

# The University of Toledo

An addendum to  
Graduate Council's

## Manual for the Formatting of Graduate Dissertations and Theses

Sample Pages for Students  
Following the APA Style Guide

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# [ Sample: Title Page ]

A Dissertation

entitled

A Game-Theoretic Approach to a General Equilibrium  
Model with Asymmetric Price Information and No Goods

by

Elmer J. Fudd

Submitted to the Graduate Faculty as partial fulfillment of the  
requirements for the Doctor of Philosophy Degree in Economics

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May 2010

(Sample Page 1)

APA Format

[ Sample: Copyright Notice Page ]

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(Sample Page 2)

APA Format

# [ Sample: Abstract Page ]

An Abstract of

A Game-Theoretic Approach to a General Equilibrium  
Model with Asymmetric Price Information and No Goods

by

Elmer J. Fudd

Submitted to the Graduate Faculty in partial fulfillment of the  
requirements for the Doctor of Philosophy Degree in Economics

The University of Toledo  
May 2010

Out-of-sample forecasting experiments are used as an alternative to looking at F-statistics when examining whether money, interest rates or the commercial paper/T-bill spread provide information content for subsequent movements in output, real and nominal personal income, the CPI and the PPI. Here a variable provides information if it improves the forecast of the explained variable. Employing this procedure I find that the paper-bill spread but not monetary aggregates provide information content for industrial production or real personal income when using data over the 1980-97 period. In contrast, I find that monetary aggregates provide information content for the CPI and nominal personal income but not the PPI.

## [ Sample: Dedication Page ]

For Margaret, Jack, and Joseph. Before you entered my life, I used to wonder what I might accomplish; now, I want only to be the best Papa I can be.

# [ Sample: Acknowledgments Page ]

## Acknowledgments

This dissertation would not have been possible without the love, support, and encouragement I received from my parents, brothers and sisters. Only now am I beginning to realize how much my parents sacrificed so that I could attend college. I do not have words to adequately describe my deep gratitude for all they have provided me, though I hope to show them in the years to come.

I have benefited greatly from the mentoring of James Holmes and comments received from David Black and Kristen Keith. I studied economics because of what I saw in James Holmes — a tremendous desire to learn and understand, and a wonderful fascination with Macroeconomics. I am truly indebted to him for fostering the same pursuit and fascination in me and, of course, for his assistance and advice during my years as his student.

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# [ Sample: List of Abbreviations ]

## List of Abbreviations

AAGG.....	American Association of Solving the World's Problems by way of Government Grants
ABMC.....	American Battle Monuments Commission
ACYF.....	Administration on Children, Youth, and Families
ADA.....	Americans with Disabilities Act of 1990
ADD.....	Administration on Developmental Disabilities
AFAA.....	Air Force Audit Agency
AFDB.....	African Development Bank
AFDC.....	Aid to Families with Dependent Children
AFSC.....	Armed Forces Staff College
AJOKE.....	A game theoretic solution to an asymmetric general equilibrium economic model that has no prices and no goods
AMS.....	Agricultural Marketing Service
ANA.....	Administration for Native Americans
AOA.....	Administration on Aging
APHIS.....	Animal and Plant Health Inspection Service
ARC.....	Appalachian Regional Commission
ARS.....	Agricultural Research Service
ATF.....	Bureau of Alcohol, Tobacco, and Firearms
ATSDR.....	Agency for Toxic Substances and Disease Registry
BEA.....	Bureau of Economic Analysis
BIC.....	Business Information Center (SBA)
BJS.....	Bureau of Justice Statistics
BLM.....	Bureau of Land Management
BLS.....	Bureau of Labor Statistics
BTS.....	Bureau of Transportation Statistics
BVA.....	Board of Veterans' Appeals
CBO.....	Congressional Budget Office
CCC.....	Commodity Credit Corporation
CDBG.....	Community Development Block Grant
CDC.....	Centers for Disease Control and Prevention
CEA.....	Council of Economic Advisers
CEQ.....	Council on Environmental Quality
CFA.....	Commission of Fine Arts
CFR.....	Code of Federal Regulations
CFTC.....	Commodity Futures Trading Commission
CIA.....	Central Intelligence Agency
CMS.....	Centers for Medicare & Medicaid Services
CNO.....	Chief of Naval Operations
CRAP.....	Council for Regulating American Productivity through Government Oversight

# [ Sample: List of Symbols ]

## List of Symbols

( · ) ... Parentheses in the numerical listings contain measured or estimated uncertainties. For example, the value 1.407(83) should be interpreted as  $1.407 \pm 0.083$ . Thus the value in parentheses refers to the last significant digits given.

