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Mike Burkart and Amil Dasgupta

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Mike Burkart, Stockholm School of Economics, ECGI, FMG and CEPR
Amil Dasgupta, London School of Economics and CEPR

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Centre for Economic Policy Research
77 Bastwick Street, London EC1V 3PZ, UK
Tel: (44 20) 7183 8801, Fax: (44 20) 7183 8820
Email: cepr@cepr.org, Website: www.cepr.org

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ABSTRACT

Why is hedge fund activism procyclical?*

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.

JEL Classification: G23 and G34
Keywords: career concerns, corporate governance, hedge funds and shareholder activism

Mike Burkart
Department of Finance
Stockholm School of Economics
Sveavägen 65, Box 6501
SE-113 83 Stockholm
SWEDEN

Email: mike.burkart@hhs.se

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Amil Dasgupta
Department of Finance
London School of Economics
Houghton Street
London WC2A 2AE
UK

Email: a.dasgupta@lse.ac.uk

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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), Greenwood and Schor (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

[1] Systematic 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.

[3] According 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.

[6] Examples 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.

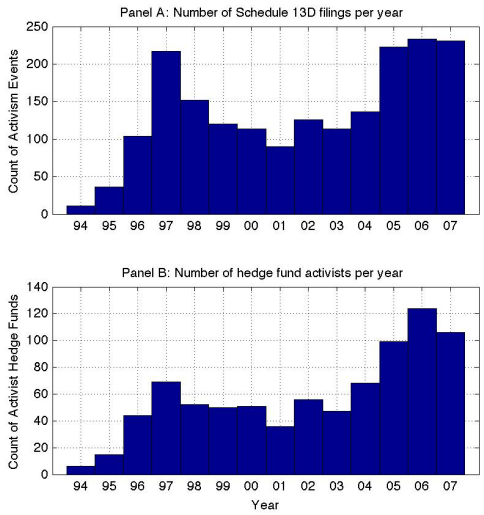

Figure 1: These figures are provided by Alon Brav, and are based on an updated sample (1994-2007) using the same data collection procedure and estimation methods as in Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, and Kim (2010). For more information please see http://faculty.fuqua.duke.edu/∼brav/HFactivism_March_2012.pdf.

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), Clifford (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

[8] While 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.

maturities, while 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).

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. *The Economist*, April 8, 2009).[10] Further, since one of the commonly declared objectives

[9] More 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.

[10] It is worth noting that an explanation based upon idiosyncratic shocks is hard to square with patterns

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 identify slack and pay out excess cash. We refer to this form of activism as payout-enhancement. 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 payout enhancement and restructuring. First, the payout enhancement from the target firm does not need to be limited to cash actually on the balance sheet of the firm, but can be enhanced by leveraging it.[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 slack 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 are higher when investment opportunities are in plenty, or because the likelihood of finding merger partners are higher in

related to the business cycle.

[11] Brav, 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.

[12] While 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 5.3, 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.

boom times.

Hedge funds differ in their ability as activists: Good hedge funds are better at both payout-enhancement and 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 payout-enhancement, 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 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 imposed on the firm by rational credit markets – 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 payout enhancement, and returns to activism must be sufficiently higher in the good state than in the bad state.

In addition to this core result, 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 at 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 talent 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 *un*levered. 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.

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. 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 procylicality 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 $t = 1, 2$. There are three sets of actors in our model. First, we consider *hedge funds* (HF) which acquire stakes in firms ("targets") 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, we consider *creditors*

who may lend to firms targeted by hedge funds. All actors are rational and risk-neutral.[13] For simplicity, we ignore discounting.

To be specific, consider a continuum of identical firms and a continuum (of equal measure) of ex ante identical hedge funds. Each hedge fund enters at $t = 1$ having used their investors' capital to acquire a stake in a target firm, i.e. blocks in firms are formed at some unmodelled period "$t = 0$".[14] The initial match between firms and funds is random. Hedge fund activism potentially occurs during $t = 1, 2$ and firms are liquidated at $t = 2$. Each hedge fund is financed by a continuum of identical investors and each target firm can borrow from a continuum of deep pocketed creditors.

