

Relation between monetary announcement and Phillips Curve? An empirical study from Malaysia

Abey P. PHILIP

Curtin University, Sarawak Malaysia
abeypp@curtin.edu.my

Abstract. *Macro economist over the years have camped their argument on the tradeoff between inflation and unemployment on an economy. As the monetary announcement of an economy has an important influence on both inflation and unemployment, this paper reviews the existing literature to find out the relation between inflation and unemployment rate in Malaysia with special emphasis given on the monetary announcement over a period of 1980-2011. This research not only looks into the tradeoff between inflation and unemployment but also look into the impact of the monetary announcement in an economy. This research tries to look into the shape of the Phillips curve in Malaysian economy and how monetary announcement of Malaysia influence on the Phillips curve. This study can help the policy makers to come up with realistic policy to manage country's inflation and unemployment rate with the support by monetary policy.*

Keywords: Phillips curve, inflation, unemployment, monetary announcements.

JEL Classification: E1, E24, E62.

REL Classification: 8J, 8F, 8G.

1. Introduction

The tradeoff between inflation and unemployment rate is a few decades old controversy in macroeconomics and it persists in economics because policy makers are required to take appropriate decision to fulfill the macro objectives of economy. The famous research by (Phillips, 1958) on the negative relation between inflation and unemployment in the United Kingdom encouraged researchers to test this interesting tradeoff between these variants persist in different countries. (Solow, 1969) supported and reconfirmed that the negative relation between inflation and unemployment existed in the United Kingdom. Later, (Gordon, 1970) went further and found the possibility of quantitative support in the short run and long run.

(Lucas, 1978) argued that tradeoff between inflation and unemployment was due to the identification problem existed and stated that it is “econometric failure on grand scale”. They found the higher average values of inflation and argued that increased persistence of inflation is associated with a decline in the estimate of the long-run tradeoff between unemployment and inflation. (Friedman, 1977; Phelps, 1967) pointed out that the controversy about the illicit relation between inflation and unemployment are enlaced with monetary, fiscal and other factors that affect aggregate demand. It is true that all these factors are interdependent and therefore it has a special role in the growth of an economy. Thus, there exist two schools of thought about the relationship between inflation rate and unemployment. One says the relation is negative and other concludes it is positive. (King & Watson, 1994) supported the argument of positive relations between inflation and unemployment with the clear evidence of structural change in the behaviour of US inflation and unemployment rate.

(Marika Karanassou, 2005) stated that the slope of the long-run Phillips curve is related to inflation persistence and unemployment persistence in the aftermath of monetary shocks. There is a lack of evidence in the literature about the influence of monetary policy on the Phillips curve. Macroeconomics theory clearly says that the monetary policy can be used to effect changes in either inflation or unemployment. (Meade & Thornton, 2012) Phillips curve was not considered in US to the formulation of monetary policy. Even though this study is not exploited the influence of monetary policy on employment and inflation of US economy. However, there is no evidence showing its impact on the traditional Phillips curve.

Bank Negara Malaysia (BNM) has the goal of a low inflation rate (Roberts, 1993) and Malaysia operate monetary policy an explicit inflation target. (Munir, Mansur, & Furuoka, 2009) found that there is a substantial change in economic

growth by keeping a low level of inflation in Malaysia. It shows that Malaysia should tradeoff employment for keeping low or stable inflation in its economy. In this aspect, we can expect that traditional Phillips curve has a role in the Malaysian economy. The main objective of this research is looking into the influence of monetary policy on inflation and unemployment and also to define the shape of the Phillips curve in Malaysia. There is no study done to find out the influence of monetary policy on Phillips curve and a clear evidence of the existence of a gap in research about the influence of monetary policy on the Phillips curve.

2. Literature Review

Phillips pointed out a smooth tradeoff between inflation and unemployment rate (Fig-1) and that is opposed by other emeritus economics like Lucas and Sargent etc. Friedman and Phelps debated firmly that there is no or “long term” trade-off between inflation and employment. The price stickiness could cause the trade off in the short run but can move opposite direction because of the structural break (Ball, 1988).

