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The Impact of Economic Freedom on Per Capita Real GDP: A Study of OECD Nations

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Abstract. This study of the impact of economic freedom on per capita real GDP among OECD nations over the 2002-2006 period, with each OECD nation during this time frame being treated as a *de facto* "economic region" within the OECD, finds strong initial support for the hypothesis proffered here, namely, the higher the degree of economic freedom, the higher the *level* of economic activity and hence the higher the per capita real GDP level. In particular, the per capita real GDP level in each of the nations (regions) in existence as OECD members (except Iceland) over the study period is shown, using *fixed-effects* PLS estimations, to be an increasing function of business freedom, freedom from corruption, investment freedom, monetary freedom, government size freedom, trade freedom, and property rights freedom. By contrast, these preliminary estimations find that labor freedom, financial freedom, and fiscal freedom do not exercise a statistically significant impact on per capita real GDP (income).

1. Introduction

Over the past two decades, numerous studies have been conducted expressly to investigate the impact of economic freedom on economic growth. Most of these empirical studies find that there exists a strong, positive impact of economic freedom, especially a measure of *overall* economic freedom, on the *rate of economic growth* (Ali, 1997; Ali and Crain, 2001, 2002; Arora and Vamvakidis, 2006; Cebula, 2011; Cebula and Mixon, 2012; Clark and Lawson, 2008; Dawson, 1998, 2003; De Haan and Siermann, 1998; De Haan and Sturm, 2000; Goldsmith, 1995; Gwartney, Holcombe, and Lawson, 2006; Gwartney and Lawson, 2008; Heckelman, 2000; Heckelman and Stroup, 2000; Norton, 1998; Tortensson, 1994). Indeed, the study by Cole (2003, p. 196) concludes that, "economic freedom is a significant factor in economic growth, regardless of the basic theoretical framework." This generalization is predicated presumably upon the argument that increased economic freedom elevates the growth of economic activity through incentives and other means and hence generates higher economic growth. The present study focuses on a similar, but not identical, potential and reasonable impact of higher economic freedom levels, namely, higher real income levels.[1] In particular, this study investigates the hypothesis proffered here, that higher levels of economic freedom in an "economic region" promote a higher *level* of economic activity and hence yield higher *levels* of per capita real income (GDP) in that region, *ceteris paribus*.

To provide a broad and diverse context for the empirical analysis of this hypothesis, we begin with the observation that, in the global economy of the 21st century, the nature of what constitutes a region for economic purposes can easily transcend that of merely some arbitrary or non-arbitrary geographic or politically delineated portion of a single nation.

[1] This emphasis on the per capita real income level is compatible, in principle, with the emphasis in Wiseman and Young (2011), which focuses on U.S. states.

Indeed, a "nation" can very reasonably be defined as a "region" *per se*, such as is the case of an organization such as the OECD (consisting of 30 nations in the early years of this century and of 34 nations at present). Within this perspective, the present study investigates whether "regional" per capita real income is an increasing function of economic freedom. The study period runs from 2002-2006 and encompasses a panel dataset.

One criticism of a cross-country comparison is that it is not appropriate to include city-states such as Singapore and Hong Kong in regressions with large countries because city states can get economic freedom at lower cost due to either greater homogeneity or greater ease in shifting the median voter towards economic freedom. Regardless of why, the countries with the most economic freedom often do have a tendency to be small. This criticism obscures the fact that there are real differences between countries (e.g., Denmark and France) that actually have very different policies. One compelling reason to study the OECD is to control for the fact that all of the countries are at least somewhat similar and therefore are more reasonably comparable in that they are already developed in many parallel dimensions. Thus, there is little concern that the results are driven by outliers that obscure our understanding of how, for example, decreases in fiscal freedom resulting from a rise in the maximum marginal tax rate to 75% in France will play out.

