

## Chapter 4: Macroeconomic Volatility and Economic Freedom—a Preliminary Analysis

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*“What we urgently need, for both economic stability and growth, is a reduction of government intervention not an increase.”*

Milton Friedman, *Capitalism and Freedom*, 38.

### Introduction

One aspect of the preceding quotation has been extensively studied in the economics literature. Numerous studies have examined the relationship between economic freedom and long-run economic growth across countries.<sup>1</sup> The other aspect of Friedman’s statement—that referring to the relationship between economic freedom and short-run macroeconomic stability—has received relatively little attention in the literature.<sup>2</sup> One possible explanation for this omission is that institutions such as economic freedom change only gradually over time and, thus, are more likely to be viewed as deep determinants of long-run growth rather than the type of transitory shocks that might

explain macroeconomic fluctuations. While changes in institutions may not be among the shocks that cause business cycles, the institutional environment in general and economic freedom in particular may well be an important determinant of an economy’s ability to absorb and recover from these shocks. Indeed, even in the Principles of Economics classroom, market impediments such as labor contracts, minimum wage laws, and other price controls that cause wage or price rigidity are routinely used to explain why an economy might not recover from aggregate shocks as quickly as might otherwise be the case.

Another possible problem in the analysis of relationships involving economic freedom is the measurement of economic freedom itself. This problem, fortunately, has been alleviated more recently by the index published in *Economic Freedom of the World* (EFW).<sup>3</sup> The EFW index is based on the classical conception of individual liberty, which emphasizes personal choice, private property, and freedom of exchange. The EFW index currently encompasses five Areas of freedom that are aggregated into a single summary index of economic freedom. The five major Areas of the index are (1) Size of Government; (2) Legal Structure and Security of Property Rights; (3) Access to Sound Money; (4) Freedom to Trade Internationally; and (5) Regulation of Credit, Labor, and Business. The underlying data of each Area are listed in table 4.1. All underlying data are converted to a scale from 0 (representing the least free) to 10 (most free). Each underlying component is equally weighted to construct an index for each of the

\* I would like to thank Renea Reed for providing valuable research assistance in the preliminary stages of this chapter. Art Diamond, Jim Gwartney, Frank Stephenson, two anonymous referees, and session participants at the 2009 annual conference of the Association of Private Enterprise Education in Guatemala City, the 2009 annual meetings of the Southern Economic Association in San Antonio, and the 2010 annual conference of the Association of Private Enterprise Education in Las Vegas provided useful comments and discussion. Any remaining errors are my own.

1 See, for example, the studies cited in the recent reviews by Berggren (2003) and de Haan, Lundstrom, and Sturm (2006).

2 Acemoglu, Johnson, Robinson, and Thaicharoen (2003) address the role of institutions in general in their analysis of the relationship between macroeconomic policy and volatility. Easterly, Islam, and Stiglitz (2001) consider the role of the financial system in explaining growth volatility. Lipford (2007) provides a first look at the relationship between economic freedom and macroeconomic stability.

3 The original publication was Gwartney, Lawson, and Block, 1996. The version used in this chapter is Gwartney, Lawson, and Hall, 2009.

**Table 4.1: Areas and Components of the EFW Index**

<p><b>1 Size of Government: Expenditures, Taxes, and Enterprises</b></p> <p>A General government consumption spending as a percentage of total consumption</p> <p>B Transfers and subsidies as a percentage of GDP</p> <p>C Government enterprises and investment</p> <p>D Top marginal tax rate</p> <p style="padding-left: 20px;">i Top marginal income tax rate</p> <p style="padding-left: 20px;">ii Top marginal income and payroll tax rates</p> <p><b>2 Legal Structure and Security of Property Rights</b></p> <p>A Judicial independence (GCR)</p> <p>B Impartial courts (GCR)</p> <p>C Protection of property rights (GCR)</p> <p>D Military interference in rule of law and the political process (ICRG)</p> <p>E Integrity of the legal system (ICRG)</p> <p>F Legal enforcement of contracts (DB)</p> <p>G Regulatory restrictions on the sale of real property (DB)</p> <p><b>3 Access to Sound Money</b></p> <p>A Money growth</p> <p>B Standard deviation of inflation</p> <p>C Inflation: Most recent year</p> <p>D Freedom to own foreign currency bank accounts</p> <p><b>4 Freedom to Trade Internationally</b></p> <p>A Taxes on international trade</p> <p style="padding-left: 20px;">i Revenues from trade taxes (% of trade sector)</p> <p style="padding-left: 20px;">ii Mean tariff rate</p> <p style="padding-left: 20px;">iii Standard deviation of tariff rates</p>	<p>B Regulatory trade barriers</p> <p style="padding-left: 20px;">i Non-tariff trade barriers (GCR)</p> <p style="padding-left: 20px;">ii Compliance cost of importing &amp; exporting (DB)</p> <p>C Size of trade sector relative to expected</p> <p>D Black-market exchange rates</p> <p>E International capital market controls</p> <p style="padding-left: 20px;">i Foreign ownership/investment restrictions (GCR)</p> <p style="padding-left: 20px;">ii Capital controls</p> <p><b>5 Regulation of Credit, Labor, and Business</b></p> <p>A Credit market regulations</p> <p style="padding-left: 20px;">i Ownership of banks</p> <p style="padding-left: 20px;">ii Foreign bank competition</p> <p style="padding-left: 20px;">iii Private sector credit</p> <p style="padding-left: 20px;">iv Interest rate controls/negative real interest rates</p> <p>B Labor market regulations</p> <p style="padding-left: 20px;">i Minimum wage (DB)</p> <p style="padding-left: 20px;">ii Hiring and firing regulations (GCR)</p> <p style="padding-left: 20px;">iii Centralized collective bargaining (GCR)</p> <p style="padding-left: 20px;">iv Mandated cost of hiring (DB)</p> <p style="padding-left: 20px;">v Mandated cost of worker dismissal (DB)</p> <p style="padding-left: 20px;">vi Conscription</p> <p>C Business regulations</p> <p style="padding-left: 20px;">i Price controls</p> <p style="padding-left: 20px;">ii Administrative requirements (GCR)</p> <p style="padding-left: 20px;">iii Bureaucracy costs (GCR)</p> <p style="padding-left: 20px;">iv Starting a business (DB)</p> <p style="padding-left: 20px;">v Extra payments/bribes (GCR)</p> <p style="padding-left: 20px;">vi Licensing restrictions (DB)</p> <p style="padding-left: 20px;">vii Cost of tax compliance (DB)</p>
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Source: Gwartney, Lawson, and Hall, 2009: 6.

