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Performance Feedback, Firm Resources, and Strategic Change

By

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Abstract:
Combining insights from the behavioral theory of the firm and the resource-based view we investigate the antecedents of strategic change in fast-changing environments. We hypothesize the independent and joint effects of performance feedback and of flexible and specific resources on strategic change. Using an unbalanced panel of 493 publisher-year observations we find that negative performance feedback triggers more strategic change. Further, while flexible resources have no direct influence on strategic change they weaken the negative relationship between performance feedback and strategic change. Finally, we find that larger stocks of specific resources lead to less strategic change.

Keywords: Performance feedback; strategic change; resource-based-view; video game industry
Jel codes: L21 ; L82

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PERFORMANCE FEEDBACK, FIRM RESOURCES, AND STRATEGIC CHANGE

Academics and practitioners in management have long been interested in strategic change. The demise of established firms has been attributed to their inability to adapt business models to changing environmental demands. Engaging in strategic change – adapting the ways in which firms create and appropriate value – can therefore secure the future profitability and viability of organizations. Even so, strategic change is inherently risky and may result in firms losing their competitive advantage without significant gains for future competitiveness. A substantial body of academic work has therefore looked into the antecedents, occurrences, and performance implications of strategic change.

Two strands of literature have emerged as the most active research streams on strategic change. The behavioral theory of the firm highlights the importance of performance feedback and the availability of slack resources for understanding strategic change (Cyert & March, 1963; Greve, 2003; Miller & Chen, 2004; Singh, 1986). The key conjecture is that positive performance feedback reinforces commitments to prior strategic initiatives while negative feedback triggers strategic changes (Bromiley, 1991; March, 1988; March & Shapira, 1987). The availability of slack resources for experimentation facilitates adaptation independent of performance feedback (George, 2005; Greve, 2007; Nohria & Gulati, 1996). The resource-based view of strategy sees a firm's resource base as a primary driver of strategic change (Gilbert, 2005; Kraatz & Zajac, 2001; Teece, Pisano, & Shuen, 1997). The intuition is that the current resource base shapes the menu of strategic options available to a firm. The resource base can be both an enabler and a constraint to strategic change. Yet, what appears less well understood is how performance feedback and the resource base of firms jointly and interdependently influence the propensity to engage in risky strategic changes. We therefore ask the following questions: Does the availability of flexible resources make firms more sensitive to feedback and thereby promote strategic changes? How do prior, specific resource commitments affect the propensity to engage in strategic change?

To address these questions, we combine insights from the behavioral theory of the firm with considerations from the resource-based view. Following extant research on organizational risk taking, we propose that negative feedback triggers more substantial changes in strategic actions. The resource base of a firm has an important influence on the link between performance feedback and strategic change. We distinguish two broad classes of firm resources that play a primary role in strategic decision-making, flexible and specific resources (Caves, 1984; Dierickx & Cool, 1989; Montgomery & Wernerfelt, 1988; Teece et al., 1997). Flexible resources can be easily (re)allocated across strategic options, while specific resources result from prior resource commitments and are specialized toward particular strategic actions. We argue that flexible resources such as unabsorbed slack or industry competence make firms less sensitive to performance feedback. Firms with larger stocks of flexible resources have a lower propensity to initiate changes in response to negative feedback, while they adapt strategy more rapidly when feedback is positive. Prior resource commitments to specific strategic options reduce the propensity to change. That is, independent of performance feedback, firms with more specific resources initiate fewer strategic changes, highlighting the path-dependent nature of strategic behavior. Thus, the causal mechanism linking feedback to strategic change differs for flexible and specific resources.

We test our hypotheses on a panel of video game publishers. The dynamic nature of the video gaming industry is a useful testing ground for our theory since firms constantly engage in strategic change. We use change in the product portfolios of publishers as our dependent variable since product releases are genuinely strategic and the development of video games requires substantial resource commitments. Strategic change can then be measured as the rate of change in the product portfolio of a firm over time. Our main independent variables are performance feedback and the stocks of flexible and specific resources. Controlling for a range of portfolio-, firm and industry-specific conditions, we find most of our hypotheses supported.

