Impact of Economic Freedom, Regulatory Quality, and Taxation on the Per Capita Real Income: An Analysis for OECD Nations and Non-G8 OECD Nations

Cebula, Richard and Clark, Jeff

Jacksonville University, University of Tennessee-Chattanooga

9 June 2014

Impact of Economic Freedom, Regulatory Quality, and Taxation on the Per Capita Real Income: An Analysis for OECD Nations and Non-G8 OECD Nations

By Richard J. Cebula (Jacksonville University)

and J.R. Clark (University of Tennessee-Chattanooga)

I.   INTRODUCTION

Over the past quarter of a century, 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; Ashby, Bueno, and Martinez, 2013; Belasen and Hafer, 2013; Cebula, 2010, 2011; Cebula and Alexander, 2006; Cebula, Clark, and Mixon, 2013; Clark and Lawson, 2008; Cole, 2003; Dawson, 1998, 2003; De Haan and Strum, 2000; Farr, Lord and Wolfenbarger, 1998; Goldsmith, 1995; Gwartney, Holcombe, and Lawson, 2006; Gwartney, Lawson, and Holcombe, 1999; Heckelman, 2000; Heckelman and Stroup, 2000; Liu and Riyanto, 2009; Mathers and Williamson, 2011; Mulholland and Hernandez-Julian, 2013; Norton, 1998; Powell, 2003: Tortensson, 1994).

A good example of this literature is provided by Gwartney, Lawson and Holcombe (1999), who examine the importance of market institutions and economic freedom as prerequisites for economic growth, demonstrating that economic freedom is a significant determinant of economic growth, even when human capital, physical capital, and demographics are taken into account. Powell (2003) analyzes the relationship between freedom and economic growth in Ireland, reporting that as economic freedom increased, Ireland grew more rapidly. Reforms following Ireland's fiscal crisis slashed

1

the government's role in the economy, reduced large government budget deficits and tax rates, and improved the institutional environment in which entrepreneurs operate. Cole (2003) evaluates the impact of economic freedom on economic growth under alternative theoretical frameworks, finding that economic freedom was robust with respect to major changes in all the model specifications and concludes that economic freedom was a significant factor in economic growth, regardless of the basic theoretical framework. Farr, Lord, and Wolfenbarger (1998) use Granger-causality to examine the relationship between freedom and economic growth finding bi-directional causality. That is, economic freedom Granger-causes the level of economic well-being (growth) as well as the reverse: the level of economic well-being (growth) is shown to Granger-cause economic freedom. Mathers and Williamson (2011) empirically test the effects of culture upon the success of capitalist institutions, specifically economic freedom, and demonstrate that culture enhances the effectiveness of capitalism and its subsequent impact on economic growth. Easterly (2011) finds that by examining many examples of rapid economic growth in both autocracy and democracy, democracy does significantly better than autocracy at reducing shocks from outside the political system and thus freedom is more important in producing growth than even good autocratic leadership. Indeed, despite the considerable variations in the modeling of economic growth amongst these various studies, economic freedom appears to play a consistently significant role in elevating that growth. This generalization is predicated presumably upon the argument that increased economic freedom elevates the growth/pace of economic activity through incentives to work, invest, save, hire/dismiss, make market-based business decisions, and take risk in a market-based economy.

This study focuses on a similar, but not identical, potential impact of a higher level of economic freedom, namely, its impact on real income *levels*.[1] Whereas the existing literature in fact does to some limited extent focus on the effect of higher levels of economic freedom on real income levels, this is not the principal emphasis of the most of the related literature. Indeed, by contrast to most of the published literature, the present study exclusively investigates (in part) the hypothesis that a higher overall level of economic freedom in an economy promotes a higher *level* of economic activity and hence yields a higher *level* of per capita real income (GDP) in that economy, *ceteris paribus*. Where this study principally differs from the existing related literature is that, although focusing on the overall Heritage Foundation (2013) economic freedom index, the present study deconstructs that overall economic freedom index to create an eight-component rather than ten-component economic freedom measure; for reasons provided below, two Heritage economic freedom measures are deleted from the overall measure, namely, fiscal freedom and business freedom. The present study relies heavily on data from the Heritage Foundation freedom index most widely cited in many previous economics studies. The Heritage Foundation freedom index not only provides data for more countries than other indexes but also contains variables calculated annually from its beginning in 1995 and thus provides a larger set of yearly data points for comparison. This index also attempts to maintain continuity of data over time by continually applying its revisions and improvements in the use of new methodology and new data retroactively

---

[1] This emphasis on economic freedom and the *per capita real income level* is compatible, in principle, with that in Wiseman and Young (2011) for states within the U.S., and with certain other studies, including Grubel (1997), Islam 1996), and Nissan and Niroomand (2008).

to existing data sets in order to "attempt to make the scores continuous back to 1995" (Beach and Kane, 2007, p .55).

Furthermore, in the pursuit of a broader perspective *and* to compensate for the deletion of fiscal freedom and business freedom from the overall economic freedom index, this study also investigates two additional, complementary hypotheses, namely: (1) the higher the total tax burden level relative to GDP, the lower the per capita real income (GDP) *level*; and (2) higher quality regulation leads to a higher per capita real income (GDP) *level*.

To provide a broad and diverse context for the empirical analysis of these joint hypotheses, unlike most previous related studies, we focus on the member nations of the OECD over the study period beginning in 2003 and ending in 2007.[2] Within this perspective, the present study provides an investigation into whether international per capita real income differentials (after purchasing-power-parity adjustments have been made) are a function of differential levels of economic freedom, differential tax burden levels, and differentials in the quality of government regulation.[3] The analysis consists of a panel data-set estimated using the fixed effects model. A variety of specification estimates are provided to test the resiliency and consistency of the findings of the basic model. An empirical analysis for all OECD nations for which all needed data are available is first provided; subsequently, *as a test of robustness of the* model, the various

---

[2] In 2010, four additional nations joined the OECD, raising membership from 30 to 34. Unfortunately, there are data limitations for the earlier portion of the study period for these nations, as well as for Iceland, so that this study deals with 29 OECD nations from 2003 through 2007.

[3] In addition, 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.

model specifications are estimated for all non-G8 OECD nations. Given the complexities

involved in this project, the present study is proffered as a providing preliminary results.

