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Why is Hedge Fund Activism Procyclical?

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Abstract

We provide a theoretical model to explain the procyclicality of hedge fund activism. In our model, hedge funds which compete to retain investor flows excessively increase the net leverage of target firms in order to deliver high short-term payouts and signal their ability. Such excessive leverage leads to debt overhang in economic downturns, thereby destroying incentives for activism and engendering procyclicality. Our model thus provides a theoretical explanation that links the procyclicality of hedge fund activism with increases in the leverage or payouts ratios of target firms. In addition, the model generates several new testable implications and reconciles seemingly contradictory evidence on the wealth effects of activism for shareholders and bondholders.

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1 Introduction

Hedge funds have taken the lead in institutional shareholder activism in recent decades (e.g., Gillan and Starks (2007), Armour and Cheffins (2009)). While hedge fund activism has produced gains to targets in terms of both shareholder value and operating performance (Brav, Jiang, Partnoy, and Thomas (2008), Clifford (2008), Becht, Franks, Mayer, and Rossi (2009), Klein and Zur (2009), and Boyson and Mooradian (2011)), it has also shown itself to be pro-cyclical. In booms, activist hedge funds launch numerous campaigns, receive significant inflows, and outperform other (non-activist) hedge funds.¹ In busts, the picture reverses: Activist hedge funds reduce or entirely cease in their activist efforts and experience disproportionate investor outflows. For example, referring to the state of hedge fund activism in the period following the market collapse of 2008, *The Economist* writes: “Around the world, activist funds are on the back foot, performing poorly, facing investor withdrawals and struggling to assemble the financial firepower to take on new targets.”² The pro-cyclicality of activism, as measured by 13D filings of activist hedge funds, is evident from Figure 1 below, reproduced from Alon Brav’s webpage.³

More evidence can be found in the recent financial crisis. According to *The Economist*, Thomson Reuters data show that, “In America investors began only two new activist campaigns in the fourth quarter of 2008, down from 32 in the preceding nine months and 61 in 2007.”⁴ It is only after a “strangely quiet” period during the two years following this steep decline in activism, during which “[m]any [activist investors] scaled back or even closed shop,”⁵ that activist campaigns started to re-emerge.⁶ Indeed, it is only another eighteen months later, in mid-2012, when the market had regained most of the value lost in the 2008 crisis, that – according to Peter Harkins of D.F. King, a proxy-advisor – shareholder activism is “getting back to normal after the financial crisis of 2008.”⁷

In this paper, we offer a theoretical explanation for such procyclicality. Our explanation

¹Systematic evidence for this is provided by Brav, Jiang, Partnoy, and Thomas (2008), who study the boom period from 2001 to 2006.

²*The Economist*, “Activist Investors: Flight of the Locusts”, April 8, 2009.

³According to Section 12 of the Securities Exchange Act of 1934, any entity acquiring a stake of 5% or more of the voting shares of a publicly traded company must file a Schedule 13D with the SEC within ten days of the purchase. The schedule 13D provides information to the investing public about blockholders in public companies and their intentions with regard to the company.

⁴*The Economist*, “Activist Investors: Flight of the Locusts”, April 8, 2009.

⁵*The Economist*, “Shareholder activism: Ready, set dough”, December 2, 2010.

⁶Examples of activist campaigns launched in late 2010 include a successful joint attempt by Icahn and Seneca Capital to block the sale of Dynegy to Blackstone, a campaign by Trian Partners to induce Family Dollar to increase payouts, and a campaign by Jana partners to break up TNT (*The Economist*, “Shareholder activism: Ready, set dough”, December 2, 2010.).

⁷*The Economist*, “Corporate Governance in America: Heating Up,” April 7, 2012.

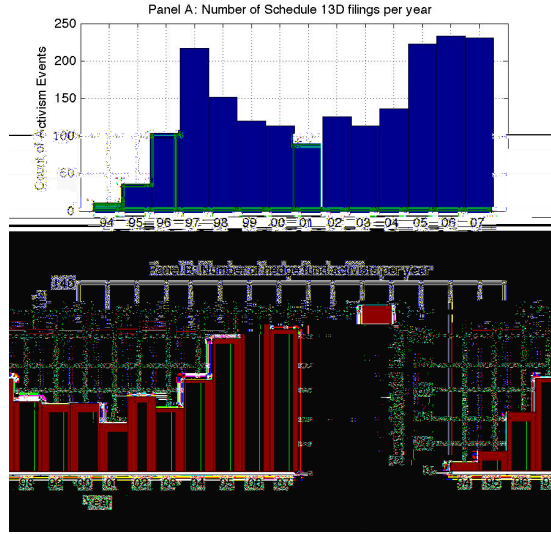


Figure 1: These figures are provided by Alon Brav, and are based on an updated sample (1994-2007) using the same data collection procedure and estimation methods as in Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, and Kim (2010). For more information please see http://faculty.fuqua.duke.edu/~brav/HFactivism_March_2012.pdf.

is grounded in two core ingredients, both of which are well supported empirically. The first ingredient is that hedge funds often increase the net leverage (debt net of cash) of their target firms. The empirical literature documents that hedge fund activists target companies with low payout ratios and increase both payouts to target shareholders and target company leverage (Brav, Jiang, Partnoy, and Thomas (2008), Klein and Zur (2009), Li and Xu (2010)).⁸ There is some evidence that such increased target net leverage increases the default risk of target firms: First, target companies disproportionately experience credit downgrades (Byrd, Hambly, and Watson (2007), Aslan and Maraachlian (2009), and Klein and Zur (2011)). Second, target companies' debt becomes riskier: Li and Xu (2010) show that bank loans to target firms become riskier, commanding higher spreads and having shorter maturities, while

⁸While there is natural variation in quantitative findings across empirical studies, the magnitude of net debt increases can be very significant. For example, focussing on the most aggressive cases of hedge fund activism between 2003 and 2005, Klein and Zur (2009) find that, on average, hedge fund targets *doubled* their payout. They also show that the median target firm increased debt by 4.6% of assets as a result of hedge fund activism, starting from an initial debt to assets ratio of 9.5%. Using a larger sample spanning 1994 to 2008, Li and Xu (2010) find that target firms increased leverage by 11% of assets, starting from a debt to assets ratio of around 30%. For the same sample, target dividend yield increased from around 1% to 1.5% as a result of hedge fund activism.

Klein and Zur (2011) document negative abnormal bond returns at the announcement of activism.⁹

The second ingredient of our model is that investor flows into hedge funds are sensitive to performance: Hedge funds that underperform experience outflows. Thus, hedge fund managers aim to retain their current clients and win new ones by generating high returns. Such flow-performance relationships are ubiquitous in the fund management industry and have been documented for hedge funds in particular by Fung, Hsieh, Naik, and Ramadorai (2008), Agarwal, Daniel, and Naik (2009), and Baquero and Verbeek (2009). Lim, Sensoy, and Weisbach (2013) show that flow-related compensation is an important driver of the incentives of hedge fund managers.

In our model, these two ingredients interact endogenously to give rise to procyclicality. Motivated by the findings of Brav, Jiang, Partnoy, and Thomas (2008) and Klein and Zur (2009), we start with a model in which hedge funds can enhance the total cash flows that can be generated by their target firms if they exert effort in activism. However, in our model, hedge funds are also engaged in a tournament for investor flows. As a result, in an attempt to capture or retain investor flows, hedge funds pump too much cash out of target companies, in the process increasing the net leverage of the target. Such increased leverage, in turn, destroys the incentives of hedge funds to exert activist effort at a later date if economic conditions decline. In a weaker economic climate, total cash flows achievable with activism are lower. At such times, the endogenously high leverage of target firms implies that too little is left for equity holders to compensate for effort. Thus, hedge fund activism ceases in downturns due to debt overhang.

It is sometimes suggested in the financial press that the procyclicality of returns from activist hedge funds is caused by the relative lack of diversification of activist portfolios (e.g.