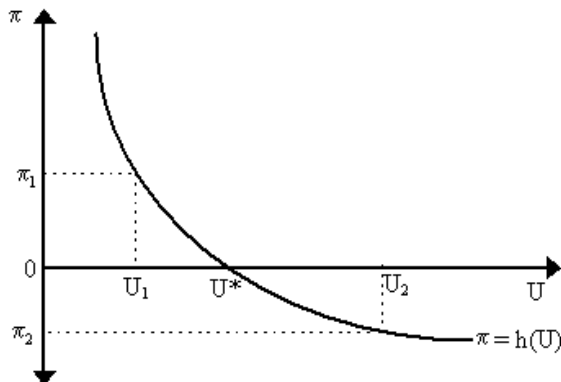


Figure 1. *Traditional Phillips curve*

(Ball, 1988) in his research noted that countries in Europe witnessed a larger increase in the natural rate of unemployment with larger decrease in inflation. In addition, in his other paper he linked these to monetary policy. He found that countries that implemented expansionary monetary policy experienced larger increases in natural rate unemployment. His subsequent research showed that fully credible disinflation could cause economic boom. However, there is inconsistency as he persists that disinflation cause booms in this model but in

reality it causes a recession. (Campbell, 1987) ascertained with support of US time series that the natural rate hypothesis is wrong. Mankiw states, “*The inflation-unemployment tradeoff is, at its heart, a statement about the effects of monetary policy. It is the claim that changes in monetary policy push these two variables in opposite directions.*” However, monetary policy causes a shift in unemployment and inflation. It is obvious that monetary changes or shocks affect unemployment and inflation. It is not proven in the literature that Malaysia has a traditional Phillips curve in both short run and long run as there are no major studies in this direction.

Even during the Asian financial crisis (Bhanthumnavin, 2002) found that tradeoff Phillips curve existed in Thailand. China witnessed trade off Phillips curve after the reformation (Scheibe, 2003). (Furuoka, 2007) found the causal relation between inflation and unemployment and it cointegrated in Malaysia. (Lean, 2007) explained that inflation and unemployment are cointegrated but their study has not given any information about the shape of the Phillips curve in Malaysia. The concluding remark of their study is that Phillips curve is alive and well in Malaysia. This study looks into the shape of the Phillips curve in Malaysia and how the monetary policy of Malaysia is influencing inflation and unemployment in Malaysia. This research will be given an idea for the policy makers when they take decision on monetary policy and its impact on inflation and unemployment.

3. Empirical Analysis

To examine the direct effect of monetary policy on the unemployment rate and inflation in Malaysia we used time series data over the period of 1980-2011 from IMF's International Monetary fund database and Bank Negara Malaysia's database. The inflation is measured as annual percentage; the unemployment is measured as a percentage of the labor force and base lending rate as a proxy for monetary policy. It is because changes in monetary policy have more impact on the base lending rate than the interest rate (Gamber & Hakes, 2005). In evaluating the fit of the models, three goodness-of-fit indices were used (GFI, CFI, RMSEA).

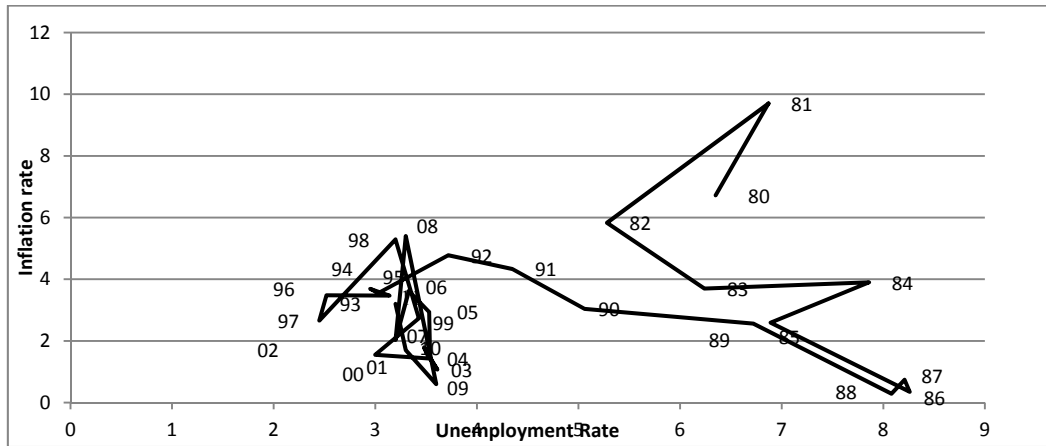


Figure 2. Long - run Phillips Curve Malaysia

The empirical result presented in this paper should be regarded as a first tentative in estimating the contemporaneous relationships between inflation and unemployment under more general conditions and without imposing any parameters of monetary policy. Figure-2 shows that the traditional consummate relationship between inflation and unemployment are established in the first period of observation. We can derive the short run Phillips curve during the period of 1980's. We can also observe that Malaysia has phenomena of the short run Phillips curve from 1987 to 1992. In 2000's the phenomena of short run Phillips curve are not deriving in the figure. During the period of 1996-98 the shape of the Phillips curve in Malaysia is a paradox to Phillips curve theory. This may be because the Malaysian economy faced drastic changes at that time of observation. But towards the end of the observation, the Malaysian economy is demonstrating the traditional theory of the Phillips curve.

