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Improving the measurement of economic freedom by replacing government size with government effectiveness

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Abstract

The Fraser Institute's Economic Freedom of the World index and the Heritage Foundation's Index of Economic Freedom allow researchers to empirically test the hypothesis that greater economic freedom leads to higher economic growth. Government size is a component of both indices. A larger government size reduces a country's economic freedom score while a smaller government size increases a country's score. This study challenges the practice of treating government size as a factor that is inversely proportional to economic freedom.

The study finds (1) the economic freedom indices better estimate GDP per capita if the government size component is removed, (2) government size is the only index component that, when excluded, materially improves the predictive power of the indices to estimate GDP per capita, and (3) modifying the published indices to replace government size (as a negative indicator) with government effectiveness (as a positive indicator) produces indices that are better estimators of economic growth.

The author argues that a larger government size cannot itself be considered a curtailment of freedom without consideration of how tax revenues are spent, which is partially captured in the *government effectiveness* measure.

JEL classification: H11, H5, O43, O57, P51

Keywords: Economic freedom, Index, Indices, Government size, Government effectiveness

1. Introduction

This study tests the hypothesis that the two major economic freedom indices improve as estimators of economic growth when the *government size* index component is replaced by a *government effectiveness* component. GDP per capita is estimated using The Fraser Institute's Economic Freedom of the World index (EFW) and the Heritage Foundation's Index of Economic Freedom (HEF) index as the predictor variables. The study's hypothesis is tested by comparing three sets of growth models, using the indices: (1) as published, (2) modified to exclude the *government size* component, and (3) modified to replace the *government size* component with a *government effectiveness* component.

This article contains five sections, beginning with this introduction. The second section presents the background of the measurement of economic freedom and the

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study's theory. The third section describes the study's data and methods. The fourth section discusses the regression model results. The final section is the conclusion, which summarizes the study's findings and provides ideas for further research.

2. Background and theory

This section has three parts. Part One provides a historical background of the measurement of economic freedom and the study's research question and hypotheses. Part Two introduces the central theory of the study. Part Three includes a review of the literature relevant to the measurement of economic freedom, identifying the gap that this study addresses.

Defining the problem

How can the measurement of economic freedom be improved?

2.2. Historical background

The problem this study addresses has its roots in the age-old dilemma of the proper role of government in the economy. Smith (1776), Friedman (1962), and others argue that states with free market economic models tend to grow faster than states in which governments retain substantial control over the economy. The foundational theories linking free market economic policy to higher growth rates rely on observation, economic and social theory, and logical reasoning. To empirically test whether economic freedom leads to higher growth, economic freedom must be defined and then measured. Before the advent of economic freedom measures currently in use, it was difficult to empirically test theories about the effect of economic freedom on economic growth.

Defining economic freedom

The core of economic freedom is the ability to choose without interference. Therefore, economic freedom is predicated on two elements: (1) *freedom to choose*: having few restrictions on one's economic decision making, and (2) *opportunities from which to choose*: having more than one possibility from which to choose. Regarding freedom to

choose, Gwartney, et al. (2020) state that "economically free individuals will be permitted to decide for themselves rather than having options imposed on them by the political process or the use of violence, theft, or fraud by others." This definition can be supplemented with Sen's (2001) conception of the "opportunity" aspect of economic freedom: "the extent to which people have the opportunity to achieve outcomes that they value and have reason to value."

Smith (1776) hypothesized that a society that grants more economic freedom will allocate its resources more efficiently and achieve more rapid economic growth. Empirical testing of Smith's hypothesis became possible in the mid-1990s when the EFW and HEF economic freedom measures were created.

When Mont Pèlerin Society members Hayek, Friedman, Becker, Stigler, and others first endeavored to measure economic freedom, they did **not** do so to study economic freedom as a solitary phenomenon. They sought to gather empirical data to back their arguments in favor of more economic freedom with the aim of influencing policy to promote greater prosperity. Therefore, how effectively a measure of economic freedom estimates economic growth is paramount. Referring to economic freedom scores, Greenspan (2007) states:

"The ultimate test of the usefulness of such a scoring process is whether it correlates with economic performance. And it does. The correlation coefficient of 157 countries between their 'Economic Freedom Score' and the log of their per capita incomes is 0.65, impressive for such a motley body of data."

Easton and Walker (1997), Scully (2002), Berggren (2003), and others demonstrate how economic freedom estimates economic growth. Indeed, if an economic freedom measure is not linked to a concrete measure of economic well-being, then how useful is it?

This study addresses a weakness in EFW's and HEF's measurement of economic freedom that, if corrected, would make both indices more effective estimators of economic growth. This weakness is caused by the assumption shared by both indices that a country's *government size* has an inverse relationship with the country's level of economic freedom. This study argues that such an assumption is not valid and demonstrates that replacing the *government size* component with a *government effectiveness* component improves the efficacy of the indices in estimating economic growth.

2.3. Hypotheses

Research Question

Are measures of economic freedom better estimators of growth if *government size* is replaced by *government effectiveness*?

Hypothesis

The two major economic freedom indices are more effective estimators of economic growth if *government size* is replaced by *government effectiveness*.

2.4. The study's central theory

Economic freedom indices measure how much or how little countries interfere with their inhabitants' free market behavior. The indices fully account for the *freedom to choose* aspect of economic freedom; in other words, the relative lack of interference. However, the indices do not adequately capture the *opportunity* aspect of economic freedom—having more than one possibility from which to choose. The indices treat government size as inversely proportional to economic freedom, some government size is needed to increase the second element of economic freedom: the number of options from which an individual may choose.

The indices' treatment of *government size* decreases the effectiveness of the indices as estimators of economic growth for three reasons. First, it underestimates the role that governments play in enhancing economic freedom by providing economic alternatives to disadvantaged members of society. Second, it ignores the role of governments in creating and maintaining the institutions that allow free markets to operate properly. Third, it equates government spending with government interference, which is not a valid assumption.

