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Macroeconomic Volatility and Economic Freedom: A Cross-Country Analysis

John W. Dawson
Appalachian State University

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John W. Dawson*
Department of Economics
Appalachian State University
Boone, NC 28608-2051
dawsonjw@appstate.edu
828-262-6128

Abstract

This paper examines the empirical relationship between business cycle volatility and economic freedom across countries. In a diverse sample of 85 countries, the results suggest a significantly negative relationship between volatility and a broad measure of freedom—even after controlling for other determinants of cross-country volatility and using an instrumental variables procedure to account for the likely endogeneity of economic freedom. Among the underlying areas of the freedom index, all but the size of government component also have a significantly negative relationship with volatility. Size of government is found to have a significantly positive relationship with volatility. Measures of changes in freedom and the volatility of freedom are found to be statistically insignificant, suggesting that freedom is not among the shocks that cause business cycles. Rather, freedom appears to allow economies to better adjust to those shocks that drive business cycles.

JEL **classifications:** E32, H11
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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 quote has been extensively studied in the economics literature. Numerous studies have examined the relationship between economic freedom and long-run economic growth across countries.[1] 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.[2] 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 potential 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 publication of the *Economic Freedom of the World* (EFW) index.[3] 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 which are aggregated into a

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[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 paper is Gwartney, Lawson, and Hall (2009).

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 that comprise each area are listed in Table 1. All underlying data are converted to a scale from 1 (representing the least free) to 10 (most free). Each underlying component is equally weighted to construct an area index for each of the 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 1975-1995, and annually since 1995.[4]

This paper uses the EFW index to examine the relationship between economic freedom and business cycle volatility across countries. The economic freedom data allow the analysis to include a broad measure of freedom as well as the five underlying areas of freedom noted above. Preliminary evidence of the freedom-volatility relationship is provided in Figures 1-6. The figures present scatter plots of the EFW index and its five underlying areas of freedom against the measure of volatility, namely the standard deviation of annual growth rates of real GDP per capita. 85 countries are included and the 1980-2007 average is used for the EFW index and its five areas. Figure 1 shows a 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 paper further explores the relationship between economic freedom and volatility. In particular, the analysis examines whether the relationships suggested in Figures 1-6 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 paper provides a brief theoretical perspective on the institutions-volatility debate. The next section then discusses the empirical model, methodology, and data in detail. A discussion of the empirical results appears in the following section. The final section offers some concluding remarks.

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

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.

Economic institutions affect an economy's ability to adjust to shocks. Shocks from government policy, technology, exchange rates, 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, unsound monetary policy practices, economic uncertainty over property rights and judicial rulings, protectionism and overvalued currencies, and limited access to capital markets all negatively impact an economy's ability to make essential adjustments and efficient reallocations of resources in light of economic instability.

More recently and from a public choice perspective, Acemoglu, Johnson, Robinson, and Thaicharoen (2003) provide six channels through which weak institutions might result in greater economic instability. (1) Weak institutions allow political power to result in redistribution of assets and income to those in power, creating economic turbulence in the process. (2) Weak institutions result in more infighting among various political groups and, thus, greater political and economic turbulence. (3) Weak institutions leave economic cooperation to rely on trust, in which case shocks may lead to a breakdown of cooperation and economic collapses. (4) Weak institutions result in imperfect contractual arrangements and leave economic relationships more susceptible to shocks. (5) Institutional problems may force politicians to pursue unsustainable policies to remain in power, resulting in volatility when these policies are abandoned. (6) Weak institutions may lead entrepreneurs to invest in sectors or activities from which they can quickly withdraw, thus contributing to economic instability.

Ultimately, theory cannot settle the debate over the relationship between market institutions and economic stability. 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 paper is cross-country regression analysis. 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 the five underlying areas of economic freedom as the explanatory variable of interest. All variables considered in the empirical analysis are briefly discussed below, except for the economic freedom indexes 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. See, for example, the studies by Acemoglu, Johnson, Robinson, and Thaicharoen (2003) and Lipford (2007). This volatility measure implicitly assumes the trend growth rate is constant and equal to the mean for each country.[5]

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).