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

The first – short-term – form of activism involves disbursing cash from the firm to equity holders. Such disbursements can, in principle, be generated by identifying excess cash or generating efficiency enhancements that free up resources. Of course, in addition, disbursements can be generated by leveraging the target firm. We assume that hedge funds differ in their capability to generate cash for disbursement *without* resorting to leveraging the target. In particular, we assume that during $t = 1$, the cash flow potentially available for disbursement *without leverage* is x_1^θ if a hedge fund of type θ is a blockholder in the target firm. We assume that x_1^G is distributed according to a cumulative distribution function F on the domain $(0, \bar{x})$ and $x_1^B = x_1^G - \Delta x_1$, where $\Delta x_1 > 0$. The cash available for $t = 1$ disbursement can be increased by leveraging the target. Identifying slack or leveraging the target require an infinitesimal effort on the part of the fund.

The second – long-term – form of activism occurs during period $t = 2$ and can be interpreted to be 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 blockholder. Second, the cash flows generated by such activism depend on the aggregate state of the economy/market: In high states, cash flows arising from such long-term activism are higher than in the low state. This could be understood to mean that in boom times business improvements generate higher returns to shareholders. Alternatively, if such activism is thought to represent merging the

[13] As 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.

[14] We ignore the investors' participation constraint at this stage. Such participation decisions are analyzed in section 5.2.

target, then the state dependence could be understood to mean that boom times are characterized by more potential buyers, generating higher cash flows for target shareholders. In particular, we assume the following: During $t = 2$: hedge funds can generate cash flows for target shareholders if they exert effort $e \in \{0, \bar{e}\}$ at private cost e. There can be two potential aggregate states at $t = 2 : s \in \{H, L\}$, with $\Pr(H) = \gamma_s$. The realized aggregate state is publicly revealed at the beginning of $t = 2$. Cash flows generated at $t = 2$ are state, type, and effort dependent, which we denote as follows: $x_2^{\theta}(e)_s$. The state, type, and effort dependence is captured in the following assumptions:

1. No effort generates no returns, regardless of the state: $x_2^{\theta}(0)_s = 0$ for all $\theta, s.$;
2. High effort generates higher cash flows for the good type fund in the high state than in the low state: $x_2^G(\bar{e})_H > x_2^G(\bar{e})_L$;
3. The cash flow generated by the bad type, regardless of the state, is not high enough to offset the effort cost: $x_2^B(\bar{e})_s < \bar{e}$ for all s.

Our assumptions about activism above are well-supported by the data. Based on 13D filings, Brav, Jiang, and Kim (2010) classify the intent of hedge fund activists into five categories: (i) "general undervaluation", (ii) "capital structure", (iii) "business strategy", (iv) "sale of the target company", and (v) "governance". They describe category (ii) as "events in which the hedge fund proposes changes geared towards the reduction of excess cash, an increase in firm leverage, or higher payout to shareholders." This category, which represents 17.4% of their sample (which incorporates and extends the sample in Brav, Jiang, Partnoy, and Thomas (2008)), is captured by the first, short-term, form of activism in the model.[15] Categories (iii) and (iv) which represent, respectively, 23% and 20% of the sample, are captured by the second, longer-term, form of activism in the model. Needless to say, our model also requires that a given hedge fund potentially engages in more than one form of activism. There is also persuasive evidence for this: In Brav, Jiang, and Kim (2010) sample, specific declarations of intent (categories (ii)-(v)) constituted around 52% of the sample, but the sum of the percentages of categories (ii)-(v) sum to nearly 85% (see Table 1). Thus, *on average*, hedge funds state around two distinct activist goals per 13D declaration.