five Areas. Then, equal weight is given to each of the five Areas in constructing the EFW index (i.e., the five Area indexes are averaged). The index is available for a large number of countries in five-year intervals from 1975 to 1995, and annually since 1995.<sup>4</sup>

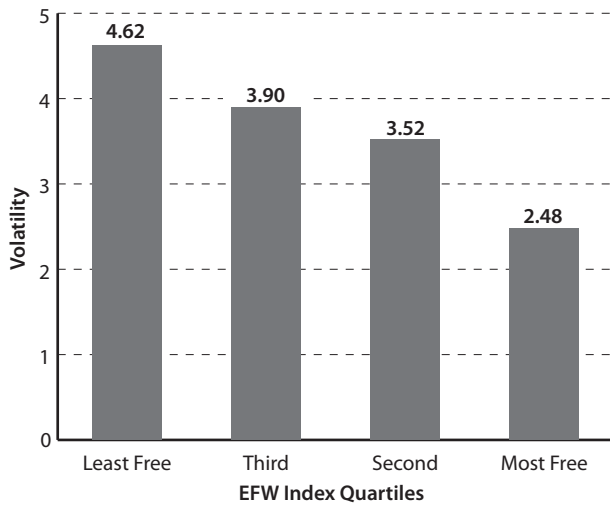
This chapter uses the EFW index to examine the relationship between economic freedom and business cycle volatility across countries. The EFW data allow analysis of a broad measure of freedom as well as the five underlying Areas of freedom noted above. Volatility is measured by the standard deviation of annual growth rates of real GDP per capita. Visual evidence on the relationship between freedom and volatility is provided in

figure 4.1, which shows the average level of volatility by EFW quartile among 85 countries over the period 1980 to 2007. There is a clear diminution of volatility among countries with higher freedom ratings. Figures 4.2 to 4.7 present scatter plots of average scores from the EFW index and its five underlying Areas of freedom against the volatility measure. Figure 4.2 confirms the negative correlation between the overall EFW index and the volatility measure. The simple regression line drawn through the data indicates a significantly negative relationship. Among the five underlying Areas of freedom, all but Area 1 have a significantly negative relationship as well. Area 1 (Size of Government) is positively related to volatility.

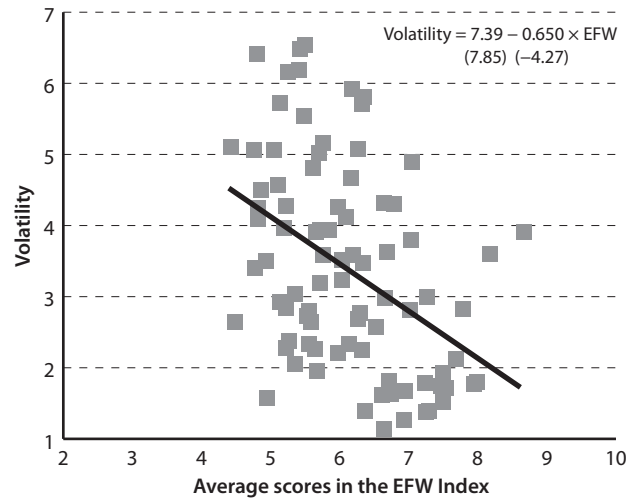
The remainder of the chapter further explores the relationship between economic freedom and volatility. In particular, the analysis examines whether the

4 The current version of the EFW index is available at <http://freetheworld.com>.

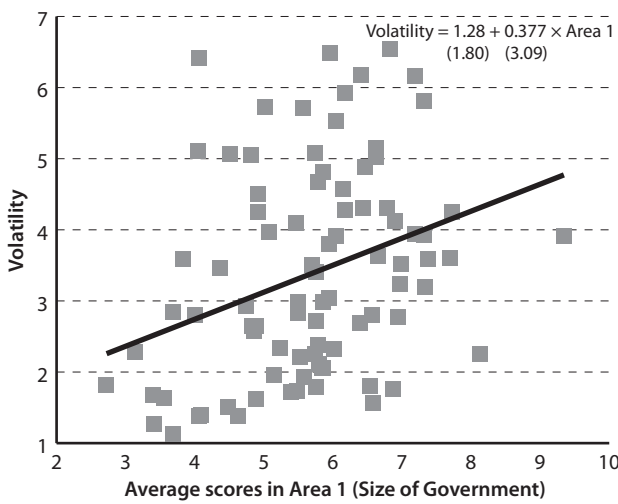
**Figure 4.1: Average level of macroeconomic volatility by EFW quartile, 1980–2007**



