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Discussion

Jean Boivin initiated the discussion by addressing several issues raised by the discussants. Responding to Lucrezia Reichlin's comments about conditional versus unconditional convergence, he clarified that the paper does not explore the unconditional convergence that might have been induced by the European Monetary Union (EMU), on either the real or the nominal side. The paper documents a reduction in the effect of a monetary shock and seeks to explain what might have caused this specific change. Second, he defended using the interest rate to identify the monetary policy shock that is assumed to have pervasive effects throughout the economy. He also pointed out that extracting common factors from multiple series is a way to obtain better estimates of the states. He cited the strong correlation between the factors and key euro aggregates as evidence that the extracted factors are core to the dynamics of the euro area. Finally, he noted that the paper's approach is to characterize some dynamics of interest without imposing the full structure of a model. He viewed the model in the second part of the paper as being a restricted version of the factor-augmented vector autoregression (VAR) considered in the first part of the paper.

Benoît Mojon expressed excitement at the fact that Lucrezia Reichlin had confirmed the paper's findings using a different methodology. He then made a few short comments. First, regarding the price puzzle, he pointed out that the sample includes the German reunification, which generated inflationary pressures in Germany, at the same time that the rest of the countries in the sample were experiencing low inflation. When the monetary policy shock was estimated as a German monetary policy shock, rather than as a shock to the euro area average interest rate, the price puzzle was very much attenuated in Germany, reflecting better identification of the shock. Nonetheless, both shocks generated similar results on all other dimensions. Regarding the oil price shock, Mojon recalled that a 10% increase in oil prices generates a 1.5% increase in food and energy in the consumer price index. Given that up to 80% of the price of oil is fixed in European countries, that magnitude is not surprising. However, he found it interesting that following the oil price shock, the long-term interest rate in Italy increased by more than the German interest rate and other rates in the area. This confirms that in the monetary policy regime pre-1999, there was something specific to Spain and Italy in terms of the reaction of the long-term interest rates.

Frederic Mishkin sought further clarification on the authors' point that the European Central Bank (ECB) was more aggressive in responding to output and inflation. Marc Giannoni responded that they estimated a policy rule in the euro area assuming that the ECB was setting rates in response to some measure of output and some measure of inflation expectations. They used information from the extracted factors to form these expectations, and on the basis of that, they found that the ECB's estimated responses to both output and inflation expectations are very aggressive. Giannoni also clarified that in the pre-EMU period, the Bundesbank was assumed to be responding only to shocks in Germany's economy.

Ken Rogoff found the results regarding Italy and Spain in relation to Germany to be very plausible. However, he hypothesized that if one compared how Korea, Turkey, and Brazil responded to the federal funds rate over the same period, one would find something very similar.

John Cochrane returned to the issue of conditional versus unconditional convergence. He pointed out that in typical VARs, monetary policy shocks account for a small fraction of the variance in the data, which might explain the finding of conditional convergence but not unconditional convergence. This divergence is a puzzle, unless money is neutral. He suggested that the way to address the puzzle is not through the responses to monetary policy shocks, but rather through responses to other shocks, which he expected would show a lot of convergence. Regarding the risk premium, Cochrane noted that the authors take the position that monetary policy caused the risk premium, which is the opposite of Atkeson and Kehoe's view, who argue that monetary policy simply responds to risk. Since the introduction of the euro eliminated this risk, monetary policy no longer has to respond to it. Cochrane suggested that Atkeson and Kehoe's view offers a very different story, but one that may be just as consistent with the data. He argued that the direction of causality could not be established without using a separate measure of the risk premium, such as interest rate differentials. Michael

Woodford responded that while logically possible, this might not be a plausible interpretation of the data. He reiterated the authors' finding that when the Bundesbank increased rates, the Italian interest rates rose by more than the German rates. He thought that it would be strange to argue that the Bundesbank decided to tighten exactly when the markets started requiring a higher premium on the Italian lira.

Woodford also proposed investigating how ECB policy responds to asymmetric shocks in different parts of the euro area. Such an exercise would contribute directly to the debate regarding business cycle heterogeneity before and after the introduction of the euro. Daron Acemoglu posed a related question, wondering if it was the case that while the ECB now responds to events that affect all euro countries, the Bundesbank responded only to German events, and the other central banks were in a way shadowing it. Giannoni indicated that they had not looked at what happens if both countries are modeled to follow the same policy. Instead, the authors estimated different policy rules followed by the different central banks and compared these rules to the rule of the monetary union. In this way, they found that, for example, Italy was less aggressive than Germany in terms of responding to inflation.

Torben Pedersen suggested performing the analysis for countries that did not adopt the euro. He was concerned that the results might be affected by the fact that these countries were heading into a monetary union and sought to keep exchange rates steady leading up to the euro. Rogoff agreed that the results might reflect something specific about the transition period, so looking at either a longer or a wider sample would be useful. Olivier Blanchard also focused on the sample, wondering to what extent the paper's results reflected the volatility in 1992, when several European exchange rates came under significant pressure. He recommended dummying out that period. Francesco Giavazzi urged the authors to extend the sample to include years before 1987, since the European Monetary System was established in 1979. Giannoni and Mojon pointed out that until 1987, the variance of inflation rates was very high, particularly in Spain and Italy, and it is unclear how informative this additional data would be for the exercise.