Why are aggregate equity payouts pro-cyclical?

Winifred Huang-Meier [a,*], Mark C. Freeman [b], Khelifa Mazouz [c]

[a] Aston Business School, Aston University, Birmingham B4 7ET, United Kingdom
[b] School of Business and Economics, Loughborough University, Leicestershire LE11 3TU, United Kingdom
[c] Cardiff Business School, Cardiff University, Aberconway Building, Colum Drive, Cardiff CF10 3EU, United Kingdom

ARTICLE INFO

ABSTRACT

We use two general equilibrium models to explain why changes in the external economic environment result in pro-cyclical aggregate dividend payout behavior. Both models that we consider endogenize low elasticity of investment. The first model incorporates capital adjustment costs, while the second one assumes that risk-averse managers maximize their own objective function rather than shareholder wealth. We show that, while both models generate pro-cyclical aggregate dividends, a feature consistent with the observed business-cycle pattern of payouts from well-diversified portfolios, the second model provides a more likely explanation for this effect. Our findings emphasize the importance of incorporating agency conflicts when considering the relationship between the external economic environment and the financial behavior of businesses.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

The observed correlation coefficient between the real aggregate dividends paid by firms and real GDP in the U.S. has been around +0.50 for many years.[1] This phenomenon suggests that the payout policies of businesses are systematically and strongly affected by external changes in the economic environment. However, this clearly observed aggregate dividend pro-cyclicality is inconsistent with the predictions of large parts of the existing theoretical literature.[2] Many general equilibrium models imply that investors should benefit from holding a portfolio with counter-cyclical equity payouts (e.g., Alessandrini, 2003; Carceles-Poveda, 2009; Jermann and Quadrini, 2012). These predictions arise because, in economic booms, many potentially profitable investment opportunities are available to firms who wish to reinvest. In addition, since the marginal utility of consumption is low during strong economic conditions, investors are less likely to depend on dividend income at this time.

In this paper, we describe two dynamic stochastic general equilibrium (DSGE) models to explain why external changes in the economic environment should result in pro-cyclical aggregate equity payout behavior. We model an environment where

---

[1] The observation period is between 1984 and 2010. For more details, please refer to Table 1 below.
[2] This issue is distinct from optimal firm-level payout behavior, which is the focus of attention in much of the dividend policy research in financial economics; see, for example, Bhattacharyya (2007) for a review of that field.

firms and households simultaneously undertake constrained optimizations and market clearing conditions ensure that the economy remains in equilibrium. As a consequence, dividend and investment decisions are made simultaneous and neither is a 'residual' of the other.

In the first set of models, managers aim to maximize their current share price while firms experience capital adjustment costs. This follows an extensive literature that is based on the observation that managers cannot immediately and perfectly adjust their real investment decisions (see, e.g., Jermann, 1998; Boldrin et al., 2001; Cooper and Haltiwanger, 2006; Gershun, 2010; Santoro and Wei, 2011). This investment friction has previously played an important role in explaining a number of asset pricing phenomena based upon DSGE models. Both Jermann (1998) and Danthine and Donaldson (2002) have exploited it to present potential resolutions to the equity premium puzzle. Christiano and Fisher (1995), by contrast, apply adjustment costs to Tobin's Q and show that adjustments costs are related to the cyclical properties of equity prices and investment goods.

In our second set of models we assume that there are no frictions, but agency conflicts exist. Specifically, we assume that managers maximize their own expected utility function rather than shareholders' wealth (see, inter alia, Radner, 1970; Sandmo, 1971; Leland, 1972; Carceles-Poveda, 2005, 2009). This choice exploits the known similarity between models that incorporate risk-averse managers and those with capital adjustment costs. In particular, Carceles-Poveda (2003) has shown that, with appropriately matched parameter values, the equilibrium behavior of these two economies around the steady state is identical.

A common key feature among these models is that they endogenize low elasticity of investment. When this feature is combined with investors' desire for dividend income as a source of consumption, more (less) money becomes available to pay out to shareholders in economic booms (recessions). This prediction is consistent with observed market behavior. Thus, since both our models endogenize low elasticity of investment, if one model predicts pro-cyclical dividends then so should the other; we confirm that here. However, we also show that the cyclicality of optimal dividend behavior is clearly distinct between the two models and, as a consequence, each is not equally plausible as an explanation. We find that while the required level of managerial risk aversion falls at the lower end of standard ranges, relatively high levels of capital adjustment costs are required to explain observed payout and consumption behavior. This evidence suggests that the economy with risk-averse managers offers a more realistic explanation to the dividend pro-cyclicality phenomenon. This conclusion is supported by the observation that the agency conflict model results are more robust to changes in the choice of parameter values.

In order to test the overall performance of our DSGE models, we consider their explanatory power for a set of macroeconomic variables. This captures the pro-cyclicality and volatility of four variables: dividends, consumption, labor hours worked, and investment. The performances of the preferred specifications across the entire range of these diagnostics are the best among all the models considered. Resolving the anomaly of pro-cyclical aggregate dividends through either agency conflicts or capital adjustment costs comes with the additional benefit of increasing the overall ability of these models to explain the broader macroeconomy.

This paper is most naturally compared with important recent studies by Carceles-Poveda (2009) and Jermann and Quadrini (2012). Carceles-Poveda (2009) focuses on the sensitivity of aggregate behavior to household heterogeneity in an incomplete market economy both in the presence and absence of utility maximizing managers. Jermann and Quadrini (2012), by contrast, explain pro-cyclical equity payments through economy-wide financial shocks. We present a number of new findings. First, we show that the pro-cyclicality of dividends can be explained in simple agency-conflict models with representative agents and no frictions. Second, we demonstrate that agency conflicts are more likely to resolve the dividend cyclicality puzzle than capital adjustment costs. Third, we extend the representative household's utility function to allow for the presence of internal multiplicative habit formation; a feature that generally makes household consumption smoother (see, for example, Constantinides, 1990). Finally, we present detailed sensitivity analysis that demonstrates that the pro-cyclicality of dividends will emerge in the utility maximizing manager model for a wide range of plausible parameter values.

The remainder of the paper is structured as follows. Section 2 presents the economic environment of the utility-maximizing manager, the value-maximizing firms with capital adjustment costs, and the "basic" model that has neither of these features. Section 3 reports our findings and Section 4 concludes.

2. Economic environment

This section presents two economic models that can potentially explain the pro-cyclicality of aggregate payout policy. The first model is based on a value-maximizing firm with capital adjustment costs (VM-CAC hereafter), while the second one assumes that managers maximize their own objective function rather than shareholders' wealth (UM hereafter). We initially present the assumptions that both models have in common and then introduce the differences.

2.1. The firm and household

The tax-free economy consists of a representative firm that is all-equity financed with one share in issue and a representative agent. There are no other investment opportunities available and, with the exception of capital adjustment costs in the VM-CAC model, there are no frictions.[3]

---

[3] With the exception of all-equity financing, these assumptions are identical to Jermann and Quadrini (2012).