II.   THE FRAMEWORK

In this study, the per capita real income level is measured by the per capita real GDP *level*

in each of the OECD nations over the study period from 2003 through 2007. The per

capita real income *level*, *RPCY*, is an economic variable that *parallels*, in principle, but

nonetheless differs from what has been the focus of most of the more recent related

studies on macroeconomic *growth*, namely, the *percentage rate of change* of per capita

real GDP or simply *the percentage rate of change* of real *GDP* (Ali, 1997; Cebula, Clark,

and Mixon, 2013;Cole, 2003; Dawson, 1998, 2003; Goldsmith, 1995; Norton, 1998;

Tortensson, 1994).

The value of per capita real GDP (income), *RPCY*, is made comparable across

nations by *PPP* (purchasing-power-parity) adjustments. Given the emphasis in this study

on the role of economic freedom in determining the per capita real income level and

hence international differentials thereof, the most fundamental hypothesis of this study is

that per capita real income (as defined) depends directly upon economic freedom

(*FREEDOM*) in each of its various studied forms, *ceteris paribus*. In addition, per capita

real income is hypothesized to be a decreasing function of the tax burden, expressed as a

percent of GDP, *TAXREVGDP*;[4] this is 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

---

[4] As explained below, *TAXREVGDP* is adopted in lieu of The Heritage Foundation (2013) economic
freedom referred to as "fiscal freedom."

hypothesized to be an increasing function of regulatory quality, *REGQUAL*.[5] This is because high quality regulation interferes less with the efficiency functioning of a market-based economy (Clark, Boettke, and Stringham, 2008; Ugur, 2009; Upadhyaya, Raymond, and Mixon, 1997).

To provide a broad view of the factors influencing per capita real income, this study estimates a number of model specifications. The eclectic general framework for the analysis is expressed as follows:

RPCYj= f(FREEDOMnj, TAXREVGDPj, REGQUALj, POLSTABj,

OTHERj, *TR*)   (1)

where *RPCYj* is the *level* of the purchasing-power-parity adjusted per capita real income (GDP) in OECD nation *j*; *FREEDOMnj* refers to the value of the economic freedom measure (index) *n* in nation *j* (*n*=8 in each of the primary estimations, as explained below)*; TAXREVGDPj* is the ratio of *all* taxes in nation *j* to the GDP level within nation *j*, expressed as percent; *REGQUALj* 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*; *POLSTABj* is an index that measures the degree of political stability in each nation/region *j*; *OTHERj* refers to the values of fundamental expressly economic control variables, namely, the unemployment rate and/or the real long term interest rate and/or the central government budget deficit in nation *j*; and *TR* is a linear trend variable to allow for trending of the variables in the analysis over time. Naturally, the explanatory variables are to be lagged in the empirical estimation process in order to avoid simultaneity problems.

---

[5] As explained below, *REGQUAL* is adopted in lieu of The Heritage Foundation (2013) economic freedom referred to as "business freedom."

The general framework subsumed under equation (1) is to be used to generate a variety of model specifications to test the three central hypotheses outlined above, one of which is a model consisting (in addition to a trend variable) solely of the variables used to reflect economic freedom, regulatory quality, and taxation. In the other estimations, a "political control" variable (*POLSTABj*) and a variety of economic variables are introduced sequentially so that per capita real income is hypothesized also to be potentially a function of political stability as well as economic variables such as unemployment rates, real long term interest rates, and the central government budget deficit.

1. Economic Freedom, Burden of Taxation, and Regulatory Quality

This study considers the economic freedom indices developed by The Heritage Foundation (2013).[6] Based on the hypotheses being 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*.

Evidence in various forms of a positive impact of economic freedom on the level of per capita income can be found in several prior studies. These studies include a fundamentally graphical cross-country analysis by Grubel (1997, pp. 289-291, esp. Figure 1), from which he infers that countries with higher levels of economic freedom have higher per capita income levels. Another of these papers is a cross-section study by Islam (1996) of countries for the year 1992. The cross-section estimates in Islam (1996)

---

[6] In an Appendix, as a rudimentary robustness test, an alternative measure of economic freedom is considered, namely, that computed by Gwartney, Lawson, and Hall (2012). The Gwartney-Lawson-Hall (2012) measure is not strictly comparable to The Heritage Foundation (2013) measure, especially given the ways in which the latter is modified in this study. Nevertheless, the results using this alternative dataset provide strong empirical support for the principal findings in this study, i.e., the findings regarding the three central hypotheses proffered here.

find a direct impact of economic freedom on per capita income in low income countries and all countries taken as a group. Furthermore, a cross-section study of states in the U.S. by Wiseman and Young (2011) also finds evidence of a positive impact of economic freedom on per capita income. Other studies, including Cole (2003), secondarily address real income levels while focusing primarily upon economic growth.

The present study extends these studies in a variety of ways. To begin with, this study differs with most related prior studies by focusing on the OECD nations. In addition, it estimates a balanced (for the study period 2003-2007) panel dataset by fixed effects. Furthermore, for all of the estimates provided in the main text, the present study constructs an overall average measure of economic freedom which expressly discards two of the ten Heritage Foundation (2013) economic freedoms, namely, fiscal freedom and business freedom, primarily to eliminate the multi-collinearity problems their presence creates and partly to replace them with arguably better variables to measure what the fiscal freedom and business freedom indices are intended to measure, namely, the ratio of all taxes to GDP (expressed as a percent) and a *direct* measure of regulatory quality, the principal component of business freedom. These substitutions are further explained later on in this section of the study. Finally, the present analysis provides estimates of a variety of model specifications which involve the introduction of a number of *de facto* economic control variables and a *de facto* political control variable to test the resilience and consistency of the results adopting the Heritage Foundation (2013) data. This study first provides estimates for all of the OECD nations for which all of the data for the variables are available; subsequently, as a test of robustness, these same model

specifications are estimated but with the G8 nations excluded from the analysis, in principle following Islam (1996).

Given this context, we first identify *freedom from excessive government size,* or simply *government size freedom* (Heritage Foundation, 2013), 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). This economic freedom is labeled *HECFR1*.

The trade freedom index 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 their economic goals (Heritage Foundation, 2013). This economic freedom is denoted as *HECFR2*.

A free citizenry requires a steady and reliable currency as a medium of exchange and as a store of value. The monetary freedom index 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, 2013). This economic freedom is referred to here as *HECFR3*.

The investment freedom index is greater in a nation with (1) fewer restrictions on foreign investment, (2) fewer restrictions that tend to limit capital inflows and outflows, and (3) fewer 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, 2013). This economic freedom is referred to here as *HECFR4*.

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 is an indicator of the degree to which the financial sector of the economy is free from *excessive* banking and financial regulation (Heritage Foundation, 2013). This economic freedom is labeled *HECFR5*.