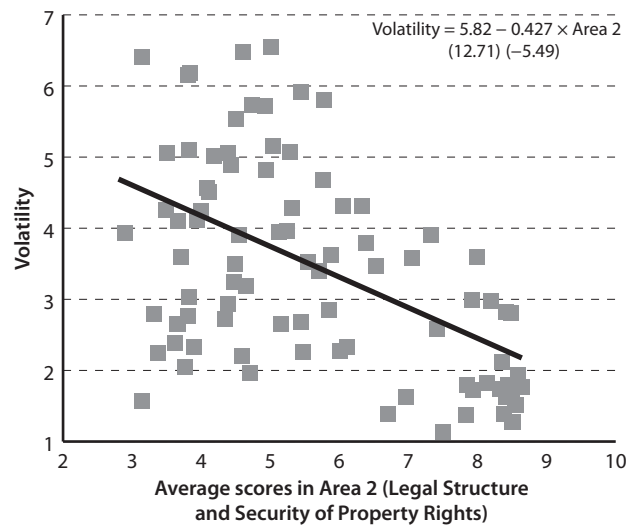
**Figure 4.2: Volatility and average scores in the EFW index, 1980–2007**



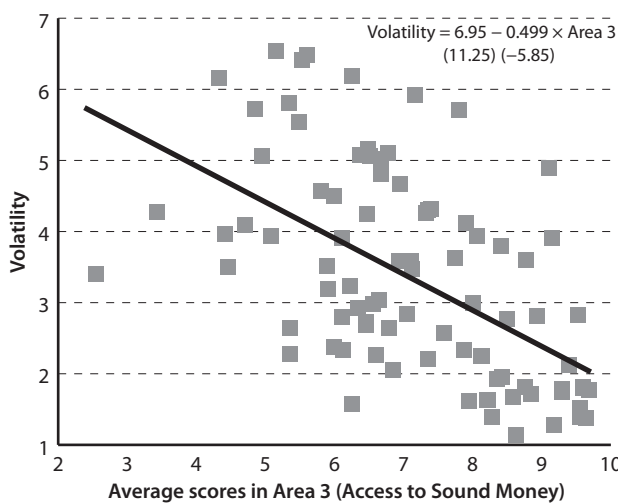
**Figure 4.3: Volatility and average scores in Area 1 of the EFW index, 1980–2007**



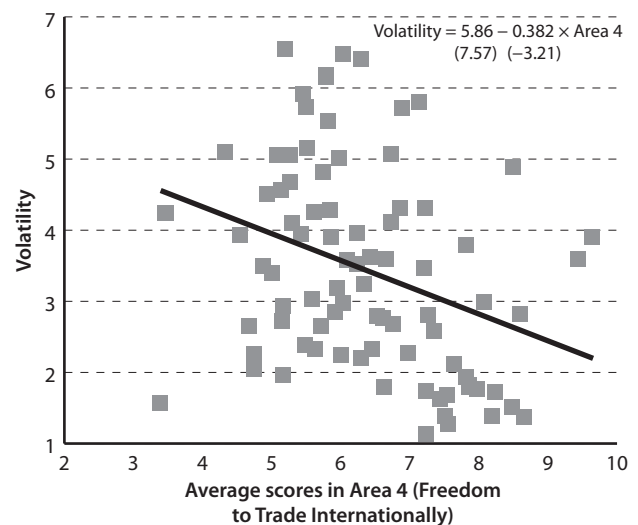
**Figure 4.4: Volatility and average scores in Area 2 of the EFW index, 1980–2007**



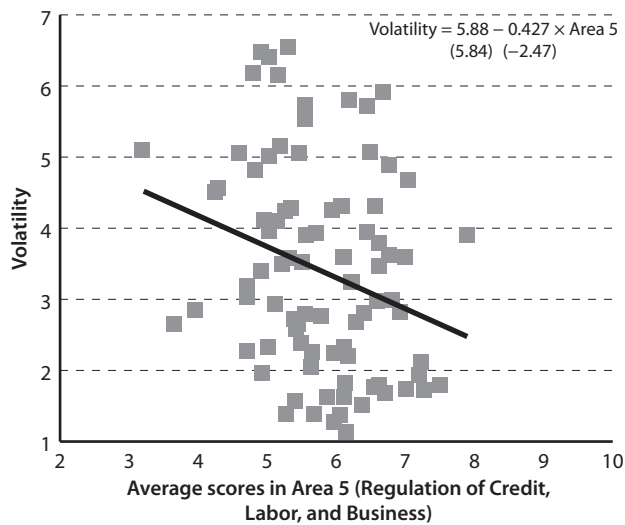
**Figure 4.5: Volatility and average scores in Area 3 of the EFW index, 1980–2007**



**Figure 4.6: Volatility and average scores in Area 4 of the EFW index, 1980–2007**



**Figure 4.7: Volatility and average scores in Area 5 of the EFW index, 1980–2007**



relationships suggested in figures 4.1 to 4.7 continue to hold after controlling for other determinants of cross-country volatility and accounting for the potential endogeneity of economic freedom. The next section of the chapter provides a brief theoretical perspective on the institutions-volatility debate. The section after that discusses the empirical model, methodology, and data in detail. Following is a discussion of the empirical results and some concluding remarks.

