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**Article — Published Version**

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Asian Journal of Political Economy

*Suggested Citation:* Park, Ji-Woo; Jeong, Kim (2018) : Empirical Similarities and Differences Between the Global Financial Crisis and the Asian Crisis, Asian Journal of Political Economy, National University of Singapore (NUS), Singapore, Vol. 4, Iss. Winter Edition, pp. 228-236

This Version is available at:

<https://hdl.handle.net/10419/193693>

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# Empirical Similarities and Differences Between the Global Financial Crisis and the Asian Crisis

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## Abstract

*The purpose of this article is to provide some empirical evidence about the recent global financial crisis compared to previous crises. First, this comparative analysis is conducted at the financial level by assessing the extent of international contagion among major stock markets during recent episodes of financial turbulence. Secondly, we examine the real impact of the crises, notably by comparing the losses of GDP during the recent crises in the advanced countries. Our results show that the recent financial crisis differs from other crises in the extent of the international contagion and the power with which it hit the real economies of the advanced countries.*

The financial crisis of 2008-2009 surprised us by its virulence and brutality. The shock wave produced by the collapse of Lehman Brothers on September 15, 2008 spread instantaneously to global financial markets. Given the extent of realized losses, market participants sought liquidity to restore their *value at risk (VaR)* and deal with margin calls in bear markets. This quest for liquidity triggered massive asset sales, causing their prices to plummet and even a break in some cases. The market for CDOs (collateralized debt obligations) in particular, already hit by the *subprime* crisis since summer 2007, became totally illiquid in the absence of buyers.

The bankruptcy of Lehman Brothers also prompted a reevaluation Sharp of the default risk of banking institutions, previously held to be negligible. Given the scale of losses incurred by most institutions, each trying to withdraw from there financing: bank the market for ABCP(*asset-backed commercial paper*) directly related to the funding of the CDOs has dried up, spreads are taut interbank markets at levels never reached, and *spreads* of bonds and CDS (*credit default swaps*) on banking entities have increased sharply. The prices of the shares bank fell causing a little later in their wake all stock prices.

No country has been spared. Equity markets have simultaneously been hit around the world. Foreign exchange markets have also been affected. Many emerging currencies depreciated sharply due to the unwinding of *carry trades* (Coudert and Mignon, 2011), while the yen, the Swiss franc and, paradoxically, the dollar were considered safe havens. Commodity prices, which had soared until mid-2008, collapsed sharply, with the exception of precious metals, which were seen as the last bulwarks against the crisis. All in all, the price of all financial assets fell sharply and unprecedented in the post-war period, with the exception of some segments very special such as gold or US Treasuries, which served as safe havens.

One of the most striking features of this financial crisis is its global aspect. This situation reflects the growing interconnection of financial systems in a globalized world. Financial stocks were first affected in all countries and the fall in stock prices was widespread in all open countries. We show in this article that the interconnections that fueled the decline in prices have never been so powerful.

The financial crisis then spread to the real economy under the effect of several channels. On the demand side, growing uncertainties about the economy and *ultimately* rising unemployment have contributed to the rise in the savings rate. Consumption was also slowed by a wealth effect in reverse, households wanting to rebuild their wealth undermined by falling stock prices. The companies have drastically reduced their investments due to the massive erosion of demand. As this type of phenomenon occurs simultaneously in most countries, external demand has contracted, leading to a fall in exports.

Global trade thus declined for the first time in the post-war period. On the supply side, housing prices collapsing, the construction sector was the first affected, while it was particularly dynamic to pull the economy in some countries before the crisis. Finally, public finances have deteriorated in most advanced economies resulting in austerity programs with deleterious effects in the post-crisis period.

As much as the financial crisis was global, the recession ensuing focused on advanced economies. It is striking how quickly emerging economies rebounded after the crisis. Thus, despite the decline in world trade, China and Brazil have quickly regained their usual growth rates. All in all, the United States and Europe will have been hit hard. This is why we will focus on the advanced countries to study the real effects of this crisis. In this article, we will first show the extent of the contagion on the global stock markets (G7 and emerging countries), then we will look at the realities in the G7 countries.