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[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.

In addition to using the *level* of economic freedom as the explanatory variable of interest, two other measures of economic freedom are considered in the analysis. Specifically, the *change* in the EFW index and the *volatility* of the path of economic freedom are considered. Changes in economic freedom have been shown to be important in explaining long-run growth experiences across countries in a number of studies (see, 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. Pitlik's measure of the volatility of freedom was the standard deviation of the time series of changes in freedom over the sample period.

The analysis also considers the possibility that economic freedom is endogenous. That is, economic freedom 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, business cycle fluctuations may prompt various other policy changes that affect the degree of economic freedom. In 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.[6] 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, and the percentage of metal and ore exports in GDP).

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

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[6]See, for example, Hall and Jones (1999) and Dollar and Kraay (2003).

units are from the Penn World Tables (Version 5.6). As noted above, the EFW index and its five underlying area indexes are from Gwartney, Lawson, and Hall (2009).

Empirical Results

This section discusses the empirical results for the models discussed above. The sample period for all results is 1980-2007. Estimation of the model 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. A common sample of 85 countries is used for all of the models estimated below—the largest sample for which data were available for all variables.[7] Table 2 lists the 85 countries included in the analysis. Tables 3 and 4 provide summary statistics and correlation coefficients for all of the model variables.

Several variables discussed in the previous section were consistently found to be unimportant in explaining volatility across countries, and these variables were subsequently excluded from the analysis. The explanatory variable measuring the frequency of systemic banking crises proved to be statistically insignificant in all of the estimated models and was excluded from the analysis. The standard deviation of inflation was also found to be statistically insignificant in all estimated models and was excluded.[8]

Measures of the change in economic freedom and the volatility of economic freedom were also found to be statistically insignificant in all models, so they were excluded. The failure of changes in freedom and volatility of freedom to explain cross-country variation in macroeconomic volatility suggests that freedom generally is not the shock that causes business cycle fluctuations. Instead, the level of economic freedom

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[7]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.
[8]The initial models that included the standard deviation of inflation used a customized version of the EFW index with Area 3 (Access to Sound Money) excluded, since Area 3 includes a measure of inflation variability as an underlying component (see component 3.B. in Table 1). Separately, Area 3 of the EFW index was used instead of the standard deviation of inflation as a measure of the soundness of monetary policy. With the other measures of economic freedom included, Area 3 remains statistically insignificant in all models and does not affect the significance of the other measures of economic freedom. Subsequent models estimated with neither the standard deviation of inflation nor Area 3 as an explanatory variable (i.e., the results reported below) use the published version of the EFW index (with all areas included).

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 5. Column (1) provides the results using the overall EFW index. The results suggest a negative and statistically significant effect of overall economic freedom on macroeconomic volatility. Coefficients on terms of trade shocks and metal and ore exports are positive and statistically significant, as expected. In economic terms, the results suggest that a one standard deviation increase in the overall EFW index reduces business cycle volatility (measured as the standard deviation of per capita output growth over the 28-year period) by 0.38. This represents a decline in volatility of slightly more than one quarter of the standard deviation in volatility across countries.

Among the underlying areas of the EFW index, only Areas 2 (legal structure and security of property rights) and 3 (access to sound money) 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 a one standard deviation increase in Areas 2 and 3 in reducing volatility over the 28-year period (−0.56 and −0.59, respectively) are larger than that for the overall index (−0.38) reported above. A one standard deviation increase in Area 1 (corresponding to a decrease in the size of government) increases volatility by 0.40 over the 28-year sample period.

