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November 2006
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INTRODUCTION

Structural models are econometric tools to analyse the interactions between sets of macroeconomic variables. The traditional approach consists in specification and estimation of large scale simultaneous models at the purposes of forecasting, policy analysis and testing of alternative economic theories.

Till the beginning of the seventies large scale models inspired by Keynesian paradigms dominated the literature. Later on the period was characterized by significant economic and political turbulences, instability, oil shocks and the end of the Bretton Woods monetary system. Such events led to the failure of most of the main traditional macroeconomic models in terms of their forecasting capacities.

Also the debate in the literature moved against the traditional approach, stimulating the "rational expectation" revolution. Under this new approach, econometric models should explicitly take under consideration rationality of agents to correctly represent the interactions among macroeconomic variables. The criticism by C.A. Sims at the beginning of the eighties represented the death-blow to traditional structural models. His suggestion was to specify vector autoregressive (VAR) models, i.e. multivariate models where each series under study is regressed on a finite number of lags of all the series jointly considered. In the Sims` view, the VAR approach overcame the criticisms of structural models due to over-identification and omission of interrelations among equations.

In last decades VARs models have found large success in several fields. Their use, however, is not free from problems. In particular the interpretation of instantaneous correlations among error terms and therefore among observable variables. A solution to this problem is provided by Structural VAR (SVAR) models, which are based on the imposition of a set of restrictions.

The following list is a non-exhaustive, subjective selection of publications on structural VAR models for Business Cycle Analysis.
Contact point: GianLuigi Mazzi, "Responsible for Euro-indicators and statistical methodology", Estat - D1 "Key Indicators for European Policies" 
gianluigi.mazzi@ec.europa.eu.
FOCUS ON: STRUCTURAL MODELS FOR BUSINESS CYCLE ANALYSIS

1.1 Amisano G. & Giannini C., Topics in Structural VAR Econometrics, Springer, 1997

The book provides a new approach to the identification and the estimation of structural VAR models. The role of deterministic variables are the connection with the concepts of cointegration is discussed at length. The book also provides criteria to select among alternative structures. In addition, the asymptotic distributions of the structural estimates of impulse response functions and forecast error variance decomposition coefficients are obtained and used to construct asymptotically based confidence intervals around the maximum likelihood estimates.

Moreover, the book contains also a critical evaluation of the problem of non-fundamental representations and of their relevance on the interpretability of the results of structural VAR analysis. Finally, the book contains two applied examples of how the described methodologies work in practice.

Text not available for download.


This paper outlines some problems with the methods often used to construct measures of real ‘disequilibria’ or ‘gaps’ (e.g. the output gap), and to examine their relation to inflation. It then offers a structural vector autoregression alternative, which we use to construct estimates of output, unemployment and capacity utilisation gaps. We construct our gap estimates by summing the effects of particular structural shocks on output etc – where the shocks are identified using long-run restrictions derived from theory. Our approach has four main advantages over other methods. First, it uses economics rather than statistics to construct the gaps. Second, the estimates are not contingent upon particular assumptions about the structure of the economy. Third, it does not impose a
rigid causal chain running from gaps to inflation. Fourth, it allows us to construct several
gaps and examine their relation to inflation in a single framework – so our three gaps are
internally consistent and can be used to make inferences about the structure of the economy.

Text available at:

http://www.bankofengland.co.uk/publications/workingpapers/wp103.pdf


Standard explanations of the bivariate correlation of money and income attribute this
correlation to an inability of agents to discriminate in the short run between real and
nominal sources of price shocks. This paper is an empirical comparison of the standard
explanation with two alternatives: 1) the "credit view", which focuses on financial market
imperfections rather than real-nominal confusion; and 2) the real business cycle
approach, which argues that the money-income correlation reflects a passive response of
money to income. The methodology, which is a variant of the Sims VAR approach,
follows Blanchard and Watson (1984) in using an estimated, explicitly structural model
to orthogonalize the VAR residuals. (This variant methodology, I argue, is the more
appropriate for structural hypothesis testing.) The results suggest that the standard
explanations of the money-income relation are largely, but perhaps not completely,
displaced by the alternatives.

