GALATASARAY UNIVERSITY

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CROSS COUNTRY CONSEQUENCES OF THE 2007-2009 FINANCIAL CRISIS:
AMERICAN EXPOSURE AND FINANCIAL CONTAGION

MASTER OF SCIENCE THESIS

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ABBREVIATIONS

FSI   :Financial Stability Index

FCI   :Financial Conditions Index

BOC   :Bank of Canada

MCI   :Monetary Conditions Index

DB   :Deutsche Bank

KCFSI   :Federal Reserve Financial Stress Index

ECB   :European Central Bank

BIS   :Bank for International Settlements

FSF   :Financial Stability Forum

CDS   :Credit Default Swap

EMBI   :Emerging Markets Bond Index

LAC   :Latin American Countries

FED   :Federal Reserve Bank

CDR   :Counterparty Risk Index

FDI   :Foreign Direct Investment

OECD   :Organization for Economic Cooperation and Development

US   : United States

VAR   :Vector Autoregression

HUN   :Hungary

MEX   :Mexico

POL   :Poland

TUR   :Turkey

UK   :United Kingdom

SWE   :Sweden

SWISS   :Switzerland

NOR   :Norway

FIN   :Finland

GARCH   :Generalized Autoregressive Conditional Heteroskedasticity Model

NYSE   :New York Stock Exchange

HKSE   :Hong Kong Stock Exchange

MIMIC   :Multiple Indicator Multiple Cause Model

GDP   :Gross Domestic Product

OLS   :Ordinary Least Squares Estimate

SIC   :Schwartz Information Criteria

AIC   :Akaike Information Criteria

LR   :Likelihood Ratio Test

HQ   :Hannan-Quinn Information Criteria

FPE   :Final Prediction Error

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RESUME

La crise financière globale de 2007- 2009 est l'une des crises les plus violentes et dont la zone de propagation est la plus large qui a eu lieu récemment au niveau de l'économie. La récession commençant dans le système financier et dans la bourse américaine vers la fin de 2007 s'est répandue en peu de temps dans plusieurs économies de pays développés ou en voie de développement. Cette crise financière dont l'origine absolue est désignée telle que l'Amérique, a souligné de nouveau la dépendance du système financier international. Suite aux connexions financières devenues fortes, la sensibilité de l'économie des pays développés et des pays en voie de développement s'est accrue aux chocs financiers. Cette crise a montré la diffusion de ce genre de chocs et cette situation a récemment prise place dans la littérature économique telle que l'effet de propagation.

Par la suite de la crise financière globale, une des motivations de ce travail est de comprendre quels pays ont été influencés par la violence d'un effet de propagation comme celle-ci et à quel point ils en ont été influencés. Pour répondre à cette question, il a fallu examiner les réactions qu'ont données les pays développés ou en voie de développement aux chocs ayant eu lieu dans le système financier de l'Amérique. Le modèle à vecteur autorégressif a été utilisé pour construire cette structure.

Jusqu'à quatre ans avant le mois d'Août 2007 les conditions financières avaient une apparence superficiellement positive pour plusieurs pays. Pendant que le secteur financier gagnait beaucoup de bénéfices, la profitabilité était élevée. Les fluctuations dans la bourse et dans les cours de change pouvaient être maîtrisées et le coefficient de risque était tout à fait bas. En même temps, l'économie mondiale continuait à grandir dans un entourage à basse inflation.

L'avertissement d'une éventuelle chute soudaine pouvant arriver dans les marchés financiers avait commencé à l'an 2006 par les autorités financières. Plusieurs avertissements ont été faits à propos du coefficient de risque. A cette époque, les banques centrales et les rapports de stabilité financiers préparés par plusieurs instituts financiers signalaient que la sensibilité des secteurs financiers augmentait et que l'affaiblissement dans le secteur à nouveau financier augmentait avec une tendance croissante. La détermination de l'unité de risque et une estimation de risque moins que le réel, sont parmi les causes prioritaires de la crise financière.

Bien que l'effet de propagation globale soit assez large, cela a eu plus d'influence sur certains pays et moins sur d'autres. Il a été séparément investigué comment il se faisait que certains pays avaient réussi à s'en sortir en combattant la crise financière.

Il est prétendu que le revenu national brut réel dans les pays en voie de développement selon 2011 pouvait augmenter de %6,5. Parmi les pays en voie de développement, la Turquie, la Hongrie, la Pologne et le Mexique ont été examinés.

La Turquie a vécu sa propre crise financière en 2001. Il ne s'agit pas d'une économie de pays étrangère aux crises financières ni aux récessions. Suite à la crise financière de 2001 la structure de politique macroéconomique s'est assez fortifiée. Un grand nombre de réforme financière ont été appliquées dans les années 2000. Tout cela a aidé la Turquie à se remettre facilement de la crise globale comparée aux autres pays en voie de développement.

Parmi les pays d'OECD, la Hongrie est l'un des pays les plus influencés de la crise. Quant à son état financièrement faible, a causé une chute de note d'investissement suite à la crise. Les autorités financières ont demandé de l'aide aux organisations financières internationales. Bien que l'inflation ne soit pas devenue très élevée, les salaires réels ont remarquablement diminué. La dette extérieure totale est parvenue à 120 % du Revenu National Brut. Contrairement aux autres pays, les politiques macroéconomiques et les précautions n'ont pas été suffisantes pour sauver la stabilité financière de la Hongrie

La Pologne est l'autre pays en voie de développement que nous avons inclus dans notre travail. La Pologne a montré une bonne performance économique après être devenue membre de l'Union Européenne. C'est même le seul pays ayant un ratio

de croissance positif lors de la crise parmi les pays membres de l'Union Européenne. La réponse des autorités financières à la crise a été assez rapide. La crise financière a montré son effet vers la fin de 2008. Autrement dit, la performance économique de la Pologne a été assez forte pendant l'an 2009. Elle a même été le pays ayant la croissance la plus rapide en 2009 parmi les pays d'OECD.

La crise financière n'est pas une expérience nouvelle pour le Mexique. En raison des liens économiques, politiques et sociaux qui sont forts entre l'Amérique et le Mexique, la récession économique a laissé des effets graves sur le Mexique. Le Revenu National Brut du Mexique a rapetissé de 6,6 % en 2009. Parmi les pays d'Amérique Latine, le pays ayant vécu la chute la plus grave était le Mexique.

Le Mexique est dépendant de l'Amérique en raison du marché de l'exportation. En 2009 le volume de commerce total du Mexique a vécu une chute importante. La demande aux marchandises de production du Mexique même a diminuée. L'exportation du Mexique a diminué de 21,5 % en total.

Un autre effet de la crise globale est celle sur le marché de main d'œuvre. Le marché de main d'œuvre du Mexique a fait preuve de vraies dégradations lors de la période de crise. Les ratios de chômage ont atteint les chiffres les plus élevés depuis l'an 2000. De ce fait, le secteur informel a agrandi. La main d'œuvre non enregistrée a augmenté pendant la crise et aussi après. En même temps, l'investissement direct vers le Mexique a gravement diminué en 2009.

Quant aux pays développés, les pays que nous avons pris en main sont la Finlande, la Norvège, la Suède, l'Angleterre et la Suisse.

Parmi les pays d'OECD, la Finlande est l'un des pays les plus influencés par la crise financière globale. Avant d'entrer dans la période de récession, la Finlande avait un grand budget déficitaire. En général, elle a subit du dommage par le canal de commerce. Le volume de commerce de la Finlande a diminué de 30 % et le volume d'exportation notamment les marchandises de production à intensité capitalistique ont été endommagées.

Les rapports d' d'OECD montrent que le secteur financer de la Finlande s'en est bien sorti de ce choc, mais indique aussi que ce processus de libération de la crise était lent. Le taux de sortie totale a diminué de 9% au dernier quart de 2009.

L'Angleterre qui est un autre pays développé est entrée dans une vrai période de récession par la suite du choc global. Sa dette publique et sa dette de secteur privé a augmenté et les chiffres de chômage se sont élevés. Pendant que des déséquilibres graves se réalisaient, ces déséquilibres devaient être supprimés prioritairement pour un sentier convenable de croissance durable.

Quant à l'économie de la Suède, parmi les pays d'OECD, c'est l'économie la plus libérale. Suite à la crise globale, le Revenu National Brut Réel a commencé à diminuer dans le premier quart de 2008. Pendant qu'une chute est observée dans les taux d'exportation et d'investissement, le système financier suédois a beaucoup subi cette crise de source américaine.

La Norvège, comparée à plusieurs autres pays, a réussi à surmonter la crise avec moins de récession et plus bas niveau de chômage. Parmi les pays d'OECD, elle prend place dans la ligue des moins influencés. Au début de l'an 2008, des précautions régulatrices ont été prises et ainsi le niveau de l'offre de monnaie du marché avait été augmenté.

En Suisse, avec l'intervention du gouvernement et l'aide de la Banque Centrale, un programme de support a été préparé pour s'épurer des effets de la crise financière. La récession a été déclenchée prioritairement avec la chute du volume d'exportation du secteur de marchandise et de service. Bien que les risques et les indéterminations continuent, la période de sortie de la crise globale avait commencé en 2011 avec les chiffres de croissance positive et continue encore.

En général, les pays ont ressenti en eux les effets de la crise financière entre le dernier quart de l'an 2008 et le premier quart de l'an 2009. Le Revenu National Brut a diminué de 14,3% à cette époque. Dans la première partie empirique de la thèse, l'effet du choc d'Amérique sur les bourses des pays en voie de développement et des pays développés a été observé. Dans ce contexte, les résultats obtenus sont testés et commentés aussi bien pour les pays développés que les pays en voie de développement.

A la suite de la crise financière de l'Asie, le lien fort des marchés des actions entre elles a joué un rôle important. Suite à cette crise, la dépendance mutuelle des bourses a commencé à être examinée.

Dans notre travail, il a été traité si dans les bourses des pays en voie de développement il était question d'un problème similaire ou pas pendant que la volatilité augmente dans la bourse américaine. Le travail montre que; l'Amérique et les marchés des pays en voie de développement ont des liens proches et que les pays en voie de développement ont besoin d'une période de 5-6 mois pour surmonter au choc qui s'est produit en Amérique.

D'après les réponses données par les marchés examinés, la réaction et le bouleversement le plus fort s'est réalisé prioritairement en Pologne, après en Hongrie, et puis au Mexique. Par ailleurs, la bourse de Turquie s'est moins influencée du choc qui a eu lieu dans la bourse américaine, comparée aux autres pays en voie de développement examinés.

Comme indiqué ci-dessus, le même modèle est aussi étudié pour les pays développés. Les résultats obtenus montrent que ; L'effet propagé des chocs américains du point de vue des pays développés, est beaucoup plus répandu. En résultat des tests effectués, l'Angleterre, la Suisse, la Suède, la Norvège et la Finlande ont donné des beaucoup de réactions soudaines aux chocs d'Amérique.

Suite aux chocs exercés aux bourses, le travail montre que ; la dépendance des marchés des actions et les effets répandus de la crise financière sont beaucoup plus voyants sur les pays développés. La crise a fait beaucoup plus d'influence sur les pays développés plutôt que les pays en voie de développement.

Le deuxième travail empirique contient l'examen des économies de pays dont la diffusion financière forme un index de stabilité financière. L'index de stabilité financière est une série d'index constitué de la méthode des composants principaux où se trouvent taux de change effectif réel, les taux d'intérêts à court terme et les revenus d'actions. Lorsqu'on analyse l'effet de propagation dans le sens de stabilité financière, le résultat que l'on obtient, la situation financièrement bouleversée de l'Amérique n'a pas influencé de manière intense beaucoup de pays en voie de développement. En majorité ces pays ont manifesté peu de sensibilité.

Malgré cela, du point de vue des pays en voie de développement qu'ont été examinés, la plus grande réaction avait été donnée était la Pologne et la Hongrie. Ces deux pays sont les seuls deux pays membres de l'Union Européenne se trouvant dans

le travail. Cette conclusion fait signe aux relations développées de l'Europe et de l'Amérique.

Le Mexique et la Turquie ont été peu influencé de la déstabilisation de stabilité financière qui s'est produite en Amérique, les preuves sont très faibles pour dire que leur stabilité financière ont subi une turbulence.

D'autre part, lorsqu'on applique cette analyse sur les pays développés, les résultats que l'on obtient font bien plus de sens. Suite au choc d'Amérique, la dégradation ayant eu lieu à la situation financière a causé le plus de déstabilisation financière respectivement en Norvège, en Suède et en Suisse. L'Angleterre restant plus fort contre ce choc, la situation financière de la Finlande a préservé sa stabilité.

Les résultats obtenus dans ce travail montrent que, cette crise financière globale de source Amérique dont la zone de propagation est la plus répandue vécue jusqu'à ce jour, a fait plus d'effet sur les pays développés plutôt que sur les pays en voie de développement. Sut l'étude de la diffusion de la crise financière, il convient de focaliser plus sur les marchés financiers. Pour des études plus avancées, il convient d'analyser l'effet de propagation avec des approches plus développées en utilisant des liens macro-financiers plus réalistes. Il peut être beaucoup plus facile de comprendre les effets mondiaux des crises financières avec ce genre de techniques avancés.

ABSTRACT

In this study diffusion of the global financial crisis is analysed. More spesifically, keeping the United States as the natural origin of the crisis its effect on emerging and advanced countries are examined. This crisis - originating from U.S. - underscored the importance of interdependence of the international financial system. Enhanced financial ties within the world, it is generally believed that the sensitiveness of financial markets to external shocks further rose in many emerging and advanced economies. This crisis is one of the examples of such shocks diffusioning from one country to another. In the economic literature, this case is called *contagion.* We analyze the intensity of contagion among emerging and advanced countries. This global financial crisis has many similarities with the past crisis[1] but it also differs from them in many other ways. The crisis started in the U.S. with the collapse of the subprime mortgage market in early 2007 and the end of a major housing boom. It spilled over the world through downfall of the equity markets which have already produced a significant recession.

Financial stability reports studied defenselessness of the financial sector and warned for the growing tendency of the weakness in the financial sector overall. Both under-pricing of the 'unit of risk' and 'under-estimation of the quantity of risk' turned out to be at the heart of the crisis. The under-pricing of the unit of risk is related basically to noneffective theories made about the division of returns to really complex, new financial securities. Furthermore, calculating the probability of default mortgages in a large economy, the possibility of a drop in real estate prices or the ongoing deterioration in lending standards, were not properly factored in. As stated below, Trichet also underscored the importance of assessing risks properly.

Despite the global spillover of the financial crisis, some countries resisted stable than others. In our study we also examine why some countries succeeded better than others while fighting the crisis. To examine this question, many studies glanced over the cross - country differences to find evidence for the importance of differences in trade and financial openness.

Rose and Spiegel (2009) studies cross country linkages taking U.S. as the most natural origin of this global turmoil, they use Multiple Indicators Multiple Causes model (MIMIC) to examine international linkages that may have allowed the crisis. Although they use many possible causes in their econometric framework, they find no evidence that international linkages can be clearly related with the incidence of the crisis.

Berkmen et. al. (2009) examines the difference impacts of the crisis across developing countries and emerging markets. They use cross- country regressions to explain the factors driving growth forecast revisions after the eruption of the global financial crisis. They find countries with advanced financial systems tended to suffer quickly than others. They also find weak evidence that countries with a stronger fiscal position were hit less severely.

We investigate the spillover effects of this financial crisis on emerging and advanced countries. Turkey is the first country we start our analysis for. Turkey which is a country quite familiar with financial crises and recessions faced this latest global financial crisis with strong resistance. The powerful macroeconomic policy framework provided support. Turkey, a growing country had its own crisis in 2000. Therefore many monetary, fiscal and financial reforms implemented in 2000s. All of them helped Turkey to get over the global turmoil period in 2008 relatively stronger among other developing countries and start growing robustly again at the end of 2008. Uygur (2010) The recovery in Turkey was the strongest in the OECD area as measured by the cumulative increase in GDP from the trough until the first quarter of 2010 by over 10 per cent.

Mexico is another country which is also included in our empirical studies. This global financial crisis is not a new experience for the Mexican economy. Since U.S. and Mexico have strong economic, political and social ties the U.S. economic

recession had strongly affected Mexican economy. The economic turmoil period in the U.S. caused a significant fall down in the foreign direct investment.

In addition to those countries we have Poland. Since joining the European Union, Poland has performed very well, including during the economic crisis, being the only EU country with a positive economic growth rate in 2009. The global crisis has worsened Poland's macroeconomic and fiscal outlook, but a recession has been avoided.

Hungary is another emerging market we run the analysis for. Before the global financial crisis, Hungary's productivity gap regarding the other OECD countries was very large and the depth of this recession left deep marks in productive capacity. Hungary is the most affected countries in the OECD countries, with the fall in real GDP in 2009 being double the OECD average.

In addition to emerging countries, we examine the spillover effects of the crisis all along advanced countries that are: Norway, Switzerland, Sweden, United Kingdom and Finland. We found that this crisis is more effective on advanced countries.

OECD (2011) states that the global financial crisis has its deepest impact on Finland comparing to most other OECD countries. Finland was mainly damaged by the trade channel during the world economic down turn. Trade volumes declined by 30 per cent. There occurred a decline in the export volumes, mainly its capital-goods intensive exports collapsed.

Moreover, when we examine United Kingdom we already know that this country experienced a serious recession as results of the global shock. This global turmoil has mostly affected the supply of credit and house prices declined sharply. Overall results indicate that, UK economy evaded from the global financial crisis with increased public and private debt and high rates of unemployment. Significant imbalances have developed in the financial sector and growth. These imbalances need to be figured out to sustain a balanced recovery.

Sweden is also another advanced country that its real GDP fell down in the first half of 2008 and the output gap becomes negative around June 2008. Weak growth in exports and investment also led to economic slowdown.

Norway also affected severely from the global turmoil period. By the global turmoil, real GDP fell down in the first half of 2008 and the output gap becomes negative around June 2008. Weak growth in exports and investment also led to economic slowdown.

In addition to those countries we examine Switzerland and glancing over the overall assessment of general economic and financial conditions for the Swiss banking sector, SNB (2011) denotes that however the uncertainties and risks remain high, the global recovery after the crisis seems sustainable, and the Swiss economy also saw robust growth in 2011.

To conclude, the scope of this thesis is to see if countries that are more deeply tied in international finance with US experienced systematically more or less severe financial crisis.

Firstly, stock market interdependence is examined among advanced and emerging markets, taking US as the epicenter of the global turmoil. Compared to the results of the econometric studies of the emerging markets, the degree of stock market interdependence is higher and diffusion is larger across advanced markets. Hence, in the bottom line US financial crisis has had a more permanent impact on advanced markets rather than emerging markets.

The second empirical study examines the financial diffusion by using financial stability index which is composed of reel effective exchange rates, short term interest rates and stock market returns.

The central message from studying the contagion in emerging markets within the context of financial stability is that, emerging markets have relatively small sized sensitivities to US shock during the crisis period. The most significant contagion from US is to Hungary and Poland.

Thus the results indicate that US is relatively important for these countries compared to other emerging markets examined. Among all emerging markets examined Poland and Hungary are the only ones from European Union. Henceforth those results are consistent with the view that Europe became connected with the US. Turkish financial stability, in particular is hurt by the shock of US financial stability.

The case of Mexico is especially notable, very weak evidence of the financial stability turbulence due to the US turbulence is found.

On the contrary, we further extent this analysis by examining the financial stability situation among major advanced countries. Also, the turbulence of financial stability in US led to a stronger reaction of the advanced countries studied. More specifically, the volatility in the US financial stability represents its biggest threat to Norway, Sweden and Switzerland. Compared to other countries financial stability of United Kingdom stand resilient due to a US shock. These results also indicate that, potential financial stability disturbance in the US has a very small contagious impact on the financial stability of Finland.

The central message from the findings is that, during this most severe global financial crisis advanced countries has larger sensitiveness to US shocks compared to emerging countries. These results are quite consistent with the enduring financial importance of US and work on diffusion should focus more on the financial markets. For the further research, the next challenge is thus to use advanced approaches, constuct more macro-financial linkages which creates the size of contagion apparently prevalent in the underlying data. These further attempts can enrich the understanding of the impact of the financial crisis worldwide.

ÖZET

2007- 2009 global finansal kriz, yakın iktisat tarihinde meydana gelen en şiddetli ve yayılma alanı en geniş olana krizlerden biridir.Amerikan finansal sisteminde ve borsasında, 2007 sonlarına doğru başlayan resesyon, kısa zamanda bir çok gelişmiş ve gelişmekte olan ülke ekonomilerine sıçramıştır. Mutlak orjini Amerika olarak tayin edilmiş bu finansal kriz, uluslararası finansal sistemin birbiri ile olan bağımlılığının tekrar altını çizmiştir. Güçlenmiş olan finansal bağlantılar sonucu finansal şoklara gelişmiş ve gelişmekte olan ülke ekonomilerinin hassasiyeti artmıştır. Bu kriz bu tür şokların difüzyonunu göstermiştir ve iktisadi literatürde bu durum yayılma etkisi olarak yakın zamanda yerini almıştır.

Global finansal krizin ardından, bunun gibi bir yayılma etkisinin şiddetinin hangi ülkelerin üzerinde ne denli olduğunu anlamak bu çalışmanın motivasyonlarından biridir. Bu soruyu cevaplamak için, gelişmiş ve gelişmekte olan ülkerinin Amerika'nın finansal sisteminde meydana gelen şoklara verdikleri tepki incelenmiştir. Bu yapıyı kurgulamak için Vektör Otoregresif model kullanılmıştır.

2007 Agustos ayından dört yıl öncesine kadar finansal koşullar birçok ülke için yüzeysel olarak pozitif görünümdeydi. Finansal sektör büyük oranda getiri kazanırken, karlılık yüksek durumda idi. Borsa ve döviz kurundaki dalgalanmalar bastırılabiliyordu ve risk katsayısı oldukça düşüktü. Aynı zamanda, dünya ekonomisi düşük enflasyonlu bir çevrede büyümeye devam ediyordu.

Finansal otoriteler tarafından, finansal piyasalarda ani bir düşüş olabileceği uyarısı 2006 yılında başlamıştı. Risk katsayısı hakkında birçok uyarı yapıldı. O zamanlarda, merkez bankaları ve birçok finansal kurumun hazırladığı finansal stabilite raporları finansal sektörlerin hassasiyetinin arttığını ve yine finansal sektörde zayıflamanın büyüyen bir eğimle arttığını işaret ediyordu.