⁹More nuanced evidence is available from Aslan and Maraachlian (2009), who document *positive* abnormal bond returns at announcement, but show that bonds underperform in subsequent years by significant and large amounts and experience downgrades.

There is also evidence of cross sectional variation in the effect on target creditworthiness by hedge fund activity. Li and Xu (2010) show that increases in cost of target debt are higher for hedge fund activism that targets capital structure (including payout policy) than for activism that targets corporate governance. Sunder, Sunder, and Wongsunwai (2010) find that hedge fund activism that forces mergers increases target bond yields, while activism that blocks mergers and resolves managerial entrenchment problems reduces bond yields. The overall effect, accounting for all other actions including capital structure changes, is to increase bond yields.

There is disagreement in the literature on the degree to which the actions of activist funds expropriate existing long-term bondholders in target firms: While Klein and Zur (2011) argue in favour of such expropriation, Brav, Jiang, Partnoy, and Thomas (2008) argue against it. While such expropriation issues are not central to our core analysis, our model helps to shed light on this debate by providing a theoretical resolution of some of the apparently conflicting evidence in these papers, see Section 4.3.

The Economist, April 8, 2009).¹⁰ Further, since one of the commonly declared objectives of activist hedge funds is the eventual merger of the target firm, it may also be tempting to attribute the procyclicality of hedge fund activism to the procyclicality of M&A markets. While these other potential channels may have a bearing on the procyclicality of activism, it is worth emphasizing that our analysis – apart from delivering a self-contained model with fully rational agents – delivers an endogenous link between the observed procyclicality of activism and the well-documented effect of activism on the net leverage of target firms. Further, as we detail below, in addition to linking procyclicality to target leverage, our model generates a number of testable implications, several of which find support in existing empirical evidence. In addition, our model provides a framework within which to interpret some of the seemingly conflicting evidence on the wealth effects of hedge fund activism.

We consider a model in which hedge funds can generate incremental cash flow from target firms in two different ways. In the first instance, they can mitigate a free cash flow problem and salvage cash that would otherwise be wasted by management. In addition, over time, hedge funds can undertake – at non-trivial effort cost to themselves – business/operational improvements in the target or arrange for a profitable takeover of the target firm (Greenwood and Schor (2009)), generating significant additional value. For ease of exposition, we refer to such actions jointly as “restructuring”. All of these activities are common activist tactics (see Brav, Jiang, and Kim (2010)).¹¹

We make a few assumptions about free cash flow problem mitigation and restructuring. First, hedge funds can augment the payout from salvaging free cash flow by leveraging the target.¹² As discussed above, there is systematic evidence that hedge funds leverage their target firms. In addition, since a significant amount of target borrowing is bank-based (see, for example, Li and Xu (2010)) hedge fund investors cannot tell (in real time) the source of the cash flows (genuine reductions in excess cash vs increased leverage) that are generated from the target firm. Second, the incremental cash flow generated by restructuring is both effort-dependent (higher effort by hedge fund blockholders translates into higher incremental cash flow) and state-dependent: In good economic times, a given amount of effort translates into higher cash flow than in bad times. This could be because returns to business improvements

¹⁰It is worth noting that an explanation based upon idiosyncratic shocks is hard to square with patterns related to the business cycle.

¹¹Brav, Jiang, and Kim (2010) provide evidence that activist hedge funds engage in multiple activities in a given target firm, and that payout policy changes in target firms occur more swiftly than other changes. These issues are discussed in greater detail in Section 2 below.

¹²While we allow target firms to take on new debt in the baseline model, this is not necessary for our analysis. Instead, as we show in Section 5.2, our qualitative results hold just as well if targets cannot take on new debt, and hedge funds were limited to paying out existing cash balances. Thus, as the terminology used earlier in the introduction suggests, it is *net* leverage that matters.

are higher when investment opportunities are in plenty, or because the likelihood of finding merger partners are higher in boom times.

Hedge funds differ in their ability as activists: Good hedge funds are better at both salvaging excess cash from managerial waste and at restructuring than bad ones. Ours is a signalling model: Hedge funds know their types but investors do not. Investors provide hedge funds with capital to acquire blocks in target companies and monitor their returns in order to infer their type. Investors pay fees to the hedge funds, both in the form of a flat management fee and in the form of shares of positive profits. If an investor, upon observing the initial return generated from free cash flow problem mitigation, rationally infers (in equilibrium) that the hedge fund is of the bad type, then it is in the investor's own best interest to take his money out of the hedge fund, costing the hedge fund future rents from being employed by that investor. Thus, in order to impress investors a hedge fund must generate a convincing early performance. Since high ability funds have an advantage in delivering high cash flows, convincing performances are associated with high early cash payout.

The problem for good hedge funds is that, since the target can be leveraged to generate additional early cash flow, bad funds can imitate – within limits – good funds and pool with them. Thus, in order to identify themselves as good, the good funds must generate sufficient early cash flow such that – even if bad funds could convince creditors that they were good, and thus borrow up to the debt capacity – they would not be able to imitate the good funds. This implies that good funds must utilize a significant fraction of the target firm's debt capacity in order to separate. However, an undesirable effect of so much leverage is debt overhang: If economic conditions sour even the good fund has no incentive to exert effort on restructuring. Thus, in busts, activist efforts cease. We show that this happens in equilibrium whenever two natural conditions hold: Good types must be sufficiently better than bad types at salvaging excess cash from managerial waste, and returns to restructuring must be sufficiently high in the good state relative to the bad state.

Our model speaks directly to the motivating empirical evidence on the procyclicality of 13D filings as a function of booms and busts in aggregate markets. Given that competition for investor flow generates excessive leverage and thus debt overhang in poor economic conditions, investors will only finance activist hedge funds if economic prospects are sufficiently good. Thus, if economic prospects are weak, no new blocks will be formed, and no new 13D's will be filed. If the equity market is – as it is often claimed – a leading predictor of economic conditions, then our model therefore predicts that the number of 13D filings will be higher during market booms than busts.

In addition to these core results, our model generates several other empirical implications. Some of these implications provide a means for interpreting existing empirical and anecdotal

evidence. Others represent new potential directions for empirical work. First, our model connects the leverage of hedge fund target firms with the level of optimism about future economic conditions. The higher is this optimism, the higher is target fund leverage, because when good times are likely in the future, target firms have higher debt capacity, resulting in a higher level of borrowing necessary to separate good from bad activists. As we discuss in section 4, this can be viewed as an explanation for emerging anecdotal evidence that while activist hedge funds leveraged their target firms very extensively in the boom years prior to 2007, newly re-emergent hedge fund activists are currently more reticent to leverage their targets. Second, our analysis connects optimism about future states to the time-pattern of returns to target firms' shareholders. In particular, the higher is this optimism, the more front-loaded are returns to target firms' shareholders. This is because greater optimism leads to greater leverage at the target level, moving cash flows forward in time for target shareholders. While there is no direct empirical analysis comparing the time profile of returns to target shareholders in different periods, the evidence in Brav, Jiang, and Kim (2010) suggests that for activist campaigns launched in the 2001-2006 period – a time of significant optimism about economic prospects – the abnormal returns to target shareholders accrued in the first few months of the campaigns. Third, our model connects the nature of ability differences within the activist hedge fund industry to target leverage and the time-pattern of returns. We show that it is exactly when activist hedge funds are principally distinguished by their ability to restructure target firms (rather than enhance cash payouts) that target firm leverage will be highest and, correspondingly, the returns to target shareholders will be most front loaded. These four findings, taken together, represent new, potentially testable, implications of the model.

