Determining the Causes of the Recent U.S. Recessions and the Economic Slowdown in China

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ABSTRACT

Variables suspected as having possibly triggered the recent U.S. recession that begins from December, 2007 to have reached its trough in June, 2010 are mostly financial (NBER, 2010). These variables are mostly suspects by the short-term account. For instance, it is reported that the breakdowns in key credit markets -- such as bond and equity finance markets (Duca & Luttrell, 2010a: Duca, DiMarino, and Renier, 2010b) first occurred. In this thinking, heavy homebuilding finance and housing-backed consumer borrowing defaults trailed the recovery from the 2001 recession (Duca and Luttrell, 2010a; Duca, DiMarino, and Renier, 2010b) were cited by the most as dual major drivers behind the recent U.S. recession. This paper examines the causes of the recent U.S. recession by investigating the relationships between U.S. public debt-to-GDP, U.S. real estate mortgage delinquency, U.S. income inequality, and U.S. GDP level. Our findings based on annual data between 1987 to 2009 shows that to U.S. GDP performance, U.S. public debt-to-GDP shows statistically insignificant indirect association whereas U.S. income inequality and real estate mortgage delinquency proxies show statistically significant direct association in a multivariate linear regression analysis. Co-integration tests upset these finding results. To U.S. GDP in difference at the first order, all the three cause variables, in respective difference at the first order, shows indirect association. The difference of the U.S. public debt-to-GDP at the first order shows statistically significant indirect association, whereas the difference of the annual income inequality and the annual real estate mortgage delinquency proxies at the first order show statistically insignificant association. Despite short-term perspectives make blame on financial accounts, annual data between 1987 and 2009, suggests that U.S. public debt-to-GDP growth is on the other hand the major statistically significant factor of the recent U.S. recession.

INTRODUCTION

In this study, U.S. debt-to-GDP ratio, U.S. income inequality, and U.S. real estate mortgage delinquency are examined as causes to the recent U.S. recession which concurrently led to slight economic slowdown in China. Our study is aimed at finding out whether each of the three selected cause variables plays a role in the recent U.S. GDP downturn. U.S. GDP is often used as an indicator for the level of the U.S. economic activities. The three variables we examine as candidates for the causes to the recent U.S. recession provide information about how each is associated with the recent U.S. economic slowdown, taking a longer-term perspective using the annual data between 1987 and 2009.

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The discussion given to this paper is carried out in the following order. First, we discuss theories. Then, we discuss the data, its sources, and two models to be used to help us decide the causaul relations between each of the identified variables and the recent U.S. GDP level. Third, we report our regression findings. This is followed by a section of the brief discussion about the recent U.S. recession and its impact on economic slowdown in China.   The last is a section of conclusion. No sophisticated econometric methods are applied in this study to examine the cause-effect relation between the recent U.S. recession and the recent economic slowdown in China.

THEORIES

Below, some theories are introduced for explaining relations between the GDP of a nation and its debt-to-GDP ratio, its income inequality proxy, and/or its real estate mortgage delinquency rate.

Recent studies on the sustainability of fiscal policy to selected Euro-area countries, including Italy, France, Germany, and Portugal, shows sustainability evidenced for fiscal policy, though the Maastricht treaty three percent restriction on debt to GDP ratio may be temporarily violated (Greiner, Köller, and Semmler, 2007; Greiner, Semmler, and Gong, 2005). The studies suggest that the primary surplus to GDP ratio if evidenced as positive function of the debt to GDP ratio, then sustainability of the fiscal policy can be expected. The primary surplus to GDP ratio evidenced as positive function of the debt to GDP ratio reflects tax-base GDP growth leading to the sustainability of fiscal policy. Tax-base GDP growth when occurred with higher debt-to-GDP ratio implies debt produces positive economic stimulation effect leading therefore not to recession..