Risk birimi saptanması ve riskin olduğundan az tahmin edilmesi finansal krizin öncelikli sebepleri arasında yer almaktadır.

Global yayılma etkisinin alanı oldukça geniş olmasına rağmen bazı ülkeler üzerinde çok bazılarında ise daha az etki yaratmıştır. Bazı ülkelerin finansal kriz ile savaşma konusunda diğerlerinden neden daha başarılı oldukları ayrıca araştırılmıştır.

Gelişmekte olan ülkelerde reel gayri safi milli hasıla 2011 itibari ile ortalama yüzde 6,5 olarak artabileceği öne sürülmektedir. Gelişmekte olan ülkelerden Türkiye, Macaristan, Polonya ve Meksika incelenmiştir.

Türkiye, kendi finansal krizini 2001 senesinde yaşamıştır. Finansal krizlere ve resesyonlara yabancı bir ülke ekonomisi değildir. 2001 finansal krizinden sonra makroekonomik politika yapısı oldukça güçlendirilmiştir. Çok sayıda mali ve finansal reformlar 2000'li yıllarda uygulanmıştır. Tüm bunlar Türkiye'nin global krizi -diger kalkınmakta olan ülkelerde kıyasladığımız zaman- rahat bir şekilde atlatmasına yardımcı olmuştur.

Macaristan, OECD ülkeleri arasında krizden en çok etkilenen ülkelerdendir.Zayıf mali durumu ise, kriz sonrası yatırım notunun düşmesine neden olmuştur. Finansal otoriteler, uluslararası finansal organizasyonlardan yardım talebinde bulunmuşlardır. Enflasyon çok artmış olmasa da, reel ücretlerde ciddi bir düşüş yaşanmıştır. Toplam dış borç, GSMH'nın yüzde 120'sine ulaşmıştır. Diğer ülkelerin aksine makro ekonomik politikalar ve önlemler Macaristan'ın mali stabilitesini kurtarmak için yeterli olamamıştır.

Polonya, çalışmamızda yer alan gelişmekte olan ülkelerden bir diğeridir. Polonya, Avrupa Birliği'ne üye olduktan sonra iyi bir ekonomik performans göstermiştir. Hatta, Avrupa Birliği üye ülkelerinden, kriz süresince pozitif büyüme oranına sahip olan tek ülkedir. Mali otoritelerin, krize cevabı oldukça hızlı olmuştur. Finansal kriz, etkisini 2008'in sonlarına doğru göstermiştir. Diğer bir deyişle, Polonya'nın 2009 yılı süresince ekonomik performansı oldukça güçlü olmuştur. Hatta OECD ülkeleri içerisinde, 2009 yılı en yüksek büyüme hızına sahip olan ülke olmuştur.

Finansal kriz Meksika için yeni bir deneyim değildir. Amerika ile Meksika arasındaki güçlü ekonomik, politik ve sosyal bağlar, ekonomik resesyonun Meksika

üzerinde ciddi etkiler bırakmasına yol açmıştır. Meksika'nın GSMH'sı 2009 yılında yüzde 6,6 oranında küçülmüştür. Latin Amerika ülkeleri içinde en ciddi düşüşü yaşayan ülke Meksika olmuştur.

Meksika, Amerika'ya ihracat piyasası dolayısı ile bağlıdır. 2009 senesinde Meksika'nın toplam ticaret hacmi ciddi bir düşüş yaşamıştır. Meksika'nın kendi üretim mallarına olan talep azalmıştır. Meksika'nın ihracatı toplamda yüzde 21,5 oranında azalmıştır.

Global krizin bir diğer etkisi ise, işgücü piyasasında olmuştur. Meksika'nın işgücü piyasası kriz periyodu süresince ciddi anlamda bozulmalar yaşamıştır. İşsizlik oranları 200 yılından beri en yüksek rakamları görmüştür. Bu sebeple, enformal sektör büyümüştür. Kayıtdışı işgücü kriz süresi ve sonrasında artmıştır. Aynı zamanda, Meksika'ya olan doğrudan yabancı yatırım 2009 senesinde ciddi bir düşüş yaşamıştır.

Gelişmiş ülkelere bakacak olursak, ele aldığımız ülkeler Finlandiya, Norveç, İsveç, İngiltere ve İsviçre'dir.

Finlandiya, OECD ülkeleri arasında global finansal krizden en çok etkilenen ülkelerden biridir. Finlandiya resesyon dönemine girmeden önce büyük bütçe açığına sahipti. Genel olarak ticaret kanalı ile zarar görmüştür. Finlandiya'nın ticaret hacmi yüzde 30 azalmıştır ve ihracat hacmi özellikle sermaye yoğun üretim malları zarar görmüştür.

OECD raporları, Finlandiya'nın finansal sektörünün bu şoku iyi bir şekilde atlattığını gösterirken, krizden çıkış sürecinin yavaş olduğuna işaret etmektedir. Toplam çıktı oranı ise 2009'un son çeyreğinde yüzde 9 oranında azalmıştır.

Bir diğer gelişmiş ülke olan İngiltere ise, global şokun ardından ciddi bir resesyon dönemine girmiştir. Kamu ve özel sektör borcu artmış ve yüksek oranlı işsizlik rakamlarını görmüştür. Finansal sektörde ciddi dengesizlikler oluşurken, bu dengesizlikler, uygun bir sürdürülebilir büyüme patikası için öncelikli olarak giderilmelidir.

İsveç ekonomisine bakacak olursak, OECD ülkeleri içerisinde en liberal olan ekonomidir. Global krizden sonra, reel GSMH 2008'in ilk çeyreğinde düşmeye

başlamıştır. İhracat ve yatırım oranlarında düşüş izlenirken, İsveç finansal sistemi yüksek oranda Amerika kaynaklı bu krize mağruz kalmıştır.

Norveç, birçok ülke ile kıyaslandığında krizi, daha düşük resesyon ve işssizlik seviyesi ile atlatabilmiştir. OECD ülkeleri içinde en az etkileneler liginde yer almaktadır. 2008'in başında düzenleyici tedbirler alınmıştır böylece piyasadaki para arzı seviyesi arttırılmıştır.

İsviçre'de hükümet müdahelesi ve Merkez Bankası yardımı ile finansal krizin etkisinden arındırılması için destek programı oluşturulmuştur. Resesyon öncelikli olarak mal ve hizmet sektörünün ihracat hacmindeki düşüle tetiklenmiştir. Riskler ve belirsizlikler devam etmesine rağmen, global krizden çıkış dönemi pozitif büyüme rakamları ile 2011'de başlamıştı ve halen devam etmektedir.

Genel olarak finansal krizin etkisini, ülkeler üzerinde 2008'in son çeyreği ve 2009'un ilk çeyreği arasında hissetmiştir. GSMH o dönemde yüzde 14,3 azalmıştır. Tezin ilk ampirik kısmında Amerika'daki şokun gelişmekte olan ve gelişmiş ülkelerdeki borsalara oloran etkisi incelenmektedir. Bu bağlamda elde edilen sonuçlar, hem gelişmiş hem de gelişmekte olan ülkeler için test edilip yorumlanmıştır.

Asya'daki finansal kriz sonucunda, hisse senetleri piyasalarının birbiri ile olan güçlü bağları önemkli rol oynamıştır. Bu kriz sonrasında borsaların karşılıklı bağımlığı incelenmeye başlanmıştır.

Çalışmamızda, Amerikan borsasındaki volatilite yükseldikçe, gelişmekte olan ülkelerin borsalarında benzer bir rahatsızlığın ortaya çıkıp çıkmadığı ele alınmıştır. Çalışma göstermektedir ki; Amerika ve gelişmekte olan ülkelerin piyasaları yakın bağlar içerisindedir ve Amerika'da meydana gelen şokun, gelişmekte olan ülkeler tarafından atlatılması yaklaşık 5 – 6 aylık bir süreç gerektirmektedir.

İncelenen piyasaların verdikleri cevaplar gereğince, en yüksek tepki ve sarsılma öncelikli olarak Polonya, sonrasında Macaristan ve Meksika'da gerçekleşmiştir. Öte yandan, Türkiye borsası, Amerikan borsasında meydana gelen şoktan diğer incelenen gelişmekte olan ülkelere nazaran daha az etkilenmiştir.

Yukarıda da bahsedildiği üzere, aynı model gelişmiş ülkeler için de çalışılmıştır. Elde edilen sonuçlar göstermektedir ki; Amerika şoklarının yayılmış

etkisi gelişmiş ülkeler açısından çok daha yaygın dır. İngiltere, İsviçre, İsveç, Norveç ve Finlandiya yapılan testler sonucunda Amerika şoklarına oldukça yüksek oranlı ve ani tepkiler vermiştir. Borsalara verilen şoklar sonucunda, çalışma şunu göstermektedir ki; hisse senetleri piyasalarının bağımlığı ve finansal krizin yaygın etkileri, gelişmiş olan ülkeler üzerinde çok daha fazladır. Gelişmekte olan ülkerden ziyade, gelişmiş ülkelerin üzerinde kriz çok daha etkili olmuştur.

İkinci ampirik çalışma, finansal difüzyonun, ülke ekonomilerinin finansal stabilite endeksi oluşturarak incelenmesini içermektedir.Finansal stabilite endeksi, içinde reel efektif döviz kuru, kısa vadeli fazi oranları ve hisse senedi getirilerinin, yer aldığı ve asal bileşenler yöntemi ile oluşturulan bir endeks serisidir.Yayılma etkisini finansal stabilite ışığında incelediğimiz zaman elde ettiğimiz sonuçlar, Amerika'nın sarsılan finansal dyurumu, pek çok gelişmekte olan ülkeyi yoğun olarak etkilememiştir. Bu ülkeler, çoğunlukla düşük oranlı hassasiyet göstermişlerdir.

Buna rağmen, incelenen gelişmekte olan ülkeler açısından en yüksek oranlı tepkiyi Polonya ve Macaristan vermektedir. Bu iki ülke çalışmada yer alan Avrupa Birliği üyesi tek ülkelerdir. Bu sonuç, Avrupa ile Amerika'nın gelişmiş bağlantılarını işaret etmektedir.

Meksika ve Türkiye, Amerika'da meydana gelen finansal stabilite destabilizasyonundan az etkilenmekte olup, finansal stabilitelerinin türbülansa uğradığı hakkında çok zayıf kanıtlar içermektedir. Diğer bir yandan, bu analizi gelişmiş ülkeler için uyguladığımızda elde ettiğimiz sonuçlar çok daha anlamlıdır. Amerika'ya verdiğimiz şok sonucu, finansal durumunda meydana gelen bozulma, sırasıyla en çok Norveç, İsveç ve İsviçre'nin finansal destabilizasyonuna yol açmıştır. İngiltere, bu şoka karşı daha güçlü dururken, Finlandiya'nın finansal durumu stabilitesini korumuştur.

Bu çalışmada elde edilen sonuçlar göstermektedir ki, bugüne kadar yaşanmış etki alanı en yaygın olan, Amerika kaynaklı bu global finansal kriz gelişmekte olan ülkelerden ziyade gelişmiş olan ülkelerde etkili olmuştur. Finansal krizin difüzyonunun çalışılmasında finansal piyalar üzerinde daha çok odaklanılmalıdır. Daha ileri çalışmalar için daha gelişmiş yaklaşımlar, daha realistik makro finansal bağlantılar kullanılarak yayılma etkisi incelenilmelidir. Bu gibi, ilerlemiş tekniklerle finansal krizlerin dünya çapında etkilerini anlamak çok daha kolay hale gelebilir.

1. INTRODUCTION

The 2007 – 2009 financial crisis, is one of the most tumultuous economic events in the recent financial history. The recession in the United States (U.S.) financial system and stock market began in the late 2007, was followed by both emerging and advanced countries. This crisis - originating from U.S. - underscored the importance of interdependence of the international financial system. Enhanced financial ties within the world, it is generally believed that the sensitiveness of financial markets to external shocks further raised in many emerging and advanced economies. This crisis is one of the examples of such shocks diffusioning from one country to another. In the economic literature, this case is called *contagion.*

There occurs an important question after the recent global financial crisis. If contagion appears during the global financial turmoil period, then what is the magnitude of such contagion? The motivation of this study is to answer this question by investigating both stock market and financial stability interdependence between U.S., emerging and advanced countries. To answer these questions, this study develops a vector autoregressive framework for estimating the shocks originating from U.S. and implements the models using a sample of emerging and advanced countries.

This study is organized as follows first an historical perspective of the global financial crisis with a brief reference on causes of the turmoil, under-pricing risk, credit default swaps is reviewed. Then incoming chapters explain the econometric methodology employed. After, regional impacts of the crisis on emerging and advanced countries are analyzed. Section 8, 9 and 10 examines and reports the results of cross-country contagion and cross-market contagion.

The following sections then discuss the results in terms of the changing financial stability and stock market shocks and whether the impact of these shocks are influential on emerging or advanced economies. Finally, conclusions are drawn in Section 12.

2. AN HISTORICAL PERSPECTIVE ON THE CRISIS OF 2007-2009

This global financial crisis has many similarities with the past crisis[2] but it also differs from them in many other ways. This chapter provides an historical perspective on the crisis of 2007- 2009.

2.1 Causes of the Turmoil Period: 2007-2009

The global economy is trying to get over from the deepest recession. This global turmoil period was triggered by a serious financial crisis in United States (U.S.) that resulted with the collapse of global financial markets and the disturbance of the global trade flows mostly in advanced countries. The crisis carved out deep recessions in mostly advanced countries; the emerging countries were also affected severely, with the varying impact across regions and countries. The varying impacts are analyzed in the empirical studies of this research.

The crisis started in the U.S. with the collapse of the subprime mortgage market in early 2007 and the end of a major housing boom. It spilled over the world through downfall of the equity markets which have already produced a significant recession. In many directions, this crisis was foreseen. In what follows a survey of the background of influences that led up the crisis is explained.

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[2] Examples include the crisis of 1857, 1893, 1897 and 1929-1933.

3. THE MIS - PRICING (UNDER - PRICING) OF RISK

3.1. The Evaluation of Under - Pricing Risk

In the four years to August 2007, macro financial conditions were very positive on the surface. Financial sector was gaining huge amounts of returns: profitability was in favorable conditions, many asset prices were raising, and volatilities were handled comfortably in equity markets, bond markets and foreign exchange markets. Lattermost, risk premium was really small. Meanwhile, the world economy was growing intensely, in a low inflation environment.

Trichet (2009) states that against this normal conditioned macro financial environment, innovation was rapidly going on in the financial markets. This evoked a better and wider distribution of risk. The diversification of risk was beneficial not only for the financial sector but also for the real economy, since companies and financial institutions were more able to diversify the risks they were bearing. This situation encouraged risk taking not only inside but also outside the financial sector. However, as the financial crisis has shown its face, there is a generalized tendency to overestimate the true degree of risk spreading and diversification of risk in the financial markets.

Warning by authorities on the sudden collapse in financial markets dates back to 2006. Plenty of warnings were made about risk premia[3]. At the same time, financial stability reports[4] studied defenselessness of the financial sector and warned

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[3] For updated information about the variance risk premium see (Tim Bollerslev et al. 2011) and (Hanno Lustig and Adrian Verdelhan 2008)

[4] Including from (European Central Bank (ECB) , the Bank for International Settlements (BIS), the Financial Stability Forum (FSF) and other organizations

for the growing tendency of the weakness in the financial sector overall. Both under-pricing of the 'unit of risk' and 'under-estimation of the quantity of risk' turned out to be at the heart of the crisis.

3.2. Under-Pricing of the Unit of Risk

The under-pricing of the unit of risk is related basically to noneffective theories made about the division of returns to really complex, new financial securities. Furthermore, calculating the probability of default mortgages in a large economy, the possibility of a drop in real estate prices or the ongoing deterioration in lending standards, were not properly factored in. As stated below, Trichet also underscored the importance of assessing risks properly.

"The compression of spreads and risk premia coupled with the search for higher returns tended to lead to a higher level of investors' appetite for risk. This, in turn, further inflated valuations based on very favorable expectations of future returns. Contributing to the under- pricing of a unit of risk was also the opacity and complexity of structured financial products. Not even sophisticated investors were able to assess the risks embedded in these products properly." (Tritchet, 2009)

Goodhart (2008) argued that this under - pricing risk is a result of a long period of abnormally low nominal and very low real interest rates that had continued from the ending of the Tech Bubble in 2001, until central banks generally began to provoke interest rates again in 2005. Figure 3.1 shows the time path of interest rates in the USA and Eurozone, and Figure 3.2. shows the time path of interest rates in the UK.
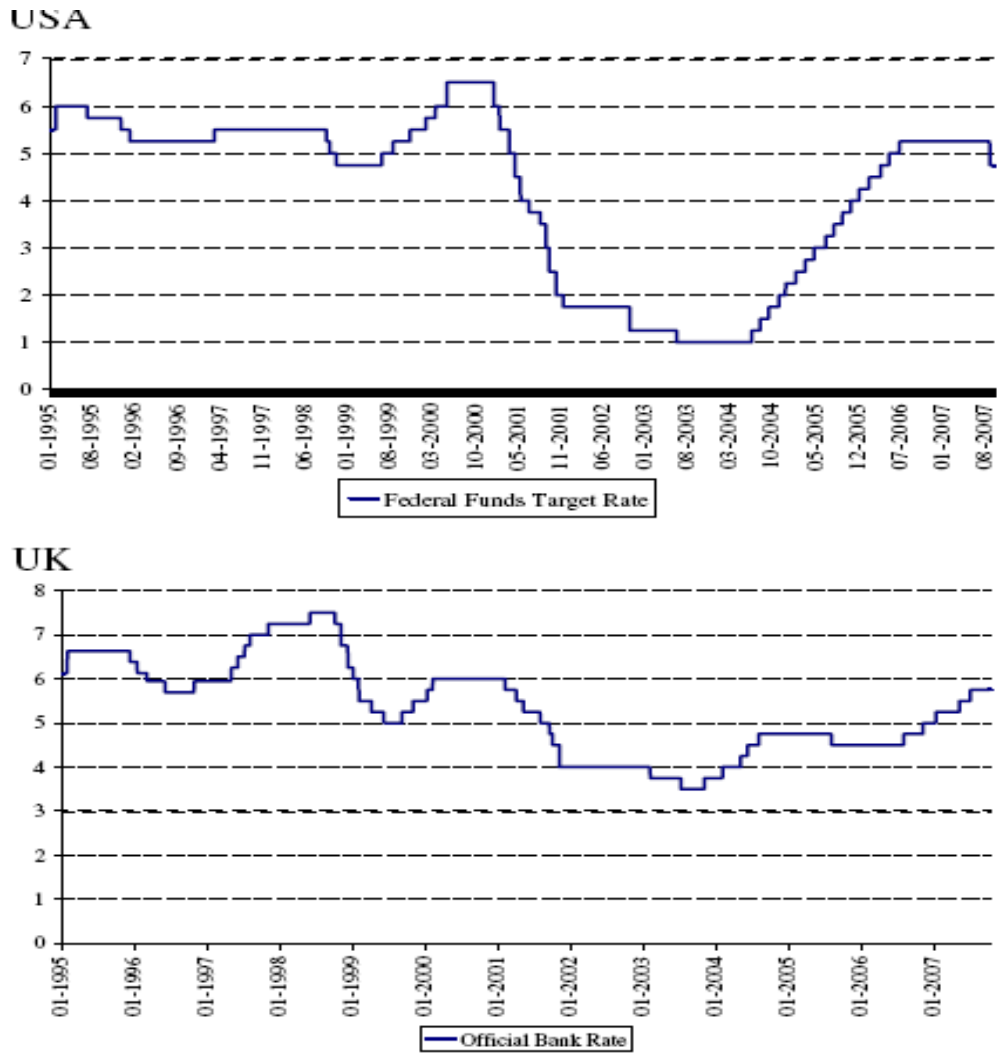
Figure 3.1: Time path of interest rates in the USA and Eurozone

Source: (Goodhart 2008)
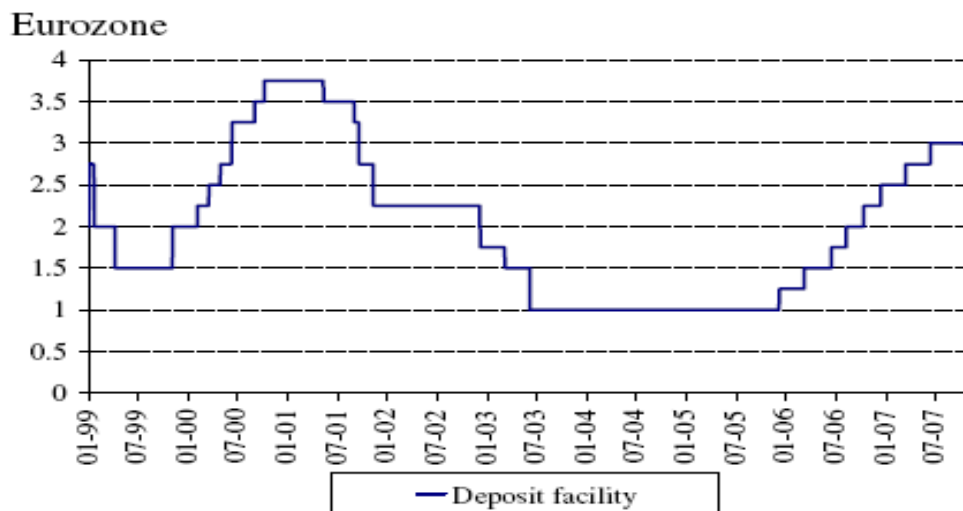
Figure 3.2: Time path of interest rates in the UK

Source: (Goodhart 2008)

Bernanke (2005) highlights the negative results of the Tech Bubble; there was a material fear among USA that price deflation might follow. In addition, there appeared to be a glut of savings, which caused to a driving down real interest rates all around the world.

Bordo (2008) found that the fear of having a deflation trouble, and the savings glut, evoked a period of expansionary monetary policies, with nominal policy interest rates at very low levels, and with accelerating monetary growth for the USA, the Eurozone and the UK over the years from 2001 to the present.