### **Economic Freedom and Volatility— a Brief Theoretical Perspective**

While modern empirical macroeconomics has had little to say on the relationship between economic freedom and business cycle volatility, the debate over the impact of free-market institutions on economic stability has a long history in economics. Marxist philosophy maintains that capitalist systems are inherently incapable of order and stability, while Friedman (1982) argues that market capitalism disperses economic power rather than concentrating it. Adam Smith's *laissez-faire* view held that markets are more capable of maintaining stability than government planners, while the Keynesian tradition countered that activist government policy is necessary to stabilize the business cycle. Clearly, these opposing views imply different relationships between economic freedom and volatility.

Even among ardent capitalists who would generally proclaim the stability offered by markets, theory can provide an avenue whereby market outcomes may promote

greater instability. Entrepreneurship is one such channel through which market institutions may contribute to economic instability. Indeed, the connection between entrepreneurship and business cycle activity is present in some of Schumpeter's early writings. Schumpeter viewed cycles as the result of waves in innovation and entrepreneurial dynamics. Downturns were a necessary part of the capitalist process—a period of creative destruction during which old products, firms, and entrepreneurs are eliminated and new products are conceived. Schumpeter (1935) described the tendency of innovations to cluster in time rather than to flow continuously: “as soon as the various kinds of social resistance to something that is fundamentally new and untried have been overcome, it is much easier not only to do the same thing again but also to do similar things in different directions, so that a first success will always produce a cluster” (1935: 141).

Entrepreneurship provides a link between institutions and volatility. For example, Sobel (2008) demonstrates an empirical link between economic freedom and entrepreneurship. Taken together, then, there is the possibility of a causation running from freedom to entrepreneurship and innovation to macroeconomic volatility. Along these lines, more freedom may drive entrepreneurship and innovation that contribute to economic growth, but the path of growth may be more volatile.

Economic institutions also affect an economy's ability to adjust to shocks. Shocks from government policy, technology, exchange rates, resource supplies, and commodity prices necessitate adjustments and reallocation of resources to avoid collapses in output and employment. Institutions contributing to state ownership or subsidization of enterprises, wage and price rigidities, erratic fiscal policy, unsound monetary policy, uncertainty over property rights and judicial rulings, protectionism and overvalued currencies, and limited access to capital markets all have the potential to affect—either positively or negatively—an economy's ability to make essential adjustments and efficient reallocations of resources in light of economic instability.

For example, weak institutions leave economic cooperation to rely on trust, in which case shocks may lead to a breakdown of cooperation and economic collapses. Similarly, weak institutions result in imperfect contractual arrangements and leave economic relationships more susceptible to shocks. Thus, it is also possible to argue that institutions consistent with less freedom may exacerbate macroeconomic volatility.

While the preceding theoretical discussion is obviously far from complete, the point is to illustrate that

theory alone cannot settle the debate over the relationship between market institutions and economic stability. It is ultimately an empirical issue. The analysis in the next section seeks to provide an empirical answer to this question.

## Data, Methodology, and Empirical Model

The empirical methodology used in this chapter is cross-country regression analysis. For all of the analysis that follows, the sample includes 85 countries over the period from 1980 to 2007. The dependent variable is a measure of economic volatility. Each regression includes a common set of explanatory variables and a measure of economic freedom. Separate regressions are run using the overall EFW index and each of its five underlying Areas of economic freedom as the explanatory variable of interest. All explanatory variables considered in the empirical analysis are briefly discussed below, except for the measures of economic freedom that were discussed in the previous section.

Macroeconomic volatility, the dependent variable in the analysis, is measured using the standard deviation of annual growth rates of real GDP per capita. This is a standard measure of business-cycle volatility and has been used in a number of recent studies (e.g., Acemoglu, Johnson, Robinson, and Thaicharoen, 2003; Lipford, 2007). This volatility measure implicitly assumes the trend growth rate is constant and equal to the mean for each country.<sup>5</sup>

The control variables considered for the volatility regressions represent the major causes of macroeconomic fluctuations as described in the literature. These include the standard deviation of terms of trade shocks (measured as the standard deviation of the annual growth rate of terms of trade), the frequency of systemic banking crises (measured as the fraction of years in the sample

period during which a country experienced a major crisis), the importance of commodity exports (measured as the percentage of metal and ore exports in GDP), and the soundness of monetary policy (measured by the standard deviation of consumer price inflation). The intuition for including these variables is to control for the major shocks that drive macroeconomic fluctuations across countries. The average over the period 1980 to 2007 is used for each of these variables. Theory predicts a positive coefficient on all of these explanatory variables.