Reason #1: Government spending can help provide more economic freedom to less advantaged segments of the population.

Having a hands-off government does not always correlate with higher degrees of economic freedom with respect to its second element—alternatives from which to

choose—for disadvantaged members of a society. To have economic freedom, people need to have alternatives from which to choose. When the free market does not provide adequate economic alternatives for a segment of the population, the government can step in programs to provide alternatives - as Sen (2001) would put it, to help people develop the capability to help themselves.

Reason #2: Government spending is needed to create and maintain the institutions required for free markets to operate.

A government cannot adopt a *laissez-faire* approach to economic markets until it has established basic regulations and a reliable system of property rights protections. Government institutions are required to ensure that economic freedom is granted as inclusively as possible and not to just a select few. A *laissez-faire* approach might succeed after government institutions, such as the Federal Trade Commission in the U.S., are in place to protect the free market and to prohibit the development of monopoly powers that eventually distort free market dynamics and reduce overall economic freedom. Government spending is thus required to establish and maintain the institutions that make free markets a possibility. As economic activity becomes more complex, the government infrastructure and regulations must keep pace. For example, the U.S. Patent Office has needed to hire more patent inspectors to keep pace with patent applications.

"With the power to tax, the state is then able to provide public goods required for the security and enforcement of property rights and contracts, safeguarding them from private predation, thereby creating the institutional conditions required for economic development" (Boettke and Candela, 2020). Free markets and liberal democracies are fragile institutions that require constant vigilence to avoid being overrun by human desire for power and advantage. A country may benefit from a relatively *laissez faire* government only when order has been established and maintained – this costs money. Tax revenues are required to enforce constraints on the nasty, brutish behavior (Hobbes, 1651) of an anarchy-prone populace (see modern day Yemen and the Congo).

Reason #3: Government spending is not the equivalent of government interference

Government spending is not, by definition, a curtailment of economic freedom. To properly assess the effect that government spending has on economic freedom, *the way* taxes are collected and spent has to be considered.

In *The Constitution of Liberty*, Hayek states the following:

> "**[I]t is the character rather than the volume of government activity that is important**. A functioning market economy presupposes certain activities on the part of the state; there are some other such activities by which its functioning will be assisted; and it can tolerate many more, provided that they are of the kind which, are compatible with a functioning market. But there are those which run counter to the very principle on which a free system rests and which must therefore be altogether excluded if such a system is to work. **In consequence, a government that is comparatively inactive but does the wrong things may do much more to cripple the forces of a market economy than one that is more concerned with economic affairs but confines itself to actions which assist the spontaneous forces of the economy**" (emphasis added; Hayek, 1960).

The manner in which North Korea collects and spends tax revenues may be viewed as a curtailment of its citizens' economic freedom. However, democratically-approved tax collections in New Zealand and Switzerland cannot be considered a *per se* curtailment of economic freedom. Typical inhabitants of advanced liberal democracies expect their government to collect taxes to fund social programs intended to improve the well-being of the most disadvantaged in their society and to step in when a fellow inhabitant is on the border of human tragedy. When measuring economic freedom, *how* governments reallocate resources is more important than *how much* the governments collect. Countries like Denmark and Finland spend tax revenues in a way that enhances economic freedom by creating economic opportunities for a wider swath of their populations. La Porta et al. (1999) found that "some bureaucracies deliver a given bundle of interventions more efficiently than others" and larger governments tend to be better performing. This finding is in direct contradiction with the Economic Freedom index pubilshers' current treatment of *government size*.

The Government Effectiveness Index is one of six World Governance Indicators (WGI) published by the World Bank. The Government Effectiveness Index will be defined in more detail in the Data and Methodology section. In simple terms, the index measures how well or poorly a government spends tax revenues. Inserting the

Government Effectiveness Index into the economic freedom indices as a component in place of the *government size* component would allow the economic freedom indices to address La Porta et al.'s finding that not all governments use tax revenues for the public benefit in the same manner. This will better account for countries like those found in Western Europe and the Nordic Region that have high marginal tax rates and a large *government size*, yet are highly efficient at providing a high level of economic freedom to their inhabitants.

Gap in the literature

Hanke and Walters (1997) find that the country rankings of EFW and HEF are highly correlated. De Haan and Sturm (2000) and de Haan (2003) conclude that the two indices are similar. De Haan and Sturm (2000) question the inclusion of government spending in an economic freedom index because government spending is required to maintain legal infrastructure and to provide public goods such as national defense. Ram (2014) finds that EFW and HEF assign widely different economic freedom score for the same countries, but does not identify the major drivers of the same-country score differences.

Ott (2018) identifies *government size* as the most problematic component of the EFW and HEF indices and recommends its exclusion from the indices. Ott (2018) argues that excluding *government size* from the indices leads to better convergent validity. Convergent validity refers to the consistency of measurements generated by different indicators. In Fahrenheit or Celsius, Finland is a colder country than Qatar. Not so with economic freedom. Table 1 displays a sample of ten countries where EFW and HEF give different economic freedom readings for the same country.

Ott (2018) finds that excluding *government size* from the indices leads to a higher correlation with alternative types of freedom and happiness. Ott's study assesses the effectiveness with which the indices estimate happiness, but not economic growth.

EFW and HEF assign a lower economic freedom score for larger government sizes, however La Porta et al. (1999) find that larger governments tend to be the better performing ones, suggesting that "higher tax rates may go hand in hand with better institutions." No study has yet shown that EFW and HEF better estimate growth if

government size is removed and replaced by government effectiveness. This study will present and test the theory that the ability of economic freedom measures to estimate economic growth will improve if the *government size* component is replaced by a *government effectiveness* component. The study tests the theory by comparing growth models. One set of models estimate GDP per capita using the published economic freedom indices, respectively, as the predictor variable. The second set of models uses economic freedom indices with the *government size* component removed. The third set of models uses economic freedom indices modified to replace *government size* with government effectiveness.