3.3. Underestimation of the Quantity of Risk

As the turmoil period started, some large institutions revealed a massive concentration of risk, suggesting that risk management systems were unable to identify the quantity of risk that financial institutions were accumulating. For example, credit default swap (CDS) market hardly existed in 2002 and grew enormously and reached a size of $58 billion in 2007. Market participants believed that they are insulated against the risk of default of the issuer. But, this protection appeared to be faulty when the first signs of financial distress emerged. During CDS market growth, the performance of this market had not been tested before. Trichet has another statement about the risk under certainty below.

"In general, cross - correlations across and between defaults on the one hand and the rest of economy on the other hand was generally not properly factored in when calculating probabilities of default. The limited importance given to risks of a systematic nature was thus responsible, to a large extent, for the massive underestimation of the quantity of risks borne by market players, as shown by the unfolding of the crisis. In general, the evaluation methodology of the quantity of risk and the price of a unit of risk has turned out highly inadequate in the light of the current experience. The dominant models rely on simplified hypotheses, consisting of laws of probabilities about future events. In these periods the behavior of markets and prices does not appear to follow any probabilistic model ex ante but rather reflects a more fundamental Knightian uncertainty in which even probabilities is unknown". (Trichet, 2009)

4. HOW THE U.S. SUBPRIME MORTGAGE CRISIS WENT GLOBAL

4.1 The Great Moderation / Stability

Bordo (2009) states that since the early 1990s, the major advanced markets in the world have enjoyed a Golden Age. During this period, inflation level was very close to inflation targets as output was growing rapidly and with few cycles. Despite of the remarkably stable and strong growth of US and ex-Japan Asia, growth in Europe has been slightly disappointing. This ongoing stable macroeconomic environment led many to believe that macroeconomic risks had been reduced. Moreover, whenever financial markets in the US had weakened sharply over the previous years[5], the Federal Reserve Bank had always intervened the economy to protect the financial downfall spreading more widely into the economy.

There has been a growing tendency among many to believe that the Fed would assist its domestic markets enviably from any serious downfall. To result of all these factors, is that there was a clear and apparent diffusion of under-pricing risk.

4.2 Evidence From Bank Credit Default Swap Spreads

This section examines the financial interlinkages by focusing on credit default swap indices (CDS). CDS is a form of insurance which protects the lender in the case of a loan default. When a lender purchases a CDS from an insurance company, the loan becomes an asset that can be swapped for cash if the loan defaults. (Garbowski, 2008)

In other words, CDS is, essentially, an insurance contract between a protection buyer and a protection seller covering a corporation's, specific bond or loan. A

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[5] For example Black Monday of October 19, 1987; the Housing Crisis in 1992; the Asian Crisis in 1997/1998; or the collapse of the Tech Bubble at the end of 2001.

protection buyer pays an advance payment and yearly premiums to the protection seller to cover any loss on the face amount of the referenced bond or loan.[6]

Stulz (2009) states that CDS are traded in largely unregulated over the counter market usually by phone as bilateral contracts involving counter party risk and they facilitate peculation involving negative views of a firm's financial strength. CDS market performance was well during the first year of the crisis exchange trading has both advantages and costs compared to over-the-counter trading. Why banks collapsed, why housing prices fell so dramatically, and why the credit markets froze, many have declared that credit default swaps to be a famous evil.

In their basic form, credit default swaps are a simple type of financial derivative. They make a payment to the buyer, generally called the protection buyer, equal to losses on bonds or loans resulting from the default by a company. Figure 4.1 shows how the credit default swap system works.
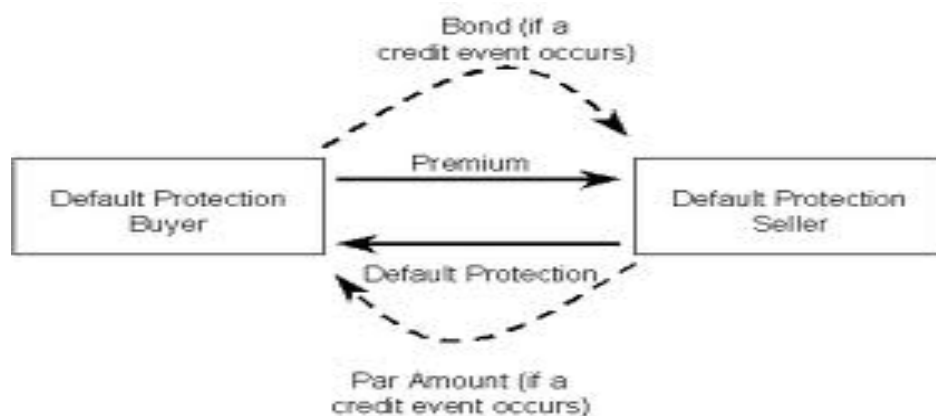
Figure 4.1.: Credit Default Swap System

Source: stern.nyu.edu /syntheticabs

The seller, usually named the protection seller, receives a periodic fee for agreeing to make these payments. A simple way to understand these contracts is that they are functionally equivalent to default insurance contracts. The insured event is the loss arising from a default; the premium paid is the fee; the policy limit, i.e., the maximum covered loss, is called the notional amount; in contrast to typical insurance policies, credit default swaps have no deductible. Importantly, however, one has to

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[6] Typically, the insurance is for five years.

be exposed to a risk to obtain an insurance contract; for instance, to buy insurance on a house, one has to own the house; with credit derivatives, one can buy protection without being exposed to the risk that the protection insures. (Bloomberg, 2006)

Absolutely, as with the all derivates, credit default swaps get into various combinations. They could be purchased to insure portfolios of subprime mortgages and, in securitizations, slices of such portfolios. During the boom, the demand for exposure to subprime mortgages grew so quickly that there were not enough subprime mortgages to satisfy that demand. Finally, investors obtained such exposure through credit default swaps.

Frank and Hesse (2009) examined potential financial linkages between liquidity and bank solvency measures in advanced economies and emerging market bond and stock markets during the financial crisis. They estimated a multivariate GARCH model to gauge the extent of co- movements of the financial variables across markets. They argued that specifically, proxies for general stress in market volatility is strongly related to stock market, bond spreads and credit default swap indices of the countries.

As a measure of the default risk of large complex financial institutions, Frank and Hesse (2009) used average credit default swap spread of a number of banks[7]. Regarding emerging market financial variables emerging markets bond index (EMBI+) spreads - which is a benchmark index for measuring the total return performance of international government bonds issued by emerging market countries that are considered sovereign and that meet specific liquidity and structural requirements.[8]- For the regions Latin America (LAC), Europe and Asia are used as a measure of their respective sovereign risks. Overall findings reflect that, the U.S. Libor spread is related to sovereign bond and the sovereign credit default swap spreads of the emerging countries Brazil, Russia, Turkey and Mexico.

Shah Gilani[9] who also questioned credit default swap derivatives could ignite a worldwide capital markets meltdown or not, underlines the CDS is not standardized

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[7] Namely those of Bank of America, JP Morgan, Merill Lynch, Goldman Sachs, Lehman Brothers, HSBC, UBS and Deutsche Bank. After Lehman Brothers collapse they used the average CDS values for Goldman Sachs, Merill Lynch and Morgan Staney fort he Lehman Brothers time series data.
[8] For further information JP Morgan, Methodology Brief, JP Morgan, New York, 1999

[9] Contributing editor of the Money Morning.

instruments, and serves as a hedging device. CDS is written on subprime mortgage securities and that situation is like a *"ticking time bomb"*. Because speculators sell and buy trillions of dollars of insurance that these pools would, or wouldn't default. There exists a strong contagion from CDS market through stock market and credit markets. The FED did not let Bear Stearns enter bankruptcy because the trillions of dollars of credit default swaps. All of Bear Stearns's trading partners[10] exposed to the counterparty risk if it was enter to bankruptcy it would take so many years to cover losses. The CDR Counterparty Risk Index has reached at around 250 bases during the Bear Stearns crisis. In march, spreads on CDS related to Bear Stearns rolled to over 750 basis points, or more than $ 750.000 annually to insure against a default in $ 10.000 of Bear debt over five years. Meanwhile, Bear's trading partners bought credit protection on Bear because they were nervous about a potential collapse. Figure 4.2 shows CDS spreads of major credit derivative dealers.
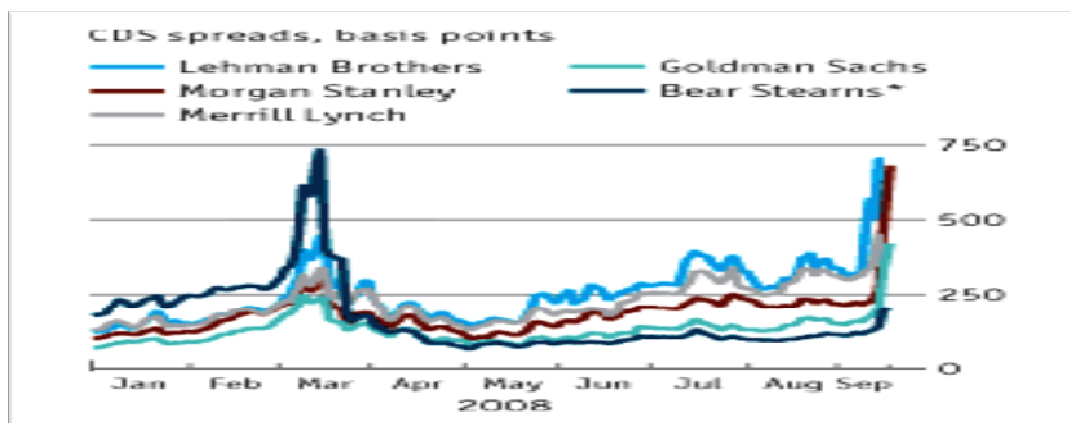
Figure 4.2.: Major Credit Derivative Dealers in 2008[11]

Source: Financial Information Services – Markit

Overall studies show that CDS is at the center of the financial crisis because it allowed people to bet against the rising prices of housing market. The people were betting that bubble would burst, and if they were right then they would win a big time. As a result the bubble burst and the world had a huge financial crisis.

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[10] All the banks and institutions that had insurance written by Bear Stearns would not be able to announce that they were insured and they would have to take the responsibility of billions of dollars in losses that they have been carrying at higher values because noone could insure them for those losses.
[11] *:Trading on JPMorgan risk since April.

5. THE GLOBAL FINANCIAL CRISIS AND CRISIS INTENSITY AMONG COUNTRIES

Despite the global spillover of the financial crisis, some countries resisted stable than others. This chapter examines why some countries succeeded better than others while fighting the crisis. To examine this question, many studies glanced over the cross - country differences to find evidence for the importance of differences in trade and financial openness.

5.1. Impacts of the Crisis Across Countries

The World Bank (2009) has studies the factors that could explain the change in the actual growth in 2007 and potential growth in 2009. They found many countries were expected to face a downfall, but this approach does not provide a clean Picture of the distribution of growth collapses.

Rose and Spiegel (2009) studies cross country linkages taking U.S. as the most natural origin of this global turmoil, they use Multiple Indicators Multiple Causes model (MIMIC) to examine international linkages that may have allowed the crisis. Although they use many possible causes in their econometric framework, they find no evidence that international linkages can be clearly related with the incidence of the crisis.

Berkmen et. al. (2009) examines the difference impacts of the crisis across developing countries and emerging markets. They use cross- country regressions to explain the factors driving growth forecast revisions after the eruption of the global financial crisis. They find countries with advanced financial systems tended to suffer quickly than others. They also find weak evidence that countries with a stronger fiscal position were hit less severely.

Obstfeld and Rogoff (2009) found that as well as the U.S., the surpluses of other advanced countries and oil-exporting Middle East have fallen dramatically. Asia has maintained its surplus while China has continued upward. Figure 5.1. gives a sense of global reshape of global current account balances.
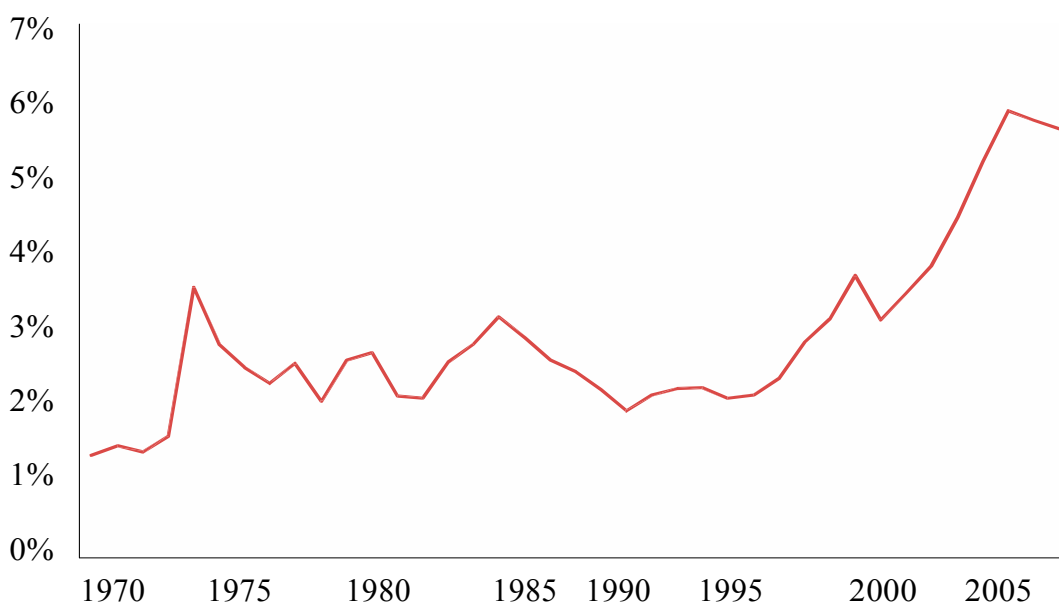
Figure 5.1.: Dispersion of the World Current Account Balances[12]

Source: IMF World Economic Outlook 2010

When we glance over the nature imbalances, it is seen clearly that it has changed over time, within different periods. Blanchard and Ferretti (2009) suggest dividing recent history into three main stages leading up to crisis: 1996 - 2000, 2001 - 2004 and 2005 - 2008.

It shows, for example, among countries China's surpluses are large in only 2005 and 2008. It reflects an intentional undervaluation of the exchange rate, together with a high saving rate to avoid overheating. (See Table 5.1. for average current account balances) Current account balances shows redundant macroeconomic and financial mechanisms. In a globalised world, expecting balanced current accounts is irrational. According to Blanchard and Ferretti (2009) the adjustment process of global imbalances has started.

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[12] Ratio of world GDP

Table 5.1. Average current account balances[13]

	1996-2000	2001-2004	2005-2008
United States	-0.8	-1.4	-1.4
Peripheral Europe	-0.1	-0.4	-0.8
Rest of the world	-0.3	0.0	-0.3
China	0.1	0.1	0.6
Emerging Asia	0.1	0.2	0.2
Japan	0.3	0.3	0.3
Oil exporters	0.2	0.4	1.0
Core Europe	0.2	0.4	0.7

Source: Blanchard and Ferretti (2009)

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[13] in per cent of current GDP

6. IMPACT OF THE GLOBAL FINANCAL CRISIS ON EMERGING MARKETS

The world experienced a period of corruption in financial stability in 2008 - 2009, coming along by the violent global economic downturn and collapse in trade in many decades. As a result, the contagion of the financial crisis advanced further and faster in the following year of 2008. This spillover effects lead to a matchless shrinking in trade and global output.

The main impact of the global turmoil on emerging market economies are lower employment rates and a lack of social safety nets in what follows higher poverty than it would otherwise have been. It is obvious that effects of the financial crisis have deep impacts on developing countries. Emerging markets and low income countries are affected from the crisis because of owing to their limited exposure to U.S. mortgage - related assets and their credit markets, trade finance and exchange markets became under heavy pressure.

This chapter investigates the effects of 2007 - 2009 financial crisis on emerging countries. Emerging economies registered a significant slowdown in their growth trajectory. The main challenges they faced are: tightening of external financial conditions, declining commodity prices, weak external demand and countries capacity to finance counter-cyclical policies.

Dolphin and Chappell (2010) examine the effect of the global financial crisis on emerging and developing economies and find that in the poorest economies this global turmoil effects has been disastrous.

Velde (2010) underscore the impact of the current global financial crisis on developing countries. It caused a considerable slowdown in developing countries. Stock markets are down more than 40 per cent from their recent highs, investment banks have collapsed and interest rates have been cut.

6.1 What Does The Turmoil Mean For Developing Counties?

The channels through which the crisis have spilled over to developing countries and the effects felt in developing countries is examined in the financial contagion chapter. This chapter gives an overall look about the recent growth performance in emerging countries.

Real GDP in developing economies is expected to expand by about 6, 5 percent in 2011. (IMF, 2011) Downside risks continue to outweigh upside risks. Account of commodity prices, geopolitical uncertainty and booming asset markets are creating new risks for developing countries. There is also accruing positive signs of growth in the short term. This chapter is organized in the following countries: Turkey, Mexico, Poland, and Hungary.

6.1.1. The Regional Impacts on Emerging Economies and Expected Effects

The global financial crisis absolutely have a major impact on developing countries, with the International Monetary Fund having downgraded its growth forecasts for 2009 by nearly two percentage points for developing economies. The World Bank is also forecasting a drop in world trade in 2011.

There are important effects on international financial flows. Cali et. al. (2008) indicates that net financial flows to developing countries may fall by as much as $ 300 billion over two years, which equal to 25 per cent drop. Slow down in the world growth emphasizes a normal fluctuation. Given the statistics in many emerging and advanced countries, it is indicated notably that economic prospects for 2011 – 2012 are in favorable conditions. GDP is expected to rise by 2, 5 per cent in advanced economies and 6, 5 per cent in emerging and developing countries. This evokes a modest slowdown relative to the growth rates reached in 2010. (See Table 6.1. below.)

Table 6.1. Overview of the World Economic Outlook Projections[14]

			Year over Year Projections	
	2009	**2010**	**2011**	**2012**
World Output	-0.5	5.0	4.4	4.5
Advanced Economies [15]	-3.4	3.0	2.4	2.6
United States	-2.6	2.8	2.8	2.9
United Kingdom	-4.9	1.3	1.7	2.3
Emerging and Developing Economies[16]	2.7	7.3	6.5	6.5
Central and Eastern Europe	-3.6	4.2	3.7	4.0
Mexico	-6.1	5.5	4.6	4.0

Source: International Monetary Fund

6.1.2. Turkey

Turkey had a global debt crisis in 1979, followed by a 'stabilization and liberalization' programme in January 1980. This was based on standby agreements by IMF. These measures continued along 1980s.

In early 1994, another financial crisis occurred. The spillover effects of the Russian and Asian crises brought crisis in 1998 and 1999. In other words, Russia and Asia sneezed and Turkey caught the cold. Negative growth in these years, with a very high inflation rate led to a disinflation program with the IMF at the end of 1999. This program composed of structural reforms, privatizations, shrinking the public sector and was to be in effect for three years until 2002. In December 2000 and February 2001, the crawling peg system was replaced by a floating exchange rate regime.

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[14] Percent change unless noted otherwise
[15] Consists U.S., EU17, Germany, France, Italy, Spain, Japan, United Kingdom, Canada
[16] Includes Central and Eastern Europe, Russia, China, India, ASEAN 5 :Indonesia, Malaysia, Thailand and Vietnam, Brazil, and Mexico

Turkey which is a country quite familiar with financial crises and recessions faced this latest global financial crisis with strong resistance. The powerful macroeconomic policy framework provided support. Turkey, a growing country had its own crisis in 2000. Therefore many monetary, fiscal and financial reforms implemented in 2000s. All of them helped Turkey to get over the global turmoil period in 2008 relatively stronger among other developing countries and start growing robustly again at the end of 2008. Uygur (2010)

Thus Turkey's macroeconomic pathway differed from the average OECD country. The financial sector and economy shrinked in the beginning of the crisis, late 2008 and early 2009 but this situation did not continued long. In the crisis of 2008 - 2009, inflation and interest rates declined and various economic safety packages were put into effect, resulted in raising budget deficits.

Turkish economy has seen impacts of the global financial crisis mainly in the first quarter of 2009, first economic activity slowed down, growth was down to 3, 7 per cent during the 2007:Q1 – 2008:Q3. Growth rate plunged down to -6, 5 per cent in 2008:Q4 and to -14, 3 per cent in 2009:Q1. This huge decline in growth is most visible in monthly industrial production. (OECD, 2010)

Figure 6.1. shows the GDP growth rate fluctuations in Turkey. This decline of Turkey's GDP was the deepest all along the OECD countries. This huge output depreciation is explained by the foreign demand shock. A deep fall in exports triggering decline in industrial output and investment resulted as a sharp loss in business and consumer confidence. In other words, this crisis show the fact that Turkish export performance in particular is the center of cyclical movements in Turkey; however their share in GDP is surprisingly low. After one year of sharp decline in output GDP changed its path and the upturn period started. This period was supported by robust export and private consumption growth. The recovery in Turkey was the strongest in the OECD area as measured by the cumulative increase in GDP from the trough until the first quarter of 2010 by over 10 per cent.

Figure 6.1: Turkey's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted

Source: OECD STAT (2011)

6.1.3. Mexico[17]

This global financial turmoil is not a new experience for the Mexican economy. Since U.S. and Mexico have strong economic, political and social ties the U.S.'s economic recession period had strongly affected Mexican economy. The Mexican economy in 2009 experienced its biggest recession. Mexico's gross domestic product (GDP) shrinked by 6 per cent in 2009, the sharpest decline of any Latin American country experienced. (See Figure 5.3.)

Mexico is the U.S.' second largest export market.(U.S. Department of State). Mexico is dependent on the U.S. export market. In 2009, Mexico's total trade with the world fall down, with much lower demand in the U.S. for Mexican products and lower consumer demand in Mexico due to the decline. Mexico's exports to overall world decreased 21, 5 per cent and exports to the U.S. decreased 17, 6 per cent in 2009. (OECD, 2011) (See Table 6.2.)

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[17] Mexico is classified by the World Bank as an upper- middle- income country. Poverty is wide spread (around 44% of the population lives below the poverty line) and high rates of economic growth are needed to create legimate economic opprtunities for new entrants to the work force.

