EF. A one standard deviation increase in post materialism results in a 0.15 standard deviation decrease in economic growth (total effect of Inglehart index). In comparison, a similarly sized increase in economic freedom generates an increase of 0.28 standard deviation of economic growth. The difference between the total and direct effect of post materialism implies that the positive indirect effect of post materialism equals a 0.13 standard deviation increase of economic growth. This is a sizeable effect, representing about 46% of the positive growth effect of EF.

The remainder of Table 6 shows the magnitudes of the effects when we replace EF with one of the three component variables. Sound Money generates the largest positive effect on economic growth, followed by Freedom to Trade and Regulation. The negative total effect and the positive indirect effect of post materialism are also the largest when controlling for the effect of Sound Money. As for the relative size of the indirect effect of post materialism with respect to the components of economic freedom, the indirect effect of post materialism represents about 25% of the effect of Sound Money, 31% of the effect of Freedom to Trade and 35% of the effect of Regulation.

5. Summary, limitations and further research

The importance of social values and institutions is increasingly recognised in research on fundamental causes of economic growth. Our paper presents a panel data study that contributes to this research strand in two ways. First, we estimate the growth effect of post materialism, a type of social value that has been largely overlooked in research on the economic effects of social values. Second, we estimate the growth effect of economic freedom and the effect of a possible interrelationship between post materialism and economic freedom. Doing so allows us to assess whether economic freedom acts as a transmission channel of an indirect effect of post materialism. The potential existence of such an interrelationship also relates to research that tries to obtain a better understanding of factors that influence economic freedom. We use instrumental variable estimation techniques within a 3SLS framework to ensure that we identify the effects of economic freedom and post materialism accurately, whilst also capturing the effect of the relationship between post materialism and economic freedom.

Before summarising our main findings, it is important to acknowledge caveats and limitations of our study. First, especially with cross-sectional data, model uncertainty is an important issue in empirical growth research, as decisions on which variables to include and exclude from the model may impact on the estimated effects of the included variables. Although in the present study we do control for country and period effects and – besides economic freedom and post materialism - we use a set of control variables that are commonly accepted in the literature on growth effects of economic freedom, a further examination of different specifications of the model would provide more clarification on the strength of the relationships that we estimate.

Second, our estimations do not allow for the possibility that the effects of economic freedom and post materialism differ between groups of countries. Whereas we identify average effects of these variables for the countries in our sample, it may be the case that these effects are for instance influenced by the level of development of the countries.

Third, we rely strongly on 3SLS estimations, allowing us to identify the direct and indirect effects of post materialism and economic freedom. The congruence of findings with several different instruments provides us with some confidence that we estimate the growth effect of the interrelationship between post materialism and economic freedom

Table 6
Effect of one standard deviation increase of post materialism and economic freedom.

	Inglehart index			EF	Inglehart index			Sound Money
	Total	Direct	indirect		Total	Direct	indirect	
Effect as share of one standard deviation economic growth	-0.15	-0.28	0.13	0.28	-0.17	-0.29	0.12	0.37
	Inglehart index			Trade	Inglehart index			Regulation
	Total	Direct	Indirect		Total	Direct	Indirect	
Effect as share of one standard deviation economic growth	-0.16	-0.22	0.06	0.19	-0.11	-0.16	0.05	0.14

Effects are calculated for the full sample, combining the estimated coefficients of Table 4 (economic freedom indicators) and 5 (Inglehart index). Reported effects obtained with genetic distance to New Zealand as instrument in first stage.

accurately. However, more work undoubtedly needs to be done to ensure that the endogenous elements of the complex relationships between these variables and with economic growth are fully accounted for. In relation to this, it may also be that the inter-relationship between these variables is more complex and is influenced by additional variables, requiring a more richly specified system of equations.

Finally, our use of country level indicators is primarily motivated by the relative wide availability of data at this level of aggregation. A further empirical analysis at the sub-national level may provide more information on the nature and strength of the growth effects of the relationship between post materialism and economic freedom within regions.

Our main findings can be summarised as follows. Estimations that do not control for a reverse line of causation from economic growth to post materialism and economic freedom produce results showing significant positive growth effects of both variables. When replacing the economic freedom index with its component variables, we find that Sound Money, Freedom to Trade and Regulation drive the positive growth effect of economic freedom. Findings from 3SLS estimations reveal an important difference, as the estimated direct growth effect of post materialism turns negative. These findings (together with the additional results in the online Appendix) are robust to the use of a different indicator of post materialism, different sample compositions and different instrumental variables. The findings also confirm that economic freedom transmits an indirect growth effect of post materialism.

A further analysis reveals that the indirect effect of post materialism via economic freedom is of a positive nature. This positive indirect effect is smaller than the negative direct effect, resulting in an overall negative growth effect of post materialism.

The implications of our findings for contemporary research on economic growth and institutional development are two-fold. First, our results indicate that post materialism should be added to the collection of social values that are analysed as drivers of economic growth and that more research into the effects of post materialism is called for. For instance, it will be interesting to see whether the relationship between post materialism and economic growth is uniform, or alternatively varies between groups of countries that differ in terms of levels of education or overall development. In extension of this, it will also be fruitful to further examine differences between post materialistic citizens in (groups of) countries. Post materialism is related to a range of non-materialistic values and it is likely that conditions in individual countries influence the particular values and priorities that post materialists in these countries pursue. A further assessment of how these values may differ in their direct and/or indirect impacts on economic growth will provide further insight into the possibility of a more heterogeneous growth impact of post materialism.

Second, more research needs to be conducted on the role of economic freedom as transmission channel of growth effects of social values. Most of the research on economic freedom focuses on identifying its direct growth effect. As our findings show, economic freedom can also act as a transmission channel of growth effects from other forces, indicating that more research is called for to examine this additional dimension of the relationship between economic freedom and economic growth. Our

results that indicate that post materialism influences economic freedom suggests that more research is needed into similar effects from other types of social values. There is a clear need for more evidence and a better understanding of forces that influence the development of economic freedom; within this context, our findings suggest that the link between social values and economic freedom appears to be a particularly interesting and important one to be further examined.

CRediT authorship contribution statement

Jacob A. Jordaan: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

I would like to thank the editor and the referee for their very helpful and constructive comments. I also thank participants of the 5th International Conference on the Political Economy of Democracy and Dictatorship (University of Münster) and the “7th The Role of the State in Varieties of Capitalism Conference” (Institute of World Economics, Central European University in Budapest) for their comments on earlier versions of this paper. The usual disclaimers apply and all remaining errors are mine.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssaho.2023.100416>.

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