

## [Inventories and the Role of Goods-Market Frictions for Business Cycles](#)

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This paper focuses on the interaction between goods-market and labor-market frictions: Firms are likely to hold back on hiring workers when demand for their products is low and consumers may very well postpone purchases when they worry about becoming unemployed. Such interaction could deepen economic downturns. In modern business cycle models, such "Keynesian" interaction is typically due to nominal frictions, that is, due to the presence of sticky prices and wages. When prices are sticky, changes in demand have a stronger impact on production and changes in production have a stronger impact on employment when wages are sticky. Recently, several models have been developed in which such Keynesian interaction is due to the presence of real frictions in the labor market *as well as* the goods market. With frictions in both markets, there is a potentially powerful interaction between the goods market and the labor market even when prices and wages are flexible.

This paper shares with the recent literature the assumptions that (i) firms face frictions in finding buyers for their products and (ii) the severity of this friction varies over the business cycle. An essential aspect in which this paper differs from the literature is that the model includes inventories. There are several reasons to include inventories. As documented in this paper, the observed behavior of inventories is informative about the characteristics of frictions in goods markets and the quantitative importance of such frictions for business cycles. The reason is simple. When there are cyclical changes in the frictions that firms face in selling products, then this is likely to affect the accumulation of inventories. Another important reason to include inventories in business cycle models is that changes in the investment in inventories are a quantitatively important aspect of cyclical changes in GDP.

This paper constructs an empirical measure for goods-market efficiency. It is shown that fluctuations in goods-market efficiency are non-trivial and procyclical. Another observation is that goods-market efficiency decreases when the level of inventories increases. That is, firms find it more difficult to sell when they have larger stocks of inventories.

The paper develops a simple business cycle model with search frictions in the labor and the goods market. The combination of a procyclical goods-market friction and a (standard) labor-market search friction can generate—in principle—a strong interaction between the two markets. When

consumers buy more and the size of the goods market increases, then firms hire more workers, since they can sell their goods more easily. This in turn induces consumers to buy more.

The model does a good job in capturing key characteristics of the business cycles, including inventory facts such as procyclical investment in inventories and a countercyclical inventory-sales ratio. Procyclical goods-market efficiency makes it more difficult to match a third well-known fact of the joint behavior of inventories, sales, and output, namely that output is *more* volatile than sales. If goods-market efficiency decreases sharply when the economy deteriorates, then sales would go down by more than output not by less. The model can generate the right relative volatility of sales and output only if—as observed in the data—goods-market efficiency depends not only positively on real activity, but in addition negatively on the accumulated stock of inventories.

It is remarkable that such a simple model can match the three key facts regarding the joint behavior of inventories, sales, and output, since these facts have turned out to be difficult to replicate. When the model matches all three facts, however, then the interaction between goods-market and labor-market frictions is no longer quantitatively important. In fact, goods-market frictions seem to dampen business cycles slightly. The reason is the following. At the start of an economic downturn, goods-market efficiency deteriorates. However, as inventories are being reduced goods-market efficiency recovers and in fact improves. The net effect of these two aspects of goods-market efficiency is basically zero.

The paper discusses some reasons why cyclical changes in goods-market efficiency may still be important, but the conclusion of this paper is that the observed behavior of inventories, sales, and output suggests that interaction between goods-market frictions and labor-market frictions does not seem to be very important, at least not in the type of model considered here and when prices and wages are flexible.