Next, the results from the instrumental variables (IV) analysis are reported in Table 6. In general, accounting for the endogeneity of economic freedom increases both the significance of the coefficient estimates and the estimated impacts of increases in economic freedom. The coefficient on the overall economic freedom index remains negative and significant at the 1% level, but the estimated impact of a one standard deviation increase in overall freedom increases to a 0.71 reduction in the volatility measure. This estimate represents nearly half of the standard deviation in the volatility measure over the sample period. Similarly, the coefficients on Areas 2 and 3 remain statistically significant and the estimated impacts increase to −0.60 and −0.98, respectively, for a one standard deviation increase 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 now estimated to be −0.86 and −0.70, 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 now larger than that for the overall freedom index.

The IV results also indicate that the coefficient on Area 1 (size of government) remains positive and statistically significant. The estimated impact of a one standard deviation increase in the Area 1 index (a move which is synonymous with smaller government) is 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, however, other possible explanations.

One possible explanation is that government size 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.

It is also possible that Area 1 is positively related to volatility 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 private spending components. With a larger share of output devoted to government, there is naturally less volatility in output.

Conclusions

This paper 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 component areas of the broader freedom index—aspects of freedom relating to (1) legal structure and security of property rights; (2) access to sound money; (3) freedom to trade internationally; and (4) regulation of credit, labor, and business. The area of freedom corresponding to smaller size of government 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 changes in 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 better cope with the 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 freedom can provide both higher and more stable growth over time.

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Table 1: Areas and Components of the EFW Index

1. **Size of Government: Expenditures, Taxes, and Enterprises**
   A.   General government consumption spending as a percentage of total consumption
   B.   Transfers and subsidies as a percentage of GDP
   C.   Government enterprises and investment as a share of total investment
   D.   Top marginal tax rate (and income threshold at which it applies)
        i.   Top marginal income tax rate (and income threshold at which it applies)
        ii.   Top marginal income and payroll tax rate (and income threshold at which the top marginal income-tax rate applies)

2. **Legal Structure and Security of Property Rights**
   A.   Judicial independence—the judiciary is independent and not subject to interference by the government or parties in disputes
   B.   Impartial courts—a trusted legal framework exists for private businesses to challenge the legality of government actions or regulation
   C.   Protection of intellectual property
   D.   Military interference in rule of law and the political process
   E.   Integrity of the legal system

3. **Access to Sound Money**
   A.   Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last ten years
   B.   Standard inflation variability in the last five years
   C.   Recent inflation rate
   D.   Freedom to own foreign currency bank accounts domestically and abroad

4. **Freedom to Trade Internationally**
   A.   Taxes on international trade
        i.   Revenue from taxes on international trade as a percentage of exports plus imports
        ii.   Mean tariff rate
        iii.   Standard deviation of tariff rates
   B.   Regulatory trade barriers
        i.   Non-tariff trade barriers
        ii.   Compliance cost of importing and exporting
   C.   Actual size of trade sector compared to expected size
   D.   Difference between official exchange rate and black-market rate
   E.   International capital market controls
        i.   Foreign ownership/investment restrictions
        ii.   Restrictions on the freedom of citizens to engage in capital market exchange with foreigners—index of capital controls among 13 IMF categories

5. **Regulation of Credit, Labor, and Business**
   A.   Credit market regulations
        i.   Ownership of banks—percentage of deposits held in privately owned banks
        ii.   Competition—domestic banks face competition from foreign banks
        iii.   Extension of credit—percentage of credit extended to private sector
        iv.   Avoidance of interest rate controls and regulations that lead to negative real interest rates
        v.   Interest rate controls—interest rate controls on bank deposits an/or loans are freely determined by the market
   B.   Labor market regulations
        i.   Impact of minimum wage
        ii.   Hiring and firing practices—hiring and firing practices of companies are determined by private contract
        iii.   Share of labor force whose wages are set by centralized collective bargaining

    iv. Unemployment benefits—the unemployment benefits system preserves the incentive to work

    v. Use of conscripts to obtain military personnel

  C. Business regulations

    i. Price controls—extent to which businesses are free to set their own prices

    ii. Burden of regulation

    iii. Time with government bureaucracy—senior management spends a substantial amount of time dealing with government bureaucracy

    iv. Starting a new business—starting a new business is generally easy

    v. Irregular payments—irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare

Source: Gwartney, Lawson, and Hall (2009), p. 6.

