

What Does the EU Crisis Mean for the U.S. Economy?

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Abstract

The Europe economy is on the edge of a recession unlike anything since World War II. Many economies in the Euro zone have already been confronted with the sovereign debt crisis, and there is little hope for a recovery in 2012. The EU crisis has important policy implications for the rest of the world, particularly for the United States, which is its main trade and investment partner. This paper emphasizes on trade, investment, stock, and monetary transmission channels of contagion from Europe to the United States and estimates the effects of the EU crisis on U.S. exports, the inflow of foreign direct investment (FDI), the stock market, the U.S. banks' claims on the European banks, and the U.S. foreign-owned assets in the EU. The results of this study indicate that the U.S. economy will be severely affected by the EU crisis.

Keywords: Sovereign debt crisis, EU crisis, monetary transmission channel, U.S.-owned foreign assets, Foreign Direct Investment (FDI), Dow Jones Industrial, banks' claims

JEL Classification: E44, F14, F31, G15

1. Introduction

The European Union's summit after summit faded the hopes of reaching an agreement that would rescue the whole union. The sovereign debt crisis of Greece, the severity of the fiscal crisis in Spain and Italy, the result of new presidential election in France that heralds signs of schism among European core economic powers, and the dichotomy around the role of the European Central Bank (ECB) as the lender of last resort threaten the integrity and unity of the Euro zone. Indeed, the euro parity has slumped substantially against major currencies during the past few months due to concerns about the ability of the EU to tackle its sovereign debt crisis, and to keep its single currency surviving.

The European economy is currently experiencing the deepest recession since WWII. The public debt in the Euro area is projected to reach 100% of GDP by 2014 (note 1). While the Greek economy teeters on the edge of a default, Italy and Spain are suffering from unprecedented budget deficits of more than 100% of GDP, which has led to unsustainable level of yields on their debts.

While the public debt has contributed to the Euro zone crisis, many argue that the roots of the crisis may be attributed to the lack of competitiveness, particularly in peripheral countries. The adoption of the euro, which was accompanied by a fall in interest rates, triggered the demand and increased exports from core countries, while hindering the exports from peripheral countries. With the rise in the government expenditures and stagnated exports to GDP, the current account deficit soared in many peripheral countries; with high level of foreign debt already in place, countries like Greece, Spain, and Portugal were confronted with sovereign debt crises. Indeed, the single monetary policy of the euro was too loose for these peripheral countries, and fiscal policy was not in tandem with core European countries. These features plus the lack of the role of a lender of last resort for the European Central Bank (ECB) inflamed the sovereign debt crisis in many countries in the continent.

Indeed, not only the European countries but also many other countries around the globe will be affected by this crisis; the U.S. economy is no exception. Given its close trade and investment relationships with Europe, the EU crisis would affect the U.S. economy through different transmission channels: exports, FDI, availability of credit to U.S. households and businesses, equity markets, and foreign-owned assets. According to Goldman and Sachs forecasts the crisis will shave off 1% of the U.S. GDP growth (note 2); however, the results of this study, which captures the effects of the EU crisis on the U.S. economy by using econometric technique, suggest that the effect of the EU crisis on the U.S. economy is enormous.

The rest of the paper is organized as follows: the transmission channels of contagions are discussed in section 2. The literature review is discussed in section 3. The relations between the U.S. and European economies are discussed in

section 4. The list of the variables, data sources, and the results of the econometric models are presented in section 5. Finally, policy options that could help the U.S. economy weather the adverse impacts of the EU crisis are discussed in section 6.

2. Transmission Channels

The U.S. economy will certainly suffer from the contagions of the Euro zone crisis through five transmission channels: (i) a lower GDP growth in Europe will reduce the demand for the U.S. exports, and a weaker euro against the U.S. dollar will lead to the loss of competitiveness for U.S. tradable goods; (ii) with a weaker euro against the dollar, capital will flow to emerging markets rather than the United States; (iii) stock market indices in the U.S. will slump because the U.S. stock market is closely tied to the European markets; (iv) the crisis will also affect the U.S. foreign-owned assets abroad, particularly those in the EU; (v) and finally, the EU crisis could undermine the U.S. banks' claims on EU banks and financial institutions.

Europe is a market for 20% of the U.S. exports and holds more than 50% of the U.S. overseas assets. The European flow of direct investment (FDI) constitutes 20% of total FDI to the United States (note 3). A severe recession and a fragile financial market in Europe could hamper the economic recovery in the U.S., and push it toward the edge of a double-dip recession. Many economists agree it is very likely that the Euro zone will experience a recession in 2012, which will have severe adverse consequences for the U.S. economy, especially in sectors such as exports, banking, and financial services. A weaker euro not only hinders U.S. exports to the European Union but also to the rest of the world, because many currencies are pegged to the euro or have used euro as their main reserve currency. The fall in exports would exacerbate the U.S. current account deficit.

Another important channel that will affect the U.S. economy is through financial institutions, particularly through banks. Though the exposure of the U.S. banks to most vulnerable countries in Europe is limited to \$176 billion, or 5% of its total exposure, the indirect exposure, which will operate through all international banks and intermediaries, would be much higher.