Secure property rights provide citizens the confidence to engage in entrepreneurial activities, including commercial activities, saving, investing, and risk taking. The ability to accumulate private property is a primary motivation, if not *the* primary motivation, for participation in a market economy; a "rule of law" that effectively 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 (Heritage Foundation, 2013). This economic freedom is referred to here as *HECFR6*.

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 or the abuse of political power. Political corruption interferes with market efficiency. The freedom from corruption

index indicates the degree to which an economy is free from such forms of corruption (Heritage Foundation, 2013). This economic freedom is labeled as *HECFR7*.[7]

The labor freedom index is a composite index that reflects freedom from government wage and price controls and 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, 2013). This economic freedom is referred to here as *HECFR8*.

The fiscal freedom index (Heritage Foundation, 2013) 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 the fiscal freedom index. 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. This economic freedom is labeled as *HECFR9*.

The business freedom index reflects the individual's right and ability to freely conduct entrepreneurial activities (i.e., to create, to operate and thereby make economic, financial, and management decisions, 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

---

[7] Related to the impact and nature of corruption, see the recent study by Goel and Nelson (2014).

of taxation that makes it difficult for entrepreneurs to produce goods and services

(Heritage Foundation, 2013). This economic freedom is labeled *HECFR10*.

Of the ten economic freedoms measured above, two, *HECFR9* and *HECFR10*, are

of special interest here in terms of whether there is a reasonable alternative way in which

to capture their essential significance but perhaps in either a more direct fashion and/or in

a *technically* less problematic fashion, i.e., one that avoids multi-collinearity with one or

more other variables in the system. In particular, to measure economic freedom using

The Heritage Foundation (2013) indices of economic freedom and to address the fact

that, technically, the ten economic freedoms interact, i.e., are overlapping, although the

exact mechanisms for this interaction are not easily identifiable or entirely clear (Heritage

Foundation, 2013), we define, with two notable exceptions (fiscal freedom, *HECFR9* and

business freedom, *HECFR10*) the *overall average* economic freedom measure based on

the Heritage Foundation (2013) indices, *HFFREEDOMjt*, as the average of the economic

freedoms described above, where *n* denotes the *n*th economic freedom:

$$HFFREEDOMjt = \sum_{n=1}^{8} HECFRnjt/8, \; j=1,\ldots,29, \; t= 2003,\ldots, 2007 \qquad (2)$$

The principal reason for defining the overall freedom index *without fiscal freedom*

(*HECFR9*) *included* is that *HECFR9* is highly correlated ($r = 0.670$) with *government*

size freedom, *HECFR1*, and therefore introduces a multi-collinearity problem. In

addition, however, it is noteworthy that the *HECFR9* index is constructed in part with an

arguably excessive focus on *just* the *top* corporate and personal income tax brackets so

that it may *potentially* fail to provide a systematic and purely objective inclusion of the

remainder of the corporate and personal income tax structures, be they imposed by

central governments or sub-central government entities. In point of fact, there are also numerous other tax forms besides income taxation that arguably must be systematically considered when quantifying fiscal freedom. Accordingly, *HECFR9* is replaced with a simple measure of the overall tax burden in each of the OECD nations, *TAXREVGDPj*. This substitute for *fiscal freedom* has two advantages over *HECFR9:* simplicity and comprehensiveness on the one hand, i.e., it is computed as simply the sum of *all* taxes in nation *j* expressed as a percent of GDP, and on the other hand, it is not highly correlated with *HECFR9* ($r = 0.390$). In the spirit of *HECFR9*, it is of course expected that real per capita income is a *decreasing* function of *TAXREVGDP*, *ceteris paribus* (Clark and Lawson, 2008; Yandle, 2013).[8] This hypothesis is consistent with empirical results in the recent study by Afonso and Jalles (2014, p. 349), which finds "…government revenue has a negative impact on growth…"[9] and in principle with the recent study of Indonesia by Parjiono, Beg, and Monypenny (2013).

The most fundamental reason for defining the overall freedom index with *business freedom* (*HECFR10*) *excluded* is the simple fact that this economic freedom measure, whose principal component is government regulation, is highly correlated ($r = 0.599$) with property rights freedom. That said, in order to reflect at least in part the role of government in the economic environment *as* a regulator *per se*, this study adopts in place of *HECFR10* the variable computed as "regulatory quality" by the World Bank Institute (2012, p. 1). This regulatory quality variable, expressed by the symbol

---

[8] Interestingly, it can be easily argued that the higher the value of *TAXREVGDP*, the greater the incentive to evade taxes (Cebula, 1997), which in turn can compromise tax revenue forecasts and actual tax revenues.
[9] There is also reason to believe that high taxation distorts human migration and the efficiency effects of migration and thereby reduces economic growth (Saltz, 1998; Cebula and Alexander, 2006; Damette and Fromentin, 2013), although such an issue is beyond the scope of this study.

REGQUALj in the present study, is an index that reflects "the ability of the government to provide sound policies and regulations that enable and promote private sector development" (World Bank Institute, 2012, p. 9). It is hypothesized that the greater/the higher the degree of regulatory quality in nation *j*, *REGQUALj*, the greater the level of economic activity and hence the greater the level of per capita income (GDP) in nation *j* in year *t*, *ceteris paribus* (Upadhyaya, Raymond, and Mixon, 1997; Ugur, 2009).[10]

Arguably, the most basic equation to be estimated in the context of this study involves the variable *RPCYj and* the three explanatory variables described above (along with a linear trend variable):

$$RPCYj = f(HFFREEDOMnj, TAXREVGDPj, REGQUALj, TR), \tag{3}$$

where $f_{HFFREEDOMnj} > 0, f_{TAXREVGDPj} < 0, f_{REGQUALj} > 0$

However, as observed above, several extensions of this basic specification are also to be estimated. Indeed, although estimations of this rudimentary framework are provided in this study, models with a number of expressly economic variables as well a variable reflecting political stability are provided first, since they are clearly more complete specifications and hence less subject to questions regarding omitted variable bias. The identity of the variables used to generate broader model specifications are discussed below.

