SELECTED READINGS

Focus on: James D. Hamilton

November 2008

INDEX

INTRODUCTION

James Douglas Jim Hamilton (29 November 1954) is an US econometrician currently teaching at University of California, San Diego. His work is especially influential in time series analysis, macroeconomics and econometrics.

James Hamilton received his Ph.D. in Economics from the University of California at Berkeley in 1983. He has been a professor at the University of California, San Diego since 1990 and served as Chair of the Economics Department from 1999 to 2002. He is the author of Time Series Analysis, the leading text on forecasting and statistical analysis of dynamic economic relationships. He has done extensive research on business cycles, monetary policy, inventories and oil shocks, nonlinear data analysis, heteroskedasticity and economic analysis of systems subject to changes in regimes. He has been a research adviser and visiting scholar with the Federal Reserve System for 20 years. He has been responsible of several research projects for the US National Science Foundation in his long career. He took several honorary lectures with honors and awards. He gave relevant contributions to handbooks, encyclopedias and edited books. He is associate editor of the Journal of Business and Economic Statistics and of the Journal of Money, Credit and Banking.

The following list is a non-exhaustive, subjective selection of James Hamilton's publications.

This list is divided in two parts:

- Working Papers,
- and articles

More information can be found on James Hamilton's homepage at:

http://econ.ucsd.edu/~jhamilto/

Contact point: GianLuigi Mazzi, Responsible for Euro-indicators and statistical methodology, Estat - D1 Key Indicators for European Policies gianluigi.mazzi@ec.europa.eu.

1 WORKING PAPERS

1.1 James D. Hamilton, Macroeconomics and ARCH, NBER Working Papers No. 14151, National Bureau of Economic Research, 2008.

Although ARCH-related models have proven quite popular in finance, they are less frequently used in macroeconomic applications. In part this may be because macroeconomists are usually more concerned about characterizing the conditional mean rather than the conditional variance of a time series. This paper argues that even if one's interest is in the conditional mean, correctly modeling the conditional variance can still be quite important, for two reasons. First, OLS standard errors can be quite misleading, with a spurious regression possibility in which a true null hypothesis is asymptotically rejected with probability one. Second, the inference about the conditional mean can be inappropriately influenced by outliers and high-variance episodes if one has not incorporated the conditional variance directly into the estimation of the mean, and infinite relative efficiency gains may be possible. The practical relevance of these concerns is illustrated with two empirical examples from the macroeconomics literature, the first looking at market expectations of future changes in Federal Reserve policy, and the second looking at changes over time in the Fed's adherence to a Taylor Rule.

Available at: http://www.nber.org/papers/w14151.pdf

1.2 James D. Hamilton, Assessing Monetary Policy Effects Using Daily Fed Funds Futures Contracts, NBER Working Papers No. 13569, National Bureau of Economic Research, 2007.

This paper develops a generalization of the formulas proposed by Kuttner (2001) and others for purposes of measuring the effects of a change in the fed funds target on Treasury yields of different maturities. The generalization avoids the need to condition on the date of the target change and allows for deviations of the effective

fed funds rate from the target as well as gradual learning by market participants about the target. The paper shows that parameters estimated solely on the basis of the behavior of the fed funds and fed funds futures can account for the broad calendar regularities in the relation between fed funds futures and Treasury yields of different maturities. Although the methods are new, the conclusion is quite similar to that reported by earlier researchers-- changes in the fed funds target seem to be associated with quite large changes in Treasury yields, even for maturities up to ten years.

Available at: http://www.nber.org/papers/w13569.pdf

1.3 James D. Hamilton, Daily Changes in Fed Funds Futures Prices, NBER Working Papers No. 13112, National Bureau of Economic Research, 2007.