The significance of our work is threefold. First, we add to work on the behavioral theory of the firm by elaborating on the effect of firm resources on organizational adaptation (Argote & Greve, 2007; Audia & Greve, 2006). Importantly, flexible resources

may be useful to shield firms from negative feedback, granting stability advantages to a firm. These advantages are especially valuable in turbulent environments where short-term performance feedback is often misleading. Second, we contribute to the resource-based view of strategy. Prior resource commitments, the availability of flexible resources, and performance feedback combine to shape how firms create, evaluate, and choose among strategic paths (Dierickx & Cool, 1989; Teece et al., 1997). Third, our results also shed light on strategic decision-making in fast-changing environments (Brown & Eisenhardt, 1997). Prior research on time-paced competition suggests that firms navigate those business settings by creating and maintaining temporal links in product portfolios. Flexible resources help firms maintain these links even in the face of negative performance feedback.

Our paper is structured as follows. In the next section, we develop the theoretical body of our work and develop a set of hypotheses. In Section 3, we introduce our empirical context and describe our sample, measures and the estimation method. Section 4 presents the results and Section 5 discusses how our research contributes to prior work. Section 6 concludes.

THEORY AND HYPOTHESES

Fast-moving markets pose ongoing challenges for firms. Entry of new competitors and customers and rapidly evolving technologies combine to create constant pressure for strategic change to stay competitive. In recent years the notion of proactive adaptation has gained currency as an appropriate organizational response (Eisenhardt & Tabrizi, 1995; Nadkarni & Narayanan, 2007; Teece et al., 1997). The proposition is that organizations need the ability and willingness to initiate intentional strategic adjustments in resource deployment and investment strategies. Put differently, firms must change before competitive advantages are eroded.

Yet, initiating strategic change is also risky, since the changes could destroy the sources of profitability without gains for future competitiveness (Ghemawat & Costa, 1993; Greve, 2003; March, 1991). The behavioral theory of the firm suggests that a firm's willingness to engage in risky strategic change primarily depends on performance

feedback (Bromiley, 1991; Cyert & March, 1963; Greve, 1998; Levinthal & March, 1981). Positive feedback signals the success of a current strategy and firms will be reluctant to change current strategy and experiment with risky options. Negative feedback suggests a failing strategy and thereby motivates experimentation and strategic adjustments in resource deployment and investment strategies (Audia, Locke, & Smith, 2000; Lant, 1992; Miller & Chen, 2004). Prior work found strong support for this relationship between performance feedback and organizational change in manufacturing (Bromiley, 1991), radio broadcasting (Greve, 1998), financial services (Mezias, Chen, & Murphy, 2002), shipbuilding (Audia & Greve, 2006; Greve, 2007), and railway operations (Desai, 2010) among others. Our baseline hypothesis therefore is:

Hypothesis 1: Negative performance feedback leads to more strategic change.

Research on performance feedback and strategic change in the behavioral tradition highlights contextual factors that affect organizational decision-making (Audia & Greve, 2006; Argote & Greve, 2007). Older firms respond less to performance feedback, suggesting that they are more inert in decision-making and risk-taking (Audia & Greve, 2006). Firms threatened with bankruptcy focus on survival and lower risk-taking in response to negative feedback (March & Shapira, 1992; Miller & Chen, 2004; Audia & Greve, 2006). A large body of work studies the role of slack resources for organizational change, as these are available for experimentation and the exploration of new opportunities (Greve, 2007; Nohria & Gulati, 1996; Voss, Sirdeshmukh, & Voss, 2008). Extant studies found a strong effect of slack resources on organizational innovativeness (Nohria & Gulati, 1996; Geiger & Cashen, 2002; Greve, 2008).

Yet, while prior work showed that organizational factors such as firm age, resource endowments, and threat perception influence a firm's proclivity to change, less is known about how the characteristics of a firm's resource base affects their responsiveness to performance feedback and strategic change. The main tenet of the resource-based view is that resource characteristics influence the strategic options available to a firm (Wernerfelt, 1984; Dierickx & Cool, 1989; Teece et al., 1997). For example, Montgomery and Wernerfelt (1988) show how the heterogeneity of internal resources affects diversification strategies. Flexible resources allow firms to explore

distant market opportunities and to diversify widely. The literature on strategic change also points to the resource base of a firm as a primary source of organizational inertia (Colombo & Delmastro, 2002; Kraatz & Zajac, 2001) and adaptability (Nohria & Gulati, 1996; Voss et al., 2008). However, a limitation of these studies is that they do not consider performance feedback or study the differential impact of different resource classes.

