

Analysis of Output Fluctuations in Italy and Policy Implications

Yu Hsing*

Southeastern Louisiana University, U.S.A.

ABSTRACT

The author extends the IS-MP-AS model and the Taylor rule to examine output fluctuations for Italy. The results show that equilibrium GDP is negatively associated with the expected inflation rate, the government deficit/GDP ratio, and the federal funds rate and positively influenced by stock prices due to the wealth effect and the balance-sheet effect. The real effective exchange rate is found to be insignificant, suggesting that a stable real exchange rate instead of real appreciation or depreciation would better serve the economy.

JEL Classification: E52 E62 F41

Keywords: IS-MP-AS model, Taylor rule, GARCH, expected inflation, deficit/GDP ratio, real exchange rate, stock price, world interest rate

Introduction

Like some countries in the region, the Italian economy has experienced progress and challenges. After moderate growth since 1994, the growth rate of real GDP slowed down to 0.36% in 2002 and 0.26% in 2003. The government deficit/GDP ratio of 4.64% in 2003 is lower than 6.10% in 2001 but is higher than the 3.0% benchmark required by the Maastricht Treaty of 1992 and the Stability and Growth Pact of 1997. The government debt/GDP ratio of 106.20% in 2003 is an improvement over a high of 115.48% in 1999 but is higher than the 60% threshold required for EU members. The main objective of the ESCB is “to maintain price stability” in order to provide “a high level of employment, ..., sustainable and non-inflationary growth, a high degree of competitiveness and convergence of economic performance” among EU member nations (*Monetary Policy of the ECB*, 2004). To stimulate the economy, the central bank reduced the money market rate from a high of 14.02% in 1992 to a low of 2.33%. The lending rate followed suite to drop from 15.76% to 5.03% during the same period. The inflation rate has been mild and below 3.00% since 1997. The most recent inflation rate of 2.67% in 2003 was a little higher than the EU guideline of below and close to 2.00% as specified in the *Monetary Policy of the ECB* (European Central Bank, 2004). During 1990-1998, the lira/dollar exchange rate trended upward, suggesting that the depreciation would help net exports. During 1999-2003, the dollar/euro rate appreciated from a low of 0.8403 in 1000.M10 to a high of 1.2195 in 2004.M5, indicating that it would hurt net exports. The share price

* Ph.D. in Economics from the University of Tennessee–Knoxville and M.S. in ILR from the University of Oregon – Eugene. He authored or coauthored more than 75 refereed journal articles indexed by the *Journal of Economic Literature*. He is Professor of Economics, department Head, and Editor-in-Chief of the *International Journal of Applied Economics*. The paper was presented at the annual conference of the International Atlantic Economic Society, New York City, October 2005.

index reached to a high of 100 in 2000 and then continued to decline to 58.05 in 2003. The considerable decline is expected to reduce consumption and investment spending.

The purpose of this paper is to determine how macroeconomic policies and other related variables would affect the Italian output and has several different aspects. First, the author extends the IS-MP-AS model (Romer, 2000) to study the subject. Romer (2000) maintained that the conventional IS-LM-AS model focuses on the price-output relation and uses real quantity of money as a monetary tool whereas his model emphasizes the inflation-output relation and uses the interest rate as a monetary instrument. Second, in the IS-MP-IA model, the monetary policy (MP) function extends the Taylor rule (1993, 1998a, 1998b) in that the interest rate is determined by the inflation gap, the output gap, the exchange rate gap, and other related variables. Therefore, the central bank targets the interest rate instead of the quantity of money. Third, additional variables such as the stock price and the world interest rate are considered in the paper in order to measure the wealth effect, the balance-sheet effect, and the possible response of the Italian interest rate to the world interest rate. Hsing (2004) extended the Romer model, provided theoretical analysis of the impact of the exchange rate change on real output, and found that the IS-MP-AS model is useful in explaining output fluctuations in the Czech Republic. Fourth, Engle's (1982, 2001) GARCH model is applied in order to determine whether error variance may be affected by past squared errors and past error variances.