   2. *Economic Variables and a Political Stability Control Variable*

In addition to the hypothesized impacts of economic freedom, taxes as a percent of GDP, and regulatory quality on real income, this study includes three expressly economic "control" variables and a political control variable. The explicitly economic control

---

[10] The potential economic significance of regulation (good quality) is considered elsewhere in related studies (Clark, Boettke and Stringham, 2008; Yandle, 2013;).

variables are, as follows: the average percentage unemployment rate in country j, URj (Cebula, Clark, and Mixon, 2013); the average *ex post* real long term rate of interest in country j, $RLONGINTj$ (Cecchetti, 2006; Mishkin, 2013; Taylor, 1999; Allison, 2013); and the central government budget deficit in country j, $BUDDEFj$, expressed as a percentage of GDP (Carlson and Spencer, 1975; Cebula, 1978; Abrams and Schmitz, 1978).

The unemployment rate variable controls for the expected negative influence 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* (Cebula, Clark, and Mixon, 2013). Next, as observed by Cecchetti (2006, p. 555), "the economic decisions of households to save and of firms to invest depend on the *real* interest rate." Similarly, Mishkin (2013, p. 609) observes that the traditional view is that "a fall in real interest rates…lowers the cost of borrowing, causing a rise in investment spending…and consumer durable expenditure." According to the "conventional wisdom" then, 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*. Thus, the higher the *ex post* real long term interest rate, the lower the level of economic activity and hence the lower the per capita real income/GDP level. Finally, a higher government budget deficit is often argued to lead to "crowding out" of private sector investment and other spending and hence to induce a lower level of

economic activity and a lower per capita real GDP, *ceteris paribus* (Carlson and Spencer, 1975; Cebula, 1978; Abrams and Schmitz, 1978).

We also introduce a *de facto* political control variable for each nation, *POLSTABj*, which is an index of political stability and the absence of violence in those nations. 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 (World Bank Institute, 2012, p. 9) and thereby should act, *ceteris paribus*, to elevate per capita real income.

For the interested reader, it is observed that the variables reflecting "regulatory quality" and "political stability" are in fact quite different. The variable used to measure regulatory quality, *REGQUAL*, reflects the ability of the government of a nation both to formulate and execute/implement sound, rational, and objective policies and regulations that not only permit but also promote private sector development and efficiency (World Bank, 2012, p. 5). By contrast, the variable used to reflect political stability, *POLSTAB*, actually measures the perceived likelihood that the government of a nation is vulnerable to being destabilized or even overthrown by either constitutional or violent means, with the latter including politically-motivated violence and terrorism (World Bank Institute, 2012, p. 9). From a different perspective, to illustrate how statistically unrelated these two variables are, the zero-order correlation coefficient between them is nearly 0, i.e., $r =$ -0.018.

III.   LINEAR FIXED EFFECTS PLS ESTIMATION RESULTS

Predicated upon the eclectic framework of per capita real income/GDP determination

described above, the following specification is estimated *initially*:[11]

$RPCY_{jt}= f(HFFREEDOM_j, REGQUAL_j, TAXREVGDP_j, POLSTAB_j, UR_j,$
        $RLONGINTR_j, BUDDEF_j, TR)$ (4)

where it is hypothesized that:

$f_{HFFREEDOM_j}>0, f_{REGQUAL_j}>0, f_{TAXREVGDP_j}<0, f_{POLSTAB_j}>0, f_{UR_j}<0, f_{RLONGINTR_j}<0, f_{BUDDEF_j}<0$

Data for each of the economic freedom variables/indices (*HFFREEDOM*) initially

considered were obtained from The Heritage Foundation (2013); data for the real per

capita income variable (*RPCY*) were obtained from the International Monetary Fund

(2013); data for the variables *TAXREVGDP, UR, BUDDEF,* and *RLONGINTR* (the latter

more specifically being the percentage nominal average annual long term interest rate

yield minus the percentage annual inflation rate) were obtained from the OECD (2013);

and data for the governance indices for regulatory quality (*REGQUAL*) and political

stability (*POLSTAB*) were obtained from the World Bank Institute (2012). Finally, *TR* is

a linear trend variable. Descriptive statistics for each of the non-trend variables in the

analysis are provided in Table 1.[12] As observed earlier in this study, the explanatory

variables are lagged so as to avoid simultaneity issues.

Equation (4), expressed in linear form, was estimated by PLS (panel least

squares), first using the random effects model and then using the fixed effects model. For

---

[11] *HFFREEDOM* is adopted as the symbol for the *overall average level of economic freedom* based on The Heritage Foundation (2013) indices. As observed in footnote 5, in subsequent estimations found in the Appendix of this study, an alternative measure of economic freedom based on Gwartney, Lawson, and Hall (2012), *GLHECONFREE*, is substituted for *HFFREEDOM*.

[12] A complete dataset for Iceland was unavailable, so that only 29 of the 30 member OECD nations over the study period could be studied over the 2003-2007 period.

this linear specification, a Hausman specification test (Hausman, 1978) was performed, and it generated an *F*-statistic with a $p = .0436$, so that the study adopted the fixed effects model. Similarly, all of the equation specifications estimated in this study were estimated by PLS (panel least squares), first using the random effects model and then using the fixed effects model. In each linear specification, a Hausman specification test (Hausman, 1978) was performed, and it generated an *F*-statistic with a $p < 0.05$, so that the study adopted the fixed effects model for all the model specifications provided in this study.

Equation (4) is estimated adopting the White (1980) cross-section heteroskedasticity correction.[13] These results are provided in column (a) of Table 2, where all seven of the estimated coefficients for the non-trend explanatory variables exhibit the expected signs. Of these seven coefficients, four are statistically significant at the 1% level, and one is statistically significant at beyond the 5% level, i.e. at the 3% level. The coefficients on the budget deficit and unemployment variables fail to be statistically significant at the 10% level. Thus, as hypothesized, these fixed effects results reveal that the per capita real income level among OECD nations during the study period is an increasing function of economic freedom, regulatory quality, and political stability and a decreasing function of the tax burden (as a percent of GDP), as well as the *ex post* real long term interest rate. These results, as they pertain to economic freedom, quality regulation, and the tax burden, provide strong initial support for the three central hypotheses being investigated in this study. More specifically, a one unit increase in The Heritage Foundation overall economic freedom index would *elevate* per capita real income by $510, *ceteris paribus*. Therefore, a rise in this Heritage Foundation (2013)

---

[13] *All* of the estimations in this study adopt the White (1980) cross-section heteroskedasticity correction.

measure of economic freedom index of 10 units would be expected to elevate per capita real income by approximately $5,103, *ceteris paribus*. In addition, a rise in the *REGQUAL* index of one unit would raise per capita real income by $621, *ceteris* paribus, whereas a rise of 1% in the percentage ratio of taxes to GDP would reduce per capita real income by $369, *ceteris paribus*.