Published also in: “Real Business Cycles, Real Exchange Rates, and Actual Policies,

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domain of the client browser is in a developing country or transition economy free access
is provided. More information about subscriptions and free access is available at:

1.4  Blanchard O., A traditional interpretation of macroeconomic fluctuations, American Economic Review No. 79, pages 1146-64, 1989

Under the traditional interpretation of macroeconomic fluctuations, aggregate demand shocks move output and prices in the same direction, while aggregate supply shocks move output and prices in opposite directions. This paper examines the joint behavior of U.S. output, unemployment, prices, wages, and nominal money and asks whether it is consistent with this interpretation. The answer is a qualified yes.

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This paper examines two questions. The first is whether economic fluctuations-business cycles-are due to an accumulation of null shocks or instead mostly to infrequent large shocks. The paper concludes that neither of these two extreme views accurately characterizes fluctuations. The second question is whether fluctuations are due mostly to one source of shocks, for example monetary, or instead to many sources. The paper concludes that evidence strongly supports the hypothesis of many, about equally important, sources of shocks. To analyze the empirical evidence and to reach these conclusions, the paper uses two different statistical approaches. The first is estimation of a structural model, using a set of just identifying restrictions. The second is non-structural and may be described as a formalization of the Burns Mitchell techniques. Both approaches are somewhat novel and should be of independent interest.
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The authors interpret fluctuations in GNP and unemployment as due to two types of disturbances: disturbances that have a permanent effect on output and disturbances that do not. They interpret the first as supply disturbances, the second as demand disturbances. Demand disturbances have a hump-shaped, mirror-image effect on output and unemployment. The effect of supply disturbances on output increases steadily over time, peaking after two years and reaching a plateau after five years.

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Text available at:

http://www.jstor.org/pss/1827924


We investigate the relationship between inflation and real output in a large sample of postwar economies. Our methodology is to use a structural vector autoregression to estimate the response of the level of real output to permanent inflation shocks separately for each country. We find that a permanent shock to inflation is not associated with a permanent movement in the level of real output for most countries in our sample. The main exceptions are certain low inflation countries, in which permanent inflation shocks
permanently increase the level of output. We also find that permanent inflation shocks do not permanently influence real output growth rates in our sample.

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Text available at:

http://www.sciencedirect.com/science/article/B6VBW-3YN9DR5-2/2/480a72c832c0d83d0ecb1f5889aa1559


This paper assesses the statistical reliability of different measures of the output gap for the Euro-11 area and the US using output, inflation and unemployment systems. In order to assess the reliability of an output gap estimate two criteria are adopted. Firstly, the estimate should have forecasting power over inflation. Secondly, the ex post statistical revisions of the output gap should not differ significantly from previously computed measures. As an additional check on reliability, we find out whether the estimate of the output gap is positively correlated with standard measures of capacity utilization. We find that under our multivariate specification, unobservable components (UC) type models of the output gap show temporal consistency between sequential and final estimates and are consistent with known cyclical indicators. On the other hand, our UC models for the output gap have limited forecasting power for inflation, since they underperform an arbitrary autoregressive model.


Text available at:


1.9 Campbell J. Y. & Mankiw N. G., Are output fluctuations transitory?, Quarterly Journal of Economics No. 102, pages 857-80, 1987

No abstract is available for this item.

This paper uses two-variable auto regressions to characterize transitory components in GNP and stock prices. Shocks to GNP holding consumption constant are almost entirely transitory and account for large fractions of the variance of GNP growth. If consumption does not change, consumers must think that any GNP change is transitory. The facts that the consumption/GNP ratio forecasts GNP growth and that consumption is nearly a random walk drive this result. An implication is that consumption provides a good estimate of the 'trend' in GNP. Prices and dividends behave similarly: shocks to prices, holding dividends constant, are almost entirely transitory.