Table 2: Countries Included in the 85-Country Sample

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

Table 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: Correlation Coefficients

	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
Bank Crises	−0.017	−0.130	0.155	−0.125	−0.161

	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	
Bank 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.

Table 5: Volatility and Economic Freedom, 1980-2007, OLS Estimation

| | Economic Freedom Index | | | | | |
| | Overall | Area 1 | Area 2 | Area 3 | Area 4 | Area 5 |
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Constant	5.15***	0.66	4.67***	5.45***	3.70***	3.69***
	(1.3523)	(0.5547)	(0.7605)	(0.9181)	(1.2373)	(1.1238)
Economic freedom	−0.40**	0.32***	−0.32***	−0.37***	−0.18	−0.21
index, 1980-2000	(0.1901)	(0.1035)	(0.0997)	(0.1043)	(0.1632)	(0.1705)
average						
Volatility of terms	0.06**	0.08***	0.04*	0.04**	0.07**	0.08***
of trade growth,	(0.0240)	(0.0183)	(0.0210)	(0.0221)	(0.0265)	(0.0208)
1980-2000						
Metal & ore exports	0.15***	0.13**	0.14***	0.12**	0.15***	0.15***
(% of GDP), 1980-	(0.0505)	(0.0510)	(0.0450)	(0.0502)	(0.0526)	(0.0542)
2000 average						
Adjusted R^2	0.27	0.30	0.33	0.34	0.24	0.24
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 6: Volatility and Economic Freedom, 1980-2007, IV Estimation

| | Economic Freedom Index | | | | | |
| | Overall | Area 1 | Area 2 | Area 3 | Area 4 | Area 5 |
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Constant	7.52***	−0.66	4.79***	7.52***	7.34***	7.27***
	(1.8860)	(1.1740)	(0.7475)	(1.6082)	(1.7272)	(2.2379)
Economic freedom	−0.75***	0.56**	−0.34***	−0.62***	−0.68***	−0.79**
index, 1980-2000	(0.2759)	(0.2210)	(0.0997)	(0.1889)	(0.2328)	(0.3663)
average						
Volatility of terms of	0.03	0.08***	0.04*	0.01	0.02	0.05*
trade growth, 1980-	(0.0290)	(0.0185)	(0.0219)	(0.0322)	(0.0304)	(0.0259)
2000						
Metal & ore exports	0.16***	0.12**	0.14***	0.10**	0.19***	0.16***
(% of GDP), 1980-	(0.0489)	(0.0512)	(0.0446)	(0.0482)	(0.0479)	(0.0585)
2000 average						
Adjusted R^2	0.24	0.26	0.33	0.29	0.12	0.13
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, and metal and ore exports as a percentage of GDP. Heteroskedasticity-consistent (Newey-West) standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

