

General Discussion: International Aspects of Inflation Dynamics

Chair: James Poterba

Mr. Frenkel: Thank you. I join those who complimented the paper on being really very fascinating. I would like to make three points. The paper focuses on impulse, on commodity trade pricing, invoicing and pass-through. Now, I would like to put the argument on its head on the basis of the experience that I have had in a high-inflation country in Israel, where the actual mechanism in which exchange rates transmitted themselves into prices and inflation really started paradoxically from the non-tradable sector, e.g., services. Because of the legacy of very high inflation, wages were highly indexed to exchange rates; rents were highly indexed to exchange rates; housing prices were highly indexed to exchange rates; and even wage contracts were set in terms of exchange rates. Under these circumstances, the pass-through was immediate and it was affected through wages, rents and other contracts that were directly indexed to the exchange rate. I would say that there are two different paradigms: the paradigm of a stable, low-inflation country, which seems to be the paradigm to which the present paper is so well applicable, and another paradigm of high inflation countries, in which the transmission operates through the prices of services due to indexation clauses.

The second point that relates to it has to do with the pass-through from exchange rates to inflation. Here again it very much depends on

the degree of credibility of monetary policy. As an illustration, consider the extreme case in which there is an inflation-targeting policy, which is highly credible. In that case when an exchange rate change occurs, there will be no expectations that it will be passed through prices since the credibility of the inflation targeting policy will generate the expectations that monetary policy will not allow inflation to deviate from its target and therefore, the expectations will be that the reaction from the monetary authority will reverse the change in the exchange rate without allowing it to be transmitted to prices.

The third point has to do with the relation between exchange rates and competitiveness. Again, on the basis of the Israeli experience, when the anti-inflation stance was not credible, exporters, who wished to improve their competitiveness, lobbied for a depreciation of the exchange rate; subsequently, with the enhanced creditability of monetary policy they realized that the central bank would not tolerate the inflationary consequences arising from changes in the nominal exchange rate and therefore realized that a more effective way to improve competitiveness is through improved productivity and cost control than through changes in the nominal exchange rate.

Ms. Mann: Being a pass-through person from way back I also enjoyed this paper. And I also have three different perspectives. One is that the way the paper is written gives us another source of original sin that countries other than the United States have to bear. In the sense that if they don't invoice in their own currency, then they face a situation where they have to have a much stronger central bank, as Jacob Frenkel just said, and if they don't have a very strong central bank then they suffer a pass-through of depreciation into domestic inflation, and if they don't have a strong central bank, then they suffer inflation. If they do have a strong central bank, then they have to have big increases in interest rates and a consequent deflationary effect on their economy and lower output. That really puts a premium on the central bank, but it also puts a country in a bad situation with regard to this, as I say, another source of original sin.

But the second point, which was the focus of Charles Engel's commentary, does the exchange rate matter a lot for real side adjustments or not? And you can say, well, it matters a lot for real side

adjustments if, in fact, it gets transmitted through relative prices. But, if all the margins everywhere adjust, then the exchange rate has no effect at all, and so there are no adjustments in quantities. So, I think we don't know yet, and it differs for different countries, whether or not the change in the domestic currency value is absorbed through all of the margins along the global value chain, or they are not. And we know that countries increasingly these days, especially emerging markets, view their integration into the global value chain as being not quite a holy grail, but something that they certainly want to do. We need to understand whether or not putting themselves into a position of having a greater relationship to multinationals and a greater relationship to the global value chain is going to help them adjust in the face of exchange rates, or is going to exacerbate this second source of original sin. Thanks.