This paper explores the properties of daily changes in the prices for near-term fed funds futures contracts. The paper finds these contracts to be excellent predictors of the fed funds rate, and shows that the claim of a nonzero term premium in the short-horizon contracts is more sensitive to outliers than previous research appears to have recognized. I find some statistically significant evidence of serial correlation in the daily changes, but this accounts for only a tiny part of the one-day movements and there is essentially zero predictability for horizons longer than one day. Settlement futures prices for each day appear to incorporate the information embodied in that day's term structure of longer-horizon Treasury securities. Previous employment growth makes a statistically significant contribution to predicting futures price changes, though again this could only account for a tiny part of the daily variance. The paper concludes that futures prices provide a very useful measure of the daily changes in the market's expectation of near-term changes in Fed policy.

Available at: http://www.nber.org/papers/w13112.pdf

1.4 Marcelle Chauvet & James D. Hamilton, Dating Business Cycle Turning Points, NBER Working Papers No. 11422, National Bureau of Economic Research, 2005.

This paper discusses formal quantitative algorithms that can be used to identify business cycle turning points. An intuitive, graphical derivation of these algorithms is presented along with a description of how they can be implemented making very minimal distributional assumptions. We also provide the intuition and detailed description of these algorithms for both simple parametric univariate inference as well as latent-variable multiple-indicator inference using a state-space Markov-switching approach. We illustrate the promise of this approach by reconstructing the inferences that would have been generated if parameters had to be estimated and inferences drawn based on data as they were originally released at each historical date. Waiting until one extra quarter of GDP growth is reported or one extra month of the monthly indicators released before making a call of a business cycle turning point helps reduce the risk of misclassification. We introduce two new measures for dating business cycle turning points, which we call the quarterly real-time GDP-based recession probability index and the monthly real-time multiple-indicator recession probability index that incorporate these principles. Both indexes perform quite well in simulation with real-time data bases. We also discuss some of the potential complicating factors one might want to consider for such an analysis, such as the reduced volatility of output growth rates since 1984 and the changing cyclical behavior of employment. Although such refinements can improve the inference, we nevertheless find that the simpler specifications perform very well historically and may be more robust for recognizing future business cycle turning points of unknown character.

Available at: http://www.nber.org/papers/w11422.pdf

1.5 James D. Hamilton & Daniel F. Waggoner & Tao Zha, Normalization in econometrics, Working Paper No. 2004-13, Federal Reserve Bank of Atlanta, 2004.

The issue of normalization arises whenever two different values for a vector of unknown parameters imply the identical economic model. A normalization does not just imply a rule for selecting which point, among equivalent ones, to call the maximum likelihood estimator (MLE). It also governs the topography of the set of points that go into a small-sample confidence interval associated with that MLE. A poor normalization can lead to multimodal distributions, disjoint confidence intervals,

and very misleading characterizations of the true statistical uncertainty. This paper introduces the identification principle as a framework upon which a normalization should be imposed, according to which the boundaries of the allowable parameter space should correspond to loci along which the model is locally unidentified. The authors illustrate these issues with examples taken from mixture models, structural VARs, and cointegration.

Available at: http://www.frbatlanta.org/filelegacydocs/wp0413.pdf

1.6 Michael C. Davis & James D. Hamilton, Why Are Prices Sticky? The Dynamics of Wholesale Gasoline Prices, NBER Working Papers No. 9741, National Bureau of Economic Research, 2003.

The menu-cost interpretation of sticky prices implies that the probability of a price change should depend on the past history of prices and fundamentals only through the gap between the current price and the frictionless price. We find that this prediction is broadly consistent with the behavior of 9 Philadelphia gasoline wholesalers. We nevertheless reject the menu-cost model as a literal description of these firms' behavior, arguing instead that price stickiness arises from strategic considerations of how customers and competitors will react to price changes.

Available at: http://www.nber.org/papers/w9741.pdf

1.7 James D. Hamilton & Ana Maria Herrera, Oil Shocks and Aggregate Macroeconomic Behavior: The Role of Monetary Policy, University of California at San Diego, Economics Working Paper Series 2001-10, Department of Economics, UC San Diego, 2001.