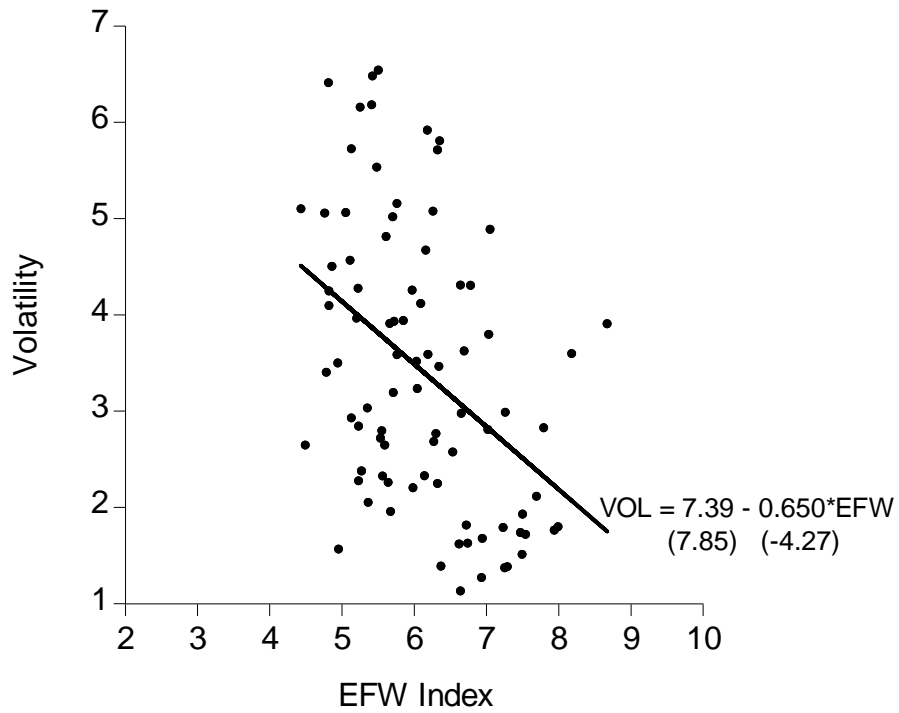**Figure 1: Volatility and the EFW Index, 1980-2007**

VOL = 7.39 - 0.650*EFW
(7.85) (-4.27)

Figure 2: Volatility and Area 1 of the EFW Index, 1980-2007

VOL = 1.28 + 0.377*Area 1
(1.80) (3.09)
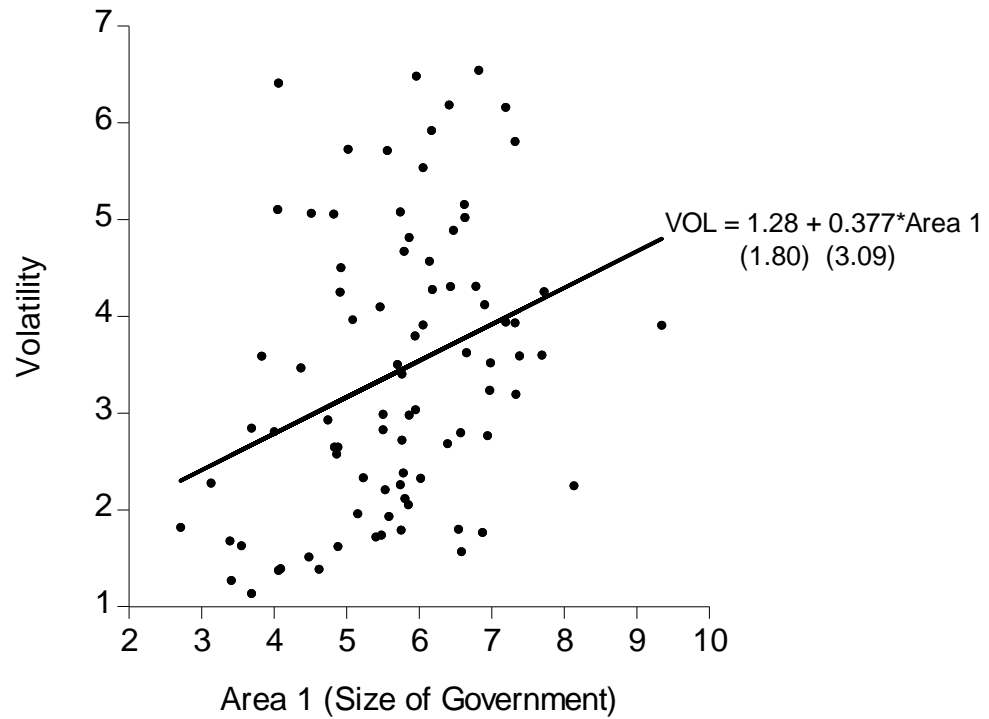
Figure 3: Volatility and Area 2 of the EFW Index, 1980-2007

