European Economic Review 66 (2014) 111–126

Contents lists available at ScienceDirect

European Economic Review

journal homepage: www.elsevier.com/locate/eer

Investment shocks and consumption

Francesco Furlanetto *, Martin Seneca [1]

Norges Bank, Bankplassen 2, PB 1179 Sentrum, 0107 Oslo, Norway

ARTICLE INFO

Article history:
Received 20 December 2011
Accepted 30 November 2013
Available online 17 December 2013

JEL classification:
E32

Keywords:
Investment shocks
Wealth effect
Complementarity
GHH preferences
Co-movement

ABSTRACT

Several influential papers have argued that preferences featuring a weak wealth effect on labour supply are key to generate macroeconomic co-movement across real variables in response to shocks. Using a fully general specification for the instantaneous utility function, we show that the size of the wealth effect on labour supply is largely inconsequential for macroeconomic dynamics. Instead, we find that Edgeworth complementarity between consumption and hours worked is crucial in order to obtain co-movement of key macroeconomic variables. We consider investment shocks and we show that co-movement can easily be achieved with non-separable preferences in combination with a reasonable degree of nominal rigidity. This holds even in the presence of sizeable wealth effects.

1. Introduction

Since the seminal contribution by Barro and King (1984), it has been well known that consumption tends to move countercyclically in dynamic macroeconomic models with time-separable utility specifications. Dynamic stochastic general equilibrium (DSGE) models therefore often fail to generate the co-movement of key macroeconomic variables that is characteristic of empirically recognisable business cycles, see, e.g., King and Rebelo (1999). Total factor productivity shocks generate co-movement in the baseline real business cycle (RBC) model. But other disturbances such as shocks to the marginal efficiency of investment (MEI), to preferences, or to government spending do not generate the typical patterns of business cycles, neither in RBC models nor in New Keynesian models with nominal rigidities.

In overcoming this co-movement problem, a number of papers have highlighted the need for preferences that further restrict the labour supply decision either to be fully independent of the intertemporal consumption-savings choice as in Greenwood, Hercowitz and Huffman, henceforth GHH (1988), or to be affected only by a limited wealth effect as in the more recent paper by Jaimovich and Rebelo (2009). Thus, GHH preferences – or more general specifications with weak wealth effects – have been used to address several features of business cycles, cf., e.g., Dey (forthcoming), Dey and Tsai (2012), Monacelli and Perotti (2008), Raffo (2007) and Schmitt-Grohé and Uribe (2012).

In this paper, we reconsider the use of utility specifications with weak wealth effects on labour supply as a means to generate co-movement in DSGE models. Focusing on the MEI shocks studied by GHH, we show that the co-movement problem posed by Barro and King (1984) cannot be solved by reducing the wealth effect on labour supply. Instead, the crucial feature of preferences needed to generate co-movement is a complementarity in the sense of Edgeworth (1881)

* Corresponding author. Tel.: +47 22316128; fax: +47 22413105.
E-mail addresses: francesco.furlanetto@norges-bank.no (F. Furlanetto), martin.seneca@norges-bank.no (M. Seneca).
[1] Tel.: +47 22316095.

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http://dx.doi.org/10.1016/j.euroecorev.2013.11.013

between consumption and hours worked, or equivalently, Edgeworth substitutability between consumption and leisure. The GHH utility specification implies both that the wealth effect on labour supply is absent and that consumption and labour effort are Edgeworth complements. It is not possible to disentangle the effect of each of them. In contrast, we follow Bilbiie (2009, 2011) and work with a fully general specification of the instantaneous utility function. This allows us to vary the size of the wealth effect and the degree of complementarity separately.

According to our results, GHH-type preferences have proven to be useful to generate co-movement not simply because they lead to weak wealth effects on labour supply, but because they imply a large degree of Edgeworth complementarity between consumption and hours worked, especially when the Frisch elasticity of labour supply with respect to the real wage is high as in GHH (1988), Jaimovich and Rebelo (2009) and Schmitt-Grohé and Uribe (2012). In addition, preferences of the King, Plosser and Rebelo, henceforth KPR (1988) family, which feature a positive wealth effect on labour supply, can also generate co-movement if only the Edgeworth complementarity between consumption and hours is high enough.