In addition to using the 1980-2007 average *level* of economic freedom as the explanatory variable of interest, two other measures of economic freedom are considered in the analysis: the *change* in the EFW index and the *volatility* of the path of economic freedom over the period from 1980 to 2007. These variables are included in the regressions both with and without the level of freedom as an explanatory variable. Changes in economic freedom have been shown to be important along with the level of freedom in explaining long-run growth experiences across countries in a number of studies (e.g., Dawson, 1998). In addition, Pitlik (2002) showed that a measure of the volatility of economic freedom is negatively related to long-run growth rates across countries even after controlling for the level of freedom. Pitlik's measure of the volatility of freedom was the standard deviation of the time series of changes in freedom over the sample period, and that measure is used here.

The use of the standard deviation of inflation as a control variable in the analysis requires an adjustment of the underlying EFW data. Specifically, the standard deviation of inflation, which is used as a control variable in all regressions, is also a component of Area 3 (Access to Sound Money) in the EFW index (see Component 3B in table 4.1). To avoid correlation between these explanatory variables, the EFW index is adjusted to exclude Area 3 from the measure of overall economic freedom. Similarly, Area 3 of the EFW index is adjusted to eliminate the standard deviation of inflation in the measure of access to sound money. These adjusted measures of the EFW index and Area 3 are used in the analysis that follows.

The analysis also considers the possibility that economic freedom is endogenous. That is, economic freedom itself may be determined to some extent by the underlying macroeconomic environment, in particular the volatility of the business cycle. For example, governments may impose more stringent labor regulations in economies that face more extreme fluctuations. Similarly, fluctuations of the business cycle may prompt various other policy changes that affect the degree of economic freedom. In

5 An alternative measure of volatility is the standard deviation of the output "gap" measured as the difference between actual and trend real GDP per capita, where the trend is obtained using a smoothing method such as the Hodrick-Prescott filter. This method allows for a time-varying trend for each country, whereas the standard deviation of growth rates implies a constant trend. Each method has benefits and costs depending on the exact nature of a given country's growth path. In practice, however, the two volatility measures are highly correlated and provide qualitatively similar results in the analysis below. Thus, only the results using the standard deviation of annual growth rates as the dependent variable are reported below.



order to identify causation running from economic freedom to volatility, instrumental variables that isolate the exogenous variation in economic freedom are used. The instrumental variables used to identify exogenous variation in economic freedom are selected in light of the recent literature on the determinants of institutions in general (e.g., Hall and Jones, 1999; Dollar and Kraay, 2003). They include the initial level of real GDP per capita, proxies for the degree of Western influence (measured as the fraction of the population speaking a major European language), and the other exogenous explanatory variables in the analysis (standard deviation of terms of trade shocks, frequency of systemic banking crises, the percentage of metal and ore exports in GDP, and the standard deviation of inflation rates).

Underlying data on real GDP per capita, inflation rates, metal and ore exports, and terms of trade are from the World Bank's *World Development Indicators* database. Data on systemic banking crises are from Caprio and Klingebiel (1996). Data on the fraction of the population speaking a major European language are from Dollar and Kraay (2003). Data on the initial (1980) level of real GDP per capita in common international currency units are from the Penn World Tables (Version 5.6), as described in Summers and Heston (1991). As noted above, the EFW index and its five underlying Area measures are from Gwartney, Lawson, and Hall (2009).

## Empirical Results

This section describes the empirical results for the models discussed above. Estimation of models is by ordinary least squares and, for the instrumental variables analysis, two-stage least squares. Reports of statistical significance are based on Newey-West heteroskedasticity-consistent standard errors. The common sample of 85 countries used for all of the models estimated below is the largest sample for which data were available for all variables (table 4.2). Table 4.3 and table 4.4 provide summary statistics and correlation coefficients for all of the model variables. Again, the sample period covered in the analysis is 1980 to 2007.

Several control variables discussed in the previous section were consistently found to be unimportant in explaining volatility across countries, namely the frequency of systemic banking crises and the standard deviation of inflation. Although these variables are consistently found to be statistically insignificant, they are theoretically valid and likely to be correlated with other explanatory variables. Since excluding these variables would violate one of the classical assumptions of the linear regression model and cause bias in the coefficient estimates, they are not excluded from the analysis.

Measures of the change in economic freedom and the volatility of economic freedom are also found to be statistically insignificant in all models, and these variables

**Table 4.2: Countries Included in the 85-country sample**

Algeria	Côte d'Ivoire	Haiti	Madagascar	Portugal
Argentina	Cameroon	Honduras	Mexico	Senegal
Australia	Congo, Republic of	Hong Kong	Mali	Singapore
Austria	Colombia	Hungary	Malawi	South Africa
Burundi	Costa Rica	Iceland	Malaysia	Spain
Belgium	Denmark	Indonesia	Niger	Sweden
Benin	Dominican Republic	India	Nigeria	Syria
Bangladesh	Ecuador	Ireland	Nicaragua	Thailand
Belize	Egypt	Israel	Netherlands	Togo
Bolivia	El Salvador	Italy	Norway	Trinidad and Tobago
Brazil	Finland	Jamaica	Nepal	Tunisia
Botswana	France	Jordan	New Zealand	Turkey
Central African Republic	Gabon	Japan	Pakistan	United Kingdom
Canada	Germany	Kenya	Panama	United States
Switzerland	Ghana	Sri Lanka	Peru	Uruguay
Chile	Greece	Luxembourg	Philippines	Venezuela
China	Guatemala	Morocco	Papua New Guinea	Zambia

Note: The final 85-country sample excludes Rwanda and Sierra Leone because of outlier observations on volatility. This exclusion does not qualitatively affect the results reported below.