In the remainder of the model description we outline our informational assumptions. In our signalling model, hedge funds are the most informed party. At the beginning of $t = 1$ hedge funds learn the realized value of x_1^B, x_1^G and also their own type $\theta = G, B$. Other

[15] It is also reasonable to model dividend 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).

players have less information and there are differences in information amongst them. Hedge fund investors know more about their hedge funds than creditors who, in turn, know more about the target firm and its borrowing. We specify our assumptions in full below.

First, we assume that any cash flow paid out by any hedge fund at any t is observed by its investors and the (potential) creditors of its target firm at the end of t.[16] Next we turn to hedge fund investors.

At the beginning of $t = 1$ hedge funds investors also learn the realized value of x_1^B, x_1^G. They do not observe the types of their hedge funds directly, but can make inferences based on the cash paid out by their funds. Hedge funds are opaque: While hedge fund investors observe the cash flow paid out by the fund at $t = 1$ they do not know how much of this cash flow is obtained as the result of leveraging the target. This assumption is intended to capture the fact that hedge fund investors know relatively little about hedge fund targets: In reality, hedge funds own several firms in their activist portfolio, and do not tell investors what they are doing in each one (at least not in real time). It would be difficult for investors to directly observe bank loans to the target, the draw-down of credit lines, lengthening of trade credit terms etc. Finally, we turn to creditors.

Unlike hedge fund investors, creditors do not know the realized values of x_1^G, x_1^B, but they observe the amount borrowed by the target firm they lend to at $t = 1$. They set the $t = 2$ face value to break even, making all relevant equilibrium inferences. This assumption is intended to capture the fact that creditors lend to a target firm, and do not know much about activist hedge funds owners per se, but – when someone borrows from them against future income, they (a) know how much they are lending, and (b) can compute the debt capacity.

To conclude the description of the model, we now specify the payoffs of the hedge funds and the investors' potential actions. 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 $\alpha \max(\text{equity-cash-flows}_{t=2}, 0)$ for some $\alpha \in (0, 1)$ and is only paid in the second period.[17] This implies that hedge funds that are retained by their investors into $t = 2$ get a share of the liquidating cash flows to equity holders. Focussing on the second-period carry is clearly a simplification. It is worth noting that we could have carried out the analysis to allow hedge funds to get share of cash flows to equity in each period t. The resulting changes would simply complicate the algebra without changing qualitative results. Focussing exclusively on the $t = 2$ carry reduces incentives for overleveraging (as will be clear later). Thus, in this

[16] These cash flows do not literally have to paid out to hedge fund investors, but can also be reinvested by hedge funds in other targets on behalf of investors.

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

sense, this simplification works *against* us.[18]

Hedge fund investors observe the cash flows generated by their hedge funds at $t = 1$, and can choose whether to retain the fund or not. The retention decision is made at the end of $t = 1$. If not retained, the hedge fund is shut down, and all future cash flow is destroyed.

3 Procyclical Activism in Equilibrium

We proceed via a set of preliminary results leading up to our main result. 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").

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 *If the investor learns upon observing the $t = 1$ cash flows that the fund is bad, he should fire the fund.*

Proof: This follows from the assumptions that (i) $x_2^{\theta}(0)_s = 0$ for all θ, s and (ii) $x_2^{B}(\bar{e})_s < \bar{e}$ for all s. (ii) means that the bad fund will exert no effort at $t = 2$ if retained, and (i) means that no cash flows will be produced at $t = 2$ as a result. But, if the investor retains the fund, he has to pay w at the beginning of $t = 2$. Thus, he will fire.■

We next show that, given Lemma 1, there is no incentive, in any separating equilibrium, for the bad funds to engage in activism even at $t = 1$.

