AN EMPIRICAL ANALYSIS OF NATIONAL ECONOMIC RESILIENCE USING MACROECONOMIC DATA BEFORE AND AFTER THE GLOBAL FINANCIAL CRISIS

In this paper, an empirical analysis investigates which countries were resilient after the crisis, and what features those countries have. We use macroeconomic data of Organisation for Economic Co-operation and Development (OECD) countries before and after the great recession. The results from the correlation analysis imply that determinants such as "sudden expansion of exports", "inflation rate", "dependence on fuel imports", and "dependence on manufactured exports" can explain the economic resilience of the major advanced countries including Germany, Japan and the US.

Introduction

There are an increasing number of discussions on the current recession triggered by the fall of Lehman Brothers in September 2008. Rossi and Aguilera (2009) focused on risk mitigation in relation to financial crises while making it clear that the effects of the current recession are different among the developed countries. Lane and Milesi-Ferretti (2010) examined the determinants of the economic slowdown over 2008- 9 by comparing the annual GDP of the pre-crisis period of 2005-7. They find that increases in the ratio of private credit to GDP and current account deficits have negative impacts on demand growth. Claessens et al. (2010) examined the events and timeline of the recession and addressed the necessity of regulatory arrangements for cross-border activities. Groot et al. (2011) investigated the effects of financial markets and international trade linkages not only on GDPs but also on unemployment changes in Europe. Although these literatures stress the importance of mitigating economic volatility, they are still based on economic growth theory, i.e., they are posited on the concept that the reverse effects of growth engines brought on the recession.

On the other hand, Aiginger (2009, pp.310) presented the concept of "economic resilience" and defined it as "the ability of an economy to reduce the probability of further deep crisis or at least to mitigate the effects of a crisis". The concept introduces the vulnerability of socio-economic structures and stresses the importance of the mitigation of economic shocks. The objectives are not only to maximize utilities through economic growth but also to minimize economic shocks.

Despite the importance of the concept of resilience, it has not frequently been applied by practitioners to assess the performance of national economies, especially in developed countries. Other indexes such as economic growth, unemployment rate, CPI, income equality and so on have much more frequently been used.

The aim of this paper is to empirically investigate relations between socio-economic features and effects of the financial global crisis in line with previous studies, and to derive policy implications in terms of economic resilience.

In the next chapter, we review previous studies on economic resilience, and define it as "the ability of a national economy to reduce the probability of a crisis, to mitigate the effect of a crisis, or to recover quickly after a crisis," while referring to previous research. In the third chapter, we explain the data used in this study. In the fourth chapter, we show the results of the factors that affect national economic resilience through an analysis of macroeconomic data of 32 countries belonging to the Organisation for Economic Co-operation and Development (OECD) before and after the crisis in August 2010. In the last chapter, we propose four economic policies that will make national economic structures more resilient based on the empirical findings of this research, i.e., 1) to escape deflationary environments, 2) to refrain from major expansions of export and to alter the expansion of domestic demand, 3) to avoid dependence on manufacturing exports such as capital goods or durable goods, and 4) to reduce dependence on strategic imports such as fuel.

The concept of resilience

Resilience denotes "the ability of a substance or object to spring back into shape; elasticity" (Oxford Dictionary, 2011). However, the meaning of resilience differs among disciplines. For example, in terms of disaster prevention research, it is defined as the comprehensive ability to prevent disasters, including both prevention and mitigation. Business organizations such as the Council on Competitiveness (2007, 2008) have proposed the idea of corporate resilience for business continuity. At a national level, resilience is a key concept in the promotion of comprehensive homeland security strategies. In the field of psychiatry, it is defined as "the ability of personal

psychological elasticity to prevent deeper mental disease or to recover from mental disease even in the face of difficult situations" (Ishige & Mutou. 2003, pp.243). Hence, although the concept of resilience differs among disciplines, we can basically clarify it into two key concepts: "shock-absorption" and "shock-counteraction".

Literature review of economic resilience

Previous studies of economic resilience have described the concept as two sided, based on its characteristics. For example, Briguglio et al. (2005, pp.5) defined it as "coping ability: enabling a country to withstand or bounce back from external shocks". Duval et al. (2008, pp.3) defined it as "the ability to maintain output close to potential in the aftermath of shocks". Moreover, Aiginger (2009, pp.310) considered it to be the ability of an economy to reduce the probability of further deep crisis or at least to mitigate the effects of a crisis. Since it is commonly defined as the ability to reduce the damage inflicted by some kind of economic shock, we also define economic resilience as the ability of a national economy to reduce the probability of shocks, or to mitigate the effects of shocks.