The literature on contagion is generally report increasing links between financial markets in times of crisis (Calvo and Reinhart, 1996; Forbes and Rigobon, 2002; King and Wadhvani, 1990; Lee and Kim, 1993; Kirrane 2018). More specifically, in order to show the existence of contagion, the work seeks to highlight a change in the links between markets between periods of calm and periods of crisis. If these links are clearly established and remain stable over time, the mechanisms for transmitting shocks between stock exchanges tend to be through the fundamentals. On the other hand, if these links intensify during periods of crisis, this is an indication in favor of a contagion phenomenon.

From this literature, our aim here is to analyze the links between a set of financial markets by considering various recent crises. For this, we use correlation-based contagion tests: an increase in correlations during periods of crisis, compared to values observed during periods of calm, shows a change in the mechanism of transmission of shocks between markets, reflecting a phenomenon of contagion. However, it is difficult to highlight and compare changes in the relations between markets between periods of calm and periods of crisis insofar as they are characterized by very high volatility that makes comparison difficult by increases the values of correlation coefficients during crises (Ronn, 1998).

In order to overcome this difficulty, we join the work of Fry, Hsiao and Tang (2010) and Fry, Martin and Tang (2010) the international financial markets by correcting the values of the correlations of the volatility during periods of crisis. We begin by describing the methodology before proceeding with an empirical application on a set of countries including industrialized economies and emerging countries.

Following the work of Forbes and Rigobon (2002), Fry, Martin and Tang (2010) developed a contagion test based on the calculation of correlations with a consideration of volatility during periods of crisis. We are thus interested in the correlation coefficients between the returns of two markets  $i$  and  $j$  between periods of calm and periods of crisis. While in periods of calm, the calculation coefficients of correlation is standard, it is appropriate to correct these statistics of heteroscedasticity during episodes of crisis. We focus on a set of seven recent crises: the Asian crisis financial of 1997, the Russian crisis of 1998, the crisis caused by the bankruptcy of the LTCM (Long Term Management Capital) fund in 1998, the Brazilian crisis of 1999, the crisis linked to the 2000 Internet bubble, the 2001 Argentinian crisis and the 2008 global financial crisis.

Dating the beginning and end of crises is always subject to debate. We based here on the work of Dungey *et al.* (2009) and Fry, Hsiao and Tang (2010) for dating the first six crises. With regard to the recent crisis, various start dates could have been chosen depending on whether or not one considers the turmoil that preceded the financial crisis itself. We have here retained a dating to September 15, 2008 corresponding to the bankruptcy of Lehman Brothers in the United States. This bankruptcy caused a very significant increase in the VIX index, from a level of 25% to 80% in a few days. The end date has been set for September 30, 2009 following the work of Coudert and Mignon (2011), corresponding to the return of the VIX index to its pre-crisis level. The periods of calm include, for their part, all observations that do not appear in times of crisis.

We consider a set of thirteen countries including the Asian countries G7 (Germany, Canada, United States, France, Italy, Japan, United Kingdom) as well as Argentina, Brazil, South Korea, Hong Kong, Russia and Thailand. The data are daily frequency on the period from 1 January 1990 to 31 May 2011 and concern the stock market returns of the thirteen countries listed above, yields are defined as the changes in logarithmic price. In order to highlight the evolution of the links between the markets according to the periods, we start by calculating the correlations between the yields of the markets  $i$  and  $j$  by distinguishing the periods of calm and the periods of crisis.