Table 1 – Countries with wide differences in economic freedom scores

Variable*	**EFW Economic Freedom score percentile** (100% = most economic freedom)	**HEF Economic Freedom score percentile** (0% = least economic freedom)	**Percentile difference between economic freedom score** (EFW score vs. HEF score)
Mongolia 2017	72% (high)	28% (low)	44%
Georgia 2004	77%	33%	44%
Gambia 2016	62%	19%	43%
Zambia 2018	60%	20%	40%
France 2000	75%	37%	38%
Barbados 2007	23% (low)	83% (high)	60%
Israel 2009	40%	88%	48%
Colombia 2014	39%	84%	45%
Madagascar 2004	13%	57%	44%
Thailand 2000	34%	76%	42%

***Due to time lag between the underlying data and published index, the official indices are most closely matched with one another with a one-year difference in the publication year. Therefore Mongolia 2017 is a comparison of its 2017 EFW score with its 2018 HEF score.*

Source: Fraser Institute, Heritage Foundation

3. Data and methodology

This Methodology and Results section has two parts. Part One describes the study data: EFW's and HEF's underlying components, primary sources, and calculation methodologies. Part Two describes the study's research design.

3.1. The economic freedom indices

The Fraser Institute and the Heritage Foundation publish their respective index data and methodology on their websites. Both indices are annual country scores that measure economic freedom as a composite of each country's *government size*, *rule of law*, *regulation*, and *market openness*. Both indices disclose the primary data sources for all their inputs, which are a mix of publicly available data, such as World Bank data, and fee-based data, such as the PRS Group's *International Country Risk Guide.* (Fraser Institute, 2021).

Although the indices both measure economic freedom, there are differences in methodology and coverage. For example, EFW's country scores began in 1975; whereas HEF country scores began in 1995. EFW has five components made up of 42 underlying indicators; HEF has four components made up of 12 underlying indicators. The two indices use slightly different ways to calculate underlying component scores. EFW's index is published with approximately a two-year time lag from the primary data collection; HEF's index is published with a one-year time lag.

3.1.1 Calculation methodology

EFW and HEF both measure economic freedom. However, EFW uses five components and HEF uses four, as outlined in Table 2.

Table 2 – EFW and HEF index components

Fraser Institute **Economic Freedom of the World Index (EFW)**	**Heritage Foundation** **Index of Economic Freedom (HEF)**
Legal system and property rights	Rule of law
Regulation	Regulatory efficiency
Freedom to trade internationally	Market openness
Sound money	Government size
Size of government	

Source: Fraser Institute, Heritage Foundation

3.1.2. Index components by category

This section describes the indices' underlying components and input data. The *government size* component will be covered last because that treatment provides a smooth segue to the hypothesis section.

3.1.2.1. Rule of law

Rule of law is a wide-ranging measure of the level of institutional order that extends from a country's justice system to its control of corruption. The *rule of law* component for both indices include multiple inputs for property rights protection, an institution that has proven to be one of the foremost determinants of cross-country per capita income differences (Hall and Jones, 1999; La Porta, et al. 1999; Acemoglu, et al. 2005). Higher country scores for the *rule of law* component lead to higher economic freedom scores.

EFW's *rule of law* component is designated *Legal Systems and Property Rights* and HEF's *rule of law* component is simply designated *Rule of Law*. For the *rule of law* component, both indices capture key institutional characteristics, albeit by slightly different methods. Both indices take a comprehensive approach to assessing rule of law by examining both codified law and the enforcement of those laws. For example, both indices rely on the World Bank's *Doing Business* report and the World Economic Forum's *Global Competitiveness Report,* which use survey data to capture actual rates of compliance with and enforcement of the law in regular day-to-day activities.

A summary comparison of the inputs to the *rule of law* component for both indices is shown in Table 3. There are two major differences between the indices' *rule of law* components. First, EFW has specific inputs for the military and law enforcement; whereas those same inputs appear indirectly in HEF's Government Integrity subcomponent.

The second major *rule of law* component difference is that EFW's overall legal structure score is adjusted to reflect HEF's Gender Disparity Index (Gwartney, et al. 2020) while HEF does not have an analogous adjustment.

Table 3 – Rule of law

Fraser Institute Economic Freedom of the World Index (EFW)	**Heritage Foundation Index of Economic Freedom (HEF)**
Legal system and property rights	Rule of Law
Judicial independence Impartial courts Protection of intellectual property Military interference in rule of law & politics Integrity of the legal system Legal enforcement of contracts Regulatory costs of the sale of real property Reliability of police Gender Disparity Adjustment	Property rights Physical property rights Intellectual property rights Strength of investor protection Risk of expropriation Quality of land administration Judicial Effectiveness Judicial independence Quality of the judicial process Favoritism in obtaining judicial decisions Government integrity Irregular payments and bribes Transparency of govt policymaking Absence of corruption Perceptions of corruption Governmental and civil service transparency

Source: Fraser Institute, Heritage Foundation

3.1.2.2. Regulation

The *regulation* component represents the extent to which government institutions constrain business and individuals from freely transacting. The regulations included in this assessment include ease of opening a business, minimum wage legislation, banking regulation, interest rate controls, and price manipulation through direct controls or subsidies. Higher levels of regulation result in lower economic freedom scores. A summary comparison of the inputs to the *regulation* component for both indices is shown in Table 4.