2. The framework

In this study, per capita real income is measured by the per capita real GDP in each of the OECD nations over the five-year study period from 2002 through 2006. Per capita real income, *RPCY*, is a measurement that parallels, in principle, what has been the focus of most of the more recent related studies on macroeconomic *growth*, which is *the percentage rate of change* (rather than the *level)* of per capita real income (Ali, 1997; Cebula, 2011; Cebula and Mixon, 2012; Cole, 2003; Dawson, 1998, 2003; Goldsmith, 1995; Hall, Sobel, and Crowley, 2010; Norton, 1998; Tortensson, 1994). The value of per capita real income is made comparable across nations by *PPP* (purchasing-power-parity) adjustments. Given the emphasis in this study on economic freedom, the fundamental hypothesis of this study is that per capita real income (as defined) depends directly upon economic freedom (*FREEDOM*) in each of its various forms, *ceteris paribus*, as well as upon other variables (*OTHER*), as follows:

$$RPCY_{jt} = f(FREEDOM_{njt}, OTHER_{jt}) \quad (1)$$

where $RPCY_{jt}$ is the level of the purchasing-power-parity adjusted per capita real GDP in OECD nation j in year t; $FREEDOM_{njt}$ refers to the value of economic freedom measure (index) n in nation j in year t; and $OTHER_{jt}$ refers to the values of control variables in nation j in year t (as well as a trend variable) to be included in the empirical estimates.

2.1. Ten economic freedoms

This study considers all ten of the economic freedom indices developed by The Heritage Foundation (2008). Based on the hypothesis stated above, per capita real income is expected to be an increasing function of each of these ten individual economic freedoms, *ceteris paribus*.

The fiscal freedom index, *FF* (Heritage Foundation, 2008, p. 13), reflects the freedom of individuals and firms to keep and control their income and wealth for their own use/benefit. Fiscal freedom is a measure of freedom from the burden of government (from the *revenue* side): the lower this burden, the higher the value of *FF*. Technically, fiscal freedom includes freedom from both the tax burden, in terms of both the top income tax rate (on corporations and individuals, taken separately) and the overall amount of tax revenue as a percentage of a nation's GDP. The underlying idea is that higher taxation not only interferes with the ability of individuals and businesses to pursue their goals in the marketplace, it may also reduce the incentive to work, save, invest, or take risk.

Freedom from excessive government size, or simply *government size freedom*, *GSF* (Heritage Foundation, 2008, pp. 13-14), is an index that reflects the degree of *freedom* in an economy *from* the *burden of excessive government in terms of expenditures* (i.e., freedom from government on the *expenditure* side). Government outlays compete with private agents and interfere with natural market processes, prices, and interest rates by over-stimulating demand and diverting resources through "crowding out" effects (Abrams and Schmitz, 1978; Carlson and Spencer, 1975; Cebula, 1978).

The business freedom index, *BF*, reflects the individual's right and ability to freely conduct entrepreneurial activities (i.e., to create, operate, and close an enterprise without government interference). It is argued that burdensome, redundant regulations

are the most common barriers to the free conduct of entrepreneurial endeavors, and indeed are a *de facto* "form of taxation that [makes] it difficult for entrepreneurs to [produce goods and services]" (Heritage Foundation, 2008, p. 12).

The trade freedom index, *TF*, reflects the openness of an economic system to imports of goods and services from other nations and the ability of citizens to interact freely as buyers and sellers in the global marketplace. Government hindrance of the free flow of such commerce (through taxation of imports and/or exports, bans, quotas, and so forth) has a negative impact on the ability of individuals and firms to pursue economic goals (Heritage Foundation, 2008, p. 13).

A free citizenry requires a steady and reliable currency as a medium of exchange and as a store of value. The monetary freedom index, *MF*, is an indicator of stable currency and market-determined prices. A high degree of monetary freedom is characterized by an independent central bank, policies promoting low inflation, and the absence of price controls (Heritage Foundation, 2008, p. 14).

The investment freedom index, *IF*, is greater in a nation with fewer (1) restrictions on foreign investment, (2) restrictions that tend to limit capital inflows and outflows, and (3) restrictions that hinder the ability of capital to flow to its best and most efficient use. Such restrictions interfere with the freedom of investors and firms seeking capital (Heritage Foundation, 2008, p. 14).

Nearly all nations impose some form of supervision/oversight on banking institutions and the providers of other financial services, including markets for equities. The financial freedom index (*FINF*) is an indicator of the degree to which the financial sector of the economy is free from *excessive* banking and financial regulation (Heritage Foundation, 2008, p. 14).

Secure property rights provide citizens the confidence to engage in entrepreneurial activities, including commercial activities, saving, and investing. The ability to accumulate private property is the primary motivation in a market economy; a "rule of law" that protects property rights is critical to an efficient free market economy. The greater the protections afforded to property rights under the rule of law, the greater the property rights freedom index, *PRF* (Heritage Foundation, 2008, pp. 14-15).