Finally, our model also helps to resolve seemingly contradictory evidence on whether the documented gains to shareholders of firms targeted by hedge fund activists can be wholly or partly attributed to the expropriation of existing bondholders. At one end of the spectrum, Klein and Zur (2011) argue that hedge fund activism leads to an expropriation of existing bondholders. This conclusion is shared – with caveats and qualifications – by Li and Xu (2010) and Sunder, Sunder, and Wongsunwai (2010). In contrast, Brav, Jiang, Partnoy, and Thomas (2008) persuasively argue that expropriation of existing bondholders is unlikely to be a source of significant shareholder value because they find that announcement returns to target shareholders are *higher* in companies which are previously *unlevered*. While our core mechanism does not require us to take any stance on the wealth effects of hedge fund activism on existing long-term creditors, our model provides a framework for interpreting this seemingly conflicting evidence. In particular – as we demonstrate in section 4.3 – when the target firm has risky long-term pre-existing debt, in equilibrium: (i) Existing creditors may

be expropriated as a result of hedge fund activism, yet (ii) returns to equity holders as a result of hedge fund activism are *reduced* by the presence of pre-existing leverage. The intuition underlying this resolution is as follows. First, since leverage created by hedge fund activists is motivated by competition for investor flows, it may well end up reducing the cash available to pay existing creditors when economic conditions sour. However, target-level borrowing is carried out on rational credit markets: Pre-existing leverage at the level of the target firm reduces the (residual) debt capacity of the target. Since leverage serves a signalling role, the reduced debt capacity, in turn, reduces the payout necessary for separation. This, in turn, lowers the cash flows received by target shareholders.

While our model is motivated by activist hedge funds, the analysis and results may apply more generally. It is often argued, for example, that the buyout activity of private equity funds is procyclical.¹³ Like hedge funds, private equity funds also receive higher future investor capital if their performance on existing projects is high (Chung, Sensoy, Stern, and Weisbach 2012). In addition, the use of extensive leverage in private equity buyouts is well known. Thus, at a qualitative level, our debt overhang story provides an explanation for the cyclical features of private equity buyout activity as well. Indeed, consistent with our results in section 4.1, Axelson, Jenkinson, Stromberg, and Weisbach (2013) find that private equity buyout leverage is procyclical.

Our paper engages with a large literature, both theoretical and empirical. The empirical literature has already been reviewed in motivating our analysis above. At the broadest level, our paper belongs to the rich theoretical tradition of modeling blockholder monitoring in publicly traded corporations (e.g. Grossman and Hart (1980), Shleifer and Vishny (1986), Admati, Pfleiderer, and Zechner (1994), Burkart, Gromb, and Panunzi (1997), Bolton and von Thadden (1998), Kahn and Winton (1998), Maug (1998), Tirole (2001), Noe (2002), Faure-Grimaud and Gromb (2004), Admati and Pfleiderer (2009), Edmans (2009), and Edmans and Manso (2011)). This well established and insightful theoretical literature does not account directly for the delegated nature of blockholding, a phenomenon particularly prominent in the US and the UK, but also relevant elsewhere. A handful of recent papers have started to consider the role of incentives in delegated portfolio management in affecting the nature of delegated blockholder monitoring. In particular, Goldman and Strobl (2011) examine how a given degree of fund managers' short-termism affect firm investment policy; Dasgupta and Piacentino (2011) model the effect of competition for investor flows on the ability of delegated blockholders to govern via the threat of exit; Dasgupta and Zachariadis (2010) model the effect of business ties with portfolio firms on mutual fund proxy voting.

¹³In their model of the optimal financing structure of private equity funds, Axelson, Stromberg, and Weisbach (2012) demonstrate how the procyclicality of funding implies overinvestment in booms and underinvestment in busts.

While these papers share, in the broadest of terms, our interest in modeling the effect of incentive conflicts arising from the delegation of portfolio management on the nature of blockholder monitoring, none of them consider the issue of the procyclicality of hedge fund activism. Finally, our paper has a family connection to the more established literature on how competition for investor flows affect the prices, returns, volume, and volatility of assets traded by money managers (Dasgupta and Prat (2008), Dasgupta, Prat, and Verardo (2011), or Guerrieri and Kondor (2011)).

The rest of the paper is organised as follows. In the next section, we outline the model. In section 3 we analyse the model to demonstrate the procyclicality of hedge fund activism in equilibrium. Section 4 outlines the additional empirical implications arising from our analysis, while section 5 discusses a number of natural questions that arise about the baseline analysis. Section 6 concludes.

2 Model

We consider a setting with two periods and four sets of actors. There are *hedge funds* (HF) which acquire stakes in *target* firms to seek changes (increasing payouts, business restructuring, sale of assets, etc.). In other words, hedge funds are shareholder activists. Hedge funds are financed by *investors* who pay fees to them and monitor their performance in order to maximize private returns. Finally, there are *creditors* who may lend to firms targeted by hedge funds. All actors are rational and risk-neutral.¹⁴ For simplicity, we ignore discounting.

To be specific, there is a continuum of identical firms, a continuum of ex ante identical hedge funds, and a continuum of competitive deep pocketed creditors. Each continuum is of measure 1. Each hedge fund enters the first period having used their investors' capital to acquire a stake in a target firm, i.e. blocks in firms are formed at some unmodelled prior period.¹⁵ The match between firms and funds is random. Hedge fund activism potentially occurs in each period. Each hedge fund is financed by a continuum of identical investors. Each target firm can borrow from a deep pocketed creditor.

Hedge funds come in two types $\theta \in \{G, B\}$, where $\Pr(\theta = G) = \gamma$. Type G are better activists: They are able to produce higher cash flows from target firms. Each hedge fund,

¹⁴As a result of the assumption of universal risk-neutrality, we ignore issues related to block size. In particular, we write the payoffs to hedge funds and their investors "as if" funds owned the entire target firm. This is not true in practice, but – in our model – accounting for block size would amount to a simple scaling of all payoffs, leaving the qualitative results unchanged. Potential concerns about additional information that could be impounded in secondary market prices by the trade of direct owners of the target firms are mitigated by the fact (as shown below) that our equilibria are fully revealing.

¹⁵We ignore the investors' participation constraint at this stage. Such participation decisions are analyzed in section 3.1.

regardless of type, can engage in two types of activism.

The first – short-term – form of activism occurs during the first period and involves mitigating a free cash flow problem in target firms. Each target firm has excess cash of $C > 0$ in the first period which, if left under the discretion of the firm's manager, will be wasted (e.g., invested in zero gross return projects or otherwise diverted). Hedge funds can at infinitesimal cost monitor ($m \in [0, 1]$) the target firm. If hedge funds monitor ($m = 1$) they identify a type-dependent amount of free cash x_1 . We assume that x_1^G is distributed according to a cumulative distribution function F on the domain $[0, C]$ and that $x_1^B = x_1^G - \Delta x_1$ where $\Delta x_1 > 0$. Thus, the good type is better able to salvage excess cash from managerial waste. Any identified free cash is disbursed to shareholders at the end of the first period. In addition, hedge funds can increase the payout by leveraging the target firm. They may choose an amount $L \in R_+$ to borrow from competitive credit markets. As a result the payout at the end of the first period is $D_1 = mx_1 + L$.¹⁶

The second – long-term – form of activism occurs during the second period and involves business enhancements, restructuring, or the merger of the target firm. This form of activism differs from the first in several aspects: First, it is – as noted already – long-term, and requires more time and effort from the hedge fund. Second, the cash flows generated by such activism depend on the aggregate state of the economy. There are two possible states, $s \in H, L$, with $\Pr(s = H) = \gamma_s$. The state is revealed at the beginning of the second period. Following the revelation of the state, hedge funds can exert effort $e \in [0, \bar{e}]$ at private cost e , giving rise to cash flows, $x_2(e)_s$, which are state, type, and effort dependent. We assume:

1. No effort generates no returns, regardless of the state: $x_2(0)_s = 0$ for all θ, s ;
2. High effort generates higher cash flows for the good type fund in the high state than in