$\alpha$  ..... Angle of rotation around internal rotation axis.

$\beta$  ..... correlation coefficient

$\delta$  ..... Magnetic field gradient pulse separation

$\Theta_i$  ..... the *ith* degree to which the flayrod has gone out of skew on tredel

$\lambda$  ..... the shadow price of income

$\mu$  ..... the ratio of the monetary aggregate to the monetary base

$\rho$  ..... Internal rotation interaction constant  $\rho = [\sum_x (\lambda_x I_\alpha / I_x)^2]^{1/2}$

$A_C$  ..... crystal surface area

Ba .... Barium

BB .... B.B. King

Be ..... Beryllium

Ca .... Calcium

$E_G$  ..... activation energy

$F$  ..... Internal rotation dynamical constant (GHz)  $F = h/8\pi^2 r I_\alpha$

$I_i$  ..... Angular momentum quantum number of nuclear spin for the *ith* nucleus

$J$  ..... Resultant total angular momentum quantum number, excluding nuclear spins

$k$  ..... Boltzmann's constant

Mg .... Magnesium

$N$  ..... Rotational angular momentum quantum number, excluding electron and nuclear spins, in the case where electron spin is present

$Q$  ..... Tobin's *q*; the ratio of the market value of installed capital to the replacement cost of capital

Ra .... Radium

$S_a$  ..... area of an active site

Sr ..... Strontium

$Y$  ..... Gross Domestic Product

$Y^P$  ..... Potential Gross Domestic Product

# [ Sample: Preface Page ]

## Preface

Macroeconomics analyzes the economy as a whole; where output, prices, interest rates, exchange rates, and unemployment are the key variables macroeconomists want to explain. In contrast, microeconomics analyzes the behavior of individuals and firms; where prices for particular products are determined by demand and supply. As it is all but impossible to summarize all of the differences between macro- and microeconomic models, I focus only on three theoretic models that have had a substantial impact on economic modeling over the last 60 years. The three classes of models I examine are the IS-LM, overlapping generations, and growth models. The IS-LM is the traditional (static) aggregative macro model which excels in short-run stabilization issues. The overlapping generations model with production is a general equilibrium, intertemporal micro-based macro model. It incorporates both utility and profit maximization. Growth models examine the importance of technology and human capital, convergence to equilibria, and its long-run focus sharply contrasts that of the IS-LM model.

The IS-LM model is particularly adept at providing short-run stabilization policy prescriptions, an ability that (by design) is absent in both the overlapping generations and growth models. Fiscal policy does this in the IS-LM model by driving a wedge between saving and investment. Unlike the classical model, fiscal stimuli in the IS-LM model will not necessarily alter saving and investment in the same direction nor in the same proportion, Keynes (1936, p. 21). (See Barro and King [1984] for an overlapping generations model that assumes the contrary, and Dowd [1990] for further discussion of this issue.) The independent movements of saving and investment allows income to adjust in order for the economy to reach a new equilibrium. Monetary policy affects income by first altering the interest rate and, in turn, the incentives for savers and investors. See Blinder and Solow (1973)

# [ Sample: Chapter First Page ]

## Chapter One

### The Heading to Chapter One (Level 1 Heading)

#### This is a Level 2 Section Heading

The Federal Reserve has at its disposal a limited set of instruments through which it can attempt to achieve its objectives of price stability and/or full employment output. Between the time a monetary instrument is adjusted and its ultimate effect on economic activity has occurred there are observable movements in other important economic variables such as monetary aggregates or interest rates.

**This is a level 3 section heading.** These variables may be used as intermediate targets if immediately subject to influence by policy and if their movements affect output or prices. If the variable does not cause output or prices, it may still be useful as an information variable if its movements consistently lead movements in the variables the Federal Reserve wishes to influence.

