

EXTENSIVE ABSTRACT

Can Phillips curve explain the recent behavior of inflation? Evidence from G7 countries

Michael Chletsos¹
University of Ioannina

Vassiliki Drosou
University of Ioannina

The financial crisis which occurred in 2007 changed to an economic crisis, commonly known as the “Great Recession” affecting the output produced, inflation and unemployment. Many OECD countries entered in a long recession period with significant drops of GDP and increases in unemployment rate. Data on unemployment rate and on NAIRU show that unemployment rate is higher than NAIRU and this difference becomes greater and greater during the recession period. One of the characteristics of this last recession was the great decrease of the output during this period and the slow growth and the substantial weakness that many countries face after the recession period. This prolonged period of recession and the slow growth reflected a downward pressure on prices. This could develop to a deflation period.

Phillips in 1958 analyzed the relationship between unemployment and inflation by focusing on their negative relationship. While there is a short run tradeoff between unemployment and inflation, it has not been observed in the long run period. In 1968, Milton Friedman said that the Phillips Curve was only applicable in the short-run and that in the long-run, inflationary policies will not decrease unemployment. Then, Friedman correctly predicted that, in the upcoming years after 1968, both inflation and unemployment would increase. The long-run Phillips Curve is now seen as a vertical line at the natural rate of unemployment, where the rate of inflation has no effect on unemployment.

Standard models of inflation in the short run build upon the work of Friedman (1968) and support that inflation depends on expected inflation and slack in the economy. The accelerationist Phillips curve has been modified and adapted by many authors over those last

¹ Corresponding Author : Michael Chletsos, University of Ioannina, Department of Economics, University Campus, P.O. Box 1186, 45110 Ioannina, tel : +30 26510 05924, fax : +30 26510 05093, e-mail : mhletsos@cc.uoi.gr and mhletsos@otenet.gr

decades. Ball and Mazumder (2011) explore the ability of the Phillips curve model to explain the behavior of inflation during the Great Recession. Murphy (2014) revisits the question of why the Standard Phillips curve has predicted deflation over that past several years in USA. He modifies the Phillips curve to allow its slope to vary continuously through time. He finds that modifying Phillips curve to allow continuous time – variation in its slope greatly improves its ability to explain the recent behavior of inflation.

The purpose of this paper is to follow the methodology applied by Murphy (2014) and examines if the standard Phillips curve can explain correctly the behavior of inflation and its slope during the last years of economic crisis. In order to answer our research questions we use the standard Phillips curve and the modified Phillips curve. We use data for four countries of G7 group (USA, Canada, Germany and Japan) for the period 1960 – 2013. We estimate NAIRU following the estimation method proposed by Ball and Mankiw (2012). In order to answer the question if the Phillips curve can explain the behavior and the slope of inflation we use the typical Phillips curve ($\pi_t = \pi_t^e + \beta[u_t - u_t^n] + \varepsilon_t$, where π_t = inflation rate, π_t^e = expected inflation rate, u_t = unemployment rate and u_t^n = NAIRU) and the modified Phillips curve ($\pi_t = 0.25 [\pi_{t-1} + \pi_{t-2} + \pi_{t-3} + \pi_{t-4}] + \beta [u_t - u_t^n] + \beta_1 \overline{\pi_t} [u_t - u_t^n] + \beta_2 \sigma_t^\pi [u_t - u_t^n]$, where : $\overline{\pi_t}$ και σ_t^π are moving average of average and standard deviation.

Some preliminary results are presented below.

Table 1 : Some preliminary results using traditional Phillips curve

Η.Π.Α.

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	-.734275	.0870134	-8.44	0.000	-.9059114	-.5626387

Καναδάς

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	-.7386729	.0944555	-7.82	0.000	-.9250989	-.5522469

Γερμανία

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	-.65159	.0837651	-7.78	0.000	-.8169165	-.4862636

Ιαπωνία

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	-3.121458	.696868	-4.48	0.000	-4.499034	-1.743881

Table 2 : Some preliminary results using the modifying Phillips curve

Η.Π.Α.

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	.2114269	.2269295	0.93	0.353	-.2362283	.6590822
mugap	-.1802978	.0395709	-4.56	0.000	-.2583578	-.1022378

Καναδάς

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	-.3470395	.2633755	-1.32	0.189	-.8669039	.1728248
mugap	-.0733928	.0440469	-1.67	0.097	-.1603349	.0135493

Γερμανία

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	.1272538	.2013802	0.63	0.528	-.2702408	.5247485
mugap	-.2704475	.0641854	-4.21	0.000	-.3971399	-.1437551

Ιαπωνία

inflation	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
expectations	¹					
ugap	1.904767	.6989748	2.73	0.007	.5228565	3.286678
stugap	-3.535517	.3300156	-10.71	0.000	-4.187976	-2.883059

The preliminary empirical results indicate that the ability of Phillips curve to predict the behavior and the slope of inflation is not good. We remark that there is a change in the slope in all countries and the estimated predictions using the modified Phillips curve are better than the predictions using the traditional Phillips curve.

References

Atkeson, A. and L.E. Ohanian (2001): "Are Phillips Curves Useful for Forecasting Inflation?" Federal Reserve Bank of Minneapolis Quarterly Review 25(1):2-11.

Ball, L., N. Mankiw, and D. Romer (1988): "The New Keynesian Economics and the Output-Inflation Trade-off," Brookings Papers on Economic Activity, 19, 1–82.

Ball, L., and N.G. Mankiw (2002): "The NAIRU in Theory and Practice," NBER Working Paper 8940.

