Examining the Global Reach of the 2008 US Economic Downturn

By

Yener Kandogan

This article analyzes how the 2008 US economic downturn propagated through the global trading system, creating an economic contagion around the world. Consistent with previous global crises, the reach and impact of this crisis is not the same across different regions. This article contributes to the literature by examining the effect of dependency on the country of origin of a crisis, openness to international trade, and the role a country plays in the global trading network to explain the variation in the reach and the impact across countries. The article concludes with policy recommendations to avoid future economic contagions or reduce their impact. © 2011 Wiley Periodicals, Inc.

Introduction

The literature on financial contagions (Forbes, 2001; Forbes & Rigobon, 2002; Kaminsky & Reinhart, 2000, 2003) continues to examine why many of the recent financial crises that began in one country, even relatively small ones, had such global repercussions, and why crises originating in one market spread to some markets, while markets in other countries were relatively unaffected. Within this literature, some suggest the increase in economic integration that led to spectacular economic performance for many countries open for cross-border business also caused an increase in the volatility of countries' economic performance during crises.

Since the third quarter of 2008, the world has been experiencing an economic contagion of a financial crisis that originated in the United States. The next section examines the economic growth rates of the largest 40 economies of the world over the period starting with the third quarter of 2008 and ending with the second quarter of 2009. The data demonstrate that the reach and the impact was not the same across these economies.

This article tries to explain this economic contagion that started in the United States and reached to other countries, and the cross-country variation through international linkages. Understanding how this economic crisis propagated through the global trade system can teach us how to avoid similar events in the future. In particular, the purpose of this article is to explain the variation in the severity and reach of the crisis across countries, particularly addressing the role of the international trade network, openness to international trade, and the dependency on the crisis epicenter country for exports.

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Clearly, a closed economy with no or insignificant international business activity will not be affected by such an economic contagion. Naturally, one can also easily argue that even an open economy without much international business dealings with the crisis epicenter can avoid much of the domino effect in economic growth rates. Furthermore, Forbes (2001) and Abeysinghe and Forbes (2005) emphasize the importance of the international trade network in explaining the spread of an economic contagion. Kali and Reyes (2005) find that the severity

TABLE 1 Quarterly Real GDP Growth Rates

Countries	2007 Q3/2008 Q2	2008 Q3	2008 Q4	2009 Q1	2009 Q2
United States	2.5	0.7	–0.8	–2.5	–3.9
Japan	1.5	–0.5	–4.3	–8.8	–6.4
China	10.9	9.0	6.8	6.1	7.9
Germany	2.0	0.8	–1.7	–6.9	–5.9
France	1.9	0.5	–1.1	–3.2	–2.6
Britain	2.5	0.3	–2.0	–4.9	–5.5
Italy	0.7	–0.9	–2.9	–6.0	–6.0
Brazil	6.0	6.8	1.3	–1.8	–1.2
Russia	8.4	6.2	1.1	–9.5	–10.9
Spain	3.0	0.9	–0.7	–3.0	–4.2
Canada	2.1	0.5	–0.7	–2.1	–3.2
India	8.5	7.6	5.3	5.8	6.1
Mexico	3.1	1.6	–1.6	–8.2	–10.3
Australia	3.6	1.9	0.3	0.4	0.6
South Korea	5.3	3.8	–3.4	–4.2	–2.5
The Netherlands	3.7	1.8	–0.6	–4.5	–5.1
Turkey	3.4	0.5	–6.2	–13.8	–7.0
Poland	6.1	4.8	2.9	0.8	1.1
Indonesia	6.4	6.1	5.2	4.4	4.0
Belgium	2.3	1.3	–0.8	–3.0	–3.7
Switzerland	3.0	1.7	–0.1	–2.4	–2.0
Sweden	1.9	0.0	–4.9	–6.5	–6.2
Norway	3.7	0.6	0.8	1.5	–4.8
Austria	3.0	1.5	0.5	–3.5	–4.4
Taiwan	5.9	–1.0	–8.4	–10.2	–7.5
Greece	3.6	3.1	2.4	0.3	–0.3
Denmark	1.0	–1.2	–3.7	–4.1	–7.2
Argentina	8.4	6.2	4.9	2.0	–0.8
Venezuela	7.3	4.6	3.2	0.3	–2.4
South Africa	4.6	2.9	1.0	–1.3	–2.8
Thailand	5.5	4.0	–4.3	–7.1	–4.9
Colombia	5.6	3.1	–0.7	–0.6	–0.5
Czech Republic	5.6	4.2	0.7	–3.4	–4.9
Hong Kong	6.0	1.7	–2.5	–7.8	–3.8
Israel	5.4	5.1	1.2	0.6	0.1
Malaysia	6.9	4.7	0.1	–6.2	–3.9
Singapore	5.8	–0.6	–4.2	–10.1	–3.5
Chile	3.9	4.8	0.2	–2.1	–4.5
Egypt	7.2	5.9	N/A	4.2	4.5
Hungary	1.4	0.8	2.0	–6.7	–7.6

Source: *The Economist.*

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and geographic reach of an economic crisis can be amplified if the epicenter country of the crisis is well integrated into the global trade network. They further argue that target countries affected by such a shock are, in turn, better able to dissipate the impact if they are well integrated into the network. This article will also attempt to test if this crisis provides support for these claims.

The remainder of the article is organized so that the third section describes the data and the methodology, followed by the empirical results of the analysis. The last section discusses the results and provides policy recommendations to avoid or dampen the reach and effect of similar future global economic contagions.

2008 Economic Crisis in the United States and Around the World

Table 1 shows the quarterly real gross domestic product (GDP) growth rates since the start of the crisis in the third quarter of 2008, as well as the average quarterly growth rates for the four quarters preceding the crisis, for the largest 40 economies of the world. The data is obtained from *The Economist*. Growth rates in each quarter are relative to the same quarter in the previous year. Countries are sorted according to the size of their GDP in 2008. Accordingly, along with the United States, the crisis started affecting the national output of most countries in the third quarter of 2008; the majority experienced either a decline in their growth or a negative growth in that quarter. Despite this decline, the countries in this table grew at a GDP-weighted average of approximately 1.97% in the third quarter, primarily as a result of high growth in a few large economies such as Brazil, Russia, India, and China (BRIC). In the following quarters, economies were progressively shrinking at average rates of –0.56%, –3.32%, and –3.34% in Q4 of 2008, Q1 of 2009, and Q2 of 2009, respectively.