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We make three comparisons relevant for the business cycle accounting approach. We show that in theory, representing the investment wedge as a tax on investment is equivalent to representing this wedge as a tax on capital income as long as the probability distributions over this wedge in the two representations are the same. In practice, convenience dictates that the underlying probability distributions over the investment wedge are different in the two representations. Even so, the quantitative results under the two representations are essentially identical. We also compare our methodology, the CKM methodology, to an alternative one used in Christiano and Davis (2006) and by us in early incarnations of the business cycle accounting approach. We argue that the CKM
methodology rests on more secure theoretical foundations. Finally, we show that the results from the VAR-style decomposition of Christiano and Davis reinforce the results of the business cycle decomposition of CKM.

Full text available at:


1.12 Chari V. V., Kehoe P. J. & McGrattan E. R., Are structural VARs with long-run restrictions useful in developing business cycle theory?, Research Department Staff Report 364, Federal Reserve Bank of Minneapolis, 2007

The central finding of the recent structural vector autoregression (SVAR) literature with a differenced specification of hours is that technology shocks lead to a fall in hours. Researchers have used this finding to argue that real business cycle models are unpromising. We subject this SVAR specification to a natural economic test and show that when applied to data from a multiple-shock business cycle model, the procedure incorrectly concludes that the model could not have generated the data as long as demand shocks play a nontrivial role. We also test another popular specification, which uses the level of hours, and show that with nontrivial demand shocks, it cannot distinguish between real business cycle models and sticky price models. The crux of the problem for both SVAR specifications is that available data require a VAR with a small number of lags and such a VAR is a poor approximation to the model’s VAR.

Full text available at:


This paper examines the usefulness of applying structural vector autoregressions (SVARs) to the study of business cycles. The SVAR approach aims to provide robust inferences, by imposing only weak theoretical restrictions. We illustrate that the
robustness of conclusions drawn from SVAR exercises are questionable. We also examine the problem of identification failure in structural VAR models.

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Text available at:

http://www.sciencedirect.com/science/article/B6VC0-3SX6N67-4/2/09be75ec99488ac04c9e2dd551def037


In a recent paper, Blanchard and Quah (American Economic Review, 1989, 79, 655–673) propose a set of restrictions to identify the structural innovations from a reduced-form bivariate model of income growth and unemployment. Given the assumptions made by Blanchard and Quah on the time-series properties of the data, this paper demonstrates that their bivariate model is just a special case of Stock and Watson's Journal of the American Statistical Association, 1988, 83, 1097–1107) common trends representation. More importantly, this alternative representation allows the econometrician to test the long-run restrictions used by Blanchard and Quah to distinguish between demand and supply innovations.

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http://www.sciencedirect.com/science/article/B6V84-3YVCYS2-R/2/9b7ca57258089d68c9345b99af5f5cc3


This paper examines the roles played by innovations identified from a simple four-variable VAR characterized by cointegration. Using knowledge of cointegration rank and "textbook" relations that link macroeconomic aggregates, we identify distinct "real" and
"nominal" innovations that dictate the long-run behavior of the model. We also examine the explanatory power of transitory innovations that are orthogonal to these permanent shocks. One of the permanent shocks displays all the characteristics of a technology or "supply" innovation, while one of the transitory innovations—identified by imposing short-run price rigidity—is interpretable as a "demand" side impulse. The permanent nominal shock bears the imprint of an innovation in aggregate inflation expectations. Historical decomposition and comparison with variables that are external to the model reveals the relative importance of the shocks at various episodes.