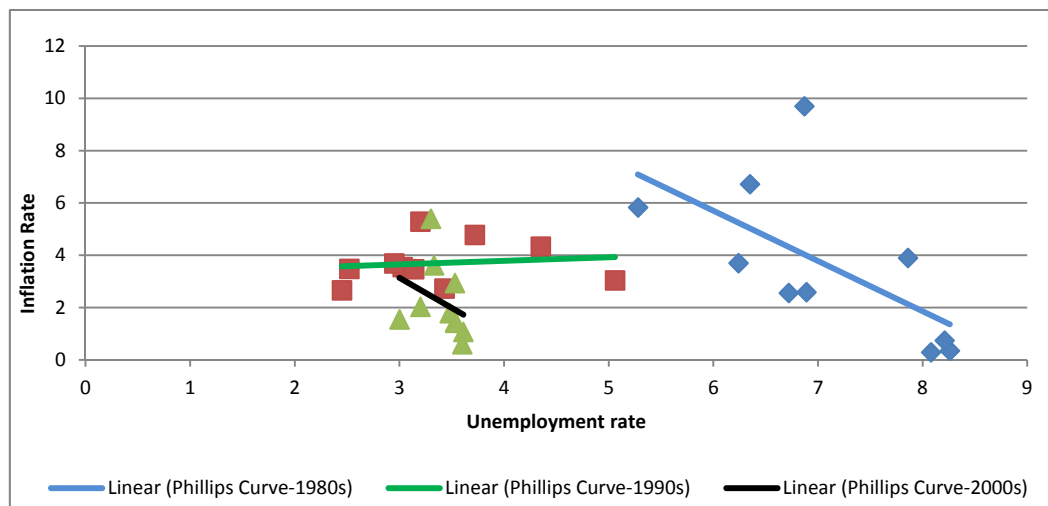


Figure 3. Long run Phillips curve

Figure-3 displays the short run Phillips curve presence in 1980's and 2000's. During 1990s', the Short run Phillips curve is parallel to the horizontal axis. It may be because during 1990's economy implemented more inflation targeted policy rather than employment targeted.

That shows that Phillips curve is very much relevant in the contemporary Malaysian economy in short runs of a period. But it is very difficult to obtain the long- run Phillips curve as the theory stated. It is now very interesting to know how monetary policy is affecting the Phillips curve or unemployment and inflation in Malaysia and Will monetary policy has more influence on unemployment or inflation. If monetary policy has more influence on employment, then policy makers can use monetary policy to create more employment. At the same time, if monetary policy has more influence on inflation as theory expect, then policy makers can stabilise the economy by using the monetary policy.

In this model regression of Granger causality or other regression will not be appropriate because we would like to know the influence of monetary policy in both inflation and unemployment in Malaysia. Structural equation models (SEMs), also known simultaneous equation models would be best fit to explain how monetary policy influencing both inflation and unemployment. The response variable in one regression equation in an SEM may seem as a predictor in some other equation; surely, variables in an SEM may influence one-another inversely, either directly or through other variables as intermediaries (Greene, 1993; Klein,

1950). These structural equations are meant to represent causal relationships among the variables in the model. Structural equation model is an extension of the regression model, used to test the fit of the correlation matrix against two or more causal models. But in the case of regression it is very difficult to find the influence of monetary policy on both inflation and unemployment. Therefore we can use structural equation model to find out the influence of monetary policy on these two variables.

To simplify the concept, path diagrams, structural equation in the form of a graph are used to determine the influence of monetary policy in both inflation and unemployment in Malaysia. (Blau, 1967) used path diagram in research to find out the occupational structure in America. There are number of social science researchers was utilised SEM in their research (Gartland, 2005; Hoepner, Kant, Scholtens, & Yu, 2012; Khan & Thorbecke, 1989; Stanley, Doucouliagos, & Jarrell, 2008).

