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Research Summaries

Forecasting Recessions: Consensus and Disagreement

Natalia Tamirisa

This article provides a brief overview of the latest research on the ability of forecasters to predict recessions. Few recessions have been forecast before their onset. Forecasters tend to be excessively cautious and do not revise their forecasts promptly and sufficiently to reflect incoming news. Nor do they fully take into account interdependence among economies. There is also a tendency for "groupthink" among forecasters, preventing them from giving due weight to their individual priors.

Most U.S. recessions remain undetected until they are well under way. This "predictive failure" was documented several decades ago by Zarnowitz (1986) and then by Fintzen and Stekler (1999). During the latest recession, which according to the National Bureau of Economic Research began in December 2007, the initial forecast for 2008 by private analysts *(continued on page 2)*

Searching for Robust Growth Determinants

Alin Mirestean and Charalambos Tsangarides

There has been a vast literature of cross-country studies of economic growth, but the mechanics of growth and development are still not fully understood. The lack of an explicit theory identifying growth determinants has recently prompted researchers to start investigating how robust the various possible empirical relations are by formally incorporating model uncertainty in the empirical growth analysis. This article surveys the latest research related to investigating growth empirics using robustness analysis.

Over the last two decades, empirical work has tried to explain why some countries have had rapid long-term growth rates in income while others have not. After a period during which the neoclassical Solow (1956) framework was the workhorse of empirical growth analysis, endogenous growth theory introduced alternative models that allow growth to be generated by factors other than exogenous technical change. Endogenous growth theory provided mechanisms through which economic and social policies could affect growth through their effects on human and physical capital accumulation. Consequently, empirical work on growth that ensued extended the neoclassical *(continued on page 4)*

Forecasting Recessions: Consensus and Disagreement

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in January 2007 was on average for growth of 3 percent. Almost every month since then the forecast has been lowered, but even as late as September 2008 forecasters expected on average that growth would be close to 2 percent. It was only in the last quarter of the year that expectations of growth adjusted sharply downward. Actual growth in 2008 was about 1 percent.

"It is somewhat surprising that there is no evidence that the practical implications of the inefficiency of consensus forecasts are well understood by forecasters themselves"

Data on private analysts' forecasts of output growth are available for a broad range of advanced, emerging, and developing economies. Consensus Economics, Inc. has been collecting and publishing monthly forecasts by private analysts since October 1989 for major advanced economies under the title of *Consensus Forecasts*, and over time the data set was expanded to include many emerging and developing economies. *Consensus Forecasts* survey a number of prominent financial and economic analysts and report their forecasts as well as simple statistics summarizing the distribution of forecasts, particularly the mean (the "consensus") and the standard deviation of the consensus (the "dispersion," a measure of the extent of disagreement among forecasters).

Loungani (2001) used *Consensus Forecasts* to examine the track record for forecasting recessions in a diverse sample of advanced, emerging, and developing economies. He concluded that forecasters' ability to predict recessions is generally very limited. Only two of the 60 recessions that occurred around the world during the 1990s were predicted a year in advance. Two-thirds of those recessions remained undetected seven months before they occurred. And even as late as two months before each recession began, about a quarter of the forecasts still did not predict a recession. Evidence from the 2000s examined by Loungani, Stekler, and Rodriguez (2008) suggests the recessions that occurred during this decade went also largely undetected until they started. (For the analysis of the track record for forecasting recoveries, see Loungani, 2002.)

Loungani, Stekler, and Tamirisa (forthcoming) explore forecasting performance for the recessions caused by economic and financial crises. They find that forecast errors for the recessions following banking crises exceed those for regular recessions, while the opposite is true for recessions following currency and debt crises. One reason for the greater predictive failure in the case of crisis-related recessions is a greater tendency of forecasters to smooth their forecasts, failing to adjust them sufficiently in response to news. The failure to incorporate foreign news, especially news from major emerging economies, appears to be because it is more of a challenge than incorporating domestic news. Forecasters do not take into account the dependence of economies on one another, particularly the closer linkages between advanced and emerging economies. These findings are broadly consistent with the results obtained for the G-7 economies by Isiklar, Lahiri, and Loungani (2006) in a paper in which the authors proposed a methodology for testing how quickly forecasters incorporate foreign news.