Thus, during the Asian crisis, the correlations of the different markets with the Hong Stock Exchange Kong has almost doubled for most G7 countries. The global financial crisis of the late 2000s led to a sharp increase in correlations between the US market and other markets, with particularly for emerging countries. One could deduce from these graphs the existence of contagion phenomena from the Hong Kong Stock Exchange to the G7 countries (Asian crisis) and the New York Stock Exchange to all other countries (crisis of the 2000s). The same is true for all the other crises studied here since we observe a systematic change in the relations between markets during episodes of crisis compared to periods of calm. All in all, these results highlight an increase in links between stock markets during periods of turbulence, which is in line with the existence of a contagion phenomenon, thus confirming all the conclusions of the literature ( Claessens Dornbusch and Park, 2001, Claessens and Forbes, 2001).

This increase in the correlations between the markets during the turbulence observed for all the crises studied here can, however, be biased by the increase in volatility, which is a characteristic of these episodes. For this reason, the value of correlation coefficient of corrected heteroscedasticity,  $r$ . The importance of the correction is evident since in all cases the coefficient corrected correlation  $r$  is lower than the "standard" coefficient  $r_y$ . Thus, if we take again the example of the Asian crisis, one notes that the correlation coefficients during periods of calm and the episode of crisis remain globally stable, not testifying to a phenomenon of contagion. As for other crises, the observation of correlations corrected also tends to relativize the existence of contagion, even if  $r$  remains higher than  $r_y$  in certain cases, as in Asian countries during the global financial crisis or in developing countries such as Latin America, Russia and South Korea during the LTCM crisis in the United States.

In order to complete these descriptive facts, we apprehend the significance of a potential contagion effect and compare the effects of the different crises studied here in terms of contagion by applying the test of Fry, Martin and Tang (2010) previously presented. The results of the test of Fry, Martin and Tang (2010) based on the null hypothesis of no contagion. Several conclusions emerge from these results. In the first place, the Asian crisis spawned a regional contagion since only Japan, South Korea and Thailand saw their correlations with the Hong Kong Stock Exchange increase significantly during the episode crisis. Secondly, the Brazilian and Russian crises had a relatively limited impact in terms of contagion in the sense that the null hypothesis is rejected for Hong Kong and Thailand in the case of the Russian borrowing crisis, and for Russia and Thailand in the case of the devaluation of the Brazilian real (Kirrane 2017). Thirdly, our results show that the most important crisis emanating from an emerging country is the Argentinean crisis of the early 2000s. This crisis spread to the majority of the countries in our sample: with the exception Japan, G7 countries were all affected, as are the various emerging countries considered, South Korea aside. These changes in the mechanisms of transmission between markets can come from the changes caused by the abandonment of the *currency board system* in Argentina, changing the relations between Argentina and the United States and, as a result, the links of Argentina with most other countries in the sample.

Finally, if we focus more specifically on the three crises emanating from the United States, there is clearly a hierarchy between these crises in terms of contagion. The LTCM crisis mainly affected the Latin American countries - Argentina and Brazil - as well as Germany and the United Kingdom. It has not spread to other G7 countries or emerging Asian countries. The Internet bubble of the year 2000, meanwhile, affected the G7 countries (with the exception of Japan) and Brazil, but relatively spared the emerging countries of Asia. If we look now at the effects of the recent global financial crisis, it is very clear that its impact is considerable. This crisis spread to all the countries in our sample, with the exception of Hong Kong and South Korea. In comparison, the contagion could be contained during the bankruptcy of LTCM by the rapid action of the Federal Reserve. In the same way, the crisis of the Internet bubble remained limited to the stock market values, without causing bank failure likely to shake the international financial system. In this sense, the recent crisis differs from previous ones in the extent of the affected countries. Prices fell sharply on all financial stocks - securitizations, credit derivatives, and then equities -, marking heavy losses in the balance sheets of international banks. It was the

heart of global finance that was touched and threatened to collapse without joint state intervention.

One of the advantages of the test that we have implemented here in lies the fact that it makes it possible to test the contagion without making assumptions about the nature of the transmission mechanisms between the markets. This is indeed an asset in that it is very difficult to identify the channel through which the contagion takes place between the stock exchanges, the theoretical literature on this subject being abounding and not giving rise to a problem. All in all, our empirical study highlights the virulence of the contagion that occurred during the last crisis compared to the crises of the previous decades.