It should be noted that economic resilience is also related to the recovery process (Brigugulio et al., 2005; Simme & Martin, 2010), but we focus on the damage process, i.e., after the shock and before the recovery phase. This is due to the data availability, as noted by Groot et al. (2011). As Duval et al. (2008) have noted, the flexibility of economic structures makes it possible to recover quickly from the recession. This can be regarded as the recovery phase of economic resilience, but we conjecture that the negative shocks and the recovery are asymmetric and that socio-economic damage to economic agents is irreversible. In our paper, taking irreversible adjustment costs after the recession into account, we concentrate on analyzing the damage process and seek more effective policy arrangements to mitigate the negative shocks.

In addition to studies by Lane and Milesi-Ferretti (2010), Claessens et al. (2010), and Groot et al. (2011), there are some remarkable studies related to economic resilience. Some studies measure economic resilience (e.g., Brigugulio et al., 2005), while others analyze the effects of resilience on economic growth and research the determinants of economic resilience (e.g., Duval et al., 2008; Aghion & Howitt, 2009).

Bristow (2010) analyzed the relations between resilience and regional strategies. Simmie and Martin (2010) regarded resilience as a four-phase adaptive cycle model.

Similar to our awareness of the issue, Rossi et al. (2009) focused on the national economic structures surrounding the crisis. Suzuki (2009) investigated the structures of trade and verified why Japan suffered serious effects from the current crisis.

Duval et al. (2008) investigated the determinants of economic resilience as stated, but they focused on policy variables related to economic policies such as fiscal policies or monetary policies and on system variables related to labor and product market regulations. They did not examine the structures of economy or trade that Rossi and Suzuki focused on.

In this paper, based on the literature review above, we empirically investigated which countries were resilient after the crisis, and what features those countries have, using macroeconomic data, which can clarify structures of the national economy and trade.

Methodology

We investigate the determinants of economic resilience through an analysis of macroeconomic data of 32 countries belonging to OECD, before and after the financial crisis, August 2010.

There are two reasons for using data of OECD countries for our analysis. First, these countries maintain precise macroeconomic data. Second, it is possible to compare countries with similar national economic structures.

Measurement of the effect of the recession

In the past studies (see Ramey & Ramey, 1995; Fatas & Mikov, 2006; Hnatkovska & Loayza, 2005), economic growth or stability was measured by real GDP growth rates or volatility measures (a measure for variations of GDP). However, Olaberria and Rigolini (2009, pp.4) reported that "output growth volatility is usually estimated using a five- or 10-year rolling window", and therefore it seems to be too early to use volatility measures for estimating economic resilience at this stage. Hence, in this paper, economic resilience is measured not by volatility measures but by real GDP growth. Moreover, annual GDP includes decline patterns after the bankruptcy of Lehman Brothers. The data on quarterly real GDP are used for analysis.

Figure 1 shows GDP growths of major countries from Q1-2000. GDP growths declined from Q1-2008 because the subprime mortgage crisis was becoming clear at that time. After AIG, the so-called "Lehman Shock" hit the world market in September 2008. The GDP of each country dropped dramatically. Hence, peak-to-trough changes, from Q3-2008 to Q1-2009 in GDP, are used for a measurement of the effect of the recession.

Figure 2 shows the rates of GDP change in OECD countries. Respective fundamental statistics are shown in Table 1.

Extractions of explanatory variables

In this section, we choose the explanatory variables related to the structures of national economy and trade from previous studies (Briguglio et al., 2005; Knack & Keefer, 1997; Rossi et al., 2009)

Economic openness

Briguglio et al. (2005) focused on economic openness to determine economic vulnerability. Based on his work, **(1) Sum of imports and exports (% of GDP)** is used for indicating economic openness. Countries with high rates of economic openness, which are often shown in small countries, could be vulnerable in relation to financial crisis, and less resilient.

Moreover, countries that expanded exportation dramatically along with globalization and depended on foreign demand could be less resilient against a sudden decrease of foreign demand (Suzuki, 2009). Therefore, **(2) Export value rate (1997-2007)** is used to indicate the trade tendencies of a country before the crisis.