In an endogenous growth model with elastic labor supply, where agents differ in initial endowments of physical capital, García-Peñalosa and Turnovsky (2007) theorizes that the growth rate and the distribution of income are jointly determined. García-Peñalosa and Turnovsky (2007) also show that policies, especially those ones used in financing an investment subsidy, aiming at increasing the growth rate may result in a more unequal distribution of pre-tax income. Higher income inequality reported by the recent empirical literature may be by theory unfavorable to the growth rate of a consumption-driven economy. Despite families that first encountering liquidity constraints may have shortened multi-period planning horizons, their consumptions are not necessarily restrained by disposable income [Mariger (1987)]. The factor is important to be examined, for that a consumption-driven growth may occur as income inequality worsens and liquidity constrained consumption become increasingly financed by debt.

Sub-prime mortgage default and foreclosures triggered widening of the Libor-IOS spread is a feature unique of the recent U.S. recession (Duca and Luttrell, 2010a; Duca, DiMartino, and Renier, 2010b). Importance of the mortgage default to the pre-U.S. recession financial crisis has been widely commented by government research staff (Economic Report of the President, 2010; Duca and Luttrell, 2010a; Duca, DiMartino, and Renier, 2010b); and scholars Caballero, Farhi and Gourinchas 2008).

Based on aforementioned reasoning, we formalize a simple multivariate regression model aiming at examining whether our regression outcomes based on this simple model may shed lights to help determine causes of the recent U.S. recession. Below is the organized linear regression model.

$$US\text{-}GDP_t = a + b1^* DGDPR_t + b2^* (I^*I)_t + b3^* MDR_t + u_t \qquad (\text{Model I})$$

In the model, US-GDP stands for either U.S. annual or quarterly GDP in current or constant dollars. (I*I) stands for an U.S. yearly income inequality index, DGDPR stands for the U.S. annual debt-GDP ratio, MDR is U.S. annual mortgage delinquency rate, a stands for intercept of the regression, b1, b2, and b3 are regression coefficients with respect to variables DGDPR, I*I, and MDR, u is a stochastic disturbance term in linear regression Model I, and t is a time descriptor.

We begin with this simple linear regression assumption in Model I, then change this model accordingly when regression results suggest to do is necessary and beneficial. Otherwise, Model is proposed as behaving in agreement with the normality assumed in the classical linear regression model.

DATA AND ECONOMETRIC MODELS

Gathered from the BEA (Bureau of Economic Analysis) are the following data: The time-series U.S. annual GDP in current and constant dollars; and the time-series U.S. quarterly GDP in current and constant dollars. Yearly U.S. GINI index is used as U.S. income inequality proxy. Gathered from the Economic Report of the President is the annual U.S. Federal debt-to-GDP ratio. Annual U.S. real estate mortgage delinquency rates are also gathered to be used as the pre-financial crisis indicator proxy.

In this paper, we first use the ordinary least squares method to obtain regression estimation for Model I. The model later is refined to Model II, with details given below for points to be refined.

REGRESSION FINDINGS

The estimated linear regression results of Model I is illustrated in Table I, where the time-serial U.S. annual GDP in million of 2005 dollars is used as a regressor, annual U.S. debt-to-GDP ratio, U.S. yearly GINI index, and U.S. annual real estate mortgage delinquency rate are used as regressands. The estimated regression results, reported in the second column, Table I, show statistical significance for intercept and for the regression coefficient of variable I*I at the, two-tailed, level of the significance at 1%. However, the regression coefficients of both the variables DGDPR and MDR do not show such a statistical significance. U.S. annual GDP in 2005 dollars is positively correlated to U.S. yearly GINI index and U.S. I*I. Using the estimated results, we cannot generate a prediction for the recent U.S. recession. Our prediction merely on the base of magnitude of I*I from 2007 to 2009 shows wider income inequality should have brought increases to U.S. GDP during these years. This direction of the prediction is reverted because the negative estimate of the regression coefficient for DGDPR (or, U.S. debt-to-GDP ratio). From 2007 to 2009, high U.S. debt-to-GDP ratio reduces the level of U.S. annual GDP in 2005 dollars, based on the regression outcomes of Model I. Positive estimate obtained for the regression coefficient of variable MDR (or, U.S. annual real estate mortgage delinquency rate) suggests that U.S. annual GDP

should have been rising, which actually dropped, between 2007 to 2009. We suspect that multicollinearity may have caused the estimated regression coefficients to be significant for variable I*I and insignificant for both the regressands DGDPR and MDR.