Literature Survey

Several recent articles examined monetary policy, fiscal policy, and exchange rate movements for Italy and EU countries. Using a sample for Germany, France, and Netherlands during 1976-99 and applying the cointegration test, Saiti (2002) found that interest rates in Netherlands and France were strongly influenced by the German interest rate, that money supply is primarily used to contain inflation, that monetary policy formulation was not directed toward exchange rate determination, and that all 3 countries placed more emphasis on inflation stability than output stability. In studying fiscal and monetary policy for Germany, France and the Euro area during 1979-2000, Bruneau and De Bandt (2003) showed that a significant correlation of monetary shocks between Germany and France was found whereas fiscal shocks were not correlated and that monetary policy has a more significant impact than fiscal policy. Johnson (2002) found that the expected inflation rate in five inflation targeting nations fell after the government announced the targeting when controlling for other major factors. However, the variability of the expected inflation rate and forecast error did not fall after announcing targeting. All the 11 nations in the sample including Italy as a non-targeting country went through unexpected disinflation.

Fiorito (2000) showed that growth will be hurt with a rising tax and debt/GDP ratio and that the prevailing tax rate was higher than the sustainable level. Bravo and Silvestre (2002) employed the cointegration technique to test fiscal sustainability for 11 EU member states and found that Germany, France, U.K., Austria and the Netherlands exhibited fiscal sustainability whereas Italy, Belgian, Portugal, Denmark, Ireland, and Finland did not show sustainable fiscal paths.

Based on a sample of 7 industrialized nations including the Italy, Germany, France, UK, the U.S., Japan, and Canada during 1950-97 and applying the impulse response function, Giorgioni and Holden (2003) examined the impact of government taxation and spending on consumption. They reported that the expansionary fiscal contraction (EFC) model applied to the response of consumption to government taxation and the Keynesian model applied to the reaction of consumption to government spending.

Savona and Viviani (2003) found that economic growth rate in Italy was negatively affected by government current spending but positively influenced by government capital spending, private investment and several other factors. Hence, they suggested that the Stability and Growth Pact should be revised to exclude government capital investment from the calculation of government deficit. Brunetta and Tria (2003) reviewed the Stability and Growth Pact of 1997 and indicated that the Pact needs to be strengthened to allow a “golden rule” including some type of fiscal policy which is countercyclical and discretionary to deal with different economic situations in individual member countries.

Based on the VAR model and a sample of five countries during 1973-1999, Samanta and Zadeh (2003) found that exchange rate movements among Italy, U.K., Canada, Germany, France, and Japan exhibited significant interdependence or spillover effects. In investigating the impact of currency depreciation on the price level for five euro nations including Germany, Hufner and Schroder (2003) applied the VECM and found that a depreciation of the euro by 10% would lead to a 0.4% increase in the consumer price index by the end of 12 months and a 0.8% increase in the long run. In examining the effect of currency depreciation on stock prices for six industrialized countries including Germany during 1974-99, Apergis and Eleftheriou (2003) reported that currency depreciation led to a lower stock price for U.K., Canada, and Italy and a higher stock price for Germany, France, and Japan.

Theoretical Model

Suppose that consumption spending is determined by disposable income, the real interest rate, and stock prices (Mishkin, 1995; Taylor, 1995; Kuttner and Mosser, 2002), investment spending is a function of output and the real interest rate and stock prices (Mishkin, 1995; Taylor, 1995; Bernanke and Gertler, 1995; Kuttner and Mosser, 2002), net exports are influenced by the real exchange rate, the monetary policy (MP) function is determined by the inflation gap, the output gap, the exchange rate gap, and the world interest rate, and the inflation rate depends on the expected inflation rate, the output gap, and the nominal exchange rate. Extending the IS-MP-AS model (Romer, 2000) and the Taylor rule (1993, 1998a, 1998b), the IS, MP, and AS functions for the Italian economy can be expressed as

$$\begin{aligned}
 Y &= C(Y - T, R, S) + I(Y, R, S) + G + NX[e(P^*/P)] \\
 R &= R(\pi - \alpha, Y - Y^*, e - \beta, R^w) \\
 \pi &= \pi^e + \lambda(Y - Y^*) + \delta e
 \end{aligned}
 \tag{1}$$

where

- Y = real GDP in Italy,
- C = consumption function,
- T = government tax revenues,
- R = the real interest rate,
- S = price of financial stocks,
- I = the investment function,
- G = real government spending,
- NX = real net exports,
- e = the nominal effective exchange rate (an increase is an appreciation),
- P* = the price level in Italy,
- P = the foreign price level,
- π = the inflation rate,
- α = the inflation target,
- Y* = potential output,
- β = the exchange rate target,
- R^W = the world interest rate,
- π^e = the expected inflation rate.