3. Literature Review

Douglas Elliot (2011) argues that a recession in Europe would trigger a recession in the U.S. through a number of links across the Atlantic. He conjectures that the U.S. economy will lose a lot of trade in Europe as Europe is in a deep recession. The second channel he discusses is the investment channel. The U.S. firms have over \$1 trillion of direct investment in the EU, which would drop substantially due to the decline in profits. He emphasizes on financial flows as the third channel: U.S. banks and corporations have \$2.7 trillion in loans and other commitments to European governments, banks, and financial institutions, which will be adversely affected by the EU crisis.

John Makin (2011) underpins the reasons for the rapidly growing debt crisis in Europe, which threatens the global financial system and the global economy. He argues that the rise in interest rate on Italian, French, and Spanish bonds has led to a drop in the market value of trillions of dollars held by European households and banks. The stock indices have dropped sharply, while the borrowing cost in the interbank markets has risen dramatically. Slowing economic growth and rising interest rates not only has led to a vicious circle in the EU, but also has created the biggest threat to the U.S. economy and its financial system.

Cari Chastain et al. (2011) investigate the effects of European debt crisis on the U.S. economy. They argue that as investors became more wary of the European markets' instability, they invested their capital in more stable markets, such as the United States Treasury bond market. The rise in demand for the U.S. Treasury bonds drove the yields down considerably. They argue that we can link the European debt crisis to the overall slump in the yields on U.S. Treasury securities. However, they conjecture that the debt crisis in Europe doesn't seem to have a significant impact on the U.S. GDP. They argue that the U.S. banking system will not be hurt since most of the Greece debt is tied up to European countries.

Rebecca M. Nelson et al. (2012) indicate that the Eurozone crisis could impact the U.S. economy through a number of different channels. One possible channel is the exposure of the U.S. financial institutions to the Eurozone. They refer to a report from the Bank for International Settlements (BIS), which points out that the direct and potential U.S. bank exposure to Greece, Ireland, Italy, Portugal, and Spain amounted to \$717 billion in September 2011. However, those data do not capture the exposure of non-bank financial institutions (such as money market, pension, or insurance funds). They argue that another channel through which the Eurozone could impact the United States is trade and investment. There has been concern that austerity measures would slow down economic growth in Europe, and depress the demand for U.S. exports. In addition, the crisis would erode consumers' confidence in the Euro zone, leading to depreciation of the euro against the U.S. dollar, which makes U.S. exports more expensive overseas. However, they argue that there is no indication of sustained depreciation of the euro relative to the U.S. dollar.

Likewise, slower economic growth rate in Europe could cause U.S. investors to look increasingly toward emerging markets for investment opportunities. On the other hand, a weaker euro could make European stocks and assets look cheaper and more attractive for U.S. investors, attracting more U.S. capital to the Eurozone. They conclude it is not clear how the crisis will shape long-term U.S.-EU investment flows. As they emphasize, the U.S. Federal Reserve (Fed) announced the re-establishment of temporary reciprocal currency agreements, known as swap lines in May 2010 to minimize exchange rate and credit risk. The swap lines have been extended a number of times, allowing the Federal Reserve to reduce the borrowing rate for the swap lines in order to further ease the strains on financial markets. As of February 15, 2012, the outstanding on swap lines amounted to \$109 billion compared to a high of \$583 billion during the global financial crisis in December 2008.

Catherine Rampell (2011) measures the potential effects of the Euro crisis on the U.S. economy. She discusses three main channels that could hurt the U.S. economy: exports, stock market, and debt. She argues if a severe recession explodes in Europe, U.S. export would fall substantially. Moreover, the fall in demand for European products due to high unemployment and low economic growth means less demand for euro and a stronger dollar, which leads to lower exports from the U.S. She also argues the two stock markets are strongly correlated, and movement in Europe stock market is leading the U.S. market. Therefore, any drop in EU stock markets means less valuable portfolio for Americans (wealth effect). The third channel is the debt exposure and contagious credit channel. As she argues American banks own a huge amount of French debts, and French banks own enormous amount of Italian banks' debts. If Italy defaults French banks are in trouble, and if French banks default, American banks will be subject to debt crisis. Such a scenario can seriously damage U.S. financial markets because banks will stop lending or initiate tightening the standards for those borrowers who have significant exposure to Europe; this will lead to lower economic growth in the U.S.