A recent paper by Bernanke, Gertler and Watson (1997) suggests that monetary policy could be used to eliminate any recessionary consequences of an oil price shock. This paper challenges that conclusion on two grounds. First, we question whether the Federal Reserve actually has the power to implement such a policy; for example, we consider it unlikely that additional money creation would have succeeded in reducing the Fed funds rate by 900 basis points relative to the values seen in 1974. Second, we

point out that the size of the effect that Bernanke, Gertler and Watson attribute to oil shocks is substantially smaller than that reported by other researchers, primarily due to their choice of a shorter lag length than used by other researchers. We offer evidence in favor of the longer lag length employed by previous research, and show that, under this specification, even the aggressive Federal Reserve policies proposed would not have succeeded in averting a downturn.

Available at: http://ideas.repec.org/p/cdl/ucsdec/2001-10.html

1.8 James D. Hamilton & Dong Heon Kim, A Re-examination of the Predictability of Economic Activity Using the Yield Spread, University of California at San Diego, Economics Working Paper Series 2000-23, Department of Economics, UC San Diego, 2000.

This paper revisits the yield spread's usefulness for predicting future real GDP growth. We show that the contribution of the spread can be decomposed into the effect of expected future changes in short rates and the effect of the term premium. We find that both factors are relevant for predicting real GDP growth but the respective contributions differ. We investigate whether the cyclical behavior of interest rate volatility could account for either or both effects. We find that while volatility displays important correlations with both the term structure of interest rates and GDP, it does not appear to account for the yield spread's usefulness for predicting GDP growth.

Available at: http://ideas.repec.org/p/cdl/ucsdec/2000-23.html

1.9 James D. Hamilton, What is an Oil Shock?, NBER Working Papers No. 7755, National Bureau of Economic Research, 2000.

This paper uses a flexible approach to characterize the nonlinear relation between oil price changes and GDP growth. The paper reports clear evidence of nonlinearity, consistent with earlier claims in the literature-- oil price increases are much more important than oil price decreases, and increases have significantly less predictive content if they simply correct earlier decreases. An alternative interpretation is

suggested based on estimation of a linear functional form using exogenous disruptions in petroleum supplies as instruments. The evidence suggests that oil shocks matter because they disrupt spending by consumers and firms on certain key sectors.

Available at: http://www.nber.org/papers/w7755.pdf

1.10 James D. Hamilton, A Parametric Approach to Flexible Nonlinear Inference, University of California at San Diego, Economics Working Paper Series 99-03, Department of Economics, UC San Diego, 1999.

This paper proposes a new framework for determining whether a given relationship is nonlinear, what the nonlinearity looks like, and whether it is adequately described by a particular parametric model. The paper studies a regression or forecasting model of the form yt = μ (xt) + et where the functional form of μ (.) is unknown. We propose viewing μ (.) itself as the outcome of a random process. The paper introduces a new stationary random random field m (.) that generalizes finite-differenced Brownian motion to a vector field and whose realizations could represent a broad class of possible forms for μ (.). We view the parameters that characterize the relation between a given realization of m (.) and the particular value of μ (.) for a given sample as population parameters to be estimated by maximum likelihood or Bayesian methods. We show that the resulting inference about the functional relation also yields consistent estimates for a broad class of deterministic functions μ (.). The paper further develops a new test of the null hypothesis of linearity based on the Lagrange multiplier principle and small-sample confidence intervals based on numerical Bayesian methods. An empirical application suggests that properly accounting for the nonlinearity of the inflation-unemployment tradeoff may explain the previously reported uneven empirical success of the Phillips Curve.

Available at: http://ideas.repec.org/p/cdl/ucsdec/99-03.html

1.11 James D. Hamilton & Gang Lin, Stock Market Volatility and The Business Cycle, University of California at San Diego, Economics Working Paper Series 96-18, Department of Economics, UC San Diego, 1996.