Dependence on strategic imports

A country with a heavy dependence on strategic imports such as food or fuel could be relatively vulnerable to the crisis. Therefore, **(3) Net exports of fuel (% of GDP)**, **(4) Net exports of food (% of GDP)**, and **(5) Self-sufficient rate in energy** are used to indicate dependence on strategic imports.

Though it is obvious that a country depending on strategic imports is vulnerable, we cannot be confident that agricultural or resource-supplying countries are resilient. In the 1980s after the second oil crisis, countries such as Mexico and Argentina suffered from a serious debt crisis and economic slackening because the recession in developed countries had lasted for a long time and demands for fuel or food had decreased suddenly (Cabinet Office 1982, Cabinet Office 1984). Therefore, it should be noted that resource-supplying countries or agricultural countries are less resilient against a drop in demand for primary products. We consider the results of our analysis from these points of view.

Dependence on manufactured exports

Rossi and Aguilera (2009) pointed out that countries with high dependence on global cyclical industries such as Japan and Germany have been hit by the impact of the current crisis severely. Hence, countries depending on manufactured exports are less resilient against the crisis. **(6) Net Manufactured exports (% of GDP)** can be used to

indicate dependence on manufactured exports.

Macroeconomic stability

Briguglio et al. (2005) focused on macroeconomic stability in measuring resilience, so we also used the variables of **(7) CPI change rate (1997-2007)** and **(8) GDP Deflator** to indicate macroeconomic stability.

Government size

Government size affects macroeconomic stability (Minsky, 1986). Therefore **(9) Government expenditure (% of GDP**) variables were used to indicate the size of the government.

Social development

(10) Human Development Indicator (HDI) has been used to indicate social development, (e.g., Briguglio et al., 2005). HDI is a comparative measure of per capita GDP, life expectancy, and education standards. To use HDI, per capita GDP is excluded because it may affect the dependent variable, GDP change rate, as explained in the last section. Moreover, we use two social capital variables to explain social development. The first one is **(11) TRUST** and the second one is **(12) CIVIC**. These variables were used in the study by Knack and Keefer (1997). They verified the correlation between economic growth and social capital. (11) TRUST is the percentage of respondents in each nation replying "most people can be trusted" to the question: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" (12) CIVIC is assessed from responses in each nation to questions concerning, "claiming government benefits that you are not entitled to," "avoiding a fare on public transport," and "cheating on taxes if you have the chance." Respondents addressed these issues by choosing a number from 1 (never justifiable) to 10 (always justifiable). We reversed these scales and summed values to create the scale (CIVIC). This value indicates the strength of norms of civic cooperation.

Infrastructure

Public investment has an important role in stabilizing the national economy. Therefore, we also used a variable related to infrastructure investments, **(13) Public investment (% of GDP)**.

Others

We also used two variables of **(14) Financial Depth** to indicate the depth of financial sector in each national economy and **(15) GDP growth (1997-2007)** to indicate the tendency of the dependent variable before the crisis.

The variables (1), (3)-(6), (8)-(10) and (13) are the average ratio before the crisis, from the years 2006 and 2007. Variables (2), (7), and (15) show the percentage changes from 1997 to 2007. Variable (14) is the value in 2000. Variables (11) and (12) reflect the latest data available.

Table 1 shows the fundamental statistics of explanatory variables. Data sources and calculation methods are described in the Data Appendix.

Analysis of 32 countries

Table 3 shows the correlation between GDP change rates and each explanatory variable for all 32 countries. It is indicated that countries with high rates of fuel-sufficiency, high values of HDI, and deeper financial sectors tended to experience smaller drops in GDP. Meanwhile, countries that had high rates of manufactured exports and that expanded exportation before the crisis experienced bigger drops in GDP.

 It was also shown that there is not a strong correlation between GDP change rates and (8) GDP Deflator. However, from the scatter plot shown in Figure 3, GDP change rates and GDP deflator seem to have a strong positive correlation in the major advanced countries such as the G7 members. Then, we divided the 32 countries into the major advanced countries and the quasi-developed countries.

Analysis for the major advanced countries and the quasi-developed countries

As implied by Figure 3, correlations in the major advanced countries like Germany, Japan or the US, and in the quasi-developed countries such as Hungary or Mexico, are different. Moreover, it is preferable to compare among the countries with similar levels of development in order to understand economic resilience for respective countries, because the economic structures and determinants of economic resilience might be different even among the developed countries.