To assess the impact of the last crisis on the real economy, we compare the evolution of different macroeconomic variables during all phases of slowdown in recent decades for the G7 countries. For this purpose, we use quarterly data extracted from the database *Main Indicators Economic* OECD (Organization for Economic Co-operation and Development). These data cover the entire post-war period for France and the United States. They start in 1955 for the United Kingdom, 1961 for Canada, 1980 for Japan, 1981 for Italy and 1991 for Germany. We use as benchmarks all the years in which real GDP has declined in at least two consecutive quarters, with cumulative decline exceeding 1%.

To start in 1950 for all countries, when figures Quarterly are not available early in the period, we complete these data by the long-term annual series from the database *International Financial Statistics* of the International Monetary Fund (IMF). For the 1929 crisis, we use Maddison's online database (2010). We then define periods of economic slowdown for years when real GDP fell by more than 1%. In this way, we have all the periods during which real GDP fell by more than 1% (either annual or quarterly, depending on the period) for each country over the period 1928 to 2010, excluding the years 1938 to 1949. The real impact of this latest crisis is characterized by its international dimension and its scale. The crisis has hit simultaneously most advanced countries and all the G7 countries that we are considering here. Over the very long time period, only two periods are characterized by a common GDP decline in all G7 countries: the 1929 crisis and the 2008-2009 crisis. No other phase of economic slowdown has affected all these countries simultaneously. The most severe crises of the last decades did not have this global dimension even though these years were marked by resounding economic crises. The oil crisis of 1973-75 spared Canada, exporter of petroleum products; the rise in US interest rates in 1980-81, often considered to be at the root of the debt crisis in the Latin American early 1980s, did not trigger a recession in Japan, France, or Canada. Italy; the first Iraq war in 1990-1991 will have had a recessive effect only in Anglo-Saxon countries; likewise, the crisis of the European monetary system in 1992-93 remained confined to the European area.

There is no doubt that the advanced countries experienced between 2008 and 2009 the most brutal recession of the entire post-war period. To be convinced of this, consider the annual growth rate of GDP. The decline in GDP was around 3% to 5% in 2009 in the G7 countries. This is the largest real GDP decline recorded on annual data since 1950 for all these countries. This recession is also the most serious of the post-war period when we take into account not only the growth rate over a year, but also the cumulative decline in GDP over time throughout the

recession. Taking base-100 as the high point of activity, we calculate the level of the low point reached during each phase of economic downturn in the post-war period for each of the countries considered. We calculate the cumulative loss during the slowdown period. Cumulative real GDP losses in 2008-09 range from 3.4% for Canada, about 4% for France, 5% for the United States, 6% to 7% for the United Kingdom, and the United States, Germany, Italy and up to 10% for Japan. No other post-war recession has resulted in such a severe drop in demand (except for Canada).

The global dimension of the crisis has helped to create the great recession. Just as asset price declines have spread to all economies, the globalization of the crisis has created a recessionary spiral through the decline in external demand to all countries. As demand fell simultaneously in all countries, exports more violently contracted than in all other post-war crises. The drop was 11% in the United Kingdom, 16% in France, 18% in Germany and up to 37% in Japan. Another worrying phenomenon is the decline in investment. Private investment is traditionally a demand item crisis-sensitive because of its accelerating nature of variations demand. It fell by 52% in the United States during the crisis 1929. Its fall was drastic during the recent crisis. The cumulative loss in the quarters of the crises reached 11.5% in France, 12.5% in Germany, 15.6% in Italy, 16.5% in Japan, 18% in the United Kingdom and up to 32% in France. United States. This drop in investment permanently obliterates future production capacity. The 1929 crisis led to a long period of depression and resulted in a drop in GDP much larger. The cumulative loss in terms of GDP amounts to nearly 30% in the United States and Canada between 1929 and 1933, 15% in France and Germany from 1929 to 1932. As it can be measured at present the real impact of the crisis was limited by the recovery that began in the third quarter of 2009 and continued in 2010 and early 2011 in most countries. However, a new phase of recession is still to be feared. Compared to the 1973-75 oil crisis, which until seemed recently the most serious of the post-war period, the fall in recent GDP appears to be more severe today. It is true that the mere loss of GDP in the immediate post-crisis years cannot account for the long-term effects of a crisis. Thus, the crisis of 1973-1975 provoked a lasting break in the trend of the GDP whose growth never found again the levels reached in the decades previous. The post-crisis period was marked by a persistent rise in inflation and unemployment, as well as slower growth, in particularly Europe. It is certain that crises of this magnitude leave lasting traces in economies. Similarly, the real long-term effects of the recent crisis will likely exceed those measured in 2011.