This paper investigates the joint time series behavior of monthly stock returns and growth in industrial production. We find that stock returns are well characterized by year-long episodes of high volatility, separated by longer quiet periods. Real output growth, on the other hand, is subject to abrupt changes in the mean associated with economic recessions. We study a bivariate model in which these two changes are driven by related unobserved variables, and conclude that economic recessions are the primary factor that drives fluctuations in the volatility of stock returns. This framework proves useful both for forecasting stock volatility and for identifying and forecasting economic turning points.

Available at:

http://ideas.repec.org/a/jae/japmet/v11y1996i5p573-93.html

1.12 James D. Hamilton, Specification testing in Markov-switching time-series models, Journal of Econometrics, Elsevier, vol. 70(1), pages 127-157, January 1996.

This paper develops a series of specification tests of Markov-switching time-series models. Tests for omitted autocorrelation, omitted ARCH, misspecification of the Markovian dynamics, and omitted explanatory variables are proposed. All of the tests can be constructed as a natural byproduct of the routine used to calculate the 'smoothed' probability that a given observation came from a particular regime, and do not require estimation of additional parameters. The paper performs Monte Carlo analysis of the tests and briefly illustrates their use with an empirical application.

Available at:

http://www.sciencedirect.com/science/article/B6VC0-3VWPP29-10/2/88f45914d2b681c0035dd386f8485fe0

1.13 James D. Hamilton, The Daily Market for Federal Funds, Journal of Political Economy, University of Chicago Press, vol. 104(1), pages 26-56, February 1996.

This paper reports overwhelming evidence against the hypothesis that the federal funds rate follows a martingale over the two-week reserve maintenance period, establishing that banks do not regard reserves held on different days of the week to be perfect substitutes. A theoretical model of the federal funds market is proposed that could account for these empirical regularities as the result of line limits, transaction costs, and weekend accounting conventions. The paper concludes that such transaction costs lie at the heart of the liquidity effect that enables the Federal Reserve to change the interest rate on a daily basis.

Available at:
http://ideas.repec.org/a/ucp/jpolec/v104y1996i1p26-56.html

1.14 James D. Hamilton, State-space models, Handbook of Econometrics, in: R. F. Engle & D. McFadden (ed.), Handbook of Econometrics, edition 1, volume 4, chapter 50, pages 3039-3080 Elsevier, 1986.

This chapter reviews the usefulness of the Kalman filter for parameter estimation and inference about unobserved variables in linear dynamic systems. Applications include exact maximum likelihood estimation of regressions with ARMA disturbances, time-varying parameters, missing observations, forming an inference about the public's expectations about inflation, and specification of business cycle dynamics. The chapter also reviews models of changes in regime and develops the parallel between such models and linear state-space models. The chapter concludes with a brief discussion of alternative approaches to nonlinear filtering.

Available at:
http://www.sciencedirect.com/science/article/B7GX7-4FPWV09-N/2/57b6842d32b053e40469aa3e6cec1cb9

1.15 James D. Hamilton & Susmel, Raul, Autoregressive conditional heteroskedasticity and changes in regime, Journal of Econometrics, Elsevier, vol. 64(1-2), pages 307-333, 1994.

ARCH models often impute a lot of persistence to stock volatility and yet give relatively poor forecasts. One explanation is that extremely large shocks, such as the October 1987 crash, arise from quite different causes and have different consequences for subsequent volatility than do small shocks. We explore this possibility with U.S. weekly stock returns, allowing the parameters of an ARCH process to come from one of several different regimes, with transitions between regimes governed by an unobserved Markov chain. We estimate models with two to four regimes in which the latent innovations come from Gaussian and Student *t* distributions.

Available at:
http://www.sciencedirect.com/science/article/B6VC0-459B9P0-H/2/f05e9ddce7ae156ba38e3b17ae556b21

1.16 Charles Engel & James D. Hamilton, Long Swings in the Exchange Rate: Are they in the Data and Do Markets Know It?, NBER Working Papers No.3165, National Bureau of Economic Research, 1989.