 Therefore, we classified the 32 countries according to level of economic development into the major advanced countries and the quasi-developed countries according to GDP per capita (Table 4). Fundamental statistics of the dependent variable and explanatory variables for the major advanced countries and those for the quasi-developed countries are shown in Tables 5 and 6, respectively.

 As can be seen in the results of the correlation analysis shown in Table 7, there are

significant positive correlations between GDP change rates and (3) Net fuel exports (% of GDP) and (5) Self-sufficient rate in energy for the major advanced countries. These results indicate that, especially for the major advanced countries, a country with a high rate of fuel exportation in GDP and of self-sufficiency in energy tended to experience only a small downfall in GDP. This result implies that: (A) a country that depends on strategic imports such as fuel is less resilient, and (B) a country that tends to export fuel, i.e., a resource-supplying country, has high resiliency. (A) supports the notion stated by Briguglio et al. (2005) that a country with a tendency to depend on strategic imports is vulnerable against the rise of food or fuel. Meanwhile, (B) disproves the historical fact that resource-supplying countries were vulnerable against declining demands for primary products, as indicated in Latin America in the 1980s. This could be caused by the following two reasons. First, there were global imbalances of trade between countries, that is, some developed countries, including the United States as the most typical example, run large current account deficits, while emerging countries such as China have maintained a large surplus after the crisis. Countries that traded actively with the US have experienced great damage from the current crisis, because of the sudden decline of the demand for the goods and services that had been consumed in the US. Meanwhile, resource-supplying countries such as Australia and Norway had mainly traded with China, a country with remarkable recent economic growth (Australian Government, 2011). The economies of these countries were sustained by this emerging country, the economic growth of which in 2009 was 9.1% (WDI, 2010). Second, oil prices increased dramatically and reached the highest level before the crisis due to an influx of speculative money. Additionally, the globalized financial market and commodities such as oil and primary products were expected to become financial products. Therefore, when the subprime mortgage crisis came to a head in the US in 2007, hedge funds tried to escape from the financial panic, and speculation moneys flowed into the oil futures market. Hence, resource-supplying countries such as Australia and Norway met with economic bubbles before the crisis. These are expected to be reasons explaining why the GDPs of these countries fell less sharply, as compared to other countries.

The results also show the significant negative correlation between GDP change rates and (6) Net manufactured exports (% of GDP), especially for the major advanced countries. This result indicates that countries that depended on manufactured exports tended to experience a larger downfall in GDP after the crisis. This result might, again, be explained by global imbalances. Exportation to the US accounts for 20.1% of Japan's exports and 9.1% of Germany's exports (Ministry of Japan, 2010; JETRO, 2010). These

countries were vulnerable against the sudden decline of demand for cyclical products consumption in the US. Also, in the major advanced countries, the tendency of a sudden expansion in exportation before the crisis is revealed, and the dependency on foreign demands corresponds to a larger downfall of GDP. This implication confirms the points Rossi and Suzuki mentioned.

Furthermore, there was significant positive correlation between GDP change rates and (7) CPI change rate (1997-2007) and (8) GDP Deflator for the major advanced countries. On the contrary, in quasi-developed countries, (7) CPI change rate (1997-2007) has a significant positive relationship. These results indicate that for the major advanced countries, countries with a high inflation rate experienced a smaller downfall in GDP, while for the quasi-developed countries, countries with a high inflation rate experienced a larger downfall in GDP. In future research, we need to disentangle why the impact of high inflation was different and why it has led to different levels of GDP downfall between the major advanced and the quasi-developed countries.

Among the quasi-developed countries, there is a significant correlation between GDP change rates and (10) HDI. Correlation coefficients between the GDP change rates and (11) TRUST and (12) CIVIC for the quasi-developed countries were larger than the values for the major advanced countries. In addition, as shown in Tables 6 and 7, the mean values of (10) HDI, (11) TRUST and (12) CIVIC for the major advanced countries are larger, as compared to those for the quasi-developed countries. Therefore, a country with high social development and social capital tends to experience a smaller downfall of GDP among the quasi-developed countries, while there was no such relation among the major advanced countries. From this analysis, there could be a non-linear relationship between high standards of education, trust in people, and civic norms enhancing economic resilience to some extent, but the effects are faint.

It can also be noted that there is a significant positive correlation between GDP change rates and (14) Financial Depth for the quasi-developed countries, while there was no such relationship for the major advanced countries. This result indicates that there is a non-linear relationship between these variables as shown in measures related to social development.