Tim Christensen (2012) investigates the global effects of the European sovereign debt crisis. He argues that throughout the European sovereign debt crisis, investors have retained confidence in the U.S. economy. The U.S. dollar has become stronger against the euro. This has led to a reduction in U.S. exports and slower economic growth. In January 2012, the U.S. saw its overall trade deficit widen to a 3-year high of \$52.7 billion. Specifically, exports to the Eurozone were down by 11% (\$1.32 billion) from the previous month. Exports to the Eurozone have also decreased because of lower demand in the Eurozone. In addition, the crisis has adversely affected European investment in the U.S. In 2010, the EU companies invested more than \$131 billion in the U.S., bringing the cumulative total of EU investment in the U.S. to \$1,484 billion (accounting for 63.3% of all EU foreign direct investment). However, in 2011, EU companies only invested \$105.07 billion in the U.S. Despite declining exports from the U.S. and lower foreign direct investment from the EU, the U.S. economy grew by 3% in 2010 and 1.7% in 2011. Although the economic growth rate slowed in 2011 due to the effects of the European sovereign debt crisis, it exceeded the 3.5% economic contraction in 2009. European banks experienced a shortage of U.S. dollars as U.S.-based money market funds began to pull out of the European banks, threatening the European banks to pay back their dollar-denominated loans and defaulting on their debt. The lack of dollars in European banks would potentially increase the costs of borrowing and would exacerbate the crisis as banks, companies, and individuals all over the world would find it more difficult to obtain affordable loans. They argue that, though the U.S. has managed to continue its economic recovery from the global financial crisis, the European crisis has prevented a robust recovery from happening. Concerns about a rising dollar, a weaker euro, and lower European investment in the U.S. could hinder the U.S. recovery, as investors and consumers' confidence remains fragile. Another concern is that if banks fail in Europe due to overexposure to European sovereign debt crisis, those banks will not be able to repay their debt to the U.S. banks, which could tighten credit to businesses and consumers, delaying economic recovery.

4. Stylized Facts on the U.S. Economic Ties to the European Union

This section underpins the U.S. economy's ties to the European Union, with an emphasis on exports, FDI, stock markets, and financial assets held abroad. Amazingly, more than one-fifth of U.S. exports are directed to the European Union and more than 50% of the FDI that flows to the U.S. originates from the EU. The questions are to what extent the EU crisis can affect the U.S. economy? To what extent FDI from the EU to the U.S. will be affected? And, finally how much exports of the U.S. to the EU will drop as a result of financial crisis in Europe? These questions will be answered in the econometric section of this paper.

The data on FDI flow from different regions to the United States indicates that Europe's FDI in the U.S. has exceeded those of other regions since 2000, except for 2001 (Figure 1). Therefore, any change in the flow of FDI from Europe to the United States will have a huge impact on the total flow of FDI to the U.S., which can potentially affect different sectors of the U.S. economy, and have important consequences for investment and GDP growth.

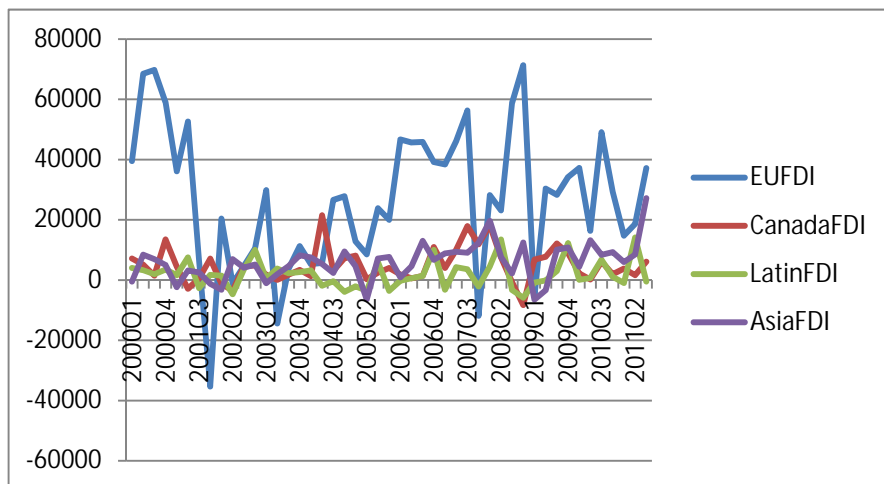


Figure 1. The FDI flow to the United States from different regions (in million dollars)

Source: Bureau of Economic Analysis (BEA) at <http://www.bea.gov/iTable/iTable.cfm?ReqID=6&step=1>, Table 12. U.S. Transactions by Area.

The second transmission channel that will affect the U.S. economy is exports; interestingly enough, more than 20% of the U.S. exports are directed to the European Union. Indeed, U.S. exports to the European Union stand above its exports to Canada and Latin America (Figure 2). Though the amount of U.S. exports to the EU and the Asia-Pacific region has been closely moving together since 2000, the former has been left behind with the emergence of recession in the Eurozone since 2009.

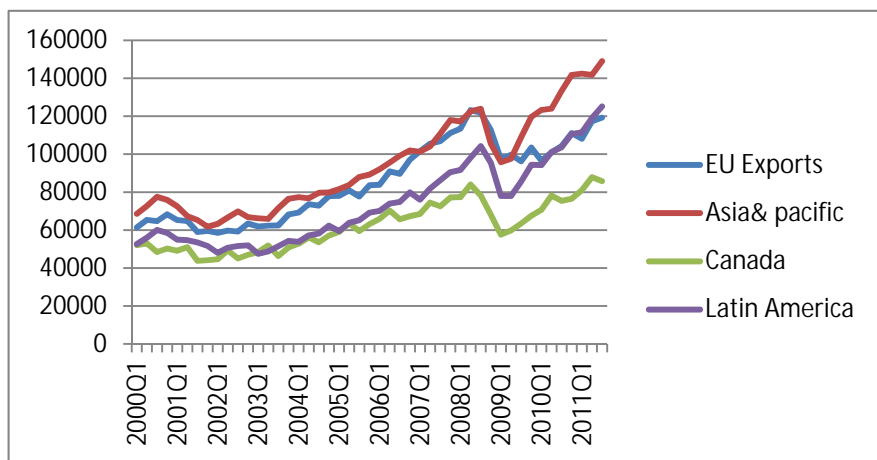


Figure 2. The United States' exports to different regions (in millions dollars)

Source: Bureau of Economic Analysis (BEA) at <http://www.bea.gov/iTable/iTable.cfm?ReqID=6&step=1>, Table 12. U.S. Transactions by Area.