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[http://www.jstor.org/pss/2646790](http://www.jstor.org/pss/2646790)


Previous empirical study on the effects of monetary policy shocks in small open economies has generated puzzling dynamic responses in various macroeconomic variables. This paper argues that these puzzles derive from an identification of monetary policy that is inappropriate for such economies. To remedy this, it is proposed that a structural model be estimated to explicitly account for the features of the small open economy. Such a model is applied to Canada with tightly estimated results overall. The dynamic responses to the identified monetary policy shock are consistent with standard theory and highlight the exchange rate as a transmission mechanism.

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[http://www.sciencedirect.com/science/article/B6VBW-3SX0R5J-5/2/396791588b21fedf7c249d6a3d861146](http://www.sciencedirect.com/science/article/B6VBW-3SX0R5J-5/2/396791588b21fedf7c249d6a3d861146)
1.17 DeSerres A. & Guay A., Selection of the truncation lag in structural VARs (or VECMs) with long run restrictions, Bank of Canada Working Paper No. 95-9, 1995

The authors examine the issue of lag-length selection in the context of a structural vector autoregression (VAR) and a vector error-correction model with long-run restrictions. First, they show that imposing long- run restrictions implies, in general, a moving-average (MA) component in the stationary multivariate representation. Then they examine the sensitivity of estimates of the permanent and transitory components to the selection of the lag length required in a VAR system to approximate this MA component. In summary, they find that using a lag structure that is too short can lead to a significant estimation bias of the permanent and transitory components. In addition, in comparing four different lag- selection criteria, they find that the Schwarz information criterion systematically underperforms relative to the other tests. More generally, as the order of the VAR that best approximates the data- generating process increases, the sequence-based tests (Wald, likelihood ratio) tend to provide more reliable results than the information-based tests (Akaike, Schwarz).

Text available at:
http://129.3.20.41/eps/em/papers/9510/9510001.pdf

1.18 Dupasquier C., Guay A. & St-Amant P., A survey of alternative methodologies for estimating potential output and the output gap, Journal of Macroeconomics No. 21, pages 577-595, 1999

In this paper, we survey some techniques proposed in the literature to measure potential output. Given the reported shortcomings of univariate approaches and mechanical filters, we focus on three simple multivariate methodologies: the multivariate Beveridge-Nelson methodology (MBN), Cochrane's methodology (CO), and the structural VAR methodology with long-run restrictions (LRRO). These methodologies are presented and then applied to U.S. data. The results show that the LRRO estimates provide significant evidence that permanent shocks have more complex dynamics than the random walk assumed in CO and MBN approaches. As in other studies, estimates of the output gap remain imprecise.
Galí's innovative approach of imposing long-run restrictions on a vector autoregression (VAR) to identify the effects of a technology shock has become widely utilized. In this paper, we investigate its reliability through Monte Carlo simulations using calibrated business cycle models. Overall, Galí's methodology appears to be fruitful: the impulse responses derived from the artificial data generally have the same sign and qualitative pattern as the true responses, and the approach can be informative in discriminating between alternative models. However, our results reveal some important quantitative shortcomings, including considerable estimation uncertainty about the impact of technology shocks on macroeconomic variables. More generally, the conditions under which the methodology performs well appear considerably more restrictive than implied by the key identifying assumption. This underscores the importance of using economic models to guide in the implementation of the approach, in interpreting the results, and in assessing its limitations.
when the information set includes other I (1) and/or stationary variables. We show how the relative importance of the cyclical component depends on the size of the information set, and is necessarily higher with multivariate BN decompositions. The results are illustrated using post-WWII United States data. An explanation is also provided for the empirical finding of a positive association of the multivariate BN cycle with output growth.

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Many recent articles have identified behavioral disturbances in vector autoregressions by imposing restrictions on the long-run effects of shocks. This article demonstrates that this approach will be unreliable unless the underlying economy satisfies three types of strong restrictions. Although many aspects of these issues have been raised before, this article draws out and illustrates the implications for inferences under the long-run scheme. Furthermore, it provides strategies for dealing with the problems.