Figure 6.2.: Mexico's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted

Source: OECD STAT (2011)

Table 6.2. Mexico's Exports: 2007-2009[18]

Mexico's Exports	2007	2008	2009	Δ 2008-2009
To the U.S.	223, 4	234,6	193,9	-17,6%
Total Exports	272	292,6	229,6	-21,5%

Source: Mexico's Secreteria de Economia and Subsecreteria de Negociaciones Comerciales Internacionales. (2010)

Another huge impact of the crisis is on its labor market. Mexico's labor market collapsed during the crisis period, unemployment arrived its highest level since 2000. This collapse also caused a decline both in private consumption and retail sales. In Mexico there is a large informal sector and the crisis may led to a growing trend towards informality and self-employment[19] (OECD, 2011)

The flows of FDI to Mexico fall sharply in 2009. Total FDI flows to Mexico decreased by 42, 5 per cent, from $ 24.3 billion in 2008 to $ 12.2 billion in 2009. The U.S. is the largest foreign investor in Mexico, accounting for 45 per cent ($6.4 billion

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[18] U.S. dollar in billions
[19] Informal sector workers are explained as self-employed workers or workers who are hird by a firm that has not registered them formally with the Mexican government.

FDI from the U.S.) of reported FDI. The economic turmoil period in the U.S. caused a expressive fall down in the FDI. (U.S. Department of State)

6.1.4. Poland

Since joining the European Union, Poland has performed very well, including the global economic turmoil period, being the only EU country with a positive economic growth rate in 2009.[20] The global crisis has worsened Poland's macroeconomic and fiscal outlook, but a recession has been avoided. The response of the policy makers was rapid and adequate. Financial crisis started to show its effects on Poland in the third quarter of 2008 but meanwhile Poland had already strong and sound financial system comparing to other EU countries. (World Bank, 2010) Figure 6.3. shows GDP growth rate of Poland. In other words, Poland's economic performance in 2009 is vigorous, given the global financial downturn. Indeed, it recorded the best real growth rate in the OECD countries in 2009[21], before recovering 3 per cent growth in 2011 (OECD, 2011). In 2009, it is noted that the Polish government's access to money from the IMF would make Poland as one of the inhabitant and safe economies.

Figure 6.3.: Poland's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted Source: OECD STAT (2011) In mid-April, the finance ministry announced that the Polish government asked IMF for a credit line of $ 20 billion.[22] The sharp depreciation of

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[20] Real GDP growth rate in 2009 of 1.7 per cent
[21] At 1.7 per cent

[22] The IMF's flexible credit line facility is intended for countries whose economies are in good shape, but which may have temporary liquidity problems.

the zloty eased the impact of the foreign shock, but that depreciation contributed to the delay of euro adoption.

6.1.5. Hungary[23]

OECD (2011) denotes that before the global financial crisis, Hungary's productivity gap when compared with the other OECD countries was already very large and the intensity of this recession left deep marks on the production capacity of the country. Hungary is the one of the most affected countries among all the OECD countries, due to the huge decline in the real GDP in 2009 - which is more than double of the OECD average - . Before the financial crisis Hungary had one of the largest budget deficits in the European Union in 2008 and 2009. Figure 6.4. shows the GDP growth rates in Hungary. Moreover, Hungary faced a serious trade collapse which caused a sharp decline in business and investment confidence. Both high foreign currency indebtness and weak fiscal sustainability are the main causes of the depreciation in business confidence. Investor confidence decline triggered steep depreciation of foreign exchange thus policy makers asked for financial assistance from international organizations. Inflation did not rise significantly, but real wages decreased.[24] Total external debt reached about 120 per cent of GDP at the end of 2008. Unlike other countries, macroeconomic policies were not adequate enough to protect fiscal stability. (OECD, 2011)
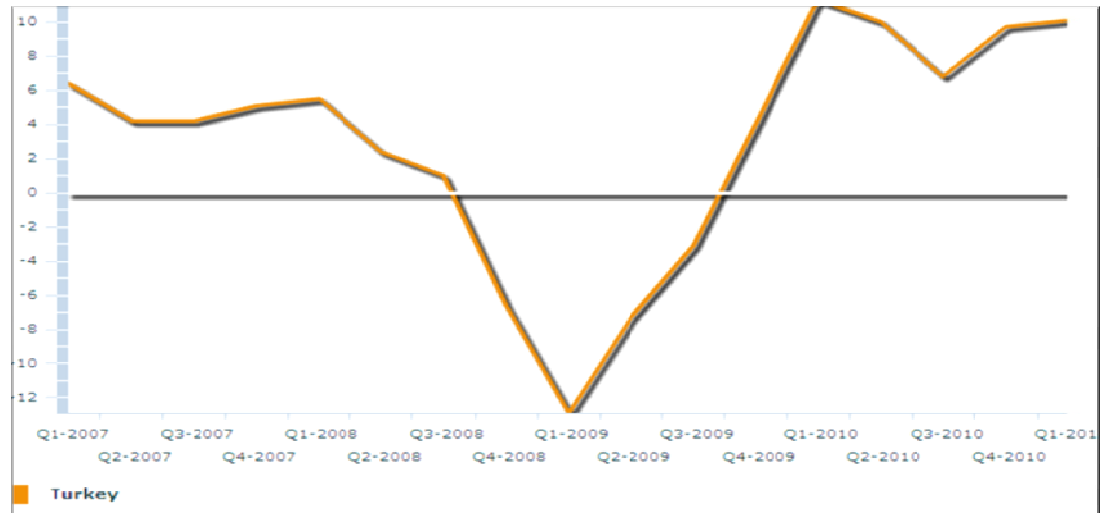

Figure 6.4.: Hungary's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted (OECD, 2011)

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[23] For further information see OECD Policy Brief 2011
[24] Hungarian Central Statistical Office, Economy and Society, January - March 2009.

7. IMPACT OF THE GLOBAL FINANCAL CRISIS ON ADVANCED MARKETS

IMF (2011) points out that advance economies started to relapse rapidly after the collapse of Lehman Brothers. Such solvency of many big financial institutions in the U.S. led to deterioration in financial stabilities of advanced economies. As a consequence, external debt markets closed and nearly no wholesale funding left hence there occurred disorderly deleveraging across the rest of the global financial system. The volume of gross capital flows shrinked, flows had a new path towards to more liquid and safe- heaven markets. Many advanced countries' financial markets started to stabilize by late 2008, but they were still under pressure during the 2009 financial year. As output declined, the risk of increasing corporate and household defaults expanded credit spreads and raised credit related losses on bank's balance sheets. In the last quarter of 2008, advanced economies had an output decline of 70 per cent.[25]

Country policy makers responses during the turmoil period were rapid but mostly unsuccessful. Generally, country authorities widened guarantees of bank liabilities. When we glance over the advanced countries, we see Central Banks used traditional and advanced policy tools to make the credit conditions relieved and declined policy rates. However overall credit growth shrinked. Large sized optimal fiscal stimulus packages were put in the plan in China, Germany, the U.K., Japan, Korea and the U.S. Although, the impact from increased spending will mostly be felt in 2011.

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[25] Annulized

In the United States, - the most natural origin of the crisis – consumption collapsed, real GDP contracted by more than 6 per cent in the fourth quarter of 2008 and by 5,7 per cent in the first quarter of 2009, and the unemployment rate rose to 8,5 per cent.

The World Bank (2010) emphasizes that the financial crisis has also its deepest impacts on the Asian countries because of their greater exposure to the fall down of external demand. Japan's economy dwindled at a 14 per cent annualized rate in the fourth quarter of 2008. Huge wealth losses and lower earnings led consumer confidence to fall at the lowest level and caused a huge increase in the savings rate.

Most countries in Europe, macroeconomic policies were generally slow to response and European financial systems fight with a much larger and more sustained shock than ever. Exposure to U.S. based assets led to adverse effects in the banking system because of the close ties among European financial institutions and their high degree of leverage. Also, advanced countries like Canada, Australia and New Zealand fight with negative trade shocks, due to the spillover effects they faced the impact of sizable private wealth reduction. These countries handle with the turmoil period much better than others because of their more conservative financial system regulation and cautious fiscal policy management. (IMF, 2011)

7.1. Finland

Before the global financial crisis, Finland had a significant economic expansion following a deep recession in the early 1990s. Nevertheless, the global financial crisis has its deepest impact on Finland comparing to most other OECD countries. Figure 7.1. shows the GDP growth rates in Finland during and after the crisis period. Finland got into the recession with a large budget surplus and a strong net asset position. Finland was mainly damaged by the trade channel during the world economic down turn. Trade volumes declined by 30 per cent. There occurred a decline in the export volumes, mainly its capital-goods intensive exports collapsed. (OECD, 2010)

OECD states that financial sector overcome the shock well, but as an important consequence the fiscal outlook damaged. However there were supportive fiscal and monetary policies, recovery from the crisis has been slow. Output dropped by 9 per

cent over the year to the second quarter of 2009, triggering an increase in unemployment levels. (OECD, 2010)
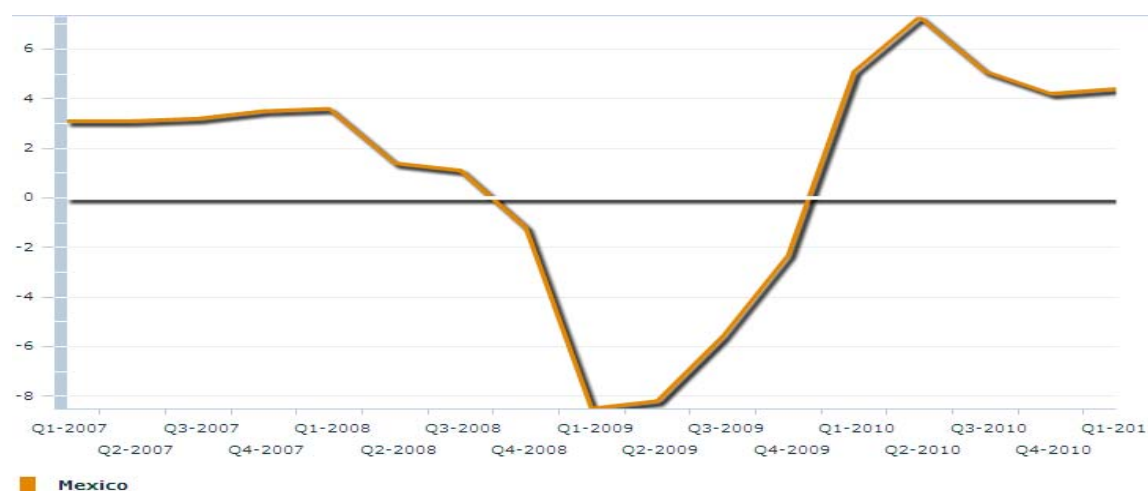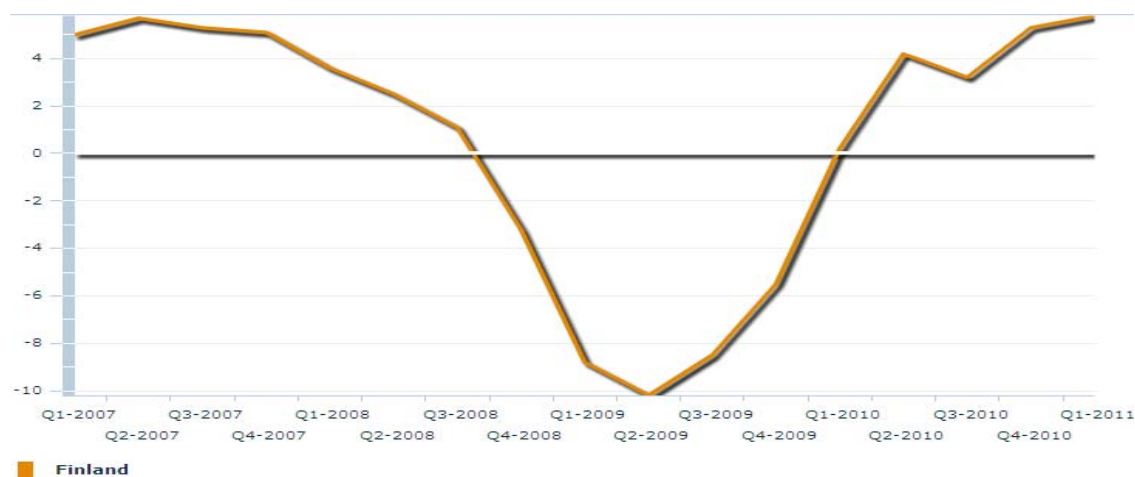
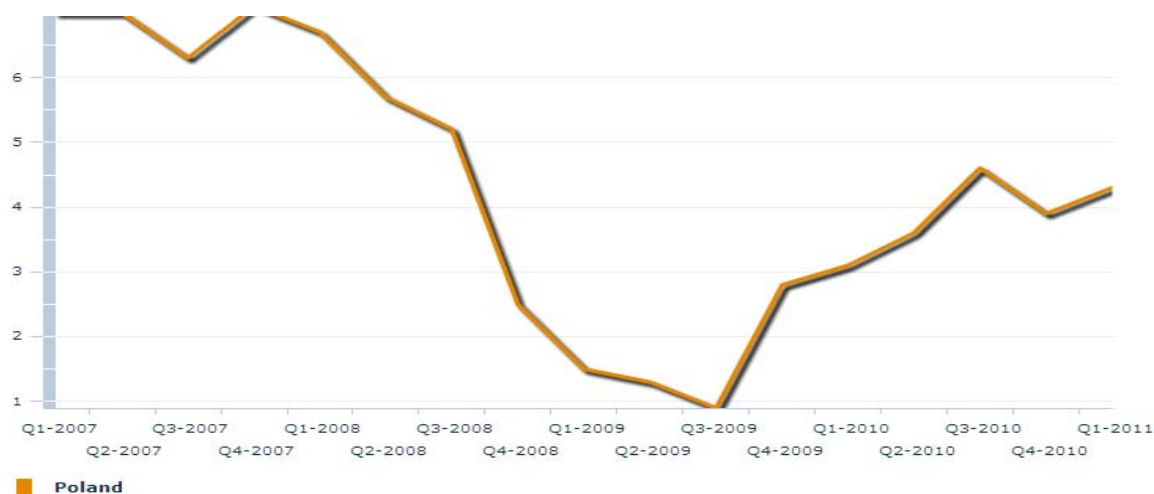

Figure 7.1.: Gross Domestic Product by expenditure approach. Growth rate compared to the same quarter of previous year

Source: OECD STAT (2011

7.2. United Kingdom

OECD (2011) states that United Kingdom got into a serious recession as a consequence of the global shock. This global turmoil has generally affected the supply of credit and house prices, they declined sharply. Overall results indicate that, UK economy resulted the global financial crisis with increased public and private debt ratios and high rates of unemployment. Significant imbalances occurred in the financial sector and growth. These imbalances need to be figured out to sustain a balanced recovery.

Another impact was on the unemployment rates, it reached three million by the end of 2009. Low skilled workers and youth have been much more damaged during the recession. Labor market recovery is also slow in 2011. Fiscal position was not adequate coming into recession and deteriorated rapidly as output dropped. In 2010, fiscal outlook was not that negative when compared to 2009. Government speed up the consolidation process with regulatory reforms and this attempts resulted with low fiscal risks The broad based recovery in U.K. started in end of 2009 and slowed in the second half of 2010 (OECD, 2011).

In addition to the information above, government deficit increased hence debt to GDP ratio increased substantially. Fiscal situation in England deteriorate sharply. Governments net lending reached approximately 11 per cent of its GDP. In this manner a fiscal tightening is of the essence to accomplish a favorable fiscal outlook and reassure investors. According to the OECD (2011), fiscal consolidation will impact significantly on government consumption and investment in 2011 – 2012.
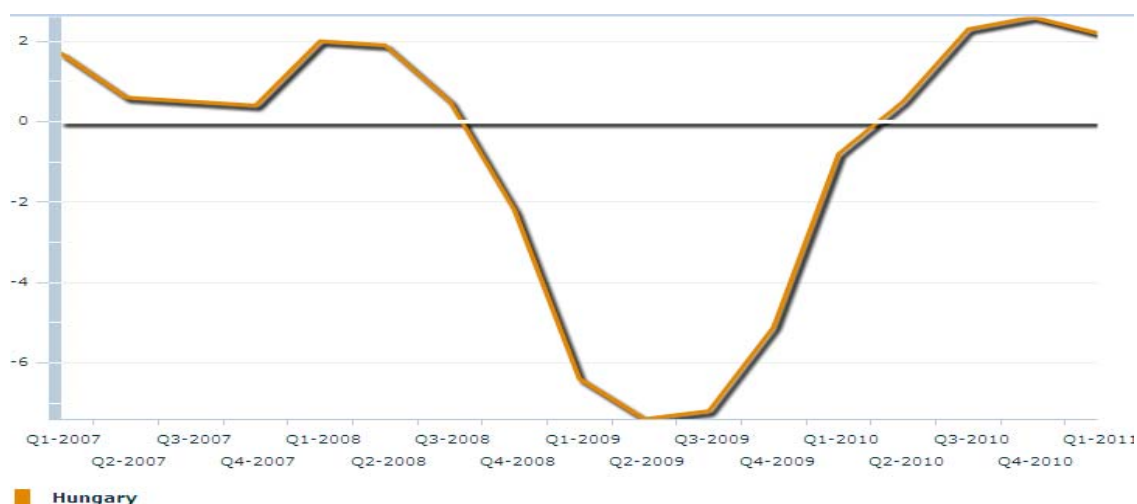

United Kingdom

Figure 7.2.: UK's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted

Source: OECD STAT

7.3. Sweden

Karl Aiginer (2007) specifies that the Swedish economy model combines three key indicators. They are growth targeted policies, openness and structural change. Sweden is the most liberal economy compared to other OECD countries because of having lower state control and less legal barriers to competition. Regulatory reforms affecting foreign trade and investment are also liberal. Strong emphasis on equal opportunities is another central future of the Swedish economic model. By the global turmoil, real GDP fell down in the first half of 2008 and the output gap becomes negative around June 2008. Weak growth in exports and investment also led to economic slowdown.

The policy makers introduced a number of measures to sustain the functioning of financial markets. The Swedish financial system has been exposed to the international financial crisis originating from US. Interbank spreads increased very much, the perceived risk of mortgage bonds have raised, equity prices have declined, stock market index decline by 40 per cent among January and October 2008. Banks

started to lose financial assets. Thus they started to invest in low- risk securities and take other precautions to raise their capital base. In addition to those stated above, currency deteriorated in Sweden. (OECD, 2011)

The Central Bank (Riksbank) declined interest rates with other Swedish policy makers and make additional policy measures which helped the financial sector during turmoil. Also, money market rates moved similarly together over the decade preceding the global financial crisis with bigger deviations and funding problems occurred. Many banks faced severe funding problems, especially to firms. Effectiveness of the programmes put in place to respond to the crisis by Swedish authorities generally helped to stabilize the financial system. The global slowdown has many effects on the Swedish economy. Swedish macroeconomic policy makers target to maintain low inflation during the global turmoil period. Sweden already has a strong macroeconomic policy framework and low government debt. Upcoming years to third quarter of 2007, Swedish economy expanded rapidly, meanwhile and unemployment fell by 2 per cent. (OECD, 2011)
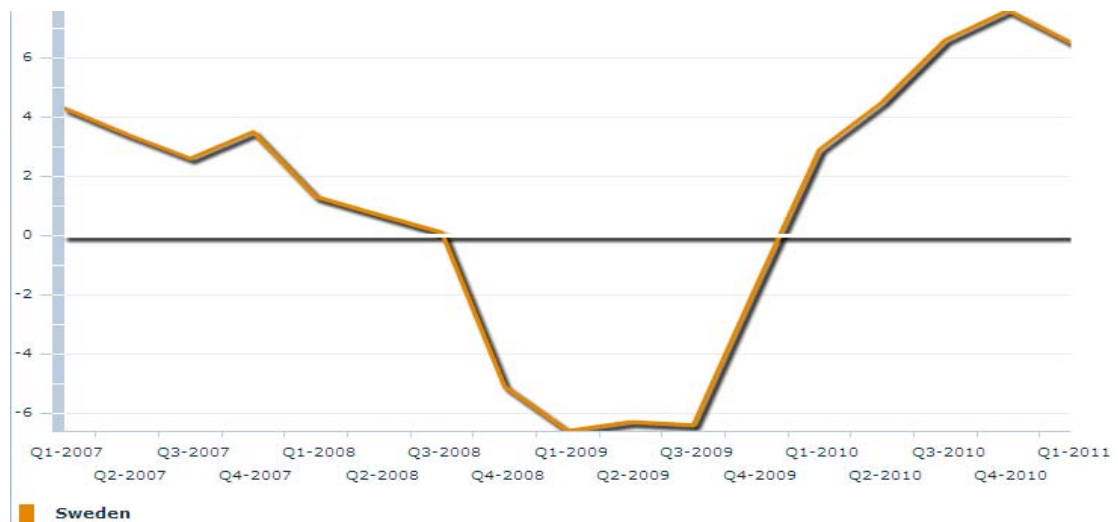
Figure 7.3: Sweden's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted

Source: OECD STAT (2011)

7.4. Norway

Norway get over the financial crisis compared to other OECD countries with a lower recession and unemployment level at around 4 per cent. In other words, the global financial crisis hit Norway less seriously than many other OECD countries. The low levels of recession and dynamic consumer demand were the biggest factors in sustaining demand strong. Norway's fiscal stimulus was strong when it went to global financial crisis. Regulatory measures were taken early in 2008 and also for 2009 and 2010. Central Bank reduced interest rates by 450 basis points between October 2008 and June 2009. This move led to an increase in the supply of liquidity. (OECD, 2010) Furthermore, the Norwegian government builds up a Finance Fund to supply capital to banks to reinforce their lending capacity and a Government Bond Fund to boost the supply of credit in the bond market. As the financial situation healed, CB began to phase out many of the exceptional liquidity measures in summer 2009. Credit conditions get in better position and lower uncertainty in the markets improved economic outlook in the summer 2009.