The value of the dollar appears to move in one direction for long periods of time. We develop a new statistical model of exchange rate dynamics as a sequence of stochastic, segmented time trends. The paper implements new techniques for parameter estimation and hypothesis testing for this framework. We reject the null hypothesis that exchange rates follow a random walk in favor of our model of long swings. Our model also generates better forecasts than a random walk. We conclude that persistent movement in the value of the dollar is a fact that calls for greater attention in the theory of exchange rate behavior. The model is a natural framework for assessing the importance of the peso problem for the dollar. It allows for the expectation of future exchange rates to be influenced by the probability of a change in regime. We nonetheless reject uncovered interest parity. The forward premium appears frequently to put too high a probability on a change in regime.

Available at:
http://www.nber.org/papers/w3165.pdf

1.17 James D. Hamilton & Marjorie A. Flavin, On the Limitations of Government Borrowing: A Framework for Empirical Testing, NBER Working Papers No.1632, National Bureau of Economic Research, 1985.

This paper seeks to distinguish empirically between two views on the limitations of government borrowing. According to one view, nothing precludes the government from running a permanent budget deficit, paying interest due on the growing debt load simply by issuing new debt, An alternative perspective holds that creditors would be unwilling to purchase government debt unless the government made a credible commitment to balance its budget in present value terms. We show that distinguishing between these possibilities is mathematically equivalent to testing whether a continuing currency inflation might be fueled by speculation alone or is instead driven solely by economic fundamentals. Empirical tests which have been developed for this economic question lead us to conclude that postwar U.S. deficits are largely consistent with the proposition that the government budget must be balanced in present-value terms.

Available at:
http://www.nber.org/papers/w1632.pdf

2 ARTICLES

2.1 James D. Hamilton, What's real about the business cycle?, Review, Federal Reserve Bank of St. Louis, issue Jul, pages 435-452, 2005.

This paper argues that a linear statistical model with homoskedastic errors cannot capture the nineteenth-century notion of a recurring cyclical pattern in key economic aggregates. A simple nonlinear alternative is proposed and used to illustrate that the dynamic behavior of unemployment seems to change over the business cycle, with the unemployment rate rising more quickly than it falls. Furthermore, many but not all economic downturns are also accompanied by a dramatic change in the dynamic behavior of short-term interest rates. It is suggested that these nonlinearities are most naturally interpreted as resulting from short-run failures in the employment and credit markets and that understanding these short-run failures is the key to understanding the nature of the business cycle.

Available at:

http://research.stlouisfed.org/publications/review/05/07/Hamilton.pdf

2.2 James Hamilton, Comment on Investigating Nonlinearity, Studies in Nonlinear Dynamics & Econometrics, Berkeley Electronic Press, vol. 9(3), pages 1286-1286, 2005.

The paper by Bond, Harrison, and O'Brien illustrates the role that convergence criteria, search algorithms, and starting values can play in influencing the success of numerical optimization. One aspect contributing to the importance of these choices in their results appears to be a multivariate generalization of the pile-up phenomenon for maximum likelihood estimation of moving average processes. Their results suggest advantages in some settings of using either Bayesian methods or an alternative specification of the random field.

Available at:

http://www.bepress.com/cgi/viewcontent.cgi?article=1286&context=snde

2.3 James Hamilton, Regime shifts in a dynamic term structure model of U.S. Treasury bond yields, comments, Proceedings, Federal Reserve Bank of San Francisco, issue March 2004..

No abstract available.

Available at:

http://www.frbsf.org/economics/conferences/0403/james_hamilton.pdf

2.4 James D. Hamilton, Comment on a comparison of two business cycle dating methods, Journal of Economic Dynamics and Control, Elsevier, vol. 27(9), pages 1691-1693, July 2003.