In our research, we draw on an important categorization of resources in the strategy literature, namely the distinction between flexible and specific resources (Montgomery & Wernerfelt, 1989; Ghemawat, 1991; Lippman & Rumelt, 1992). The distinction aims at the plasticity of resources and their potential for (re-)deployment. Flexible resources are both tangible and intangible assets that may be easily redeployed since they retain their value across alternative strategic options (Sanchez, 1995; Nakadarni & Narayanan, 2007). For example, internal financial resources (Chatterjee & Wernerfelt, 1991), managerial competence (Penrose, 1959), or alliance experience (Hoang & Rothaermel, 2005) are highly flexible as they can be allocated across a wide range of options. In contrast, specific resources are relevant to particular strategies, resulting from irreversible investments and commit firms to specific strategic options, since their re-deployment is often impossible without a sharp reduction in resource value (Caves, 1994; Dierickx & Cool, 1989; Lippman & Rumelt, 1992; Ghemawat, 1991). Specific resources often secure sustainable competitive advantage (Ghemawat, 1991; Lippman & Rumelt, 2003; Peteraf, 1993). The question we explore is how stocks of flexible and specific resources affect how firms process performance feedback and engage in strategic change.

Intuitively, flexible resources may have a direct impact on a firm's proclivity to change strategies. Regardless of performance feedback, larger stocks of flexible resources allow firms to seize more strategic options and proactively adapt to a changing environment (Aaker & Mascarenhas, 1993; Nadkarni & Narayanan, 2007; Teece, 2007). In contrast, smaller stocks of flexible resources may limit the ability of firms to implement intentional strategic changes. We therefore expect a direct effect of flexible resources on strategic change:

H2: Firms with larger stocks of flexible resources engage in more strategic change.

However, the relationship between flexible resources and strategic change may be even more subtle. The stock of flexible resources influences the ability, but not necessarily the willingness to implement strategic change. We posit that flexible resources influence how firms process and act upon performance feedback. Put differently, flexible resources are an important moderator of performance signals and strategic change, making firms less responsive to feedback. Flexible resources only promote intentional strategic change if performance feedback is positive, while they make firms less prone to change if feedback is negative.

Behavioral and organizational factors might keep a firm with large stocks of flexible resources from being responsive to negative performance feedback, especially if the environment is characterized by ambiguous feedback. If that happens, firms may find it difficult to disentangle the causes of success and failure and make inferences from performance feedback (Levinthal & March, 1993; March, 2010). Adner and Levinthal (2004) argue that flexibility stems from a willingness to abandon prior strategic investments and to reallocate flexible resources to new options. If feedback is ambiguous decision-makers might believe that further investments can improve the value of prior investments. For example, negative customer feedback in product development might be perceived as calling for further development efforts rather than a signal to abandon the project. Ambiguous feedback may thus lead firms into investment traps hindering the abandonment of existing options. This tendency to reinforce failure is also stressed in work on escalating commitments (Brockner, 1992; Starbuck, Barnett, & Baumard, 2008; Staw, 1981). Firms with ample flexible resources are especially prone to reinforcing potential failure as it buffers them from environmental pressures and lets them avoid difficult managerial choices.

These papers point to a firm's failure to interpret environmental signals as actionable feedback. However, not responding to negative feedback and staying on course can also be effective in turbulent, fast-moving environments (Kim & Rhee, 2009; Levinthal & Posen, 2011; Stieglitz, Knudsen, & Becker, 2009). These environments are

often characterized by fleeting opportunities rather than stable trends (Bettis & Hitt, 1995; Siggelkow & Rivkin, 2005). There, performance feedback might be ambiguous since performance changes could be temporary. An appropriate organizational response in such settings could be to pursue stability in strategic actions and eschew the flexibility advantages in resource allocation. Otherwise, firms may abandon attractive long-term options too early while chasing short-lived opportunities. Larger stocks of flexible resources can confer stability advantages, allowing firms to persevere and to hold on to valuable options even in the face of temporary setbacks.