*This is a level 4 section heading.* Friedman and Kuttner (1992, 1993) sparked a healthy debate as to which variables are good candidates for intermediate targets or information variables. The candidates they considered to explain movements in industrial production included a price index, a monetary aggregate and the difference between the commercial paper rate and the treasury bill rate (the “paper-bill spread”).

*This is a level 5 section heading.* Using F-statistics to determine whether a particular variable provided information content, Friedman and Kuttner concluded that the paper-bill spread was a good candidate because it contained significant information content for industrial production regardless of sample: “[t]he spread is a predictor of real economic activity, not prices, and of nominal magnitudes only to the extent that they reflect real ones” (Friedman and Kuttner 1993, p. 214). This was followed by Dewey, Robem, and Howe (1996) who argued that monetary balances are related to neither real nor nominal income fluctuations and concluded

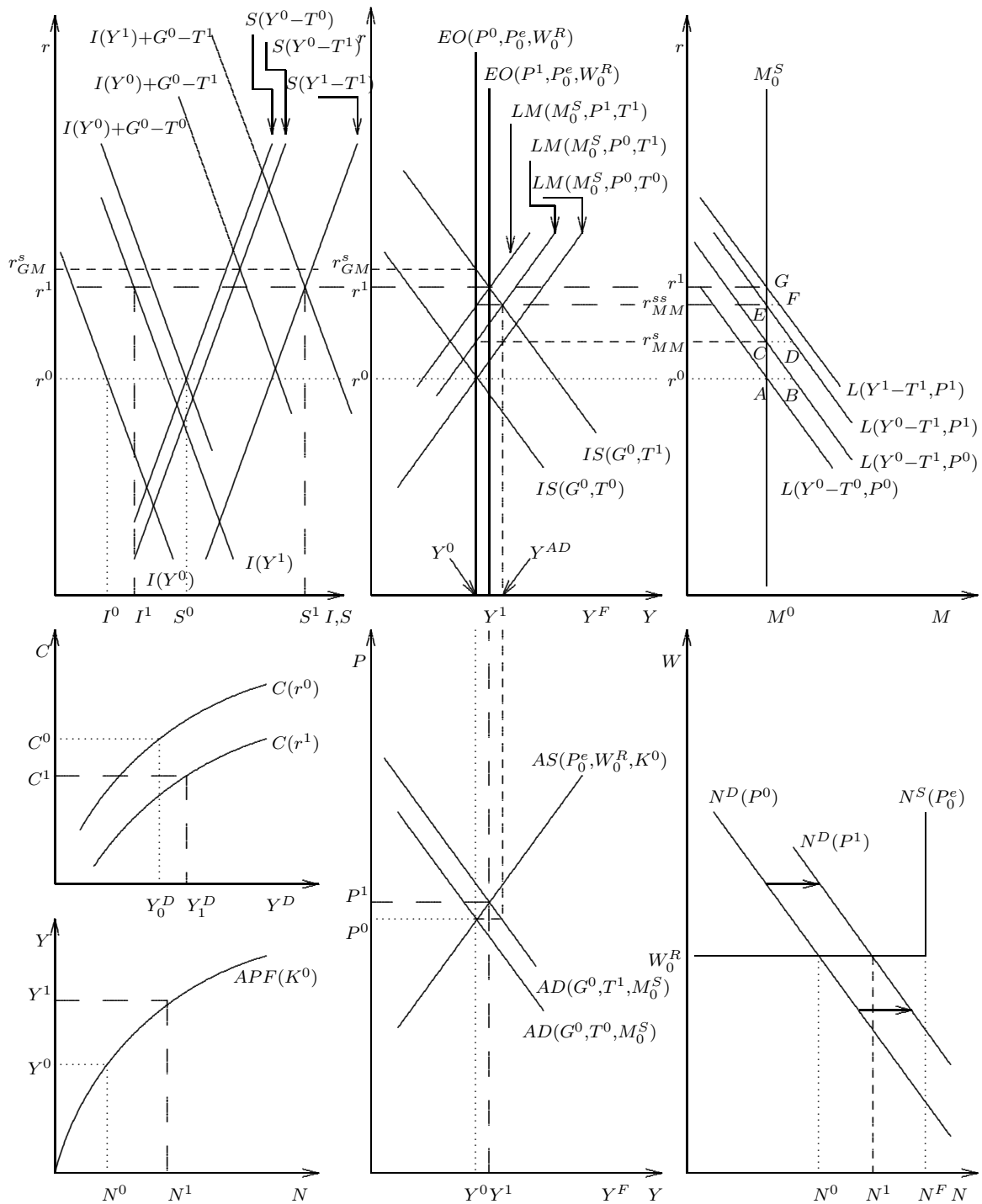


Figure 1. Rudimentary economic analysis of a change in taxes when the Federal Reserve is following a Money Stock Instrument. This assumes the goods market's sensitivity to a change in taxes is greater than that in financial markets.

## [ Sample: Table Page ]

When forecasting industrial production and real and nominal personal income,  $X_t$  represents the measure of price included (i.e., the CPI or the PPI). When forecasting the CPI or the PPI,  $X_t$  represents the measure of output/income included (i.e., industrial production or real personal income).  $M_t$  and  $R_t$  are respectively the monetary aggregate and the interest rate measure used. As described below, in models II and V the  $\phi$ 's are zero and in model III the  $\delta$ 's are zero. Table 1 provides the mean absolute percentage errors (MAPEs) from 1 to 6 months-ahead forecasts of industrial production generated by the six alternative model specifications considered.

Table 1

*The Mean Absolute Percentage Errors from 1 to 6 months-ahead Forecasts of Industrial Production*

Month Forecast	Forecast Errors from Six Alternative Models					
	I	II	III	IV	V	VI
1	0.502	0.716	0.680	0.581	0.584	0.581
2	1.030	1.343	1.271	1.171	1.186	1.219
3	1.578	1.757	1.679	1.631	1.661	1.759
4	2.146	2.070	1.944	2.109	2.103	2.418
5	2.728	2.279	2.107	2.563	2.530	3.055
6	3.240	2.293	2.157	2.857	2.819	3.664