Our assumptions about activism above are well-supported by the data. The mitigation of free cash flow problems is a central goal of activist hedge funds. As Brav, Jiang, and Kim (2010) note in their survey, hedge fund targets can be characterised as “...“cash-cows” with low growth potentials that may suffer from the agency problem of free cash flow.” Longer-term forms of activism by hedge funds often include changes in business strategy and the merger of target companies. In the sample of Brav, Jiang, and Kim (2010) (which is an augmented version of the sample of Brav, Jiang, Partnoy, and Thomas (2008)) such changes, taken together, constitute 43% of 13D filings. Finally, our model requires that a given hedge fund potentially engages in more than one form of activism. There is also persuasive evidence for this. In the Brav, Jiang, and Kim (2010) sample, 48% of 13D filings between 2001 and 2007 do not declare a specific intent (i.e., state “general undervaluation” as the reason for intervention). The remaining 13D filings declare intent to (i) make changes to capital structure or (ii) business strategy, (iii) engage in a sale of the target company, or (iv) improve governance. While specific declarations of intent (13Ds that did not fall into the “general undervaluation” category) constituted only 52% of the sample, the percentages of 13D filings that declared goals (i)-(iv) above sum to nearly 85%. Thus, *on average*, hedge funds state around two distinct activist goals per 13D declaration.¹⁷

We now turn to our informational assumptions. Hedge funds are the most informed party in the model. Hedge fund investors and creditors have less information and their information sets are non-nested. At the beginning of the first period hedge funds learn the realized value of x_1^B and x_1^G and also discover their own type $\theta = G$ or B . In contrast, hedge funds investors only learn the realized value of x_1^B and x_1^G . They do not directly observe the types of their hedge funds. At the end of the first period, hedge fund investors see the payout D_1 but do not directly observe how much of this payout was generated through target leverage (L). At the time of the lending decision (when D_1 has not yet been paid), creditors do not know the realized values of x_1^G, x_1^B , but they observe L (since they are the lenders). They form beliefs $\mu_C(L) = \Pr(\theta = G | L)$ and set the face value of the debt (K) due at the end of the second period to break even, making all relevant equilibrium inferences.

It is worth noting that our assumptions that hedge fund investors do not directly observe target leverage and conversely that creditors do not directly know the potential abilities of hedge funds do *not* bind in equilibrium. As will be clear below, in equilibrium, hedge fund investors can infer the leverage of their fund’s target and creditors correctly anticipate the type and ability of the hedge fund.

To conclude the description of the model, we now specify the actions of hedge fund

¹⁷It is also reasonable to model payout policy changes as being a shorter-term form of activism as Brav, Jiang, and Kim (2010) present evidence that in firms targeted by hedge funds, changes in payout policy happen more quickly than other changes (Table 5).

investors and the payoffs of the hedge funds. After observing of the payout D_1 hedge fund investors form their beliefs $\mu_1(D_1) = \Pr(\theta = G | D_1)$ about the type of the hedge fund and choose whether to retain ($a_1 = R$) or to fire the fund ($a_1 = F$). If $a_1 = F$, the fund is shut down, and all future cash flow is destroyed.

Hedge fund fees are made up of two parts. The first part is an assets-under-management fee, w , paid during each period of employment, at the beginning of the period. The second part is an incentive fee – a so-called “carry” – which is $\alpha \max(D_2, 0)$ for some $\alpha \in (0, 1)$.¹⁸ This implies that hedge funds that are retained by their investors for the second period get a share of the liquidating cash flows to equity holders.^{19 20}

3 Procyclical Activism in Equilibrium

Since all firms are identical, each firm is matched to one fund, and all funds of any type are identical, the discussion below is framed in terms of a representative firm (“the firm”) and a representative fund (“the fund”) that has invested in it. Similarly, since all investors and creditors are identical, the discussion is couched in terms of a representative investor (“the investor”) and a representative creditor (“the creditor”).

A perfect Bayesian equilibrium of this game is a n-tuple $(m^*, L^*, e^*, a_1^*, K^*, \mu_1^*, \mu_C^*)$ where (i) the retention decision a_1^* is optimal for the investor given beliefs μ_1^* ; (ii) The face value of debt K^* allows the creditor to break even given beliefs μ_C^* ; (iii) Monitoring m^* , leverage L^* , and effort e^* are best responses of the fund to (a_1^*, μ_1^*) and (K^*, μ_C^*) ; and (iv) The posterior beliefs μ_1^*, μ_C^* are consistent with Bayes updating along the equilibrium path and are arbitrarily chosen otherwise.

We do not consider equilibria in which, by the suitable choice of off-equilibrium beliefs, creditors can commit to enforcing arbitrary predetermined loan amounts or firms can commit to borrowing arbitrary predetermined amounts. Such equilibria with commitment do not seem realistic because they require perfect coordination across firms and/or creditors. Below,

¹⁸Since we assume that $w > 0$ is paid at the beginning, even the bad type fund’s participation constraint is trivially satisfied.

¹⁹Focussing on the second-period carry is a simplification reduces incentives for leveraging. Thus this simplification works *against* us.

²⁰The contracts that we consider are motivated by observed compensation arrangements of hedge funds in the real world. It is, however, worth noting that no other short-term contract performs better in our framework. Since hedge fund activists do not know their type at the beginning of the model, good types cannot reveal their type by their choice of contract. Given universal risk neutrality, there are – within bounds – various combinations of w and α that deliver the same outcome for a given rent to the hedge fund activist. For instance, instead of inducing effort and participation solely through a relatively high α the same can be achieved with a positive w and somewhat lower α .

we focus on equilibria without such commitment.²¹

We begin the analysis by making a few straightforward observations about equilibria. The corresponding results are formally stated and proved in the appendix.

We first note that it is never in the interest of any investor to continue to invest with a fund he knows to be of the bad type (Lemma 1). This is because we know by Assumption 3 that a bad type never makes an effort during the second period, and the resulting cash flow is zero (by Assumption 1). Yet, the retention costs the investor w in second-period fees.

This means that in a separating equilibrium, the bad fund will neither monitor in the first period, nor borrow (Lemma 2). Since he will be discovered and fired, it is not worth paying even the infinitesimal cost of monitoring of borrowing in the first period.

Finally, since the bad fund does not borrow in a separating equilibrium, the creditor will rationally assume that any positive amount of borrowing arises from a good type (Lemma 3) and therefore is willing to lend up to the pledgable income of the good type (PI^G).

We show that these observations sharply restrict the set of separating equilibria that can arise. The reason is as follows. Since the creditor does not know x_1^B and x_1^G he cannot infer how much the good type would need to borrow in equilibrium. Thus, the creditor cannot detect potential deviations by the bad type which involve borrowing any amount up to the pledgable income of the good type. But this means that, to separate, the good type hedge fund must pay out an amount so high that, even by receiving the same borrowing terms as a good type, the bad type cannot imitate. The following key result formalizes this intuition. The proof is in the appendix.

Proposition 1 *In separating equilibria, $D_1^*(G) > x_1^B + PI^G$.*

We are now ready to state our main result. Before doing so, it is useful to introduce some suggestive terminology. To motivate this terminology, note that since the hedge fund receives only the second-period carry, he does not wish to borrow too much: The more he borrows, the less is this carry (by definition). So, it is reasonable to focus on the separating equilibrium with leverage which delivers separation with as little leverage as possible.

In addition, since our explanation for procyclicality of hedge fund activism is linked to excessive leverage arising endogenously from a tournament for investor flow, focussing on separating equilibria with *minimal* leverage establishes the conditions under which procyclicality is an *essential* element of equilibrium. By the same token, since in our model it is leverage that gets in the way of effort exertion by the hedge fund, we refer to the equilibrium

²¹Equilibria in which credit markets commit to lending only specific predetermined amounts also could not support separation in a variant of our model with stochastic Δx_1 , i.e., in which ability differences in free cash flow mitigation are stochastic.

which delivers separation with as little leverage as possible as the *separating equilibrium with minimal leverage* (SEML).