Blau and Duncan's model is very similar to Klein's model

- Directly observable variables are enclosed in rectangular boxes.
- Unobservable variables are enclosed in circles (more generally, in ellipses); in this model, the only unobservable variables are the disturbances.
- Exogenous variables are represented by x's; endogenous variables by y's; and disturbances by ζ 's.
- Directed (i.e., single-headed) arrows represent structural parameters. The endogenous variables are distinguished from the exogenous variables by having directed arrows pointing towards them, while exogenous variables appear only at the tails of directed arrows.

The structural equations of the model may be read off the path diagram:

$$y_{1i} = \gamma_{10} + \gamma_{11}x_{1i} + \gamma_{12}x_{2i} + \zeta_{1i} \quad (2)$$

The variables in the model (2) have the following definitions:

y_{1i} = Monetary policy (the Base Lending rate has taken as a proxy for monetary policy (in year t))

x_{1i} = Inflation

x_{2i} = Unemployment rate

ζ_{1i} = Structural disturbances or errors in equations

Table 1. Correlation Matrix

Variable	1	2	3
Inflation	1		
Unemployment	.012 (.949)	1	
Monetary policy	.355*(.046)	.423*(.016)	1

a. $P < 0.05$.*. Correlation is significant at the 0.05 level (2-tailed).

Since three variables namely inflation, unemployment and monetary policy were identified as significant variables in this study, a correlation matrix was employed with these variables in a maximum-likelihood estimation procedure to test the fit of the hypothesized model. The correlation matrixes, as well as significance level were presented in Table-2. Inspection of correlation reveals that inflation and unemployment is not correlated each other as theory says and monetary policy has significantly correlated with unemployment and inflation.

In order to understand more the influence of monetary policy in unemployment and unemployment, the proposed path analysis was examined using the statistical package AMOS 20.

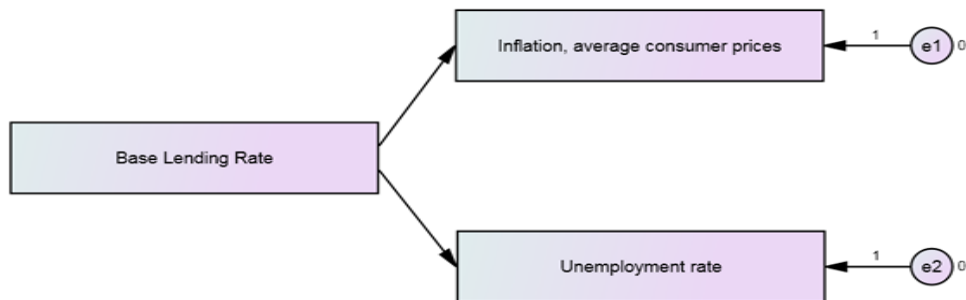


Figure 1. Basic stratification model

As recommended by (Loehlin, 2004; Thompson, 2004), a subset of these overall fit measures were examined: the chi-square, the normed fit index (NFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). The Baseline comparisons indices, another set of goodness-of-fit statistics shown in Table-2, are used to support the fitness of the hypothesized model. (Hair, 2006) pointed that value of Normed Fit Index (NFI) and Comparative Fit Index (CFI) less than 0.9 are not usually associated with a model that fits well. Values of .9 or higher (some say .95 or higher) indicate good fit. In this case NFI and CFI values are , 0.97 and 1.00 respectively, are consistent in suggesting that the hypothesized model represented an adequate fit to the data.

Table 2. Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.925	.549	1.016	1.193	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

The value of the root mean square error of the approximation (RMSEA), presented in Table 3, of 0.08 indicates a reasonable error of approximation implying that the model is accepts fit of the model (Steiger, 1980). Based on the above goodness-of-fit statistics, The Root Mean Square Error of Approximation (RMSEA) estimates lack of fit compared to the saturated model. RMSEA of .05 or less indicates good fit, and .08 or less adequate fit. LO 90 and HI 90 are the lower and upper ends of a 90% confidence interval for this estimate. (Browne MW 1993) stated that practical experience shows that a value of the RMSEA of about .05 or less would indicate a close fit of the model in relation to the degrees of freedom.