No abstract available.

Available at:

http://www.sciencedirect.com/science/article/B6V85-45V6V3W-5/2/d2badfe49a513fa2491a85dfdad2d693

2.5 James D. Hamilton & Oscar Jorda, a Model of the Federal Funds Rate Target, Journal of Political Economy, University of Chicago Press, vol. 110(5), pages 1135-1167, October 2002.

This paper is a statistical analysis of the manner in which the Federal Reserve determines the level of the federal funds rate target, one of the most publicized and anticipated economic indicators in the financial world. The paper introduces new statistical tools for forecasting a discrete-valued time series such as the target and suggests that these methods, in conjunction with a focus on the institutional details of how the target is determined, can significantly improve on standard vector autoregression forecasts of the effective federal funds rate. We further show that the news that the Fed has changed the target has statistical content substantially different from the news that the Fed failed to make an anticipated target change, causing us to

challenge some of the conclusions drawn from standard linear VAR impulse-response functions.

Available at:

http://www.journals.uchicago.edu/cgi-bin/resolve?JPE110504PDF

2.6 James D. Hamilton, On the interpretation of cointegration in the linear-quadratic inventory model, Journal of Economic Dynamics and Control, Elsevier, vol. 26(12), pages 2037-2049, October 2002.

No abstract available.
Available at:

http://www.sciencedirect.com/science/article/B6V85-45W39R2-3/2/b8a912135e77f8197914ff2726dad3c3

2.7 James D. Hamilton & Baldev Raj, New directions in business cycle research and financial analysis, Empirical Economics, Springer, vol. 27(2), pages 149-162, 2002.

This paper serves as a partial introduction to and survey of the literature on Markov-switching models. We review the history of this class of models, describe their mathematical structure, and exposit the basic ideas behind estimation and inference. The paper also describes how the approach can be extended in a variety of directions, such as non-Gaussian distributions, time-varying transition probabilities, vector processes, state-space and GARCH models, and surveys recent methodological advances. The contributions of the other papers in this volume are reviewed. A final section offers conclusions and implications for policy.

Available at:

http://ideas.repec.org/a/spr/empeco/v27y2002i2p149-162.html

2.8 James Hamilton, Book review, Econometric Reviews, Taylor and Francis Journals, vol. 19(1), pages 135-137, 2000.

No abstract available.

Available at:
http://www.informaworld.com/openurl?genre=article&doi=10.1080/07474930008800463&magic=repec&7C&7C8674ECAB8BB840C6AD35DC6213A474B5

2.9 James D. Hamilton& Monteagudo Josefina, The augmented Solow model and the productivity slowdown, Journal of Monetary Economics, Elsevier, vol. 42(3), pages 495-509, October 1998.

In an insightful and influential paper, Mankiw, Romer and Weil (1992) have suggested that an augmented Solow growth model can account for 80% of the variation in output per capita across countries due to different steady-state growth paths that result from differences in saving rates, education, and population growth. This paper carries their analysis one step further and asks whether changes in the growth rate between the 1960s and the 1980s can also be explained by this framework. Our results provide further support for several of Mankiw, Romer and Weil's key conclusions--investment in physical capital, population growth, and the initial levels of output seem to matter a great deal. However, investment in human capital has no ability to account for changes in growth rates over time. We conclude that investment in physical capital seems to be quite important for economic growth, though the reasons for this importance may not be fully captured by the augmented Solow growth model.

Available at:

http://www.sciencedirect.com/science/article/B6VBW-3V8D5DR-4/2/242ec28997683959f6ab1e0b229199f5

2.10 James D. Hamilton, The supply and demand for Federal Reserve deposits, Carnegie-Rochester Conference Series on Public Policy, Elsevier, vol. 49, pages 1-44, December 1998..