Another reason for the failure to predict recessions appears to be a tendency for herd behavior in forecasting, possibly owing to forecasters putting a higher weight on the group's shared view than on private priors and incoming news. Such a tendency is particularly pronounced in forecasts of advanced economies, as reflected in the decline in the dispersion of consensus forecasts over the year preceding recessions. In contrast, for emerging and developing economies, the dispersion of consensus forecasts tends to rise about nine months before the start of a recession. This suggests that monitoring trends in the dispersion of forecasts may help improve forecasting performance for recessions.

Dovern, Fritsche, and Slacalek (2009) also find that disagreement about real variables (GDP, consumption, investment, and unemployment) intensifies strongly during recessions, including the current one. Disagreement over nominal variables (interest rates and inflation) rises with their level and is considerably lower under independent central banks. Cross-sectional dispersion for both groups increases with uncertainty about the underlying actual indicators, though to a lesser extent for nominal series. These findings suggest that more credible monetary policy can substantially contribute to anchoring expectations about nominal variables, while its effects on disagreement about real variables are moderate.

The extent of disagreement among forecasters may be indicative of the degree of uncertainty surrounding macroeconomic forecasts. This interpretation justifies using the dispersion of forecasts as one of the risk factors underpinning the *World Economic Outlook*'s fan chart for global

economic growth. This is the approach taken under the new methodology for the fan chart (Kannan and Elekdag, 2009). In another area of research—predicting economic and financial crises—papers by Prati and Sbracia (2002) and Kannan and Köhler-Geib (2009) show that the dispersion of analysts' forecasts is a significant predictor of financial crises.

There is strong evidence that consensus forecasts are inefficient and biased. Loungani (2001) showed that forecasts for both advanced and emerging and developing economies are characterized by a tendency for excessive smoothing (serial correlation in forecast revisions) and systematic biases. These results were confirmed in a more recent data set by Ager, Kappler, and Osterloh (2009). The inefficiency of forecasts is partly due to informational rigidities faced by all agents—including consumers, investors and forecasters—when forming their expectations. Coibion and Gorodnichenko (2009) show that mean forecasts fail to completely adjust on impact to structural shocks, leading to statistically and economically significant deviations from the null of full information. The behavior of forecast errors following structural shocks is consistent with the predictions of models of informational rigidities.

It is somewhat surprising that there is no evidence that the practical implications of the inefficiency of consensus forecasts are well understood by forecasters themselves. For example, forecasters fail to correct their individual forecasts for the inefficiency of consensus forecasts (Crowe, forthcoming). This finding offers an explanation for a number of empirical regularities, such as the positive short-run serial correlation observed in stock prices and the apparent success of momentum trading strategies, while posing a challenge for the efficient markets hypothesis more generally.

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Visiting Scholars, January–March 2010

Fabio Canova; Universitat Pompeu Fabra, Spain; 1/15/10–4/30/10

Lawrence Katz; Harvard University; 2/8/10–2/9/10

Christopher Meissner; University of Cambridge, England; 12/1/09–2/26/10

Enrique Mendoza; University of Maryland; 9/1/09–4/30/10

Chris Rodrigo; 8/17/09–2/26/10

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Searching for Robust Growth Determinants

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model to include a number of determinants that are partially correlated with growth, including proxies for government policies and measures of technology diffusion.

A fundamental problem confronting researchers is the lack of an explicit theory identifying the determinants of growth. Indeed, extensions to the neoclassical and endogenous growth models are what Brock and Durlauf (2001) call "open-ended," as they admit a vast range of logical and testable additions, and a broad number of possible specifications. In fact, a survey of the empirical growth literature by Durlauf, Johnson, and Temple (2005) identifies over 140 proxies of growth determinants put forward by various empirical studies, highlighting the "open-endedness" of growth theories and implicitly the degree of uncertainty surrounding the validity of the competing theories. As a result, researchers began to investigate how robust empirical relations for economic growth are.

Work on investigating the robustness of growth determinants was initiated by Levine and Renelt (1992) and Sala-i-Martin (1997). The former approach—using a version of the extreme bounds analysis introduced by Leamer (1985)—labeled a few variables as robust but was criticized for its restrictiveness. The latter approach identified a relatively large number of robust variables and was criticized for the simplifying assumptions of a fixed model size and the existence of a set of "fixed regressors" appearing in each specification. While these studies were important initial attempts to shed light on the robustness of growth determinants, they did not fully take model or theory uncertainty into account.