Table 4 – Regulation

Fraser Institute Economic Freedom of the World Index (EFW)	**Heritage Foundation Index of Economic Freedom (HEF)**
Regulation	Regulatory efficiency
Credit Market Regulations Labor Market Regulations Business Regulations	Business freedom Labor freedom Monetary freedom

Source: Fraser Institute, Heritage Foundation

3.1.2.3. Market openness

Market openness measures the degree to which domestic goods, services, and financial markets are free from restrictions. *market openness* was a key theme in Smith's and Ricardo's theories regarding government policies that lead to greater prosperity. The more open a country's market is, the higher is its economic freedom score.

A summary comparison of the inputs to the *market openness* component for both indices is shown in Table 5.

Table 5 – Market openness

Fraser Institute Economic Freedom of the World Index (EFW)	**Heritage Foundation Index of Economic Freedom (HEF)**
Freedom to Trade Internationally	Market openness
Taxes on international trade Regulatory trade barriers Actual size of trade sector compared to expected size Difference between official exchange rate and black-market rate International capital market controls	Trade freedom The trade-weighted average tariff rate Qualitative evaluation of nontariff barriers Investment freedom Investment restrictions National treatment of foreign investment Foreign investment code Restrictions on land ownership Sectoral investment restrictions Expropriation of investments without fair compensation Capital controls Financial Freedom The extent of govt regulation of financial services The degree of state intervention in banks and other financial firms through ownership Govt influence on the allocation of credit The extent of financial and capital market development Openness to foreign competition

Source: Fraser Institute, Heritage Foundation

3.1.2.4. Sound money

EFW includes a sound money component that HEF does not. Three out of four of the inputs to EFW's *sound money* component are inflation-related. HEF captures a country's policies to control inflation in the monetary freedom input of the *regulation* component.

EFW's non-inflation-related *sound money* input is freedom to own foreign currency bank accounts. This input is related to inflation and monetary policy because access to foreign currency accounts can provide a measure of protection against inflation driven domestic currency depreciation. The corresponding HEF input is found in the *market*

openness component. Table 6 shows the inputs to EFW's *access to sound money* component and the corresponding HEF inputs.

Table 6 – EFW's fifth component: Sound Money

Fraser Institute Economic Freedom of the World Index (EFW)	**Heritage Foundation Index of Economic Freedom (HEF)**
Sound money	No equivalent category
Money supply growth relative to GDP growth Standard deviation of annual inflation Annual inflation in the most recent year	Comparable to Monetary Freedom measure in HEF regulatory efficiency category
Freedom to own foreign currency bank accounts	Comparable to Financial Freedom measure in HEF market openness category

Source: Fraser Institute, Heritage Foundation

3.1.2.5. Government size

Taxes and spending are the core of the *government size* component of EFW and HEF. In both indices, larger government sizes, as evidenced by higher tax rates and higher spending levels, equate to lower freedom scores, and, correspondingly, smaller governments with low tax rates and spending levels are assigned higher freedom scores.

A summary comparison of the inputs to the *government size* component for both indices is shown in Table 6.

For *government size*, both EFW and HEF include a country's top marginal tax rate and government spending as a percentage of GDP. Lower values for these measures lead to a higher *government size* score, which in turn corresponds to higher economic freedom scores. For tax rate information, both indices use the international tax guides published by Deloitte and PricewaterhouseCoopers. For HEF's tax burden input, HEF uses, among other sources, OECD data and the IMF *Staff Country Report*.

EFW's and HEF's measurements of *government size* differ in several ways. First, EFW's tax burden measure produces a composite score that combines the highest marginal tax rates for income and payroll as well as the top income bracket level. HEF's tax burden measure includes top marginal individual and corporate tax rates and the

overall level of taxation as a percentage of GDP imposed by all levels of government, including transfers and subsidies (Miller, et al., 2020).

Second, EFW includes an ownership of assets data point excluded from HEF. Government ownership of assets "gauges the degree to which the state owns and controls capital (including land) in the industrial, agricultural, and service sectors" (Gwartney, 2020). EFW obtains the government ownership of assets input from the *Varieties of Democracy* report produced by the V-Dem Institute.

Finally, HEF includes a fiscal health input that EFW does not include. HEF's fiscal health input includes average deficits and debt for the most recent three years as a percentage of GDP. HEF's inclusion of a fiscal health input is the primary reason why the U.S., with its soaring deficits and debt, tends to score lower on economic freedom according to HEF compared to EFW. For fiscal health, HEF draws on data from the IMF as well as the Asian Development Bank, the African Development Bank, and other sources. Table 7 outlines the inputs to the *government size* component for EFW and HEF.

Table 7– Government size

Fraser Institute Economic Freedom of the World Index (EFW)	**Heritage Foundation Index of Economic Freedom (HEF)**
Size of government	Government size
General government consumption spending as % of total consumption Transfers and subsidies as % of GDP Government enterprises and investment as a % of GDP Top marginal tax rate State ownership of assets	Tax burden Top marginal tax rate on individual income Top marginal tax rate on corporate income Total tax burden as % of GDP Government spending Average total government spending at all levels as % of GDP for the most recent three years Fiscal health Average deficits as % of GDP for the most recent three years (80% of score) Debt as % of GDP (20% of score)

Source: Fraser Institute, Heritage Foundation

3.2. Same-country score differences

A basic assessment of the same-country score differences by index component shows that the methodological differences between the two index providers in calculating the *government size* component is one of the top drivers of score differences between EFW and HEF. This is a troublesome aspect of the current measurement of economic freedom (see Ram, 2014) that has not been resolved. Table 8 shows ten

countries in which EFW and HEF have widely different *government size* scores for the same country, which in turn leads to significant differences in the countries' overall economic freedom scores.