In sum, we expect firms with larger stocks of flexible resources to engage in less change when performance feedback is negative. By contrast, with positive feedback the ability to change combines with a willingness to allocate flexible resources to new strategic options. This is because success promotes (over-)confidence (Camerer & Lovallo, 1999; March, 2010; Simon & Houghton, 2003). Firms with abundant flexible resources receiving positive feedback will not simply stick to their strategy but use their resources to experiment. The overall effect then is to make firms with larger stocks of flexible resources less responsive to performance feedback.

H3: Larger stocks of flexible resources weaken the negative relationship between performance feedback and strategic change.

Specific resources stem from irreversible investments into specialized tangible or intangible assets and competencies (Ghemawat, 1991; Lippman & Rumelt, 1992; Williamson, 1999) and may create competitive advantage (Dierickx & Cool, 1989; Ghemawat, 1991; Peteraf, 1993), but also commit firms to strategic options since they cannot be redeployed without losses in resource value (Adner & Levinthal, 2004; Bowman & Hurry, 1993; Dixit, 1989). The critical question then is how past resource commitments influence future resource deployment and investment strategies. We expect a direct effect of the stock of specific resources on the general proclivity to change. The intuition is that abandoning a specific resource locks the firm out of an option (Dixit, 1989; Lippman & Rumelt, 1992). Re-entering in the future would imply incurring irreversible investment costs again. This is especially relevant if feedback is ambiguous and it is unclear if negative feedback signals a temporary setback or a

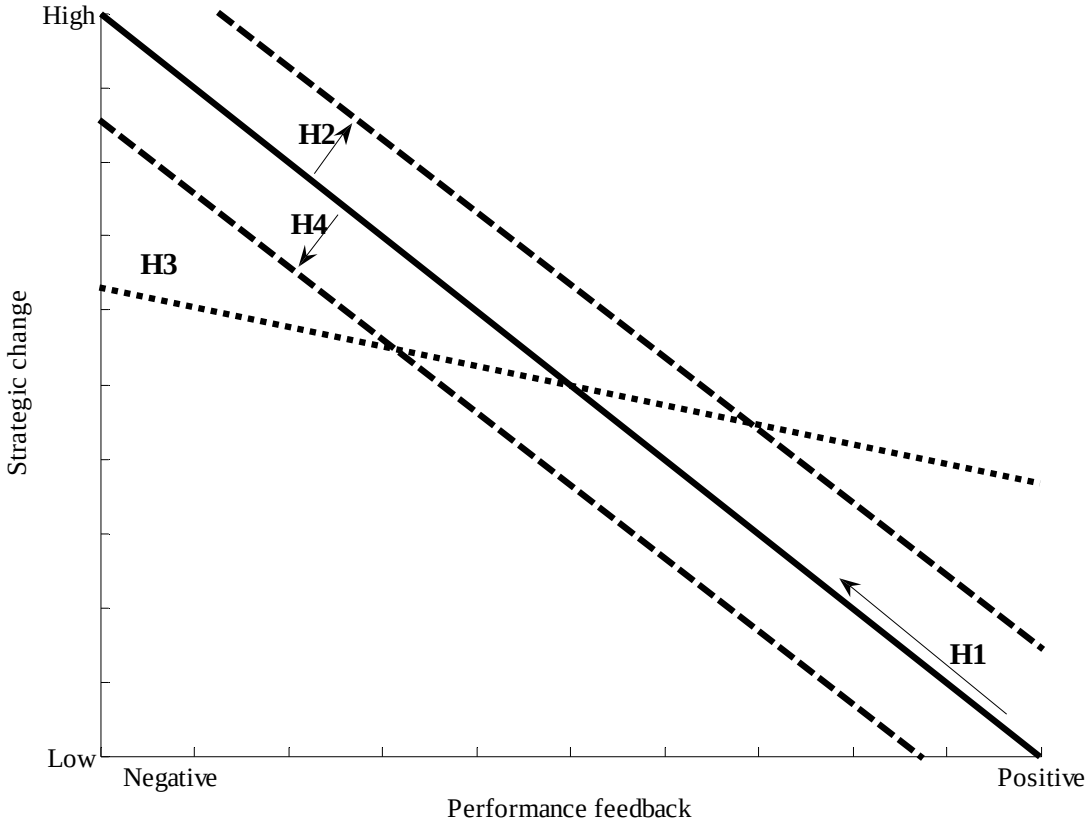
pronounced preference shift. The more ambiguous the feedback, the stronger the evidence needed to trigger a disinvestment of a specific resource and investment in a new one (Dixit, 1989). Firms with larger stocks of specific resources therefore exhibit stronger path-dependency in strategic behavior and have lower proclivity to change, regardless of performance feedback.

