International Shocks: An Examination of Key Channels of Transmission

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This paper explores the channels of transmission of international shocks in the empirical literature, by examining key international shocks such as the Asian crisis of 1997 and shocks transmitted into African countries via the trade channel. The paper draws conclusions having relevant policy implications, which include the following: (i) Contrary to the belief of many that agent behaviour is the main source of international contagion, both macroeconomic fundamentals and agent behaviour are relevant factors of cross-country transmission of crisis, as shown in the case of the Asian crisis of 1997. It would therefore be useful that policymaking is tailored to give balanced attention to the two factors. (ii) Although among other economies the US remains the dominant source of international transmission of shocks, China’s role in the economic performance of African countries seems to be increasing. It would therefore be useful that African policymakers note this.

Keywords: International shocks, crisis-oriented shocks, non-crisis-oriented shocks
JEL Classification Numbers: F01, F4, F41

INTRODUCTION

International shocks are unexpected variations in economic and financial variables transmitted between countries. The source economies of such shocks are usually influential or large economies such as the US, and the Euro Area; and groups of countries such as the Organization of Petroleum Exporting Countries (OPEC). For example, developments within OPEC may trigger unexpected variations in oil price, which may eventually lead to a global crisis.

Basically, international shocks have varying signs (positive or negative), magnitude, speed of transmission, and persistence. For example, unexpected and large increases in oil price originating from oil exporters are positive shocks, while unexpected decreases in US stock prices are negative shocks. Regarding impact, for example, the impact of the oil price shocks of the 1990s and 2000s on oil importers is lower, compared to the impact of the oil price shocks of the 1970s (see Blanchard and Gali, 2010). A plausible reason for this is improved policy response to shocks in the concerned economies.

The objective of this paper is to review empirical studies on international shocks, in order to examine the channels through which the shocks are transmitted. The literature shows that shocks may be classified into two broad divisions, namely crisis-based and non-crisis-based shocks. This paper examines the channels of the transmission of both forms of shocks, touching on key crisis-based shocks such as the Asian crisis of 1997 and non-crisis-based shocks such as shocks transmitted into African countries via the trade channel from advanced countries. The paper ends with relevant conclusions which include the following: (i) both agent behaviour and macroeconomic fundamentals are relevant factors of international contagion, contrary to the belief of many that agent behaviour is the main source of contagion; (ii) trade is the most important source of transmission of shocks into African countries; and (iii) although the US remains the dominant source of international transmission of shocks, the role of China in the transmission of shocks seems to be increasing, particularly with respect to shocks transmitted into Africa. The remaining part of the paper is organized as follows: Section 2 focuses on the crisis-based shocks. Section 3 examines the non-crisis-based shocks. Concluding remarks are presented in section 4.
Crisis-Based Shocks

The channels of transmission of cross-border crisis are examined under two divisions. The first division focuses on the channels of the transmission of the Asian crisis of 1997, being a key example of relatively recent international contagion. The second division focuses on channels relating to other international crises apart from the Asian crisis. Generally, contagion channels relate to variations in macroeconomic fundamentals and investors’ behaviour. Therefore, empirical studies on the channels employ methodologies designed to measure cross-border comovements due to crisis.

Channels of Transmission of the Asian Crisis

The Asian crisis of 1997 had significant impact on Asian countries and the economies of other regions. Both agent behaviour and macroeconomic fundamentals contributed to the crisis, according to the literature. Key agent-related channels of the transmission of the crisis shown in the empirical literature are agent attention relocation and herd behaviour.

Mondria and Quintana-Domeque (2013) examine an interesting mechanism of cross-border contagion called agents’ attention relocation. The authors show that the mechanism can make crisis to be transmitted between countries and regions without correlated fundamentals. Agents’ attention relocation is a process that relates to human psychology. The human brain has information processing limitations, hence there is information-related trade-off between giving attention to one market at the expense of another market. This makes attention to be an information-related resource. Suppose agents invest in two markets and volatility becomes high in one market due to crisis. Agents will give attention to the market with high volatility, which will lead to reduced expected returns in the second market because agents consider it to be riskier, since less information resource is processed on it because less attention is given to it. The reduction of expected returns will make agents to sell their assets, leading to low asset value and crisis in the second market, although its fundamentals are uncorrelated with those of the first market. The authors provide evidence supporting that the attention relocation mechanism was a channel of transmission of the Asian crisis of 1997 to Latin America. The Asian crisis originated in Thailand in July 1997 due to the collapse of the Thai baht’s peg.