Proposition 2 *As long as*

- (i) Δx_1 *is large enough, and*
- (ii) $x_2^G(\bar{e})_H - x_2^G(\bar{e})_L$ *is large enough given* Δx_1

the SEML involves the good type hedge fund leveraging sufficiently to generate debt overhang in state L.

The formal proof in the appendix uses five interlinked steps. First, we compute the range of face values of debt that trigger debt overhang only in the low state. Next, using Proposition 1, we compute the minimal first period dividend and associated face value of debt if debt overhang arises only in the low state. Putting the first two steps together we obtain conditions (i and ii above) on parameters consistent with debt overhang only in the low state in the SEML. We then check that it is in the interest of investors to retain the good hedge fund, given separation. Finally, we check that conditions (i) and (ii) preclude separation without debt overhang in the SEML. Thus, conditions (i) and (ii) are synonymous with the existence of debt overhang in the low state.

The intuition behind our result is as follows. Hedge funds are engaged in a tournament for investor flow. A bad fund wants to pretend to be a good fund to retain investor flow and thus fees from fund management for another period. A good fund wants to separate from a bad fund to be identified immediately as being good. In the first period, the hedge fund can only lever the target firm up by a finite amount (borrowing capacity). As a result, in any potential separating equilibrium, even by deviating and pretending to be the good fund, the bad fund can only produce a finite early cash flow determined by the equilibrium borrowing capacity. But, respecting that same borrowing capacity constraint, the good type can always produce at least infinitesimally higher cash flows (without exhausting debt capacity) and thus separate. In the proposition, we characterise the parameter ranges for which taking on this amount of debt generates debt overhang and eliminates incentives of the fund to exert effort in the low state. Next we turn to interpreting the role of the parameter restrictions in Proposition 2.

Proposition 2 identifies two parameter restrictions that imply that the tournament for investor flows implies leverage of a level that generates debt overhang in the low state and thus procyclicality in hedge fund activism. In economic terms, the two conditions are that (i) the good type of hedge fund is intrinsically sufficiently more able than the bad type at

mitigating the free cash flow problem; and (ii) given such ability differences, returns from restructuring effort are sufficiently higher in the high state in comparison to the low state. In what follows, we provide an intuitive discussion of the role played by each of these restrictions.

The first parameter restriction requires that the difference in ability to mitigate free cash flow problems, Δx_1 , is large enough. To appreciate the role of this restriction, note that if borrowing is too high in the first period debt overhang will arise in both states. The level of borrowing required to separate is inversely linked to the differences in first period cash flows generated *without* borrowing by good and bad types: Δx_1 . Thus, if Δx_1 is large enough, the good type will not need to borrow so much as to generate debt overhang in both states.

The second parameter restriction requires that differences in returns to effort between high and low states must be high enough: $x_2^G(\bar{e})_H - x_2^G(\bar{e})_L$ large enough given Δx_1 . To appreciate the role of this restriction, note that, for a given level of debt, procyclicality requires effort in the high state and not in the low state. This requires that returns from effort to the hedge fund must be sufficiently higher (given the debt level, determined by Δx_1) in the high state than in the low state. That, in turn, is guaranteed when $x_2^G(\bar{e})_H$ is large relative to $x_2^G(\bar{e})_L$.

3.1 Funding activist hedge funds

Up to now we have neglected the investors' participation decision. Here, we check when such participation is optimal, and show that investor participation is fully consistent with the conditions generating our core results. We normalize the block price in period 0 to be 1. Suppose that the investor has initial wealth $1 + w$, and can either invest it in a storage asset (with zero net return), or give 1 to an activist hedge fund to form a block and pay him a fee of w for the first period. If the investor employs a hedge fund, then (since all hedge funds of either type participate) with probability γ he is matched with a good fund. In the SEML, the good fund pays out $x_1^G + \gamma_s x_2^G(\bar{e})_H - \Delta x_1$ in the first period, and then in the second period the investor always pays w but the hedge fund pays back only in the high state. Hence, the investor receives in expectation $\gamma_s \left((1 - \alpha) \left(x_1^G(\bar{e})_H - \frac{x_2^G(\bar{e})_H - \Delta x_1}{s} \right) \right) = \gamma_s (1 - \alpha) \frac{\Delta x_1}{s}$. Instead, with probability $1 - \gamma$ he is matched with a bad fund. The bad fund pays out nothing in the first period and is fired, and there are no further cash flows. Thus, the investor's expected total cash flows are:

$$\begin{aligned} & 1 - w + \gamma \left(E(x_1^G) + \gamma_s x_2^G(\bar{e})_H - \Delta x_1 - w + \gamma_s (1 - \alpha) \frac{\Delta x_1}{\gamma_s} \right) + (1 - \gamma)(0) \\ = & 1 - w + \gamma \left(E(x_1^G) + \gamma_s x_2^G(\bar{e})_H - \alpha \Delta x_1 - w \right). \end{aligned}$$

This is to be compared with the net return on the outside option which is zero. Thus, the investor participates if and only if

$$1 - w + \gamma \left(E(x_1^G) + \gamma_s x_2^G(\bar{e})_H - \alpha \Delta x_1 - w \right) \geq 0.$$

It is clear that as long as $x_2^G(\bar{e})_H$ is high enough (that is, returns from hedge fund activism in the high state are high enough – for which there is considerable evidence) then this participation constraint is satisfied, without violating any of the equilibrium conditions.

It is also clear that, for a given $(E(x_1^G), \Delta x_1, x_2^G(\bar{e})_H, \gamma, w, \alpha)$ there is a threshold level of γ_s , say γ_s^{DO} , such that the investor participates, and thus a block is formed, only if $\gamma_s \geq \gamma_s^{\text{DO}}$. In other words, since debt overhang destroys the investor's payoffs in the second period should the low state arise, the investor only participates if he believes the probability of the high state to be high enough.

3.2 Interpreting the empirical evidence on procyclicality

Activist hedge funds file 13Ds when blocks cross a threshold level (5%) of ownership. Our model's literal prediction is that upon the realization of a low economic state in the second period, hedge funds will not exert effort at activism. In other words, any plans they may have declared in their initial 13D's at block formation will be abandoned. A direct test of this would require that we observe what happens after 13D's are filed if the economy sours.

In contrast, our motivating evidence has to do with new 13D filings, which are typically associated with block formation. Block formation requires that activist hedge funds are financed, and thus requires that investors agree to participate. As we note above, investors are only willing to participate if $\gamma_s \geq \gamma_s^{\text{DO}}$. Thus, if economic prospects are weak (γ_s is low), investors will not participate, no new blocks will be formed, and no new 13D's will be filed. Our motivating evidence on new 13D filings by activist hedge fund managers suggests that there are many 13D filings during equity market booms but few during busts. If the equity market is – as it is often claimed – a leading predictor of economic conditions, then our model predicts that the number of 13D filings will be higher during market booms than busts.

Needless to say, even if there was no debt overhang in the low state, just the fact that $x_2^G(\bar{e})_H > x_2^G(\bar{e})_L$ would imply that the investors' participation constraint is harder to satisfy for low γ_s . Indeed, there may be some different threshold γ_s^{NDO} such that even without debt overhang, there is the possibility that for $\gamma_s < \gamma_s^{\text{NDO}}$ no blocks will be formed. Of course, as long as $x_2^G(\bar{e})_L > 0$, it will always be the case that $\gamma_s^{\text{DO}} > \gamma_s^{\text{NDO}}$. Thus, competition for flow and debt overhang will exacerbate the sensitivity of 13D filings to market booms and busts.

4 Further Empirical Implications

In this section, we outline further empirical implications of our analysis. Some of these are new testable implications (sections 4.1 and 4.2), while others reconcile existing empirical evidence (section 4.3).