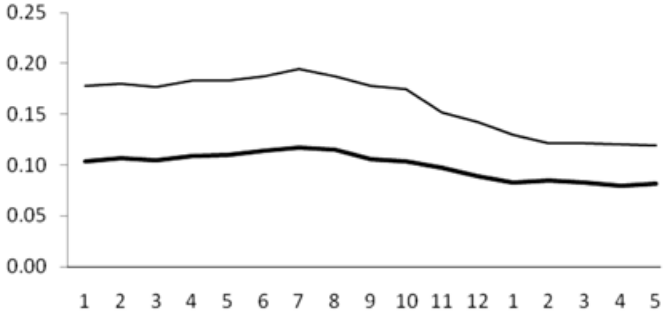
A few observations are noteworthy. Even if the crisis originated in the United States, there are many countries that have been affected worse than the United States; examples include mostly smaller countries, some of which are not even listed in this table. In fact, the weighted average growth rates in countries with GDP less than $100 billion were –2.4%, –9.1%, and –9.2% in the last quarter of 2008 and the first and second quarters of 2009, respectively, as opposed to –0.5%, –3.3%, and –3.4% for countries with GDP more than $1 trillion. Other countries, such as Turkey, Taiwan, Finland, Thailand, Hong Kong, and Singapore, stand out, with growth rates ranging between –2.5% and –8.4% in the last quarter of 2008, and between –7.1% and –13.8% in the first quarter of 2009, as among the worst-affected countries in this table.

What is even more interesting is the continued growth in some countries during this turmoil. Examples include China, India, Australia, Poland, Indonesia, Norway, Greece, Argentina, Venezuela, Israel, and Egypt. What could be the reason for these countries' better performance? Did these countries have relatively closed economies? Did they not trade much with the United States or other countries affected by this crisis?

Figure 1 depicts the monthly US imports and exports figures in trillions of US dollars for 2008 and the first five months of 2009. Bold lines represent US exports, and the light lines represent US imports. The source for this data is the US Census Bureau Foreign Trade Statistics. Comparing the first five months of 2008 to that of 2009, there is a clear drop in both US exports and imports in 2009. It seems that the decline in the trend started in the month of August 2008 and continued to decline steadily in the ensuing months before reaching a new lower plateau in January or February 2009. Interestingly, the drop in imports is far more significant (32%) than the drop in exports (23%), helping the United States narrow the trade gap from a monthly average of $73.4 billion in 2008 to $40.3 billion in 2009.

The situation in specific industries can be observed in Table 2. Only industries with more than $10 billion in US exports or imports in 2008 are listed. Figures are in millions of US dollars. In all major commodity groups, both exports and imports dropped dramatically. In US exports, the biggest percentage drop was experienced in the automotive vehicles, parts, and engines sector with –44.2%, whereas the consumer goods sector had the smallest drop of –8.9%. Within these sectors, most industries had difficulty exporting their products. However, there are a few exceptions, such as medicinal equipment, civilian aircraft, and pharmaceutical preparations, where exports increased. The picture for US imports is not much different, with only bigger percentage

FIGURE 1 Monthly US Trade Statistics Since 2008



Source: US Census Bureau Foreign Trade Statistics.

TABLE 2 US Trade Performance in Large Industries Since 2008

Industries	01–05/2008	01–05/2009	% Change
Exports			
Foods, feeds, and beverages	46,107	37,167	–19.4%
Industrial supplies and materials	161,923	111,186	–31.3%
Chemicals—Organic	14,459	8,715	–39.7%
Fuel oil	12,799	8,085	–36.8%
Plastic materials	13,721	9,086	–33.8%
Petroleum products, other	10,994	7,322	–33.4%
Capital goods, except automotive	191,182	160,334	–16.1%
Semiconductors	22,031	14,038	–36.3%
Industrial machines, other	16,568	11,537	–30.4%
Electric apparatus	12,956	10,306	–20.5%
Computer accessories	12,733	10,161	–20.2%
Telecommunications equipment	13,744	11,824	–14.0%
Medicinal equipment	10,836	10,961	1.2%
Civilian aircraft	14,512	15,163	4.5%
Automotive vehicles, parts, and engines	51,548	28,765	–44.2%
Consumer goods	66,392	60,481	–8.9%
Pharmaceutical preparations	15,720	19,411	23.5%
Imports			
Foods, feeds, and beverages	36,545	33,915	–7.2%
Industrial supplies and materials	328,535	174,047	–47.0%
Crude oil	144,875	63,817	–56.0%
Gas—Natural	15,570	7,296	–53.1%
Petroleum products, other	22,253	10,847	–51.3%
Fuel oil	17,238	9,271	–46.2%
Industrial supplies, other	10,090	7,710	–23.6%
Capital goods, except automotive	193,304	149,131	–22.9%
Computer accessories	27,079	19,006	–29.8%
Electric apparatus	15,467	10,931	–29.3%
Semiconductors	11,233	8,112	–27.8%
Telecommunications equipment	19,200	14,487	–24.5%
Industrial machines, other	15,435	12,059	–21.9%
Computers	17,717	14,823	–16.3%
Medicinal equipment	11,052	10,099	–8.6%
Automotive vehicles, parts, and engines	105,295	53,041	–49.6%
Consumer goods	203,082	176,906	–12.9%
Furniture, household goods, etc.	10,124	7,984	–21.1%
TVs, VCRs, etc.	17,588	14,923	–15.2%
Apparel, household goods—cotton	20,830	18,396	–11.7%
Apparel, textiles, nonwool or cotton	12,746	11,489	–9.9%
Toys, games, and sporting goods	14,680	13,433	–8.5%
Pharmaceutical preparations	32,910	32,602	–0.9%

Source: US Census Bureau Foreign Trade Statistics.

drops. Again, imports of all six sectors have decreased. The sharpest drop is again in the automotive vehicles, parts, and engines sector with –49.6%, closely followed up by the industrial supplies and materials sector with –47%. While the drop in the consumer goods sector is still one of the smallest, the food, feeds, and beverages sector had the smallest drop in US imports, with –7.2%. Imports of all industries under these sectors decreased, with the exception of an insignificant increase in the other consumer goods industry.