Meanwhile, the coefficient of determination values (the R^2 and the adjusted R^2) imply that the model explains nearly three-fifths of the variation in the dependent variable, per capita real income (GDP). In addition, the *F*-ratio is statistically significant at the 1% level, attesting to the overall strength of the model. The interested reader is referred to the correlation matrix in Table 3, where the absence of a multi-collinearity problem in the model is revealed.

In order to test the consistency and robustness of these results, several additional model specifications are estimated below. Refer now to column (b) of Table 2, where the specification deletes the statistically insignificant [in column (a)] budget deficit variable, *BUDDEF*. This estimation is a *de facto* robustness test, albeit a modest one, of the central findings shown in column (a) of Table 2. In the fixed effects results shown in column (b) of Table 2, all six of the estimated non-trend coefficients exhibit the expected signs; furthermore, four are statistically significant at the 1% level, and one is statistically significant at the 3% level. Only the coefficient on the unemployment rate variable fails to be statistically significant at the 10% level. In addition, the R^2 value and adjusted R^2 value imply that the explanatory variables in the model explain in excess of half of the variation in the variable *RPCY*. Finally, the *F*-statistic is statistically significant at beyond the 1% level. These results imply that the per capita real income level among OECD

nations during the 2003-2007 study period was 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) and the *ex post* real long term interest rate. In this estimate, a one unit increase in the modified overall economic freedom index would appear to *elevate* per capita real income by $337. Other results of interest in column (b) would be that a rise in the *REGQUAL* index of one unit would raise per capita real income by $628 [a result very similar in magnitude to that in column (a)], while a rise of 1% in the percentage ratio of taxes to GDP would reduce per capita real income by $452. These three results parallel those provided in column (a), thereby lending further support for the three basic hypotheses being tested in this study, although the results are not of the same magnitude.

In column (c) of Table 2, another specification is estimated, this model being one that excludes both of the previously statistically insignificant (in this study) variables, namely, *BUDDEF* and *UR*. In this estimation, all five of the explanatory variables exhibit the hypothesized signs and are statistically significant at the 1% level. Thus, this estimate implies that per capita real GDP in OECD nations over the 2003-2007 study period was an increasing function of economic freedom (as reconfigured in the present study), regulatory quality, and political stability, while being a decreasing function of the tax burden (as a percent of GDP) and the real long term interest rate. Hence, the model estimated in column (c) of Table 2 reaffirms the empirical support for the three hypotheses under examination in this study.

To further seek insight into the roles of economic freedom, the burden of taxation, and regulatory quality on per capita real GDP, the estimate in column (d) of Table 2

estimates a model that further deletes the last of the economic variables considered here, i.e., the long term rate of interest. In this fixed effects estimate, all four of the estimated coefficients exhibit the expected signs and are statistically significant at the 1% level. Thus, the per capita real GDP in OECD nations is an increasing function of political stability, as consistently shown in columns (a) through (c) of Table 2. More relevant is the fact that, once again, support for our three basic hypotheses is obtained: real per capita GDP in OECD nations over the 2003-2007 study period is shown to be an increasing function of economic freedom and quality regulation and a decreasing function of the tax burden.

Finally, in column (e), results are provided for the estimation of another model, one that discards all of the variables except those for economic freedom, regulatory quality, and the tax burden. Note that in this estimate, there still is strong empirical support for the three hypotheses of interest here. Thus, based on this estimate, per capita real income is an increasing function of economic freedom (at the 5% statistical significance level) and regulatory quality (at the 1% statistical significance level) and a decreasing function (at the 1% statistical significance level). However, it is noteworthy that the *F*-statistic, while still statistically significant at the 1% level, is nonetheless of far lesser magnitude than in all four of the other model estimations in Table 2. Furthermore, the coefficients of determination (R^2 and adjusted R^2) are only 0.18 and 0.14, respectively, also modest fractions of their counterparts in the previous four model estimations. Hence, whereas this model is theoretically potentially useful insofar as it affirms the previous four sets of results for economic freedom, quality regulation, and the tax burden, it is realistically manifesting omitted variable bias.

Put somewhat differently, the results in columns (a) through (d) clearly represent

models with greater dependability than the model expressed in column (e). Indeed, it is

suggested here that the results shown in columns (a), (b), (c), and (d) all provide sound

and useful insights into the three issues at the heart of this study. That said, the next

section of this study provides a test of the robustness of the results in Table 2 regarding

the impacts of economic freedom, *regulatory quality, and the burden of taxes.*

IV.   ROBUSTNESS TESTING: OECD NATIONS EXCLUSIVE OF G8
        NATIONS

In section of the study, we seek to provide a stronger robustness test of the basic

model than simply the estimation of sequentially different models, as shown in columns

(a) through (e) of Table 2. In particular, the models estimated in this section of the study

differ in an important way from those estimated in the previous section by omitting all of

the G8 nations from the estimations. Thus, to the extent that per capita real GDP in G8

nations *may* have been significantly influenced (or *disproportionately* influenced) by

economic freedom, regulatory quality, and the tax burden and therefore *biased* the

results shown in the various model estimates summarized in Table 2 , the new estimates

provided in this section of the study test the basic hypotheses being studied while

controlling for said (potential) bias/biases by estimating the very same models but only

for non-G8 member nations of the OECD over the 2003-2007 study period.

Accordingly, equation (4) was estimated by fixed effects, adopting the White

(1980) cross-section heteroskedasticity correction, for the non-G8 OECD nations for the

2003-2007 study period. These results are provided in column (a) of Table 4. As shown,

all seven of the estimated coefficients exhibit the expected signs, with two statistically

significant at the 1% level, one statistically significant at the 2.5% level, and one

statistically significant at the 5% level. Thus, after deleting the G8 nations from the

OECD membership study sample, per capita real GDP is found to be an increasing

function of economic freedom (5% statistical significance level), regulatory quality (2.5%

statistical significance level), and political stability (1% statistical significance level),

while being a decreasing function of the tax burden as a percent of GDP (1% statistical

significance level; moreover, it is again noteworthy that multi-collinearity was not a

problem. In terms of the three central hypotheses of interest in this study, as shown in this

estimate, a one unit increase in The Heritage Foundation overall economic freedom index

would *elevate* per capita real income by $399, *ceteris paribus*. Therefore, a rise in this

Heritage Foundation (2013) measure of economic freedom index of 10 units would be

expected to elevate per capita real income by approximately $3,991, *ceteris paribus*. In

addition, a rise in the *REGQUAL* index of one unit would raise per capita real income by

$937, *ceteris paribus*, whereas a rise of 1% in the percentage ratio of taxes to GDP would

reduce per capita real income by $748, *ceteris paribus*. Thus, this test of robustness

reveals that there is indeed strong evidence supporting the three basic hypotheses upon

which this study has focused, even when considering only non-G8 OECD member

nations.