Baig and Goldfajn (1998) analyse financial-market comovements between Malaysia, Indonesia, Korea, Philippines, and Thailand, in order to investigate whether the Asian crisis which originated in Thailand was transmitted to the other four countries. Using correlations, VAR, and linear regressions, the authors observe evidence of contagion between the countries, mainly due to the herd behaviour of investors. However, the analysis also reveals that fundamentals play a role in the cross-country transmission of the crisis, albeit with relatively lower power. The authors therefore note that distinguishing between these two causes of contagion is required in dealing with financial contagion.

Differentiating between the causes of contagion and their relative roles in crisis is necessary in applying effective policies to deal with the challenge. For example, many authors argue that agent behaviour was the primary factor that caused the Asian crisis. But in an empirical review, Corsetti et al. (1998) show that the crisis was primarily caused by weaknesses in macroeconomic fundamentals. The authors explain that structural and policy weaknesses in the Asian countries constituted the main origin of the crisis, although market and agent reactions made the crisis stronger than the fundamental weaknesses would have accounted for.

For example, the authors note that there was high degree of openness in most Asian countries in the period preceding the crisis (see Table 1 below) and that many East Asian countries experienced negative terms of trade shocks in 1996 due to the decrease in the price of some of their key exports. Besides, the authors also show that majority of the currencies that crashed in 1997 had experienced real appreciation prior to the crisis (see Table 2 below), which led to loss of competitiveness and current account difficulties. The real appreciation was due to the US dollar appreciating in the months preceding the crisis at a time when most of the crisis countries pegged their exchange rates to a basket of currencies in which the US dollar had a very strong effective weight.

Table 1: Openness in Asian Countries

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<td>20.38</td>
<td>29.38</td>
<td>29.04</td>
<td>30.47</td>
<td>33.59</td>
<td>34.36</td>
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<td>76.46</td>
<td>87.72</td>
<td>92.15</td>
<td>97.42</td>
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<td>35.55</td>
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<td>31.58</td>
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<td>36.98</td>
<td>40.26</td>
<td>44.90</td>
<td>54.20</td>
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<tr>
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<td>44.88</td>
<td>42.19</td>
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<td>140.37</td>
<td>137.18</td>
<td>138.92</td>
<td>151.67</td>
<td>142.28</td>
<td>132.68</td>
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<tr>
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<td>45.14</td>
<td>42.34</td>
<td>43.29</td>
<td>43.16</td>
<td>47.80</td>
<td>46.63</td>
<td>48.07</td>
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Source: corsetti at al. (1998). Notes: openness is defined as (Exports + imports)/2 as a percentage of GDP.

Table 2: Real Exchange Rates of Asian Countries

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<td>91.50</td>
<td>87.70</td>
<td>85.20</td>
<td>84.70</td>
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<td>Indonesia</td>
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<td>106.90</td>
<td>112.10</td>
<td>84.90</td>
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<tr>
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<td>82.40</td>
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<td>107.10</td>
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<td>109.60</td>
<td>116.40</td>
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<tr>
<td>Singapore</td>
<td>101.20</td>
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<td>112.70</td>
<td>118.20</td>
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<tr>
<td>Thailand</td>
<td>102.20</td>
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<tr>
<td>Hong Kong</td>
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<tr>
<td>Taiwan</td>
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<td>95.70</td>
<td>91.40</td>
<td>92.60</td>
<td>90.40</td>
<td>89.60</td>
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Source: Corsetti at al. (1998). Notes: Real Exchange rates are in terms of the US Dollars.
Channels of Transmission of Other Crises

Key channels of transmission of other crises shown in the empirical literature include globalization; the US as a dominant player in the world economy; policies such as liberalization policy; non-economic factors such as politics; and agent behaviour. These channels show that contagion is caused by variations in fundamentals and agent behaviour, as indicated earlier.