Lemma 2 *In any separating equilibrium, the bad fund will not produce any cash flows at $t = 1$.*

Proof: In a separating equilibrium the bad fund is identified as being bad, and by the previous lemma is fired at the end of $t = 1$. The w he got at the beginning of $t = 1$ is sunk,

[18] The 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.

and since he gets fired he receives no further payoffs. Thus, he weakly prefers not to produce any cash flow.■

Next, given Lemma 2, we show that it follows that there is no borrowing by bad type funds at $t = 1$. Thus, any borrowing in a separating equilibrium must arise from firm in which a good type activist holds a block:

Lemma 3 *In any separating equilibrium with leverage, the only fund borrowing is a good fund.*

Proof: By the previous lemma, the bad fund does not produce cash flows, gets fired, and receives no reward other than the sunk w at the beginning of $t = 1$, so there is no benefit to his borrowing.■

We show that these results, taken together with the assumption that creditors do not observe x_1^B and x_1^G, sharply restrict the set of separating equilbria with leverage. In particular, while creditors know which equilibrium they are in, and thus the cash-payout at $t = 1$ that distinguishes good from bad hedge funds, not knowing x_1^B and x_1^G they cannot infer how much any given type would need to borrow to reach the target. Now, given Lemma 3, creditors rationally attribute *any* amount borrowed to a good type hedge fund, and thus offer the corresponding borrowing terms. 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.

Define by PI^θ the total pledgable income of type θ. That is, it is the maximum amount that the rational creditor is willing to lend, if he believes that type θ is borrowing. Clearly, $PI^B = 0$ and $PI^G > 0$.

Proposition 1 *In any separating equilibrium with leverage the good type must pay out at least* $x_1^B + PI^G$ *at* $t = 1$.

Proof: A separating equilibrium is characterized by a cash flow paid out at the end of $t = 1$ which distinguishes the good from the bad type. Though the creditor knows the equilibrium he is in, and thus this total cash flow, he does not know x_1^G, x_1^B, and thus cannot infer how much the good type would want to borrow from him in equilibrium. Thus, he offers type G borrowing terms to any amount that any fund wishes to borrow from him. This means that the bad fund can always imitate the good fund unless the good fund pays out at least $x_1^B + PI^G$, the bad fund will always be able to imitate him, destroying separation.■

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 flows by hedge funds, 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 which delivers separation with as little leverage as possible as the *maximal effort separating equilibrium with leverage* (MESEL).

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

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

In state H, effort pays $\alpha\left(x_2^G(\bar{e})_H - K\right) - \bar{e}$. No effort pays 0. Thus, effort is exerted if $\alpha\left(x_2^G(\bar{e})_H - K\right) - \bar{e} > 0$. 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 $\frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s}$. Thus, for consistency, we need $\frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s} \in \left(\underline{K}, \bar{K}\right)$.

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:

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

No debt overhang in state H implies that:

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

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:

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

Or fire for a payoff:

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

For retention:

$$(1-\alpha)\Delta x_1 - w \geq 0. \tag{3}$$

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.■

The intuition behind our result is as follows. Hedge funds are engaged in a tournament for investor capital. Bad funds wants to pretend to be a good type to retain investor capital and thus rents from fund management for another period. Good funds want to separate from bad funds to be identified immediately as being good. At $t = 1$, faced with rational credit markets, the hedge funds 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 hedge fund, the bad hedge 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 (which is purely a separation device and serves no socially beneficial purpose in our model) generates debt overhang and eliminates incentives of blockholders to exert effort in the low continuation state. Next we turn to interpreting and providing intuition for 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 continuation 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 payout enhancement; and (ii) Given such ability differences, returns from activist effort are sufficiently higher in the high continuation state in comparison to the low continuation state. In what follows, we provide an intuitive discussion of the role played by each of these restrictions.

The first parameter restriction requires that differences in payout enhancement ability between good and bad type hedge funds, Δx_1, is large enough. To appreciate the role of this restriction, note that if borrowing is too high at $t = 1$ debt overhang will arise in both states. The level of borrowing required to separate is inversely linked to the differences in $t = 1$ 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 continuation 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 state H and not in state L. This requires that returns from effort to hedge funds must be sufficiently higher (given the debt level, determined by Δx_1) in state H than in state L. That, in turn, is guaranteed when $x_2^G(\bar{e})_H$ is large relative to $x_2^G(\bar{e})_L$.