Political corruption by public officials manifests itself in many forms, including bribery, extortion, embezzlement, and graft, and it enables certain public officials to steal or otherwise profit illegitimately from public funds. Political corruption interferes with market efficiency. The freedom from corruption index, *CORRF*, indicates the degree to which an economy is free from such forms of corruption (Heritage Foundation, 2008, p. 15).

The labor freedom index, *LF*, is a composite index that reflects freedom from government wage and price controls which, thus, measures the ability of both workers and firms to interact freely without restrictions imposed by government. The greater the degree of labor freedom in an economy, the more efficient and productive is that economy (Heritage Foundation, 2008, p. 15). Technically, "it is clear that the 10 economic freedoms interact," i.e., overlap, although the exact mechanisms for this interaction are not easily identifiable (Heritage Foundation, 2008, p. 15). After extensive experimentation to address this issue, certain of the economic freedom measures have been lagged. In particular, two of the economic freedom indices are lagged one year (government size freedom and business freedom), and three are lagged two years (fiscal freedom, investment freedom, and freedom from corruption). This lagging results in the absence of even one zero-order correlation coefficient among the economic freedom variables that exceeds 0.395.[2]

2.2. Control variables and a trend variable

In addition to the hypothesized role of economic freedoms in elevating real income, this study includes two economic "control" variables and a trend variable. The control variables are the percentage unemployment rate in country *j* in year *t-1* ($UR_{j,t-1}$) and the *ex post* real long term rate of interest in country *j* in year *t-1* ($RLONGINT_{j,t-1}$). The unemployment rate variable controls for the expected negative influence of higher unemployment rates on per capita real income levels. Furthermore, the higher the *ex post* real long term rate of interest, the lower the present value of investment for firms, and hence the lower the rate of investment in new plant and equipment. Moreover, the *ex post* real long term rate of interest also captures the fact that consumption, particularly that of durable goods, is a decreasing function of the *ex post* real long term rate of interest, *ceteris paribus*. Thus, the higher the *ex post* real long

[2] The Heritage Foundation (2008, p. 15) weights each economic freedom measure equally so as to prevent bias toward any given freedom or policy. Each of the economic freedoms is graded using a scale ranging from 0 to 100, with 100 being the maximum level of freedom. The higher the numerical value of any one of these economic freedom indices, the greater the degree of that corresponding economic freedom.

term interest rate, the lower the pace of economic activity, and hence the lower the per capita real income level, *ceteris paribus*. Finally, the linear trend variable, *TR*, is included to account for trending of per capita real income over the study period.

3. Linear PLS and linear-log PLS estimation results

Based on the eclectic economic freedom-based model of investigating the determination of per capita real income described above, the following equation is to be estimated initially:

$$RPCT_{jy} = f(BF_{j,t-1}, FINF_{jt}, FF_{j,t-2}, CORRF_{j,t-2}, IF_{j,t-1}, LF_{jt}, MF_{jt}, GSF_{j,t-1}, TF_{jt}, PRF_{jt}, UR_{j,t-1}, RLONGINTR_{j,t-1}, TR) \quad (2)$$

Data for each of the ten economic freedom variables/indices in equation (2) were obtained from the Heritage Foundation (2008); data for the real per capita income variable were obtained from the International Monetary Fund (2008); and data for the unemployment rate and interest rate variables were obtained from the OECD (2008). Descriptive statistics for each of the non-trend variables in the analysis are provided in Table 1.[3]

Table 1. **Descriptive statistics.**

Variable	*Mean*	*Standard Deviation*
Real Per Capita Income	26,969	11,636
Business Freedom	79.11	11.14
Financial Freedom	70.0	17.14
Fiscal Freedom	60.35	12.53
Freedom from Corruption	70.28	21.69
Investment Freedom	69.3	13.68
Labor Freedom	66.41	16.26
Monetary Freedom	83.17	6.2
Government Size Freedom	41.2	19.49
Trade Freedom	80.6	4.8
Property Rights Freedom	77.155	15.65
Unemployment Rate	6.66	3.27
Real Long Term Interest Rate (Ex Post)	4.8	2.24

Equation (2), which is in linear form, was estimated by PLS (panel least squares), first using the *random effects* model and then using the *fixed-effects* model. A Hausman specification test (Hausman, 1978) generated a *t*-statistic with a $p = 0.0487$, so the study adopted the *fixed-effects* model.[4] Equation (2) is estimated in linear form, adopting the White (1980) correction. These results are provided in column (a) of Table 2.