H4: Firms with larger stocks of specific resources engage in less strategic change.

Error! Reference source not found. summarizes our theoretical framework and gives a stylized representation of the expected effects of our main independent variables on the relationship between performance feedback and strategic change. Our hypotheses are all contained in **Error! Reference source not found.**: Firms respond to negative performance feedback by engaging in more strategic change (H1), firms with larger stocks of flexible resources engage in more strategic change (H2), firms with larger stocks of flexible resources become less sensitive to performance feedback (H3), and firms with larger stocks of specific resources engage in less strategic change (H4).

Figure 1

Expected Relationships between Performance Feedback, Firm Resources and Strategic Change



DATA AND METHODOLOGY

Research Setting

Our empirical setting is the global video game industry. In the last 30 years the electronic game industry has become the most important segment of the entertainment industry. In 2009, total hard- and software sales reached $19.66 billion in the US, of which $10.5 billion were generated by software sales (NPD, 2010). In comparison, movie box office revenues were $10.6 billion in the same year in the US and Canada together (MPAA, 2010).

The video game industry consists of three types of players: Platform providers, game publishers, and game developers. Platform providers (such as Nintendo or Sony) design and manufacture video game hardware and charge licensing fees to game publishers. Publishers (such as Electronic Arts or Activision) manage relationships with software retailers and platform providers, and package and market the game to consumers. Importantly, they also fund and control the game development process. Game developers (such as Rockstar Toronto or Lucasarts) create and code the video games. Game developers may be in-house studios owned by publishers or independent, external companies. Although game developers make most decisions regarding game development, publishers are highly involved in the process. They bear most of the financial risk of the development process and have to ensure that a development project remains on time and budget whilst meeting expected product quality (Chandler, 2009).

We focus on game publishers and their product market decisions. Publishing a game involves considerable resource commitments through substantial marketing and development costs. Average development costs have soared during the last decade and amount to several million US dollars. A recent study by entertainment analyst group M2 Research puts development costs for single-platform projects at an average of $10 million (Crossley, 2010). At the same time, various industry factors contribute to the financial risk of releasing a video game and recouping investment costs.

First, the video game industry is hit- or blockbuster driven (Tschang, 2007). While many new games are introduced every month, a relatively small number of games (blockbusters) account for the majority of total sales. In 2009, the bestselling game “Wii Sports” sold more than 10.5 million units in the US alone, whereas the game ranked second, “Call of Duty: Modern Warfare 2” for the Xbox 360, sold only 58% of this and the game ranked twentieth “UFC 2009 Undisputed” for the Xbox 360 sold a mere 4% of this (VGChartz, 2011). As publishers know only some of their projects will pay off, they build up game portfolios to spread the risk: “We believe the diversification of our product mix will reduce our operating risks and increase our revenue” (TakeTwo, 2008). To increase the likelihood of releasing a hit a publisher focuses on sequels or licensed intellectual property from movies, books, sports leagues or players’ associations.

However, due to the intense competition for licenses, the royalties paid to licensors are high (Edge, 2005), which increases the pressure for the game to be successful.

Second, the product life cycle of a video game is relatively short, with 80% of game revenues made in the first 12 months after release (Dezsö, Grohsjean, & Kretschmer, 2010). This puts pressure on game publishers to ensure a constant stream of new releases. At the same time, predicting costumer reception and product success is difficult (De Vany, 2004), not least because of fast-changing consumer demands. **Error! Reference source not found.** shows the top five genres and their annual market shares in the US between 2005 and 2009.