Following the early work on investigating the robustness of growth determinants, Bayesian Model Averaging (BMA) techniques were introduced in the context of growth empirics. The BMA techniques—advanced through the work of Raftery (1995)—provide a conceptually attractive solution to the problem of model uncertainty. These techniques assume that the researcher does not know which model is "true" and thus needs to attach probabilities to different possible models. Inferences are then based on a weighted average of the full model space instead of on one selected model, thus incorporating uncertainty in both predictions and parameter estimates.

Fernández, Ley, and Steel (2001), Brock and Durlauf (2001), and Sala-i-Martin, Doppelhofer, and Miller (2004) formally introduced model averaging to the growth empirics literature. While their methodologies differ—the inference in Fernández, Ley, and Steel (2001) and Brock and Durlauf (2001) is based on BMA, while Sala-i-Martin, Doppelhofer, and Miller (2004) advocate making inferences based on a selected group of variables—their results are similar. All these studies find that initial level of income is important in determining growth along with some measures of human capital, some sectoral variables, and regional dummies.

More recent applications of BMA to investigate growth empirics suggest several modifications of the early BMA framework, such as testing the strength of various growth theories instead of concentrating on the individual explanatory variables. In addition, within the context of addressing model uncertainty, researchers began to address other issues that may plague the study of growth empirics, such as including omitted country-specific effects and incorporating heterogeneity, modeling dynamics, and endogenous variables.

In an attempt to test growth theories rather than particular variables, Durlauf, Kourtellos, and Tan (2008) assign priors to various combinations of empirical proxies for a given theory. They find little evidence for the fundamental growth theories of geography and institutions and strong evidence for macroeconomic policy and regional heterogeneity in explaining aggregate growth. In addition, Ley and Steel (2007) and Doppelhofer and Weeks (2009) develop measures of "jointness" to examine whether explanatory variables in growth regressions act as complements or substitutes. Ley and Steel (2007) find evidence of jointness between some determinants of growth—suggesting that they have a separated role in explaining growth and that they should appear jointly in the regressions—and more frequent situations of "disjointness," where regressors are substitutes and thus should not appear together. In contrast, using a different measure for jointness, Doppelhofer and Weeks (2009) find an important role for jointness among growth determinants.

Rather than modeling heterogeneity as a fixed effect (e.g., by adding a dummy variable) BMA approaches incorporate parameter heterogeneity in the estimation. Brock and Durlauf (2001) allow African countries to have different growth parameters than the rest of the world, and they find evidence of heterogeneity through different coefficient estimates. In addition, Masanjala and Papageorgiou (2008) investigate growth determinants in Africa using BMA and find that initial conditions such as initial primary education and primary resources and geography can explain a significant portion of the differences in Africa's growth from the rest of the world. Finally, Tsangarides (2005) using a new BMA methodology, finds evidence that what is good for growth around the world is also good for growth in Africa, although the marginal impacts vary.

Most of the work using BMA to address model uncertainty in the context of growth has been in the form of cross-country regressions using static models, with variables

of interest essentially averaged over the period of analysis. However, recent work began to model dynamics in the context of BMA by exploring the use of panel data in the context of model uncertainty. In addition to increasing the amount of observations available through the within-country variation, the use of panel data captures the dynamic evolution of the growth process and offers the possibility to account for heterogeneity, and control for (or estimate) country-specific effects. In an attempt to model heterogeneity in the context of a panel BMA, Moral-Benito (2009) considers a panel-data model where the lagged dependent variable is correlated with the individual effects.

A common issue in growth empirics is that many explanatory variables are endogenously determined in an economic sense. This, in turn, implies a strong chance that they are endogenous in the statistical sense, that is, correlated with the disturbance term and hence leading to inconsistent estimates. Tsangarides (2004) and Chen, Mirestean and Tsangarides (2009) address the issue of endogeneity in a panel-data context by proposing a new limited information BMA (LIBMA) methodology based on generalized methods of moment (GMM) estimation that they apply to investigate growth determinants. Durlauf, Kourtellos, and Tan (2008) construct instruments for variables that are endogenously determined in the economic sense and introduce a model-averaged version of two-stage least squares. Eicher, Lenkoski, and Raftery (2009) develop formal statistical foundations for an instrumental variable BMA (IVBMA) methodology to address model uncertainty in the presence of endogeneity. Once endogeneity is taken into account, Durlauf, Kourtellos, and Tan (2008) and Mirestean and Tsangarides (2009) find support for the canonical neoclassical growth theory as well as for some macroeconomic policies.