Indeed, U.S. exports to the Euro area is not only affected by the shrinkage in the European GDP, but also by the euro/dollar exchange rate parity (Figure 3); with a weaker Euro and stronger dollar, U.S. exports are expected to fall, not only due to lower demand from the EU but also due to a stronger dollar, which weakens the competitiveness of U.S. products and services around the globe.

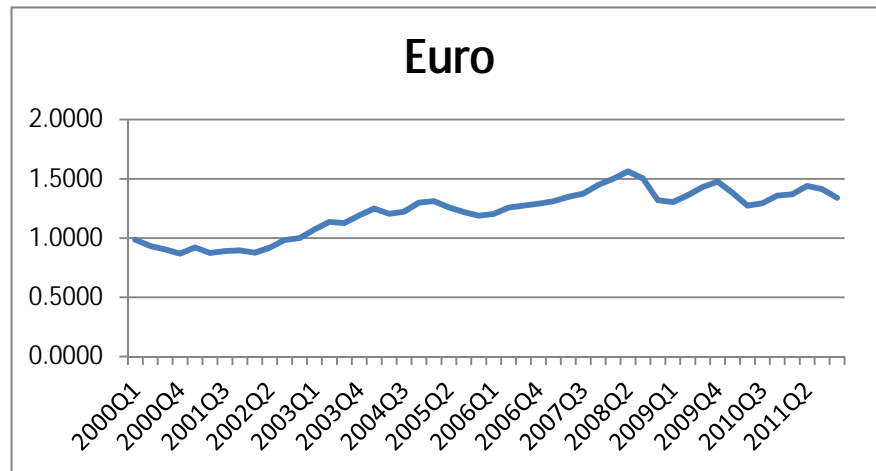


Figure 3. The Euro-dollar exchange rate parity since the first quarter of 2000

Source: Federal Reserve Bank of St. Louis, at <http://research.stlouisfed.org/fred2/series/DEXUSEU/downloaddata?cid=94>.

The third transmission channel that threatens the U.S. economy is through the stock market; the EU and U.S. stock markets are highly correlated (Figure 4); the correlation between the U.S. Dow Jones Industrial and the European Dow Jones is 60% (as indicated in the econometric section). Since the two stock market indices move very closely, any drop in the EU stock market could have severe consequences for the U.S. economy.

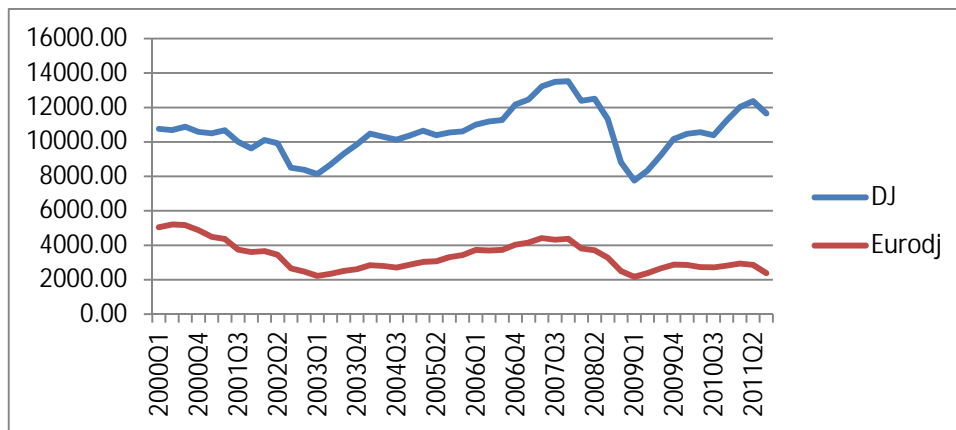


Figure 4. The U.S. Dow Jones Industrial and the EU Dow Jones

Source: Federal Reserve Bank of St. Louis, at <http://research.stlouisfed.org/fred2/series/DJIA/downloaddata?cid=32255>, and the European Central Bank at <http://sdw.ecb.europa.eu/>.

The fourth transmission channel is the impact on the U.S. banks' claims on EU banks and financial institutions. The U.S. banks' claims on the European banks and financial institutions jumped substantially after 2008, dropped back in 2010, but have recovered again in 2011 (Figure 5). The U.S. banks and securities brokers' claims on the EU financial institution will certainly be affected not only through a weaker euro, but also due to the contraction of the European GDP.