Of the 12 estimated coefficients shown in column (a) of Table 2, nine exhibit the expected signs. More relevantly, of the ten estimated coefficients reflecting the economic freedom indices, eight exhibit the expected positive signs, with six being statistically significant at the 1% level (business freedom, investment freedom, monetary freedom, government size freedom, trade freedom, and property rights freedom), one being statistically significant at the 2.5% level (freedom from corruption), and one being statistically significant at the 10% level (fiscal freedom).[5] The estimated coefficients on the labor freedom and financial freedom indices were not statistically significant at the 10% level. The estimated coefficients on the economic control variables in this specification fail to reach statistically significance at the 5% level; however, one of these variables—the *ex post* real long term rate of interest—exhibits greater strength in the subsequent estimation (i.e., the linear-log estimation provided in column (b) of Table 2). Meanwhile, the coefficient of determination (R^2) value implies that the model explains nearly seven-tenths of the variation in the dependent variable, per capita real income. Finally, the *F*-ratio is statistically significant at the 1% level, attesting to the overall strength of the model.

This estimation of the basic model reveals evidence that the level of per capita real income is an increasing function of business freedom (*BF*), freedom from corruption (*CORRF*), investment freedom (*IF*), monetary freedom (*MF*), government size freedom (*GSF*), trade freedom (*TF*), and property rights freedom (*PRF*). There is also modest (initial) evidence that the level of per capita real income is an increasing function of fiscal freedom (*FF*).

In particular, according to the initial estimate, a one unit increase in the business freedom index raises per capita real income (*RPCY*) by $165. Similarly, a one unit increase in the freedom from corruption index raises per capita real income by $142, whereas

[3] A complete dataset for Iceland was unavailable, so only 29 of the 30 member OECD nations could be studied.

[4] The null hypothesis (H_0) in the Hausman (1978) test is that a *random effects model* is consistent and efficient, whereas the alternative hypothesis (H_1) is that *a random effects model* is inconsistent. Thus, if H_0 is rejected, as is the case here, a *fixed-effects* model should be employed.

[5] Our model's ability to parse each of these many different "freedom effects" is consistent with analyses of overall freedom indices conducted by Caudill, Zanella, and Mixon (2000).

a one unit increase in investment freedom raises per capita real income by $297. The level of per capita real income rises by $717 with a one unit increase in monetary freedom, whereas per capita real income rises $170 with a one unit increase in government size freedom. Lastly, a one unit increase in the trade freedom index elevates per capita real income by $377, while a one unit increase in the property right freedom index elevates per capita real income by $317. Of these findings, the initial estimation implies that the strongest economic impacts on per capita real income appear to be exercised by monetary freedom, trade freedom, property rights freedom, and investment freedom.

Table 2. Linear and linear-log PLS estimates (f*ixed-effects*) – dependent variable: *RCPY*.

Linear Estimation				Linear-log Estimation		
Variable	Coefficient (t-statistic)			Variable	Coefficient (t-statistic)	
Constant	-139646			Constant	-590983	
Business Freedom	164.63	***		*Log Business Freedom*	18,532	***
	(2.58)				(3.67)	
Financial Freedom	-45.7			*Log Financial Freedom*	-4,840	
	(-0.73)				(-1.56)	
Fiscal Freedom	157.46	*		*Log Fiscal Freedom*	10,951	
	(1.67)				(1.42)	
Freedom from Corruption	142.32	**		*Log Freedom from Corruption*	5,424	**
	(2.39)				(2.37)	
Investment Freedom	296.69	***		*Log Investment Freedom*	18,194	***
	(3.61)				(3.89)	
Labor Freedom	-90.85			*Log Labor Freedom*	285.31	
	(-1.02)				(0.07)	
Monetary Freedom	717.43	***		*Log Monetary Freedom*	42,390	***
	(4.10)				(3.38)	
Government Size Freedom	170.06	***		*Log Government Size Freedom*	3,045	***
	(3.49)				(2.70)	
Trade Freedom	377.62	***		*Log Trade Freedom*	31,174	***
	(3.49)				(3.45)	
Property Rights Freedom	317.46	***		*Log Property Rights Freedom*	21,135	***
	(5.62)				(5.24)	
Unemployment Rate	-368.5	*		*Log Unemployment Rate*	-623.12	
	(-1.70)				(-1.27)	
Real Interest Rate	285.96	*		*Log Real Interest Rate*	-9,734	**
	(-1.64)				(-2.29)	
Trend	-186.06			*Trend*	-0.022	
	(-0.18)				(-0.47)	
n	116			*n*	116	
R^2	0.69			R^2	0.72	
F	12.16	***		*F*	14.00	***

***statistically significant at 1% level; **statistically significant at 5% level; *statistically significant at 10% level.