IMF (2011) indicates that with an appropriate recovery program, the large fiscal stimulus needs to be withdrawn to avoid overheating in 2011- 2012.
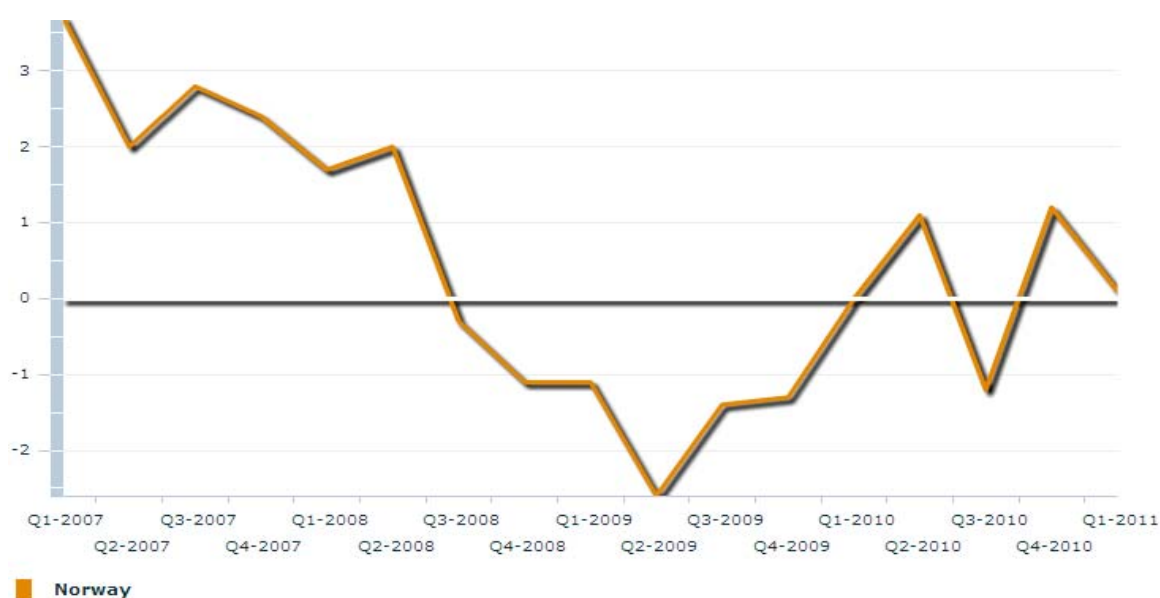
Figure 7.4: Norway's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted

Source: OECD STAT (2011)

7.5. Switzerland

Swiss National Bank (SNB) emphasize that the recession in Switzerland is less deep than in Switzerland's main trading partners. Government intervention and Central Bank support also helped Switzerland during the turmoil period. However, the weight of financial intermediation in economic activity and large losses of big sized Swiss banks in the US subprime mortgage market, Switzerland performed better than most OECD countries. The recession was driven by a decrease in exports of goods and services. This decline in exports led an appreciation in Swiss franc. Industrial production fell by 10 per cent. In addition to those financial services felt a sharp decline which contributes about 11 per cent of Swiss Gross Domestic Product. (OECD, 2009)

Which was interesting for Switzerland is, for many countries that experienced a housing crisis in 2008 - 2009, there occurred a huge fall in the real estate prices, but in Switzerland real estate prices increased continuously over the entire course of the crisis period and are still rising. (SNB, 2011)

Glancing over the overall assessment of general economic and financial conditions for the Swiss banking sector, SNB (2011) denotes that however the uncertainties and risks remain high, the global recovery after the crisis seems sustainable, and the Swiss economy also saw robust growth in 2011.

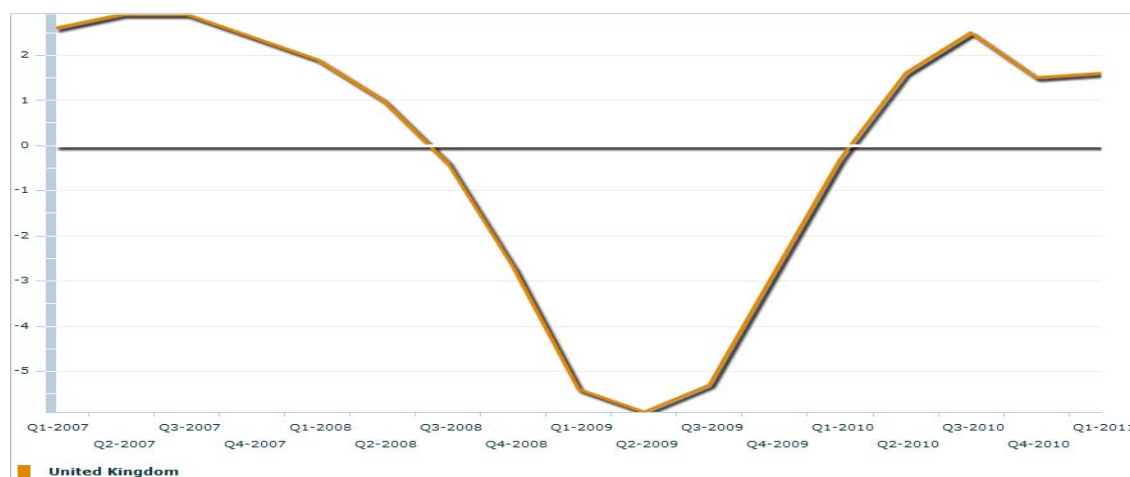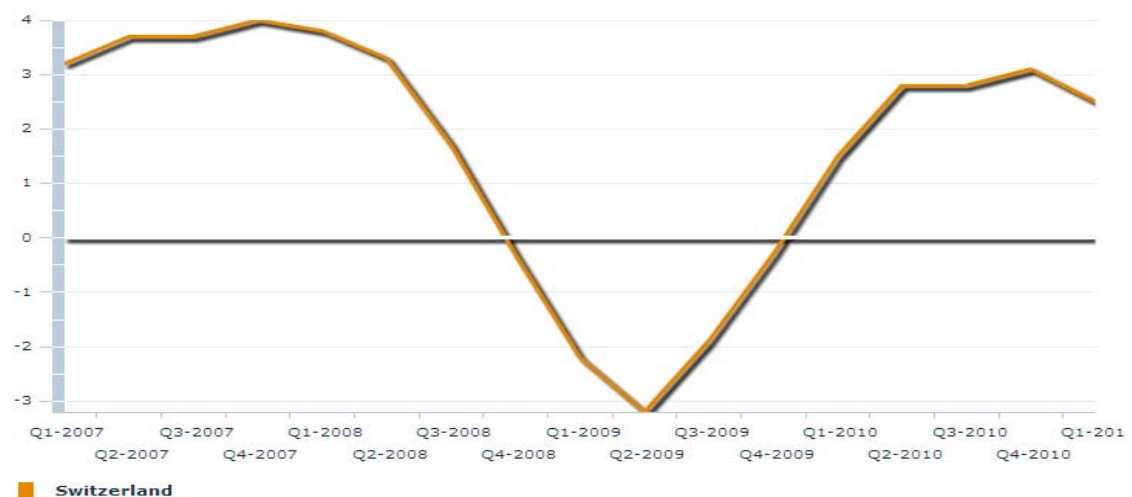Figure 7.5.: Switzerland's Gross Domestic Product: Expenditure Approach, growth rate compared to the same quarter of previous year, seasonally adjusted

Source: OECD STAT (2011).

8. STOCK MARKET INTERDEPENDENCE AND FINANCIAL CONTAGION

In this chapter, contagion of the global financial crisis is analyzed. More specifically, keeping United States as the natural origin of the crisis, how other emerging and developed countries are affected from this turmoil period is answered. Using Vector Auto-regression models, it is found that an international stock market cycle is mostly affected by U.S. stock market shocks. European countries have a much smaller role in the financial spillovers. These linkages are mostly transmitted through fluctuations in the stock market.

The empirical evidence, in this study finds a strong evidence for stock market contagion. We further extend the analysis by towards the impulse response analysis and variance decompositions. The results are in line with the expectations referring to the current financial contagion literature. These findings underscore the importance of building sustainable financial reforms for both emerging and advanced countries to avoid similar shocks originating from US in the future.

8.1. Defining Stock Market Interdependence and Contagion

The fall in the countries' stock markets began in late 2008, which was triggered by declines in US stock market. During the worst episode of the financial turmoil that lasted for about 6 months from September 2008 to early March 2009, the U.S. stock market declined by 43 per cent, the emerging markets by approximately 45 per cent, and frontier markets declined at around 60 per cent.

In this chapter, this depreciation in stock market around the world - during the U.S. financial crisis- and evidence of diffusion is examined.

If diffusion exists during the U.S. crisis, then the magnitude of such contagion is questioned towards the vector auto regression analysis. The motivation of this chapter is to answer these questions by investigating the stock market shocks between the U.S. and emerging and frontier markets. Finding appropriate answers to these questions, developing a framework for estimating the impact of shocks is vital.

First, stock market returns are calculated by taking the first log difference by specifying an autoregressive model of returns allowing for time-variation of expected returns for the U.S. market and for each emerging and advanced market is studied.

In the next step, using vector auto regressions (VAR) framework, it is founded that stock market turmoil is mostly affected by U.S. stock market shocks. The model is estimated using monthly stock market index data for US, Hungary, Mexico, Poland, Turkey, United Kingdom, Sweden, Swiss, Norway and Finland including the exact period of January 2000 and April 2011.

This study promotes to the main aim of the research in many ways. The first major contribution is to construct a framework for distinction between emerging and advanced stock market interdependence and contagion is framed on the basis of time varying return shocks rather than correlation or volatility. The linkage between return shocks of a one market with the other is formulated by VAR methodology.

Another contribution of the chapter is to obtain theoretical evidence on the impact of interdependence and degree of contagion between the U.S. and emerging and frontier markets throughout the global financial turmoil period.

In addition to those contributions above it is particularly important to study emerging and advanced markets, because there has been a growing tendency among investors to diversify international portfolio around the countries

The rest of this chapter is organized as follows. Firstly, an overview of related literature is given then data and summary statistics is presented. Further, the methodology is outlined. At the bottom line, the empirical results and conclusion are discussed.

8.2. Overview of Related Literature about Stock Market Interdependence

The purpose of this chapter is to present the causes of the 2008- 2009 financial crisis due to the related literature, with a special focus on the role of international financial integration. Many studies suggest that financial globalization played an important role in the recent financial crisis. In this manner the underscored importance of international financial integration is questioned with the special focus on the inquiry that 'Which advanced or emerging countries experience more or less intense in the global financial crisis?'

Previous studies analyze various approaches to model the stock market interdependence. One approach used in the previous literature to study contagion is to estimate cross - market correlations between stable and turmoil periods. A sudden rise in correlation during a turmoil period is briefly explained as a strong proof of diffusion (King and Wadhwani (1990); Lee and Kim (1993). These studies find important proof of rise in cross-market correlations during relatively more volatile periods, offering contagion.

Baig and Goldfijn (1998) used daily exchange rates and stock prices data to study spillovers in the foreign debt market including Thailand, Malaysia, Philippines, Indonesia and South Korea, they used VAR framework and accomplished weak supportive evidence for stock market contagion in the examined region. The study shows that the cross-country correlation in the currency and equity markets remains large and significant.

Masih (1999) studies major evidences of significant relationship, using end-of-day stock price indices of four Asian and four OECD countries. This study resulted that only U.K. is expected to have a quantitative impact on regional Asian market. The empirical tests confirm diffusion within Asian markets.

Instead of simply using cross - market returns and developing a vector auto-regression model (VAR) of time- varying returns, İnci and Li (2010) and Asongou (2011) argue that the spillover effects of the stock market interdependence should be examined trough Pearson Correlation Coefficient.

Another different econometric approach is used by Marçal and Pereira (2011) who looked into the presence of contagion between countries on the basis of an analysis of returns for stock indices over the period 1994-2003, generalized

autoregressive conditional heteroskedasticity model (GARCH) is generally used to predict stock market volatility and they also used multivariate GARCH volatility model and found evidence affirmative to the hypothesis of regional contagion in both Latin America and Asia.

Nagayasu (2000) examined interlinkages between the stock markets of Thailand and Philippines using Granger causality through VARs. This study found significant support for contagion moving from Thai Banking sector to the Philippines. Impulse response analyses indicate that a shock in stock prices in Thai lasts for a short time in Philippines.

Baig and Goldfajn (2000) analyzed whether there was diffusion throughout the Russian crisis with respect to Brazil among spreads on bonds and stock indices. This study is similar with Forbes and Rigobon (2002). The both studies used adjusted correlation coefficient. Baig and Goldfajn resulted that diffusion occurred and that the mechanism of spreading was debt securities market. They also noted the sudden stop in capital flows to Brazil and to Russia.

Forbes and Rigobon (2002) examined the affect of the Asian and Mexican crises and the 1987 crash of the New York Stock Exchange (NYSE) on the equity markets of emerging and developing countries, and resulted, with adjusted correlation tests, that most of the changes were due to interdependence.

Corsetti et al. (2005) used a factor model for analysis of equity returns during the Asian crisis, examining the linkages between returns from the Hong Kong Stock Exchange (HKSE), the stock markets for emerging countries and the G7 countries

Rose and Spiegel (2008) studied linking crisis incidence to its causes. With restriction data from 2007 and main determinants of this financial crisis. Linking 2007 causes of the crisis with 2009-2010 measures of its intensity by using a Multiple Indicator Multiple Cause Model (MIMIC). By using MIMIC model they found that, Iceland appears as a country dramatically affected by the crisis in all four sectors examined, as are countries like Ukraine, Estonia, Latvia, Ireland and the UK. Asian economies have not been particularly hard hit; while China experienced the most severe stock market decline, on the other side its bond ratings improved and real GDP growth as phenomenal. Japan on the contrary, experienced a large decline in its stock market, a decline in its bond ratings, and experienced a severe recession.

Overall findings of this study states that real gross domestic product per capita has a negative and considerable effect since the 2008-09 financial crisis was cascade; richer countries were systematically hit more intensely than poorer countries. While many countries experienced harsh stock market declines, quite a few national stock markets actually rose over 2008 - 2009. The same spread is apparent in GDP growth, exchange rate depreciations, and country credit rating changes.

8.3. Data and Estimation Techniques

8.3.1. Data

Main objective of this chapter is to express the methodology used to study the interlinkages between stock markets. As underscored above and will be debated in more detail later, various scenarios identifying any cross - market and cross - country diffusion is analyzed. Organization for Economic Co-operation and Development (OECD) database is the main source used for share prices index.

To calculate stock market returns the formulation below is used

$$= \ln \left(\frac{pt+1}{pt} \right)$$

p_t : Price of index at t month

p_{t+1} : Price of index at t+1 month

Stock market returns is the main indicator to study stock market interdependence. First condition rule to study VAR model is that our dataset must be stable and stationary thus the dataset is in the form of first log difference.

Monthly observations for each country[26] are used. Monthly data are averages of daily quotations, prices of common shares of companies traded on stock exchanges. The empirical analysis embraces monthly observations from January 2000 to April 2011. Using this acute sample facilitates to indicate these rises may have evolved over and following shorten the sample period to spot the definite period when the crisis diffused across countries.

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[26] The group contains United States, United Kingdom, Turkey, Mexico, Hungary, Poland, Sweden, Switzerland, Finland, and Norway given the availability of monthly data.

8.3.2. Econometric Methodology

To illustrate the approach, this study examines stock market spillovers through emerging and developed countries taking the U.S. as the epicenter.

The vector auto-regression (VAR) model is used for analyzing multivariate time series and this model is especially useful for clarifying the dynamic behavior of economic and financial time series and for forecasting[27]. Further, the VAR model is also used for policy analysis.

VAR models were introduced to the current econometric literature generally by Sims (1980). The acute technical reference for VAR models is Lütkepohl (1991), and newly surveys of VAR techniques are examined in Watson (1994), Lütkepohl (1999) and Waggoner and Zha (1999). Applications of VAR models to financial datasets are looked at in Hamilton (1994), Campbell et al. (1997), Cuthbertson (1996), Mills (1999) and Tsay (2001).[28]

The VAR approach models every endogenous variable in the system as a function of the lagged values of all of the endogenous variables in the system and can be defined as:

$$y_t : A_1\, y_{t-1} + \ldots + A_p\, y_{t-p} + B x_t + \varepsilon_t$$

y_t : k vector of endogenous variables

x_t : d vector of exogenous variables

$A_1, \ldots, A_p$ and B : matrices of coefficients to be estimated

ε_t **:** vector of innovations that may be contemporaneously correlated with each other but uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables.

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[27] For further information see Brandt and Williams, 2007 '' **Multiple Time Series Models''**, London

[28] In addition to the papers above Y.Toda and B. Phillips, 'Vector Autoregressions and causality', Econometrica, 61(6), 1367-1393 studied the underscored importance of Granger Causality

8.3.2.1 Augmented Dickey Fuller Test

Before generating VAR model, we must be sure that our dataset is stationary. Trend and seasonal components must be extracted to generate accurate forecasts. Hence testing for unit roots is very important because if one or more of the variables has a unit root, there could be an error correction mechanism and that tests for Granger causality may be suspect.

When the time series is flat (i.e. doesn't have a trend) the following test equation is used:

$$\Delta z_t = \theta z_{t-1} + \alpha_1 \Delta z_{t-1} + \alpha_2 \Delta z_{t-2} + \mathbf{L} + \alpha_p \Delta z_{t-p} + a_t$$

Where the number of augmenting lags (p) is determined by minimizing the Akaike Information criterion. E - Views allow all of these options for us to choose from.

θ: This is called the Dickey-Fuller t - statistic.

The null hypothesis of the Augmented Dickey- Fuller test is:

H$_0$: $\theta = 0$ (i.e. The data needs to be differenced to make it stationary)

Versus the alternative hypothesis of

H$_1$: $\theta < 0$ (i.e. The data is stationary and doesn't need to be differenced)

While calculating stock market returns, their first log difference has already taken. Therefore there is no non-stationary series left in the model. All stock markets index series are differenced.

8.3.2.2. Specifying Lag Length

It is material to decide the optimal lag-length before estimating VAR. Commonly appropriate lag length is determined by some procedures such as the Schwartz information criteria (SIC), the Akaike information criteria (AIC) and the likelihood ratio (LR) test. All of these procedures are used to select a lag length. Depending on the financial contagion literature, AIC is generally used to specify the optimal lag length, and in this study it offered one lag for emerging countries and three lags for advanced countries.

The following formulation is used to calculate the AIC measure for unrestricted VARs of length

$P = 0 \ldots p_{max}$

$AIC(p) = T \log |\Sigma| + 2(m2p + m)$

T: is the sample size under a model with p_{max} lags,

Log $|\Sigma|$: Log determinant of the error covariance for a model with p lags

m: number of endogenous variables in the VAR.

Thus one lag for all VARs is chosen for investigation stock interdependence in Emerging markets (see Table 8.1.) and AIC offered to choose three lags to examine Financial contagion through advanced stock markets (see Table 8.2.)

Table 8.1. : VAR Lag Order Selection Criteria For Emerging Markets

Endogenous variables: US TURKEY POLAND MEXICO HUNGARY
Exogenous variables: C
Sample: 2000M01 2011M04
Included observations: 128

Lag	LogL	LR[29]	FPE[30]	AIC[31]	SC[32]	HQ[33]
0	1068.810	NA	4.16e-14	-16.62203	**-16.51063***	**-16.57677***
1	1100.428	60.27063	**3.75e-14***	**-16.72543***	-16.05699	-16.45384
2	116.8897	30.09433	4.29e-14	-16.59202	-15.36654	-16.09410
3	1135.159	31.97127	4.79e-14	-16.48685	-14.70434	-15.76261
4	1152.543	29.06377	5.44e-14	-16.36785	-14.02830	-15.41728
5	1183.546	49.41178	5.02e-14	-16.46166	-13.56506	-15.28476
6	1202.760	29.12042	5.61e-14	-16.37124	-12.91761	-14.96802
7	1218.410	22.49718	6.68e-14	-16.22515	-12.21448	-14.59560
8	1233.588	20.63297	8.10e-14	-16.07169	-11.50398	-14.21581

Source: Own calculations

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[29] LR: sequential modified LR test statistic (each test at 5% level)

[30] FPE: Final prediction error

[31] AIC: Akaike information criterion

[32] SC: Schwarz information criterion

[33] HQ: Hannan-Quinn information criterion

Table 8.2.. VAR Lag Order Selection Criteria For Advanced Markets

Endogenous variables: USA UNITED KINGDOM SWITZERLAND SWEDEN NORWAY FINLAND
Exogenous variables: C
Sample: 2000M01 2011M04
Included observations: 128

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1642.137	NA	3.18e-19	-25.56464	**-25.43095***	**-25.51032***
1	1697.513	104.6967	2.35e-19	-25.86740	-24.93158	-25.48717
2	1730.711	59.65182	2.47e-19	-25.82361	-24.08565	-25.11747
3	1777.337	**79.40989***	**2.11e-19***	**-25.98964***	-23.44955	-24.95759
4	1799.361	35.44458	2.67e-19	-25.77126	-22.42904	-24.41330
5	1831.858	49.25369	2.90e-19	-25.71653	-21.57218	-24.03266
6	1862.266	43.23692	3.30e-19	-25.62916	-20.68267	-23.61938
7	1889.253	35.84127	4.04e-19	-25.48833	-19.73970	-23.15263
8	1921.845	40.23060	4.63e-19	-25.43507	-18.88432	-22.77347

Source: Own calculations

8.3.2.3. Impulse Response Analysis

Analyzing the impulse responses is the next step. This function shows the effect of, a one standard deviation shock to one of the innovations on the current and future values of endogenous variables.[34] At the same time, impulse responses allow us to trace out the dynamic impacts of changes in each of the endogenous variables over time. For this purpose, a shock to US stock market is introduced and the impact on other international markets is analyzed.

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[34] For detailed information about the impact of stock market shocks, see A.M. Khalid and M. Kawai, 14, Journal of Asian Economics, page 131-156

8.3.2.4 Variance Decomposition

A further method for explaining the interrelated dynamic changes in this multiple time series model is decomposition of the forecast error variance. This method is used to figure out the amount of variation in the emerging and advanced countries due to fluctuations in the U.S. stock market over the sample period.