4 Further Empirical Implications

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

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

Our model predicts an interesting 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 MESEL is $\gamma_s x_2^G\left(\bar{e}\right)_H - \Delta x_1$, while the face value of the debt is $\frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s}$. 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 hedge funds to separate. To summarize:

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 collapse in the stock market, 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."[19] 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 $\gamma_\theta\left(x_1^G + \gamma_s x_2^G\left(\bar{e}\right)_H - \Delta x_1\right)$ at $t=1$ and $\gamma_\theta\gamma_s\left(x_2^G\left(\bar{e}\right)_H - \frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s}\right) = \gamma_\theta \Delta x_1$

[19] *The Economist*, "Shareholder activism: Ready, set dough", December 2, 2010.

at $t = 2$. The likelihood of the good aggregate state, γ_s, enhances the $t = 1$ payoffs to target shareholders without affecting the $t = 2$. This is because higher optimism about future prospects induces higher leverage for separation, moving payouts to equity holders in target firms forward in time. To summarize:

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 MESEL 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 payout enhancement. 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 payout enhancement, 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 payout enhancement 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 payout enhancement also affect the time-pattern of expected returns to target shareholders.

Implication 4 *When talent differences across activists matter little for payout enhancement, 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 payout enhancement translate into higher leverage, which moves payoffs to target shareholders forward in time.

4.3 Returns to target shareholders and bondholders: Interpreting the empirical evidence

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 to shareholders 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 *un*levered.

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.[20] 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

[20] Equivalently, 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.

the absence of pre-existing leverage in the target firm. To summarize:

Proposition 3 *Existing target leverage can reduce shareholder returns from activism even when activism expropriates existing bondholders.*

To see this, assume that the representative firm has pre-existing free cash on hand of $\widehat{c}_1 > 0$ which – absent the presence of hedge fund activists – would be retained until $t = 2$ 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 cash of $\widehat{c}_{2H}$ and $\widehat{c}_{2L}$ at $t = 2$ in states H and L respectively, where $\widehat{c}_{2H} > \widehat{c}_{2L} = 0$. These cash flows at $t = 2$ are produced regardless of the presence of an activist hedge fund. Accordingly, the $t = 2$ cash flows from activism in the baseline model can be thought to be incremental to these cash flows. Finally, cash amounts $\widehat{c}_1, \widehat{c}_{2H}$, and $\widehat{c}_{2L}$ are all common knowledge.

Now compare the unlevered version of the representative target firm to the – otherwise identical – target firm with pre-existing long-term leverage of D_{LT} such that

$$\widehat{c}_{2H} + \widehat{c}_1 = D_{LT} > \widehat{c}_{2L} + \widehat{c}_1.$$

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^θ generated by hedge fund activists at $t = 1$ include the payout of $\widehat{c}_1$, i.e., activist hedge funds, acting on behalf of shareholders, pay out excess cash saved by the firm for future payments to bondholders. Thus, in the presence of hedge fund activists, the cash available to pay existing bondholders is $\widehat{c}_{2H} \in (0, D_{LT})$ in state H and $\widehat{c}_{2L} = 0$ in state L. Finally, assume that $x_2^G\left(\overline{e}\right)_H > D_{LT}$.

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

$$\widehat{PI}^G = \gamma_s \left(x_2^G\left(\overline{e}\right)_H - \left(D_{LT} - \widehat{c}_{2H}\right)\right),$$

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

$$\widehat{PI}^G < \gamma_s \left(x_2^G\left(\overline{e}\right)_H + \widehat{c}_{2H}\right) = \widetilde{PI}^G,$$

where $\widetilde{PI}^G$ is the modified pledgable income of the unlevered representative target firm, accounting for the extra available cash of $\widehat{c}_{2H}$, and also for the fact that with the hedge fund activist present, the existing $\widehat{c}_1$ is no longer available at $t = 2$. This then implies that the payout in the MESEL at $t = 1$ 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 representative target firm is $\frac{\widehat{PI}^G - \Delta x_1}{\gamma_s}$, so that the $t = 2$ cash flow to equity holders in the levered representative target firm in state H is