By contrast, the estimation results in column (a) reveal that financial freedom and labor freedom do *not* influence the level of per capita real income. In both of these cases, the estimated coefficient was actually *negative* and was not statistically significant at even the 5% level. Interestingly, whereas similar results were obtained for the *financial freedom* index in at least one recent real *economic growth* study (Cebula, 2011, p. 74), that same study found that the *labor freedom* index exercises a positive and statistically significant impact on real economic growth (Cebula, 2011, p. 74). Finally, from the estimate in column (a) of Table 2, it appears that the *fiscal freedom* index *may* play a modest role in the determination of per capita real income, although the evidence of such is far from compelling.[6]

[6] Although, in theory, a one unit increase in fiscal freedom appears to increase per capita real income by $157, this result is dubious in view of the modest statistical significance (10%) of this explanatory variable in the estimation.

As illustrated in Panel A in Figure 1 of this study, the linear model above assumes constant marginal returns to each particular form of economic freedom, *i*, included in equation (2). However, as with many economic phenomena and relationships, economic freedoms are likely to exhibit diminishing

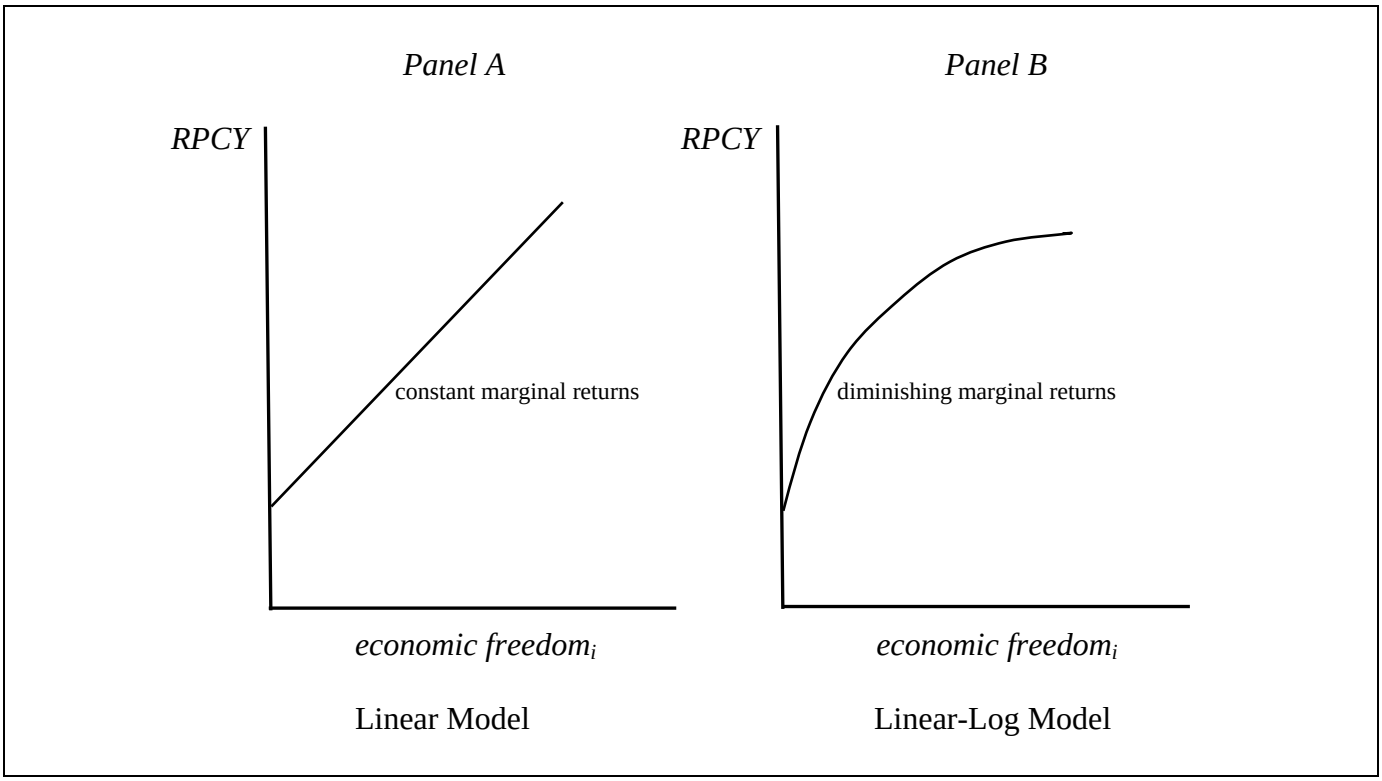

Figure 1. Constant versus diminishing marginal returns to economic freedom.

marginal returns, as illustrated in Panel B in Figure 1.[7] Accordingly, as a test of robustness of the basic model, the model in equation (2) was also estimated in linear-log form.

The linear-log form of equation (2) was estimated by PLS, first using the *random effects* model and then using the *fixed-effects* model. In this case, a Hausman specification test (Hausman, 1978) generated a *t*-statistic with a $p = 0.0492$, so that our study again adopts the *fixed-effects* model. This *fixed-effects model* PLS estimation in linear-log form is provided in column (b) of Table 2.

As shown in column (b) of Table 2, ten of the 12 estimated coefficients exhibit the expected signs, with eight statistically significant at the 5% level or better. Of the *economic freedom indices*, seven of the ten are statistically significant at the 5% level or better. Indeed, this linear-log estimation of the basic model reveals evidence that the level of per capita real income is, once again, found to be an increasing function of business freedom, freedom from corruption, investment freedom, monetary freedom, government size freedom, trade freedom, and property rights freedom. These particular results for the economic freedom indices are entirely supportive of those shown in the linear PLS *fixed-effects* estimation provided in column (a) of Table 2, with the exception of the case of the fiscal freedom index, which fails in the present estimate to achieve statistically significance at the 10% level. Furthermore, financial freedom and labor freedom again prove to be statistically insignificant in determining real per capita income.