4.1 Optimism about the future, target leverage, and returns to target shares

Our model predicts a relationship between the degree of optimism about future economic conditions and the degree of target leverage and the time pattern of returns from activism. The amount of borrowing in the SEML is $\gamma_S x_2^G(\bar{e})_H - \Delta x_1$, while the face value of the debt is $\frac{{}_s x_2^G(\bar{e})_H - \Delta x_1}{s}$. Both quantities are increasing in γ_S . Thus, when γ_S is higher, hedge fund activists will impose greater leverage on their target firms in equilibrium. The reason is that better prospects for target firms (a result of increased γ_S) implies a higher debt capacity for the target, which in turn implies that more borrowing is necessary for good type funds to separate.

Implication 1 *In periods of greater optimism about the future state of the economy, hedge funds target firms will be more highly leveraged.*

While we are aware of no systematic empirical investigation of this question, it is interesting to note that, as hedge fund activism slowly resurfaced two years after the complete cessation caused by the 2008 stock market collapse, there is anecdotal evidence for a change in the tactics of activist hedge funds. According to *The Economist*, “Activists are toning down their attempts to get companies to take on more debt. Many were burned before, and are reluctant to put their hands back in the fire.”²² Interpreted through the lens of our model, this may simply be a case of lower market confidence about future prospects for the economy in 2010 than in the heady days of optimism in the years leading up to the financial crisis.

It is also worth mentioning that target debt has a higher face value in times of greater optimism about the future. So, if investment were of variable scale, there would be more debt overhang if economic conditions soured (i.e., more projects would be shut down).

Finally, optimism about future prospects also has implications for the time pattern of expected returns to target shareholders. The expected equilibrium payoff to target shareholders is $\gamma (x_1^G + \gamma_S x_2^G(\bar{e})_H - \Delta x_1)$ in the first period and $\gamma \gamma_S \left(x_2^G(\bar{e})_H - \frac{{}_s x_2^G(\bar{e})_H - \Delta x_1}{s} \right) = \gamma \Delta x_1$ in the second period. The likelihood of the good aggregate state, γ_S , enhances the

²² *The Economist*, “Shareholder activism: Ready, set, dough”, December 2, 2010.

first period payoffs without affecting the second period payoffs. This is because higher optimism about future prospects induces higher leverage for separation, moving payouts to equity holders in target firms forward in time.

Implication 2 *In periods of greater optimism about the future state of the economy, the returns to target firms' shareholders from hedge fund activism will be more front-loaded.*

This is another testable implication of our model. While we are aware of no empirical examination comparing the time profile of returns to target shareholders at different times, the evidence in Brav, Jiang, and Kim (2010) (see Table 4) suggests that in the 2001-2006 period – a time of significant optimism about economic prospects – the abnormal returns to target shareholders accrued in the early months of activist campaigns. This is consistent with Implication 2. In addition, Implication 2 may also suggest that activist hedge funds would be particularly attractive to impatient investors during periods of significant optimism about future prospects.

4.2 Payout enhancement vs Restructuring

Our model also relates the nature of ability differences within activist hedge funds to the leverage of their targets, providing another potential set of testable implications. Keeping Δx_1 large enough to satisfy the SEML conditions, it is clear that lower Δx_1 implies higher leverage for a given $x_2^G(\bar{e})_H - x_2^G(\bar{e})_L$. Δx_1 is a measure of managerial talent differences in combating the free cash flow problem. Thus, the less managerial talent matters in the short-run payout enhancement form of activism, the higher is leverage and the higher is the potential for debt overhang. To summarize:

Implication 3 *When talent differences across activists matter little for mitigating free cash flow problems, target leverage is higher.*

Excessive target leverage is what gives rise to procyclicality and thus shuts down restructuring in economic downturns. In turn, as ability differences in mitigating free cash flow problems become less important, a higher utilization of the target's debt capacity is required for separation. Thus, it is precisely when activist hedge funds are principally differentiated by restructuring ability that restructuring becomes less likely in downturns.

Ability differences in tackling free cash flow problems also affect the time pattern of expected returns to target shareholders.

Implication 4 *When talent differences across activists matter little for mitigating free cash flow problems, the returns to target firms' shareholders from hedge fund activism will be more front loaded.*

Again, the effect works through the amount of leverage. Lower talent differences in tackling free cash flow problems translate into higher leverage, which moves payoffs to target shareholders forward in time.

4.3 Do activists expropriate bondholders?

There is general agreement in the literature on the fact that – as in our model – hedge fund activism produces significant positive returns to target shareholders. However, the empirical literature is not unanimous on whether (some of) these gains derive from the expropriation of existing bondholders. At one end of the spectrum, Klein and Zur (2011) argue that hedge fund activism leads to an expropriation of existing bondholders, a conclusion shared – with caveats and qualifications – by Li and Xu (2010) and Sunder, Sunder, and Wongsunwai (2010). However, Brav, Jiang, Partnoy, and Thomas (2008) argue that expropriation of existing bondholders is unlikely to be a source of significant shareholder value because they find that returns to target shareholders are *higher* in companies which are previously *unlevered*.

Our core mechanism does not turn on the interaction between existing bondholders and shareholders. Indeed, since in our baseline model the representative target firm is unlevered, our baseline results are – by definition – silent on the issue of bondholder expropriation.²³ Rather, our theoretical results are founded on the less controversial claim that hedge funds increase the leverage and riskiness of the *firms* which they target. Thus, our results predict only that the overall leverage of the target firm will increase and that the target firm will be viewed as being more risky, and thus experience credit downgrades, both of which are generally agreed upon in the empirical literature. Leverage is “excessive” in the baseline model only in the sense that it destroys overall value, and thus effectively penalizes (given that all borrowing happens from new creditors) equity holders relative to a theoretical first best, absent the effect of competition for flows, which would deliver activist returns without generating debt overhang in the low state.

By adding risky long-term pre-existing debt to the representative target firm, our model provides a framework for interpreting the seemingly conflicting evidence in Brav, Jiang, Partnoy, and Thomas (2008) and Klein and Zur (2011). In particular, we show that in equilibrium: (i) existing creditors can be expropriated as a result of hedge fund activism and (ii) returns to equity holders as a result of hedge fund activism would have been higher in the absence of pre-existing leverage in the target firm.

Proposition 3 *Existing target leverage can reduce shareholder returns from activism even*

²³Equivalently, one could think of the representative target firm as having pre-existing riskless debt, where the cash flows generated without hedge fund activism (and unaffected by the presence of the activist) are just sufficient to pay off the pre-existing long-term debt.

when activism expropriates existing bondholders.

To see this, assume that the representative firm has some liquid assets of $Y_1 > 0$ in the first period. Unlike the pre-existing excess cash C , which is subject to a free cash flow problem and will be wasted by management unless paid out, these liquid assets Y_1 cannot be diverted. Thus, absent the presence of hedge fund activists, this Y_1 would be retained until the second period and available to pay pre-existing creditor claims (if any, otherwise it is paid out to equity holders). Suppose that, in addition, the baseline firm generates further revenues of Y_{2H} and Y_{2L} during the second period in the high and low states respectively, where $Y_{2H} > Y_{2L} = 0$. These second period revenues are produced regardless of the presence of an activist hedge fund. Accordingly, the second period cash flows from activism in the baseline model can be thought to be incremental to these revenues.

Now compare the unlevered version of the target firm to a – otherwise identical – target firm with pre-existing long-term leverage with face value K_2 such that

$$Y_{2H} + Y_1 = K_2 > Y_{2L} + Y_1.$$

Thus, existing long-term debt is risky: It defaults in the low state and is fully paid in the high state. Now suppose that the cash flows x_1 generated by hedge fund activists in the first period include the payout of Y_1 , i.e., activist hedge funds, acting on behalf of shareholders, liquidate the assets saved by the firm for future payments to bondholders. Thus, in the presence of hedge fund activists, the resources available to pay existing bondholders is $Y_{2H} - (0, K_2)$ in the high state and $Y_{2L} = 0$ in the low state. Finally, assume that $x_2^G(\bar{e})_H > K_2$.

