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Inventory investment and financial constraints in the Italian manufacturing industry: A panel data GMM approach ☆

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ABSTRACT

Three large unbalanced panels of Italian manufacturing firms observed over the period 1991–2009 are employed to assess, by means of a dynamic GMM approach, whether the existence of financial frictions is suitable to explain deviations of inventories from their long-run path. A negative response of inventory investment to the presence of financial burdens might provide evidence of a significant role played by the financial framework in conditioning the real side of the economy, especially during recession years, when liquidity problems arise. The negative effect is found over the entire analyzed period, with firms' dimensional aspects accounting more than risk characteristics to explain the phenomenon, but the inclusion of recessionary dummies into the model leads to controversial and puzzling results. A significant recessionary effect is found during the Nineties, accounting for inventories being more sensitive to financial frictions during the main recessionary peaks, 1993 and 1996. The result is not confirmed by the most recent estimates, especially the ones referring to the 2008–2009 recessionary shock, whose effects are investigated for the first time by a paper addressing the inventory investment–financial constraints subject. Alternative hypothesis for the proposed results have been tested on data. Firms were found to rely on inventory decumulation to a lesser extent compared to the past, to generate internal financing. More specifically, disinvestments in financial assets were found to represent, as a matter of fact, one of the main drivers adopted to ease liquidity tensions: a negative and strongly significant relationship with inventory investment was detected, after controlling for short-run liquidity constraints at firm level. By contrast, only a weak negative relationship was established with fixed capital during the same recessionary biennium.

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1. Introduction

Inventory movements proved to be strongly related to output fluctuations during the past. It is widely accepted that they are useful indicators of business activities, in the sense of being precursors, at certain stages, of output downward corrections at macro level.

A flourishing literature has documented that firm inventories tend to be proportional to sales in the long-run but the relation is violated in the short-run, when a sort of trade-off between inventory investment and sales takes place. Financial constraints faced by firms are found to be one of the main determinants of downward corrections in inventories. The negative response of inventory investment to the presence of financial boundaries might provide evidence of a significant role played by the financial framework in conditioning the real side of the economy, especially during recession years, when liquidity problems arise.

The present paper addresses this issue by exploiting three large unbalanced panels of Italian manufacturing firms observed over the period 1991–2009. The selected period includes two severe recessionary episodes for the Italian economy: the early Nineties recession and the 2008–2009 shock. This is, as far as I know, the first paper on the subject analyzing the effects of the latter recession over the Italian manufacturing sector. A dynamic approach is adopted to shed light on peculiarities of the phenomenon that may rely on intrinsic riskiness of firms, to the role played by sectorial effects or to different reactions to monetary policy stances during the past years, especially as far as the liquidity accumulation attitude is concerned.

The remainder of this paper is organized as follows. The next section presents and briefly discusses the theoretical background on inventory behavior. Section 3 describes the empirical specification of the model, both the baseline specification and the related variants. Section 4 is devoted to data description while empirical econometric results and further tests are discussed in Section 5. The main conclusions are summarized in Section 6.

2. Theoretical background on inventory behavior

With the attempt of investigating what factors determine the short-run variability of inventories with respect to sales, several models have been formalized and tested on both macro- and micro-data.

Target adjustment models (Lovell, 1961; Blanchard, 1983), production smoothing models (Blinder and Maccini, 1991) and production-cost smoothing models (Blinder, 1986; Eichenbaum, 1989; West, 1990) have been developed in earlier studies on the subject to capture these patterns. More specifically, target adjustment models are set to explain a reverting behavior of firm inventories towards a 'target level' because of the rising of adjustment costs when, for some reasons, the fixed proportion 'inventories to sales' is overcome. Production smoothing models, instead, posit that inventories react negatively to demand shocks in the context of profit-maximizing firms who tend to smooth production relative to fluctuations at demand side. More generally, inventories respond negatively to cost shocks affecting the operational ground of industrial firms.

A second strand of the literature analyzes the sensitivity of firm inventories to liquidity shocks and constraints in order to provide an alternative explanation for their short-run dynamics. In this case firm inventories are modeled like investment variables and, particularly, investment-type variables which are subject to lower adjustment costs with respect to fixed assets. This allows firms to strongly react in terms of inventory decumulation as soon as external shocks require the adoption of smoothing strategies and fosters inventories to be more volatile than sales, especially during recessionary periods. Firms who are financially constrained – in the sense of being in difficulty in catching more credit from the market – or are more likely to suffer from problems of informational asymmetry tend to utilize the inventory channel to generate internal liquidity as fast as possible while facing contingencies.

Evidences of binding financial constraints for inventory investment were found in a lot of studies focused on American data. Kashyap et al. (1996) and Gertler and Gilchrist (1994) make use of time series data on credit to sustain the hypothesis that financial variables are good proxies to explain inventory over-decumulation in most periods of slowdown of the American economy. The same view is supported by Carpenter et al. (1994, 1998) and by Kashyap et al. (1994), who based their empirical research on micro-data, either cross-section regressions or panel regressions. Emphasis is posed on small firms and on firms without bond ratings, who turn out to be much more exposed to the phenomenon. A panel data approach is employed also in selected works on the European manufacturing industry. Reference is made to Guariglia (1999, 2000, 2010), who focuses on the UK industry and to Bagliano and Sembenelli (2004). The latter authors make use of annual data on firms' balance sheets to study the effects of the early Nineties' recession on inventory investment in Italy, France and United Kingdom. By means of proxies for financial pressure at firm level a higher sensitivity of inventory investment is detected for small and young manufacturing firms. As far as Italian firms are specifically concerned, an additional recessive effect is found, acting in the sense of amplifying inventory investment variability. This supports the view of a 'financial accelerator channel' emphasizing the transmission of monetary effects to the real side of the economy.

Financial constraints were analyzed, at this stage, in the context of fixed investment regressions – in levels – augmented with financial variables. Other studies make instead use of a more dynamic approach. Error-correction inventory investment equations augmented with a financial composition variable are exploited to capture both the influence of a long-run relationship between inventories and sales and the response of inventory-investment to financial pressure in the short-run. More precisely, Choi and Kim (2001) from International Monetary Fund apply this approach on quarterly panel data of US