Forecast error decomposition aims to explain how much the fitted model differs from the actual values of the vector of the variables examined. The variance of the forecast errors is resolved and the percentage of the forecast variance due to each variable is decided. If the variables are correlated, we expect to see that the variation one variable can explain the variation on the other with a lag

Forecast errors for the VAR system at period s:

$$y_{t+s} - \hat{y}_{t+s} = e_{t+s} + C_1 e_{t+s-1} + C_2 e_{t+s-2} + \ldots + C_{s-1} e_{t+1}$$

Potential values of VAR: y_{t+s}

Predicted values of VAR: $\hat{y}_{t+s}$

Right hand side shows representations of the forecast errors over the current period T=s back to period s-1. This explains how the current forecast errors in the VAR model are functions of the past forecast errors.

The variance of the forecast errors is: $V(y_{t+s} - \hat{y}_{t+s}) = E\left[(y_{t+s} - \hat{y}_{t+s})'(y_{t+s} - \hat{y}_{t+s})\right]$

9. STOCK MARKET INTERDEPENDENCE, DIFFUSION AND THE US FINANCIAL CRISIS

9.1. Impact of US Shocks on Emerging Markets

9.1.1. Residual Correlations for Emerging Countries

Before considering dynamics, Table 9.1. Shows the intra-month correlations of the VAR residuals. It is unsurprising that US residuals are more strongly correlated with those of Mexico. It is also unsurprising that residuals for Poland and Hungary - two EU countries- are both strongly correlated. It is notable that the residual correlations of Mexico, Poland and Hungary are generally stronger than with Turkey. As the Turkey and Mexico residuals exhibit only moderate correlations.

Table 9.1. Residual Correlations for Emerging Countries

2000:M01 - 2011:M04	Correlation with				
	USA	TR	POL	MEX	HUN
USA	1.00	0.49	0.73	0.71	0.72
TR	0.49	1.00	0.43	0.34	0.51
POL	0.73	0.43	1.00	0.69	0.73
MEX	0.71	0.34	0.69	1.00	0.62
HUN	0.72	0.51	0.73	0.62	1.00

Source: Own calculations

9.1.2. The Impact of Stock Market Shocks on Emerging Markets

The first step is to study return shocks or unexpected returns. A return shock is explained as the difference between the actual and the conditional expected return, based on the information available at time t+1. (Samarakoon, 2011)

Figure 9.1. shows the impact of the shock originating from the stock market in United States and provides the results relating to the effect of U.S. shocks on emerging markets.[35] Turning to dynamic patterns, this figure shows the impulse responses for the effects of the U.S. shock, respectively, over the entire sample[36], together within the period 2000 - 2011. Taking into account the test results in the previous section, I estimate the VAR with stock market returns using the whole sample of 2000: M01-2011: M04. The outcomes from this can help to shed light on the contemporaneous impacts and the impulse responses of stock markets over the turmoil period of a positive shock in each region

The results of impulse response analysis suggest that a shock to U.S. stock market creates a major disturbance to the countries examined below and generally takes about five periods to disappear.

Figure 9.1. also suggests that a given shock to U.S. stock market creates a major disturbance to the Turkish stock market and takes about four months to disappear. Mexico, Poland and Hungary are also affected seriously by this shock. In other words, the disturbance of the stock market in the US caused serious fluctuations to other stock markets. It takes four months in Turkey, six and a half months in Poland, five months in Mexico and four and a half months in Hungary to disappear. In the bottom line of the impulse response functions led us to the result that U.S. stock market fluctuations matter to developing economies.

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[35] This refers to impulse response Functions
[36] Sample countries :Turkey, Mexico, Hungary and Poland

Response to Cholesky One S.D. Innovations ± 2 S.E.
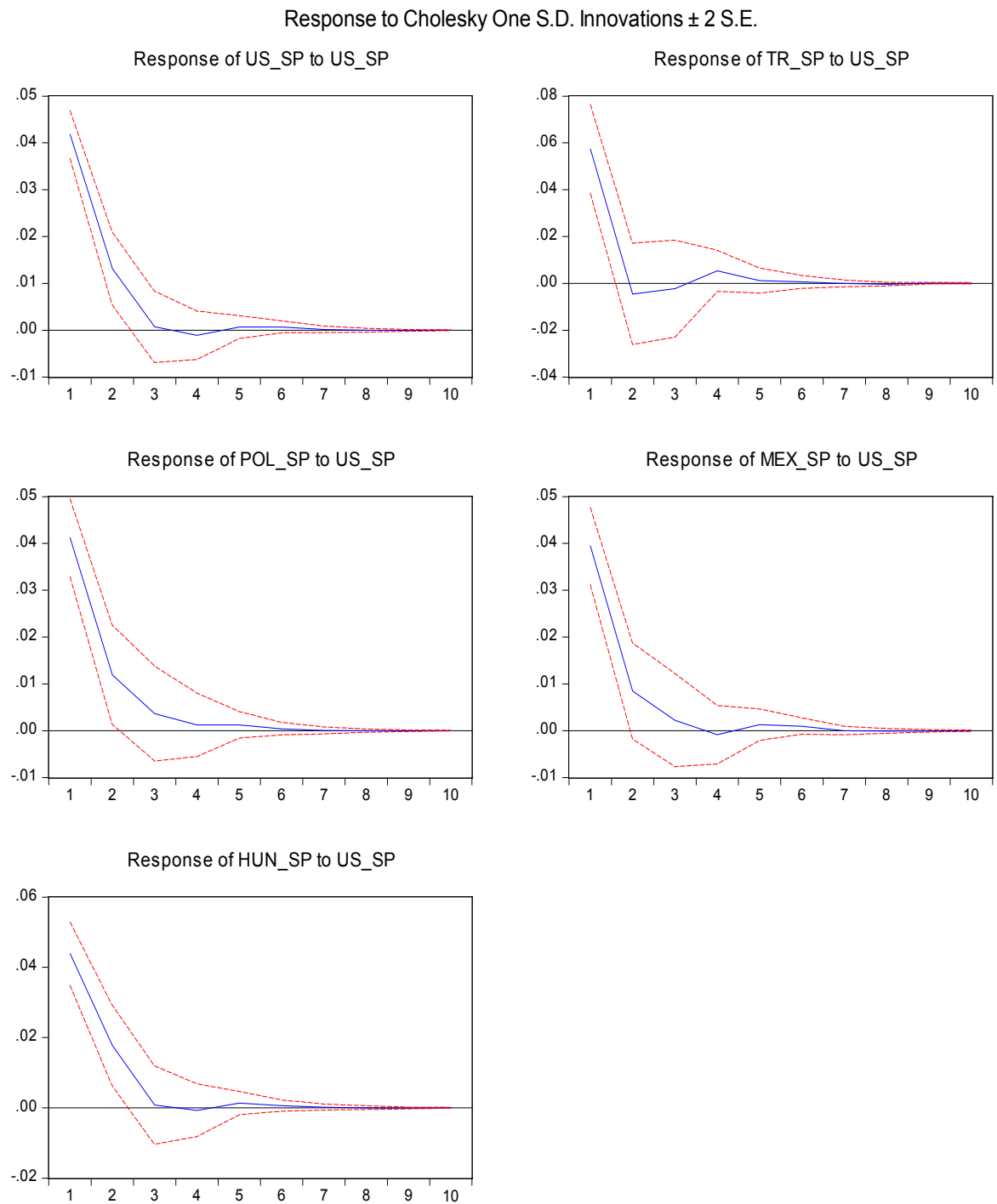
Figure 9.1.: Contagion from the US Stock Market to Emerging Economies

Source: Own calculations

9.1.3. Variance Decompositions of Emerging Markets

The forecast error decomposition for the VAR model of stock market returns about emerging markets is represented below in Table 9.2.

Table 9.2. : Variance Decomposition of U.S.' Stock Market:

Period	S.E.	US_SP	TR_SP	POL_SP	MEX_SP	HUN_SP
1	0.041810	**100.0000**	0.000000	0.000000	0.000000	0.000000
2	0.044977	**94.95699**	3.382404	1.109939	0.171568	0.379103
3	0.045660	**92.16293**	3.632111	2.230065	0.191769	1.783125
4	0.045782	**91.73028**	3.636307	2.387901	0.358186	1.887323
5	0.045835	**91.54000**	3.628483	2.385749	0.561623	1.884148
6	0.045844	**91.52609**	3.628486	2.395180	0.563247	1.887000
7	0.045846	**91.52107**	3.628274	2.395046	0.566572	1.889037
8	0.045846	**91.51900**	3.628991	2.395526	0.567366	1.889122
9	0.045846	**91.51881**	3.628980	2.395561	0.567386	1.889265
10	0.045846	**91.51869**	3.628994	2.395558	0.567489	1.889265

Variance Decomposition of TURKEY's Stock Market:

Period	S.E.	US_SP	TR_SP	POL_SP	MEX_SP	HUN_SP
1	0.116853	**24.19260**	75.80740	0.000000	0.000000	0.000000
2	0.122031	**22.32004**	73.69012	3.378828	0.413556	0.197452
3	0.123783	**21.72686**	71.62454	4.858410	1.596116	0.194071
4	0.124179	**21.77164**	71.37914	4.964344	1.637098	0.247771
5	0.124287	**21.74267**	71.35261	4.975968	1.650781	0.277976
6	0.124299	**21.74063**	71.34308	4.984221	1.653633	0.278427
7	0.124305	**21.73846**	71.33964	4.983747	1.656798	0.281354
8	0.124307	**21.73875**	71.33936	4.983670	1.656810	0.281404
9	0.124307	**21.73859**	71.33874	4.983633	1.657624	0.281412
10	0.124307	**21.73860**	71.33868	4.983670	1.657635	0.281413

Variance Decomposition of POLAND's Stock Market:

Period	S.E.	US_SP	TR_SP	POL_SP	MEX_SP	HUN_SP
1	0.056301	**53.61846**	0.649716	45.73182	0.000000	0.000000
2	0.060484	**50.31561**	5.825631	43.23548	0.023233	0.600044
3	0.060898	**49.99222**	5.781968	42.77894	0.182617	1.264259
4	0.061011	**49.84815**	5.807836	42.66818	0.405460	1.270382
5	0.061039	**49.84215**	5.810169	42.62853	0.448911	1.270238
6	0.061042	**49.84260**	5.809859	42.62607	0.451005	1.270470
7	0.061042	**49.84215**	5.809822	42.62620	0.451163	1.270661
8	0.061042	**49.84181**	5.810141	42.62602	0.451161	1.270869
9	0.061042	**49.84180**	5.810159	42.62600	0.451163	1.270878
10	0.061042	**49.84178**	5.810161	42.62598	0.451196	1.270879

Variance Decomposition of MEXICO's Stock Market:

Period	S.E.	US_SP	TR_SP	POL_SP	MEX_SP	HUN_SP
1	0.055246	**51.04422**	0.009628	6.523632	42.42252	0.000000
2	0.058298	**47.93786**	5.484077	8.015427	38.26828	0.294355
3	0.059727	**45.81120**	5.755566	8.130863	37.02302	3.279355
4	0.059897	**45.57206**	5.994628	8.148116	36.99423	3.290967
5	0.059978	**45.49325**	5.978795	8.127283	37.11224	3.288428
6	0.059990	**45.50133**	5.977296	8.134974	37.09850	3.287902
7	0.059993	**45.49620**	5.977586	8.134451	37.10209	3.289675
8	0.059994	**45.49512**	5.978631	8.135208	37.10111	3.289932
9	0.059994	**45.49505**	5.978617	8.135182	37.10099	3.290157
10	0.059994	**45.49497**	5.978689	8.135169	37.10101	3.290160

Variance Decomposition of HUNGARY's Stock Market:

Period	S.E.	US_SP	TR_SP	POL_SP	MEX_SP	HUN_SP
1	0.060781	**52.14633**	3.538821	7.597269	0.306830	36.41075
2	0.066104	**51.25760**	6.840822	10.67464	0.278170	30.94877
3	0.066836	**50.15449**	6.790916	11.28122	0.956326	30.81705
4	0.066928	**50.02827**	6.774964	11.33870	1.095149	30.76292
5	0.066999	**49.96139**	6.765036	11.31747	1.239699	30.71640
6	0.067005	**49.96022**	6.769204	11.31873	1.239458	30.71238
7	0.067006	**49.95959**	6.769050	11.31877	1.239608	30.71298
8	0.067007	**49.95889**	6.769709	11.31870	1.239941	30.71276
9	0.067007	**49.95888**	6.769726	11.31869	1.239992	30.71271
10	0.067007	**49.95883**	6.769721	11.31868	1.240078	30.71268

Cholesky Ordering: US_SP   TR_SP   POL_SP   MEX_SP   HUN_SP

Source: Own calculations

The importance of studying emerging countries as a whole is emphasized by the variance decomposition results of Table 9.2. The correlation between shocks to stock market returns in the U.S. to stock market returns in Poland and Hungary is about 50 per cent in the first month indicating that stock markets returns in Poland and Hungary tends to be associated with disturbance to the stock market in U.S. [37] Thus U.S. stock market shocks have become relatively important for Poland and Hungary.

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[37] Campell and Kyle (1988) find a similar result for annual U.S. stock market data over the period 1871- 1986.

The case of Mexico is especially notable, it may be noted that this percentage is very similar to that for Mexico and it is around 50 per cent.

The correlations between stock returns in U.S. and Turkey are estimated to be 24 per cent at the beginning of the period. Around 24 per cent, these results strongly indicate that Turkey's stock market is relatively less affected by the U.S. stock market shock.

In terms of the scaled responses, the U.S. is relatively important for Poland, Hungary and Mexico. In addition to the results below, again stock market fluctuations in the U.S. is relatively less important for Turkey, accounting for less than 25 per cent to the forecast error variance. Also the effect of declining volatility is also notable in Table 8.2.

The evidence of interdependence is in line with expectation. Comparing with the current literature (Forbes and Rigobon 2002), which finds extensive support for the presence of long-term co movements or linkages among stock markets.

Bekaert et al. (2005) find contagion in emerging markets during periods of crisis, this empirical work emphasizes that contagion from U.S. is important in Latin America and Europe. Final remark is that in response to U.S. shocks, a Latin American emerging market – Mexico – show powerful proof of both interdependence and contagion. Emerging markets have fairly large sized correlations and large sensitivity to U.S. shocks. The concurrent and lagged interdependence coefficients are generally large and statistically significant, providing strong evidence that examined emerging markets are influenced by U.S stock market shocks.

9.2. Impact of U.S. Shocks on Advanced Countries

9.2.1. Residual Correlations

Table 9.3. Residual Correlations of Advanced Countries

2000: M01 - 2011: M04				Correlation	with	
	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
US_SP	1.000000	0.903817	0.847425	0.781012	0.836569	0.644544
UK_SP	0.903817	1.000000	0.877307	0.805298	0.837849	0.678674
SWISS_SP	0.847425	0.877307	1.000000	0.801203	0.772479	0.644341
SWE_SP	0.781012	0.805298	0.801203	1.000000	0.779319	0.739198
NOR_SP	0.836569	0.837849	0.772479	0.779319	1.000000	0.604193
FIN_SP	0.647443	0.678674	0.644341	0.739198	0.604193	1.000000

Source: Own calculations

Table 9.3 shows the intra-month correlations of the VAR residuals. The overall table suggests that advanced countries residuals are strongly correlated with those of all advanced countries examined. Respectively, residuals of UK 90 per cent, Swiss 84 per cent, Sweden 78 per cent, Norway 83 per cent and Finland 64 per cent.

9.2.2. The Impact of Stock Market Shocks on Advanced Markets (Impulse Response Functions)[38]

Response to Cholesky One S.D. Innovations ± 2 S.E.
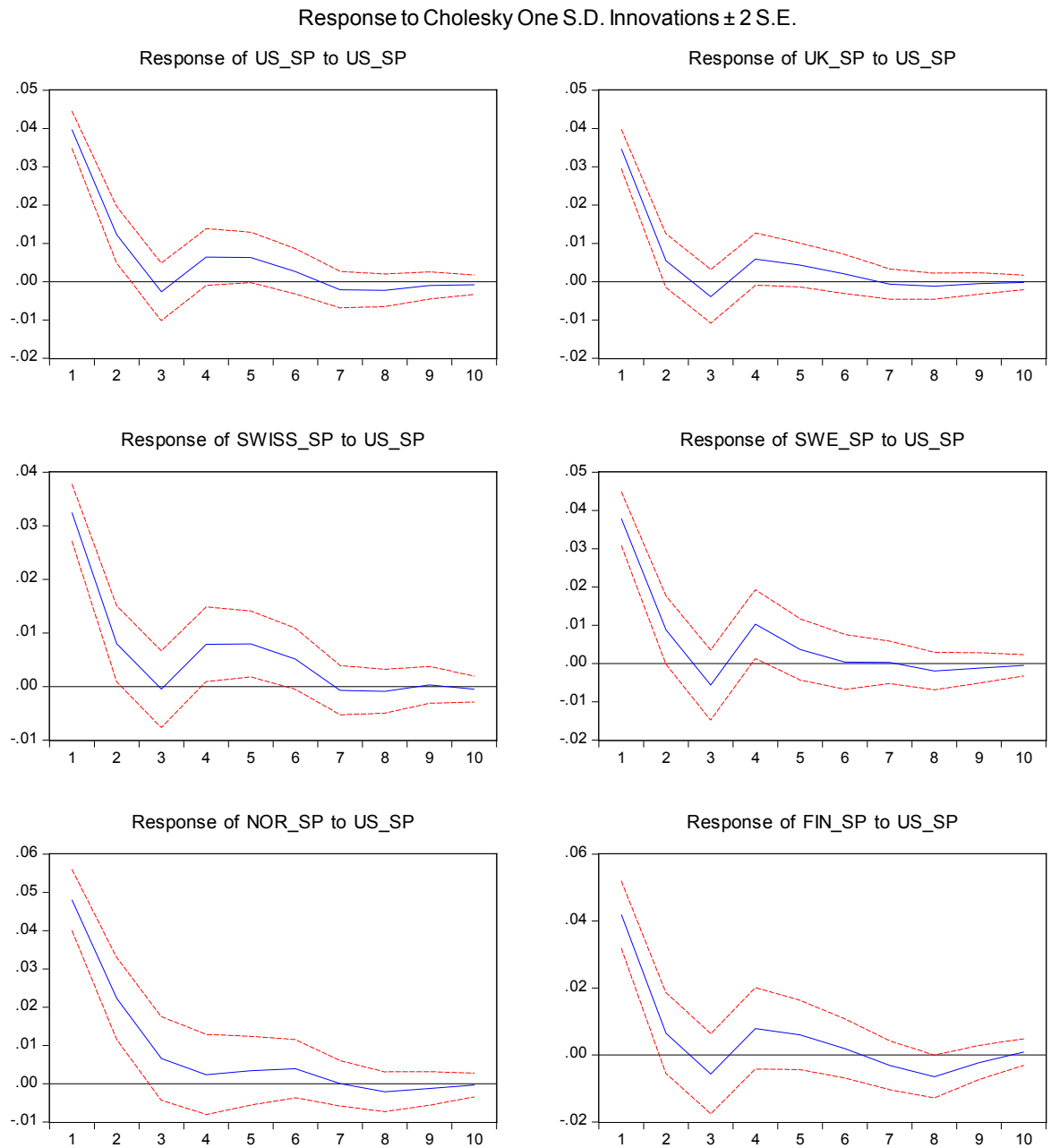
Figure 9.2.: Contagion from U.S. stock market to Advanced Markets

Source: Own calculations

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[38] The results are robust to alternative specifications of the model and variables.The robustness check consisted lower and higher lag selections of indicators to compute return shocks and financial stability shocks. Alternative periods of the model 01/ 1999 – 06/ 2011 is rolled and it is againg found that the results and conclusions are remarkably robust to these alternative specifiacations.

Figure 9.2. Shows the impulse response functions of shocks introduced to the stock market in the U.S. on advanced economies. Return shocks originating from the U.S. have severe influence on advanced markets. Thus contagion of U.S. shocks is large. There is strong evidence of widespread influence of U.S. shocks on advanced markets. Among the advanced markets, interdependence could be pronounced. England, Switzerland, Sweden, Norway and Finland exhibit significant interdependence with respect to U.S. shocks. The stock market disturbance takes respectively about seven months in UK, again seven months in Switzerland, six months in Sweden, four months in Norway and again four months in Finland to disappear.