Ms. Reinhart: I would like to reiterate the comments earlier that I think this paper fills in a really important hole on the issue of invoicing because both in the literature on exchange rate arrangements and the literature on pass-through, the discussion of pass-through as connected to invoicing was largely anecdotal. I would like to go back to something related to what Jacob said, which is complementary to the analysis, and I think in terms of taking this line of research forward is going to be quite important. One of the sources of time variation in pass-through in the last 20 years has been the sharp decline in inflation rates in many emerging markets. I think we can incorporate in this analysis another layer, which is inflation history. That is to say, the fresher the high inflation history, perhaps the higher the pass-through. I think if we look, for example, at the contrast you have in the paper between Japan and Turkey, and if one looked at the issue of pass-through in Turkey around the early 2000s, around the financial crises and when inflation was still a significant issue—and this is true not just for Turkey but for many high inflation countries—we would see that pass-through was higher given the level of invoicing, which isn't as variable as inflation. And in connection with that, I think a good supplemental layer of analysis for future work would be to look at the role of exchange rate expectations. So, to what extent are current exchange rate changes related to or impact future expectations of further depreciation? Because I think a lot of the pass-through

potentially, for example in the current environment in which we're concerned about further declines in the currencies of many emerging markets and what that may do to pass-through, has to do with whether the current depreciation is unanchoring expectations about future depreciation.

Mr. Carstens: Thank you very much. I also very much enjoyed the paper. I want to also make one comment, very much in the line of Jacob Frenkel and Carmen Reinhart. At least for emerging markets there are many more factors that play a role in the determination of the pass-through, like the output gap, as well as the response in the services sector is different. I also think that if you analyze the pass-through through time, there really has been a significant structural break once many emerging markets switched from a fixed exchange rate regime to a managed exchange rate regime and eventually to a floating exchange rate regime. Once that change, this transition, took place, the behavior of emerging markets' pass-through is comparable to the one in Japan and to other advanced economies. So the exchange rate regime that is in place and the credibility of the policy response matter a lot.

Mr. Portes: The first point is that the theory and the discussion in the paper seem to be almost entirely from the viewpoint of exporters. I'm wondering whether there's a role for looking at currency choice of invoicing by importers. There is a European Central Bank study in their latest *The International Role of the Euro* volume that compares invoicing behavior across various eurozone countries, and indeed confirms that the share of invoicing in euros is very closely related to the degree of exchange rate pass-through. But then goes on to consider the impossibility that importers do choose the currencies in which they want to be invoiced, and that that reflects some degree of difference across countries, in this case, in the desirability and their desire or preference for exchange rate pass-through. And so I'm wondering whether you might comment on whether importers' decisions matter.

The second is about Charles Engel's point about the network effects on which you rely in the discussion of invoicing, then lead you naturally to think about the possibility of multiple equilibria, and

could you see any shocks that might result in transition from the current equilibrium to one which is much less dollar denominated.

And finally, I was amazed at the empirical results that basically all the pass-through comes in the first quarter. I don't know; I'm just as I say amazed, and I'd like you to comment on my amazement.

Mr. Eichengreen: Another reason that so much trade is invoiced in dollars is that trade credit is disproportionately provided in dollars. It's a way for importers and exporters to match or hedge that exposure. Once upon a time, when London was the source of trade credit and it was provided in sterling, trade was disproportionately invoiced in sterling. And then came a big shock to financial markets sufficient to alter that equilibrium.

Ms. Groshen: So, a data moment. This paper and the previous one really show the value of using statistical agency microdata to answer new questions. There's also a lot of value to the statistical agencies including the Bureau of Labor Statistics (BLS) from such work. You use monthly U.S. import price data from the BLS, and note in your conclusions that policy implications in Section IV need to be confronted by additional work. We at BLS are creating a research database from the data that you and our staff put together, for others both inside and outside of the BLS to use to address further questions. My question is, what kind of additional variables should be added to this research database to really enhance its value? For example, location of origin versus country of import, things like that. We'd be really interested to know what it is that can be added. Thank you.

Mr. Kuroda: As you pointed out, Japan's imports are still largely invoiced in foreign currencies, mainly the U.S. dollar. One reason is that Japan imports a lot of commodities and raw materials; Japan is one of the world's largest importers of food stuff. And also, Japan imports a lot of mineral resources including oil, gas, coal, iron ore and copper. And as you know, almost all commodities are quoted in the dollar. So naturally, we import those commodities invoicing in the dollar. And, because price elasticity is quite low, almost 100 percent pass-through is also quite understandable.