$$\begin{aligned} & x_2^G(\bar{e})_H - \frac{\widehat{PI}^G - \Delta x_1}{\gamma_s} - (D_{LT} - \widehat{c}_{2H}) \\ = \; & x_2^G(\bar{e})_H - \frac{\gamma_s\left(x_2^G(\bar{e})_H - (D_{LT} - \widehat{c}_{2H})\right) - \Delta x_1}{\gamma_s} - (D_{LT} - \widehat{c}_{2H}) \\ = \; & \frac{\Delta x_1}{\gamma_s}. \end{aligned}$$

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

$$\begin{aligned} & x_2^G(\bar{e})_H + \widehat{c}_{2H} - \frac{\widetilde{PI}^G - \Delta x_1}{\gamma_s} \\ = \; & x_2^G(\bar{e})_H + \widehat{c}_{2H} - \frac{\gamma_s\left(x_2^G(\bar{e})_H + \widehat{c}_{2H}\right) - \Delta x_1}{\gamma_s} \\ = \; & \frac{\Delta x_1}{\gamma_s}. \end{aligned}$$

Thus, when comparing the representative target firm with and without leverage, in the presence of activist hedge funds, we find that $t = 1$ payoffs to equity holders are strictly lower for the target firm with leverage, whereas the $t = 2$ payoffs are independent of existing target leverage. The reason is that, in our setting, the size of the cash flow to target equity holders at $t = 1$ is determined by the pledgable income of the firm at $t = 2$. 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 representative 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 representative target with leverage, in the absence of the hedge fund activists, creditors would have expected to receive D_{LT} at $t = 2$ in state H and $\widehat{c}_1 > 0$ at $t = 2$ in state L. In the presence of hedge fund activists, the same creditors can expect to receive D_{LT} at $t = 2$ in state H but nothing at $t = 2$ in state L.

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 delineate conditions under which the investors' ex ante participation constraint is satisfied, so that delegation is optimal in spite of the perverse actions undertaken by hedge funds in an attempt to signal their ability to investors. Finally, 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 discerning reader may be concerned about whether pooling equilibria with less undesirable characteristics may exit. We show that there are no pooling equilibria our model:

Proposition 4 *There exists no pooling equilibrium.*

Proof: 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 $b \leq PI^P < \infty$ 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.■

A pooling equilibrium can only exist if the $t = 1$ payout 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 Investors participation decision

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 at $t = 0$ 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 then pay him a fee of w for the first period. If the investor employs a hedge fund, then (since all hedge funds of all types participate) with probability γ_θ he is matched with a good fund. The good fund pays out $x_1^G + \gamma_s x_2^G\left(\bar{e}\right)_H - \Delta x_1$ at $t=1$, and then in $t=2$ the investor always pays w but the hedge fund pays back only in the high aggregate state, so the investor receives in expectation $\gamma_s\left((1-\alpha)\left(x_2^G\left(\bar{e}\right)_H - \frac{\gamma_s x_2^G(\bar{e})_H - \Delta x_1}{\gamma_s}\right)\right) = \gamma_s(1-\alpha)\frac{\Delta x_1}{\gamma_s}$. Instead, with probability $1-\gamma_\theta$ he is matched with a bad fund. The bad fund pays out nothing at $t=1$ and is fired, and there are no further cash flows. Thus the investor's total cash flows are:

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

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

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

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

5.3 Excess cash payout without new debt

In the baseline model, the procyclicality of hedge fund activism arose from the fact that – in an attempt to signal their ability – hedge funds increased the leverage of their target firms to the point where debt overhang was generated in the low aggregate state. Would our core results hold in an environment in which hedge funds principally reduced spare cash on the balance sheets of firms rather than increased their leverage? In other words, can signalling generated by payouts sourced from pre-existing cash *without* additional leverage 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 leverage – a reduction in cash increases the effective leverage. When such cash reduction is motivated by signalling purposes, the reductions can well be excessive in the sense that they generate debt overhang in the low aggregate state.

