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Economic Freedom and Real Income

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Abstract: This article further investigates the critical relationship between economic freedom and real income levels**.** Treating member nations of the OECD as *de facto* economic and political *regions*, the estimations in this empirical study all provide strong support for the three hypotheses considered here: (1) the higher the overall degree of economic freedom, the higher the per capita real income *level*; (2) the higher the level of regulatory quality, the higher the *level* of per capita real income; and (3) the higher the tax burden, expressed as a percent of GDP, the lower the *level* of per capita real income.

1. Introduction

In a recent Special Issue of this *Journal*, the topic of economic freedom and the economic ramifications and measures thereof were studied by a number of authors.[1] These studies were those by Hall (2013), Stansel (2013), Ashby, Bueno, and Martinez (2013), Cebula, Clark, and Mixon (2013), Bennett and Vedder (2013), Belasen and Hafer (2013), and Mulholland and Hernandez-Julian (2013). In the spirit of these studies, the present study focuses on providing updated insights into a particular potential impact of higher economic freedom levels, namely, higher real income *levels*. Although the existing literature in fact does to some extent focus on the effect of higher levels of economic freedom on real income levels, this is not the primary focus of the majority of the related literature. By contrast, then, this study exclusively investigates the hypothesis that higher levels of overall economic freedom in an economy promote a higher *level* of economic activity and hence yield higher *levels* of per capita real income (GDP) in that economy, *ceteris paribus*.

Where this present study principally differs from the existing related literature is three-fold. First, although focusing on the overall Heritage Foundation (2013) economic freedom index, the present study deconstructs that overall index to create an eight-component rather than ten-component measure; for reasons provided below, fiscal freedom and business freedom are deleted from the overall measure. Second, in the pursuit of a broader perspective *and* to compensate for the deletion of fiscal freedom and business freedom, this study also investigates two additional, complementary hypotheses: (1) the higher the taxation level relative to GDP, the lower the per capita real income *level*; and (2) quality regulation leads to a higher per capita real income *level*. Third, in order to provide a broad and diverse context for the empirical analysis of these joint hypotheses, we focus on the member nations of the OECD, consisting of 30 nations in the early years of this century and of 34 nations as of 2010.[2]

[1]Most empirical studies of the impact of economic freedom have found a positive impact of overall economic freedom on the *rate of economic growth* (Cebula and Alexander, 2006; Clark and Lawson, 2008; De Haan and Strum, 2000; Easterly, 2011; Gwartney, Holcombe, and Lawson, 2006; Gwartney, Lawson, and Holcombe, 1999; Heckelman, 2000; Mathers and Williamson, 2011; Powell, 2003).

[2] Each nation during this time frame is considered either as a nation *per se* or as a *de facto* "economic region" or "economic-political region" within the OECD.

This study investigates whether international/interregional per capita real income differentials are a function of different levels of economic freedom, differential tax burdens, and differentials in the quality of government regulation.[3] The study period runs from 2003-2010.

2. Framework

Per capita real income, *RPCINC*, is an economic variable that parallels, in principle, what have been the foci of most of the more recent related studies on macroeconomic *growth*. Per capita income is made comparable across nations by purchasing-power-parity adjustments. Given the emphasis in this study on the role of economic freedom in determining per capita real income and hence international differentials thereof, the most fundamental hypothesis of this study is that per capita real income depends positively upon economic freedom in each of its various studied forms, *ceteris paribus*. In addition, per capita real income is hypothesized to be a negative function of the tax burden as a percent of GDP, *TAX*, because higher tax burdens reduce disposable income and limit the ability to purchase new goods and services and thereby reduce/restrict the level of economic activity. In addition, per capita real income is hypothesized to be an increasing function of regulatory quality, *REGQ*, since better quality regulation interferes less with the market-based economy. Per capita real income is also hypothesized to be influenced by political stability as well as economic variables (*OTHER*).