In the continuing investigation of the empirics of growth, increasing attention is being given to the implications of model uncertainty. A growing number of growth researchers are turning to BMA methods, which provide a solid theoretical foundation for addressing model uncertainty. While there is a growing literature focusing on improving and refining the BMA techniques—particularly the impact of the choice of the priors—the work on BMA and its applications has underscored that failing to properly account for model uncertainty results in overconfident and often fragile inferences. This has important implications for policymakers seeking to use findings of growth analyses to offer policy advice, suggesting that policy analysis and recommendations should not be conditioned on a specific model but rather should reflect model uncertainty.

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Seven Questions about House Price Cycles

Prakash Loungani

House prices have fallen in many countries across the globe over the last few years. Will house prices fall more? This article provides an answer by comparing the present housing cycle with previous ones in countries in the Organization for Economic Cooperation and Development (OECD) since 1970. Drivers of house prices, including behavioral factors, are discussed along with evidence on global synchronization of house prices and the role that central bank policies have played—and ought to play—in housing cycles.

Question 1: What are the broad features of house price cycles?

Between 1970 and the mid-1990s, on average across OECD countries, the median upturn in house prices lasted four years and the median real increase in prices over the course of the upturn was 33 percent (see figures). The median downturn also lasted four years, during which time prices fell 20 percent. These figures are based on work by Igan and Loungani (forthcoming), but estimates by the IMF (2003), Girouard and others (2006), Claessens, Kose, and Terrones (2008), and André (2010) are in the ballpark. These studies also find considerable variation across countries and across time in the duration of upturns and downturns; the figures show the 25th and 75th percentile bands for the duration and amplitude of housing cycles.

Question 2: Are we near the trough of the present housing cycle?

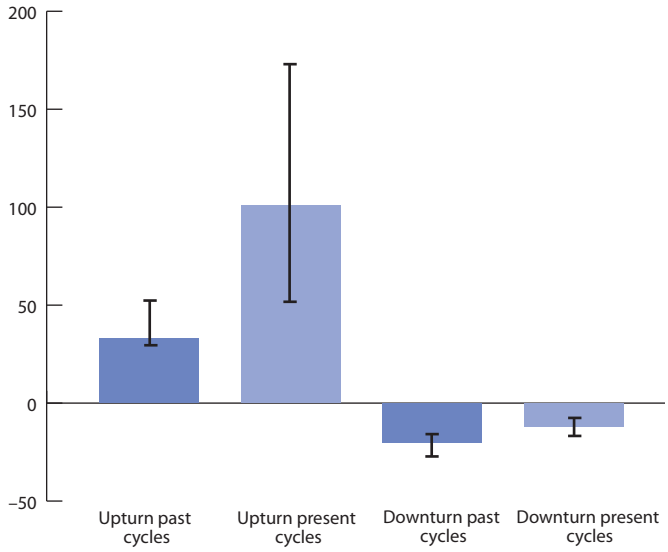
The present housing cycle started in the mid-1990s and early-2000s for most countries. The median upturn in this most recent cycle lasted over twice as long as those in the past (41 quarters compared to 16 quarters) and was more pronounced, with prices rising nearly three times as much as in the past cycles. The median ongoing downturn is approaching the halfway mark in terms of duration and amplitude of price declines, which suggests that further corrections could be in the offing. And with prices having risen much more sharply than in earlier upturns, the declines in prices might also eclipse those observed that were in the past.

Question 3: What anchors house prices in the long run?