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The dynamics of a linear (or linearized) dynamic stochastic economic model can be expressed in terms of matrices (A, B, C, D) that define a state space system. An
associated state space system (A, K, C, Sigma) determines a vector autoregression for observables available to an econometrician. We review circumstances under which the impulse response of the VAR resembles the impulse response associated with the economic model. We give four examples that illustrate a simple condition for checking whether the mapping from VAR shocks to economic shocks is invertible. The condition applies when there are equal numbers of VAR and economic shocks.

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A model's ability to explain procyclical movements in real wages has become an important benchmark by which macroeconomists judge business cycle theories. Because Keynesian models with sticky nominal wages predict countercyclical real wages, they have been criticized and dismissed in favor of Real Business Cycle models or New Keynesian models based on price stickiness or countercyclical markups. The bulk of the evidence for procyclical real wages, however, comes from studies using panel data that estimate the unconditional, contemporaneous correlation between real wages and the unemployment rate. These studies constrain real wage cyclicality to be the same irrespective of the source of the business cycle fluctuations. This paper relaxes this constraint and estimates a structural VAR identified by long-run restrictions on the responses of hours and output to labor supply, technology, oil price, and aggregate demand shocks. It finds that real wages are procyclical in response to technology shocks and oil price shocks, but are countercyclical in response to labor supply shocks and aggregate demand shocks. The procyclicality of real wages during the periods covered by
the panel data sets may be explained by the importance of the productivity slowdown and the 1970s oil price shocks. The results highlight the limitations of using the unconditional, contemporaneous correlation between real wages and business cycle indicators to sort out competing theories of the business cycle, and cast strong doubt on the appropriateness of the rejection of sticky wage models.

Full text available at:


Postwar U.S. time series for money, interest rates, prices, and GNP are characterized by a multivariate process driven by four exogenous disturbances. Those disturbances are identified so that they can be interpreted as the four main sources of fluctuations found in the IS-LM-Phillips curve model: money supply, money demand, IS, and aggregate supply shocks. The dynamic properties of the estimated model are analyzed and shown to match most of the stylized predictions of the model. The estimated decomposition is also used to measure the relative importance of each shock, to interpret some macroeconomic episodes, and to study sources of permanent shocks to nominal variables.

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Text available at:

http://www.jstor.org/pss/2118487


The author estimates a decomposition of productivity and hours into technology and nontechnology components. Two results stand out: (1) the estimated conditional correlations of hours and productivity are negative for technology shocks, positive for
nontechnology shocks; and (2) hours show a persistent decline in response to a positive technology shock. Most of the results hold for a variety of model specifications and for the majority of G7 countries. The picture that emerges is hard to reconcile with a conventional real-business-cycle interpretation of business cycles but is shown to be consistent with a simple model with monopolistic competition and sticky prices.

Text available at:

http://www.jstor.org/pss/116987

1.26 Garratt A., Lee K., Pesaran, M. H. & Shin Y. (), Forecast uncertainties in macroeconometric modelling: an application to the UK economy, Discussion Papers in Economics No. 00/4, Department of Economics, University of Leicester, 2000

This paper argues that probability forecasts convey information on the uncertainties that surround macro-economic forecasts in a manner which is straightforward and which is preferable to other alternatives, including the use of confidence intervals. Probability forecasts relating to UK output growth and inflation, obtained using a small macro-econometric model, are presented. We discuss in detail the probability that inflation will fall within the Bank of England’s target range and that recession will be avoided, both as separate single events and jointly. The probability forecasts are also used to provide insights on the interrelatedness of output growth and inflation outcomes at different horizons.