This paper argues that the following ingredients are necessary in order to draw causal inference from historical correlations: explication of the real-world mechanism that is supposed to have produced a proposed structural relation; the existence of a natural experiment through which the data were generated; and extensive statistical

corroboration of the econometric model. This research strategy is employed in an effort to identify the sources of disturbances to the supply and demand for Federal Reserve deposits. The effect of a shock in the supply of reserves on the federal funds rate depends on the marginal benefits banks perceive to holding excess reserves and the marginal costs of discount window borrowing. We find empirically that a temporary shock to the supply of reserves will only induce banks to borrow at the discount window if it occurs on settlement Wednesday or the last day of the quarter. The structural estimates presented here suggest that a $1 billion loss in reserves will raise the federal funds rate by 6.6 basis points if it occurs on settlement Wednesday or the last day of a quarter and by 2.6 basis points if it occurs on other days. A number of alternative sources of evidence are used to corroborate these structural estimates and to provide independent statistically significant confirmation that a reduction in the supply of reserves clearly raises the overnight interest rate.

Available at:

http://www.sciencedirect.com/science/article/B6V8D-3WM4R46-1/2/9d3a2a581070dc0f6d065feac47de6b1

2.11 James D. Hamilton, Measuring the Liquidity Effect, American Economic Review, American Economic Association, vol. 87(1), pages 80-97, March 1997.

This paper measures the effect on the federal funds rate of an open-market operation. The paper deals with simultaneous-equations bias by developing a proxy for the errors the Federal Reserve makes in forecasting the extent to which Treasury operations will add or drain reserves available to private banks. These errors induce fluctuations in bank reserves which have measurable consequences for the federal funds rate. The paper estimates that a reduction in nonborrowed reserves of $30 million, if sustained for an entire fourteen-day reserve maintenance period, will cause the federal funds rate to rise by ten basis points.

Available at:

http://ideas.repec.org/p/fip/fedfap/96-06.html

2.12 James D. Hamilton, This is what happened to the oil price-macroeconomy relationship, Journal of Monetary Economics, Elsevier, vol. 38(2), pages 215-220, October 1996.

No abstract available.

Available at:

http://www.sciencedirect.com/science/article/B6VBW-3VWC6R6-4/2/d9e8d126fc1bdb4e67337af9b98014f0

2.13 James D. Hamilton & Perez-Quiros, Gabriel, What Do the Leading Indicators Lead?, Journal of Business, University of Chicago Press, vol. 69(1), pages 27-49, January 1996.

The authors find that the composite leading index (CLI) is useful for forecasting gross national product (GNP), both in sample and in an out-of-sample real-time exercise. They propose a nonlinear specification in which cyclical shifts of the CLI precede those in GNP. However, the authors find that better forecasts are provided by a simple linear relation between current GNP growth and the growth rate of the CLI during the previous quarter along with an error-correction term corresponding to the previous quarter's logarithmic difference between the level of the CLI and the level of GNP.

Available at:

http://ideas.repec.org/a/ucp/jnlbus/v69y1996i1p27-49.html

2.14 James D. Hamilton, Was the Deflation during the Great Depression Anticipated? Evidence from the Commodity Futures Market, American Economic Review, American Economic Association, vol. 82(1), pages 157-78, March 1992.

Futures prices were well above spot prices for most commodities during most of the Great Depression; evidently the spectacular declines in agricultural prices caught many people by surprise. Based on the historical correlations between commodity prices and consumer prices, commodity markets anticipated stable consumer prices during the first year of the Great Depression. The dramatic drop in nominal Treasury

bill yields, thus, should be read as a drop in ex ante real rates. Later in the Great Depression, markets anticipated deflation, but not as severe as actually occurred.

Available at:

http://ideas.repec.org/a/aea/aecrev/v82y1992i1p157-78.html

2.15 James D. Hamilton, The Sustainability of Budget Deficits with Lump-Sum and with Income-Based Taxation: Comment, Journal of Money, Credit and Banking, Blackwell Publishing, vol. 23(3), pages 608-12, August 1991.