In general, we find that the degree of Edgeworth complementarity between consumption and hours worked is the main determinant of the sign of the consumption impact response, whereas the size of the wealth effect on labour supply influences the magnitude of this response. But for plausible parameter values, we find this influence to be small. Therefore, the absence of a wealth effect on labour supply is largely inconsequential for the purpose of generating co-movement, while the degree of Edgeworth complementarity between consumption and hours worked is crucial.

This finding is encouraging given recent microeconometric evidence. A number of studies have found evidence in favour of non-separabilities between aggregate consumption and labour following the lead of Basu and Kimball (2002), e.g., Guerron-Quintana (2008), Kilponen (2012), Kilponen et al. (2013) and Kim and Katayama (2012). Similarly, recent papers find evidence in favour of non-negligible wealth effects on labour supply, cf. Imbens et al. (2001) and Kimball and Shapiro (2010).

Our results are in keeping with the results in Bilbiie (2011), who shows how the combination of nominal rigidities and Edgeworth complementarity between consumption and hours worked can generate co-movement after a government spending shock.[2] Our paper distinguishes from his by analysing and disentangling the different roles played by Edgeworth complementarity and wealth effects on labour supply, and by considering responses to MEI shocks in a DSGE model with endogenous capital accumulation rather than disturbances to government spending.

We believe that the study of MEI shocks, which we shall sometimes call investment shocks for short, is particularly interesting given the importance assigned to them in recent studies. First emphasised by Keynes (1936) and later reintroduced into (New Classical) macroeconomics by GHH (1988), MEI shocks have been found to be important drivers of business cycles in New Keynesian DSGE models of the US economy. For example, Justiniano et al. (2010) find that MEI shocks account for about 50% of output fluctuations, 80% of those in investment, and 60% of variation in hours worked. However, the shocks can account for less than 10% of the variation in consumption, and consumption fails to co-move with other macroeconomic variables subject to the shocks. Specifically, a positive MEI shock leads to a decline in consumption on impact and for the first five quarters after the shock.[3]

Moreover, finding economic mechanisms through which consumption may increase following MEI shocks is interesting for two reasons (besides comparability with GHH, 1988). First, the lack of co-movement of consumption with other key variables in response to MEI shocks is not compensated for by other shocks in the model estimated by Justiniano et al. (2010). In fact, although dynamics are driven by seven sources of aggregate fluctuations, the unconditional correlation between consumption and investment is negative in the model. Hence, while performing well in reproducing other cross-correlations, the model fails to generate the large positive correlation found in the data. Second, conditional empirical evidence based on VAR studies suggests that consumption increases significantly in response to an MEI shock, cf. Peersman and Straub (2007) for the US and the euro area, and Braun and Shioji (2007) for Japan, both identify MEI shocks using robust sign restrictions that leave the sign of the consumption response itself unrestricted. Hence, if consumption can be made to co-move with other key macroeconomic variables after shocks to the marginal efficiency of investment in standard DSGE models, this would both improve the empirical performance of the models and provide further support to the proposition that MEI shocks are important drivers of the business cycle.

Importantly, our results on co-movement rely on the presence of nominal price rigidity. Sticky prices lead to countercyclical mark-ups, which shift labour demand on impact of shocks other than to total factor productivity. The previous literature emphasising preferences with weak wealth effects on labour supply also rely on a labour demand shifter to generate co-movement. In GHH (1988), Jaimovich and Rebelo (2009) and Schmitt-Grohé and Uribe (2012), it is the presence of variable capacity utilisation that shifts labour demand. According to our analysis, the combination of nominal rigidities and Edgeworth complementarity generates co-movement under more general conditions than this alternative mechanism based on variable capacity utilisation.

[2] Other recent studies that discuss co-movement are Eusepi and Preston (2013), Guerrieri et al. (2010), Khan and Tsoukalas (2011), Christiano et al. (forthcoming), Ajello (2012) and Del Negro et al. (2010). None of these papers disentangle the different roles played by non-separability and the absence of a wealth effect.

[3] The same is true for all the models, with and without financial frictions, considered in Christiano et al. (forthcoming). The decoupling between consumption and investment dynamics is even larger in the estimated model with flexible prices and wages by Schmitt-Grohé and Uribe (2012). Comparable results are derived from an open economy model estimated by Jacob and Peersman (forthcoming).