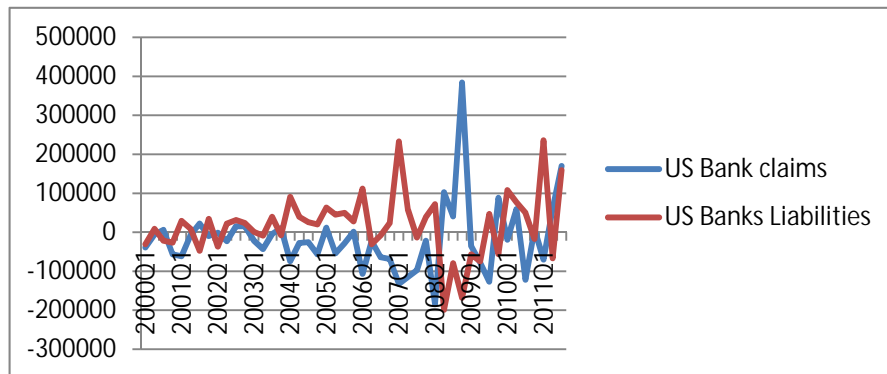


Figure 5. United States banks' claims and liabilities to European banks

Source: Bureau of Economic Analysis (BEA) at <http://www.bea.gov/iTable/iTable.cfm?ReqID=6&step=1>, Table 12, US Transactions by Area.

Fifth, the euro crisis will likely shrink the value of U.S. foreign-owned assets in the Eurozone through a weaker euro. Indeed, it is likely that the U.S.-owned assets in the European Union will drop substantially as a result of the drop in euro parity against the dollar. This assertion will be investigated in the econometric section of this paper. The U.S.-owned assets in the EU have been relatively volatile due to dollar/euro fluctuations and the interest rate differential; however, a substantial rise was observed in 2011 (Figure 6).

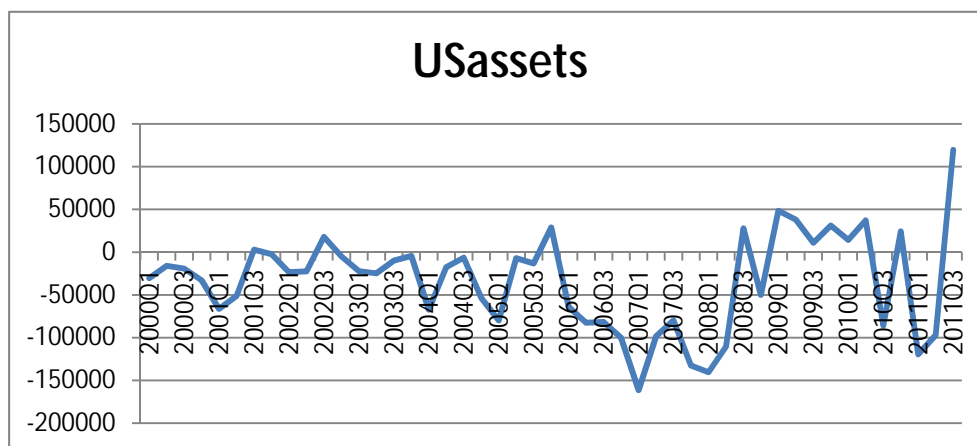


Figure 6. U.S.-owned assets in the EU

Source: Bureau of Economic Analysis (BEA) at <http://www.bea.gov/iTable/iTable.cfm?ReqID=6&step=1>, Table 12, U.S. Transactions by Area.

5. Data and Econometric Results

We use quarterly data from 2000Q1 to 2011Q3 to capture the impact of the EU crisis on the U.S. economy in different sectors, including exports, FDI, stock markets, U.S.-owned foreign assets in the EU, and the banking system claims on the European banks. The U.S. economy is already struggling to recover from a mild recession; if precautionary actions are not implemented there is the possibility that the U.S. economy may slide back in to a double-dip recession. Therefore, it is very important to quantify the effects of the Eurozone crisis on the U.S. economy. An econometric technique is used to measure the impact of the abovementioned transmission channels on the U.S. macroeconomic variables.

The list of variables, their summary statistics, and sources are provided in Table 1. The data on exports, FDI to the United States, U.S.-owned assets in the EU, U.S. banks' claims and liabilities to European financial institutions, income receipts, and payments to the EU are from Bureau of Economic Analysis (BEA). The data on EUGDP, EU

interest rate, EU Dow Jones, and Eurobond interest rate are from the European Central Bank (ECB). The CPI in the U.S., 1-year swap interest rate, U.S. Dow Jones Industrial, U.S. bond interest rate, and U.S. GDP are from the Federal Reserve Bank. Finally, European CPI is retrieved from the World Bank.