No abstract available.

Available at:

http://ideas.repec.org/p/fth/pennfi/17-90.html

2.16 James D. Hamilton, Analysis of time series subject to changes in regime, Journal of Econometrics, Elsevier, vol. 45(1-2), pages 39-70, 1990.

No abstract available.

Available at:

http://www.sciencedirect.com/science/article/B6VC0-4582CY8-20/2/af4ef1535da31d69fad61731d08faf45

2.17 James D. Hamilton, A New Approach to the Economic Analysis of Nonstationary Time Series and the Business Cycle, Econometrica, Econometric Society, vol. 57(2), pages 357-84, March 1989.

This paper models occasional, discrete shifts in the growth rate of a nonstationary series. Algorithms for inferring these unobserved shifts are presented, a byproduct of which permits estimation of parameters by maximum likelihood. An empirical application of this technique suggests that the periodic shift from a positive growth rate to a negative growth rate is a recurrent feature of the U.S. business cycle, and indeed could be used as an objective criterion for defining and measuring economic

recessions. The estimated parameter values suggest that a typical economic recession is associated with a 3 percent permanent drop in the level of GNP.

Available at:

http://ideas.repec.org/a/ecm/emetrp/v57y1989i2p357-84.html

2.18 James D. Hamilton, Rational-expectations econometric analysis of changes in regime: An investigation of the term structure of interest rates, Journal of Economic Dynamics and Control, Elsevier, vol. 12(2-3), pages 385-423, 1988.

This paper is of interest both for its methodological contribution of new tools for analyzing rational-expectations models and for its substantive conclusions concerning the term structure of interest rates during the monetary experiment of October 1979.

The paper studies systems subject to changes in regime, interpreted here as occasional, discrete shifts in the parameters governing the time series behavior of exogenous economic variables. The specification is shown to be quite tractable both theoretically and empirically. The technique is used to analyze yields on three-month Treasury bills and ten-year Treasury bonds during 1962 to 1987. A constant-parameter linear model for short-term rates is shown to be inconsistent both with the univariate time series properties of short rates and with the observed bivariate relation between long and short rates under the expectations hypothesis of the term structure. AN alternative nonlinear model that admits the possibility of changes in regime affords a much better description of the univariate process for short rates. Moreover, the cross-equation restrictions implied by the expectations hypothesis of the term structure are consistent with the nonlinear specification. Indeed, the residuals of the restricted relation have a standard error of only 0.8 basis points. This is a third less than that of a completely unrestricted linear regression of long rates on short rates, and compares with an unconditional standard deviation of long rates of 142 basis points.

I conclude that once the recognition by bond traders of changes in regime is taken into account, the expectations hypothesis of the term structure of interest rates holds up fairly well for these data.

Available at:

http://www.sciencedirect.com/science/article/B6V85-45MFRW4-M/2/8448f4d350843e858d7b2eb9b0e9fa36

2.19 James D. Hamilton, A Neoclassical Model of Unemployment and the Business Cycle, Journal of Political Economy, University of Chicago Press, vol. 96(3), pages 593-617, June 1988..

This paper investigates a general equilibrium model of unemployment and the business cycle in which specialization of labor plays a key role. A rational expectations equilibrium with fully flexible wages and prices can exhibit unemployment in which the marginal product of employed workers exceeds the reservation wage of those who are without jobs. Workers are unemployed either because they are in the process of relocating for a better job or because they are waiting for conditions in the depressed sector to improve. Moreover, seemingly small disruptions in the supplies of primary commodities such as energy could be the source of fluctuations in aggregate employment and can exert surprisingly large effects on real output.

Available at:

http://ideas.repec.org/a/ucp/jpolec/v96y1988i3p593-617.html

2.20 James D. Hamilton, Monetary factors in the great depression, Journal of Monetary Economics, Elsevier, vol. 19(2), pages 145-169, March 1987.

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