As for Japan's exports, they are increasingly invoiced in the yen. However, for instance, Japanese automobile exports to the United States may be invoiced in the yen, but many Japanese automakers are also producing automobiles in the United States. They don't want to reduce the dollar prices of exported automobiles because they are also producing automobiles in the United States. And the depreciation of the yen does not affect U.S.-produced automobiles. They maintain the dollar price of exported automobiles in the United States, meaning that their export prices in yen would be accordingly raised. So here, invoicing or invoiced price, invoiced currency does not matter very much. It's rather the pricing strategy, pricing to the market.

Mr. Almubarak: Thank you for a very interesting paper. A couple of questions. One is of a technical nature and similar to what had been asked earlier in terms of factors. Have you considered the factor of transportation and inventory costs, and how would that affect the time most of the imports usually get stored and sold later on, especially if they are non-food items? And would that have effect since the time is different from buying it and paying for it versus selling it and that additional cost? The second question is about what we just chatted about at the break. For countries like mine (Saudi Arabia), where the currency is pegged to the dollar, which model is it more of? The United States or more of the emerging market as you have set in your paper? And how can one extend your paper to better understand the variables in such different situations? Thank you.

Mr. Kroszner: Great paper. I think there are a lot of interesting implications to be worked out further. In particular, thinking about examples of switching as Gov. Kuroda had mentioned, there seem to be some countries that are doing more in other currencies or in their domestic currencies. It might be very interesting to explore that. It might also be very interesting to explore picking up on some of the points that Carmen Reinhart and others have raised about looking more historically to see if there were changes in exchange rate regimes or in the institutions of central banks that led to a gradual switching in some areas. I think an excellent example would be the exogenous change in the invoicing that came with the euro, getting back to

Richard Portes' point, looking at what has happened since the euro. But you have a lot of data pre-euro, and it would be very interesting to see whether it's sort of an exogenous change in the amount of foreign invoicing, whether they switch to dollars, whether they kept it local or not, what type of firms did that? Also, I think there's some very interesting cross-sectional implications that actually relate back to the first paper in thinking about customer markets and actually as Gov. Kuroda said also, pricing to market, trying to maintain the customer base. I think those two ideas are very closely related. So for example, looking at the cross section of how depreciation affects the equity prices of Japanese exporters when the exchange rate goes down very rapidly after Gov. Kuroda gets into office. But there wasn't a dramatic change in the amount of exports. So it might be very interesting to explore that and how that relates to some of the customer markets that we talked about earlier.

Mr. Vergara: I really enjoyed the paper. Most of the literature that I'm aware of finds that the pass-through coefficient is higher in emerging market economies than in advanced economies. That's not necessarily inconsistent with your findings since that literature mostly relates to consumer prices rather than import prices, as in your case. Actually when you see your table in page 10 of your handout, you see that the effect on consumer prices is larger for the two emerging market economies that you have here than for the two advanced economies. But of course then, other things matter such as the ones that were mentioned before, namely credibility, the level of inflation, the monetary policy reaction, etc.

The second comment is more a policy comment. This exercise is with a 10-percent depreciation. Then you have minor effects on inflation. Now, the fact of the matter is that in these last several months, there are many countries, mostly emerging market economies, that have had depreciation of between 30 to 60 percent. So, this predicts that the effects on inflation will be all but minor.

Mr. Wright: Just a quick comment. The paper shows that pass-through into the United States is much smaller than for other countries, but that doesn't mean it's so small as to be irrelevant to monetary policy. If I take the appreciation of the dollar over the last year,

and multiply it by the coefficient estimates for the pass-through into consumer prices, I get something like seven-tenths on consumer prices, which seems quite big.