Such comparisons will determine whether a variable is a good candidate as an information variable. Comparing the mean absolute percentage error from models I, II and III (or models III, IV and V) examines the relative contributions of money versus the interest rate spread (or money versus the federal funds rate). Moreover, comparing the MAPEs from model II and V and those from models I and IV examines the relative contribution of the federal funds rate versus the interest rate spread. To examine whether the information content provided by a candidate variable is unique to the variable being forecasted, we repeated the above analysis but substituted real gross domestic produce and, subsequently, real personal income

## [ Sample: References - Example 1 ]

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## [ Sample: References - Example 2 ]

### References

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# [ Sample: Appendix First Page ]

## Appendix A

### The Heading to Appendix A

The Federal Reserve has at its disposal a limited set of instruments through which it can attempt to achieve its objectives of price stability and/or full employment output. Between the time a monetary instrument is adjusted and its ultimate effect on economic activity has occurred there are observable movements in other important economic variables such as monetary aggregates or interest rates. These variables may be used as intermediate targets if immediately subject to influence by policy and if their movements affect output or prices. If the variable does not cause output or prices, it may still be useful as an information variable if its movements consistently lead movements in the variables the Federal Reserve wishes to influence.

Friedman and Kuttner (1992, 1993) sparked a healthy debate as to which variables are good candidates for intermediate targets or information variables. The candidates they considered to explain movements in industrial production included a price index, a monetary aggregate and the difference between the commercial paper rate and the treasury bill rate (the “paper-bill spread”). Using F-statistics to determine whether a particular variable provided information content, Friedman and Kuttner concluded that the paper-bill spread was a good candidate as it contained significant information content for industrial production regardless of sample: “[t]he spread is a predictor of real economic activity, not prices, and of nominal magnitudes only to the extent that they reflect real ones” (1993, p. 214). In contrast, they argued that money is related to neither real nor nominal income fluctuations and concluded that money is not a reasonable candidate as its information content broke-down in samples that included the 1980s. Monetary aggregates being “unreliable indicators of economic activity and as guides for stabilizing prices” has also been argued by Akhtar (1997, p. 4). The debate sparked