Table 1

Top 5 Genres regarding Market Shares in the US between 2005 and 2009 (Source: NPD Market Research)

	2005	2006	2007	2008	2009
Nr.1	Action Games (12%)	Role Playing Games (11%)	Music/Dance Games (13%)	Music/Dance Games (17%)	1st Person Shooters (13%)
Nr.2	Jump 'n' Run Games (9%)	Action Games (10%)	1st Person Shooters (11%)	1st Person Shooters (9%)	Action Games (10%)
Nr.3	Racing Games (9%)	Jump 'n' Run Games (8%)	Action Games (9%)	Action Games (7%)	Music/Dance Games (10%)
Nr.4	Role Playing Games (8%)	Football Games (7%)	Jump 'n' Run Games (7%)	Racing Games (6%)	Fitness Games (7%)
Nr. 5	1st Person Shooters (7%)	Racing Games (7%)	Role Playing Games (7%)	Role Playing Games (5%)	Role Playing Games (5%)

Games classified as "Jump 'n' Run" are the second top selling games in 2005 but constantly lost market shares in the subsequent years and even disappeared from the list in 2008. On the other hand, "Music/Dance" games did not make the list until 2007 when they reached top position and even increased their market share in 2008. While some genres like "Action" or "Role Playing" are constantly among the top five, other

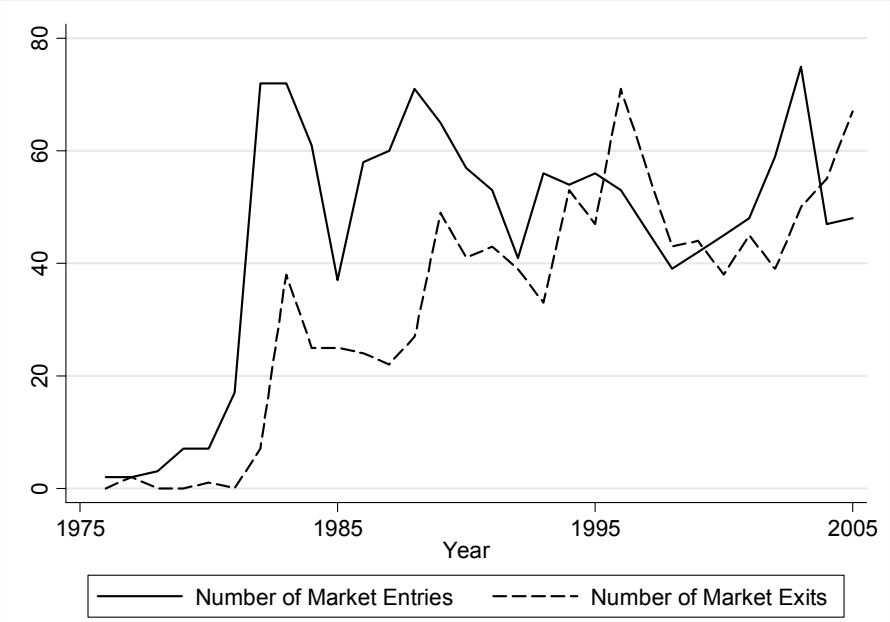
genres like “Football” or “Fitness” were among the top five only once. Clearly then, predicting the success of different genres and their games is challenging, but obviously important: “With target audiences and video game consumption constantly evolving, it is essential for a publisher to correctly anticipate market trends and to choose the proper format for a game. This strategic choice is crucial, given the sums invested.” (Ubisoft, 2009).

The issue of rapidly shifting consumer demand is reinforced by technological progress and opportunities. Every four to six years a new generation of video game consoles consisting of three to five different platforms is introduced. Publishers have to predict which console will be successful and which genre matches best with a given platform as consoles differ not only in their technological specifications but also target groups. While the most successful games on Nintendo’s Wii are sports games, the bestselling games on Sony’s Playstation 3 are mostly action and 1st person shooter games (VGChartz, 2011).

Lastly, publishers face a constantly changing roster of competitors, with high simultaneous entry and exit rates as shown in **Error! Reference source not found.**.

Figure 2

Number of Market Entries and Exits of Publishers between 1975 and 2005



Data and Sample

We use two different sources to construct our dataset: the *MobyGames* and *Osiris* databases. MobyGames is the world's largest and most detailed video game documentation project, containing comprehensive information on more than 53,000 games published since 1972. All information is entered by users of the site on a voluntary basis. To ensure accuracy, MobyGames has a strict set of coding instructions and requires all entries to be peer-reviewed prior to publication. For all game releases we retrieved data on genre, release date, intellectual property (IP), and publisher. We use MobyGames to build our dependent variable *portfolio change,* the independent variables *industry experience* and *share of games based on IP*, and the control variables *portfolio size*, *portfolio concentration* and *platform introduction*.