Table 8 – Different government size scores for the same country

Variable*	**EFW Government size score percentile** (high percentile = high index score = small govt)	**HEF Government size score percentile** (low percentile = low index score = large govt)	**Percentile difference between govt size score** (EFW score vs. HEF score)
Ghana 2017	97% (small govt)	19% (large govt)	78%
Lebanon 2016	92%	18%	74%
Switzerland 2000	85%	12%	73%
Zimbabwe 2009	70%	2%	68%
Chad 2000	100%	31%	69%
Myanmar 2003	1% (large govt)	97% (small govt)	96%
Saudi Arabia 2010	4%	91%	87%
Guinea-Bissau 2014	14%	99%	85%
Oman 2012	2%	83%	81%
United Arab Emirates 2000	15%	95%	80%

**Due to time lag between the underlying data and published index, the official indices are most closely matched with one another with a one-year difference in the publication year. Therefore Ghana 2017 is a comparison of its 2017 EFW score with its 2018 HEF score.*

Source: Fraser Institute, Heritage Foundation

3.3. Government effectiveness data

The World Bank's WGI measure quality of governance by country with six indicators: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption. Of the six WGI indices, the Government Effectiveness index is the best to replace *government size* in EFW and HEF because it best captures how the government is performing on dimensions that affect economic freedom.

- The WGI Government Effectiveness Index captures perceptions of:
- the quality of public services,
- the quality of the civil service

- the degree to which civil service is independent of political pressures
- the quality of policy formulation and implementation, and
- the credibility of the government's commitment to such policies. (WGI 2022)

Exhibit 1 is a representative sample of the inputs to the government effectiveness index.

Exhibit 1 - Sample of the inputs to the government effectiveness index

- Quality of bureaucracy / institutional effectiveness
- Quality of transportation, energy, and other infrastructure
- Quality of education system
- Quality of health care system
- Policy instability
- Efficiency of revenue mobilization
- Quality of budgetary & financial management
- Resource efficiency
- Public resources for rural development
- Trust in government

Each country's index score estimates how well or poorly a government allocates tax revenues, which, in turn, affects the willingness of the electorate to sustain their tax contributions.

The WGI Government Effectiveness Index is reported in two ways: (A) in standard normal units, ranging from approximately -2.5 to 2.5, and (B) in percentile rank terms from 0 to 100, with higher values corresponding to better outcomes (WGI, 2022).

3.4. Control data

The focus of this study is to determine whether replacing *government size* with *government effectiveness* makes the economic freedom indices better estimators of GDP per capita. The regression models used to test this relationship control for other factors that

influence GDP per capita, namely, education, life expectancy, fertility, and terms of trade, following Barro (1998). Two additional factors that Barro also uses as controls, rule of law and inflation, are already included in the economic freedom indices, and are therefore not used as controls, to avoid double-counting.

3.5. Research design

This section describes the regression models used to test whether removing the government size component improves the effectiveness of EFW and HEF as estimators of GDP per capita. In each case, a two-step process is followed where the model is examined after governments size is excluded, and then again when *government size* is replaced by *government effectiveness*.

Excluding government size

The study tests the following hypotheses on both indices using OLS regression.

Hypothesis 1a and 2a – Excluding government size

H_{1a}: For **EFW**, excluding the *government size* component from EFW improves the index as an estimator of GDP per capita.

H_{2a}: For **HEF**, excluding the *government size* component from HEF improves the index as an estimator of GDP per capita.

Hypothesis 1b and 2b – Replacing government size with government effectiveness

H_{1b}: For **EFW**, replacing the *government size* component with a government effectiveness component improves the index as an estimator of GDP per capita.

H_{2b}: For **HEF**, replacing the *government size* component with a government effectiveness component improves the index as an estimator of GDP per capita.

To test the hypotheses, three regression models for each index are estimated with GDP per capita as the dependent variable. Replacing *government size* with government effectiveness is a two-step process: first, *government size* is removed and results are assessed, then government effectiveness is added, and results are assessed again.

Equation 1 uses the published index as the predictor variable. Equation 2 uses the published index ex *government size*. Equation 3 uses the published index modified to replace *government size* with *government effectiveness*. All models control for education, life expectancy, fertility rate, and terms of trade growth rate. For ease of reference, the regression equations and the identification key for the variables are displayed together in Exhibit 2.

In addition to primary regression tests (Models 1 and 2), two other regression models (Models 3 and 4) are used to test whether excluding *government size* is the best way to improve the effectiveness of the economic freedom indices as estimators of GDP per capita. Analogous to the exclusion of *government size*, each of the other components (*rule of law*, *sound money*, *market openness*, and *regulation*) is excluded, one by one, from both indices. The modified index is then used as an independent variable in a regression model estimating GDP per capita. The same control variables used in Models 1 and 2 are used in Models 3 and 4 (see Exhibit 3). The study's hypothesis is that the removal of no other component will increase the adjusted R-squared of the estimator model as much as the removal of *government size*.

Country data

For the EFW model, the country data are used for 160 countries from the years 1985–2018. The EFW index data are available every five years for the period 1985 through 2000 and then annually from 2000 through 2018. For the HEF model, the country data is annual data for 181 countries from the years 1995–2019. There are many instances, especially when countries are engaged in military conflict, for which annual index data are missing. In those years, for those countries, the data point is excluded from the sample.

Because the HEF index data is calculated based on data from the previous year, the HEF index data needs to be regressed against data that is lagged by one year so that the economic freedom 2021 HEF index data had already been published based on input data from the period

Exhibit 2 – Primary test regression models (Models 1 and 2) and variables key

EFW

Model 1a – EFW

GDP per capita = $\beta_0 + \beta_1$EFW + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 1b – EFW excluding *government size*

GDP per capita = $\beta_0 + \beta_1$EFWXG + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 1c – EFW replacing government size with government effectiveness

GDP per capita = $\beta_0 + \beta_1$EFWGE + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