Solving for Y, R, and in equation (1), the equilibrium output is given by

$$\bar{Y} = \bar{Y} [\pi^e, G, T, e(P^*/P), S, R^W; Y^*, \alpha, \beta, \lambda, \delta] \quad (2)$$

We expect that equilibrium output has a negative relation with the expected inflation rate, tax revenues, the world interest rate and a positive relation with government spending and stock prices. The relation with the exchange rate is unclear. A higher expected inflation rate would shift the aggregate supply curve to the right and result in a higher inflation rate and lower output in the inflation-output diagram. Increased government spending or a tax cut or both would shift the aggregate demand curve to the right and cause output to rise. However, the Ricardian-equivalence hypothesis (Barro, 1989) suggested that deficit-financed spending may have a neutral effect in the long run.

Currency depreciation is expected to stimulate net exports and shift aggregate demand to the right. On the other hand, the depreciation may cause import prices and domestic inflation to rise, which would shift aggregate supply to the left. Some studies showed that the effect of currency depreciation or devaluation on output is ambiguous, depending upon the specification of a model, the methodology used in empirical work, the country under study, and the short-run versus the long-run (Edwards, 1986; Morley, 1992; Upadhyaya, 1999; Bahmani-Oskooee and Miteza, 2003).

Higher stock prices are likely to allow households to increase consumption via the wealth effect and firms to investment more via the balance-sheet effect (Mishkin, 1995;

Bernanke and Gertler, 1995; Kuttner and Mosser, 2002). If the European Central Bank responds positively to a higher world interest rate by raising the interest rate for EU countries, it would decrease consumption and investment spending.

Some of these relations can be analyzed by comparative-static analysis. Assume that equations in (1) have continuous partial derivatives. Let

$$C_Y > 0, C_S > 0, C_R < 0, I_Y > 0, I_R < 0, I_S > 0, NX_e < 0, \\ R_\pi > 0, R_Y > 0, R_e < 0, R_{R^w} > 0, \lambda > 0, \delta < 0.$$

The endogenous-variable Jacobian is given by equation (3) and has a positive value.

$$|J| = \begin{vmatrix} 1 - C_Y - I_Y & -(C_R + I_R) & 0 \\ -R_Y & 1 & -R_\pi \\ -\lambda & 0 & 1 \end{vmatrix} = (1 - C_Y - I_Y) - \lambda R_\pi (C_R + I_R) - R_Y (C_R + I_R) > 0. \quad (3)$$

It can be shown that the impact of a change in the exchange rate on equilibrium output can be written as

$$\frac{\partial \bar{Y}}{\partial e} = \frac{\begin{vmatrix} NX_e(P^*/P) & -(C_R + I_R) & 0 \\ R_e & 1 & -R_\pi \\ \delta & 0 & 1 \end{vmatrix}}{|J|} \\ = \frac{NX_e(P^*/P) + \delta R_\pi (C_R + I_R) + R_e (C_R + I_R)}{|J|} \quad (4) \\ > 0 \text{ if } |NX_e(P^*/P)| < |\delta R_\pi (C_R + I_R) + R_e (C_R + I_R)| \\ < 0 \text{ if } |NX_e(P^*/P)| > |\delta R_\pi (C_R + I_R) + R_e (C_R + I_R)|$$

Whether currency appreciation would affect equilibrium output positively or negatively depends on the difference between the expected negative impact on net exports and expected positive impacts of increased consumption and investment expenditures due to a lower interest rate.

