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Commentary

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To prevent their theories from becoming as unhinged as the Phillips curve, modern macroeconomic theorists conventionally build from microeconomic fundamentals. Recent empirical studies of macroeconomic phenomena that heavily use data from individual producers, exemplified by the work of Davis, Haltiwanger, and Schuh (1996), have convinced empirical macroeconomic practitioners they should do the same with their craft. The necessary econometric tools are increasingly available for this task, and the work of many individuals inside and outside government have made the necessary observations available. Yet, this enterprise is increasingly hindered by a data collection organization oriented towards a view of macroeconomics without miocroeconomic foundations.

This state of affairs sets the stage for "Measuring and Analyzing Aggregate Fluctuations: The Importance of Building from Microeconomic Evidence." John Haltiwanger has two goals. First, he intends to convince us of the utility of building empirical macroeconomic analysis from microeconomic foundations. Second, he wishes to highlight obstacles to this research program inherent in our national collection process and suggest beneficial changes in this process. The author does an outstanding job at the first task. My comments regarding this section of the article will mostly reinforce the points he has already made. I will comment on the second goal by suggesting further changes in the way data on producers' prices and balance sheets are collected and by stressing the importance of economic theory in the enterprise.

WHY ARE MICRO-FOUNDATIONS IMPORTANT?

At least three substantive reasons have been given in the literature for the importance of microeconomic foundations for macroeconomic analysis. The first is that science cannot rest on myths. This is well illustrated by Paul Samuelson's quote reported in Hammermesh and Pfann (1996):

> Thought suggests, and experience confirms, that such a dogma [that a scientific theory is none the worse if its premises are unrealistic] will be self indulging, permitting its practitioners to ignore or play down inconvenient departures of their theories from the observable real world.

According to this view, we can never be sure whether we understand aggregate behavior until we understand individuals' behavior. Second, aggregation may mask phenomena important for aggregate fluctuations. For example, the substantial countercyclical job reallocation that Davis, Haltiwanger, and Schuh (1996) found would never be observed if we looked only at net employment growth. If recessions are primarily periods of increased reallocation, then we would never understand their real nature. Third, microeconomic analysis can improve the accuracy and usefulness of our forecasting exercises. As Caballero, Engel, and Haltiwanger (1995 and 1997) have shown, the elasticity of aggregates with respect to shocks is generally time varying, and this elasticity can be characterized using microeconomic data and some rudimentary economic theory.

These reasons can all be summarized in a single statement: Most decisions of macroeconomic importance are intrinsically dynamic. If individuals are different, but we only observe aggregate variables, then we have no hope of learning about

the primitives of individuals' problems. Therefore, we have no hope of accurately characterizing aggregate behavior. Because individuals' problems are dynamic, to understand them we must observe them through time. That is, we require longitudinal databases. Unfortunately, the data collection apparatus of the United States government is not oriented towards producing such observations. Rather, it focuses on producing aggregate data of the sort found in the National Income and Product Accounts.

LONGITUDINAL DATA COLLECTION

In this article, Haltiwanger suggests three fundamental changes in the way data are collected and disseminated to facilitate longitudinal analysis. First, he suggests that the various agencies responsible for data collection begin to think longitudinally. Currently, decisions regarding the scope and collection of data sets are made primarily considering their effects on aggregate statistics. This is resulting in a serious *decline* in the availability and quality of longitudinal data at the establishment and firm levels. Reversing this decline is necessary if macroeconomic analysis is to continue benefiting from the many insights of the past decade. Second, Haltiwanger proposes that those who construct data sets follow a "plug & play" approach. That is, the use of a common *establishment* list for sampling would allow data to be more easily linked across surveys.

Even if these first two proposals were effected, the resulting fruits would be available to relatively few researchers because of the government's requirement to maintain confidentiality. Haltiwanger addresses this by suggesting the construction of new aggregate statistics, such as the successful job-creation and job-destruction data, which usefully summarize relevant heterogeneity for applied researchers not associated with the Census Bureau or the Bureau of Labor Statistics.

My first comment on Haltiwanger's proposals concerns their implementation. The author focuses on constructing longitudinal databases of establishments' output and input quantities. However, it is equally important to think longitudinally when measuring establishments' prices and financial transactions. Theoretical macroeconomics has suggested interesting ways that firms' pricing and financial decisions can affect the aggregate economy. Determining the relevance of these ideas for the U.S. economy requires longitudinal data on firms' prices and balance sheets. For example, Caplin and Spulber (1987) showed that the consequences of price stickiness of individual firms for aggregate price inflation depend critically on the distribution of prices across firms. With suitable modification, the same tools Caballero, Engel, and Haltiwanger (forthcoming) used to document the dependence of aggregate employment growth on the distribution of establishments' employment needs can be applied to determine the role of firm-level price stickiness in generating aggregate price sluggishness.

My second comment regards Haltiwanger's "plug & play" suggestion. Linking firms' financial data with information about their real activities would be of great interest to economists. Currently, these data are collected in separate surveys. The author proposes that new surveys be based on samples of establishments; however, financial data are intrinsically attached to a firm. Successfully linking the financial and real sides of firms' activities will require foresight in planning the sampling of establishments for new surveys.

Finally, I would like to comment on the role of economic theory in constructing new aggregate statistics. Although it is tempting to try to develop "theory-free" aggregates to satisfy a constituency of diverse economists, such an effort may produce something no one will find useful. For example, consider the decomposition of industry total factor productivity (TFP) growth that Haltiwanger computes. What do we learn when a substantial fraction of industry productivity growth is attributed to the covariance term? As the author

claims, this reflects the importance for the reallocation of factor inputs across establishments for TFP growth. Indeed, if this term equaled zero, TFP would shrink in many industries. This statistic tells us something we already know: To maximize industry productivity, allocate variable factors to equate their marginal productivities across establishments. If this process is shut down, productivity growth will slow down in most sensible economic models. This is so regardless of whether TFP growth is embodied in plants and equipment, as assumed in Campbell (1997) and Greenwood, Hercowitz, and Krusell (1996), or disembodied and freely available to all establishments as in King, Plosser, and Rebelo (1988). Therefore, such a theory-free exercise does not allow us to distinguish between interesting economic theories.

In contrast, examining broad classes of theories can suggest interesting new aggregate variables that would be useful to many economists. For example, the theory of factor demand with nondifferentiable and nonconvex costs of adjustment, exposited by Abel and Eberly (1994) and Hammermesh and Pfann (1996), immediately suggests the decomposition of aggregate capacity growth rates into intensive and extensive margins:

$$G_t = X_t \times Y_t. \quad (1)$$

The growth rate is G_t, the size-weighted probability of an establishment changing its factor demand is X_t, and the average growth-rate of factor demand—conditional on changing it at all—is Y_t. If all firms follow identical (S,s) factor demand rules, as in Caballero and Engel (1991), then Y_t will be constant and all fluctuations of G_t will reflect those of X_t. However, if firms adjust their factor demand along both the intensive and extensive margins, as in the model of Campbell and Fisher (1996), then both X_t and Y_t will change over time. Observations of X_t and Y_t can allow us to distinguish between these competing economic models. The theory of industry dynamics, represented by Jovanovic (1982) and Hopenhayn (1992), suggests another set of statistics—job creation, destruction, and growth probabilities by firm size, age, and wage class—which would be interesting to a wide variety of researchers.

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