HEF

Model 2a – HEF

GDP per capita = $\beta_0 + \beta_1$HEF + β_2EDU + β_3HEL + β_4FER + β_5TT + ε

Model 2b – HEF excluding *government size*

GDP per capita = $\beta_0 + \beta_1$HEFXG + β_2EDU + β_3HEL + β_4FER + β_5TT + ε

Model 2c – HEF replacing *government size* with government effectiveness

GDP per capita = $\beta_0 + \beta_1$HEFGE + β_2EDU + β_3HEL + β_4FER + β_5TT + ε

Variables key

Independent variables	
EFW	Economic Freedom Score (EFW) by country
EFWXG	Economic Freedom Score (EFW) excluding government size component
EFWGE	Economic Freedom Score (EFW) replacing government size with government effectiveness

Independent variables	
HEF	Economic Freedom Score (HEF) by country
HEFXG	Economic Freedom Score (HEF) excluding government size component
HEFGE	Economic Freedom Score (HEF) replacing government size with government effectiveness

Control variables	
EDU	Education: Average Total Years of Schooling for Adult Population
HEL	Health: Life expectancy at birth, total (years)
FER	Fertility: Fertility rate, total (births per woman)
TT	Terms of Trade: Export value minus import value

June 30, 2019 through June 30, 2020. Therefore the 2021 HEF index data is associated with 2020-underlying data not 2021-underlying data.

Post-estimate results

The post-estimate results of the regressions are used to verify the validity of the requirements and the models. The paired models' adjusted R-squared values, F-statistics, and slope coefficients are used to test the hypothesis that removing *government size* from economic freedom indices improve the indices' effectiveness at estimating economic growth. Each model's Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) are calculated to examine if the models using the indices that exclude and replace *government size* are a better fit than the models using the unmodified indices.

Exhibit 3 – Secondary test regression models (Models 3 and 4) and variables key

EFW

Model 3a – EFW excluding Legal system and property rights

GDP per capita = $\beta_0 + \beta_1$EFWXLP + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 3b – EFW excluding Regulation

GDP per capita = $\beta_0 + \beta_1$EFWXR + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 3c – EFW excluding Freedom to trade internationally

GDP per capita = $\beta_0 + \beta_1$EFWXFT + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 3d – EFW excluding Sound money

GDP per capita = $\beta_0 + \beta_1$EFWXSM + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

HEF

Model 4a – HEF excluding Rule of law

GDP per capita = $\beta_0 + \beta_1$HEFXRL + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 4b – HEF excluding Regulatory efficiency

GDP per capita = $\beta_0 + \beta_1$HEFXRE + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Model 4c – HEF excluding Market openness

GDP per capita = $\beta_0 + \beta_1$HEFXMO + β_2EDU + β_3HEL + β_4 FER + β_5TT + ε

Variables key

Independent variables	
EFWXLP	EFW excluding legal system and property rights component
EFWXR	EFW excluding *regulation* component
EFWXFT	EFW excluding freedom to trade internationally component
EFWXSM	EFW excluding *sound money* component

Independent variables	
HEFXRL	HEF excluding *rule of law* component
HEFXRE	HEF excluding *regulatory efficiency* component
HEFGMO	HEF excluding *market openness* component

Control variables	
EDU	Education: Average Total Years of Schooling for Adult Population
HEL	Health: Life expectancy at birth, total (years)
FER	Fertility: Fertility rate, total (births per woman)
TT	Terms of Trade: Export value minus import value

4. Results and discussion

This section has three parts. The first part presents and analyzes the study's regression model results. The second part discusses the limitations of the study. This section concludes with a recommendation about how the insights from this study can be applied to improve the measurement of economic freedom and to the broader evaluation of different styles of government.

Table 9 summarizes key post-estimation results for both regression models.

Table 9 – Summary of post-estimate results for Models 1 and 2

	Model 1a EFW	Model 1b EFWxGS	Model 1c EFWwGE	Model 2a HEF	Model 2b HEFxGS	Model 2c HEFwGE
Adj. R-squared	0.49	0.52	0.58	0.53	0.59	0.61
F-statistic	477.09	548.86	675.87	563	717	770
AIC	54,582	54,405	54,120	54,372	54,034	53,929
BIC	54,618	54,441	54,155	54,407	54,069	53,964
Economic Freedom index coefficient	3,980	6,167	8,263	661	746	792
Coefficient t-test	9.37	16.65	24.75	17.73	26.86	29.32
Coefficient p value	0.00	0.00	0.00	0.00	0.00	0.00
Observations	2,490	2,490	2,490	2,490	2,490	2,490

Source: Author's calculations

Both removing and replacing *government size* increases the adjusted R-squared in both models. Removing *government size* as an index component improves the EFW model adjusted R-squared by 0.03 and improves the HEF model adjusted R-squared by 0.06. Then replacing *government size* lowers the EFW model's adjusted R-squared by 0.06 and lowers the HEF models' adjusted R-squared by 0.02. It appears that HEF benefits more from exclusion and EFW benefits more from replacement.

For the AIC and BIC measures, the lower the value, the better the model fits the underlying data. For both indices, the AIC and BIC results confirm that the model that replaces *government size* with *government effectiveness* are a better fit of the data than the models that use the published indices.

The regression coefficient for both indices increases and their standard error decrease when the indices are modified to remove and replace *government size*. The regression coefficients for all control variables also decrease along with their standard errors. In summary, the explanatory power of economic freedom to explain GDP per capita improves when *government size* is removed and replaced. Table 10 shows the regression model coefficients and standard errors.