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The United States plays an important role both as a market (and thus an export destination for companies in other countries) and a producer supplying their capital goods and industrial materials needs, critical for investment and growth. It is also very well integrated into the global trade network per measurements in Kali and Reyes (2007). Consequently, with the United States as the crisis epicenter, the US economic downturn inevitably affects the trade performance and the economies of the rest of the world.

Tables 3 and 4 show the quarterly growth rates in exports and imports, respectively, in major economies

TABLE 3 Quarterly Export Growth Rates

Countries	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009
Germany	21.1	25.4	13.6	–14.5	–31.3
China	21.3	22.3	23.1	4.4	N/A
United States	17.1	19.0	17.1	–4.2	–22.4
Japan	28.7	18.1	10.5	–9.7	–41.8
France	21.3	22.3	14.1	–14.7	–31.5
Italy	15.4	20.6	20.5	–14.7	–33.2
The Netherlands	26.5	28.5	19.0	–14.2	–30.2
Belgium	18.0	28.1	15.0	–16.5	N/A
Russia	53.2	50.9	53.0	–10.7	–47.7
Britain	11.6	17.5	15.8	–20.3	–30.2
Canada	12.5	14.6	18.8	–10.7	–34.4
South Korea	17.4	23.1	27.0	–9.9	–24.9
Hong Kong	10.6	8.1	5.6	–1.9	–21.5
Singapore	21.2	26.4	21.2	–13.9	–32.7
Mexico	16.6	17.1	12.2	–14.1	–28.6
Spain	20.2	26.7	20.4	–13.8	–31.9
Malaysia	19.1	28.9	21.8	6.7	–28.8
Brazil	13.8	32.5	38.8	6.9	–19.4
Switzerland	20.4	32.7	21.1	–5.3	–18.0
Australia	24.2	39.8	50.5	16.8	–3.6
Sweden	23.0	30.5	14.6	–23.1	–39.2
India	43.9	37.1	25.8	–12.5	–24.1
Austria	21.8	25.1	14.4	–13.3	–30.6
Thailand	21.3	20.7	23.3	–10.3	–21.7
Poland	43.5	41.5	28.9	–18.1	–33.1
Norway	36.9	43.3	31.3	–21.9	–34.2
Indonesia	25.9	28.2	26.5	18.0	–30.9
Czech Republic	34.7	40.1	26.2	–16.9	–34.7
Turkey	42.9	34.8	36.7	–13.2	–26.5
Denmark	21.9	30.0	18.4	–15.1	–27.5
Hungary	32.8	33.8	17.4	–17.3	–36.1
Venezuela	52.7	77.2	56.8	–42.5	N/A
South Africa	33.8	27.3	34.4	–6.2	–36.1
Argentina	43.6	27.8	49.4	–5.7	–25.9
Chile	16.3	0.7	1.1	–25.5	–41.5
Israel	24.1	23.8	25.8	–19.0	–35.1
Colombia	41.5	46.3	41.5	–6.0	–13.2
Egypt	56.0	98.8	104.3	3.4	–16.8
Greece	2.6	27.7	14.3	–11.9	N/A

Sources: UN Comtrade database, and author's own computations.

TABLE 4 Quarterly Import Growth Rates

Countries	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009
United States	11.2	14.0	14.2	–9.0	–29.7
Germany	21.1	24.5	20.7	–9.0	–25.4
China	28.6	32.4	25.7	–9.0	N/A
Japan	25.9	24.9	38.3	5.9	–29.3
France	25.0	26.2	18.4	–12.5	N/A
Britain	10.2	13.6	8.1	–23.4	–31.4
Italy	15.8	22.4	17.2	–14.7	–33.5
The Netherlands	27.7	28.8	23.5	–11.0	–29.9
Belgium	21.5	31.3	21.6	–14.4	N/A
South Korea	28.9	30.6	42.9	–8.9	–32.9
Spain	26.0	23.6	13.3	–21.6	–40.2
Canada	13.6	15.7	11.2	–10.0	–26.8
Hong Kong	11.7	9.4	7.1	–4.1	–22.4
Singapore	32.1	35.5	32.9	–9.1	–32.5
Mexico	17.4	14.4	16.5	–7.4	–29.5
India	54.7	36.8	53.2	5.8	–25.3
Russia	46.9	47.2	48.3	3.5	–38.9
Poland	55.1	44.1	33.5	–14.6	–38.8
Turkey	39.8	34.5	30.5	–20.7	–42.7
Australia	31.7	33.8	31.0	–5.8	–25.9
Brazil	43.1	58.7	57.9	20.5	–21.9
Thailand	42.3	26.7	38.0	4.4	–39.7
Switzerland	19.1	27.0	18.2	–8.0	–17.0
Austria	21.3	28.3	13.3	–15.8	–30.5
Sweden	24.4	34.5	14.0	–22.5	–37.2
Malaysia	15.7	17.1	15.0	0.4	–37.2
Czech Republic	36.2	38.0	24.8	–12.2	–35.7
Indonesia	42.2	32.6	44.5	43.2	–32.3
Denmark	22.1	29.3	18.7	–14.4	–25.4
Hungary	27.2	30.2	17.2	–18.2	–37.3
Norway	22.0	28.3	19.5	–21.6	–29.9
South Africa	25.5	24.8	24.6	N/A	N/A
Greece	5.4	18.4	9.2	–16.5	N/A
Israel	31.3	26.5	19.0	–13.0	N/A
Chile	38.9	44.6	44.5	2.5	–31.2
Argentina	40.2	50.5	30.0	0.6	–36.1
Venezuela	8.8	12.3	0.9	9.7	N/A
Egypt	29.0	102.4	130.0	60.5	33.0
Colombia	20.2	27.2	18.2	10.2	–10.2

