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Comment Stephen J. Redding

I am delighted to discuss this chapter. Reading it made me think of the following quote from Ben Bernanke: "In many spheres of human endeavor, from science to business to education to economic policy, good decisions depend on good measurement." In my view, this chapter provides an excellent example of good measurement, and not simply for its own sake but also for deepening our understanding of a range of substantive economic issues.

The research question addressed in the chapter is, How should the economic activity of multinational enterprises (MNEs) be apportioned across countries? A distinction is drawn between two main approaches. First, there is "separate accounting," as used in the System of National Accounts (SNA) and Balance of Payments and International Investment Position Manual (BPM). According to this approach, the economic activity of multinational-

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als is allocated to locations based on the residences of transacting entities, where residence may be the economy of legal incorporation or registration of a holding company or special purpose entity. Second, there is “formulary apportionment,” as used in this chapter and the related work in Guvenen et al. (2017). According to this methodology, the transactions of multinationals are attributed across the various locations in which they operate based on apportionment factors that reflect their relative levels of economic activity in those locations.

This is an important research question, because multinationals have access to countries that vary widely in corporate tax rates, which creates both incentives and opportunities to shift profits from high to low tax countries. This profit shifting can occur through a variety of means, including transfer pricing and holding companies that are resident in an economy of legal incorporation or registration that can differ from a multinational’s main centers of operations. As a result, the measured distribution of economic activity of multinational corporations across locations can appear quite different under separate accounting versus formulary apportionment.

To provide evidence on the empirical relevance of this issue, this chapter recomputes key economic accounting measures in the US national accounts and balance of payments for 2014 using formulary apportionment. The impact of offshore profit shifting is measured using the differences between the values of these measures under formulary apportionment versus separate accounting. The chapter then goes beyond measurement to examine the economic implications for common analytic uses of the US national accounts and balance of payments including: (i) the labor share of income; (ii) national saving rates; (iii) returns on domestic financial business; (iv) returns on foreign direct investment; and (v) external balances.

The resulting empirical findings connect with a series of recent economic debates about the role of measurement in understanding key trends in economic performance, including the productivity slowdown and the decline in the labor share. It is clear that there is the potential for profit shifting under separate accounting, and formulary apportionment provides a natural and intuitive benchmark for comparison that has the potential to be more widely used in future research.

One of my main comments on the chapter relates to what are the right weights. Although the chapter provides an intuitive economic motivation for formulary apportionment, I found the text unclear, and I thought that this discussion could be tightened to think more carefully about the implicit assumptions on production technology and market structure. For each location n in the set Ω in which a given multinational has operations, we start by constructing an apportionment weight ω_n for that multinational based on the arithmetic average of location n ’s share in the wage bill and revenue of the multinational:

$$(1) \quad \omega_n = \left(\frac{1}{2} \times \frac{w_n L_n}{\sum_{i \in \Omega} w_i L_i} \right) + \left(\frac{1}{2} \times \frac{p_n y_n}{\sum_{i \in \Omega} p_i y_i} \right).$$

We next consider a particular economic variable of interest (ψ_i), such as employment or profits, for this multinational in each location i . Summing this variable across the set of locations (Ω), we obtain a measure of multinational's total scale of operations for that variable ($\sum_{i \in \Omega} \psi_i$). Finally, we use the apportionment weights (ω_n) to allocate this total amount across the individual locations and generate a predicted value of the economic variable ($\bar{\psi}_n$) in each location under formulary apportionment:

$$(2) \quad \bar{\psi}_n = \psi_n \sum_{i \in \Omega} \psi_i.$$

This procedure immediately suggests a number of questions. Why do we use the arithmetic mean of the wage bill and sales shares as the weights rather than some other weights, such as wage bill or sales shares by themselves? Could we derive the appropriate weights from an underlying economic model based on assumptions on the production technology and market structure? For example, if we assume a Cobb-Douglas production technology, the wage bill in each location is proportional to the total production cost in that location. Additionally, if we assume monopolistic competition and no transfer pricing, markups are constant and the same for all locations, which implies that the share of each location in the multinational's costs equals its share in revenues. Therefore, these two assumptions together seem to imply that wage bill shares should equal revenue shares, and hence either measure or both measures together could be used to construct the apportionment weights. Is this the right way to think about microfoundations for these apportionment weights? How large is the class of economic models for which these apportionment weights would provide a good approximation to the underlying distribution of multinational activity in the model? Although there are some robustness checks in the chapter, it would be helpful to provide more evidence on the sensitivity of the results to alternative assumptions about these weights. Are the circumstances under which the appropriate weight could depend on the economic question at hand?

Another of my comments relates to overidentification checks on the predicted distribution of economic activity under formulary apportionment. Notably, the chapter finds that around 75 percent of the adjustments to the measured distribution of economic activity are foreign affiliates classified as holding companies, which is consistent with profit shifting through the use of such companies and special purpose entities. By itself, this is a powerful overidentification check that the adjustments under formulary apportionment are capturing what we would expect them to capture. As already discussed to some extent in the chapter and related research by the authors, these overidentification checks could be pushed further, using varia-

tion across countries and industries where relevant. For example, are the countries and industries where the biggest differences between formulary apportionment and separate accounting those where we expect to find the greatest incentive and opportunity for profit shifting?

Another question suggested by the results is, What is the right metric for assessing the economic magnitude and statistical significance for the adjustments? Many of the findings exceed commonsense notions for what is large in economic magnitude, such as percentage points of GDP. But what is the right formal metric for assessing the economic magnitude of the results? What about statistical inference? Should we think of the apportionment weights as estimates from an underlying distribution? If so, can the authors provide evidence on the statistical significance of the various adjustments to the distribution of economic activity under formulary apportionment?

I found the implications of the measures for analytic uses of the US national accounts and balance of payments to be particularly interesting. I would encourage the authors to push further in terms of these economic implications. In particular, what are the economic questions for which formulary apportionment changes the answer in quantitatively relevant ways? Are there questions to which we get the answer wrong if we use separate accounting rather than formulary apportionment? Would we obtain substantially different estimates of key model parameters if we used data based on separate accounting instead of formulary apportionment? What are the implications of these findings for public policy?

Taken together, this is an excellent chapter with important measurement contributions and important substantive economic insights for a host of issues of great contemporary relevance. I look forward to following the authors' ongoing research in this area.

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