The impacts of a change in stock prices and the world interest rate on equilibrium output are given by equations (5) and (6), respectively. As shown, increased stock prices are expected to raise equilibrium output. A higher world interest rate would reduce equilibrium output due to the response of the domestic interest rate and reduced consumption and investment spending.

$$\frac{\partial \bar{Y}}{\partial S} = \frac{C_S + I_S}{|J|} > 0 \quad (5)$$

$$\frac{\partial \bar{Y}}{\partial R^w} = \frac{R_{R^w} (C_R + I_R)}{|J|} < 0 \quad (6)$$

Empirical Results

The data were taken from the *International financial Statistics* published by the International Monetary Fund and the Bank of Italy. Real GDP is expressed in trillions at the 2000 price. The expected inflation rate is the average inflation rate of past three years. Due to a high degree of correlation between G and T and to follow EU's guideline, government deficit is expressed as $DY = (G - T)/GDP * 100\%$ or the deficit spending/GDP ratio. When the real effective exchange rate increases, the currency appreciates, and vice versa. The stock price is the share price index compiled by the IMF. The U.S. federal funds rate is selected to represent the world interest rate because of its worldwide influence. The sample consists of annual data ranging from 1975 to 2003. Earlier data for the share stock index is not available.

The estimated linear regression and related statistics are presented in Table 1. The ARCH(1) process is employed in estimating the variance equation. Because the coefficients for ARCH(1) is significant at the 1% level, error variance is a function of past error variance. The GARCH process is also considered but is not employed due to the insignificant coefficient in the variance equation and the outcome that is inconsistent with the theoretical expectation. In the estimated regression, 83.15% of the variation in equilibrium output can be explained by the five right-hand side variables. All the coefficients are significant at the 1% level except that the coefficient for the real effective exchange rate is insignificant at the 10% level. Equilibrium output is negatively associated with the expected inflation rate, the budget deficit/GDP ratio, and the U.S. federal funds rate and positively influenced by stock prices.

Specifically, an increase in the expected inflation rate by 1 percentage point would reduce equilibrium output by 26.81 trillion or 1.46% at the mean value. It is interesting to find that the coefficient of the government deficit/GDO ratio is negative and significant. An increase in the deficit/GDP ratio by 1 percentage point would reduce equilibrium output by 10.17 trillion or 0.55%. Possible reasons for the negative and significant coefficient of the budget deficit/GDP ratio include that increased government debt to finance the deficit would raise the long-term interest rate and dampen consumption and investment spending and that the change in the portfolio among different assets including money, government bonds, stocks, etc, may not affect consumption and other expenditures much.

An increase in the stock price index by 1 would raise equilibrium GDP by 2.19 billion because higher stock prices would stimulate consumption and investment expenditures through the wealth effect and the balance sheet effect. If the Federal Reserve Bank raises the federal funds rate by 1 percentage point, equilibrium output would decline by 11.86 trillion.

To test the robustness of empirical results, the semi-log form is considered and reported in Table 2. The GARCH(1,1) process is applied, and the coefficient of GARCH(1)

Table 1
ARCH(1) Regression for the Italian Output: Linear Form

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistic</i>	<i>Prob.</i>
Dependent Variable: \bar{y}				
Method: ML-ARCH (BHHH)				
Sample: 1975 2003				
Included observations: 29				
Bollerslev-Wooldrige robust standard errors & covariance				
Variance backcast: ON				
C	2284.579	49.64859	46.01498	0.0000
π^e	-26.81372	2.554383	-10.49714	0.0000
DY	-10.16774	3.619788	-2.808932	0.0050
ε	-0.616258	0.546287	-1.128086	0.2593
S	2.189450	0.598442	3.658585	0.0003
R ^w	-11.85738	3.357856	-3.531236	0.0004
<i>Variance Equation</i>				
C	697.5028	223.8936	3.115332	0.0018
ARCH(1)	0.758642	0.199597	3.800872	0.0001
R-squared	0.831457	Mean dependent var		1834.216
Adjusted R-squared	0.775276	S.D. dependent var		319.0231
S.E. of regression	151.2331	Akaike info criterion		11.69617
Sum squared resid	480300.8	Schwarz criterion		12.07336
Log likelihood	-161.5945	F-statistic		14.79960

Notes

π^e is the expected inflation rate.

DY is the budget deficit/GDP ratio.

ε is the real effective exchange rate.

S is the stock price index.

R^w is the U.S. federal funds rate.

is significant, suggesting that error variance is a function of past error variance. The explanatory power of 94.61% is higher than the linear form. The sign and significance of the coefficients are similar to those in Table 1. The coefficients are different because all the explanatory variables are measured in the logarithmic scale. To minimize the forecast error, the semi-log form would be better than the linear form.