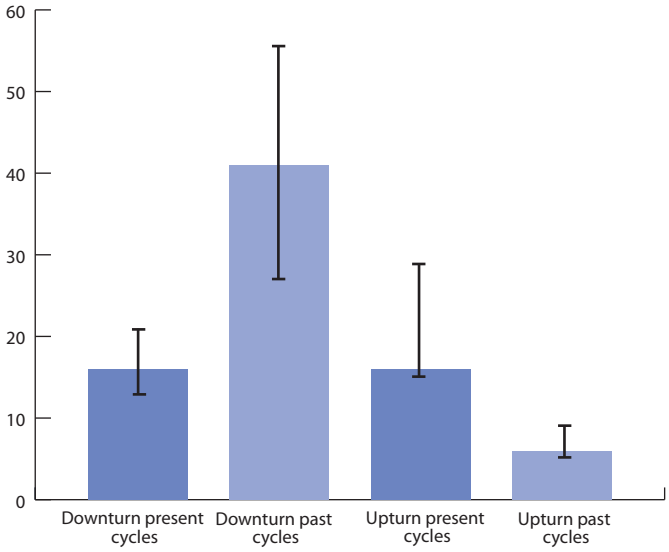
Economic theory asserts that house prices, rents, and incomes should move in tandem over the long run. House prices and rents should be cointegrated because buying and renting are alternate ways of meeting the need for shelter (Poterba, 1984). Likewise, in the long run, house prices cannot get too far out of line with people's ability to afford houses, that is, with their incomes. For most countries, these long-run relationships do have some drawing power, though the rate of mean reversion is often so sluggish that the relationships do not pass formal tests of stationarity (Girouard and others, 2006). For instance, the ratio of house prices to rents in the United States has reverted to its long-run average four times between 1970 and the early 2000s. Between 2000 and 2006, the ratio of house prices to rents rose dramatically above the long-run average and has been moving back toward it since then. The United Kingdom has a similar story for the ratio of house prices to incomes. For a few countries, the long-run relationships are a very weak anchor. In Australia and Canada, there has been a trend increase in the price-to-rent ratio since the mid-1980s.

However, even in cases where long-run relationships do act as an anchor, in the short run house prices drift away from them, often quite strongly and for long periods of time (Klyuev, 2008). As the IMF (2004) demonstrates, demand momentum leads to increases in house prices, often in excess of what can be explained on the basis of the demand-side forces. For instance, over the period from 1992 to 2006, Ireland's annual real income growth was twice the rate of the preceding two decades, but annual growth in that country's house prices was 10 times the rate of the previous two decades. Hilbers and others (2008) find that for some European countries house prices have been more sensitive to output per capita than in others; specifically, the authors find that a 1 percent increase in output per capita raised house prices by about 2½ percent in Belgium, France, Ireland, the Netherlands, Spain and the United Kingdom.

Amplitude of House Price Upturns and Downturns
(In percent)



Duration of House Price Upturns and Downturns
(In quarters)



Question 4: What factors amplify the response of house prices to fundamentals?

A number of explanations have been advanced: (1) supply constraints; (2) interactions between housing and other financial markets; and (3) slow recognition of changes in fundamentals.

Supply constraints. The difficulties of adjusting the supply of housing to keep pace with demand forces provides one explanation for the amplified response of house prices to fundamentals. Strong economic growth is often concentrated in particular sectors, regions or cities. Thus there are geographical constraints on increasing the supply of housing to keep pace with the increased economic activity in these areas. Due to such constraints, even fairly predictable and slow-moving demand-side changes, such as demographic changes, often end up having an amplified effect on house prices. In the case of Spain, Aspachs-Bracons and Rabanal (2009) argue that some of the demographic changes such as the coming of age of a baby-boom generation were predictable, but that others were less so. These include the extent of immigration and changes in the rate of household formation—the latter are dependent on social factors such as divorce rates and the growth of single-parent families, which can be difficult to predict. These authors also show that frictions in labor reallocation between construction activity and other sectors can also act to amplify the effects of demand changes on house prices.

Interactions with other financial markets. Another reason for the amplification effect lies in the interaction between housing markets and other financial markets. Igan and others (2009) document the overlap of housing and credit cycles. An increase in house prices, whether driven by demand momentum or the effects of government policies or institutional changes, can have a collateral feedback effect: once collateral values increase, lenders are willing to lend even more to households, feeding the house price boom (Kiyotaki and Moore, 1997; Iacoviello, 2005). Dell'Ariccia, Igan, and Laeven (2008) find that in the United States, relaxation in lending standards was higher in areas with faster rates of house price appreciation, which suggests that lenders were gambling that higher house prices would enable borrowers in default to liquidate the collateral and repay the loan. Several other papers, including Mian and Sufi (2009), also provide empirical illustrations of such an amplification.