Conclusion

In this paper, we investigate which countries were resilient after the crisis in order to understand the features those countries have, through measuring the economic resilience of each country by using quarterly real GDP. We also extracted explanatory variables from previous studies and analyzed the correlations between them. The analysis

indicates some significant findings.

First, the results indicate that countries that expanded exportation suddenly before the crisis and depended on manufactured exports had low economic resilience against the current crisis. This supports the points that Rossi and Suzuki raised. Second, resource-supplying countries were resilient against the current crisis. Third, countries with high inflation were resilient among the major advanced countries, while these countries were not resilient among the quasi-developed countries.

These findings imply that the following four policy strategies may enhance economic resilience against the exogenous crisis for the major advanced countries: (1) avoiding deflation, (2) switching to expanding domestic demand and refraining from a sudden expansion of exportation, (3) avoiding excessive dependence on exports of cyclical manufactured products such as capital goods or durable goods, and (4) reducing dependence on strategic imports such as fuel.

Analysis of economic resilience using data from the Asian Financial Crisis or from the two energy crises in the 1970s, in addition to the analysis presented in this study using data from the current financial crisis, may provide more general findings. We also need to analyze regional economic resilience by using macroeconomic domestic data. It is important to accumulate research into economic resilience and what determines it. Moreover, resilience against exogenous shocks such as war, terrorism, and natural disasters should be considered seriously in future studies. However, we believe this research provides empirical findings that are helpful in understanding what kind of national economy is resilient and in selecting economic policies to increase resilience.

Endnotes

The English in this document has been checked by at least two professional editors, both native speakers of English.

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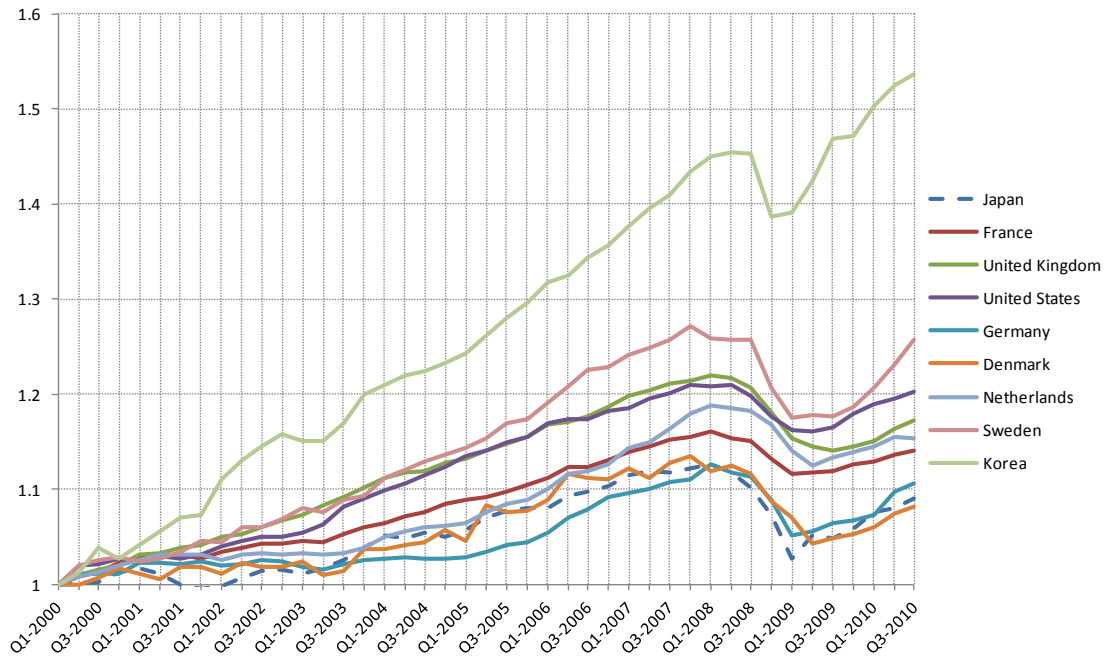The World Bank (2010) World Development Indicators.