Sources: UN Comtrade database, and author's own computations.

around the world. The rates given are relative to the same quarter in the previous year. The source of data is again the UN Comtrade. In each table, countries are sorted according to the volume of their exports or imports in 2008. These tables clearly demonstrate that the impact of the crisis on the international trade volume has been detrimental. Almost all countries experienced a decrease in trade volume, with lower exports and imports. The only exception was Egypt, which saw its trade volume continuously improve, with a 32% increase in its annual

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trade volume in the first quarter of 2009 in comparison to the annual trade volume in the second quarter of 2008. For most countries, the crisis affected the trade volume in the fourth quarter of 2008. Some other countries, such as Australia, Brazil, Colombia, Indonesia, Malaysia, and South Africa, experienced this decrease in trade volume as late as the first quarter of 2009.

This decrease in trade volume experienced during the crisis improved the trade balance of the majority of countries in these tables. These countries reduced their trade deficit from a total of $1,701 billion in the third quarter to $1,607 billion in the fourth of 2008, and then to $1,360 billion in the first quarter of 2009. Austria turned its precrisis trade deficit into a surplus by the first quarter of 2009. Other notable success stories are Australia and South Korea, which reduced their deficit by 90% and 76%, respectively. For five countries, the trade deficit at the beginning of the crisis widened by a total of $19 billion by the fourth quarter of 2008; $10 billion of this amount was experienced by France alone. In percentage terms, Egypt saw the biggest widening of its trade deficit, with 97%. Other countries in this group are Colombia and Israel. The remaining countries were running a trade surplus at the beginning of the crisis. Most of these countries experienced a decrease in their surplus, with the exception of Argentina, China, Hungary, Malaysia, and Switzerland. These countries increased their surplus from $352 billion in the second quarter of 2008 to $418 billion in the fourth, with continued growth into the first quarter of 2009; $49 billion of this increase is due to China. All six countries experienced an improvement of their surplus by more than 20%, with the exceptions of Switzerland (10%) and Venezuela (5%). Hungary had the highest increase, with 35%. The trade surplus in the remaining countries exponentially shrank from $898 billion in the second quarter of 2008, down to $863 billion, then to $758 billion, and to $610 billion in consequent quarters. Japan and Germany had the worst impact, with decreases in surplus by $99 billion and $77 billion, respectively. In fact, Japan started running a deficit in the first quarter of 2009. Proportionally, the biggest decreases in trade surplus were experienced by Japan (109%), Chile (94%), Belgium (56%), Singapore (42%), and Indonesia (37%).

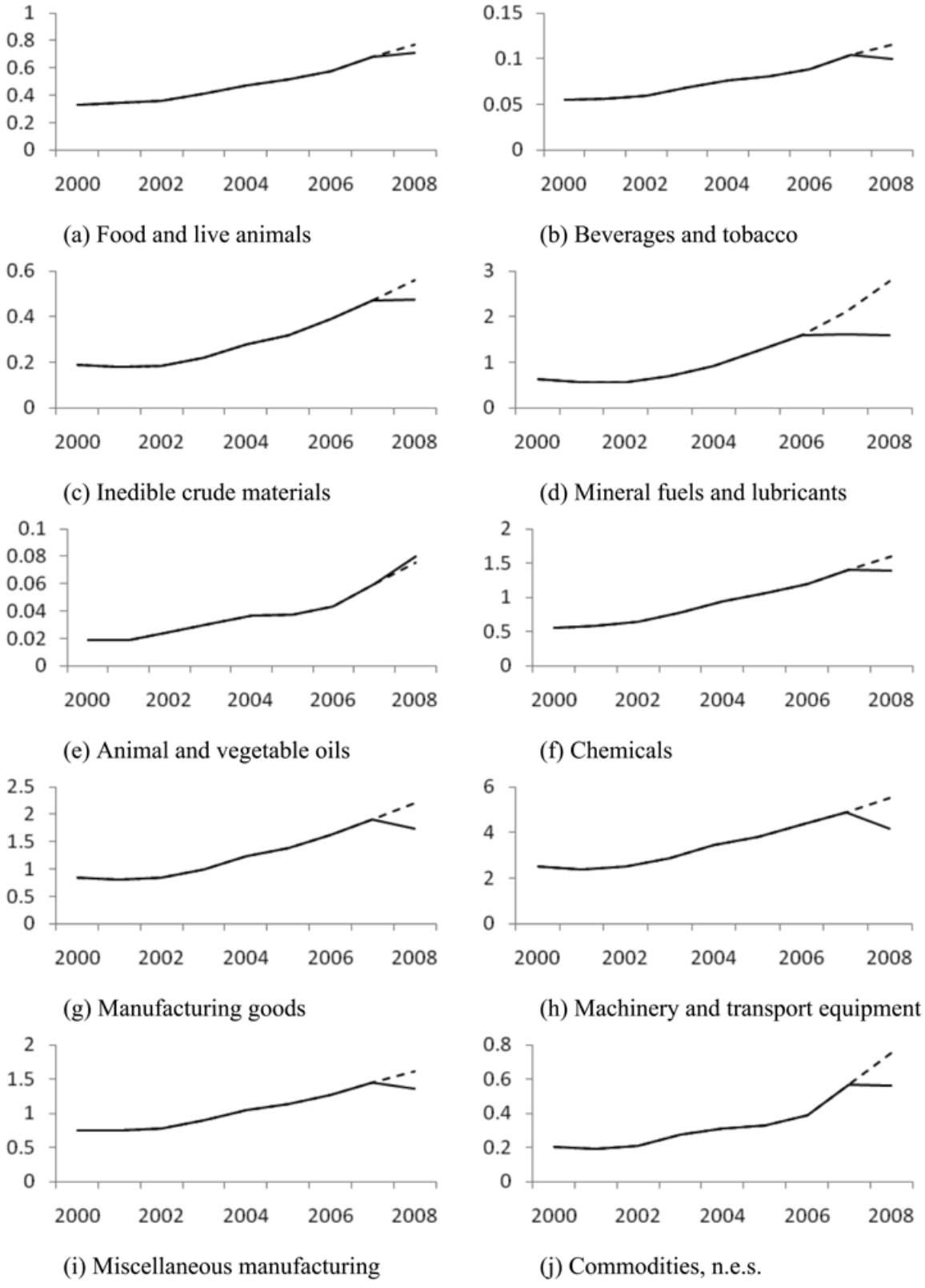
Figure 2 plots the world exports since 2000 in various sectors classified according to Standard International Trade Classification (0–9). The figures are in trillions of US dollars. Solid lines show the actual exports. Dashed lines show the trend based on the average of the percentage changes during 2004–2007. The period of 2005–2007 is considered to determine the trend for the mineral fuels and lubricants sector. The trend established in previous years, either a decrease or an increase, continued in 2008 in some sectors. These are as follows, with percentage changes relative to 2007 given in parentheses: food and live animals (up by 4.6%) and animal and vegetable oils (up 34.1%). The year 2008 clearly stands out as the year when the trend in exports changed in many other sectors. These sectors experienced stark decreases in comparison to the previous trend. Exports in beverages and tobacco, inedible crude materials, chemicals, and commodities not specified elsewhere have been lower than their respective trends by 14.7%, 17.7%, 15.1%, and 33.4%, respectively. While the decrease in exports in the mineral fuels and lubricant sector has been significant (33.1%), it cannot be attributed to the 2008 crisis, as it started declining in 2007. Unfortunately, most significant decreases from the trend have occurred in sectors that are the largest in volume. These are manufacturing (24.5%), miscellaneous manufacturing (17.5%), and machinery and transport equipment (27.5%). The loss of export volume in these sectors amounts to $2,068 billion total, with the machinery and transport equipment experiencing the largest decline.