Table 3. RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.000	.000	.452	.380
Independence model	.163	.000	.311	.113

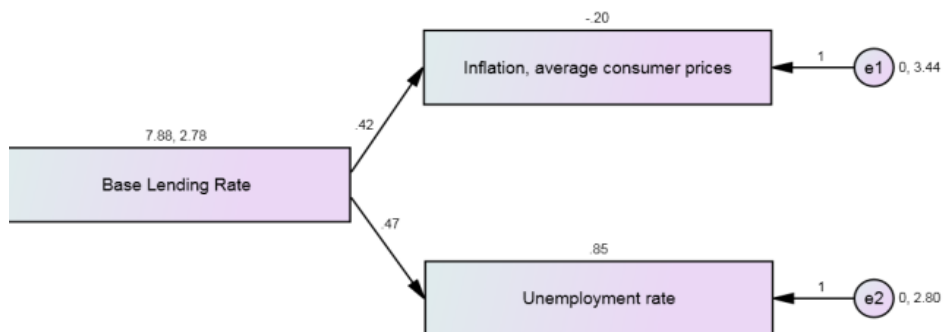


Figure 5. Basic Stratification Model

Table 4. Regression Weights: (Group number 1 - Default model)

Variable			Estimate	S.E.	C.R.	P
UNEMPLY	←	MONETARY	.468	.180	2.598	.009*
INFLATION	←	MONETARY	.422	.200	2.112	.035*

parenthesis shows significant at the 0.05 level

When we examine the direct path in figure-5 from monetary policy to inflation is significantly influencing unemployment in Malaysia table -3 as well, we can observe that monetary policy has a good hold on both inflation and unemployment. When one percent changes in monetary policy lead to a 0.468 increase in unemployment and 0.422 increases in inflation as well. The p value

shows that both unemployment and inflation is significant at .05 per cent. Path analysis shows us that monetary policy has more comparative influence in the unemployment rate than inflation. This may be because economic policy makers would want to influence more on unemployment rather than inflation. Another policy suggestion that we can derive is that policy makers can influence more on employment by regulating or deregulating the monetary policy.

The path coefficient from monetary policy to the unemployment was 0.47, $p < .01$. Also, the path coefficient from monetary policy to the inflation was 0.42, $p < .05$. Thus, these results suggest that changes in monetary policy lead to changes in both inflation and unemployment rate in Malaysian in turn, these leads economy policy makers to stabilise the economy by adjusting monetary policy.

4. Conclusion

The trade-off between unemployment and inflation is an old age controversy, and we are trying to look at this controversy in Malaysian perspective by looking at the shape of the Phillips curve in Malaysia .This study also tries to find the influence of monetary policy on both inflation and unemployment. The SEM model used to find out the influence of monetary policy on inflation and unemployment in Malaysia. The analysis strongly confirms that there is an evidence of the short run Phillips curve in Malaysian economy when the data is separated into different segments. But there is no evidence of the long run Phillips curve in the Malaysian economy. This means that in long run unemployment cannot be kept constant as economic theory says, in case of the Malaysian economy. The path analysis gives us the influence of monetary policy in both unemployment and inflation in Malaysia. The analysis evidences that monetary policy is influenced both inflation and unemployment in Malaysia. But the influence of monetary policy affects unemployment more than inflation. This finding is questing the existing concept of monetary policy influence more on inflation than unemployment. Policy makers may be benefitted by targeting unemployment through monetary policy as the study shows its effect more on unemployment than on inflation in Malaysia. This is also points to the possibility of more studies in this area.