Table 4.3: Summary statistics

Variable	No. Obs.	Mean	Std. Dev.	Min.	Max.
Volatility	85	3.42	1.46	1.14	6.54
EFW (Summary) Index	85	6.11	0.95	4.43	8.67
Area 1 (size of government)	85	5.68	1.24	2.71	9.34
Area 2 (legal/property rights)	85	5.63	1.76	2.90	8.65
Area 3 (sound money)	85	7.06	1.58	2.55	9.68
Area 4 (freedom to trade)	85	6.39	1.27	3.38	9.64
Area 5 (regulation)	85	5.77	0.89	3.19	7.89
Terms of Trade Shocks	85	9.17	7.31	0.18	42.41
Metal & Ore Exports (% of GDP)	85	1.40	2.46	0.00186	14.16
Banking Crises (% of sample)	85	0.13	0.17	0.00	0.70

Note: See variable definitions in the text.

Table 4.4: Correlation coefficients

Variable	Volatility	EFW Index	Area 1	Area 2	Area 3
Volatility	1				
EFW Index	-0.424***	1			
Area 1	0.321	0.136	1		
Area 2	-0.516***	0.804***	-0.335***	1	
Area 3	-0.540***	0.824***	-0.110	0.632***	1
Area 4	-0.332***	0.878***	-0.044	0.746***	0.675***
Area 5	-0.262***	0.834***	0.244	0.593***	0.565***
Terms of Trade	0.446***	-0.621***	0.074	-0.598***	-0.549***
Metal & Ore Exports	0.248**	0.035	0.084	-0.010	-0.104
Banking Crises	-0.017	-0.130	0.155	-0.125	-0.161

Variable	Area 4	Area 5	Terms of Trade	Metal & Ore Exports	Banking Crises
Volatility					
EFW Index					
Area 1					
Area 2					
Area 3					
Area 4	1				
Area 5	0.646***	1			
Terms of Trade	-0.600***	-0.395***	1		
Metal & Ore Exports	0.113	-0.073	0.032	1	
Banking Crises	-0.206*	-0.076	0.146	-0.120	1

Notes: See variable definitions in the text. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

are subsequently excluded from the analysis. The failure of changes in economic freedom and volatility of freedom to explain cross-country variation in macroeconomic volatility suggests that economic freedom generally is not among the shocks that cause fluctuations in the business cycle. Rather, the level of economic freedom appears to have important implications for an economy's ability to adjust to the shocks that drive the business cycle.

Results for the ordinary least squares (OLS) estimation of the base model (without instrumental variables) are provided in table 4.5. Column (1) provides the results using the overall EFW index (adjusted to exclude Area 3, as noted above). The results suggest a negative but statistically insignificant effect of overall economic freedom on macroeconomic volatility after accounting for other determinants of cross-country volatility. Coefficients on terms of trade shocks and metal and ore exports are positive and statistically significant, as expected. Among the underlying Areas of the EFW index, only Areas 2 (Legal Structure and Security of Property Rights) and 3 (Access to Sound Money, adjusted to exclude inflation variability) are negative and statistically significant at conventional

levels. Areas 4 (Freedom to Trade Internationally) and 5 (Regulation of Credit, Labor, and Business) are negative, but statistically insignificant. Area 1 (Size of Government) is significantly positive. The estimated impacts of an increase of one standard deviation in Areas 2 and 3 in reducing volatility over the 28-year period are  $-0.58$  and  $-0.46$ , respectively. An increase of one standard deviation in Area 1 (corresponding to a decrease in the size of government) increases volatility by  $0.43$  over the 28-year sample period.

It is possible the estimates from the OLS analysis are inconsistent because of endogeneity of the economic freedom variable. A version of the Hausman specification test proposed by Davidson and MacKinnon (1989, 1993) suggests endogeneity may be a problem in the specifications that include the overall EFW index, Area 4, and Area 5 as the variable of interest. These test results, reported in table 4.6, suggest that the instrumental variables (IV) technique is appropriate for these three specifications at a minimum. Results from the IV estimation for all specifications are reported in table 4.6. For all models, the first stage  $F$ -statistics suggest the instruments are sufficiently strong.

**Table 4.5: Volatility and economic freedom, 1980–2007, ordinary least squares (OLS) estimation**

Variable	Economic Freedom Index					
	Overall (1)	Area 1 (2)	Area 2 (3)	Area 3 (4)	Area 4 (5)	Area 5 (6)
Constant	3.98* (1.3710)	0.57 (0.5665)	4.75*** (0.7310)	4.79*** (0.7197)	3.81*** (1.1994)	3.74*** (1.1061)
Economic Freedom, 1980–2007 Avg.	-0.24 (0.2047)	0.35*** (0.1141)	-0.33*** (0.0954)	-0.29*** (0.0831)	-0.18 (0.1593)	-0.21 (0.1692)
Volatility of Terms of Trade Growth	0.08*** (0.027)	0.09*** (0.0206)	0.05* (0.0258)	0.07** (0.0232)	0.07** (0.0293)	0.08*** (0.0231)
Metal/Ore Exports (% of GDP)	0.15*** (0.0538)	0.12** (0.0531)	0.14*** (0.0445)	0.13** (0.0545)	0.15*** (0.0532)	0.15*** (0.0556)
Standard Deviation of Inflation	-0.0001 (0.0004)	-0.0003 (0.0004)	-0.0002 (0.0004)	-0.0003 (0.0004)	-0.0002 (0.0004)	-0.0002 (0.0004)
Frequency of Banking Crises	-0.56 (0.8954)	0.97 (0.9670)	-0.67 (0.9315)	-0.90 (0.8059)	-0.66 (0.8963)	-0.54 (0.8763)
Adjusted $R^2$	0.23	0.30	0.32	0.30	0.23	0.23
Observations	85	85	85	85	85	85

Notes: The dependent variable is the standard deviation of the growth rate of real GDP per capita over the 1980–2007 period. Estimation is by ordinary least squares. Heteroskedasticity-consistent (Newey-West) standard errors are shown in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.