Since these aggregate figures might hide some significant changes, Table 5 shows the changes in exports of large commodity groups within these sectors. Figures are in billions of US dollars. Only industries with more than $75 billion in exports are listed. All industries within the machinery and transport equipment sector experienced decreases in export volume in 2008. Road vehicles, electrical machinery, and telecommunications equipment in this sector all experienced the most significant decreases. This is followed by the manufacturing sector. Nonferrous metal and rubber manufacturers, optical goods and professional instruments, textile, apparel, and furniture industries are among the worst hit. Interestingly, some manufacturing industries such as miscellaneous manufacturers and iron and steel manufacturers did experience an increase in exports, and some, such as metal manufacturers and mineral manufacturers, posted no significant change in exports. It is further noteworthy that there are also six other industries that experienced more than 10% increases in exports in 2008.

Data and Methodology

The GDP growth rates demonstrate that there are some countries that were badly hit, with growth rates much worse than the United States, whereas there are some others that were minimally affected and continued their growth. Export growth rates also presented similar observations about these countries' international trade experi-

FIGURE 2 World Exports in Various Sectors



Source: UN Comtrade database.

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TABLE 5 World Export Performance in Large Commodity Groups

Industry	2007	2008	Change
78—Road vehicles	1,153	891	–22.8%
68—Nonferrous metal manufactures	341	275	–19.2%
57—Plastics in primary forms	221	190	–14.0%
03—Fish, crustaceans, mollusks, and aquatic invertebrates	83	71	–13.8%
88—Photographic optical goods, watches, and clocks	97	84	–13.4%
77—Electrical machinery, apparatuses, and appliances	1,014	880	–13.2%
62—Rubber manufactures	100	88	–12.7%
76—Telecommunications equipment	578	505	–12.6%
51—Organic chemicals	304	269	–11.4%
58—Plastics in nonprimary forms	95	85	–10.6%
87—Professional, scientific, and controlling instruments	266	242	–9.0%
72—Machinery specialized for particular industries	371	338	–8.8%
75—Office machines and automatic data-processing machines	547	500	–8.6%
65—Textile yarn, fabrics, made-up articles	235	215	–8.3%
79—Other transport equipment	307	282	–8.0%
05—Vegetables and fruit	146	135	–7.7%
82—Furniture and parts	125	117	–6.5%
71—Power-generating machinery and equipment	327	307	–6.0%
84—Articles of apparel and clothing accessories	348	329	–5.3%
93—Special transactions and commodities not classified	500	482	–3.7%
64—Paper, paperboard, and articles	159	153	–3.6%
85—Footwear	81	80	–1.5%
74—General industrial machinery, and machine parts	518	515	–0.6%
69—Manufactures of metals	293	292	–0.5%
66—Nonmetallic mineral manufactures	238	238	–0.1%
33—Petroleum, petroleum products, and related materials	1,311	1,311	0.0%
89—Miscellaneous manufactured articles	447	453	1.3%
28—Metalliferous ores and metal scrap	215	219	2.0%
55—Essential oils, toilet, polishing, and cleansing preparations	105	107	2.0%
67—Iron and steel manufactures	455	465	2.1%
59—Chemical materials and products	140	152	8.2%
54—Medicinal and pharmaceutical products	367	401	9.1%
34—Gas, natural and manufactured	213	236	10.9%
52—Inorganic chemicals	78	87	11.1%
01—Meat and meat preparations	92	103	12.5%
04—Cereals and cereal preparations	109	140	28.2%
97—Gold	70	92	32.3%
32—Coal, coke, and briquettes	61	103	69.3%

Source: UN Comtrade database.

ence during the crisis. Clearly, the reach and the impact has not been the same across the board in this crisis that originated in the United States. The natural question then is how some of these countries dampened the effect of the crisis. The answer to this question will guide policymakers in producing solutions that will help to avoid the repeat of a similar disaster in the future.

The sample consists of the world's largest 40 economies for which quarterly real GDP growth rates were available from *The Economist* for the Q3 2007 to Q2 2009

period. These countries represent approximately 90% of the world GDP. It includes developed markets as well as emerging countries from different corners of the world.