Baur (2012) explores contagion from a global perspective by examining the contagion effects of the global financial crisis of 2007-2009, both within and across 25 developed and emerging stock markets, which captures the role of globalization or cross-country interlinkages in contagion. The author studies contagion across financial sectors and between financial and real sectors by examining financial and real sector stocks. The results show that there was cross-country contagion of the financial sector; domestic contagion between the financial and real sectors; and cross-country contagion from the financial sector to the real sector. The authors indicate that none of the countries considered was unaffected by the crisis, which confirms the global nature of the crisis. The countries are ones playing key roles in the global economy, such as US, France, Germany, Italy, Spain (i.e. Euro Area countries), Japan, Brazil, Russian, India, China (i.e. BRIC), South Africa, etc. However, the US plays a dominant role in international spillovers. This makes some studies (e.g. Guesmi et al., 2013) to focus on the role of the US in cross-border transmission of crisis.

Although internationally transmitted crises have increased because of increasing globalization, policies and institutions can limit their effects. The effects of any form of crisis will be minimal in recipient economies having sound policies and institutions. For example, Angkinand et al. (2010) show that although financial liberalization policy is a causative factor of banking crisis, good institutions in form of sound capital regulation and supervision reduce the probability of the policy causing crisis. One way through which financial liberalization causes crisis is that it increases cross-border exposures, which affects cross-border stability of banks’ balance sheets by making shocks reducing liabilities in certain countries to reduce assets in other countries (Degryse et al., 2010).

Calvo and Reinhart (1996) show that the comovements of equity and Brady bond returns between Latin American emerging markets increased after the 1994 Mexican crisis, consistent with the existence of contagion which is not associated with domestic fundamentals. The authors’ claim is mainly based on evidence from correlations and principal components. While the authors employ the correlations to investigate the degree of cross-country comovements of the equity and the Brady bond returns before and after the crisis, they use the principal components to identify the unobserved factor driving the equity returns during the crisis, which is found to have significantly strong power in driving the returns.

Finally, non-economic factors such as political factors can also cause cross-border contagion. For example, political factors seem to contribute significantly to the European 1992-1993 Exchange Mechanism crisis (see Drazen, 1999). However, the role of political factors in the crisis may not be sufficiently captured if non-economic factors are not give due attention in the analysis of the crisis, as the crisis is viewed by many as an economic one. Basically, political factors may be classed as fundamental causes of the crisis, as distinct from agent-related causes.

Non-Crisis-Based Shocks

According to the literature, the central channel of the transmission of the non-crisis-based shocks is cross-country interdependence associated with trade and financial flows. This paper examines the non-crisis-based shocks under three key divisions, namely international transmission of shocks within an econometric framework capturing globalization, due to the increasing globalization of the countries of the world; international transmission of shocks to Africa countries, as the countries are key recipients of shocks originating from developed economies, mainly due to large trade linkages between the recipients and origins of the shocks; and transmission of shocks relating to oil, due to the strong role of oil in international transmission of shocks among other commodities. For example, oil price shocks contributed to all of the post-73 global recessions (Roubini and Setser, 2004; Hamilton, 2009; Tapia, 2013).

Transmission of Shocks within a Globalization Framework

Due to increasing trade and financial globalization between the countries of the world, cross-country interdependence is best captured by empirical global models which link different countries and regions together without being affected by the curse of dimensionality. The Global Vector Autoregressive (GVAR) model is a good example of such empirical models, hence this paper focuses on studies involving the GVAR model. The GVAR model is a relatively new model pioneered by Pesaran et al. (2004) and extended by Dees et al. (2007).

Gurara and Ncube (2013) examine the spillover effects of growth shocks from the Euro Zone and BRICs on the growth of African countries, using a GVAR model that links modelled countries together through trade flows, because most African countries are trade-dependent economies. The model has wide coverage of African economies, in that it has 46 African countries and 30 developed and emerging market countries. The considered African countries are not examined individually but on group basis.
The countries are divided into the following three classes based on the characteristic of each country: factor-driven African economies which are further divided as oil and non-oil exporters; investment-driven African economies; and fragile and post-conflict African economies.

The factor-driven economies are the ones which depend largely on basic factors of production such as labour and natural resources (part of land). The investment-driven economies are the ones with the capacity and desire to invest largely in technology. On the other hand, the fragile and post-conflict economies are the ones that have been affected by recent crisis, and generally have weak policies and institutions, when compared to other countries.