Ball, L., Mazumber, S. (2011): "Inflation dynamics and the Great Recession," Brookings Pap. Econ. Activ., 337-381.

Barro, R.J., Gordon, D.B. (1983): "A positive theory of monetary policy in a natural rate model," Journal of Political Economy 91, 589–590.

Borio, C., and Filardo, A. (2007): "Globalisation and Inflation: New Cross-Country Evidence on the Global Determinants of Domestic Inflation," working paper, Bank for International Settlements.

Calvo, G. (1983): "Staggered Prices in a Utility Maximizing Framework," Journal of Monetary Economics, 12, 383–398.

Canova, F. (2007): "G-7 inflation forecasts: random walk, Phillips curve or what else?," Macroeconomic Dynamics 11, 1–30.

Croonenbroeck C., G. Stadtmann (2012): "Evaluating Phillips Curve Based Inflation Forecasts in Europe: A Note," European University Viadrina Frankfurt (Order), Discussion Paper No.329, ISSN 1860 0921.

DeBelle, G., Laxton, D. (1997): "Is the Phillips curve really a curve? Some evidence for Canada, the United Kingdom, and the United States," IMF Staff Papers 44, 249–282.

DeVeirman, E. (2007): "Which nonlinearity in the Phillips curve? The absence of accelerating deflation in Japan," Reserve Bank of New Zealand Discussion Paper Series DP2007/14, Reserve Bank of New Zealand.

Dotsey, M., R.G. King and A.L. Wolman (1999): "State-dependent pricing and the general equilibrium dynamics of money and output," Quarterly Journal of Economics 114, 655–690.

Eliasson, A.C. (2001): "Is the short-run Phillips curve nonlinear? Empirical evidence for Australia, Sweden and the United States," Sverige Risbank Working Paper Series, No. 124.

Fendel, R., E. Lis, and J. C. Rülke (2011): "Do Professional Forecasters Believe in the Phillips Curve? Evidence from the G7 Countries," Journal of Forecasting, Vol. 30 (March), 268–287.

Filardo, A.J. (1998): "New evidence on the output cost of fighting inflation," Economic Review, Federal Reserve Bank of Kansas City, Third Quarter, 33–61.

Fisher, J.D.M., C.T. Liu, and R. Zhou (2002): "When Can We Forecast Inflation?," FRB Chicago Economic Perspectives (1Q) 30–42.

Friedman, M. (1968): "The Role of Monetary Policy," American Economic Review, 58, 1–17.

Gali, J. and M. Gertler (1999): "Inflation Dynamics: A Structural Econometric Analysis," Journal of Monetary Economics, 44, 195–222.

Gordon, R.J. (1977): "Can the inflation of the 1970s be explained?," Brookings Papers on Economic Activity 1, 253–277.

Gordon, R. (2011): "The History of the Phillips Curve: Consensus and Bifurcation," Economica, 78, 10–50.

Hasanov, M., A. Arac and F. Telatar (2010): "Nonlinearity and structural stability in the Phillips curve: Evidence from Turkey," *Economic Modelling* 27, 1103-1115.

Koop, G. and Onorante, L. (2012): "Estimating Phillips Curves in Turbulent Times Using The ECB's Survey of Professional Forecasters," ECB Working Paper No 1422.

Lansing, Kevin (2002): "Can the Phillips Curve Help Forecast Inflation?," Federal Reserve Bank of San Francisco Economic Letter 2002-2029.

Lucas, R. (1973): "Some International Evidence on Output-Inflation Tradeoffs," *American Economic Review*, 63, 326–34.

Mankiw, N. and R. Reis (2002): "Sticky Information Versus Sticky Price: A Proposal to Replace the New Keynesian Phillips Curve," *Quarterly Journal of Economics*, 117, 1295–1328.

Melick, W. and G. Galati (2006): "The evolving inflation process: An overview," Bank for International Settlements Working Paper No. 196.

Mishkin, F. (2007): "Inflation Dynamics," *International Finance*, 10, 317–334.

Motyovszki, G. (2013): *"The Evolution of the Phillips Curve Concepts and Their Implications For Economic Policy,"* Budapest: Central European University.

Murphy, R. (2014): "Explaining Inflation in the Aftermath of the Great Recession," *Journal of Macroeconomics*, 40, 228-244.

Musso, A., Stracca, L., Dijk, D. (2007): "Instability and nonlinearity in the euro area Phillips Curve", ECB Working paper series no. 811.

Phelps, E.S. (1969): "The new microeconomics in inflation and employment theory," *American Economic Review: Papers and Proceedings*, 59(2), 147–160.

Phillips, A.W. (1958): "The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1861–1957," *Economica New Series* 25,

283–299.

Reis R. (2006): “Inattentive producers,” *Rev. Econ. Stud.* 73, 793-821.

Roberts, J. (2006): “Monetary Policy and Inflation Dynamics,” *International Journal of Central Banking*, 2.

Royal Swedish Academy of Sciences (2006): “Edmund Phelps’s contributions to macroeconomics,” *Kungl Vetenskapsakademien*.

Stock, J. and M. Watson (2008): “Phillips Curve Inflation Forecasts,” NBER Working Paper, 14322.

Sommer, M. (2004): “Supply Shocks and the Persistence of Inflation,” *Macroeconomics* 0408005, EconWPA.

Williams, J. (2010): “Sailing into Headwinds: The Uncertain Outlook for the U.S. Economy,” Presentation to Joint Meeting of the San Francisco and Salt Lake City Branch Boards of Directors, Salt Lake City, UT.