Table 10 – Regression model coefficients and standard errors

	Model 1a EFW	**Model 1b EFW x GS**	**Model 1c EFW w GE**	**Model 2a HEF**	**Model 2b HEF x GS**	**Model 2c HEF w GE**
Economic Freedom Index	3,229.31*** (348.10)			661.13*** (37.28)		
Economic Freedom Index ex Govt size		5,042.02*** (306.51)			746.72*** (27.80)	
Economic Freedom Index with Govt effectiveness			8,263*** (24.75)			791.69*** (27.00)
Education	2,573.08*** (143.01)	2,085.27*** (142.48)	1,478.49*** (151.38)	2,205.08*** (111.66)	1,385.50*** (148.46)	1,225.78*** (145.91)
Life expectancy	983.32*** (54.13)	854.15*** (53.04)	632.96*** (56.92)	821.23*** (58.81)	620.28*** (55.58)	559.10*** (54.70)
Fertility	4,955.96*** (343.02)	4,713.06*** (333.33)	4,293.43*** (362.56)	4,176.67*** (385.37)	3,190.49*** (363.54)	3,122.48*** (355.19)
Terms of trade	192.80 (1,241.01)	57.20 (1,204.25)	1,251.74 (1,233.05)	976.91 (1,296.96)	644.96 (1,211.82)	706.66 (1,186.45)
Constant	-111,394*** (4,421.00)	-110,094*** (4228.00)	-108,294.20*** (4,392.84)	-113,965.80*** (4,621.70)	-93,946.56*** (4,363.92)	-90,199.72*** (4,286.31)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10*

Source: Author's calculations

Table 11 shows how the correlation of the index with per capita GDP growth increases when *government size* is removed and then increases again when government effectiveness is added it its place.

Table 11 – Correlation table

	Models			Models		
	1a	**1b**	**1c**	**2a**	**2b**	**2c**
Variable	EFW	EFW ex Govt size	EFW w/ Govt effectiv.	HEF	HEF ex Govt size	HEF w/ Govt effectiv.
Correlation with per capita GDP	0.57	0.66	0.73	0.65	0.74	0.76

Source: Author's calculations

Secondary test – Models 3 and 4

To gather evidence to support or reject the study's main hypothesis, Models 3 and 4 test the secondary hypothesis that no other index component, when excluded, would improve the estimation effectiveness of the index as much as the exclusion of *government size*. Regression Models 3 and 4 facilitate a comparison of the explanatory power of the economic freedom indices when other components (*rule of law, sound money, market openness,* and *regulation*) are excluded.

Regression Models 3 and 4

For HEF, the adjusted R-squared for the model decreases when any component besides g*overnment size* is excluded. For EFW, the adjusted R-squared for the model goes down if either *government size* or *sound money* input is excluded.

However, the effect of excluding the *sound money* component from EFW is negligible. Excluding the *sound money* component from EFW only increases the adjusted R-squared by +0.0028, compared to +0.0312 when g*overnment size* is excluded. Notably, HEF does not have a component analogous to EFW's *sound money* component.

Tables 12 and 13 show the adjusted R-squared for the regression models with the respective components excluded.

Table 12 – Adjusted R-squared changes for models using modified EFW

	EFW Index	**Per capita GDP growth model using EFW Index modified to exclude:**				
		Govt size	Rule of law	Sound money	Market openness	Regulation
Adjusted R-squared	0.4767	0.5079	0.4626	0.4795	0.4758	0.4734
Change		Adj. R-squared increases	Adj. R-squared decreases	Adj. R-squared decreases	Adj. R-squared decreases	Adj. R-squared slightly increases
Difference		+0.0312	-0.0141	-0.0033	-0.0009	+0.0028

Source: Author's calculations

Table 13 – Adjusted R-squared for models using modified HEF index values

	HEF Index	**Per capita GDP growth model using HEF Index modified to exclude:**			
		Govt size	Rule of law	Market openness	Regulation
Adjusted R-squared	0.4767	0.5079	0.4626	0.4758	0.4758
Change		Adj. R-squared increases	Adj. R-squared decreases	Adj. R-squared decreases	Adj. R-squared decreases
Difference		+0.0312	-0.0141	-0.0033	-0.0009

Source: Author's calculations

Finally, the convergent validity of the economic freedom measures goes up when *government size* is replaced by government effectiveness. when *government size* is replaced by government effectiveness, the sum of the absolute value of the same-country score differences for the 2,490 common observations falls by 37% from 29,017 to 18,295. Finally, Table 14 partially demonstrates how removing and replacing *governments size* increase the convergent validity of the measurement of economic freedom by presenting ten countries whose same-country score difference significantly narrows when *government size* is replaced by government effectiveness.

Table 14 – Countries with changes to their same-country score differences

Variable*	Same-country score differences using original indices EFW and HEF			Same-country score differences using EFW and HEF modified to replace government size with government effectiveness		
	EFW Economic Freedom score percentile (100% = most economic freedom)	HEF Economic Freedom score percentile (0% = least economic freedom)	Percentile difference between economic freedom score (EFW score vs. HEF score)	EFW Economic Freedom score percentile (100% = most economic freedom)	HEF Economic Freedom score percentile (0% = least economic freedom)	Percentile difference between economic freedom score (EFW score vs. HEF score)
Mongolia 2017	72% (high)	28% (low)	44%	61% (med)	49% (med)	13%
Gambia 2016	62% (med)	19% (low)	43%	48% (med)	38% (med)	10%
Brazil 2018	37% (med)	14% (low)	23%	36% (med)	41% (med)	5%
Lebanon 2017	50% (med)	18% (low)	32%	38% (med)	32% (med)	6%
France 2000	75% (high)	37% (med)	38%	89% (high)	76% (high)	13%
United Arab Emirates 2018	54% (med)	94% (high)	40%	76% (high)	85% (high)	9%
Qatar 2010	52% (med)	81% (high)	29%	69% (high)	70% (high)	1%
Saudi Arabia 2010	33% (med)	67% (med)	34%	52% (med)	56% (med)	4%
Brunei 2016	51% (med)	79% (high)	28%	72% (high)	70% (high)	2%
Malaysia 2009	30% (low)	62% (med)	32%	56% (med)	60% (med)	4%

***Due to time lag between the underlying data and published index, the official indices are most closely matched with one another with a one-year difference in the publication year. Therefore Mongolia 2017 is a comparison of its 2017 EFW score with its 2018 HEF score.*

Source: Fraser Institute, Heritage Foundation, and Author's calculations

4.2. Summary of results

First, the primary regression tests (Models 1 and 2) demonstrate that (1) excluding *government size* and (2) replacing *government size* with *government effectiveness* in EFW and HEF

increase the effectiveness of both indices in estimating GDP per capita. Therefore, the null hypothesis that excluding *government size* would have no effect on the indices' effectiveness in estimating GDP per capita can be rejected and the study's primary hypothesis that the effectiveness increases is accepted.