The results of the analysis show that the three groups of African countries have varying responses to growth shocks from the Euro Zone and BRICs. Growth slowdowns in the two non-African economies have varying significant effects, due to groups-specific characteristics of the African countries. The study also examines the impact of quantitative easing (QE) of the US, Euro, UK, and Japan (G4) and finds that the unconventional monetary policy has moderate inflation and exchange rate effects in Africa.

The work of De Waal (2014) focuses on international spillovers in South Africa and relates to the increasing importance of China in the world economy. The author argues that the trend of South Africa’s trade has changed in recent years, mainly due to China’s emergence in the global economy. Therefore, China has overtaken the US as the dominant trade partner of South Africa. The author therefore employs a GVAR model built with cross-country trade flows for 33 countries to investigate the impact of GDP shocks from the US and China on South Africa’s GDP and finds that over time the impact of China’s shocks has become higher than that of US shocks. The finding has relevance for policymaking in South Africa and even other Africa countries. Africa’s policymakers need to consider the increasing role of China in designing policies. For example, China has invested largely in Africa in key areas such as the natural resources sector over the last decade (Yanzhuo, 2014).

Bussière et al. (2009) employ the GVAR model consisting of 21 emerging and advanced economies to explore global trade flows, modelling imports and exports with other key variables, in order to capture the dynamics of the flows. The findings indicate the central role of the US in global trade flows. The US output shock significantly affects the exports of foreign countries, while the real appreciation of the US dollar also increases the exports of foreign countries, but the role of the appreciation is not as strong as that of the output in stimulating the exports.

Using a GVAR model capturing 33 countries, with data on financial and macroeconomic variables, Eickmeier et al. (2011) explore the effects of credit supply shocks emanating from the US, the euro area, and Japan on other economies. The results reveal vital facts on international credit supply shocks, but the main finding is that among the three origins of the shocks, the negative shocks from the US have the strongest effects on the GDPs of foreign countries, confirming the strategic role of the US among the key financial centres of the global economy.

**Transmission of Shocks into African Countries**

Country-specific or region-specific features constitute one of the key factors causing the transmission of non-crisis-based shocks. A key feature of African countries is large dependence on trade, hence trade is the dominant channel of the transmission of shocks into the countries, according to the literature. Generally, trade has been identified as the dominant channel of international transmission of business cycles (Baxter and Kouparitsas, 2005).

Kose and Riezman (2001) observe from empirical estimations of a dynamic, stochastic, equilibrium model designed to represent a typical African economy that trade shocks account for over 44% of the variations in aggregate output in the modelled economy, whereas world interest rate shocks only have minor influence on the economy, despite many of the African economies being significantly indebted.

These findings are consistent with the results of Mendoza (1995), who observes that terms of trade shocks account for around half of GDP fluctuations in developing countries. African economies in particular seem to follow an export-led growth process leading to a strong role of the prices of exports and imports (largely the inputs used in producing the exports) in the fluctuations of growth in these countries. This implies that trade has a strong role in the dynamics of the business cycles of African economies not only in terms of output fluctuations, but also with respect to variations of vital variables like investment and labour supply (Kose and Riezman, 2001).

Hoffmaister et al. (1998) investigate the factors causing macroeconomic fluctuations in Sub-Saharan Africa, by comparing the sources of fluctuations in CFA franc and non-CFA franc countries. The findings show that external shocks, particularly terms of trade shocks seem to have greater role in output and exchange rate variations in the CFA franc countries, compared to their non-CFA franc counterparts.

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1 The CFA franc group consists of 14 Sub-Saharan African countries, each belonging to one of two monetary unions using the CFA franc, namely West African Economic and Monetary Union (WAEMU) and Central African Economic and Monetary Community (CAEMC). Benin, Burkina Faso, Côte D’Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo belong to WAEMU; while CAEMC consists of Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, and Gabon. The CFA is the acronym for Communauté Financière Africaine (African Financial Community) within WAEMU and Coopération Financière en Afrique Centrale (Financial Cooperation in Central Africa) within CAEMC.
As the authors note, the findings are more likely to be associated with the fixed exchange rate policy of the CFA franc countries, involving a fixed peg to the French franc in the sample period of the analysis (1971-1993), distinguishing these countries from the non-CFA franc economies which adopted adjustable pegs and more flexible exchange rate arrangements during the period. The CFA franc countries would probably have had a different experience regarding external shocks, if they had adopted the flexible exchange rate policy. According to Edwards and Yeyati (2003), the flexible exchange rate policy is an effective buffer of external shocks both in emerging and developed economies, allowing the countries adopting the policy to grow faster.2

Transmission of Shocks Relating to Oil

The literature shows that international shocks relating to oil could have negative effects on both oil importers and exporters. Large oil price increases could affect terms of trade in oil importing countries such as the US. Paradoxically, large oil price increases could also lead to challenges such as Dutch disease and rent-seeking activities in oil exporting countries. This paradoxical impact of oil in oil exporting countries is called the resource curse.