The models estimated for Table 4 parallel those in Table 2 except insofar as those

in Table 2 relate to *all* OECD members (except Iceland, due to data unavailability issues)

whereas the models in Table 4 exclude all of the G8 OECD members (as well as Iceland).

Examination of columns (b) through (d) of Table 4 reveals a distinct pattern, namely, in

all three estimates, it is found that: the estimated coefficients on the economic freedom

variable are positive and statistically significant at the 1% level; those on the regulatory

quality variable are positive and statistically significant at the 1% level; those on the tax

burden variable are negative and statistically significant at the 1% level; and, finally, the

estimated coefficients on the political stability variables are positive and statistically

significant at the 1% level. Moreover, for all four of these variables, the magnitude on the

coefficients is remarkably stable. Lastly, the results in column (e) of Table 4 also exhibit

the expected signs and are statistically significant at the 5% level for economic freedom

and at the 1% level for regulatory quality and the tax burden. Arguably, then, among

other things, it can be inferred that the results in Table 4 for the non-G8 nations offer

further strong empirical support for our three basic hypotheses of interest in this study. In

other words, there is affirmation of the robustness of the results in Table 2 that economic

growth is an increasing function of economic freedom and regulatory quality and a

decreasing function of the tax burden.[14]

V.   SUMMARY AND PERSPECTIVE

This preliminary study of the impacts of economic freedom, regulatory quality, and the

relative burden of taxation on the *level* of per capita real income/GDP among OECD

nations over the 2003-2007 period adopts a modified version of the *overall* economic

freedom index computed by The Heritage Foundation (2013), one with the fiscal freedom

and business freedom indices removed. This study then provides PLS fixed effects

estimates for five linear specifications/models. Each nation during this time frame can be

regarded either as a nation *per se* or as a *de facto* "economic region" within the OECD.

The analysis first focuses upon all of the OECD nations and then, as a robustness test,

subsequently focuses only on non-G8 OECD member nations. The estimations in this

---

[14] Interestingly, the mean per capita real GDP for the OECD nations without the G-nations is 19,738 and the mean is 15,930.

study all provide strong empirical support for the three central hypotheses proffered here, namely: (1) the higher the overall degree of economic freedom; the higher the per capita real income (GDP) *level*; (2) the higher the level of regulatory quality, the higher the *level* of per capita real income (GDP); and (3) the higher the overall tax burden, expressed as a percent of GDP, the lower the *level* of per capita real income (GDP). For the interested reader, a further reality check, i.e., another robustness test (albeit rudimentary), one that adopts fixed-effects estimations involving a different economic freedom dataset, namely, the overall economic freedom index by Gwartney, Lawson, and Hall (2012), is provided in the Appendix. The findings from those additional estimations also yield support for these three basic hypotheses.

Naturally, these conclusions are at least somewhat preliminary. Alternative model specifications involving additional or different explanatory variables could yield useful insights. In addition, future related research also could undertake the adoption/study of alternative datasets and/or alternative study periods. Thus, although these results appear to suggest a strong relationship between the level of per capita real income (GDP) on the one hand and economic freedom, regulatory quality, and the overall tax burden on the other hand, this topic requires further scrutiny and formal investigation.

REFERENCES

Abrams, Burton A., and Mark D. Schmitz (1978). The "Crowding Out" Effect of Government Transfers on Private Charitable Contributions. *Public Choice* 33 (1): 29-39.

Afonso, Antonio, and Joao Tovar Jalles (2014). Fiscal Composition and Long term Growth. *Applied Economics* 46 (3): 349-358.

Ali, Abdiweli M. (1997). Economic Freedom, Democracy and Growth. *Journal of Private Enterprise* 13 (1): 1-20.

Ali, Abdiweli M., and W. Mark Crain (2001). Political Regimes, Economic Freedom, Institutions and Growth. *Journal of Public Finance and Public Choice* 19 (1): 3-22.

Ali, Abdiweli M., and W. Mark Crain (2002). Institutional Distortions, Economic Freedom and Growth. *Cato Journal* 21 (3): 415-426.

Allison, John A. (2013). *The Financial Crisis and the Free Market Cure*. New York: McGraw-Hill.

Ashby, Nathan J., Avilio Bueno, and Deborah Martinez (2013). Economic Freedom and Economic Development in the Mexican States. *Journal of Regional Analysis and Policy* 43 (1): 21-33.

Beach, William W., and Timothy Kane (2007) *Methodology: Measuring the 10 economic freedoms*, Index of Economic Freedom, Heritage Foundation. Retrieved March 5, 2009 http://www.heritagefoundation.org.

Belasen, Ariel R., and R.W. Hafer (2013). Do Changes in Economic Freedom Affect Well Being? *Journal of Regional Analysis and Policy* 43 (1): 56-64.

Carlson, Keith M., and Roger W. Spencer (1975). Crowding Out and Its Critics. *Federal Reserve Bank of St. Louis Review* 60 (12): 1-19.

Cebula, Richard J. (1978). An Empirical Analysis of the Crowding Out of Fiscal Policy in the United States and Canada. *Kyklos* 31 (3): 424-436.

Cebula, R.J. (1997). An Empirical Analysis of the Impact of Government Tax and Auditing Policies on the Size of the Underground Economy: The Case of the United States, 1973-1994. *The American Journal of Economics and Sociology,* 56 (2): 173-186.

Cebula, Richard J. (2011). Economic Growth, Ten Forms of Economic Freedom, and Economic Stability. *The Journal of Private Enterprise* 26 (2): 61-81.

Cebula, Richard J. (2010). Impact of Trade Freedom on Per Capita Real GDP Growth among OECD Nations: Recent Panel Data Evidence. *Applied Economics Letters* 17 (16-18): 1687-1690.

Cebula, R.J., and Gigi M. Alexander (2006). "Determinants of Net Interstate Migration, 2000-2004," *Journal of Regional Analysis and Policy*, 27 (2): 116-23.

Cebula, Richard J., Clark, J.R., and Mixon, Franklin G. (2013). The Impact of Economic Freedom on Per Capita Real GDP: A Study of OECD Nations," *Journal of Regional Analysis and Policy*, 34(1): 34-41.