Table 1. Data, summary statistics, and their resources

Variable	Definition	Mean	Max	Min	Std. Dev.	Source
Exports	US exports of goods and services to EU (in million dollars)	85709.5	123265	58546	20893.1	BEA
EUGDP	Euro area Gross Domestic Product	2058054	2367320	1668417	221694	ECB
EUGDPG	Euro area GDP growth	1.44	4.47	-5.29	2.13	Author's calculation
USCPI	U.S. CPI index (1984=100)	197.64	226.21	170.1	17.05	Federal Reserve
EUCPI	E.U. CPI Index	101.20	113.48	89.17	7.22	World Bank
DCPI	Relative CPI of the U.S. to the EU	0.99	1.01	0.96	0.01	Author's calculation
USint	1-year swap interest rate in the U.S.	2.83	6.93	0.39	1.90	Federal Reserve
EUint	Euribor 1-year historical close interest rate	3.08	5.38	1.21	1.26	ECB
Dint	Interest rate differential between the U.S. and EU	0.183	2.43	-2.05	0.18	Author's calculation
Euro	Euro parity versus U.S. dollar	1.21	1.56	0.86	0.20	Federal Reserve
FDI	U.S. foreign direct investment in the Euro area	1113016	1818951	810307	276482.6	BEA
DJ	U.S. Dow Jones Industrial	10587.5	13516.9	7757.77	1375.9	Federal Reserve
EUDJ	Euro Dow Jones	3352.81	5200.81	2166.43	837.2	ECB
EUbondint	Euro bond interest rate	4.31	5.61	3.26	0.58	ECB
USbondint	U.S. bond interest rate	4.31	6.48	2.74	0.85	Federal Reserve
USassets	U.S.-owned assets in European Union, excluding derivatives (million dollars)	-33587.5	119804	-161394	57027.9	BEA
USGDP	U.S. GDP in billions of dollars	12589.4	15176.1	9709.5	1733.86	Federal Reserve
USGDPR	U.S. GDP in chain 2005 billion dollars	12415.23	13331.6	11033.6	749.02	Federal Reserve
USTreasury	Treasury securities and bonds in million dollars	535891.3	1401619	391031	218298.5	Federal Reserve
Claims	U.S. banks and securities brokers' claims on the EU (in million dollars)	-17149.7	383746	-184727	87884.7	BEA
Liab	U.S. bank liabilities to the EU (in millions of dollars)	17589.8	235789	-198998	79417.8	BEA
Banknet	U.S. banks' net claims and liabilities on the EU (in millions of dollars)	440.10	329241	-152716	86623.27	Author's calculation
Derivative	Financial Derivatives (in millions of dollars)	-621.18	5455	16236	5582.8	Federal Reserve Bank
CA	U.S. Current account with EU (in millions of dollars)	-6081.9	32925.19	-58837.05	22869.1	Federal Reserve Bank
Openness	Imports plus exports to EU ratio to GDP percent)	14.83	18.34	12.31	1.407	Author's calculation
Loans	Sum of primary credit, secondary credit, primary dealers and other broker dealer credit, asset-backed commercial paper, money market mutual fund, facility extended to American International Group, term asset-backed securities loan facility, and other credit extensions (in millions of dollars)	33393.9	309925	14	62491.7	Federal Reserve Bank

Source: Data retrieved from Bureau of Economic Analysis (BEA), Federal Reserve Bank of St Louis, European Central Bank (ECB), and the World Bank.

The following section represents the econometric results of the estimated models on the effects of Euro crisis on the U.S. economy in different sectors including exports, FDI, stock market, U.S. foreign-owned assets, and banks and securities brokers' claims on the EU financial institutions.

5.1 U.S. Exports to the EU

As many economists including Behrman and Hanson (1979) have argued, exports are a function of GDP growth, exchange rate parity, and relative Consumer Price Index (CPI). We use the same model (equation 1) to measure the impact of the EU crisis on U.S. exports. Based on the estimated model, 94% of the U.S. exports to the Euro area can be explained by three independent variables: euro/dollar parity, which affects the purchasing ability of buyers of U.S. products; EUGDP as a measure of demand for the U.S. exports; and relative CPI (DCPI) as a measure of relative competitiveness. The results indicate that U.S. exports to the Eurozone are completely elastic to relative prices, EUGDP, and euro parity. To measure the impact of the crisis on U.S. exports we consider two main transmission channels here: (i) the shrinkage in the Euro GDP (ii) and the fall in the parity of the euro against the U.S. dollar.

$$\text{Exports} = a_0 + a_1 \text{Euro} + a_2 \text{EUGDPG} + a_3 \text{DCPI} \quad (1)$$

Based on IMF predictions, the growth rate in the Euro area will drop to 1.1% in 2012 from 1.6% in 2011 (note 4); however, OECD and the EUROFRAME forecasts show a more dramatic drop. They conjecture that the EU growth rate will drop from 0.9% in 2011 to 0.6% in 2012 (note 5). Therefore, a drop of 33% in the EUGDP growth, based on OECD forecasts, will lead to at least 0.9% lower exports from the U.S. to the Eurozone ($0.027 * 33\% = 0.9\%$). But this effect is only with respect to the European GDP growth; U.S. exports to other regions will also be affected because many Asian countries' currencies are pegged to the euro or have the euro as their main reserve currency, which will affect their ability to buy from the U.S. Therefore, the total impact on the U.S. exports is expected to be much higher.

Another channel that will adversely affect U.S. exports is the parity of the euro against the U.S. dollar. A weaker euro will lead to lower exports from the U.S. to Europe; a drop of 10% in euro parity against the U.S. dollar as a result of EU crisis will lead to a drop of U.S. exports by 4.5% ($0.45 * 10\% = 4.5\%$). Therefore, in sum, U.S. exports to the EU are expected to fall by at least 5.4%, all else equal. But the real impact on U.S. exports will be much higher because many currencies are pegged to the euro, and a stronger dollar against those currencies reduces the competitiveness of the American products and services in the global market.