9.2.3. Stock Market Return Variance Decompositions among Advanced Markets

Table 9.4. Variance Decomposition of U.S.' Stock Market:

Period	S.E.	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
1	0.039651	**100.0000**	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.042499	**95.33548**	1.312971	0.023801	2.486843	0.052535	0.788372
3	0.043835	**89.98781**	1.270007	0.208016	5.068837	1.481983	1.983351
4	0.045280	**86.33254**	1.197703	2.436743	5.117438	3.008040	1.907539
5	0.046329	**84.31110**	1.440089	3.264002	5.414592	2.981495	2.588726
6	0.046807	**82.91527**	1.415257	4.002462	5.511251	3.101805	3.053955
7	0.047017	**82.37918**	1.463411	4.155989	5.515277	3.459335	3.026808
8	0.047165	**82.10514**	1.491503	4.143842	5.481010	3.738671	3.039835
9	0.047202	**82.02164**	1.490261	4.165352	5.481859	3.805721	3.035171
10	0.047223	**81.98069**	1.489671	4.174990	5.478495	3.834354	3.041796

Variance Decomposition of UNITED KINGDOM's Stock Market:

Period	S.E.	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
1	0.038324	**81.68856**	18.31144	0.000000	0.000000	0.000000	0.000000
2	0.039729	**77.89318**	18.40993	0.314941	2.604203	0.083792	0.693959
3	0.040708	**75.11143**	17.88965	0.442998	3.126503	2.464315	0.965100
4	0.041742	**73.40732**	17.55630	1.116411	3.337568	3.622809	0.959590
5	0.042205	**72.84863**	17.37682	1.276738	3.661911	3.576614	1.259286
6	0.042454	**72.20629**	17.23334	1.794322	3.687455	3.669662	1.408926
7	0.042552	**71.89753**	17.28419	1.864226	3.716921	3.834176	1.402959
8	0.042602	**71.81172**	17.26650	1.863108	3.715257	3.935440	1.407968
9	0.042622	**71.75802**	17.25057	1.903257	3.713508	3.967282	1.407360
10	0.042630	**71.73472**	17.24501	1.915717	3.712161	3.979588	1.412797

Variance Decomposition of SWITZERLAND's Stock Market:

Period	S.E.	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
1	0.038265	**71.81299**	6.775885	21.41113	0.000000	0.000000	0.000000
2	0.040421	**68.23704**	7.315055	20.93811	2.231505	0.068945	1.209344
3	0.041660	**64.25400**	7.512635	19.74330	3.871255	1.438841	3.179968
4	0.043162	**63.16428**	7.094624	18.50715	3.885173	4.384542	2.964233
5	0.044337	**63.05341**	6.792396	17.91310	4.195409	4.377607	3.668075
6	0.045007	**62.48864**	6.631643	18.15687	4.503902	4.263101	3.955840
7	0.045123	**62.19361**	6.724601	18.12016	4.637460	4.374532	3.949637
8	0.045196	**62.03186**	6.726781	18.08420	4.630095	4.567446	3.959618
9	0.045235	**61.93066**	6.758854	18.11971	4.623798	4.606287	3.960685
10	0.045254	**61.89173**	6.755570	18.12099	4.625218	4.632214	3.974285

Variance Decomposition of SWEDEN's Stock Market:

Period	S.E.	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
1	0.04841	**60.99799**	5.396388	2.906313	30.69931	0.000000	0.000000
2	0.05075	**58.49062**	6.263279	3.267837	30.90873	0.008673	1.060863
3	0.05336	**54.0757**	6.477136	3.033494	29.77063	3.934305	2.709167
4	0.05551	**53.34601**	6.954487	4.807837	27.70274	3.641790	3.547136
5	0.05622	**52.35440**	6.981688	5.099079	27.55475	3.601063	4.409023
6	0.05671	**51.51577**	7.039201	5.587891	27.18271	4.153646	4.520782
7	0.05685	**51.27496**	7.127583	5.707639	27.06199	4.294926	4.532893
8	0.05695	**51.14328**	7.163570	5.681743	26.93404	4.519872	4.557499
9	0.05706	**51.09755**	7.166465	5.725681	26.88866	4.571301	4.550345
10	0.05701	**51.07770**	7.162711	5.755491	26.87442	4.571248	4.558434

Variance Decomposition of NORWAY's Stock Market:

Period	S.E.	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
1	0.05733	**69.98473**	3.649084	0.089259	1.905293	24.37163	0.000000
2	0.06254	**71.58981**	3.697448	0.114832	3.919486	20.64738	0.031037
3	0.06365	**70.04444**	3.697822	0.439794	5.236466	20.44284	0.138637
4	0.06445	**68.45219**	4.907378	0.580218	5.968209	19.95671	0.135301
5	0.06488	**67.89684**	4.975982	0.862879	6.213353	19.71576	0.335193
6	0.06526	**67.38556**	4.923543	1.378636	6.191302	19.52293	0.598031
7	0.06542	**67.10515**	4.985133	1.427895	6.214196	19.65090	0.616726
8	0.06558	**66.99474**	4.973745	1.430849	6.197960	19.78058	0.622126
9	0.06559	**66.94846**	4.970533	1.446410	6.191049	19.81544	0.628106
10	0.06555	**66.93818**	4.970057	1.452080	6.190125	19.82085	0.628714

Variance Decomposition of FINLAND's Stock Market:

Period	S.E.	US_SP	UK_SP	SWISS_SP	SWE_SP	NOR_SP	FIN_SP
1	0.06497	**41.54375**	5.045926	0.734810	9.304085	0.209335	43.16209
2	0.06824	**38.63464**	5.197500	1.309710	8.618604	1.560713	44.67883
3	0.069784	**37.56490**	5.250786	1.594654	10.78984	1.807101	42.99272
4	0.07427	**34.27283**	4.647177	5.982317	10.54467	2.688929	41.86407
5	0.07547	**33.87818**	4.525210	6.924862	10.43887	2.874694	41.35819
6	0.07588	**33.53802**	4.477866	7.017828	10.31709	3.769271	40.87992
7	0.07632	**33.25595**	4.709723	6.931199	10.18082	4.493400	40.42891
8	0.07683	**33.60811**	4.689587	6.859232	10.07006	4.715527	40.05748
9	0.07689	**33.62891**	4.731925	6.877972	10.07082	4.708882	39.98150
10	0.07690	**33.61357**	4.733549	6.892916	10.06698	4.710061	39.98293

Cholesky Ordering: US_SP   UK_SP   SWISS_SP   SWE_SP   NOR_SP   FIN_SP

Source: Own calculations

Table 9.4. Emphasizes the impact of the U.S. stock market shock on the advanced countries, with special focus on Scandinavian countries. The overall results find that, U.S. shocks matter to the examined countries very much. Negative shocks to U.S. stock market significantly increase the volatility in all other advanced regions.

Turning to the second row, which reports the impact of the U.S. shock on the United Kingdom, we see that U.S. stock market turbulence causes immediate negative spillovers to U.K. The case of the UK is especially notable in the context of its role in Europe and the debate about whether it should join the Euro. The increased importance of U.S. shock is so evident in the variance decomposition, and account for 81 per cent of the error variance of the U.S. at horizons of a ten months period.

Turning to other significant spillovers, one standard error shock to the stock market of US have a significant impact on Switzerland, Sweden and Norway. Despite the notable effects on these countries, Finland's stock market volatility is explained by at least 41 per cent of stock market volatility of the US. By contrast maximum spillover from the U.S in the 2000 - 2011 periods to Scandinavian countries happens in Switzerland by 71 per cent. Both Sweden and Norway accounts 69 per cent of the US variance.

In sum, United States stock market volatility appears to be an important driver of the stock market fluctuations in examined advanced countries. Overall there is pervasive evidence of interdependence and contagion with respect to US shocks in advanced markets. When compared with emerging markets, the degree of interdependence is higher[39] and contagion is larger across advanced markets. In the bottom line U.S. financial crisis has had a more permanent impact on advanced markets rather than emerging markets.

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[39] Considering variance decompositions of advanced countries

10. CYCLICALITY OF THE WORLD FINANCIAL SYSTEM AND US FINANCIAL STABILITY SPILLOVERS

10.1 Importance of Monitoring Financial Conditions

Afterwards the global financial crisis, policymakers, financial market participants and regulators have all clarified the importance of linkages between traditional and newly developed financial markets, as well as their linkages to the nonfinancial sectors of the economy. Beginning in the August of 2007, the U.S. economy was hit by the most severe corruption since the Great Depression period of early 1930s. This financial turmoil was followed by the most serious recession in the post World War 2 periods, with unemployment rising and peaking at over ten percent. This huge shock to the world economy has brought of the fore importance of financial conditions to macroeconomic outcomes.

Financial conditions are the current stage of financial variables that affect economic behavior and therefore the future conditions of the economy. Thus, a financial stability index (FSI) illustrates the portrait of the future state of the economy contained in these current financial variables. Also, an FSI should measure exogenous fluctuations in financial conditions that affect or predict future economic activity. Observing financial stability, thus, now has an underscored importance. Major events in the financial history are well captured by the history of indexes, as is the interdependence of financial and economic conditions.

In what follows, the method of the index construction is described. The novel contribution of this method is that it takes into account both the cross correlations of a large number of financial variables. By developing a financial stability index, I aim to focus on the predictive power of financial conditions for future economic activity.

10.2. Overview of the Literature of Financial Condition Indexes Worldwide[40]

The Conference Board underscores the importance of yield curve as an important reliable economic activity predictor.[41] The diffusion between the Fed Funds Rate and 10 year Treasury yield has been a key component of leading indicators since 1996.

Freidman and Kuttner (1992) state that Treasury bill spread has also been used as a key component of output since 1980s. Zarnowitz (1992) emphasizes that stock market variables have been taken into account in indexes of leading indicators since the 1950s.

Later, when we arrive 1990s, Bank of Canada (BOC) pronounced its monetary condition index where exchange rate was the vital variable. Monetary Conditions Index (MCI) is an index number calculated from a composition of a number of financial variables considered relevant for monetary policy. These variables always include a short-run interest rate and exchange rate. Over the period of late 1990s, MCIs appeared to be a common tool to determine the power of monetary policy in many countries.

Although various FCIs are different among countries, there are commonalities. Most of FCIs contain some measure of short-term interest rates, long-term interest rates, risk premium, equity market performance, and exchange rates.

Hatzius et al. (2010) studied the well-constructed FCIs. They are: the Bloomberg FCI, the Deutsche Bank (DB), the Federal Reserve Financial Stress Index (KCFSI) and the OECD FCI.

10.2.1. Bloomberg Financial Conditions Index

Rosenberg (2009) indicate that this index combine yield spreads US indices from the money markets, equity markets and bond markets into a normalized index. The values of this index are scores, which refers to the number of standard deviations that current financial conditions lay above or below the average of the 1994 - 2008 period. This index is a convenient measure to track financial conditions. The index is an equally weighted sum of three major sub-indexes: money market indicators, bond market indicators, and equity market indicators

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[40] For further information see (Rosenberg, 2009)
[41] For further information about the earlier research on financial conditions see Arturo Estrella, The Term Structure as a Predictor of Real Economic Activity, Journal of Finance , 1991

10.2.2 Deutsche Bank Financial Conditions Index

The financial variables included in this index are the exchange rate, bond, stock and housing market indicators. Hooper et al. (2010) denote that DB utilizes a principle components approach in its FCI. This index is available from 1983.

10.2.3 Federal Reserve Bank of Kansas City Financial Stress Index

This index's principle components measure of eleven standardized financial indicators and developed in the early 2009. These financial variables can be divided into two categories: asset price behavior and yield spreads.

Positive index refers that financial stress is higher than its longer term average. The series is updated monthly and it can be found from 1990. Moreover these variables which index is driven form must be included in the criteria's below.

1. They should be available monthly with a history extending back to at least 1990.
2. They should represent at least one of five financial stress features that were identified by the Kansas City Federal Reserve.

3. They should also be market prices or yields.

10.2.4. OECD Financial Conditions Index

OECD financial conditions index is influenced by the US during the global financial crisis. This index is also adjusted for oil prices. The weight of each variable in the FCI is based on the relative effect of a one - unit change in that variable on US GDP. OECD FCI contains real short term interest rates, real long term interest rates, and the real effective exchange rate, various measures of bond spreads stock market capitalization and real housing wealth. They use a VAR based FCI. The OECD FCI has a history back to 1995.

10.3. Constructing Financial Stability Index

As stated above many methodologies are used to develop financial condition indexes. Mainly there are two broad categories: a weighted-sum approach and a principal-components approach.

In this study while constructing financial stability index, principal components approach is used. This methodology obtains a common factor from a group of financial variables. Principal Component Analysis is a method that reduces data dimensionality by performing a covariance analysis between factors.

By using the main parameters of this research which are exchange rates, short term interest rates and stock market returns, financial stability index is constructed by using principal component analysis. By giving shocks to the US' financial stability, financial stabilities for all countries considered are analyzed.

In what follows, next chapters develop a framework for estimating the impact of financial stability shocks both on emerging and advanced economies.

11. FINANCIAL STABILITY INTERDEPENDENCE AFTER THE GLOBAL FINANCIAL CRISIS

11.1 Financial Stability Interdependence of Emerging Countries

11.1.1. Optimal Lag Length for Emerging Countries

As specified in the stock market interdependence chapter, the AIC measure is used to specify the optimal lag length and in this empirical research about the emerging markets, it offered one lag. Henceforth one lag for all VARs is chosen for studying corruption of the financial stability diffusion among emerging countries. (See Table 11.1)

Table 11.1: VAR Lag Order Selection Criteria For Emerging Markets

Endogenous variables: US TURKEY POLAND MEXICO HUNGARY
Exogenous variables: C
Sample:2000M01 2011M04

Lag	LogL	LR[42]	FPE[43]	AIC[44]	SC[45]	HQ[46]
0	-886.6759	NA	0.863084	14.04214	14.15412	14.08764
1	-820.2318	126.6101	**0.44952***	**13.38948***	**14.0613***	**13.66244***
2	-806.3847	25.29541	0.536818	13.56511	14.79685	14.06555
3	-783.7231	**39.61323*[47]**	0.559497	13.60194	15.39355	14.32985
4	-766.0853	29.44262	0.633697	13.71788	16.06937	14.67326
5	-756.5569	15.15545	0.819946	13.96153	16.87290	15.14438
6	-738.2221	27.71875	0.929967	14.06649	17.53774	15.47682
7	-716.4409	31.21401	1.007631	14.11718	18.14831	15.75498
8	-689.7264	36.18024	1.020743	14.09018	18.68119	15.95545

Souce: Own calculations

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[42] LR: sequential modified LR test statistics (each test at 5 % level)
[43] FPE: Final prediction error
[44] AIC: Akaike information criterion
[45] SC: Schwarz information criterion
[46] HQ: Hannan- Quinn information criterion
[47] * : indicates lag order selected by the criterion

11.1.2. Residual Correlations for Emerging Countries

Before considering dynamics, Table 11.2. Shows the intra - month correlations of the VAR residuals. It is indicated in the table that U.S. residuals are more strongly correlated with those of Hungary. Turkey and U.S. exhibit only moderate correlations. It is also unsurprising that Poland and Hungary are both strongly correlated with each other. Furthermore, there are no meaningful correlations between Turkey and Mexico.

Table 11.2. Residual Correlations for Emerging Countries [48]

2000:M01 – 2011:M04	Correlation with				
	USA	**TR**	**POL**	**MEX**	**HUN**
USA	1.00	0.35	0.59	-0.28	0.67
TR	0.35	1.00	0.43	-0.33	0.49
POL	0.59	0.43	1.00	-0.38	0.66
MEX	-0.28	-0.33	-0.38	1.00	-0.27
HUN	0.67	0.49	0.66	-0.27	1.00

Source: Own calculations

11.1.3 The Impact of Financial Stability Shocks on Emerging Markets

Figure 11.1 shows the impulse responses of emerging markets financial stability conditions due to the effects of the variations of U.S. financial stability. Surprisingly, any evidence about Mexico's financial stability turbulence due to a shock given to U.S. financial stability is not found. The case of Mexico is especially notable, the impact of the financial stability turbulence in the U.S. shock is estimated to be negative over the first three months, emphasizing its apparently different short term business cycle movements in comparison with other emerging countries.
Similarly, the impulse response function of Turkey denotes a weak support about financial stability contagion from U.S. Thus U.S. financial stability has a weak influence on Turkey's financial stability.

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[48] Numbers are rounded

On the contrary, disturbance of the financial stability in U.S. reflects a strong affect on financial stability of Poland and Hungary and takes about six months in Hungary and four months in Poland to settle down. This financial stability corruption happening in U.S. has its strongest effect on Poland and Hungary.

Response to Cholesky One S.D. Innovations ± 2 S.E.
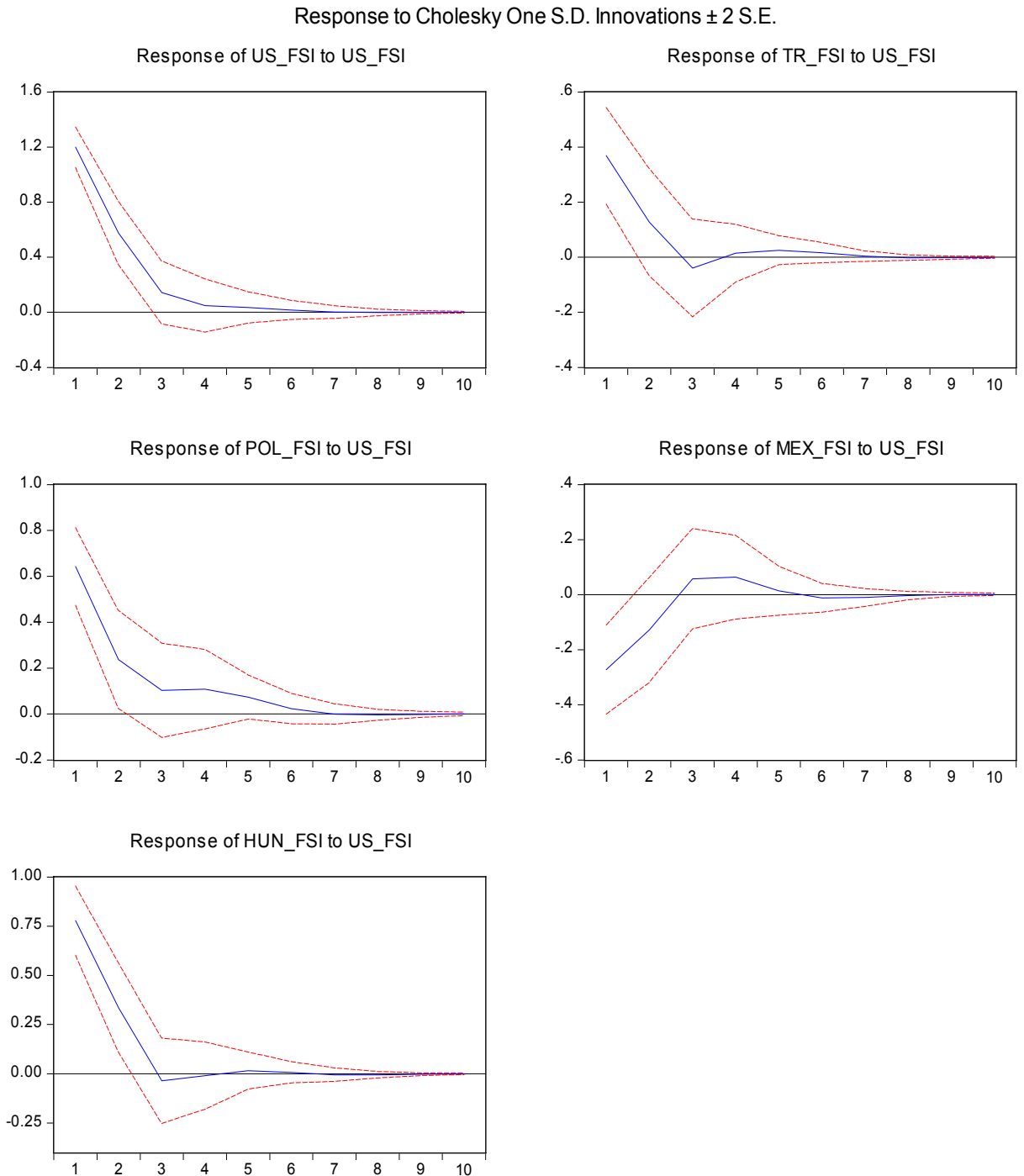
Figure 11.1. : Contagion from U.S. financial stability collapse to Emerging Countries

Source: Own calculations

11.1.4 Financial Stability Variance Decompositions among Emerging Markets

Table 11.1 : Variance Decomposition of U.S.' Financial Stability:

Period	S.E.	US_FSI	TR_FSI	POL_FSI	MEX_FSI	HUN_FSI
1	1.199325	**100.0000**	0.000000	0.000000	0.000000	0.000000
2	1.353934	**96.54107**	1.012177	1.169434	0.390661	0.886656
3	1.367701	**95.70869**	1.112948	1.154575	0.396172	1.627611
4	1.371923	**95.24595**	1.227033	1.395795	0.397466	1.733758
5	1.373428	**95.10106**	1.249826	1.516321	0.396596	1.736200
6	1.373655	**95.08371**	1.250741	1.526715	0.396840	1.741994
7	1.373694	**95.07853**	1.251320	1.526758	0.397579	1.745817
8	1.373700	**95.07782**	1.251321	1.526783	0.397578	1.746498
9	1.373702	**95.07751**	1.251385	1.526868	0.397682	1.746553
10	1.373703	**95.07739**	1.251413	1.526908	0.397729	1.746557

Variance Decomposition of TURKEY's Financial Stability:

Period	S.E.	US_FSI	TR_FSI	POL_FSI	MEX_FSI	HUN_FSI
1	1.044041	**12.44652**	87.55348	0.000000	0.000000	0.000000
2	1.093852	**12.69412**	80.37804	2.497734	0.799041	3.631068
3	1.104534	**12.57782**	79.34496	2.717905	1.536675	3.822639
4	1.106985	**12.53974**	78.99855	2.811596	1.841358	3.808751
5	1.107942	**12.57016**	78.92422	2.862037	1.841387	3.802188
6	1.108102	**12.58757**	78.90149	2.865227	1.844338	3.801368
7	1.108168	**12.58714**	78.89894	2.864960	1.846345	3.802621
8	1.108180	**12.58720**	78.89749	2.865047	1.846994	3.803272
9	1.108181	**12.58739**	78.89729	2.865038	1.847011	3.803266
10	1.108182	**12.58739**	78.89721	2.865044	1.847095	3.803263

Variance Decomposition of POLAND's Financial Stability:

Period	S.E.	US_FSI	TR_FSI	POL_FSI	MEX_FSI	HUN_FSI
1	1.075514	**35.76181**	5.788367	58.44982	0.000000	0.000000
2	1.213208	**31.92132**	9.206679	54.28694	2.149945	2.435110
3	1.227191	**31.89848**	9.675539	53.15953	2.474538	2.791919
4	1.241432	**31.92941**	10.12811	52.69153	2.519336	2.731618
5	1.244622	**32.11803**	10.07628	52.57877	2.506470	2.720440
6	1.245287	**32.12035**	10.08174	52.52699	2.530446	2.740472
7	1.245398	**32.11465**	10.08193	52.51763	2.537806	2.747996
8	1.245412	**32.11501**	10.08172	52.51656	2.537753	2.748960
9	1.245417	**32.11490**	10.08179	52.51619	2.538132	2.748986
10	1.245419	**32.11480**	10.08186	52.51607	2.538290	2.748977

Variance Decomposition of MEXICO's Financial Stability :

Period	S.E.	US_FSI	TR_FSI	POL_FSI	MEX_FSI	HUN_FSI
1	0.952160	**8.153773**	6.303974	4.036713	81.50554	0.000000
2	1.074392	**7.834812**	13.10325	4.926153	72.65062	1.485168
3	1.086892	**7.934804**	13.50376	5.638810	71.10899	1.813631
4	1.090675	**8.219857**	13.48043	5.648159	70.84905	1.802504
5	1.092330	**8.210893**	13.53326	5.644454	70.79251	1.818889
6	1.092634	**8.217719**	13.53826	5.653514	70.76603	1.824478
7	1.092696	**8.226045**	13.53677	5.653812	70.75897	1.824398
8	1.092719	**8.226649**	13.53724	5.653601	70.75795	1.824554
9	1.092724	**8.226593**	13.53737	5.653620	70.75773	1.824687
10	1.092725	**8.226672**	13.53736	5.653622	70.75765	1.824696

Variance Decomposition of HUNGARY's Financial Stability:

Period	S.E.	US_FSI	TR_FSI	POL_FSI	MEX_FSI	HUN_FSI
1	1.153062	**45.61007**	7.554785	6.535006	0.154231	40.14591
2	1.294063	**42.99006**	9.629588	15.03001	0.393116	31.95722
3	1.303530	**42.44264**	9.531963	16.09949	0.395200	31.53071
4	1.304337	**42.39553**	9.580015	16.11547	0.394939	31.51404
5	1.304940	**42.37037**	9.584090	16.13318	0.397539	31.51482
6	1.305040	**42.36652**	9.589157	16.13102	0.401721	31.51158
7	1.305117	**42.36291**	9.592161	16.13255	0.404424	31.50796
8	1.305136	**42.36359**	9.591961	16.13281	0.404587	31.50705
9	1.305139	**42.36373**	9.591942	16.13274	0.404649	31.50694
10	1.305140	**42.36369**	9.591943	16.13272	0.404697	31.50695

Cholesky Ordering: US_FSI   TR_FSI   POL_FSI   MEX_FSI   HUN_FSI

Source: Own calculations

The central message from Table 10.3. - The variance decompositions of emerging markets - is that, emerging markets financial stabilities have a very small sensitiveness to U.S. shocks. The most significant contagion from U.S. to emerging countries can be seen in Hungary. Hungary is strongly interdependent with U.S comparing to other examined emerging countries when we introduce a one standard error shock to US financial stability, this can explain 45 per cent of Hungary's financial stability volatilty.