Thus, the model is:

$$RPCINC_{jt}=g(FREE_{njt},TAX_{jt},REGQ_{jt},STAB_{jt},OTHER_{jt}) \quad (1)$$

$RPCINC_{jt}$ is the *level* of the purchasing-power-parity adjusted per capita real income (GDP) in OECD nation j in year t; $FREE_{njt}$ refers to the value of the economic freedom measure (index) n in nation j in year t (n=8 in each of the primary estimations, as explained below); TAX_{jt} is the ratio of *all* taxes in nation j to the GDP level within nation j in year t, expressed as percent; $REGQ_{jt}$ refers to the role played by government in the economy under the rubric of regulations and in fact is an index that measures the overall quality of those regulations in nation/region j in year t; $STAB_{jt}$ is an index that measures the degree of political stability in each nation/region j in year t; and $OTHER_{jt}$ refers to economic control variables in nation j in year t.

3. Empirical model

The present study extends earlier studies in a variety of ways. To begin with, this study focuses on the OECD nations. In addition, it estimates an unbalanced eight-year (2003 through 2010) panel dataset using fixed effects. Furthermore, for half of the estimates in the present study, we construct an overall average measure of economic freedom which omits two of the ten Heritage Foundation (2013) economic freedoms, primarily because of the multicollinearity problems their presence creates and partly to replace them with arguably better variables to measure what they seek to measure. We use the ratio of all taxes to GDP (as a percent) and a direct measure of regulatory quality, the main component of business freedom. These substitutions are further explained later on in this section of the study. The present analysis also includes linear, linear-log, and log-log estimates to test for consistency of results.

3.1. Economic freedom variables

This study *initially* considers the economic freedom indices developed by The Heritage Foundation (2013). An alternative measure of economic freedom computed by Gwartney, Lawson, and Hall (2012) is also considered in the estimates as a reality test, although the Gwartney-Lawson-Hall measure is not strictly comparable to The Heritage Foundation (2013) measure, especially given the ways in which the latter is modified in this study. In any event, based on the central hypothesis investigated in this study, as stated above, the level of per capita real income is expected to be an increasing function of these indices of economic freedoms, *ceteris paribus*.

Given this context, we first identify eight economic freedom indices to be considered collectively here: *government size freedom (HFR1); trade freedom (HFR2); monetary freedom (HFR3); investment freedom (HFR4); financial freedom (HFR5); property rights freedom (HFR6); freedom from corruption (HFR7);* and *labor freedom (HFR8).*

The index of fiscal freedom (Heritage Foundation, 2013) is an indication of the freedom of individuals and firms to keep and control their income and wealth for their own use/benefit; it measures freedom from the burden of government. Technically, fiscal freedom includes freedom from both the tax burden, in terms of both the *top income tax rate*

[3] This study investigates whether higher taxation reduces per capita real income and whether higher regulatory quality and greater political stability act to elevate per capita real income and thus act to create income differentials.

(on corporations and individuals, taken separately), and the overall amount of tax revenue as a percentage of a "region's" GDP. This freedom index is labeled as *HFR9*.

The index of business freedom reflects the individual's right and ability to freely conduct entrepreneurial activities. It is argued that burdensome, redundant regulations are the most common barriers to the free conduct of entrepreneurial endeavors, making it difficult for entrepreneurs to produce goods and services. This economic freedom index is labeled *HFR10*.

To measure economic freedom using The Heritage Foundation (2013) indices and address the fact that they are in some cases highly correlated, we define, with the two notable exceptions (*HFR9* and *HFR10*), the *overall average* economic freedom, $HFFE_{jt}$, as the average of the first eight economic freedoms described above, where n is the nth freedom and j is the jth economic region, so that:

$$HFFE_{jt} = \frac{(\sum_{n=1}^{8} HFR_{njt})}{8}, \quad (2)$$

j=1,…,29 for t= 2003,…, 2009,

j=1,…,33 for 2010

The primary reason for defining the overall index *with HFR9 excluded* is that *HFR9* is highly correlated with *HFR1* and therefore introduces a multicollinearity problem. Consequently, *HFR9* is replaced with a simple measure of the overall tax burden in each of the OECD nations, TAX_{jt}. This substitute for *fiscal* freedom has the advantages over *HFR9* of simplicity and comprehensiveness, i.e., it is computed as simply the sum of *all* taxes in nation j in year t expressed as a percent of GDP, and it is not highly correlated with *HFR9*. It is of course expected that real per capita income is a *decreasing* function of *TAX*, *ceteris paribus*. Moreover, higher taxes will lower real income by interfering with market processes such as migration (Cebula, 1979; Cebula and Alexander, 2006).