Table 2. Elasticities of the U.S. exports to euro parity and other economic fundamentals

Variable	Coefficients	Robust Standard Error	P
Euro	0.45	0.086	0.000
EUGDPG	0.027	0.007	0.001
DCPI	-10.76	0.859	0.000
Constant	11.16	0.015	0.000
No of Obs.	42		
R-squared	0.95		
F-statistics	246.79		

5.2 FDI Flow from the EU to the U.S.

The U.S. economy will also be affected by the shrinkage of Europe FDI in the U.S. As many economists, including Bogacz (2005) and Jaumotte (2004), have argued, FDI is a function of demand in the host country, measured by EUGDP here, exchange rate parity (Euro), stock market index (DJ), and interest rate differentials (Dint). Therefore, equation (2) has been used to measure the effects of the EU crisis on the flow of FDI from the European Union to the U.S.

$$\text{FDI} = a_0 + a_1 \text{Euro} + a_2 \text{DJ} + a_3 \text{EUGDPG} + a_4 \text{Dint} \quad (2)$$

Interestingly enough, 73% of the FDI from the EU to the United States can be explained by the above independent variables. The results indicate that the European FDI flow to the U.S. economy is completely elastic to Europe GDP growth. A 33% drop in the EU GDP growth will lead to 1.6% drop in the flow of FDI to the U.S. ($0.05 * 33\% = 1.6\%$). But this is not the whole impact. A 10% drop in the euro parity against the U.S. dollar will lead to a drop of 8.1% in the FDI from the EU to the U.S. ($0.81 * 10\% = 8.1\%$); therefore, the FDI from the EU to the U.S. is expected to fall by 9.7%.

Table 3. Elasticities of FDI from EU to the United States to euro parity and other economic fundamentals

Variable	Coefficients	Robust Standard Error	P
Euro	0.81	0.14	0.00
DJ	0.66	0.25	0.01
EUGDPG	0.05	0.02	0.05
Dint	0.03	0.02	0.09
Constant	7.65	2.31	0.00
No of Obs.	25		
R-squared	0.73		
F-statistics	17.64		

5.3 U.S. Stock Market

The U.S. stock market is closely correlated with the European markets; therefore, any change in the EU stock market can have severe adverse effects on the U.S. stock market. Following De Medeiros (2005) and Kalbasi (2009), the EU Dow Jones, EU and US bond interest rates, and US and EU and 1-year swap interest rates in the host and origin country are used as independent variables (equation 3).

$$DJ = a_0 + a_1EUDJ + a_2EUbond\ int + a_3USbond\ int + a_4US\ int + a_5EU\ int \quad (3)$$

The estimated results suggest that more than 80% of changes in Dow Jones Industrial can be explained by the abovementioned independent variables, and the correlation between the two stock markets is 0.61. Put differently, a 10% drop in the EU Dow Jones will lead to a drop of 6.1% in the U.S. Dow Jones Industrial, which will have huge impacts on the U.S. pension funds and 401(k) plans, as they are closely linked to the U.S. stock market.

Table 4. Elasticities of the U.S. Dow Jones Industrial to Euro Dow Jones and euro bond interest rate

Variable	Coefficients	Robust Standard Error	P
EUDJ	0.61	0.078	0.000
EUbondint	-0.85	0.109	0.000
USbondint	0.15	0.095	0.113
USint	-0.18	0.028	0.000
EUint	0.28	0.046	0.000
Constant	5.15	0.570	0.000
No of Obs.	44		
R-squared	0.80		
F-statistics	42.51		

5.4 U.S. Foreign-Owned Assets in the EU

Another transmission channel that will likely hit the U.S. economy is through U.S. foreign-owned assets in the EU. Since the U.S. assets are in the form of stocks, derivatives, and treasury bonds, therefore, DJ Industrial, EU Dow Jones, financial derivatives (Derivatives), and U.S. Treasury securities and bonds are used as independent variables to estimate the changes in the U.S. foreign-owned assets (equation 4).

$$USassets = a_0 + a_1DJ + a_2EUDJ + a_3Derivative + a_4USTreasury \quad (4)$$

The estimated results indicate that more than 79% of the U.S.-owned assets can be explained by aforementioned independent variables. Contrary to previous models, this model is estimated in the linear form because the data on the U.S. assets held in the EU are negative from some observations; in other words the U.S. has been a net receiver of foreign assets in some years. The estimated elasticity of the U.S.-owned assets to European DJ is -16.1; therefore, a 10% drop in the EUDJ means 161% drop in the value of U.S. foreign-owned assets in Europe, which is a huge impact and represents the most important transmission channel.