Tabel 1: Regression Results

Variables/Test Statistics	Estimated Regression Coefficients (Linear Regression Model I)	Estimated Regression Coefficients (Model II)
Constant Term	-52,555	330.4646
	(-5.86476**)	(1783454**)
DGDPR (Model I);	-50.1163	-41.4793
DGDPRD (Model II)	(-1.06555)	(-6.96606**)
I*I (Model I)	142,712.4	-2436.72
or I*ID (Model II)	(6.130013**)	(-.93262)
MDR (Model I);	296.9651	-22.9315
MDRD (Model II)	(1.960401)	(-1.30447)
R-Square	0.808027	0.847676
Adjusted		
R-Square	0.777715	0.822289
F-statistic		
Significance	5.1E-07	1.45 E-07
t-critical value at		
$\alpha/2 = 0.025$	2.093	--
Degree of freedom		
	19	--

Note: t-statistics of the regression coefficients are reported in the parenthesis under each regression coefficient estimate . t-statistics of the regression coefficients that are denoted with ** are significant at $\alpha/2 = 0.005$.   t-statistics with * are tested statistically significant at $\alpha/2 = 0.025$.

Recall that U.S. annual GDP in 2005 dollars as well as all the regressands used in Model I are time series data. Whether these variables each contains unit root is then considered. Our findings point out that variable I*I shows as a case with unit root. The other regressands do not present to be as cases with unit root. Considering this finding, regression Model II is organized after the several unit root tests.

$$\text{US-GDPD}_t = a^d + b1^{d*} \text{DGDPRD}_t + b2^{d*} (I*ID)_t + b3^{d*} \text{MDRD}_t + u^d_t \qquad \text{(Model II)}$$

For Model II, the regression results are reported in column three, Table I. These results, still in the process of being further examined for mathematical and statistical plausibility, already suggest that DGDPRD provides explanation to a very large part of GDPD in the recent U.S. recession.

When we use the causal analysis suggested by Granger (Studenmund, 2006) to identify if that DGDPRD is a cause to how U.S. GDPD performed, or, that U.S. GDPD is a cause to how DGDPRD performed, our findings suggest that U.S. GDPD leads how DGDPRD performed the next period of the time. From Model II regression results, it is clear that when DGDPRD is higher, U.S. GDPD decreases the next period of the time. And, higher U.S. GDPD is associated with much more rapid decrease in DGDPRD than the decrease in U.S. GDPD the next period of the time. This finding helps us to conclude that U.S. GDPD leads DGDPRD in direction of moves. Strong indirect DGDPD correlation with U.S. GDPD well explains how U.S. GDPD varies as a result of the changes in DGDPD in the recent years. Recent high DGDPD, led by increases in U.S. GDPD between 2000 and 2007 well explains occurrences in the recent U.S. recession beginning November, 2007 lasting until the present. Since U.S. GDPD led

changes in DGDPD, we suggest that US GDP growth by fiscal or monetary expansionary stimulation are keys to the rebound of the near future U.S. GDP performance.

We now turn to the next section, where a brief discussion is given about the recent U.S. recession and economic slowdown in China. We now turn to the next section, where the recent U.S. recession and economic slowdown in China is the subject of the study.