The basic rationale, in principle following the economic growth modeling in Cebula and Mixon (2014), for excluding *HFR10* from the freedom index is the fact that this index, whose principal component is government regulation, is highly correlated with investment freedom. As a result, to reflect in part the role of government in the economic environment *as* a regulator, this study adopts in place of *HFR10* the variable measured as "regulatory quality" by the World Bank Institute (2012, p. 1). This regulatory quality variable, expressed by the symbol *REGQjt* in the present study, is an index that reflects government's ability to provide regulations that "promote private sector development" (World Bank Institute, 2012, p. 9; Cebula and Mixon, 2014). It is expected that greater regulatory quality leads to a greater level of economic activity and a greater level of per capita income (GDP), *ceteris paribus*.

3.2. Additional variables

The study includes two economic variables, a political variable, and a trend variable. The explicitly economic control variables are the average percentage unemployment rate in country j in year t, UR_{jt}, and the average *ex post* real long term rate of interest in country j in year t, $RINT_{jt}$ (Cebula, Clark, and Mixon, 2013). The unemployment rate variable controls for negative influences of higher unemployment rates on per capita real income levels: the greater the percent of the labor force that is unemployed, the lower the per capita income, *ceteris paribus*. Next, according to "conventional wisdom", 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, *ceteris paribus*. Moreover, consumption, particularly consumption of durable goods (including housing), is likely also a decreasing function of the *ex post* real long term rate of interest, *ceteris paribus*.

We also integrate a political variable, $STAB_{jt}$, which is an index of political stability into the model. It is hypothesized that economic prosperity for an economy as a whole should be an increasing function of political stability, which by its very nature promotes orderly or lower risk decision making and greater efficiency for markets to function in an economic system and thereby should act to elevate per capita real income.

4. Linear fixed-effects results

Based on the eclectic model of per capita real income determination above, the following lin-lin model is to be estimated *initially*:[4]

$$RPCINC_{jt} = a + b\,HFFE_{jt} + c\,REGQ_{jt} + d\,TAX_{jt} + e\,STAB_{jt} + f\,UR_{jt,} + g\,RINTR_{jt} + u \quad (3)$$

with expected coefficient signs:
$b > 0$, $c > 0$, $d < 0$, e > 0, f < 0, g < 0

Data for each of these economic freedom variables/indices (*HFFE*) were obtained from The Heritage Foundation (2013). Data for the real per capita income variable (*RPCINC*) were obtained from the International Monetary Fund (2013), data for the variables *TAX*, *UR*, and *RINTR* were obtained from the OECD (2013), and data for the governance indices for *REGQ* and *STAB* were obtained from the World Bank Institute (2012).

Equation (3) is estimated using the fixed effects model, adopting the White (1980) cross-section correction. The empirical results are provided in column (a) of Table 1, where all six of the coefficients exhibit the expected signs. Of these six coefficients, three are statistically significant at the 1% level, two are statistically significant at the 2.5% level, and one is statistically significant at the 5% level. Thus, as hypothesized, these fixed effects results reveal that the per capita real income level of OECD nations during the study period are a positively related to economic freedom, regulatory quality, and political stability, and a decreasing function of the tax burden (as a percent of GDP). Thus, for example, bearing in mind that the mean of $HFFE_{jt}$ is 69.96, a one unit increase in the economic freedom index would *elevate* per capita real income by $348. Therefore, a rise in the economic freedom index of 10 units would be expected to elevate per capita real income by approximately $3,480. In addition, a rise in the *REGQ* index of one unit would raise per capita real income by $382, while a rise of one percentage point in the percentage ratio of taxes to GDP would reduce per capita real income by $248. Meanwhile, the coefficient of determination values (the R^2 and adjusted R^2) imply that the model explains approximately two-thirds of the variation in per capita real income.