Table 4.6: Volatility and economic freedom, 1980–2007, instrumental variables (IV) estimation

Variable	Economic Freedom Index					
	Overall (1)	Area 1 (2)	Area 2 (3)	Area 3 (4)	Area 4 (5)	Area 5 (6)
Constant	7.29*** (1.9911)	−0.58 (1.1582)	4.84*** (0.7276)	6.49*** (1.2887)	7.64*** (1.7821)	7.16*** (2.1729)
Economic Freedom, 1980–2007 Avg.	−0.75** (0.3105)	0.56** (0.2247)	−0.34*** (0.0976)	−0.50*** (0.1564)	−0.71*** (0.2387)	−0.76** (0.3570)
Volatility of Terms of Trade Growth	0.04 (0.0290)	0.09*** (0.0212)	0.05* (0.0253)	0.04 (0.0302)	0.02 (0.0379)	0.06* (0.0301)
Metal/Ore Exports (% of GDP)	0.16*** (0.0512)	0.11** (0.0540)	0.14*** (0.0442)	0.12** (0.0545)	0.18*** (0.0463)	0.16*** (0.0591)
Standard Deviation of Inflation	−0.0001 (0.0004)	−0.0004 (0.0004)	−0.0002 (0.0004)	−0.0003 (0.0004)	−0.0001 (0.0004)	−0.0002 (0.0004)
Frequency of Banking Crises	−0.61 (0.9707)	−1.23 (1.2288)	−0.67 (0.9412)	−1.17 (0.7962)	−1.04 (1.0620)	−0.57 (0.9009)
Adjusted $R^2$	0.16	0.27	0.32	0.25	0.10	0.13
First Stage $F$ -value	24.42***	4.16***	61.61***	14.72***	21.38***	9.37***
Hausman $p$ -value	0.0303	0.2883	0.8380	0.1406	0.0135	0.0591
Observations	85	85	85	85	85	85

Notes: The dependent variable is the standard deviation of the growth rate of real GDP per capita over the 1980–2007 period. Estimation is by two-stage least squares. Instruments for economic freedom are the level of GDP per capita in 1980, the fraction of the population speaking a major European language, volatility of terms of trade growth, metal and ore exports as a percentage of GDP, the standard deviation of inflation, and frequency of systemic banking crises. First stage  $F$ -value is the  $F$ -statistic from the regression of the economic freedom variable on the instruments. Hausman  $p$ -value is the level of significance of the  $t$ -statistic for the null hypothesis that the OLS coefficients are consistent based on the version of the Hausman test proposed by Davidson and MacKinnon (1989, 1993). Heteroskedasticity-consistent (Newey-West) standard errors are shown in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

In general, accounting for the endogeneity of economic freedom increases both the size and significance of the coefficient estimates. In particular, the coefficient on the overall economic freedom index is now negative and statistically significant at conventional confidence levels. The estimated impact of an increase of one standard deviation in the EFW index is a 0.71 reduction in volatility over the 28-year sample period. This potential impact represents nearly half of the standard deviation in the volatility measure over the sample period. The coefficients on Areas 2 and 3 remain negative and statistically significant and their estimated impacts increase to −0.60 and −0.79, respectively, for an increase of one standard deviation in the index for each Area. The estimated coefficients on metal and ore exports retain their significance and expected signs in the IV analysis, but the standard deviation of terms of trade shocks loses its statistical significance in several of the regressions.

Areas 4 and 5, which were found to be statistically insignificant in the OLS results, are now significantly negative at conventional confidence levels in the IV regressions. The estimated coefficients on these areas of freedom are considerably larger than in the OLS regressions. The estimated reductions in volatility over the 28-year period resulting from a one standard deviation increase in Areas 4 and 5 are estimated to be −0.90 and −0.68, respectively. Note that the estimated volatility-reducing impacts of Areas 3 (Access to Sound Money) and 4 (Freedom to Trade Internationally) from the IV analysis are larger than that for the overall EFW index, suggesting that improvements in these areas of freedom may be particularly effective in reducing aggregate volatility.

The IV results also indicate that the coefficient on Area 1 (Size of Government) remains positive and statistically significant. The estimated impact of an increase of

one standard deviation in Area 1 (a move that is synonymous with smaller government) is now a 0.69 increase in the volatility measure over the 28-year sample. One possible interpretation of this result, of course, is that policies consistent with larger government are effective in stabilizing the business cycle. There are others. One is that size of government is a policy *outcome* rather than an underlying institutional characteristic (the latter better describes the other areas of the EFW index). As such, higher volatility may cause larger government as a result of countercyclical policy responses. The possibility that built-in or automatic stabilizers increase the scope of government during times of economic instability is also consistent with this line of causation. This potential endogeneity of the size of government may not be attenuated by the instrumental variables intended to isolate the exogenous variation in the more deeply rooted institutional characteristics of an economy. Indeed, this specification has the lowest first stage *F*-value among all the specifications, and the Hausman test suggests the original OLS estimates are not inconsistent.