Text available at:

http://www.le.ac.uk/economics/research/RePEc/lec/leecon/econ00-4.pdf

A new modelling strategy is introduced which provides a practical approach to incorporating long-run structural relationships, suggested by economic theory, in an otherwise unrestricted VAR model. The strategy is applied in the construction of a small quarterly macroeconometric model of the UK, estimated over the period 1965q1-1995q4 in eight core variables: domestic and foreign outputs, domestic and foreign prices (both measured relative to oil prices), the nominal effective exchange rate, nominal domestic and foreign interest rates and real money balances. The aim is to develop a core model with a transparent and theoretically coherent foundation. Tests of restrictions on the long-run relations of the model are presented and the dynamic properties of the model are discussed.

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The common approach to evaluating a model in the structural VAR literature is to compare the impulse responses from structural VARs run on the data to the theoretical impulse responses from the model. The Sims-Cogley-Nason approach instead compares the structural VARs run on the data to identical structural VARs run on data from the model of the same length as the actual data. Chari, Kehoe, and McGrattan (2006) argue that the inappropriate comparison made by the common approach is the root of the problems in the SVAR literature. In practice, the problems can be solved simply. Switching from the common approach to the Sims-Cogley-Nason approach basically involves changing a few lines of computer code and a few lines of text. This switch will vastly increase the value of the structural VAR literature for economic theory.

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Are business cycles mainly the result of permanent shocks to productivity? This paper uses a long-run restriction implied by a large class of real-business-cycle models--identifying permanent productivity shocks as shocks to the common stochastic trend in output, consumption, and investment--to provide new evidence on this question. Econometric tests indicate that this common-stochastic-trend/cointegration implication is consistent with postwar U.S. data. However, in systems with nominal variables, the estimates of this common stochastic trend indicate that permanent productivity shocks typically explain less than half of the business-cycle variability in output, consumption, and investment.

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This paper presents a unified approach to impulse response analysis which can be used for both linear and nonlinear multivariate models. After discussing the advantages and disadvantages of traditional impulse response functions for nonlinear models, we introduce the concept of a generalized impulse response function which, we argue, is applicable to both linear and nonlinear models. We develop measures of shock persistence and asymmetric effects of shocks derived from the generalized impulse
response function. We illustrate the use of these measures for a nonlinear bivariate model of US output and the unemployment rate.

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1.31 Kydland F. & Prescott E., Time to build and aggregate fluctuations, Econometrica 50, pages 1345-70, 1982

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The paper provides a survey of methods that decompose multivariate series into permanent and transitory components by using ideas drawn from the co-integration literature. We adopt a two stage procedure to effect the decomposition. In the first stage a basic set of permanent and transitory components is formed by using standard definitions of the shocks which they are constituted from. The resulting measurements are not unique and further information needs to be employed to get uniqueness. Such information can come in many forms but a particularly important one involves the values of the long-run multipliers for permanent shocks that are available from many calibrated models. A comparison of the methods of effecting the decomposition is performed using a well known data set.

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In this paper, the authors argue that modeling the trend component in real GNP as a random walk is inconsistent with its interpretation as productivity growth. As an alternative, they specify the trend as an ARIMA whose impulse response function follows an S-shaped pattern reflecting the process of diffusion of technical change. Such an ARIMA is employed to build and estimate an UCARIMA using U.S. postwar quarterly data. The authors find that their model, although more parsimonious, fits the data equally as well as the standard random walk plus AR (2) cycle. Moreover, their model has a very low cycle/trend variance ratio.

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In this paper we describe how restricted vector autoregressions can be employed to examine the sources of macroeconomic fluctuations. We show how cointegration restrictions can be used to identify a VAR system with common stochastic trends subject to transitory and permanent changes in average growth, and how we may investigate the system's responses to permanent shocks, i.e. to innovations to the trends. Theoretical cointegration vectors are derived from a small open economy growth model for terms of trade, real GDP, real consumption and real investments. Applying these methods to Swedish annual data (1875-1986) we find that permanent real (supply) shocks account for most of the fluctuations in GDP, even in the short run.