Cecchetti, Stephen G. (2006). *Money, Banking, and Financial Markets*. New York: McGraw-Hill.

Clark, J.R., Peter J. Boettke, and Edward Stringham (2008). Are Regulations the Answer for Emerging Stock Markets? Evidence from the Czech Republic and Poland. *Quarterly Review of Economics and Finance* 48 (3): 541-566.

Clark, J.R., and Robert A. Lawson (2008). The Impact of Economic Growth, Tax Policy, and Economic Freedom on Income Inequality. *Journal of Private Enterprise* 24 (1): 23-31.

Cole, Julio H. (2003). The Contribution of Economic Freedom to World Economic Growth, 1980-99. *Cato Journal* 23 (2): 189-198.

Damette, O., and V. Fromentin (2013). Migration and Labour Markets in OECD Countries: A Panel Cointegration Approach. *Applied Economics* 45 (16): 2295-2304.

Dawson, John W. (1998). Institutions, Investment, and Growth: New Cross-Country and Panel Data Evidence. *Economic Inquiry* 36 (4): 603-619.

Dawson, John W. (2003). Causality in the Freedom-Growth Relationship. *European Journal of Political Economy* 19 (3): 479-495.

De Haan, Jakob and Jan-Egbert Sturm (2000). On the Relationship between Economic Freedom and Economic Growth. *European Journal of Political Economy* 16 (2): 215-241.

Farr, W. Ken, Richard A. Lord, and J. Larry Wolfenbarger, (1998). Economic Freedom, Political Freedom, and Economic Well-Being: A Causality Analysis. *Cato Journal* 18: 247–262.

Goel, Rajeev K., and Michael A. Nelson (2014). Whistleblower Laws and Exposed Corruption in the United States. *Applied Economics* 46 (20): 2331-2341.

Goldsmith, Arthur A. (1995). Democracy, Property Rights and Economic Growth. *The Journal of Development Studies* 32 (2): 157-174.

Grubel, Herbert G. (1997). Economic Freedom and Human Welfare: Some Empirical Findings. *Cato Journal* 18 (2): 287-304.

Gwartney, James D., Randall G. Holcombe, and Robert A. Lawson (2006). Institutions and the Impact of Investment on Growth. *Kyklos* 59 (2): 255-276.

Gwartney, James, Robert Lawson, and Joshua Hall (2012). Economic Freedom of the World: 2012 Report. http://www.freetheworld.com/datasets_efw.html.

Gwartney, James, Robert Lawson, and Randall Holcombe (1999). Economic Freedom and the Environment for Economic Growth. *Journal of Institutional and Theoretical Economics* 155, 643–663.

Hausman, J.A. (1978). Specification Tests in Econometrics. *Econometrica* 46 (6): 1273-1291.

Heckelman, Jac C. (2000). Economic Freedom and Economic Growth: A Short-Run Causal Relationship. *Journal of Applied Economics* 3 (1): 71-91.

Heckelman, Jac C., and Michael D. Stroup (2000). Which Economic Freedoms Contribute to Economic Growth? *Kyklos* 53 (4): 527-544.

Heritage Foundation (2013). Economic Freedom Indices: Explore the Data. http://www.heritage.org/Index/Explore.aspx.

International Monetary Fund (2013). Data and Statistics. http://www.imf.org/external.

Islam, Sadequl (1996). Economic Freedom, Per Capita Income, and Economic Growth. *Applied Economics Letters* 3 (10): 595-597.

Liu, Haoming, and Yohanes E. Riyanto (2009). Ownership of Property Rights and the Allocation of Talents. *Applied Economics* 41: 3425-3436.

Mathers, Rachel L. and Claudia Williamson (2011). Cultural Context: Explaining the Productivity of Capitalism. *Kyklos* 64 (2): 231-252.

Mishkin, Frederic S. (2013). *The Economics of Money, Banking, and Financial Markets*. New York: Pearson.

Mulholland, Sean E., and Rey Hernandez-Julian (2013). Does Economic freedom Lead to Selective Migration by Education? *Journal of Regional Analysis and Policy* 43 (1): 65-87.

Nissan, Edward, and Farhang Niroomand (2008). Linking Labor Productivity to Economic Freedom. *The American Economist* 52 (2): 42-53.

Nissan, Edward, and Farhang Niroomand (2010). Distribution of Income and Expenditures across Nations. *Journal of Economics and Finance* 34 (2): 173-186.

Norton, Seth W. (1998). Poverty, Property Rights, and Human Well-Being: A Cross-National Study. *Cato Journal* 18 (2): 233-246.

OECD (Organization for Economic Co-operation and Development) (2013). OECD Economic Surveys: Statistics from A to Z. http://www.oecd.org/statistics/.

Parjiono, A.B.M., Rabiul Alam Beg, and Richard Monypenny (2013). *Applied Economic* 45 (17): 2389-2400.

Powell, Benjamin (2003). Economic Freedom and Growth: The Case of the Celtic Tiger. *Cato Journal* 22: 431–448.

Saltz, Ira S. (1998). State Income Tax Policy and Geographic Labor Force Mobility in the United States. *Applied Economics Letters* 5 (10): 599-601.

Taylor, Mark P. (1999). Real Interest Rates and Macroeconomic Activity. *Oxford Review of Economic Policy* 15 (2): 95-113.

Tortensson, Johan (1994). Property Rights and Economic Growth: An Empirical Study. *Kyklos* 47 (2): 231-247.

Ugur, Mehmet (2009). Regulatory Quality and Performance in EU Network Industries: Evidence on Telecommunications, Gas and Electricity. *Journal of Public Policy* 29 (3): 347-370.

Upadhyaya, Kamal P., Jeannie E. Raymond, and Franklin Mixon, Jr. (1997). The Economic Theory of Regulation Versus Alternative Theories for the Electric Utilities Industry: A Simultaneous Probit Model. *Resource and Energy Economics* 19 (2): 191-202.

White, Halbert (1980). A Heteroskedasticity-Consistent Covariance Matrix and a Direct Test for Heteroskedasticity. *Econometrica* 48 (4): 817-38.

Wiseman, Travis, and Andrew T. Young (2011). Economic Freedom, Entrepreneurship, and Income Levels: Some U.S. State-Level Empirics. http://dx.doi.org/10.2139/ssrn.1817846 .

World Bank Institute. (2012). Governance Indicators. http://www.govindicators.org/ .

Yandle, Bruce (2013). *The Economic Situation*. Clemson, SC: Clemson University.