VOL = 5.82 - 0.427*Area 2
(12.71) (-5.49)

Area 2 (Security of Property Rights)
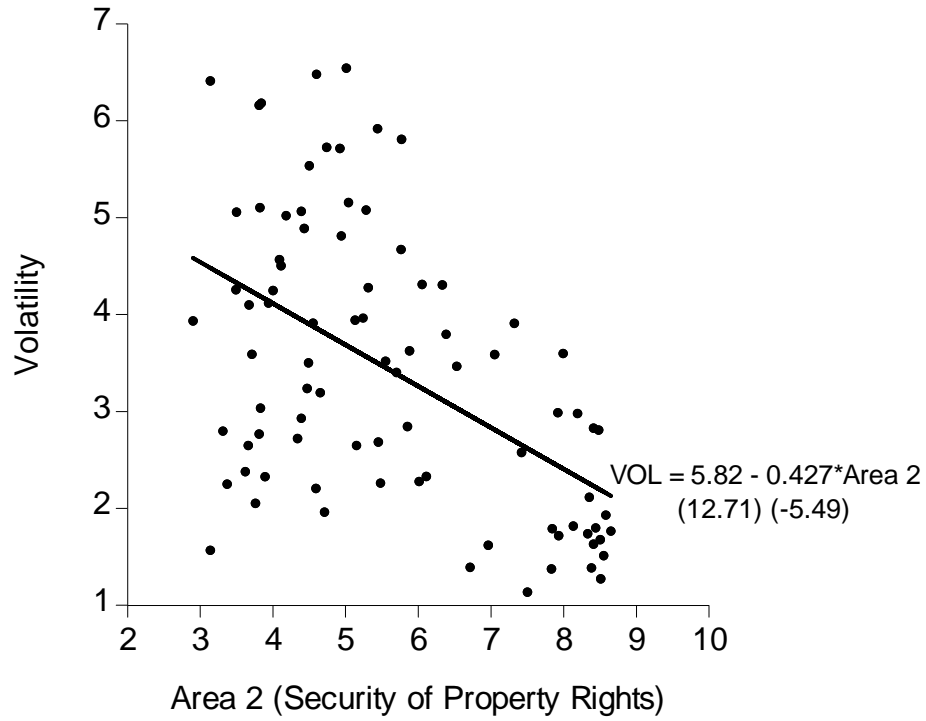
Figure 4: Volatility and Area 3 of the EFW Index, 1980-2007

VOL = 6.95 - 0.499*Area 3
(11.25) (-5.85)

Area 3 (Access to Sound Money)
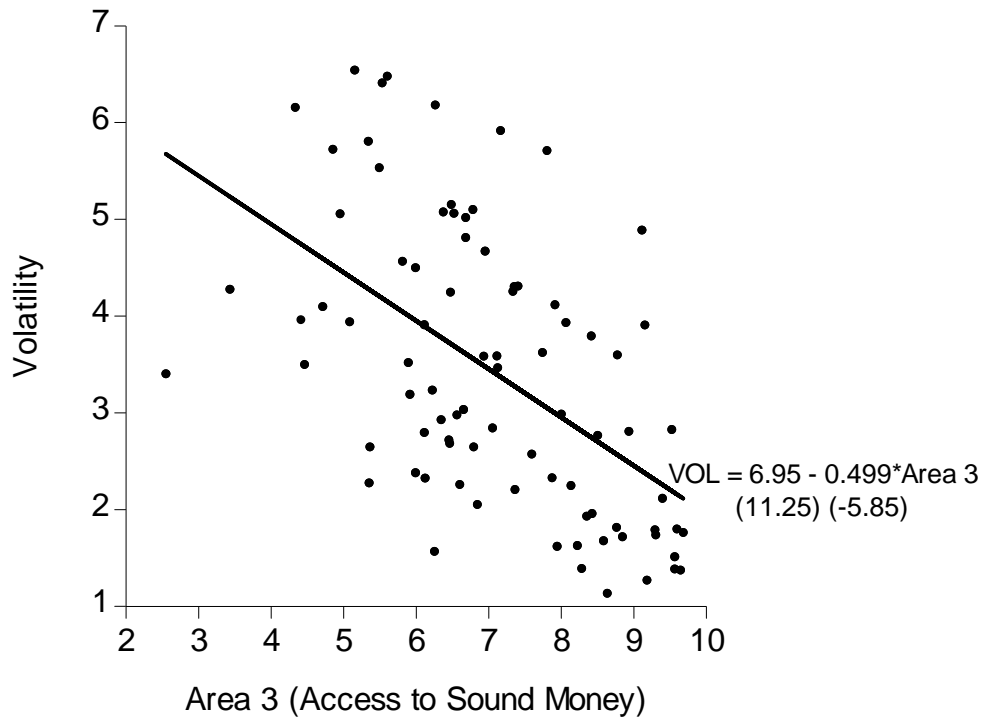
Figure 5: Volatility and Area 4 of the EFW Index, 1980-2007