The effect of the US economic downturn on these economies is examined by making comparisons of quarterly real GDP growth rates relative to the previous year before and after the third quarter of 2008. In particular, the overall average effect for each country is computed by finding the change in the average of these growth rates between the Q3 2007 to Q2 2008 period and Q3 2008 to Q2 2009 period. Accordingly, all countries experienced a decrease in their average growth rates in the latter period, ranging from –1.5% to –11.7%. The effect in the crisis epicenter, the United States, has been –4.1%. Twenty-six countries were worse hit than the United States, with Russia, Singapore, and Turkey all experiencing a more than 10% decrease in their average growth rates. The least affected countries include Indonesia (–1.5%), Greece (–2.2%), India (–2.3%), Egypt (–2.3%), and Australia (–2.8%).

What follows is a description of each factor that potentially plays a role in explaining the variation in the growth experience across countries, along with its expected relationship to the effect on the growth rate.

US Share in Exports

It would make sense that if a company does a lot of business in the United States, it will be most affected. A country that has close international trade and investment activities with the United States will be immediately and more severely impacted by the crisis in the United States. The demand for the products and services of the companies in these countries from the US consumers will decrease. The return to their investment in the United States will also be significantly reduced. This will be reflected in their profitability, and consequently their incentive to invest and hire in their home country will be reduced as well. Hence, an economic crisis that starts in the United States will spread to other countries that have business interests in the United States, and will lead to an economic downturn. One can generalize this to the following: economic contagion spreads from the epicenter country of the crisis to those with which it does cross-border business.

To capture the extent of the trade relations with the United States, the share of the United States in exports of each country will be considered. Since exports are part of the GDP, this factor is believed to have a higher correlation with the immediate impact on the economic growth rates than the share of the United States in the imports. The UN Comtrade database is used to compute this variable, and data for 2007 is used in computing the shares. According to computations, North American Free Trade Agreement (NAFTA) partners Canada and Mexico stand out, with more than 75% of their exports going to the United States. Other countries with a substantial share of their exports going to the United States include Israel, Colombia, China, Japan, and Malaysia, all with a higher than 20% share for the United States.

Openness

As is the nature of an economic contagion, the rippling effects of a crisis will be felt in third countries. The economic downturn in countries that do business with the United States will also affect third countries that do business with the partners of the United States. The revenue stream, profitability, investments, and hiring of companies in these third countries will also be reduced to the extent they are connected to or integrated with to the world economy. Therefore, the more open countries are to international business, the more negatively they will be affected by the economic crisis. Consequently, the economic crisis that started in only one country will become a global crisis affecting every open country. Hence, economic contagion spreads to third countries that are open to cross-border business.

The total trade volume-to-GDP ratio is used to measure this variable. The source of trade data is again the UN Comtrade database, and the UN National Accounts Main Aggregates for the GDP data. The data for 2007 is used in computing the shares. Computations show that the most open countries are Hong Kong and Singapore. Their total trade volume exceeds three times their GDP. Six other countries—Belgium, Malaysia, Hungary, Thailand, the Czech Republic, and the Netherlands—also have an openness ratio larger than one. Countries with openness ratios less than 30% are India, Greece, Japan, Egypt, Colombia, the United States, and Brazil. Note that Japan and Colombia are two countries that are not very open, with a high share of exports going to the United States. Malaysia also stands out as an open country with close trade relations to the United States.

Network Integration Index

Most studies of international economic integration use the above measure of openness to stand for the level of integration for a country (Rodrik, 2000). While it certainly captures the level of economic integration with the focus on one country, it has its own shortcomings, as demonstrated by the literature on networks (Albert & Barabasi, 2002; Newman, 2003). Most importantly, it fails to capture the pattern of linkages that go beyond the im-

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mediate partner countries, which ties countries around the world together. Forbes (2001) and Abeysinghe and Forbes (2005) emphasize the importance of this international trade network in explaining the spread of an economic contagion. Using the network approach, Kali and Reyes (2007) developed an index to measure a country's influence on the international trading system. They suggest that the severity and geographic reach of a crisis can be amplified if the epicenter country of the crises is well integrated into the global trade network. They further argue that target countries affected by such a shock are, in turn, better able to dissipate the impact if they are well integrated into the network. This is an index of network dependence, also called node (country) importance, in which some countries are more important if other countries, especially important ones in the network, depend on them.

This network integration index is also used in this study to see if their claims are true. While the openness measure will capture a country's exposure to risk of global economic contagion, the addition of this network index will measure its flexibility to defuse the magnitude of the impact through its role within the global trading network.

The average of the network indicators computed with export and import dependency provided in Kali and Reyes (2007) are used.[1] There is an insignificant difference between the two for any country, while there is larger variance in indicators across countries. The index for the United States is the largest, at 100.5. Other countries well connected to the global trade network include Singapore, Norway, Switzerland, Denmark, Hong Kong, Australia, Canada, and Japan. Note that the latter two countries are relatively dependent on the United States for exports, but also well connected to dissipate a shock coming from the United States, according to the index. Colombia and China stand out in the list of countries that are least connected to the trade network with significant dependence on the United States as an export market.

Table 6 reports descriptive statistics for each of the above factors, along with the correlations matrix. The matrix indicates that among the three factors used to explain the effect on growth rate, there is no significant correlation. Hence, there will not be any multicollinearity issue in the analysis. The openness variable already shows significant negative correlation with the effect on growth rate without the need for controlling for other factors, indicating its potential significant explanatory power.