It may be of interest to observe that in this particular specification, the estimated coefficient on the *ex post* real long term interest rate variable is now negative and statistically significant at the 2.5% level, as opposed to being statistically significant at only the 10% level, as in column (a) of Table 2. The coefficient of determination shown in this linear-log estimation is 0.72, so that specification explains between seven-tenths and three-fourths of the variation in per capita real income across OECD nations

[7] Regarding non-linearity in an economic growth context, see Hall, Sobel, and Crowley (2010, Table 5), and in terms of per capita GDP, see Ockey (2011).

for the study period. Once again, the *F*-ratio is statistically significant at the 1% level, attesting to the overall strength of the model.

4. Summary

This study of the impact of economic freedom on per capita real GDP among OECD nations over the 2002-2006 period, with each OECD nation during this time frame being treated as a *de facto* "economic region" within the OECD, finds strong initial support for the hypothesis proffered here, namely, that the higher the degree of economic freedom, the higher the *level* of economic activity and, hence, the higher the per capita real GDP *level*. In particular, the per capita real GDP level in each of the nations/regions of the OECD over the study period is shown, using *fixed-effects* PLS estimations, to be an increasing function of business freedom, freedom from corruption, investment freedom, monetary freedom, government size freedom, trade freedom, and property rights freedom. By contrast, it appears that financial freedom and labor freedom, and probably fiscal freedom as well, do not play major roles in determining the *level* of per capita real income in OECD nations.

Naturally, these conclusions are only preliminary. More work, using alternative data, additional years and variables, alternative specifications, and, ultimately, data for the four new OECD nations (joining in 2010) as well, is clearly needed. More specifically, the preliminary nature of these findings is emphasized in terms of the fact that the study period covers only five years. In addition, alternative specifications involving additional variables (including different control variables) could yield broader, if not better and more compelling, insights. Thus, although these results would appear to suggest a strong relationship between per capita real income (GDP) and various forms of economic freedom, this relationship requires further scrutiny and formal investigation. Indeed, future research might consider using economic freedom data from alternative sources, such as those developed by Gwartney, Lawson, and Hall (2011), to test for the robustness of the present findings.

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