References

- Ball, L., Mankiw, Gregory, N., Romer, D. (1988). "The New Keynesian Economics and the Output-Inflation Tradeoff", *Brookings Papers on Economic Activity*, 1, pp. 1-65
- Bhanthumnavin, K. (2002). The Phillips curve in Thailand. *University of Oxford Working paper*
- Blau, P.M., Duncan, O.D. (1967). *The American Occupational Structure*, New York: Wiley
- Browne M.W., C.R. (1993). *Alternative ways of assessing model fit*, B. KA (Ed.) *Testing structural equation models*
- Campbell, J.Y., Mankiw, N.G. (1987). Are Output Fluctuations Transitory?, *Quarterly Journal of Economics*, 102, pp. 857-880
- Friedman, M. (1977). "Nobel Lecture: Inflation and unemployment", *The Journal of Political Economy*, 85(3), pp. 451-472
- Furuoka, F. (2007). "Does the "Phillips Curve" Really Exist? New Empirical Evidence from Malaysia", *Economics Bulletin*, 5(16), pp. 1-14
- Gamber, E.N., Hakes, D.R. (2005). "Is monetary policy important for forecasting real growth and inflation?", *Journal of Policy Modeling*, 27(2), pp. 177-187, doi: 10.1016/j.jpolmod.2004.12.008
- Gartland, M.P. (2005). "Interdisciplinary views of sub-optimal outcomes: Path dependence in the social and management sciences", *Journal of Socio-Economics*, 34(5), pp. 686-702, doi: 10.1016/j.socec.2005.07.003
- Gordon, R.J. (1970). "The Recent Acceleration of Inflation and Its Lessons for the Future", *Brookings Papers on Economic Activity*, 1, pp. 8-41
- Greene, W.H. (1993). *Econometric Analysis*, Edition (Second ed.), New York, Macmillan
- Hair, J.F.J., Black, W.C., Babin, B.J., Anderson, R.E., Tatham, R.L. (2006). *Multivariate Data Analysis* (6th ed.), New Jersey, Prentice-Hall International, Inc.
- Hoepner, A.G.F., Kant, B., Scholtens, B., Yu, P.-S. (2012). "Environmental and ecological economics in the 21st century: An age adjusted citation analysis of the influential articles, journals, authors and institutions", *Ecological Economics*, 77(0), pp. 193-206, doi: 10.1016/j.ecolecon.2012.03.002
- Khan, H.A., Thorbecke, E. (1989). "Macroeconomic effects of technology choice: Multiplier and structural path analysis within a SAM framework", *Journal of Policy Modeling*, 11(1), pp. 131-156. doi: 10.1016/0161-8938(89)90028-8
- King, R.G., Watson, M.W. (1994). "The post-war U.S. phillips curve: a revisionist econometric history", *Carnegie-Rochester Conference Series on Public Policy*, 41(0), pp. 157-219, doi: 10.1016/0167-2231(94)00018-2
- Klein, L. (1950). *Economic Fluctuations in the United States 1921-1941*. New York: Wiley
- Lean, C.F.T. a. H.H. (2007). "The Stability Of Phillips Curve In Malaysia", *Monash University, Business and Economics, Discussion Paper 39*
- Loehlin, J.C. (ed.). (2004). *Latent variable models: An introduction to factor, path, and structural analysis* (4th ed.). Erlbaum
- Lucas, R.E.J., Sargent, T.J. (1978). "After Keynesian Macroeconomics", in *After the Phillips Curve: Persistence of High Inflation and High Unemployment*, *Conference Series No. 19*, *Federal Reserve Bank of Boston*, 19
- Marika Karanassou, H.S., Dennis, J. Snower (2005). "A reappraisal of the inflation-unemployment tradeoff", *European Journal of Political Economy*, 21, pp. 1-32
- Meade, E.E., Thornton, D.L. (2012). The Phillips curve and US monetary policy: what the FOMC transcripts tell us. *Oxford Economic Papers*, 64(2), pp. 197-216

- Munir, Q., Mansur, K., Furuoka, F. (2009). "Inflation and Economic Growth in Malaysia", *ASEAN Economic Bulletin*, 26(2), pp. 180-193, doi: 10.1355/ae26-2d
- Phelps, E. (1967). Phillips Curve, Expectation of Inflation and Optimal Inflation over Time. *Economica*, 34, pp. 254-281
- Phillips, A.W.H. (1958). The Relation between Unemployment and the Rate of Change of Money Wages in the United Kingdom. *Economica*, pp. 1861-1957
- Roberts, J. (1993). The Sources of Business Cycles: A Monetarist Interpretation. *International Economic Review*, 34, pp. 923-934
- Scheibe, J. (2003). "The Chinese Output Gap During the Reform Period 1978-2002", *Department of Economics Working Paper*, University of Oxford, 179
- Solow, R.M. (1969). *Price Expectations and the Phillips Curve*, Manchester, UK: Manchester University Press
- Stanley, T.D., Doucouliagos, C., Jarrell, S.B. (2008). Meta-regression analysis as the socio-economics of economics research. *Journal of Socio-Economics*, 37(1), pp. 276-292. doi: 10.1016/j.socec.2006.12.030
- Steiger, J.H., Lind, J. (1980). *Statistically-based tests for the number of common factors*, Paper presented at the Annual Spring Meeting of the Psychometric Society, Iowa City
- Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association