Empirical Results

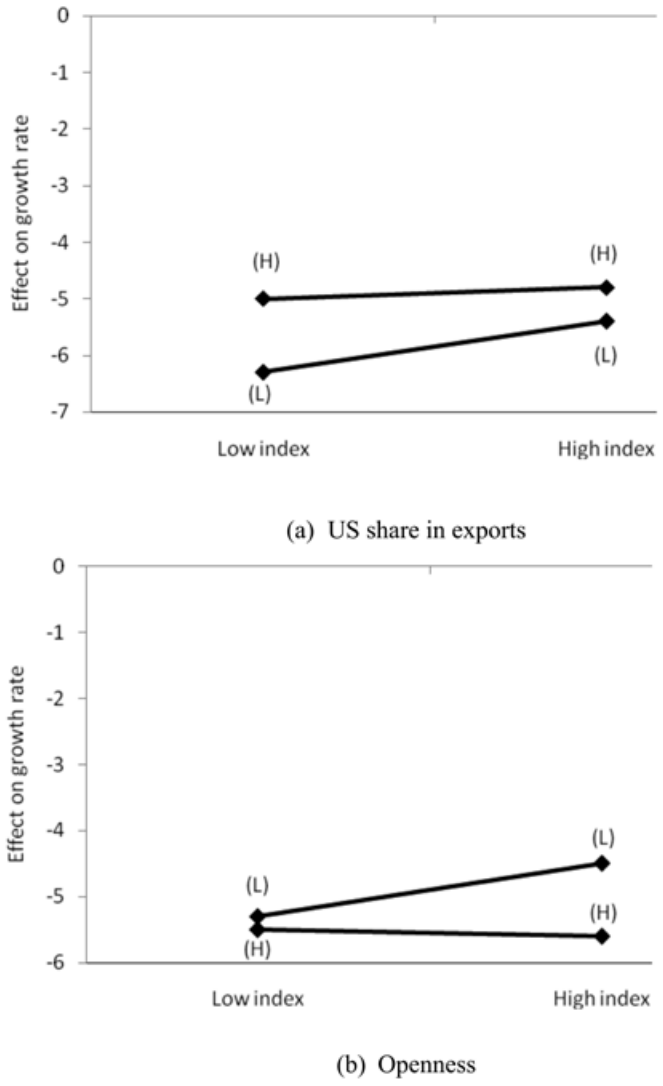
Figure 3 illustrates how these three factors interact and affect the change in the countries' growth rates. The share of the United States in exports and the openness measure are paired individually with the network index to demonstrate the particular effect the role of a country in the international trade network plays with given specific levels of openness and the importance of the United States as a market for that country's exports. For each factor, countries are arranged into two groups, with those with figures higher than the median considered high (H) and those with figures lower than the median considered low (L). The medians are 44.1, 7.92%, and 56.32% for the network index, the share of the United States in exports, and the openness measure, respectively. The plotted changes in growth rates are averages for countries in each group. Panel (a) of the figure shows that a higher index reduces the effect of a global crisis on the growth rate, irrespective of how high or low the share of the United States as a market in a country's exports is. Interestingly, when the US share in exports is low, a higher network index results in a much smaller decrease in the growth rate. This is in support of Kali and Reyes's (2005) prediction that countries affected by a shock are better able to dissipate the impact if they are well integrated into the network. However, the figure also shows that the effect on growth rates is higher when the US share in exports is lower. This is counterintuitive, as the United States is the epicenter of

TABLE 6 Means, Standard Deviations, and Correlations

	Mean	Std. Dev.	1	2	3
Change in growth rate	–5.297	2.363			
Share of United States in exports	0.165	0.219	0.098		
Openness	0.727	0.685	–0.468*	–0.213	
Network index	48.97	26.96	0.002	0.099	0.267

*Significant at 0.01 level (two-tailed).
Sources: The Economist, UN Comtrade database, Kali and Reyes (2007), and author's own computations.

FIGURE 3 Determinants of Change in Growth Rate



Source: Author's own computations.

this crisis. Dependence on the United States as an export market should have led to much more significant drops in these countries' growth rates. Panel (b) illustrates how the network index impacts the effect of a crisis on growth rates for countries that are relatively open or closed to international trade. As expected, countries that are open are more susceptible to a global crisis with more significant drops in their growth rates. For countries with low measures of openness, a well-established connection to the international network makes a significant difference in diffusing the effect of a global crisis, as the drop on growth rate is much smaller. For relatively open countries, the role in the global trade network does not seem to play a significant role in reducing the impact of the global crisis.

Table 7 presents the results of the regression analysis. The first column lists the coefficients of the three factors for the average overall effect of the crisis starting in Q3 2008 and ending in Q2 2009. Separate regressions are also carried out for each of these quarters, measuring the impact of these factors on the change in quarterly growth rates relative to the same quarter the previous year, as the crisis progressed.

The first regression covering the whole period of the crisis supports the expected impact of the three factors playing a role in the effect on growth rate of a global crisis. The coefficient of the US share in exports is negative, albeit insignificant, supporting the expectation that dependence on the crisis epicenter country as an export market amplifies the impact of the crisis on economic growth rates. The results show that if the share of the epicenter country in exports was one percentage point higher, the average quarterly growth rate would be 0.27% lower. Openness is also affecting the impact of the crisis on the growth rate, as expected. Its coefficient is negative and significant. Accordingly, open countries are more susceptible to negative effects of a global economic contagion, as they are more exposed to dropping demand from multiples of trade partners. In particular, if the share of trade volume in GDP increased by one percentage point, the average quarterly growth rate would be 0.176% lower. Finally, as Kali and Reyes (2005) predicted, the role countries play in the global trade network affects how they are able to diffuse an economic contagion. Although insignificant, the coefficient of the network index is positive, implying that this factor reduces the negative impact of the crisis on countries' growth rates.

The next four regressions are carried out separately for each quarter following the start of the crisis in the third quarter of 2008. Dependent variables are the decrease in the quarterly growth rates relative to the same quarter in the previous year. These regressions allow us to observe how roles of these three factors change as the crisis progresses. Accordingly, there is a bit of delay in how dependence on the United States as an export market would reflect on the quarterly growth rates. The fall in demand from the US market reduces the countries' growth rates with about a quarter of delay, as the coefficient of this factor is most negative in the fourth quarter of 2008. After that, it gradually has less significance on the countries' growth rate and even turns out to be positive in the second quarter of 2009, as countries look for other markets to substitute for their loss in the US markets. The openness factor has the most significant negative ef-