Now, note that when debt overhang arises only in the low state, the debt capacity of the firm with a good type activist is

$$\widehat{PI}^G = \gamma_s(x_2^G(\bar{e})_H - (K_2 - Y_{2H})),$$

since part of the available cash flow goes to existing creditors. It is clear that

$$\widehat{PI}^G < \gamma_s(x_2^G(\bar{e})_H + Y_{2H}) = \widetilde{PI}^G,$$

where \widetilde{PI}^G is the modified pledgable income of the unlevered target firm, accounting for the extra available revenues of Y_{2H} . This then implies that the payout in the SEML in the first period will be smaller with existing debt than without:

$$\widehat{PI}^G + x_1^B < \widetilde{PI}^G + x_1^B.$$

The face value of debt in the levered target firm is $\frac{\widehat{PI}^G - \Delta x_1}{s}$, so that the second period cash

flow to equity holders in the levered target firm in the high state is

$$\begin{aligned}
& x_2^G(\bar{e})_H \frac{\widehat{PI}^G \Delta x_1}{\gamma_s} (K_2 \quad Y_{2H}) \\
= & x_2^G(\bar{e})_H \frac{\gamma_s (x_2^G(\bar{e})_H (K_2 \quad Y_{2H})) \Delta x_1}{\gamma_s} (K_2 \quad Y_{2H}) \\
= & \frac{\Delta x_1}{\gamma_s}.
\end{aligned}$$

For the target firm without leverage, the payoff to equity holders in the high state is

$$\begin{aligned}
& x_2^G(\bar{e})_H + Y_{2H} \frac{\widetilde{PI}^G \Delta x_1}{\gamma_s} \\
= & x_2^G(\bar{e})_H + Y_{2H} \frac{\gamma_s (x_2^G(\bar{e})_H + Y_{2H}) \Delta x_1}{\gamma_s} \\
= & \frac{\Delta x_1}{\gamma_s}.
\end{aligned}$$

Thus, when comparing the target firm with and without leverage, in the presence of activist hedge funds, we find that first period payoffs to equity holders are strictly lower for the target firm with leverage, whereas the second period payoffs are independent of existing target leverage. The reason is that, in our setting, the size of the cash flow to target equity holders in the first period is determined by the pledgable income of the firm generated from second period resources. Existing leverage reduces this pledgable income, and thus reduces the payout necessary for separation. Thus, in the presence of hedge fund activism, returns are lower to the target firm's shareholders when there is existing leverage as documented by Brav, Jiang, Partnoy, and Thomas (2008).

However, comparison of the target firm with leverage, with and without the presence of hedge fund activists suggest that – as Klein and Zur (2011) find – hedge fund activists do expropriate existing creditors. In the target with leverage, in the absence of the hedge fund activists, creditors would have expected to receive K_2 in the second period in the high state and $Y_1 > 0$ in the second period in the low state. In the presence of hedge fund activists, the same creditors can expect to receive K_2 in the second period in the high state but nothing in the second period in the low state.

Thus, though our core mechanism does not require any view on the extent to which hedge fund activists expropriate existing bondholders in target firms, our model nevertheless provides a simple, stylized, framework that helps to resolve some of the contradictory empirical evidence in Brav, Jiang, Partnoy, and Thomas (2008) and Klein and Zur (2011).

5 Discussion

In this section, we aim to answer a set of questions that may arise about our baseline analysis. First, we show that there are no pooling equilibria. Second, we argue that our core results are robust to whether hedge funds subject their target firms to leverage increases (as in the baseline model) or simply to reductions in spare cash (in firms with pre-existing leverage).

5.1 Other equilibria

We have focussed on separating equilibria in the baseline analysis. Since excessive leverage arises as a result of signalling by good type hedge funds – a feature of separating equilibria only – the reader may be concerned about whether pooling equilibria with less undesirable characteristics may exist.

Proposition 4 *There exists no pooling equilibrium.*

A pooling equilibrium can only exist if the first period payout D_1 does not reveal the hedge fund type to the investors. This requires that bad types borrow Δx_1 more than the good types. Since bad types do not generate any pledgeable income, they can at best borrow the same amount as good types borrow. This, in turn, prevents them from offering the same cash payout. That is, mimicking the good types in the hedge fund/investor market forces bad types to reveal their type in the credit market, or conversely, mimicking the good types in the credit market leads to revelation in the hedge fund/investor market.

5.2 Excessive payout

In the baseline model, the procyclicality of hedge fund activism arises from the fact that – in an attempt to signal their ability – hedge funds increase the leverage of their target firms to the point where debt overhang results in the low state. Would our core results hold in an environment in which hedge funds can only reduce liquid assets on the balance sheets of target firms rather than increase their leverage? In other words, can signalling generated by payouts sourced from pre-existing liquid assets lead to the same conclusions as payouts generated by enhanced leverage? In this section, we argue that this is the case, because – for targets with existing debt – a reduction in liquid assets increases the effective leverage. When payouts are motivated by signalling purposes they can well be excessive in the sense that they lead to debt overhang in the low state.

In order to see this, consider the following variation of the model. As in section 4.3, we assume that the target firm has non-divertible pre-existing liquid assets $Y_1 > 0$ in the first

period (in addition to the divertible cash C) and pre-existing long-term leverage with face value K_2 where $K_2 > Y_1 > \Delta x_1$.

Activist hedge funds can salvage excess cash of x_1 and can pay it out at the end of the first period. Instead of using leverage, they may augment the payment by tapping into liquid assets Y_1 . As in the baseline model investors only observe total cash paid out but not its components x_1 and Y_1 . In the absence of a hedge fund activists, the liquid assets Y_1 would be retained until the end and available to pay pre-existing creditor claims.

Proposition 5 *High payout to retain investor flow may induce debt overhang even without new target firm borrowing.*

The intuition is that – as before – good type hedge funds must make a high enough payout at the end of the first period to prevent mimicking by bad types. Since either type can tap into the liquid assets, the good type must pay out at least $x_1^B + Y_1$ to separate. But, then, for firms with a sufficient amount of pre-existing leverage, debt overhang will arise in the low state.

6 Conclusions

We propose a simple benchmark model of hedge fund activism in the presence of competition for flows. Our self-contained story helps to explain the observed procyclicality of hedge fund activism and reconciles it with the documented effect of activist hedge funds on the net leverage of their target firms. In addition, we generate some testable implications and help to resolve some ostensibly contradictory empirical evidence on the wealth effects of hedge fund activism on different stakeholders in target firms. Our paper highlights how the agency frictions arising out of the delegation of portfolio management can affect the nature of blockholder monitoring and, more broadly, may help to enrich our understanding of corporate governance issues.

7 Appendix

Lemma 1 *If $\mu_1^*(D_1) = 0$, then $a_1^*(D_1) = F$.*

Proof: From Assumption 3 ($x_2^B(\bar{e})_s < \bar{e}$ for all s) it follows that $e(B) = 0$ and hence $x_2^B(e(B))_s = 0$ for all s (by Assumption 1 $x_2(0)_s = 0$ for all θ, s). Thus the investor's payoff from $a_1 = R$ is w smaller than his payoff from $a_1 = F$. Thus $a_1^* = F$. ■

Lemma 2 If $D_1^*(G) = D_1^*(B)$, then $D_1^*(B) = 0$.

Proof: If $D_1^*(G) = D_1^*(B)$, then $\mu_1^*(D_1^*(B)) = 0$. Thus, by Lemma 1, $a_1^*(D_1^*(B)) = F$. Therefore, $m^*(B) = 0$ and $L^*(B) = 0$ since $m > 0$ or $L > 0$ creates an infinitesimal cost for the fund. ■

Lemma 3 If $D_1^*(G) = D_1^*(B)$, then $\mu_C^*(L) = 1$ for $L \in (0, PI^G]$.