Regarding the importers of oil like the US, Roubini and Setser (2004) explain that oil price increases usually have negative impact on growth in the economy, with the degree of impact depending on magnitude of shock, persistence of shock, the intensity of oil dependency of the economy, and fiscal and monetary policy responses to the shock. In this line, the authors note the strong role of oil in recessions, noting that oil price increases have initiated or/and contributed to previous US and global recessions. The terms of trade are a major channel through which oil price shocks affect oil importers. Backus and Crucini (2000) show that there is a strong relationship between changes in oil price and terms of trade in major advanced economies, many of which are oil importers.

Treviño (2011) empirically investigated whether Dutch disease (DD) is present in the oil-exporting countries of the CFA franc zone, by comparing the oil exporters and importers of the zone, using macroeconomic data. The author observes that DD is present in the oil exporting countries, based on what the traditional DD theory predicts regarding real exchange rate appreciation and labour relocation when there is a resource boom. The theory shows that when there is a boom, persistent exchange rate appreciation and the shift of labour from the primary (agriculture) sector to the resource sector indicate that DD is present.

These findings agree with the results of Ismail (2010), who also find the evidence of DD in oil exporting countries with microeconomic data. Ismail employed microeconomic data on the manufacturing sectors of selected countries including oil exporting countries to test for the presence of DD in the selected oil exporters. The author argues that the primary advantage of the micro dataset over its macro counterpart is that the former better captures the heterogeneity of the considered sectors, leading to more robust estimates of possible divergent growth trends of the sectors. A central point to note about the considered empirical studies is that finding the evidence of DD with macro and micro data suggests that the challenge is indeed present, at least in some resource-rich countries.

Using a general equilibrium model, Angelopoulos and Economides (2008) empirically analyses the nexus between fiscal policy, rent-seeking, economic growth, and uncertainty about maintaining a political office in 25 OECD countries, and find that rent-seeking working via the pathway of fiscal policy has a negative impact on growth. The uncertainty about holding a political office makes the incumbent office holders to develop myopic attitudes towards policies, leading to a large government share of the economy. This may be the case, at least partially in Nigeria, where Sala-i-Martin and Subramanian (2003) argue that weak institution and resource waste have largely contributed to resource curse. Weak institution usually promotes rent-seeking activities and wasteful spending in an economy.

CONCLUSION

This study has led to relevant conclusions having policy implications. First, both agent behaviour and macroeconomic fundamentals are important factors of the transmission of cross-country crisis, as shown in the case of the Asian crisis of 1997. Second, although some factors such as globalization and liberalization policy enhance the transmission of cross-country crisis, other factors such as sound institutions limit the transmission.

Third, the US remains the most important source of international interdependence in the face of globalization. However, China’s role in Africa’s economic performance is increasing over that of the US. For example, in recent times China has overtaken the US as the largest trade partner of South Africa, which is key African economy. Fourth, trade is the dominant source of transmission of shocks to African countries, due to the strong role of trade in the economies. However, flexible exchange rate arrangements are effective in making African countries to be less susceptible to external shocks, including terms of trade shocks.

The fifth and last conclusion is that large oil price increases affect both the importers and exporters of oil. The oil price increases damage the terms of trade of oil importers and have paradoxical effects such as Dutch disease in oil exporting economies.

2 Examples of other studies indicating the role of the exchange rate policy as an effective external shock buffer are Edwards (2006) and Sek (2010).
Finally, although the present paper provides relevant findings, it would still be useful that future research on international shocks considers areas that the paper does not cover. Such areas include the relative effects of trade and financial channels in the transmission of shocks, and the relative effects of first and second rounds of shocks. For example, the first-round effects of the global financial crisis of 2007-2009 were financial effects experienced mainly in Europe, while the second-round effects of the crisis were economic effects experienced in countries beyond Europe.

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