[4] $HFFE_{jt}$ is adopted as the symbol for the *overall average level of economic freedom* based on The Heritage Foundation (2013) indices. In subsequent estimations, i.e., in half of the estimations presented here, an alternative measure of economic freedom based on Gwartney, Lawson, and Hall (2012), *GLHFREE*, is substituted for $HFFE_{jt}$.

Finally, the *F*-ratio is statistically significant at the 1% level, attesting to the overall strength of the model.

Table 1. Lin-Lin estimates.

Explanatory Variables	(a)	(b)
HFFE	346**	-------
	(2.43)	
GLHFREE	-------	7,857***
		(3.75)
REGQ	382***	399***
	(7.18)	(7.42)
TAX	-248**	-374***
	(-2.28)	(-3.45)
STAB	99***	111****
	(2.66)	(3.12)
UR	-692*	-701***
	(-2.04)	(-3.46)
RINTR	-1,564***	-2,125***
	(-2.66)	(-5.68)
TR	-1,310	-290
	(-1.51)	(-0.37)
Constant	-1,852	-33,417
	(-0.16)	(-1.92)
R^2	0.65	0.71
Adjusted R^2	0.62	0.68
F	20.9***	27.1***

Notes: t-statistics in parentheses. ***significant at 1% level; **significant at 2.5% level; *significant at 5% level.

The estimate in column (a) is based upon Heritage Foundation (2013) measures of economic freedom. As a test of the consistency of the conclusions for the per capita real income effects of economic freedom, as well as the regulatory quality and tax-burden variables, the next estimation provided in Table 1 offers alternative fixed effects results of a parallel model. This second model specification is not intended to substitute for the first in any way but simply to serve as a relatively approximate reality check on the validity and consistency of the first. The only difference between the specification of this alternative model and that considered in column (a) of Table 1 is the measure of economic freedom. In particular, the index *HFFE* is replaced by the overall measure of economic freedom from Gwartney, Lawson, and Hall (2012), *GLHFREE*. In principle, the two economic measures *HFFE* and *GLHFREE*

measure much the same thing; however, as illustrated in Table 1, the scale of these two variables is quite different. For the study period, for example, the mean for the *HFFE* index is 69.96 whereas that for the *GLHFREE* index is 7.52. In practical terms, this implies that should the coefficient on *GLHFREE* be statistically significant, its coefficient could be much larger than that for *HFFE*. This is at least in part because in, say, a linear estimation, a one unit increase in *GLHFREE* implies approximately a 13.3% higher degree of overall economic freedom, whereas a one unit increase in *HFFE* would be approximately a 1.4% rise in overall economic freedom.

It is also observed that in this study equation (3) is estimated not only in linear form but also in linear-log form and log-log form, with the *HFFE* index replaced in *half* of the estimations by the *GLHFREE* economic freedom index. Each of these versions of equation (3) was estimated by PLS (panel least squares), first using the fixed effects model.

In the results shown in column (b) of Table 1, all six of the estimated non-trend coefficients exhibit the expected signs; furthermore, all six are statistically significant at the 1% level. In addition, the R^2 value and adjusted R^2 value imply that the explanatory variables in the model explain effectively seven-tenths of the variation in the variable *RPCINC*. Finally, the *F*-statistic is statistically significant at beyond the 1% level. These results imply that per capita real income level among OECD nations during the 2003-2010 study period is found to be an increasing function of economic freedom, regulatory quality, and political stability, while being a decreasing function of the tax burden (as a percent of GDP), the unemployment rate, and the *ex post* real long term interest rate.