Volatility (y-axis)

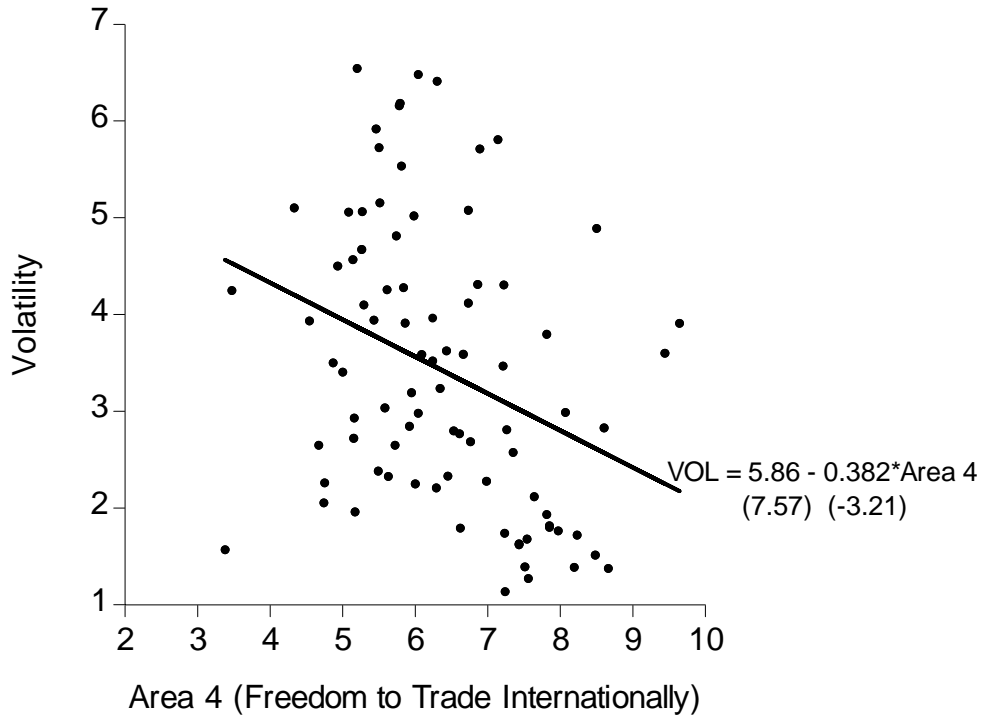Area 4 (Freedom to Trade Internationally) (x-axis)

VOL = 5.86 - 0.382*Area 4
(7.57) (-3.21)

Figure 6: Volatility and Area 5 of the EFW Index, 1980-2007

Volatility (y-axis)

Area 5 (Regulation of Labor, Credit, and Business) (x-axis)

VOL = 5.88 - 0.427*Area 5
(5.84) (-2.47)