Proof: The equilibrium payout $D_1^*(G)$ can be represented as a map $f : (x_1^G, x_1^B) \rightarrow \mathbb{R}_+$. The required borrowing is therefore $L^*(G) = f(x_1^G, x_1^B) - x_1^G$. Except in the special case in which $f(x_1^G, x_1^B) - x_1^G = k$ for some $k \in \mathbb{R}$ – which by definition can only arise in equilibria in which creditors commit/coordinate to lend only specific amounts and are thus ruled out in our analysis – creditors cannot compute $L^*(G)$ before the loan request is made because they do not know x_1^G . However, they know, by Lemma 2 that $L^*(B) = 0$. Thus, given that x_1^G can take values as low as 0, any requested amount $L \in (0, PI^G]$ is consistent with $\mu_C^*(L) = 1$. ■

Proof of Proposition 1: From Lemma 3 we know that in an equilibrium with $D_1^*(G) = D_1^*(B)$, $\mu_C^*(L) = 1$ for $L \in (0, PI^G]$. Thus creditors are happy to lend up to PI^G . Suppose that $D_1^*(G) < x_1^B + PI^G$. Then, type B can deviate and borrow $D_1^*(G) - x_1^B < PI^G$ and successfully imitate type G violating $D_1^*(G) = D_1^*(B)$. ■

Proof of Proposition 2: The proof proceeds in five interlinked steps.

Step 1: The range of face value of debt for debt overhang only in state L

In state L , effort pays $\alpha(x_2^G(\bar{e})_L - K) - \bar{e}$. No effort pays 0. Thus, effort is exerted if $\alpha(x_2^G(\bar{e})_L - K) - \bar{e} > 0$. This implies that, as long as face value of debt $K < \underline{K} := x_2^G(\bar{e})_L - \frac{\bar{e}}{\alpha}$ there is debt overhang in state L .

In state H , effort pays $\alpha(x_2^G(\bar{e})_H - K) - \bar{e}$. No effort pays 0. Thus, effort is exerted if $\alpha(x_2^G(\bar{e})_H - K) - \bar{e} > 0$. This implies that, as long as $K < \bar{K} := x_2^G(\bar{e})_H - \frac{\bar{e}}{\alpha}$ there is no debt overhang in state H .

Step 2: $t=1$ cash flow and associated face value if debt overhang arises only in state L .

When debt overhang arises only in state L , pledgable income of a firm with a good type hedge fund blockholder is $PI^G = \gamma_S x_2^G(\bar{e})_H$. By Proposition 1 separation requires a cash payment of market value of debt of $x_1^B + \gamma_S x_2^G(\bar{e})_H$. The good hedge fund thus borrows $x_1^B + \gamma_S x_2^G(\bar{e})_H - x_1^G = \gamma_S x_2^G(\bar{e})_H - \Delta x_1$. When debt overhang arises only in state L , the face value associated with such borrowing is $\frac{\gamma_S x_2^G(\bar{e})_H - \Delta x_1}{s}$. Thus, for consistency, we need $\frac{\gamma_S x_2^G(\bar{e})_H - \Delta x_1}{s} \in (K, \bar{K})$.

Step 3: Conditions on parameters consistent with debt overhang only in state L.

Putting together Steps 1 and 2 gives us the following. Debt overhang in state L implies that:

$$\begin{aligned} \frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s} &= x_2^G(\bar{e})_L - \frac{\bar{e}}{\alpha}, \\ \text{i.e., } x_2^G(\bar{e})_H - x_2^G(\bar{e})_L &= \frac{\Delta x_1}{\gamma_s} - \frac{\bar{e}}{\alpha}. \end{aligned} \quad (1)$$

No debt overhang in state H implies that:

$$\begin{aligned} \frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s} &< x_2^G(\bar{e})_H - \frac{\bar{e}}{\alpha}, \\ \text{i.e., } \frac{\Delta x_1}{\gamma_s} &> \frac{\bar{e}}{\alpha}. \end{aligned} \quad (2)$$

Step 4: Endogenous replacement

We must ensure that if the type G hedge fund separates the investor retains. Since w paid at $t = 1$ is sunk, the investor can retain the good fund for payoff:

$$\begin{aligned} &(x_1^G + \gamma_s x_2^G(\bar{e})_H - \Delta x_1) + \\ &\gamma_s \left((1 - \alpha) \left(x_2^G(\bar{e})_H - \frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s} \right) \right) = w. \end{aligned}$$

Or fire for a payoff:

$$x_1^G + \gamma_s x_2^G(\bar{e})_H - \Delta x_1.$$

For retention:

$$(1 - \alpha)\Delta x_1 - w = 0. \quad (3)$$

Step 5: Rule out separation without debt overhang.

Is debt overhang necessary for separation? Under the same parameters, could separation be achieved without debt overhang in state L ? We conclude the proof by examining this question.

No debt overhang in state L implies that effort is exerted in both states and the pledgable income of the good type is $PI^G = \gamma_s x_2^G(\bar{e})_H + (1 - \gamma_s) x_2^G(\bar{e})_L$. For separation, the good type needs to borrow $\Delta x_1 + \gamma_s x_2^G(\bar{e})_H + (1 - \gamma_s) x_2^G(\bar{e})_L$. Since there is no default, the face of debt is $\Delta x_1 + \gamma_s x_2^G(\bar{e})_H + (1 - \gamma_s) x_2^G(\bar{e})_L$. No debt overhang in state L then implies that $\Delta x_1 + \gamma_s x_2^G(\bar{e})_H + (1 - \gamma_s) x_2^G(\bar{e})_L < x_2^G(\bar{e})_L - \bar{e}/\alpha$, which is equivalent to

$$x_2^G(\bar{e})_H - x_2^G(\bar{e})_L < \frac{\Delta x_1}{\gamma_s} - \frac{1}{\gamma_s} \frac{\bar{e}}{\alpha}.$$

Since $\Delta x_1/\gamma_s - \bar{e}/\gamma_s \alpha < \Delta x_1/\gamma_s - \bar{e}/\alpha$, this is inconsistent with (1). This concludes the proof. ■

Proof of Proposition 4: In a pooling equilibrium, both types have to borrow and the break-even constraint of the creditor implies that the support of $D \in [a, b]$ is bounded, with $a > 0$ and $b = PI^P < \infty$ denotes the debt capacity when both types borrow. Given that the bad type has to borrow always Δx_1 more, the good type can never borrow $D \in [b - \Delta x_1, b]$. To avoid revelation, the bad type can then also not borrow $D \in [b - \Delta x_1, b]$. But, this, in turn, means that the good type can never borrow $D \in [b - 2\Delta x_1, b]$. Further iterations of the argument rules out any pooling equilibrium with leverage. ■

Proof of Proposition 5:

To separate from the bad type the good type must pay out $D_1 = x_1^B + Y_1$. Consequently, the good type can retain liquid assets amounting to no more than Δx_1 at the end of the first period.

Parallel to the proof of Proposition 2, we now outline the conditions for debt overhang in the low state only. In state L , effort pays $\alpha (x_2^G(\bar{e})_L - (K_2 - \Delta x_1)) - \bar{e}$. No effort pays 0. Thus, as long as $K_2 - \Delta x_1 < \underline{K}^N := x_2^G(\bar{e})_L - \bar{e}$ there is debt overhang in state L . Similarly, effort is exerted in state H if $\alpha (x_2^G(\bar{e})_H - (K_2 - \Delta x_1)) - \bar{e} > 0$. This implies that, as long as $K_2 - \Delta x_1 < \bar{K}^N := x_2^G(\bar{e})_H - \bar{e}$ there is no debt overhang in state H . Furthermore, debt overhang arises in state L and is attributable to excessive payout if $K_2 - \Delta x_1 > \underline{K}^N > K_2 - Y_1$.

Clearly, for a given $\Delta x_1 > 0$, there exist parameter values K_2, Y_1 such that these conditions are satisfied. Simply select $K_2 \in (\underline{K}^N + \Delta x_1, \bar{K}^N + \Delta x_1)$ and $Y_1 > K_2 - \underline{K}^N > \Delta x_1$.

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