Figure 1. GDP before and after the financial crisis

Source: OECD Quarterly National Account

Note1: Seasonally real GDP (national currency)

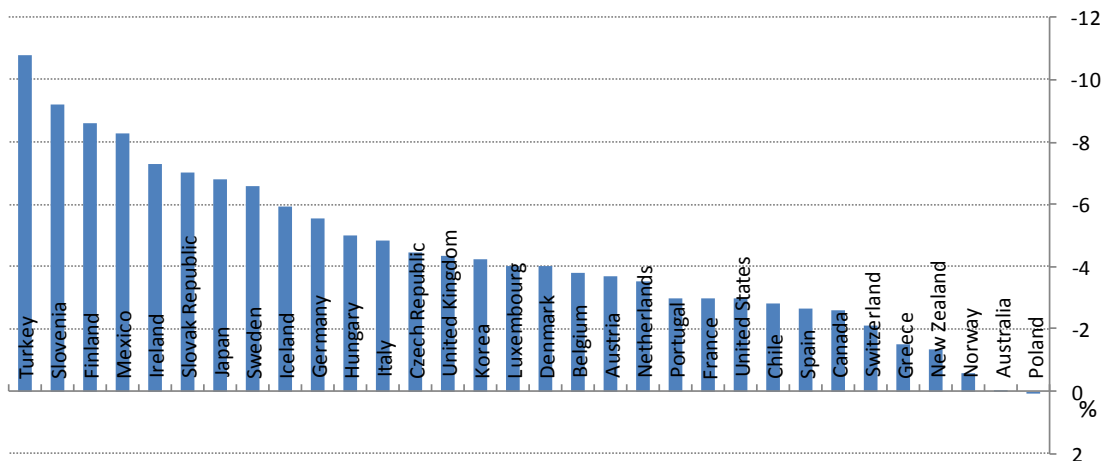*Note2:* Based on GDP of Q1-2000 in each country

Figure 2. GDP change rate (08Q3-09Q1)

Source: OECD Quarterly National Accounts
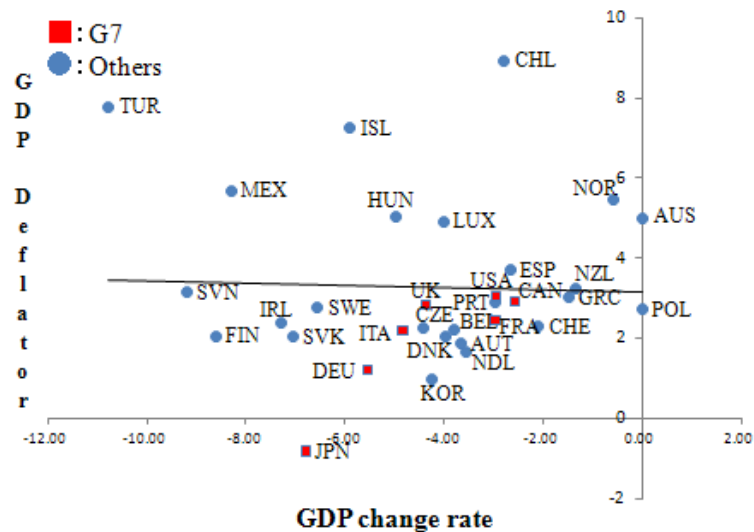
Figure 3. Scatter plot of GDP Deflators

Table 1. Fundamental statistics for 32 countries

	Variable	Obs	Mean	Min	Max	SD
	GDP change rate (08Q3→09Q1)	32	-4.39	-10.8	0.0	2.66
1	Sum of imports and exports (% of GDP)	32	95.9	28.3	317.8	57.3
2	Export value rate (1997-2007)	32	95.7	16.2	239.3	57.0
3	Net exports of fuel (% of GDP)	32	-4.9	-26.6	61.6	14.8
4	Net exports of food (% of GDP)	32	3.3	-8.4	44.0	11.1
5	Self-sufficient rate in energy	32	0.8	0.0	7.7	1.3
6	Net Manufactured exports (% of GDP)	32	-2.1	-61.9	39.0	25.9
7	CPI change rate (1997-2007)	30	34.8	-2.2	105.8	26.2
8	GDP Deflator	32	3.3	-0.8	8.9	2.0
9	Government expenditure (% of GDP)	32	18.3	10.0	25.9	4.4
10	HDI	32	0.8	0.7	0.9	0.1
11	TRUST	32	0.3	0.1	0.7	0.2
12	CIVIC	32	25.7	7.2	28.5	3.8
13	Public investment (% of GDP)	25	3.1	1.1	5.0	1.1
14	Financial Depth	25	1.1	0.1	2.4	0.6
15	GDP growth (1997-2007)	31	40.2	12.1	91.7	16.9