Summary and Conclusions

In this study, the author has examined the determinants of equilibrium GDP for Italy based on the extended IS-MP-AS model and Taylor rule. Major findings are that a lower expected inflation rate, a lower deficit/GDP ratio, a higher stock price, and a lower U.S. federal funds rate would help raise equilibrium GDP. There are several policy implications. The central bank needs to continue to maintain price stability and contain inflation because of the negative impact of rising expected inflation on output. The negative relation between the deficit/GDP ratio and equilibrium GDP suggests that fiscal discipline is needed to reduce the government deficit/GDP ratio to below 3.00% as required by the

Maastricht Treaty of 1992 and the Stability and Growth Pact of 1997. The recent trend in the dollar/euro exchange rate may hurt net exports and cause real output to decline. Hence, the European Central Bank may need to take some measures to stabilize the dollar/euro exchange rate in order to make Italian-made products more competitive in the world market. The wealth effect and the balance-sheet effect due to increased stock prices are important. Hence, a healthy stock market would be conducive to economic growth.

Table 2
GARCH(1,1) Regression for the Italian Output: Semi-Log Form

Dependent Variable: \bar{y}				
Method: ML - ARCH (BHHH)				
Sample: 1975 2003				
Included observations: 29				
Bollerslev-Wooldrige robust standard errors & covariance				
Variance backcast: ON				
	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistic</i>	<i>Prob.</i>
C	1944.667	580.2265	3.351564	0.0008
LOG (π^e)	-192.9519	37.50437	-5.144784	0.0000
LOG (<i>DY</i>)	-31.34816	16.35414	-1.916833	0.0553
LOG (ε)	15.16144	132.1398	0.114738	0.9087
LOG (<i>S</i>)	122.1463	22.81416	5.353971	0.0000
LOG (R^w)	-51.78734	19.65811	-2.634401	0.0084
<i>Variance Equation</i>				
C	577.2131	310.5219	1.858849	0.0630
ARCH(1)	-0.137170	0.112067	-1.223998	0.2210
GARCH(1)	0.875456	0.208934	4.190103	0.0000
R-squared	0.946061	Mean dependent var		1834.216
Adjusted R-squared	0.924486	S.D. dependent var		319.0231
S.E. of regression	87.66699	Akaike info criterion		11.44746
Sum squared resid	153710.0	Schwarz criterion		11.87180
Log likelihood	-156.9882	F-statistic		43.84896

Notes

π^e is the expected inflation rate.

DY is the budget deficit/GDP ratio.

ε is the real effective exchange rate.

S is the stock price index.

R^w is the U.S. federal funds rate.

Due to the use of time series data, some of the variables are highly correlated. Some techniques may be used to reduce the multicollinearity problem to yield more precise parameter estimates. Because the LM curve is replaced by the monetary policy function, potential substitution between domestic and foreign currencies is not examined. Potential output is assumed to be constant and may be estimated and considered. Other potential variables may be considered if the inclusion would not cause a high degree of multicollinearity.