5. Testing for consistency

The results in Table 1 indicate support for the main hypotheses being investigated here. To provide further evidence of the consistency of these results, two additional sets of findings are considered. The first of these findings involves lin-log estimates of the basic model (see Table 2), while the second provides log-log estimates (see Table 3). Indeed, two of the latter group of estimates consider an additional control variable to yet further test the resiliency of the findings of the model. The lin-log estimation of equation (3) using The Heritage Foundation (2013) economic freedom measure is provided in column (a) of Table 2, whereas the linear-log estimation of equation (3) adopting the Gwartney, Lawson, and Hall (2012) index is provided in column (b) of Table 2.

Table 2. Lin-Log estimates.

Explanatory Variables	(a)	(b)
Log HFFE	24,501***	-------
	(2.65)	
Log GLHFREE	-------	36,260*
		(2.13)
Log REGQ	19,513***	11,156***
	(7.11)	(4.31)
Log TAX	-11,584***	-8,885*
	(-2.96)	(-1.99)
Log STAB	6,393*	1,413
	(2.10)	(0.61)
Log UR	-6,460**	-7,407***
	(-2.34)	(-3.56)
Log RINTR	-6,665***	-12,431***
	(-2.94)	(-5.03)
TR	-1,300	274
	(-1.48)	(0.29)
Constant	-119,102**	-35,673
	(-2.29)	(-0.77)
R^2	0.64	0.64
Adjusted R^2	0.61	0.61
F	20.1***	20.2***

Notes: t-statistics in parentheses. ***significant at 1% level; **significant at 2.5% level; *significant at 5% level.

In column (a) of Table 2, all six coefficients exhibit the expected signs. Also, four are significant at the 1% level, one is statistically significant at the 2.5% level, and one is statistically significant at the 5% level. Thus, as in the linear estimates in columns (a) and (b) of Table 1, per capita real income level among OECD nations over the study period is a positive function of economic freedom, regulatory quality, and political stability, while being a decreasing function of the tax burden (as a percent of GDP) as well as the unemployment rate and the *ex post* real long term interest rate. Meanwhile, the coefficient of determination (R^2) value implies that the model explains nearly two-thirds of the variation in the dependent variable, per capita real income. Overall, these results are compatible with those in Table 1. Of greatest relevance, the findings for the economic freedom, taxation, and regulatory variables receive

further validation by the linear-log estimations found in column (a) of Table 2.

In the estimation shown in column (b) of Table 2, all six coefficients exhibit the expected signs. In addition, three are statistically significant at the 1% level and two are statistically significant at the 5% level; the coefficient on the political stability variable fails to be statistically significant at the 10% level. Thus, as in the linear estimate in columns (a) and (b) of Table 1, per capita real income level is an increasing function of economic freedom and regulatory quality but a decreasing function of the tax burden (as well as the unemployment rate and the *ex post* real long term interest rate). Meanwhile, the coefficient of determination (R^2) implies that the model explains nearly two-thirds of the variation in per capita real income. Aside from the political stability variable, these results are compatible with those in Table 1, as well as those in column (a) of Table 2. In other words, of greatest relevance the findings for the economic freedom, taxation, and regulatory quality variables receive further validation from the linear-log results shown in column (b) of Table 2.

The results of estimating the log-log form of equation (3), first using The Heritage Foundation index and then using the Gwartney, Lawson, and Hall (2012) index, are provided in columns (a) and (c), respectively, of Table 3. As shown in column (a) of Table 3, all six of the estimated coefficients on the non-trend variables exhibit the expected signs, with four statistically significant at the 1% level and one statistically significant at the 2.5% level; once again, the political stability variable is not statistically significant at even the 10% level. Despite the latter result, these log-log results offer further support for the key findings in Table 1 in that the per capita real income level among OECD nations during the study period is found to be an increasing function of economic freedom and regulatory quality while being a decreasing function of the tax burden as a percent of GDP.

Table 3. Log-Log estimates.