Table 5. Regression results of the U.S.-owned assets

Variable	Coefficients	Robust Standard Error	P
DJ	33.00	16.05	0.05
EUDJ	-161.25	40.36	0.001
Derivative	6.15	0.87	0.000
USTreasury	-0.20	0.05	0.002
Constant	236369	35038.26	0.000
No. of Obs.	22		
R-squared	0.79		
F-statistics	33.5		

5.5 The U.S. Banks' Claims on the EU Banks and Financial Institutions

The U.S. banks and securities brokers' claims on the EU financial institutions are likely to be affected with the Eurozone crisis. These claims are affected by many factors including the euro parity against the U.S. dollar (the weaker the euro, the lower the value of the foreign-owned assets in EU), U.S. exports to the EU (the lower the U.S. exports, the lower the U.S. banks' claims), and U.S. and Euro bond interest rates as Dornbusch (1989) argues interest rate differential is the main factor in the flow of capital. The U.S. banks' liabilities to the European banking system also affect the amount of U.S. claims. The EUGDP is another main factor (the higher the level of GDP in the host country the more FDI from the U.S. will flow to the EU and therefore, the higher the banks' claims would be). The stock market indices, the EU Dow Jones, and the U.S. Dow Jones Industrial also affect the banks' claims because the higher the EU stock market index, the more capital will flow to the EU, which in turn affects the U.S. banks' claims on the EU banks. Finally, the amount of loans to other banks (total loans extended to primary and secondary credit markets, mutual funds, American International Groups, and other credit extensions) can affect the claims of the U.S. banks and brokers on the European banks because many of these mutual funds or international banks work as intermediaries for European banks and can affect their claims or liabilities on the U.S. banking system. Therefore, equation (5) is used to measure the impact of the EU crisis on the US banks' claims.

$$\begin{aligned} \text{Claims} = & a_0 + a_1 \text{Euro} + a_2 \text{Exports} + a_3 \text{USbond int} + a_4 \text{EUbond int} + a_5 \text{Liab} + \\ & a_6 \text{EGDP} + a_7 \text{EUDJ} + a_8 \text{DJ} + a_9 \text{Loans} \end{aligned} \quad (5)$$

The model is estimated in the level form because the claims are negative for some observations. Therefore, the elasticities have been calculated. The elasticity of the U.S. banks' claims to euro parity is 2.12; in other words, a 10% drop in euro parity against the U.S. dollar will lead to 21% drop in the U.S. banks' claims on the EU. The elasticity of banks' claims to exports is 0.39, which means a 10% drop in the U.S. exports to the EU as a result of the EU crisis leads to 3.9% drop in the value of U.S. banks' claims on EU banks. The elasticity to EUDJ is 0.42; therefore, a 10% drop in the EUDJ implies 4% drop in the U.S. banks' claims on EU banks and financial institutions. In sum, the U.S. banks' claims on EU banks and financial institutions as a result of the crisis is expected to drop by 29%, which will substantially reduce the ability of the U.S. banks and financial institutions to lend to domestic consumers and entrepreneurs, worsening the sluggish economic recovery and hindering a fragile job market.

Table 6. Regression results of U.S. banks' claims on EU banks and financial institutions

Variable	Coefficients	Robust Standard Error	P
Euro	-301762.9	152705.1	0.060
Exports	7.81	2.88	0.012
USbondint	98961.98	32513.72	0.006
EUbondint	-74963.73	30816.7	0.023
Liab	-0.363	0.10	0.002
EUGDP	0.869	0.264	0.003
EUDJ	-216.80	43.32	0.000
DJ	95.20	15.09	0.000
Loans	1.58	0.15	0.000
Constant	1031486	445064.9	0.029
No of Obs.	34		
R-squared	0.85		
F-statistics	269.4		

6. Discussion

This study suggests that the European sovereign debt crisis will have enormous impacts on the U.S. economy through five main transmission channels: (i) exports from the U.S. to the EU; (ii) FDI flow from the EU to the United States; (iii) stock market correlation; (iv) U.S.-owned foreign assets in the EU; (v) and finally U.S. banks and securities brokers' claims on the EU banks and financial institutions.

The econometric results of this paper suggest that U.S. exports are expected to fall by 5.4%. This is only the direct impact, but exports to other regions could also fall because many currencies are pegged to euro or have euro as their main reserve currency, which dramatically reduces their demand for U.S. exports due to a weaker euro. The FDI flow from the EU to the United States is expected to fall by at least 9.7% due to the shrinkage in the EU GDP growth and a weaker euro against the U.S. dollar. The correlation between the U.S. and the EU stock markets suggests that the EU crisis will hit the DJ Industrial by at least 6%, which will have severe, adverse effects on U.S. pensions and 401(k) plans. And the most important effect is an enormous drop in the value of U.S. foreign-owned assets in the EU—by 160%. Finally, the banks and securities brokers' claims on EU banks are expected to drop by 29%.

In sum, the results of this study suggest that the EU crisis will have huge potential costs for the U.S. economy, which could reverse the recovery process or, in the best scenario, delay a robust economic recovery. To prevent these adverse effects, policymakers should adapt immediate, prudential measures. Diversifying the exports destinations, particularly, enhancing trade with Canada and Latin America should be a priority for the U.S. administration. Currently, despite the North America Free Trade Agreement (NAFTA) the U.S. exports to Canada and Latin America are lower than exports to any other regions around the globe. Though the establishment of a free trade zone (FTZ) with Southeast Asia has been initiated, facilitating the process and eliminating legal impediments, simplifying the tax system, and removing the non-tariff barriers can help neutralize the adverse effects of the EU crisis on the U.S. economy. Deregulation of financial markets is among the necessary measures that should take place to foster the capital flow to the United States from other regions, replacing those of the European Union. Finally, it would be helpful to reduce the exposure of the U.S. banking system to the European sovereign debt, not only by diversifying transactions among regions, but also by introducing different products and services.

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