Turning to the third row, U.S. financial stability disturbance magnitude on Poland appears to be 35 per cent. The results for Poland and Hungary indicate that U.S. is relatively important for these two European countries. Thus these results may fit well with the view that Europe became connected recently with the U.S. as European integration developed.

Scaled response of Turkey, accounting less than 15 per cent of the forecast error variance indicates that Turkey's financial stability is relatively less affected by US. This result is also in line with the expectations because Turkey had its own crisis in 2001 thus Turkey's financial stability has shown resilience in the face of financial crisis because due to 2001 crisis country's strong financial foundations created through reforms over the past several years.

Mexican financial system in particular, is hurt by the crisis. To prevent dangerous systematic contagion effects, some banks failed to honor their dollar liabilities, the CB stepped in as a leader of last resort. The financial authorities have taken rapid actions along with the Financial Sector Assessment Program[49] . The skill to improve the respond system to the buildup of risks has been reinforced; safety net and crisis management arrangements have improved; the institutional set-up for financial regulation and supervision has been strengthened. Partly because of this enhanced regulatory reforms and partly Mexico's vigorous financial system coming into crisis, Mexico weathered the recent global financial crisis relatively well. The implication of these findings is also in line with the discussion above.

In our findings it shows that, Mexico's financial stability displays a very low correlation with the US financial stability. It is around 8 per cent of the forecast variance at horizons of a 10 months period due to US financial destabilization.

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[49] Financial Sector Assessment Program (FSAP) is a joint programme IMF and World Bank effort, purposed to raise the effectivenss of efforts to promote the soundness of the financial system

11.2 Financial Stability Interdependence of Advanced Countries

11.2.1 Optimal Lag Length for Advanced Countries

In this study AIC offered to choose two lags. Thus two lags for all VARs are chosen for examination financial stability contagion among advanced markets. (See Table 11.4. below)

Table 11.4. VAR Lag Order Selection Criteria For Advanced Markets

Endogenous variables: USA UK SWITZERLAND SWEDEN NORWAY FINLAND
Exogenous variables: C
Sample: 2000M01 2011M04
Included observations: 127

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1061.579	NA	0.806553	16.81228	**16.94665***	16.86687
1	-987.4197	140.1444	0.442525	16.21133	17.15193	**16.59349***
2	-949.9876	67.20091	**0.434238***	**16.18878***	17.93560	16.89849
3	-914.4805	**60.38999***	0.441692	16.19654	18.74959	17.23382
4	-892.6310	35.09697	0.561785	16.41939	19.77866	17.78422
5	-866.6015	39.35158	0.676710	16.57640	20.74190	18.26880
6	-846.4801	28.51857	0.907986	16.82646	21.79819	18.84641
7	-818.1207	37.51477	1.090262	16.94678	22.72474	19.29430
8	-777.0454	50.45477	1.096720	16.86686	23.45104	19.54193

11.2.2. Residual Correlations Advanced Countries

Table 11.5. Residual Correlations for Advanced Countries

	US	UK	SWISS	SWE	NOR	FIN
US	1.000000	-0.030473	0.565966	0.691051	0.632015	0.068812
UK	-0.030473	1.000000	-0.063995	0.114828	-0.138222	0.276676
SWISS	0.565966	-0.063995	1.000000	0.454346	0.523037	0.391323
SWE	0.691051	0.114828	0.454346	1.000000	0.478965	0.340366
NOR	0.632015	-0.138222	0.523037	0.478965	1.000000	0.123094
FIN	0.068812	0.276676	0.391323	0.340366	0.123094	1.000000

Source: Own calculations

Table 11.5. Shows the intra monthly cross correlations of the VAR residuals. It is notable from the results that UK and Finland residuals are not correlated with those of U.S. However, Switzerland, Sweden and Norway are strongly correlated with U.S. It is also notable that residual correlations of Sweden with U.S. are the strongest amongst examined advanced countries.

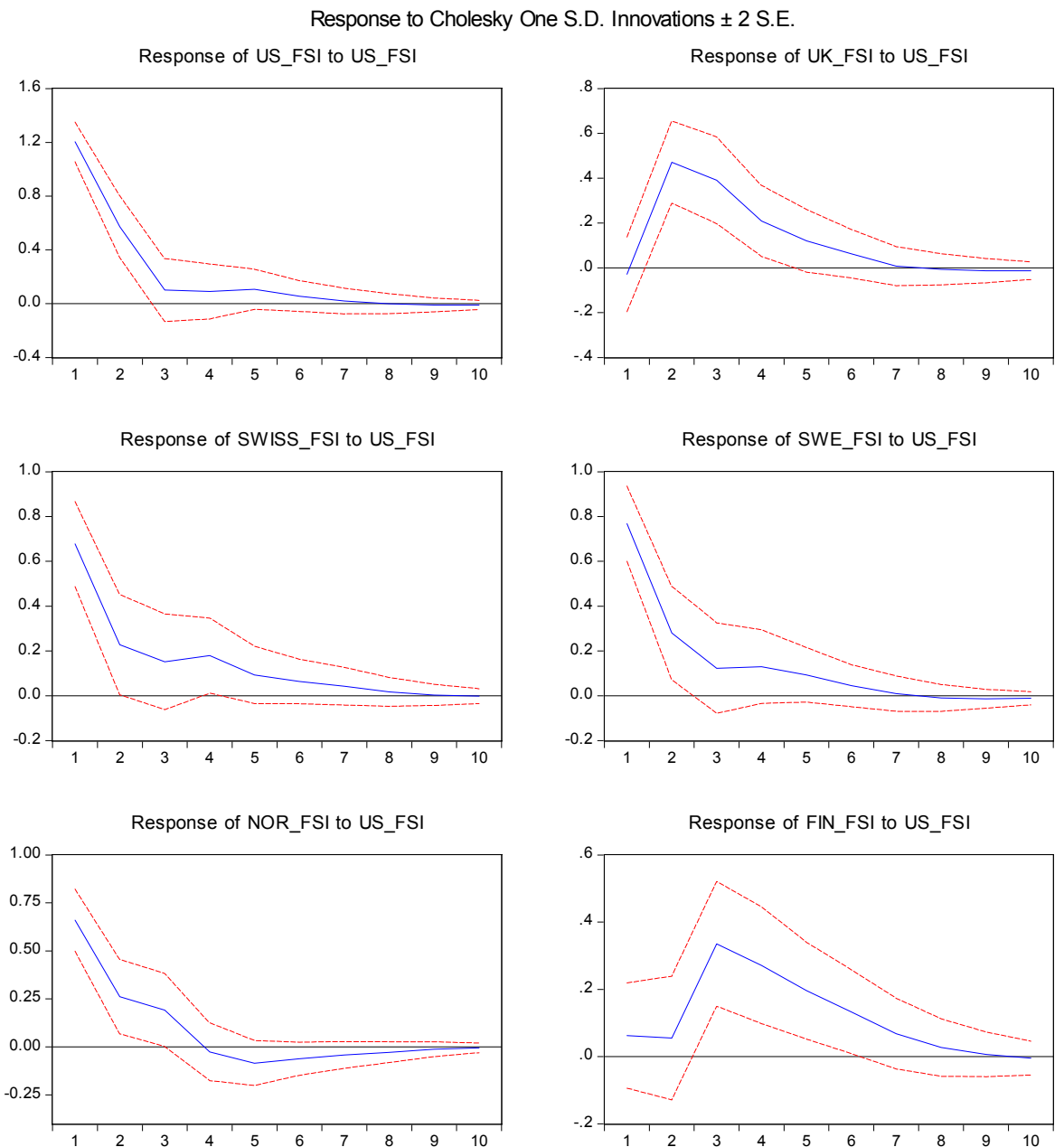## 11.2.3. The Impact of Financial Stability Shocks on Advanced Markets

Figure 11.2.: Contagion from U.S. Financial Stability Collapse to Advanced Countries

Source: Own calculations

Figure 11.2 states that, when a shock is introduced to financial stability of U.S., it causes immediate spillovers to Switzerland and Sweden. There is also another important contagion from the US to Norway. Norway is influenced by shocks emanating from disturbance in financial stability of U.S.

Compared with this evidence of interdependence of financial stabilities in Scandinavian countries, the magnitude of contagion from U.S to Finland is much smaller.

These results also indicate that, although return shocks originating from the U.S. have severe influence on Finland[50], a potential financial stability disturbance in the U.S. has a very small contagious impact on the financial stability of Finland. Amongst those advanced countries, U.S. Has the most pervasive and large interdependence as well as contagion on Sweden. Effects of the deformity of financial stability of the United States during unsettled periods takes respectively, six months in Norway, four months in Finland, UK and Switzerland and three months in Sweden to disappear.

11.2.4 Financial Stability Variance Decompositions among Advanced Markets

Table 11.6. Variance Decomposition of Advanced Markets

Variance Decomposition of U.S.' Financial Stability:

Period	S.E.	US_FS	UK_FS	SWISS_FS	SWE_FS	NOR_FS	FIN_FS
1	1.203500	**100.0000**	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.349195	**97.58384**	0.030107	0.039586	0.275603	0.168850	1.902013
3	1.371211	**95.01553**	0.988390	0.219554	0.369166	0.448907	2.958456
4	1.376344	**94.73589**	1.014402	0.226804	0.462012	0.569330	2.991563
5	1.382377	**94.50264**	1.007979	0.337449	0.487352	0.682623	2.981957
6	1.383797	**94.46924**	1.016678	0.340001	0.488860	0.707885	2.977339
7	1.384147	**94.43912**	1.031090	0.345812	0.492332	0.713320	2.978323
8	1.384243	**94.42598**	1.038601	0.349362	0.492281	0.714957	2.978819
9	1.384311	**94.42226**	1.040918	0.350936	0.492395	0.714913	2.978581
10	1.384363	**94.42070**	1.041676	0.351598	0.492361	0.715196	2.978466

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[50] This results is obtained from the stock market interdependence chapter

Variance Decomposition of UNITED KINGDOM's Financial Stability:

Period	S.E.	US_FS	UK_FS	SWISS_FS	SWE_FS	NOR_FS	FIN_FS
1	0.961564	**0.092860**	99.90714	0.000000	0.000000	0.000000	0.000000
2	1.079701	**19.13241**	79.40700	0.561024	0.002161	0.063469	0.833938
3	1.185040	**26.74172**	67.56039	2.793779	0.191269	1.660307	1.052535
4	1.207230	**28.75534**	65.10058	2.699139	0.211536	1.932906	1.300495
5	1.214295	**29.40234**	64.34976	2.668219	0.211687	2.053271	1.314726
6	1.216929	**29.53726**	64.13020	2.657298	0.215210	2.149952	1.310078
7	1.217107	**29.53196**	64.12516	2.661859	0.215634	2.155260	1.310131
8	1.217319	**29.52509**	64.12375	2.669266	0.215606	2.154931	1.311357
9	1.217440	**29.53118**	64.11502	2.671104	0.215592	2.154522	1.312589
10	1.217537	**29.53847**	64.10649	2.672096	0.215560	2.154907	1.312478

Variance Decomposition of SWITZERLAND's Financial Stability:

Period	S.E.	US_FS	UK_FS	SWISS_FS	SWE_FS	NOR_FS	FIN_FS
1	1.196700	**32.03174**	0.218744	67.74951	0.000000	0.000000	0.000000
2	1.262064	**32.05825**	1.033814	61.64497	2.108754	0.023153	3.131060
3	1.277638	**32.68453**	1.424151	60.18012	2.314268	0.026545	3.370390
4	1.294437	**33.75579**	1.418133	58.80078	2.413230	0.281237	3.330831
5	1.299830	**33.98627**	1.489773	58.39496	2.433132	0.323319	3.372547
6	1.301511	**34.13402**	1.486065	58.24578	2.428121	0.339644	3.366376
7	1.302389	**34.19217**	1.484901	58.16872	2.424854	0.364687	3.364662
8	1.302552	**34.20013**	1.487357	58.15427	2.424312	0.370086	3.363847
9	1.302582	**34.19922**	1.489765	58.15232	2.424200	0.370623	3.363874
10	1.302598	**34.19863**	1.491081	58.15143	2.424145	0.370728	3.363993

Variance Decomposition of SWEDEN's Financial Stability:

Period	S.E.	US_FS	UK_FS	SWISS_FS	SWE_FS	NOR_FS	FIN_FS
1	1.111149	**47.75510**	1.848233	0.714880	49.68179	0.000000	0.000000
2	1.184079	**47.64578**	4.792404	0.630479	44.49055	0.691905	1.748884
3	1.200418	**47.40349**	5.260980	1.029853	43.61250	0.990692	1.702488
4	1.212479	**47.61496**	5.209625	1.088978	42.79232	1.593323	1.700792
5	1.217318	**47.81917**	5.190590	1.149880	42.47385	1.679139	1.687366
6	1.218555	**47.85687**	5.215221	1.147736	42.39187	1.694962	1.693344
7	1.218872	**47.83748**	5.234256	1.157902	42.37172	1.702174	1.696466
8	1.219009	**47.83355**	5.241571	1.164066	42.36222	1.702037	1.696548
9	1.219124	**47.83703**	5.243966	1.166097	42.35435	1.702081	1.696474
10	1.219191	**47.84066**	5.244067	1.166599	42.34971	1.702488	1.696473

Variance Decomposition of NORWAY's Financial Stability:

Period	S.E.	US_FS	UK_FS	SWISS_FS	SWE_FS	NOR_FS	FIN_FS
1	1.044705	**39.94426**	1.416526	3.767867	0.354708	54.51664	0.000000
2	1.097392	**41.86698**	1.745012	5.943258	0.441394	49.40797	0.595386
3	1.140539	**41.57203**	5.392338	5.654735	0.634512	45.95614	0.790240
4	1.143060	**41.43916**	5.408970	5.819224	0.633229	45.86374	0.835682
5	1.148971	**41.55643**	5.543304	5.998555	0.627322	45.41940	0.854985
6	1.151062	**41.69332**	5.541490	5.989950	0.632298	45.26976	0.873185
7	1.151947	**41.76491**	5.537219	5.983590	0.631552	45.21065	0.872079
8	1.152354	**41.79335**	5.533380	5.980401	0.631752	45.18934	0.871768
9	1.152435	**41.79897**	5.532674	5.979610	0.631800	45.18525	0.871703
10	1.152458	**41.79953**	5.533331	5.979486	0.631775	45.18417	0.871704

Variance Decomposition of FINLAND's Financial Stability:

Period	S.E.	US_FS	UK_FS	SWISS_FS	SWE_FS	NOR_FS	FIN_FS
1	0.904290	**0.473515**	7.778637	19.70983	9.509541	0.012502	62.51597
2	1.035588	**0.639405**	13.16328	18.21504	7.386987	4.011780	56.58350
3	1.107151	**9.719592**	12.69047	17.66675	6.463147	3.845561	49.61448
4	1.155576	**14.42936**	12.73660	17.14775	5.949994	4.006339	45.72996
5	1.174464	**16.74626**	12.37355	16.70388	5.761602	4.053280	44.36143
6	1.183209	**17.75806**	12.19262	16.49014	5.677708	4.173142	43.70833
7	1.185621	**18.01336**	12.14912	16.42407	5.655697	4.226096	43.53166
8	1.186082	**18.04930**	12.15082	16.41277	5.651386	4.237619	43.49811
9	1.186203	**18.04837**	12.15857	16.41174	5.650293	4.240683	43.49036
10	1.186254	**18.04861**	12.16177	16.41214	5.649828	4.240512	43.48714

Cholesky Ordering: US_FSI UK_FSI SWISS_FSI SWE_FSI NOR_FSI FIN_FSI

Source: Own calculations

Although Sweden has well developed financial market structure, during the crisis, these systems were not resilient enough and it is notable from Table 3.b. that Sweden's financial stability is highly exposed to fluctuations in U.S. financial stability, and it is around 47 per cent. The impact of the financial crisis on Sweden's economy and financial sector was substantial. The U.S. financial stability shocks create a major upset for the same indicator in Sweden. The innovations in financial stability of the U.S. explain most of the forecast variance in Sweden.

Norwegian financial stability has certainly exposed to fluctuations in the financial stability in US at around 39 per cent thus U.S. financial stability volatility represents a big threat to Norway. Therefore, Norwegian financial institutions have certainly felt the impact.

Shocks to financial stability in U.S. lead to a change in financial stability patterns in Norway. Innovations in the U.S. account for about 40 per cent of the forecast variance in financial stability after 10 months.

Although Switzerland's financial system has numerous advantages. In more detail, these advantages include high political stability, legal certainty, and the protection of poverty and the reliability of government bodies, deterioration in the financial stability of U.S. lead fluctuations in the same indicator in Switzerland at around 32 per cent. The effect of increasing volatility is also notable in the table above.

The same shock does not disturb U.K. only at the first month. Variance decomposition results show that there is a significant financial stability turbulence contagion from U.S. to U.K. starting in the second period. Compared to other advanced countries examined the forecast error variance is less than 30 per cent. But it is still in line with what happened. The UK financial system was severely affected by the financial crisis, which exposed weaknesses in the supervisory, crisis management and resolution frameworks. The authorities have addressed some major weaknesses: the deposit insurance has been strengthened, liquidity management has been reinforced and a special resolution regime for deposit–taking institutions has been established.

Table 11.6. Shows that the impacts of innovations in U.S. financial stability account 18 per cent of the forecast variance in financial stability in Finland. Similar to the findings about UK, the same deterioration in the financial stability of US does not affect UK's financial stability only at the first period.

12. SUMMARY AND CONCLUSION

This study has explored the nature of financial diffusion across the main advanced and emerging country regions taking United States as the most natural origin of the 2007-2009 global financial crisis. Examining the sources of financial crisis has emerged as a crucial research focus in the aftermath of the famous financial crises. Many important theoretical researches underscore the importance of strong trade linkages and macroeconomic similarities as the main sources spreading the crisis from one country to the entire region (and other regions). The scope of this thesis is to see if countries that are more deeply tied in international finance with US experienced systematically more or less severe financial crisis.

This research differs from the earlier researches because the focus is to study the question of financial contagion in a wider spectrum of cross country by examining both advanced and emerging countries. Besides, monthly data is used to understand the transmission of shocks in examined countries.

This study examines financial contagion in two particular empirical studies. Firstly, stock market interdependence is examined among advanced and emerging markets, taking US as the epicenter of the global turmoil. When volatility increases in the US stock market, this stock market fluctuation creates a major disturbance to the emerging markets and overall its impact takes about approximately five months to disappear. The interference between US and emerging markets are generally large and statistically significant, providing powerful proof that emerging stock markets are generally influenced by US stock market shocks. In terms of scaled responses, the US is relatively important for Poland, Hungary and Mexico. On the contrary, Turkey's stock market seems to be less effected from the US stock market shock compared to the other examined emerging markets.

As stated above, stock market interdependence is also studied for advanced countries. Indeed, a strong evidence of widespread impact of US shocks on advanced markets is found. England, Switzerland, Sweden, Norway and Finland exhibit significant interdependence with respect to US shocks.

Overall, compared to the results of the econometric studies of the emerging markets, the degree of stock market interdependence is higher and diffusion is larger across advanced markets. Hence, in the bottom line US financial crisis has had a more permanent impact on advanced markets rather than emerging markets.

The second empirical study examines the financial diffusion by using financial stability index which is composed of reel effective exchange rates, short term interest rates and stock market returns.

The central message from studying the contagion in emerging markets within the context of financial stability is that, emerging markets have relatively small sized sensitivities to US shock during the crisis period. The most significant contagion from US is to Hungary and Poland. Thus the results indicate that US is relatively important for these countries compared to other emerging markets examined. Among all emerging markets examined Poland and Hungary are the only ones from European Union. Henceforth those results are consistent with the view that Europe became connected with the US. Turkish financial stability, in particular is hurt by the shock of US financial stability. The case of Mexico is especially notable, very weak evidence of the financial stability turbulence due to the US turbulence is found.

On the contrary, we further extent this analysis by examining the financial stability situation among major advanced countries. Also, the turbulence of financial stability in US led to a stronger reaction of the advanced countries studied. More specifically, the volatility in the US financial stability represents its biggest threat to Norway, Sweden and Switzerland. Compared to other countries financial stability of United Kingdom stand resilient due to a US shock. These results also indicate that, potential financial stability disturbance in the US has a very small contagious impact on the financial stability of Finland.

The central message from the findings is that, during this most severe global financial crisis advanced countries has larger sensitiveness to US shocks compared to emerging countries. These results are quite consistent with the enduring financial importance of US and work on diffusion should focus more on the financial markets. For the further research, the next challenge is thus to use advanced approaches, constuct more macro-financial linkages which creates the size of contagion apparently prevalent in the underlying data. These further attempts can enrich the understanding of the impact of the financial crisis worldwide.

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