Mr. Singer: I think it's really nice to see that markup matters more, which means essentially that the exchange rate changes transfer to GDP with service leverage. But I wonder what's so privileged at the U.S. insularly in that situation. In a deflationary situation, as soon as the central bank moves with expansionary policy with floating exchange rate, it essentially means that it gets a lot of GDP mileage for trying to achieve the inflationary target from the bottom. I would say it's a privileged unisularly for such countries. That's my first comment.

Second, I very much welcome the suggestions to extend the models because it seems to me at this moment that the paper has more significance for international institutions than for a particular central bank. We know we have different pass-throughs than the United States and we understand we must take this into account. Thanks.

Ms. Gopinath: Thank you for all your questions. I have great answers to all your questions, but I don't have time to go into all of them, so, let me pick a few that I think have come out in different forms. The first thing is about the credibility of monetary policy, and the implications. I've looked at exchange rate pass-through and the implications of that for a country's CPI inflation, and that it would depend upon the monetary policy regime in that particular country. And the answer is obviously yes. What I've tried to give estimates for is basically what the pressure is going to be on inflation, and so the question you would have to respond to as central bankers, but it tells you this pressure on inflation is very different depending on whether you're the United States or Turkey or another emerging market. And so besides the endogenous response of monetary policy and the credibility of monetary policy, there is a different, just positive effect that comes about when you look at inflation, the consequences for inflationary pressures of exchange rate movements. So, those were a bunch of questions.

To the point of, is Japan going to be thrilled with 1 percent inflation changes, again, this is what it says is that the inflationary

pressure. This is purely inflationary pressure of Japan. And the question is how you respond to it. If you respond to it in a way that inflation expectations are very low and stays that way, then of course, the feedback into consumer price inflation is going to be lower.

The other comment that came up, which I think I need to clarify because I didn't have time to say that in my presentation, was raised by Gov. Kuroda. So, first, about your point about Japan imports and that an important part of that is commodities and minerals and things of that kind. You can look at the manufacturing subindex of import prices, and the pass-through looks exactly the same. You can throw out all those commodities, and it's still the same thing.

The second thing you said was about Japanese exports—33 percent of Japanese exports are priced in yen and the rest is priced in a foreign currency. Into the United States, 80 percent of Japanese exports are priced in dollars and 20 percent in other currencies. You said you think this has more to do with pricing strategies and less to do with currency invoicing. So, here I want to be very clear. Currency invoicing is a sufficient statistic for predicting exchange rate movements. It's not an exogenous variable; it's not a variable that's randomly assigned to firms. So all of the issues that you think about—pricing strategy, how much of your production costs use local inputs, how much of your competitor's price in a particular currency—all of that enters into the invoicing decision. Then, the currency invoicing is just a sufficient statistic for that thing. At no point am I saying that kind of invoicing is a separate variable from all of these variables you raise here. I think what's cool about this particular sufficient statistic is that you can wrap up everything you think would go into determining pass-through, which includes market structure, your global value chains, your way or local costs, are captured with this currency invoicing decision. So, if you tell me the reason they are pricing in dollars is because a big part of their production costs is in dollars, then that's exactly why they're pricing in dollars, so the currency of invoicing is a sufficient statistic for that.

And the third point I want to make is about the pass-through into consumer prices. Charles Engel is right that the positive pressure on consumer prices is going to be muted relative to the pressure on

import prices. But if you look at the numbers, if you want to talk about what moves inflation, even for the United States, if you estimated a Phillips curve and if you looked at the weight that you would give to output gap shocks, it's pretty close to zero. So, here we're identifying one shock, which is an exchange rate shock that actually has important implications for inflation for a bunch of countries. So, you have to compare relative to other shocks that you think move inflation, I think the exchange rate is an important variable.

And then the last thing about data. I actually think the BLS—this is a shout out to the fantastic work that you do—when I wrote that conclusion, I meant it for other institutions and not the BLS. It would be great if we had similar data that the BLS puts together for other countries because otherwise you really struggle to answer a bunch of questions. I think there are a few other countries—the Bank of Japan has great data—but for most countries we do not have good price data. I hope a part of this paper is to recognize that we need to pay much more serious attention to those kind of price data.