Misperceptions of fundamentals. Kahn's (2008, 2009) work suggests that house prices can be driven by expectations of fundamentals that may turn out to be incorrect, giving the impression ex post that house prices were responding in an amplified manner to the true fundamentals. Kahn argues that the surge in home prices from the mid-1990s to 2007 was based on the belief that productivity growth would lead

to continued growth in incomes. The dynamic reversed in 2007 when productivity growth was perceived to have slowed, thereby stifling the housing boom and the viability of mortgages predicated on a sustained increase in house prices. Though U.S. productivity growth had begun to decelerate in 2004, the perception of that deceleration only caught up with reality in 2007, according to Kahn.

Question 5: What role do behavioral factors play in driving house price cycles?

Case and Shiller (2003) illustrate how house prices could be driven by psychological and sociological factors, and that these factors can also amplify the response of house prices to fundamentals. They argue that expectations of house prices are often formed by incorrect social perceptions of reality—such as the perception that house prices never fall—and by excessive confidence in positive outcomes. .

Baker (2002 noted presciently that the housing boom would come to an end because it was being driven to a large degree simply by the expectation of higher prices in the future. Indeed, Piazzesi and Schneider (2009) do find—using data from the Michigan Survey of Consumers—that there is always a small cluster of households who believe it is a good time to buy a house because house prices will rise further. The size of this "momentum" cluster doubled towards the end of the recent U.S. housing boom. In a search model, the authors show that even a small number of such optimistic investors can have a large effect on house prices, even when such investors do not end up buying a large share of the housing stock.

Question 6: Are house price cycles correlated across countries?

Housing is often considered the quintessential nontradable good, which generates a presumption that housing cycles ought not to be very correlated across countries. Nevertheless, the IMF (2004) and Girouard and others (2006) found high synchronization in housing cycles across countries. The conventional wisdom is that this does not reflect direct real estate market linkages, as in the case of equity markets, but rather the synchronization of monetary policy and financial deregulation across countries. It could also reflect general business-cycle linkages; globalization and financial innovation appear to have strengthened the degree of synchronization in macroeconomic and financial cycles, at least among OECD countries.

Consistent with this, studies that isolate a global factor in housing markets find that the importance of this factor has increased over time. The IMF (2004) found that the global housing factor is positively correlated with the mortgage-to-GDP ratio as well as home ownership rates, reflecting the deepening of mortgage markets across industrial countries and effects of government policies. The IMF also found that the global factor is negatively correlated with U.S. interest rates and that U.S. house prices lead the global housing factor. Based on the findings of synchronization and the lead role of the United States, the IMF (2004) predicted that any downturn in house prices would be highly synchronized across countries. The study by Igan and others (2009) also finds that, with growing financial integration, the role of common factors has increased in country cycles in house prices, credit, and real activity and that U.S. cycles tend to lead respective cycles in other countries.

Question 7: Should monetary policy keep house price cycles in check?

Some authors maintain that deviations from the simple rule for how monetary policy should react to output and inflation—the so-called Taylor Rule—led over the period from 2002 to 2006 to the global housing boom and the subsequent bust. It is true that house prices are sensitive to interest rates (Iossifov, Cihák, and Shanghavi, 2008) and that policy interest rates were indeed very low in most countries in recent years. However, Kannan, Rabanal, and Scott (2009a) find that there is virtually no association between the monetary policy stance and the extent of house price increases across countries. As examples, they note that Ireland and Spain had low real short-term rates and large house price rises, whereas Australia, New Zealand, and the United Kingdom had relatively high real rates and large house price rises.

A related issue is whether a simple Taylor Rule leads to an excessive focus on the variability of output and inflation at the expense of financial stability. Kannan, Rabanal, and Scott (2009b) argue that monetary policy did indeed pay too little attention to emerging signs of financial vulnerability and that by accommodating loosening credit conditions and rising debt, it allowed the risks of a bust to rise. They suggest, however, that policy interest rates are not the appropriate tool to control such risks; a macroprudential tool that works directly on lending margins would be better. Such a tool would directly tackle the emerging excesses in financial markets, limiting the need for aggressive interest rate actions. However, this makes the coordination of monetary and macroprudential policy very important. And because leading indicators of asset price busts are imperfect,

one would have to live with the possibility that in trying to check asset price bubbles, central banks may on occasion raise false alarms.

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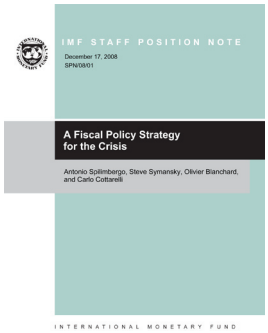

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