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Patrick Kehoe's Comment on "Determinants of Business Cycle Comovement: A Robust Analysis" by Marianne Baxter and Michael Kouparitsas

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ABSTRACT

This paper by Baxter and Kouparitsas is an ambitious attempt to explore which variables are robust in explaining the correlations of bilateral GDP between countries at business cycle frequencies. Most of the variables turned out to be fragile. The main contribution is to show that countries with large amounts of bilateral trade tend to have robustly higher business cycle correlations. Another interesting finding is that neither currency unions nor industrial structure are robustly related to business cycle correlations.

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It is a privilege to participate in this conference in honor of Alan Stockman. I will begin my comments with some remarks about him, and then I will turn to the paper.

1. Remarks about Alan Stockman

I first came into contact with Alan's work in my second year of graduate school in the early 1980s. At that time I was taking my first international macroeconomics course. For over a month we had been studying the arcane details of the international accounting system. Many classes were devoted to such questions as, "Suppose that a Thai businessman buys 100 bags of wheat from Japan but pays for it with shares of General Motors stock that were valued at $262 it received from a U.S. importer that it recently sent 50 bags of fish. Show all of the details of the resulting accounts." For the next month or so we studied papers from the 1950s on extending the ISLM model to the open economy. The third part of the course was about how to use the ISLM model to give policy advice to developing countries.

At this part of the course, just when I was in the middle of deciding between either dropping out of graduate school or flinging myself into the Charles River, I came across one of Alan's papers, "A Theory of Exchange Rate Determination," Stockman (1980). Reading that paper rekindled my interest in international economics. Here was a world economy with actual people in it. These people thought carefully about what they were doing and why. When you had a world populated with clear-thinking people and governments supplying money, the question was, What would the exchange rate look like? It was such a refreshing change from what I had been forced to sit through that I used to read it late at night with candles and a glass of wine in a kind of ritual to keep away the haunting memories of the ISLM four-quadrant diagrams.

I met Alan soon after graduate school and have known him now for over 20 years. Alan's own work has led the way for a whole group of us to take as the starting point for our work. At a personal level, Alan has always been simultaneously serious about his work and amusing to talk to about almost any subject. As I know from personal experience, Alan is very supportive of the young international economists who broke away from the established reduced-form models and explored new paradigms. One of Alan's most impressive features is the amount of time and energy he devotes to his graduate students. Today, I can name almost a dozen of them who have done very well in the profession. Overall, Alan has been an inspiring figure in international macroeconomics, and he has made an indelible mark on the field.

2. Comments on Baxter and Kouparitsas

The paper is an ambitious attempt to document what variables are robust in explaining the correlations of bilateral GDP between countries at business cycle frequencies. I will begin by summarizing the authors' methodology and then discussing their main findings. They isolate the business cycle frequencies of output by applying a band pass filter that essentially eliminates the contribution of frequencies shorter than 6 quarters and longer than 32 quarters. They then compute the bilateral correlation of the filtered GDPs and regress these correlations on a number of variables. They say that a variable is a robust determinant of business cycle comovement if that variable has a significant coefficient when all of the other candidate explanatory variables have had a chance to "knock that variable out of the equation." They apply their robustness analysis to a data set with over 100 countries.

I find it quite instructive to look carefully at Figures 1–6. These figures scatter the

bilateral correlations of output against six of the candidate explanatory variables along with the regression line from a univariate regression. As the authors note, the visual impression is that most of the figures, especially Figures 2 (Total Trade), 3 (Industrial Similarity), 4 (Similarity of Bilateral Trade), and 6 (Distance), show just a cloud of points. The R^2 of most of these regressions is tiny—under 1% for Figures 2, 4, and 6 and just above 1% for Figure 3. Of course, given that many of these graphs have over 5,000 observations, many of the regression lines have significant coefficients. I was a little surprised as just how dismally most of these candidate variables performed. The fact that these variables seem to account for so little, even by themselves, made them not so interesting to build a theory around. That most of them got "knocked out" by other variables made them even less attractive.

In terms of the tables, the overwhelming impression is that almost all of the variables are fragile. Indeed, in Tables 4–8, all of the variables are fragile. In Table 1, the top half indicates that all measures of bilateral trade are robust with no "always included variables." The bottom half indicates that once the gravity variables are always included, only the first measure of bilateral trade BT1 is robust. The analysis of the gravity variables in Table 9 indicates that three variables are robust: a measure of distance between countries, an indicator variable that both countries are developed, and an indicator variable that both countries are developing.

This paper clearly has a lot of valuable information for business cycle economists. On the positive side, the main contribution is to show that countries with large amounts of bilateral trade tend to have robustly higher business cycle correlations. For me, however, the most interesting part of the paper is the negative part. The two most important findings are that i) countries that have higher degrees of industrial similarity do not have robustly higher

business cycle comovements and *ii*) countries in a currency union do not have robustly higher business cycle comovements.

I have two minor comments. First, looking at Figure 1 on Bilateral Trade, I might be tempted to run this and the subsequent regressions on robustness excluding all countries with bilateral trade of less than 1%. The rationale, which might be weak, is that if I were proposing a theory about why countries that traded more might be more correlated than countries that traded less, I would look for countries that traded some nontrivial amounts and focus on how the comovements varied as the amounts varied. That is, once countries are essentially not trading with each other, then whatever variations there are in their business cycle comovements are essentially just noise in view of a theory that tries to link trade and comovements. Regardless of how weak this rationale might seem, I would still be interested in knowing how the regression line varies.

The second comment is a more general one on this robustness methodology. When I first read this paper I thought back to the growth regression literature that often argued that variable M is important if the researcher cannot knock it out of a regression (in the sense of making its coefficient insignificant) by adding in some other variable Z.

The worst of this lot went as follows. A researcher starts by proposing a new theory in which policy variable M is thought to affect growth y. The researcher then runs regressions and plays the knock-out game by including variables like investment Z. The problem I had was that all the stories for how the policy M was supposed to affect growth were channeled through investment. Thus, I presume that if the researcher had carefully worked out the theory, the researcher would have been happy to have variable M knocked out by variable Z (investment). Indeed, if this were not true then it is bad news for the original mechanism

in which M drives Z, which in turn drives Y. Let me rephrase this. Suppose I generated data from a model in which much (but not all) of the movements in growth were driven by a policy variable M, but both this variable and some other unmeasured policy variables worked through changing investment. I presume I would find that the variable M is not robust. But this result is good news for such a theory—not bad news!

I am most certainly not saying that the current paper has the same problem as these bad growth regressions did. Rather, I just hope to clarify what implications I think can be drawn from the results. A careless reading might be that the paper showed that currency unions have nothing to do with business cycle correlations. Hence, if a country currently not in a union proceeded to enter one, there is no reason to think that their comovements would increase. I do not think the evidence in the paper warrants that conclusion. Instead, I think the paper has a more nuanced interpretation. I think it shows that some variables, like currency unions or industrial similarity, might affect comovements, but the way they do so is completely captured by bilateral trade. Hence, once the bilateral trade variable is included it knocks out both currency unions and industrial similarity. In terms of guiding future theory, the data suggest that if currency unions are to have an effect on comovements, it is fruitful to model this effect as coming through bilateral trade and not through some other channel which is essentially logically divorced from trade.

Overall, I very much enjoyed reading the paper, and I will keep in mind its findings for later use.

References

Stockman, Alan C. 1980. A Theory of Exchange Rate Determination, *Journal of*

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