RECENT U.S RECESSION AND ECONOMIC SLOWDOWN IN CHINA

Literature in both politics (such as Drezner, 2009) and economics (such as Caballero, Farhi, and Gourichas, 2008) have led readers to dismiss the articulated growing concerns about U.S. dependence on China and other authoritarian capitalist states as a source of credit to fund the United States' trade and budget deficits. Furthermore, our study finds that the recent U.S. recession indeed turned to become a damper on the rapid economic growth in China. However, regression results, ideally analyzed using monthly if not daily data, are not possibly carried out due to limited accessibility to the Chinese data. Our findings based on quarterly data between 2008 and 2009 are in need of being revised using monthly data when it becomes accessible to us.

CONCLUSIONS

In their article published in the *Brookings Papers on Economic Activity*, Caballero, Farhi, and Gourichas (2008) considers that global asset scarcity led large capital flows toward the United States as origins of asset bubbles that eventually burst into the recent financial crisis. Shortage of assets in the world economy triggered a partial re-creation of the bubble in commodities market, and oil markets in particular. This first phase of the financial bubble is represented by an increase in petrodollars seeking financial assets in the United States. As U.S. real economy and global growth slowed down, the slowdown worked to reverse the tight commodity market conditions then destroyed the commodity bubble. After flowing into U.S. economy, a housing bubble not later sustained by real economic growth led to the recent U.S. recession. However, this recession is not as bad as it appears in duration, because the past record shows that U.S. GDP performance when excellent always led to reduction in U.S. public debt to GDP ratio. U.S. public debt to GDP ratio has not dropped, as a result of the recent U.S. economic slowdown. Literature indicating that the current recession suffering from the mortgage delinquency finds no parallel evidence to support the assertion that mortgage delinquency always led to U.S. GDP slowdown. We strongly believe that a real economic growth in response to macroeconomic stimulation remains to be the key to the recovery from this recent recession. U.S. GDP growth in the past often leads to lower U.S. public debt to GDP ratio, lower mortgage delinquency ratio, and even a better GINI index performance.

REFERENCES

Caballero, R. J., E. Farhi and P.-O. Gourinchas. 2008. Financial Crash, Commodity Prices, and Global Imbalances. *Brookings Papers on Economic Activity*, 2008: 1-55.

Drezner, D. W. 2009. "Bad Debts: Assessing China's Financial Influence in Great Power Politics." *International Security*, 34: 7-45.

Duca, J. V. and D. Luttrell. 2010a. "Recovering from Housing and Financial Crisis." *Economic Letter: Insights from the Federal Reserve Bank of Dallas*, 5(7): 1-4.

Duca, J. V., D. DiMartino, and J. J. Renier. 2010b. "Fed Confronts Financial Crisis by Expanding Its Role as Lender of Last Resort." *Economic Letter: Insights from the Federal Reserve Bank of Dallas*, 4(2): 1-11.

Economic Report of the President. 2010. U.S. Publishing Co.

García-Peñalosa, C. and S. J. Turnovsky. 2007. "Growth, Income Inequality, and Fiscal Policy: What Are the Relevant Trade-Offs?" *Journal of Money, Credit and Banking*, 39: 369-394.

Greiner, A., U. Köller, and W. Semmler. 2007. "Debt Sustainability in the European Monetary Union: Theory and Empirical Evidence for Selected Countries." *Oxford Economic Papers*, 59: 194-218.

Greiner, A., Semmler, W., and Gong, G. 2005. *The Forces of Economic Growth: A Time Series Perspective.* Princeton Unversity Press.

Mariger, R. P. 1987. "A Life-Cycle Consumption Model with Liquidity Constraints: Theory and Empirical Results." *Econometrica*, 55: 533-557.

NBER's Business Cycle Dating Committee. September 20th, 2010 Report. http://www.nber.org/.

Studenmund, A. H. 2006. *Using Econometrics: A Practical Guide.* (Pearson/Addison-Wesley)/Prentice Hall: 5th edition.