Second, the secondary regression tests (Models 3 and 4) demonstrate that the exclusion of no other component would increase the effectiveness of an economic freedom estimation model more than excluding *government size*. In fact, excluding any other component besides *sound money* for EFW decreases the effectiveness of the corresponding estimator models. Excluding EFW's *sound money* component makes only a negligible positive change. Therefore, not only should the *government size* component be excluded, it is the only component that should be excluded.

4.3. Limitations

4.3.1. Time periods

The Fraser Institute and the Heritage Foundation provide public access to subcomponent scores and underlying inputs of their respective indices. Despite this transparency, there are data limitations related to time periods and country coverage. First, this study is limited to the time periods covered by the EFW and HEF data, namely since 1970 and 1995, respectively. The HEF data is published every five years between 1970 and 1995. The Fraser Institute has supplemented the official EFW data with country economic freedom scores for 1950, 1955, 1960, and 1965, but however the pre-1970 scores are based on fewer components, and therefore, are not included in the study.

For recent periods, the EFW data are updated through 2018, while the 2021 HEF data was available in the spring of 2021 and is calculated based on data updated through June 30, 2020. To match the HEF data properly with the control data, the 2020 HEF (based on data through June 30, 2019) is the last index year used.

Finally, the data points used for all models are the same 154 countries and the period from 2000 to 2018. The sample was drawn just from the countries and years in which all three indices and the control variables had published data.

4.3.2. Data gaps

A second limitation relates to country data. First, for certain countries, there are years with missing economic freedom index data, government effectiveness data, or control variable data. For example, though HEF includes the following countries in its country coverage universe, in 2021, it provides no index score for Iraq, Libya, Somalia, Syria, or Yemen due to military conflict prohibiting the systematic collection of data.

4.3.3. Country coverage

Finally, EFW's and HEF's country coverage universe is not the same. HEF covers 22 countries that EFW does not cover. Those 22 countries are removed from the test sample.

Applying the insights

Both the Fraser Institute and the Heritage Foundation can use the results of this study to improve their indices by replacing the *government size* component with the WGI Government Effectiveness index. Government taxation and spending is not by definition curtailment of economic freedom. Furthermore, empirical tests shown here demonstrate that indices perform better as estimators of economic growth if *government size* is replaced by government effectiveness. If the index providers were to even consider modifying their indices on this point, the internal and external debates would provide fruitful discussions and analysis of comparative economic and political development.

In addition to improving the economic freedom indices as estimators of growth, replacing *government size* with *government effectiveness* increases the indices' convergent validity. This is because *government size* is the greatest driver of same-country economic freedom score differences. The EFW and HEF index scores for the same countries will move more in line with each other and provide a more consistent reading of how much economic freedom a country provides its inhabitants.

5. Conclusion

This section has three parts. The first part summarizes the study's findings. The second part describes the project's contribution to the study of economic freedom. The third part provides suggestions for further research.

5.1. Summary of study

This study finds evidence that EFW and HEF are better estimators of economic growth if *government size* is replaced by *government effectiveness*. Furthermore, there is no other index component that, when excluded, significantly improves the ability of economic freedom to estimate economic growth. The reasons for this are: (1) government spending can extend economic freedom to less advantaged segments of the population, (2) government spending is needed to create and maintain the institutions required for free markets to operate, and (3) government spending is not the equivalent of government interference.

Making an economic freedom measurement change of this nature would require a broader reconsideration of more socially minded government models and the implicit trade-offs between collecting taxes and increasing economic opportunities for the most disadvantaged in a society.

5.2. Applications

The study's index methodology recommendation can be used by the Fraser Institute and the Heritage Foundation to improve their indices of economic freedom.

This study can also provide new insights to policymakers and other observers of economic and political policymaking, including voters. Although small government fits neatly with other classic liberal economic reforms that emphasize *laissez-faire* government, this study's empirical tests show that there are many countries with large governments that provide high levels of economic freedom while also collecting the taxes required to offer more generous social support. In a way, this study encourages proponents of classic economic liberalism to adopt a more open-minded approach to socially-oriented government styles given that these governments have shown themselves able to provide similar or better levels of economic freedom than more market-oriented government styles.

5.3. Suggestions for further research

There are three areas in the measurement of economic freedom that merit further research. First, a further examination of the factors driving same-country score differences could yield ideas for more improvements in index construction and foster a

better understanding of the differences between the two indices that are endeavoring to measure the same phenomenon.

A second idea for further research is to collect data on how, if at all, the economic freedom data are being used by policymakers. Holmes (2016) reports that (a) USAID wanted economic freedom measured by country to help inform decisions about where U.S. unilateral aid dollars should be invested; and (b) that there is much fanfare some countries when a new year's rankings are released. Multinational companies also use the data to inform long-term foreign direct investment decisions. However, aside from these few anecdotes, there is little published on how governments are currently using the economic freedom index data, which is publicly available on the internet. A study that analyzes how policymakers use the data might help guide further research on which aspects of economic freedom merit the most attention, as the measurement of economic was never intended to be a purely academic exercise.

Finally, the Fraser Institute recently added a gender disparity adjustment in its *rule of law* index component. A third idea for further research would be to investigate whether a racial disparity adjustment might also be a worthwhile addition as practices such as segregation in schools and housing can reduce the economic freedom of those who are disenfranchised by discriminatory practices.

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