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TABLE 7 Regression Results

Period of Analysis	Q3 2008/Q2 2009	Q3 2008	Q4 2008	Q1 2009	Q2 2009
Constant	–4.578**	–0.386	–4.808**	–6.368**	–7.124**
	(0.796)	(0.534)	(0.930)	(1.509)	(1.260)
US share in exports	–0.270	–0.016	–0.732	–0.386	0.153
	(1.656)	(1.112)	(1.937)	(3.142)	(2.624)
Openness	–1.761**	–1.163**	–1.473*	–3.567**	–0.738
	(0.546)	(0.366)	(0.638)	(1.035)	(0.865)
Network index	0.012	–0.016*	0.018	0.035*	0.016
	(0.014)	(0.009)	(0.016)	(0.026)	(0.022)
R^2	0.237	0.341	0.138	0.265	0.03
Durbin-Watson	1.917	2.077	1.823	2.051	2.412

*$p < 0.10$; **$p < 0.01$ at one tail.
Source: Author's own computations.

fect on the growth rates about two quarters after the start of the crisis in the first quarter of 2009. This also makes sense, as it illustrates the compounding effect of the loss of demand from other trade partners who are also major trade partners of the United States and also experiencing a decline in their economic growth. Incidentally, this is the same quarter when the network index has the most positive and significant impact on the growth rate. At the start of the crisis, this index picks up the negative effects of the spreading economic contagion. Later, especially in the first quarter of 2009, it captures the countries' flexibility to dissipate the crisis by moving to other export markets that are not as much affected, and has a positive impact on their growth rate during the contagion.

Conclusions and Discussions

Global downturns threaten the process of globalization and, ironically, the resulting economic gains. In past crises, the decrease in trade has been far more significant than that in the economic output. Studies also show that over the years, the elasticity of trade volume to economic output has increased (Eichengreen & Irwin, 2009). The data provided in this article suggest that the situation in the current crisis is not different.

There are several potential reasons why trade declines at these high rates during crises. One reason is the companies reducing their inventories given the expected slowdown in growth. Data for the United States shows that trade in nondurable perishable goods has decreased the least among industries. Exporters specializing in durable goods and/or capital goods, such as Germany, have been harder hit by this crisis than others. Sector-level changes in exports provided in this article provide support for this inventory-effect hypothesis.

Another reason is governments turning to protectionist policies in the face of increasing unemployment rates and little room left for maneuvering after successive expansionary fiscal and monetary policies. This has harmful long-term effects, as such protectionist policies are difficult to remove even after economies are back on a growth trend due to the nature of multilateral negotiations. Since the start of this crisis, there have been several cases of increased tariffs, albeit within limits of commitments to the World Trade Organization; introduction of subsidies, including in the farming sector; and an increased number of antidumping cases, which are up significantly from an over-a-decade-long low in 2007.

In the United States, President Obama is facing enormous protectionist pressure from Congress, which recently levied a 35% tariff on imported tires from China. "Buy American" provisions for public contracts; shutting down the border to Mexican trucks, which was promised to be open in the NAFTA agreement; and not advancing free trade agreements that were signed with Colombia, Panama, and South Korea that are pending in Congress are other examples of recent protectionist measures implemented by the United States. Even if there have not yet been many such instances, these incidents are likely to lead to requests of similar protectionist measures from other US industries that have suffered from foreign competition.

Driven by pessimism about ever finishing the multilateral Doha negotiations that have been dragging on for seven years, export-dependent nations in Asia are engaging in an increasing number of bilateral trade

agreements. These deals offer favorable treatment to a few companies in partner countries at the expense of all the rest elsewhere in the world. Although seen as a substitute for multilateral liberalization or a stepping stone, such bilateral agreements may cause long-term damage to their economies due to their discriminating natures. Some other countries, such as Australia, China, Ecuador, and Paraguay, have moved in a liberal direction, reducing important duties or removing nontariff barriers for all countries.

The results of this article point to the revival of the Doha round of talks as offering potential for reducing the impact of future crises on national economies. Due to its multilateral nature, Doha will reduce countries' dependence on individual partner countries in bilateral deals as export markets and limit their exposure to crises that may originate from these countries. The multilateralism in the Doha negotiations will also improve countries' network index by improving the roles they play in the global trade network. This will increase their chance of countering crises that start in one country by turning to alternative markets, and thus diffusing the scale of a global economic contagion. Lastly, a couple of the major issues that divide the nations at the Doha trade talks are the liberalization of agriculture and service industries. As previous discussions indicate, inventory possibilities are limited or nonexistent in these industries. If trade in these industries is further liberalized, big decreases in their trade and a resulting further drop in economic output can be avoided.

Aside from these macro policy implications, there are also some lessons for the individual companies engaging in international business. The results of the article point to the importance of diversification of export markets for multinational companies. This will reduce their dependency in one market, and limit their exposure to any economic troubles in that market, and increase their ability to easily move from markets with economic problems to others to defuse the adverse effects.

There are certain limitations of this study. These include availability and accuracy of the data. The study includes only countries that provide recent quarterly data on GDP growth. Hence, certain countries had to be excluded from the scope of the study, including countries such as Ireland, Iceland, and some Baltic states, with anecdotal evidence in the press regarding a significant effect of this contagion on their economies. Also, the analysis is based on recent GDP growth rates. Given their nature, these types of data often get revised in later periods, with the potential of introducing error to the study.

There are also limitations resulting from the type of analysis. A sector- or industry-level analysis has the potential to shed more light on the causes of variation across countries. While the current scope of the analysis does not give way for time-series analysis since the overall effect of the recession (change in growth rates before and after) is explained, a change in the scope to allow time-series analysis might better explain the cross-country variation. Lastly, the analysis focuses on international trade linkages as causes of the economic contagion. Inclusion of other potential factors would improve the explanatory power of the analysis and better represent the role of trade linkages in the spread of the contagion.

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Note

1. The network integration index for a country i, IMP_i, is computed as follows using the importance of each country j, IMP_j, and their dependency in the network on i, DEP_{ij}, and the intrinsic value, IV_i:

$$IMP_i - \sum_j DEP_{ij}, IMP_j + IV_i$$

The intrinsic value is the ratio of GDP per capita of country i with respect to that of the United States. The dependency is the share of exports (or imports) of country j to i in the total exports (or imports) of j. A system of equations is solved to obtain the network integration indices for all countries.

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