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In this paper we examine a number of recent studies that claim to have obtained a well-defined liquidity effect using structural VAR models based on broad measures of money. These studies can be distinguished in terms of the identifying restrictions, sample periods, and frequency of data used. We show that estimation of the structural coefficients of all these models can be achieved by instrumental-variable methods, where the instruments are predetermined variables and the estimated structural errors from other equations in the system. Overall, our judgment is that the evidence for a liquidity effect from these studies is much less certain than suggested in the original papers, primarily because of the poor quality of the instruments used in estimation and the sensitivity of the estimates to the sample period used.

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Building on Koop, [Koop et al. (1996) Impulse response analysis in nonlinear multivariate models. Journal of Econometrics 74, 119–147] we propose the ‘generalized' impulse response analysis for unrestricted vector autoregressive (VAR) and cointegrated VAR models. Unlike the traditional impulse response analysis, our approach does not require orthogonalization of shocks and is invariant to the ordering of the variables in the VAR. The approach is also used in the construction of order-invariant forecast error variance decompositions.

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The paper develops a general framework for identification, estimation, and hypothesis testing in cointegrated systems when the cointegrating coefficients are subject to (possibly) non-linear and cross-equation restrictions, obtained from economic theory or other relevant a priori information. It provides a proof of the consistency of the quasi maximum likelihood estimators (QMLE), establishes the relative rates of convergence of the QMLE of the short-run and the long-run parameters, and derives their asymptotic distributions; thus generalizing the results already available in the literature for the linear case. The paper also develops tests of the over-identifying (possibly) non-linear restrictions on the cointegrating vectors. The estimation and hypothesis testing procedures are applied to an Almost Ideal Demand System estimated on U.K. quarterly observations. Unlike many other studies of consumer demand this application does not treat relative prices and real per capita expenditures as exogenously given.

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This paper generalizes the existing cointegration analysis literature in two respects. Firstly, the problem of efficient estimation of vector error correction models containing exogenous I (1) variables is examined. The asymptotic distributions of the (log-) likelihood ratio statistics for testing cointegrating rank are derived under different intercepts and trend specifications and their respective critical values are tabulated. Tests for the presence of an intercepts or linear trend in the cointegrating relations are also developed together with model misspecification tests. Secondly, efficient estimation of
vector error correction models when the short-run dynamics may differ within and between equations is considered. A re-examination of the purchasing power parity and the uncovered interest rate parity hypotheses is conducted using U.K. data under the maintained assumption of exogenously given foreign and oil prices.

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This survey uses a number of recent developments in the analysis of cointegrating Vector Autoregressions (VARs) to examine their links to the older structural modelling traditions using Autoregressive Distributed Lag (ARDL), and Simultaneous Equations Models (SEMs). In particular, it emphasizes the importance of using judgement and economic theory to supplement the statistical information. After a brief historical review it sets out the statistical framework, discusses the identification of impulse responses using the Generalized Impulse Response functions, reviews the analysis of cointegrating VARs and highlights the large number of choices applied workers have to make in determining a specification. In particular, it considers the problem of specification of intercepts and trends and the size of the VAR in more detail, and examines the advantages of the use of exogenous variables in cointegration analysis. The issues are illustrated with a small U.S. macroeconomic model.

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http://www.blackwellpublishing.com/journal.asp?ref=0950-0804

1.40 Schumacher C., Forecasting trend output in the Euro area, *Journal of Forecasting* 21(8), 543-558, 2002
This paper is an applied study about forecasting trend output and the output gap in the Euro area. The need for trend output forecasts is justified by an analysis of the monetary strategy of the European Central Bank. Trend output serves as a direct inflation indicator and helps to determine the reference value for money. For both purposes, trend output has to be forecasted. A permanent-transitory decomposition based on cointegration restrictions gives an estimate of trend output in the Euro area. Ex-ante point forecasts of trend output are computed and bootstrap simulation is employed to construct prediction intervals that take estimation uncertainty into consideration. The uncertainty of trend output and the output gap is quite large and raises questions about their usefulness as indicators for monetary policy.