Explanatory Variables	(a)	(b)	(c)	(d)
Log HFFE	0.83**	0.89***	-------	-------
	(2.31)	(2.61)		
Log GLHFREE	-------	-------	1.73***	1.76***
			(2.62)	(2.74)
Log REGQ	1.02***	1.02***	1.23***	1.18***
	(7.38)	(7.30)	(7.96)	(8.04)
Log TAX	-0.42***	-0.38**	-0.56***	-0.45**
	(-2.70)	(-2.53)	(-2.62)	(-2.28)
Log STAB	0.16	0.17*	0.21*	0.21**
	(1.54)	(1.98)	(1.99)	(2.40)
Log UR	-0.19***	-0.19***	-0.17**	-0.19***
	(-2.63)	(-2.68)	(-2.33)	(-2.77)
Log RINTR	-0.41***	-0.34***	0.044	0.001
	(-3.51)	(-2.96)	(0.56)	(0.03)
G8DUMMY	-------	0.16***	-------	0.24***
		(3.31)		(5.10)
TR	-0.06**	-0.06**	-0.02	-0.02
	(-2.58)	(-2.40)	(-0.79)	(-0.60)
Constant	4.3**	3.7*	2.99	2.7
	(2.36)	(2.09)	(1.85)	(1.80)
R^2	0.77	0.79	0.79	0.81
Adjusted R^2	0.75	0.76	0.77	0.79
F	38.1***	35.2***	41.8***	41.4***

Notes: t-statistics in parentheses. ***significant at 1% level; **significant at 2.5% level; *significant at 5% level.

In column (c) of Table 3, five of the six estimated coefficients on the non-trend variables exhibit the expected signs, with three statistically significant at the 1% level, one statistically significant at the 2.5% level, and one statistically significant at the 5% level. In this estimate, it is the *ex post* real long term interest rate that is not statistically significant at even the 10% level. Despite the latter result, these findings offer further support for the key findings in Table 1 in that the per capita real income level among OECD nations is found to be an increasing function of economic freedom and regulatory quality as well a decreasing function of the tax burden (as a percent of GDP).

As a final test of the potential validity of the model, a new variable is now added to the log-log specification. Specifically, this study now adopts a *de facto* economic control *dummy* variable, *G8DUMMY*, which assumes a value of 1 for a G8 nation and a value of 0 otherwise. This variable is included in the analysis to control for the fact that G8 nations tend to have educational, technology, infrastructure, and other advantages as compared to many if not most non-G8 nations. These advantages will tend to result in higher productivity labor and hence higher per capita real income levels, *ceteris paribus*.

The log-log estimations of the basic model with the *G8DUMMY* included can be found in columns (b) and (d) of Table 3, where column (b) adopts the *HFFE* measure of economic freedom and column (d) adopts the *GLHFREE* measure of economic freedom. In column (b), all seven of the estimated non-trend coefficients exhibit the expected signs, with five statistically significant at the 1% level, one statistically significant at the 2.5% level, and one is statistically significant at the 5% level. Thus, once again per capita real income is an increasing function of economic freedom, regulatory quality, and political stability. It also is positively impacted by having G8 status. Per capita real income is also a decreasing function of higher taxation, the unemployment rate, and the *ex post* real long term interest rate. Clearly, among other things, this estimate provides strong support for the three central hypotheses being investigated in this study.

In column (d) of Table 3, six of the seven of the estimated non-trend coefficients exhibit the expected signs, with four statistically significant at the 1% level and two statistically significant at the 2.5% level; once again [as in column (c) of Table 3], in the log-log specification the interest rate variable has the "wrong" sign but is not statistically significant at even the 10% level. In any case, once again per capita real income is an increasing function of economic freedom, regulatory quality, and political stability. It also is positively impacted by having G8 status. Per capita real income is also a decreasing function of higher taxation and the unemployment rate. Clearly, this estimation also provides support for the hypotheses being investigated.

6. Summary

The estimations in this study all provide strong support for the three central hypotheses considered here: (1) the higher the overall degree of economic freedom, the higher the per capita real income; (2) the higher the level of regulatory quality, the higher the per capita real income; and (3) the higher the tax burden, the lower the per capita real income.

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