It is also possible that size of government and volatility are negatively related because countries with larger governments are more insulated from business-cycle volatility, since government spending tends to vary less over the course of the business cycle than do the private spending components. With a larger share of output devoted to government, there is naturally less volatility in output. Similarly, it may simply be that as government grows so too does the share of employment in the government sector, which is relatively stable across the business cycle. Thus, as the size of government measure increases, the economy becomes more stable (albeit at a lower level of growth).<sup>6</sup>

## Conclusions

This chapter uses cross-country data on the level of economic freedom to estimate the relationship between economic freedom and business-cycle volatility. The results suggest a statistically significant negative relationship between a broad measure of economic freedom and macroeconomic volatility, even after controlling for other determinants of volatility and accounting for possible endogeneity of economic freedom. A statistically significant negative relationship is also found for most of the underlying Areas of the broader EFW index—aspects of freedom relating to (2) Legal Structure and Security of Property Rights; (3) Access to Sound Money; (4) Freedom to Trade Internationally; and (5) Regulation of Credit, Labor, and Business. The Area of economic freedom corresponding to smaller size of government (1) is found to have a statistically significant positive relationship with volatility, possibly suggesting countercyclical policies or automatic stabilizers corresponding to larger government may be effective in stabilizing the business cycle.

Measures of the change in freedom over time and the volatility of the path to freedom are found to be insignificantly related to macroeconomic volatility. This finding suggests that freedom itself is not a shock that generates business fluctuations at the aggregate level, but rather that freedom allows the economy to cope better with other shocks that drive the business cycle.

Taken together, these results suggest that the benefits of economic freedom are not just limited to long-run growth outcomes—that increases in economic freedom can provide both higher and more stable growth over time.

<sup>6</sup> Thanks to an anonymous referee for suggesting this line of reasoning.

## References

- Acemoglu, Daron, Simon Johnson, James Robinson, and Yunyong Thaicharoen (2003). Institutional Causes, Macroeconomic Symptoms: Volatility, Crises, and Growth. *Journal of Monetary Economics* 50: 49–123.
- Berggren, N. (2003). The Benefits of Economic Freedom. *Independent Review* 8: 193–211.
- Caprio, Jr., Gerard, and Daniela Klingebiel (1996). *Bank Insolvencies: Cross Country Experience*. Policy Research Working Paper No. 1620. The World Bank.
- Davidson, Russell, and James G. MacKinnon (1989). Testing for Consistency using Artificial Regressions. *Econometric Theory* 5: 363–84.
- Davidson, Russell, and James G. MacKinnon (1993). *Estimation and Inference in Econometrics*. Oxford Univ. Press.
- Dawson, John W. (1998). Institutions, Investment, and Growth: New Cross-Country and Panel Data Evidence. *Economic Inquiry* 36: 603–19.
- De Haan, J., Suzanna Lundstrom, and Jan-Egbert Sturm (2006). Market-Oriented Institutions and Policies and Economic Growth: A Critical Survey. *Journal of Economic Surveys* 20: 157–91.
- Dollar, David, and Aart Kraay (2003). Institutions, Trade, and Growth. *Journal of Monetary Economics* 50: 133–62.
- Easterly, William, Roumeen Islam, and Joseph E. Stiglitz (2001). Shaken and Stirred: Explaining Growth Volatility. Annual World Bank Conference on Development Economics: 191–211.
- Friedman, Milton (1982). *Capitalism and Freedom*. University of Chicago Press.
- Gwartney, James D., Robert A. Lawson, and Walter Block (1996). *Economic Freedom of the World: 1975–1995*. Fraser Institute.
- Gwartney, James D., Robert A. Lawson, and Joshua C. Hall (2009). *Economic Freedom of the World: 2009 Annual Report*. Fraser Institute.
- Hall, Robert E., and Charles Jones (1999). Why Do Some Countries Produce So Much More Output per Worker than Others? *Quarterly Journal of Economics* 114: 83–116.
- Lipford, Jody W. (2007). Short Run Macroeconomic Performance and Economic Freedom: Can Economic Growth Rates be Higher and More Stable? *Journal of Private Enterprise* 23, 1: 3–29.
- Pitlik, H. (2002). The Path of Liberalization and Economic Growth. *Kyklos* 55: 57–80.
- Schumpeter, Joseph A. (1935). The Analysis of Economic Change, Review of *Economic Statistics*. In Richard V. Clemence, ed., *Essays on Entrepreneurs, Innovations, Business Cycles, and the Evolution of Capitalism* (Transaction Publishers): 134–49.
- Sobel, Russell S. (2008). Testing Baumol: Institutional Quality and the Productivity of Entrepreneurship. *Journal of Business Venturing* 23, 6: 641–55.
- Summers, Robert, and Alan Heston (1991). The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–1988. *Quarterly Journal of Economics* 106: 327–68.
- World Bank (2009). *World Development Indicators*. World Bank.

