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Production in incomplete markets: Expectations matter for political stability

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ABSTRACT

In the present paper we study voting-based corporate control in a general equilibrium model with incomplete financial markets. Since voting takes place in a multi-dimensional setting, super-majority rules are needed to ensure existence of equilibrium. In a linear–quadratic setup we show that the endogenization of voting weights (given by portfolio holdings) can give rise to – through self-fulfilling expectations – dramatical political instability, i.e. Condorcet cycles of length two even for very high majority rules.

1. Introduction

In general equilibrium models with production and incomplete financial markets, agents (consumers/shareholders) trade assets, but at the market equilibrium, their gradients are typically not collinear: they disagree on the way to evaluate income streams outside the market span. Hence profit maximization is not a well defined objective for firms.[2]

A way to resolve these disputes between shareholders is based on majority voting in assemblies of shareholders.[3] Among others Drèze (1985) and DeMarzo (1993) propose the same concept of *majority-stable equilibria*: within each firm, the production plans of other firms remaining fixed, no alternative production plan should be able to rally a majority of the shares against the status quo. As Gevers (1974) already noted, the first problem this approach runs into is existence: Plott (1967)

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[2] For details on standard general equilibrium models of production with incomplete markets and the roles of the firms, see, e.g. Magill and Quinzii (1996) and the references therein.

[3] The choice of a state contingent production plan in a publicly traded corporation is a genuine problem of social choice. This problem has been profoundly important in the history of economic thought as Arrow's impossibility theorem arose out of his effort to find mechanisms for solving disagreements in such cases.

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shows that in multi-dimensional voting models, a simple majority political equilibrium typically does not exist.[4] Super majority rules are a way to ensure existence: to defeat the status quo, a challenger should rally a proportion larger than 50% of the voting population.[5] The question of what a 'suitable' level a super majority is, arises: it should be high enough to ensure existence, and low enough not to be too conservative. The standard way to proceed is to associate to each proposal its (Simpson–Kramer) *score*. The score of a proposal (the incumbent, or status quo) is the fraction of the voting population supporting, against this proposal, its most dangerous challenger, i.e. the alternative proposal that rallies the maximal fraction of voters against the incumbent. The most stable proposals are the ones with lowest score, the so-called *min–max*.

A central questions is: For which rate of super majority is the min–max stable? We illustrate the difficulty to answer this question through the investigation of an economy where consumers/investors have linear–quadratic utility functions. A nice observation is that the majority voting mechanism is likely to implement equilibria which have the nicest possible welfare properties one can hope for in an incomplete financial market environment. Indeed, looking at the first-order conditions of constrained Pareto optimality, Drèze (1974) argues that profit should be maximized with respect to shadow prices that average the idiosyncratic shadow prices of all shareholders; hence with respect to the shadow prices of the 'mean shareholder'. From Caplin and Nalebuff (1991) we know conditions under which the latter is a proxy to the min–max and is likely to be stable with respect to a rate of super majority inferior to 64%.

But even there things might not turn that simple. Since the electorate is endogenous, its composition is influenced by the agents' expectations. The classical concept of majority voting equilibrium supposes that shareholders have 'conservative' expectations: at equilibrium they expect that no challenger can defeat the status quo; therefore they believe that the status quo production plans are going to prevail in the future; so they stick to their current portfolios. In equilibrium, given these current portfolios, conservative expectations are self-fulfilling: no challenger can rally a high enough majority against the status quo. Hence voting equilibria may be viewed as plain Nash equilibria (see Drèze, 1989, pp. 48–49).

But what happens if shareholders deviate from these conservative expectations? If they expect a challenger to defeat the status quo, they rebalance their portfolios; and it might be the case that, given the new distribution of voting weights/shares, the challenger rallies a high enough majority against the status quo and the expectations are fulfilled.

We expect that an equilibrium which is stable under conservative expectations might not be stable if agents' expectations deviate. Indeed, suppose a firm changes its production plan from y to y', then it changes the dividend matrix for investors/consumers. Therefore consumers whose investment needs are less covered by y' than by y might exit – at least partially – from the capital of the firm: they will sell shares to consumers whose needs are better covered by y' than by y. Hence deviating from conservative expectations might enlarge the voting weight of the consumers who are better off with the challenger y' and diminishes the voting weight of the consumers who are better off with the status quo y: this *exit effect* gives more voting weight in the corporate control mechanism to the shareholders who favor the challenger over the status quo. Clearly if these deviating expectations are confirmed at equilibrium, then the status quo is not stable. At equilibrium, deviation from conservative expectations should not be confirmed. We provide a new concept of equilibrium where such deviating expectations are never confirmed at equilibrium: we dub it majority *exit*-stable equilibrium.

It is shown that generically a (weakly) higher rate is necessary for the corporate charter to secure that a ρ-majority equilibrium is exit-stable. A robust example is provided where a strictly higher rate is needed. The extent to which the corporate charter needs to be increased to secure that a ρ-majority equilibrium is exit-stable depends on the case under consideration. We provide an example where no 50%-majority equilibrium is exit-stable for any rate of super majority. This example gives rise to Condorcet cycles between two alternatives, even for rates of super majority very close to unanimity. Since expectations, whether they are conservative or not, are significant for stability of equilibria, it is natural to think of stability as being influenced by a 'political sunspot'. In general, on the one hand conservative expectations should result in stability because majority equilibria exist for rather low rates of super majority and on the other hand non-conservative expectations should result in instability perhaps in the form of proxy fights and hostile takeovers.

The paper is constructed as follows. Section 2 sets up the model. Sections 3 and 4 define the concept of ρ-majority equilibrium, provides computations and links efficiency to stability. Section 5 introduces the concept of *exit-stability*, and, through a simple geometric example, it explores the possible occurrence of political sunspots, and of Condorcet cycles of length two for any rate of super majority.

2. Setup

Consider an economy with 2 dates, $t \in \{0, 1\}$, 1 state at the first date $s = 0$, and S states at the second date $s \in \{1, \ldots, S\}$. The probability distribution over the set of states at date 1 is $\pi = (\pi^1, \ldots, \pi^S)$ where $\pi^s > 0$. There are: 1 commodity at every state, a continuum of consumers $\phi \in \Phi$ where Φ is the set of characteristics of consumers, and j firms $j \in \{1, \ldots, J\}$.

[4] Benninga and Muller (1979) have shown that if production possibility frontiers are unidimensional, then 50% majority voting works. Another condition ensuring existence of 50% majority equilibria is that the degree of market incompleteness is equal to one, see Crès (2005) and Tvede and Crès (2005).

[5] To get existence, Drèze (1985) gives veto power to some shareholders. This result is generalized in Kelsey and Milne (1996) to encompass other voting rules, such as the generalized median voter rules, a special case of which has been applied to decision theory in firms by Sadanand and Williamson (1991).