Table 2. Correlations in 32 countries

Variables	Obs	r	p	
1 Sum of imports and exports (% of GDP)	32	-0.139	0.448	
2 Export value rate (1997-2007)	32	-0.325	0.069	*
3 Net exports of fuel (% of GDP)	32	0.290	0.108	
4 Net exports of food (% of GDP)	32	0.199	0.275	
5 Self-sufficient rate in energy	32	0.339	0.058	*
6 Net Manufactured exports (% of GDP)	32	-0.412	0.019	**
7 CPI change rate (1997-2007)	30	-0.278	0.137	
8 GDP Deflator	32	-0.034	0.855	
9 Government expenditure (% of GDP)	32	0.084	0.649	
10 HDI	32	0.470	0.007	***
11 TRUST	32	0.220	0.227	
12 CIVIC	32	0.292	0.105	
13 Public investment (% of GDP)	25	-0.161	0.442	
14 Financial Depth	25	0.338	0.098	*
15 GDP growth (1997-2007)	31	-0.206	0.266	

Dependent Variable: GDP change rate(08Q3→09Q1)

$p<.10$, ** $p<.05$, *** $p<.01$

Table 3. Fundamental statistics for major advanced and quasi-developed countries

Variable	Major Advanced Countries					Quasi-developed Countries				
	Obs	Mean	Min	Max	SD	Obs	Mean	Min	Max	SD
GDP change rate (08Q3→09Q1)	16	-4.1	-8.6	0.0	2.4	16	-4.7	-10.8	0.0	3.0
1 Sum of imports and exports (% of GDP)	16	103.6	28.3	317.8	70.2	16	88.3	50.0	173.6	41.6
2 Export value rate (1997-2007)	16	76.9	16.2	150.1	36.5	16	114.4	31.5	239.3	68.0
3 Net exports of fuel (% of GDP)	16	-0.4	-5.0	22.7	6.6	16	-3.3	-6.8	2.4	2.2
4 Net exports of food (% of GDP)	16	0.3	-2.5	3.1	1.4	16	0.9	-2.1	8.7	3.3
5 Self-sufficient rate in energy	16	1.1	0.0	7.7	1.9	16	0.5	0.2	1.4	0.3
6 Net Manufactured exports (% of GDP)	16	2.2	-10.9	16.3	7.4	16	-3.0	-23.0	11.7	9.0
7 CPI change rate (1997-2007)	16	19.0	-2.2	31.5	8.0	14	52.9	24.5	105.8	28.3
8 GDP Deflator	16	2.6	-0.8	5.5	1.5	16	4.0	1.0	8.9	2.3
9 Government expenditure (% of GDP)	16	19.5	10.9	25.9	4.2	16	17.1	10.0	24.3	4.3
10 HDI	16	0.9	0.8	1.0	0.0	16	0.8	0.7	1.0	0.1
11 TRUST	16	0.4	0.2	0.7	0.2	16	0.2	0.1	0.5	0.1
12 CIVIC	16	26.7	24.3	28.4	1.2	16	24.7	7.2	28.5	5.1
13 Public investment (% of GDP)	15	2.6	1.1	4.2	0.9	10	3.8	1.9	5.0	1.1
14 Financial Depth	15	1.2	0.4	2.4	0.6	10	0.8	0.1	1.5	0.5
15 GDP growth (1997-2007)	15	36.2	12.1	91.7	20.3	16	43.9	15.5	61.3	12.3

Table 4. GDP per capita

Major advanced countries		Quasi-developed countries	
Luxembourg	106,277	Iceland	38,022
Norway	78,404	United Kingdom	35,109
Switzerland	63,075	Italy	35,059
Denmark	55,944	Spain	31,877
Ireland	49,637	Greece	28,751
Netherlands	48,078	New Zealand	27,292
United States	45,674	Slovenia	24,076
Austria	45,568	Portugal	21,902
Australia	44,922	Czech Republic	18,103
Finland	44,576	Korea	17,078
Belgium	43,666	Slovak Republic	16,167
Sweden	43,209	Hungary	12,847
France	41,080	Poland	11,287
Germany	40,672	Chile	11,287
Canada	39,599	Turkey	8,561
Japan	39,530	Mexico	8,117