References

- BAHMANI-OSKOOEE M. and MITEZA I., "Are Devaluations Expansionary or Contractionary? A Survey Article," *Economic Issues*, 2003, 8, pp. 1-28.
- BERNANKE B.S. and GERTLER M., "Inside the Black Box: the Credit Channel of Monetary Policy Transmission," *Journal of Economic Perspectives*, 1995, 9, 27-48.
- BARRO R.J., "The Ricardian Approach to Budget Deficits," *Journal of Economic Perspectives*, 1989, 3, pp. 37-54.
- BRAVO A.B.S. and SILVESTRE A.L., "Intertemporal Sustainability of Fiscal Policies: Some Tests for European Countries," *European Journal of Political Economy*, 2002, 18, pp. 517-528.
- BRUNETTA R. and TRIA G., "The Stability and Growth Pact: The Fiscal Rules Need Changing," *Review of Economic Conditions in Italy*, 2003, 2, pp. 195-236.
- BRUNEAU C. and DE BANDT O., "Monetary and Fiscal Policy in the Transition to EMU: What Do SVAR Models Tell Us?" *Economic Modelling*, 2003, 20, pp. 959-985.
- COLLARD F. and DELLAS H., "Exchange Rate Systems and Macroeconomic Stability," *Journal of Monetary Economics*, 2002, 49, pp. 571-599.
- EDWARDS S., "Are Devaluations Contractionary?" *Review of Economics and Statistics*, 1986, 68, pp. 501-508.
- ENGEL R.F., "GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics," *Journal of Economic Perspectives*, 2001, 15, pp. 157-168.
- ENGLE R.F., "Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation," *Econometrica*, 1982, 50, pp. 987-1008.
- EUROPEAN CENTRAL BANK *The Monetary Policy of the ECB*, second edition, Frankfurt am Main, Germany, January 2004, 1-126.
- FIORITO R., "Government Debt, Taxes and Growth," *Journal of Public Finance and Public Choice/Economia Delle Scelte Pubbliche*, 2000, 18, pp. 119-130.
- GALI J., "How Well Does the IS-LM Model Fit Postwar U.S. Data?" *Quarterly Journal of Economics*, 1992, 107, pp. 709-738.
- GIORGIONI G. and HOLDEN K., "Ricardian Equivalence, Expansionary Fiscal Contraction and the Stock Market: A VECM Approach," *Applied Economics*, 2003, 35, pp. 1435-1443.
- HSING Y., "Impacts of Macroeconomic Policies on Output in the Czech Republic: An Application of Romer's IS-MP-IA Model," *Prague Economic Papers*, 2004, 13, pp. 339-345.
- HUFNER F.P. and SCHRODER M., "Exchange Rate Pass-through to Consumer Prices: A European Perspective," *Aussenwirtschaft*, 2003, 58, pp. 383-411.
- JOHNSON D.R., "The Effect of Inflation Targeting on the Behavior of Expected Inflation: Evidence from an 11 Country Panel," *Journal of Monetary Economics*, November 2002, 49, pp. 1521-1538.
- JONDEAU E. and LE BIHAN H., "Evaluating Monetary Policy Rules in Estimated Forward-Looking Models: A Comparison of US and German Monetary Policies," *Annales d'Economie et de Statistique*, 2002, 0(67-68), pp. 357-388.
- KUTNNER, K.N. and MOSSER P.C., "The Monetary Transmission Mechanism: Some Answers and Further Questions," *Federal Reserve Bank of New York Economic Policy Review*, 2002, 8, pp. 15-26.

- MANKIW N.G., "A Quick Refresher Course in Macroeconomics." *Journal of Economic Literature*, 1990, 28, pp. 1645-60.
- MISHKIN F.S., "Symposium on the Monetary Transmission Mechanism," *Journal of Economic Perspectives*, 1995, 9, pp. 3-10.
- MORLEY S.A., "On the Effect of Devaluation during Stabilization Programs in LDCs," *Review of Economics and Statistics*, 1992, 74, pp. 21-27.
- ROMER D., "Keynesian Macroeconomics without the LM Curve," *Journal of Economic Perspectives*, 2000, 14, pp. 149-169.
- SAITTA A., "Monetary Policy Rules: The Experience of Germany, Netherlands and France," *Archives of Economic History*, 2002, 14, pp. 99-129.
- SANAMTA S.K. and ZADEH A.H.M., "Cross Country Spillover Effects in Foreign Exchange Market: An Empirical Analysis of Six OECD Countries," *International Trade Journal*, 2003, 17, pp. 129-164.
- TAYLOR J.B., "Discretion versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy*, 1993, 39, pp. 195-214.
- TAYLOR J.B., "The Monetary Transmission Mechanism: An Empirical Framework," *Journal of Economic Perspectives*, 1995, 9, pp. 11-26.
- TAYLOR J.B., "Applying Academic Research on Monetary Policy Rules: An Exercise on Transactional Economics," *Manchester School*, Supplement, 1998a, pp. 1-16.
- TAYLOR J.B., "Monetary Policy and the Long Boom," *Federal Reserve Bank of St. Louis Review*, 1998b, 80, pp. 3-11.
- WORMS A., "Interbank Relationships and the Credit Channel in Germany," *Empirica*, 2003, 30, pp. 179-198.
- UPADHYAYA K.P., "Currency devaluation, aggregate output, and the long run: an empirical study," *Economics Letters*, 1999, 64, pp. 197-202.