A corollary of (5) is that trade volumes will also fall, with the decline being magnified by the extent of vertical specialization of production as formalized by the length of production chains.

5 Further Avenues for Research

Financial shocks that raise the cost of financing can have a substantial impact on macro variables through their impact on the cost of working capital. Our results derive from the feature that production takes time and the operation of a production chain entails heavy demands on financing. One consequence of this feature is that long production chains are sustainable only when credit is cheap, and chains that have become over-extended are vulnerable to financial shocks that raise the cost of borrowing. The financial crisis of 2007-2009 fits this description well.

Our model has been deliberately stark so as to highlight the role of working capital. We have abstracted away from many of the standard ingredients that have been used to model financial frictions in the macro literature. We have no fixed capital, no savings decisions, nor labor supply decisions. Having turned off these intertemporal and labor supply choices, we can isolate the effect of working capital better.

Although much of the discussion of financial frictions in the economy has focused attention on fixed investment, the components of working capital have fluctuated in a much more volatile way in the recent crisis. Figure 11 plots the annual capital expenditure of non-farm, non-financial firms in the United States, taken from the Federal Reserve's Flow of Funds series. Fixed investment fell in 2008 and 2009, but the percentage falls are small (especially in 2008). Inventories fell much more dramatically during the crisis, turning negative in 2008 and especially in 2009.

Our results also relate to the literature on financial frictions and their impact on macro activity. Gilchrist, Yankov, and Zakrajsek (2009) documents