APPENDIX

This Appendix provides an additional set of estimates to test the robustness of the findings in the main text of this study. These estimates substitute the Gwartney, Lawson, and Hall (2012) measure of overall economic freedom, *GLHECFREEDOM*, for the modified version of the overall economic freedom index from The Heritage Foundation (2013) adopted in this study, *HFFREEDOM*, in equation (4), and then provide fixed effects estimates of the equation, first for all of the OECD nations (except Iceland) and then for only the non-G8 OECD nations (except Iceland). These estimation results are found in columns (a) and (b) of Table 5. As shown in both of these estimates, there is strong additional support for the three hypotheses focused upon in this study. Namely, in both of these estimates, for the 2003-2007 study period, the level of per capita real GDP is an increasing function of economic freedom and regulatory quality and a decreasing function of the ratio of taxes to the GDP level.

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation
RPCY (OECD)	27,101	12,013
HFFREEDOM	69.992	8.192
REGQUAL	1.296	0.438
TAXREVGDP	36.01	7.202
POLSTAB	0.771	0.53
UR	6.702	3.288
RLONGINTR	3.544	2.293
BUDDEF	4.85	6.56

Table 2. Linear Estimates (Fixed Effects)
Dependent Variable: *RPCY* for <u>All</u> OECD NATIONS
Economic Freedom Measure: <u>Heritage Foundation</u>

Explanatory Variables	(a)	(b)	(c)	(d)	(e)
HFFREEDOM	510.34***	333.05***	358.7***	3017.5***	224.2*
	(3.27)	(3.02)	(3.23)	(2.67)	(1.99)
REGQUAL	621.73*	628.19*	804.88***	854.09***	1,093.21***
	(2.24)	(2.20)	(3.37)	(3.33)	(4.38)
TAXREVGDP	-369.2***	-452.66***	-511.93***	-475.91***	-766.55***
	(-2.63)	(-3.43)	(-3.47)	(-3.07)	(-3.73)
POLSTAB	999.97***	930.70***	904.33***	1,227.2***	
	(4.12)	(3.75)	(3.88)	(6.38)	
UR	-359.6	-406.6			
	(-1.03)	(-1.18)			
RLONGINTR	-1,739***	-1,685***	-1,701***		
	(-3.12)	(-3.02)	(-3.07)		
BUDDEF	-270.54				
	(-1.22)				
TR	-1,953#	-1,531	-1,768#	-1,025	-961
	(-1.79)	(-1.47)	(-1.74)	(-0.90)	(-0.70)
Constant	-866.5	725.1	402.2	-742.0	-2,738.2#
	(-0.62)	(0.67)	(0.39)	(-0.70)	(1.95)
R^2	0.57	0.54	0.53	0.46	0.18
adjR^2	0.52	0.50	0.50	0.43	0.14
F	11.70***	13.20***	15.08***	13.82***	4.41***

***statistically significant at 1% level; **statistically significant at 2.5% level;
*statistically significant at 5% level; #statistically significant at 10% level.

Table 3. Correlation Matrix

	HFFREEDOM	REGQUAL	TAXREVGDP	POLSTAB	UR	RLONGINTR	BUDDEF
HFFREEDOM	1.000						
REGQUAL	-0.109	1.000					
TAXREVGDP	-0.140	0.416	1.000				
POLSTAB	-0.179	0.003	-0.247	1.000			
UR	-0.185	-0.353	-0.063	0.033	1.000		
RLONGINTR	0.180	-0.109	-0.001	-0.473	-0.023	1.000	
BUDDEF	-0.298	-0.237	-0.047	0.086	0.318	0.017	1.000

Table 4. Alternative Estimates (Fixed Effects)
Dependent Variable: *RPCY* for OECD Nation, <u>G8 Nations Omitted</u>
Economic Freedom Measure: <u>Heritage Foundation</u>

Explanatory Variables	(a)	(b)	(c)	(d)	(e)
HFFREEDOM	399.05*	532.01***	519.66***	541.4***	437.3*
	(2.00)	(3.61)	(3.74)	(3.85)	(2.20)
REGQUAL	936.53**	1,004.7***	904.0***	883.1***	1,182.3***
	(2.36)	(2.65)	(2.77)	(2.75)	(2.92)
TAXREVGDP	-748.4***	-674.5***	-640.7***	-656.0***	-1.019.6***
	(-3.40)	(-3.06)	(-2.90)	(-2.99)	(-3.87)
POLSTAB	1,584.9***	1,657.5***	1,672.5***	1,535.3***	
	(5.32)	(5.51)	(5.87)	(6.19)	
UR	-246.8	231.7			
	(-0.54)	(0.53)			
RLONGINTR	-789.1	713.7	723.03		
	(-1.14)	(1.10)	(1.11)		
BUDDEF	-180.13				
	(-0.63)				
TR	-144.4	-261.8	-116.2	-440.1	-361.4
	(-0.08)	(-0.16)	(-0.07)	(-0.27)	(-0.19)
Constant	-2,500.0	-3,862.6**	3,678.6**	-3,192.3**	1,161.6
	(-1.30)	(-2.47)	(-2.49)	(-2.33)	(0.62)
R^2	0.43	0.42	0.42	0.42	0.18
adjR^2	0.36	0.37	0.38	0.38	0.14
F	6.61***	8.21***	9.65***	11.40***	4.40***

***statistically significant at 1% level; **statistically significant at 2.5% level;
*statistically significant at 5% level.

Table 5. Additional Estimates (Fixed Effects)
Dependent Variable: *RPCY*
Economic Freedom Measure: <u>Gwartney-Lawson-Hall</u>

Explanatory Variables	All G8 Nations (a)	All OECD Nations, G8 Nations Omitted (b)
GLHECONFREE	682.0** (2.34)	1.259.8*** (3.32)
REGQUAL	785.08*** (3.06)	1,076.7*** (2.70)
TAXREVGDP	-384.1** (-2.47)	-1.399*** (-5.69)
POLSTAB	411.18# (1.66)	-1,652 (-0.44)
UR	-133.6*** (-4.60)	58.75 (0.16)
RLONGINTR	-1,355.6*** (-5.37)	-1,787*** (-11.70)
BUDDEF	-159.13 (-0.63)	-393.24** (-2.43)
TR	-485.3 (-0.27)	-1,460 (-0.64)
Constant	-7,786 (-0.35)	-9,801 (-0.33)
R^2	0.71	0.71
adjR^2	0.66	0.66
F	13.91***	13.99***

***statistically significant at 1% level; **statistically significant at 2.5% level; *statistically significant at 5% level; #statistically significant at 10% level.