Proposition 5 *High dividend payouts to retain investor flow may induce procyclicality of hedge fund activism.*

Here, we briefly sketch the argument. Suppose that the representative target firm has pre-existing long-term leverage of D_{LT} and pre-existing free cash on hand of $\widehat{c}_1$ with $\widehat{c}_1 > \Delta x_1 > 0$. As before, activist hedge funds can generate additional type-dependent cash flow of x_1^θ and can pay out cash from the firm at $t = 1$ for signalling purposes. As in the baseline model, investors only observe total cash paid out, but not its composition, i.e., not how much of the payout came from pre-existing free cash. In other words, investors do not observe how much of $\widehat{c}_1$ the firm retains. Imagine that, for some exogenous reason, the firm/hedge fund cannot take on new debt.[21] In the absence of a hedge fund activists, pre-existing free cash $\widehat{c}_1$ would be retained until $t = 2$ and available to pay pre-existing creditor claims.

To sketch the argument, first note the natural lower bound on the cash flow that must be paid out by the good type in order to separate from the bad type: $x_1^G + c \geq x_1^B + \widehat{c}_1$. Consequently, the good type can at most retain cash balance Δx_1 at date $t = 1$.

Given this, we can now outline the conditions for debt overhang in state L only. In state L, effort pays $\alpha\left(x_2^G\left(\bar{e}\right)_L - \left(D_{LT} - \Delta x_1\right)\right) - \bar{e}$. No effort pays 0. Thus, effort is not exerted if $\alpha\left(x_2^G\left(\bar{e}\right)_L - \left(D_{LT} - \Delta x_1\right)\right) - \bar{e} < 0$. This implies that, as long as $\left(D_{LT} - \Delta x_1\right) \geq \underline{\left(D_{LT} - \Delta x_1\right)} := x_2^G\left(\bar{e}\right)_L - \frac{\bar{e}}{\alpha}$ there is debt overhang in state L. Similarly, effort is exerted in state H if $\alpha\left(x_2^G\left(\bar{e}\right)_H - \left(D_{LT} - \Delta x_1\right)\right) - \bar{e} > 0$. This implies that, as long as $\left(D_{LT} - \Delta x_1\right) < \overline{\left(D_{LT} - \Delta x_1\right)} := x_2^G\left(\bar{e}\right)_H - \frac{\bar{e}}{\alpha}$ there is no debt overhang in state H. Furthermore, debt overhang in state L is attributable to excessive cash payout if $\left(D_{LT} - \Delta x_1\right) > x_2^G\left(\bar{e}\right)_L - \frac{\bar{e}}{\alpha} > \left(D_{LT} - \widehat{c}_1\right)$.

Clearly, there exist parameter values D_{LT}, $\widehat{c}_1$ and Δx_1 such that these three conditions are satisfied. Indeed $x_2^G\left(\bar{e}\right)_H - \frac{\bar{e}}{\alpha} > x_2^G\left(\bar{e}\right)_L - \frac{\bar{e}}{\alpha}$, that is, $\left[\overline{\left(D_{LT} - \Delta x_1\right)}, \underline{\left(D_{LT} - \Delta x_1\right)}\right]$ is an interval, and, given $\widehat{c}_1 > \Delta x_1$ by assumption, the constellation $\left(D_{LT} - \Delta x_1\right) > x_2^G\left(\bar{e}\right)_L - \frac{\bar{e}}{\alpha} > \left(D_{LT} - \widehat{c}_1\right)$ is feasible, that is, the debt overhang in state L must be attributed to the excessive cash payout.

6 Conclusions

We propose a simple benchmark model of hedge fund activism in the presence of competition for flows. Our simple, 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

[21] Alternatively, this can also be viewed as a setting with transparent capital (debt) markets in which hedge fund investors observe how much leverage any target firm takes on. If target borrowing is fully and immediately observable to hedge fund investors, it is of no use to bad types when trying to mimick good types.

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.

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