Source: OECD Annual National Accounts Database

Note: 2009, US$

Table 5. Correlation in major advanced and quasi-developed countries

Variables	Major Advanced Countries				Quasi-developed Countries			
	Obs	r	p		Obs	r	p	
1 Sum of imports and exports (% of GDP)	16	-0.131	0.629		16	-0.221	0.410	
2 Export value rate (1997-2007)	16	-0.723	0.002	***	16	-0.131	0.628	
3 Net exports of fuel (% of GDP)	16	0.500	0.048	**	16	-0.119	0.662	
4 Net exports of food (% of GDP)	16	0.261	0.330		16	0.212	0.431	
5 Self-sufficient rate in energy	16	0.544	0.029	**	16	-0.085	0.754	
6 Net Manufactured exports (% of GDP)	16	-0.810	0.000	***	16	-0.259	0.332	
7 CPI change rate (1997-2007)	16	0.494	0.052	*	14	-0.592	0.026	**
8 GDP Deflator	16	0.604	0.013	**	16	-0.309	0.244	
9 Government expenditure (% of GDP)	16	-0.199	0.461		16	0.251	0.348	
10 HDI	16	0.276	0.300		16	0.559	0.024	**
11 TRUST	16	0.050	0.855		16	0.354	0.179	
12 CIVIC	16	-0.027	0.921		16	0.360	0.171	
13 Public investment (% of GDP)	15	-0.207	0.459		10	0.064	0.860	
14 Financial Depth	15	0.151	0.591		10	0.634	0.049	**
15 GDP growth (1997-2007)	15	-0.210	0.453		16	-0.192	0.477	

Dependent Variable: GDP change rate(08Q3→09Q1)

*p<.10, **p<.05, ***p<.01

Data Appendix: Sources of variables used in analysis

No.	Variables	Series name	Data source	n
1	GDP change rate (08Q3–09Q1)	"VOBARSA: Millions of national currency, volume estimates, OECD reference year, annual levels, seasonally ajusted"	OECD Quartely National Accounts	32
1	Sum of imports and exports (% of GDP)	"Imports of goods and services (% of GDP)", "Exports of goods and services (% of GDP)"	World Development Indicators 2010	32
2	Export value rate (1997–2007)	"Exports of goods and services (constant 2000 US$)"	World Development Indicators 2010	32
3	Net exports of fuel (% of GDP)	"GDP (current US$)", "Merchandise exports (current US$)", "Merchandise imports (current US$), "Fuel imports (% of merchandise imports)", "Fuel exports (% of merchandise exports)"	World Development Indicators 2010	32
4	Net exports of food (% of GDP)	"GDP (current US$)", "Merchandise exports (current US$)", "Merchandise imports (current US$), "Food imports (% of merchandise imports)", "Food exports (% of merchandise exports)"	World Development Indicators 2010	32
5	Self-sufficient rate in enrgy	"Energy production/TPES"	Energy balances of OECD countries 2009	32
6	Net Manufacture exports (% of GDP)	"GDP (current US$)", "Merchandise exports (current US$)", "Merchandise imports (current US$), "Manufactures imports (% of merchandise imports)", "Manufactures exports (% of merchandise exports)"	World Development Indicators 2010	32
7	CPI change rate (1997–2007)	"Consumer price index (2005 = 100)"	World Development Indicators 2010	32
8	GDP Deflator	"Inflation, GDP deflator (annual %)"	World Development Indicators 2010	32
9	Government expenditure (% of GDP)	"General government final sonsumption expenditure (% o	World Development Indicators 2010	32
10	HDI	"Education index" "Life expectancy at birth index"	Human Development Report 2010	32
11	TRUST	"(V23)Most people can be trusted"	WVS 2005–2008, WVS four-wave aggregate of Values Studies	32
12	CIVIC	"(V198) Justifiable: claiming government benefits", "(V199) Justifiable: avoiding a fare on public transport", "(V200) Justifiable: cheating on taxes"	WVS 2005–2008, WVS four-wave aggregate of Values Studies	32
13	Public investment (% of GDP)	"Public investment"	OECD Going for growth 2010	25
14	Financial Depth	"Financial Depth"	IMF International Financial Statistics	25
15	GDP growth (1997–2007)	"GDP (constant 2000 US$)"	World Development Indicators 2010	32
16	GDP per capita	"GDP per capita (US$)"	OECD Annual National Accounts Database	32