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Full text available at:

http://www3.interscience.wiley.com/cgi-bin/fulltext/99016841/PDFSTART

1.41 Shapiro M.D. & Watson M.W., Sources of business cycle fluctuations, Cowles Foundation Discussion Papers No. 870, Yale University, 1988

What shocks account for the business cycle frequency and long run movements of output and prices? This paper addresses this question using the identifying assumption that only supply shocks, such as shocks to technology, oil prices, and labor supply affect output in the long run. Real and monetary aggregate demand shocks can affect output, but only in the short run. This assumption sufficiently restricts the reduced form of key macroeconomic variables to allow estimation of the shocks and their effect on output and price at all frequencies. Aggregate demand shocks account for about twenty to thirty percent of output fluctuations at business cycle frequencies. Technological shocks account for about one-quarter of cyclical fluctuations, and about one-third of output's variance at low frequencies. Shocks to oil prices are important in explaining episodes in the 1970's and 1980's. Shocks that permanently affect labor input account for the balance of fluctuations in output, namely, about half of its variance at all frequencies.

Existing strategies for econometric analysis related to macroeconomics are subject to a number of serious objections, some recently formulated, some old. These objections are summarized in this paper, and it is argued that taken together they make it unlikely that macroeconomic models are in fact over identified, as the existing statistical theory usually assumes. The implications of this conclusion are explored, and an example of econometric work in a non-standard style, taking account of the objections to the standard style, is presented.

Access to full text is restricted to JSTOR subscribers. See http://www.jstor.org for details.

1.43 Sims C. A., Are forecasting models usable for policy analysis?, Federal Reserve Bank of Minneapolis Quarterly Review 10, pages 2-16, 1986

In this article, Christopher A. Sims argues the answer to his title is yes. Sims explains that any decision making model must incorporate some identifying assumptions to enable it to forecast the effects of alternative decisions. He argues that although all identifying assumptions in econometric policymaking models are of uncertain validity, those incorporated in vector autoregression (VAR) forecasting models have the advantage of allowing their uncertainty to be measured. Sims concludes by demonstrating a method for identifying a small macroeconomic VAR model so that it can be used to analyze monetary policy.

Full text available at:
1.44 Sims C. A. & Zha T., Does monetary policy generate recessions?, Macroeconomic Dynamics 10, pages 231-272, 2006

We consider two kinds of answers to the title question: Do random shifts in monetary policy account for historical recessions, and would changes in the systematic component of monetary policy have allowed reductions in inflation or output variance without substantial costs. The answer to both questions is no. We use weak identifying assumptions and include extensive discussion of these assumptions, including a completely specified dynamic stochastic equilibrium model in which our identifying assumptions can be shown to be approximately satisfied.

Full text available at:

http://journals.cambridge.org/abstract_S136510050605019X


Cointegration analyses of macroeconomic time series are often not based on fully specified theoretical models. We use a theoretical model to scrutinize common procedures in applied cointegration analysis. Monte Carlo experiments show that 1) some tests of the cointegration vectors do not work well on series generated by an equilibrium cycle model; (2) cointegration restrictions add little to forecasting; (3) structural VAR models based on weak long-run restrictions seem to work well. The main disadvantages of cointegration analysis without strong links to economic theory are that it makes it hard to estimate and interpret the cointegration vectors.

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This paper discusses detrending economic time series, when the trend is modelled as a stochastic process. It considers unobserved components models in which the observed series is decomposed into a trend (a random walk with drift) and a residual stationary component. Optimal detrending methods are discussed, as well as problems associated with using these detrended data in regression models. The methods are applied to three time series: GNP, disposable income, and consumption expenditures. The detrended data are used to test a version of the Life Cycle consumption model.

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A simple procedure to identify the groups of permanent and transitory shocks in a cointegrated VAR model is suggested and a method for inverting the cointegrated VAR is provided.

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