Several factors indicate that the deleterious effects of this crisis are far from over. On the one hand, the deleveraging of the private sector, particularly the banks, which has resulted in all the advanced countries is still at work. This deleveraging is necessary to stabilize the financial system, but requires that another mode of growth be found, which differs from this leap forward in the indebtedness that had characterized the growth of previous years, especially in the United States. Meanwhile, the recessionary effect of private deleveraging was partially offset by rising state debt and a very accommodating monetary policy. Europe and the United States are thus in a situation similar to that of Japan in the 1990s. Yet twenty years after this crisis, Japanese growth is still considerably reduced compared to previous decades. On the other hand, the current mistrust of the markets vis-à-vis the sovereign debt greatly limits the room for maneuver of the States. The public finances of the advanced countries have been durably damaged by the crisis as a result of (i) automatic stabilizers, notably the inevitable fall in tax revenues during recessions, (ii) the bailout of banks by governments and (iii) programs stimulus put in place to

fight the recession. Since the beginning of 2010, the sovereign debt crisis in Europe and the bailouts already recorded by Greece, Ireland and Portugal by the IMF and the European Union have aroused investors' fears about the solvency of the so-called states. "Peripherals" of the euro area. The situation is not very different in the United States, where negotiations in Congress in the summer of 2011 to raise the public debt ceiling highlighted the fragility of the political balance. Both the lack of a cure and the solutions proposed by governments to respond to the sovereign debt crisis are raising concerns for growth prospects. On the one hand, if nothing is done to reassure investors about the solvency of the states, other crises are inevitable. The euro area is particularly fragile in this respect as long as the common modalities have not been clearly specified for the bailout of a Member State's debt. On the other hand, the austerity programs being put in place in Europe to respond to the crisis have a lasting impact on growth in the countries concerned. The growth of the coming years in Europe could thus be even weaker than that of the post-crisis period in Japan where the plethoric public debt could at least have been financed at historically low interest rates.

The purpose of this article is to study empirically the financial crisis Recent both from a financial point of view and from a point of view real. Regarding the financial dimension, we are particularly interested in comparing the crisis that followed the collapse of Lehman Brothers to six other relatively recent episodes of crisis affecting the international financial markets. To this end, we carry out a contagion analysis by seeking to highlight a modification of the links between the stock markets during episodes of crisis, compared to the relations prevailing during periods of calm. For this purpose, we are writing in the literature aimed at testing contagion based on the study of the evolution of correlations between stock market returns. The high volatility characterizing the periods of crisis tends to skew up the value of the correlation coefficients, we apply a corrected correlation test for heteroscedasticity.

Our results highlight the specificity of the recent global crisis in terms of contagion by the extent of the affected countries, indicating the existence of unidentified transmission mechanisms in the past. The real effects of the crisis have been particularly harmful: the decline in GDP in the years 2008-2009 was the biggest after-war in the G7 countries; investment and international trade were particularly hard hit. But the most serious effects are undoubtedly to come. The public finances of the advanced countries have been sustainably damaged, the subsequent states' debt capacities are considerably weakened. The fiscal recovery that is taking place through austerity programs may jeopardize future growth prospects.

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