This data is matched with the April 2010 online version of the Osiris database by Bureau van Dijk, which provides company balance sheets and income statements. Osiris has information on over 45,000 companies from over 140 countries. As well as descriptive information and the company financials, Osiris contains information on ownership structures and M&A activities, helping us match information on product releases with financial data. The level of detail depends on how demanding the accounting standards of a country are and which firms indeed report. Therefore, our sample is biased toward countries with more demanding accounting standards and more transparent firms. 50% of all firms in our sample are located in Europe, 20% in the United States and 30% in Japan. Osiris provides information on active and dissolved firms, limiting survivor bias. In fact, 8 out of 69 publishers (11%) went bankrupt during our observation period. We use Osiris to construct our two measures on performance feedback and the variables *unabsorbed slack* and *firm size*. Combining both datasets yields an unbalanced panel with 493 publisher-year observations of 69 different publishers between 1990 and 2009 for our analysis.

Measures

Dependent variable. As we are interested in the link between performance feedback and strategic change, our dependent variable must capture the scope of strategic change in a meaningful way. We disregard changes in the corporate strategy of firms (i.e. M&A activities, diversification into other industries etc.) and focus instead on changes in the business strategy of a firm. Business strategy is concerned with competitive positions and advantages in a given industry (Porter, 1980, Lippman & Rumelt, 1982; Barney, 1991) and manifests itself in resource commitments to competitive positions in an industry (Dierickx & Cool, 1989; Ghemawat, 1991). Since game releases involve substantial resource commitments in terms of development, marketing, and managerial costs, we use the pattern of game releases by a publisher over time as a dependent variable to measure changes in business strategy.

Our dependent variable *portfolio change* measures the change in the composition of a publisher's portfolio of newly released games in a given year compared to the previous year's releases. The measure is built as follows:

$$\frac{\sum_{n}\left|g_{t,n}-g_{t-1,n}\right|}{g_{t,n}+g_{t-1,n}} * \left(\frac{n_{t,new}}{n_{t}}+1\right), \quad (1)$$

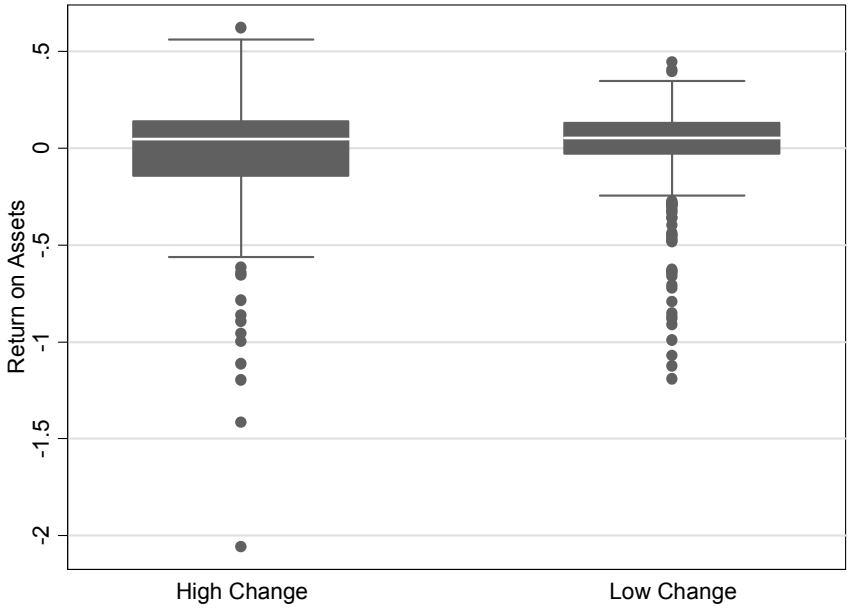
where $g_{t,n}$ denotes the number of games released in a market niche n at time t. n_t (respectively $n_{t,new}$) is the number of active market niches (respectively new market niches) at time t. A market niche in the video game industry is the genre of a game. Each genre represents a distinct product in terms of story, game design, level design, art and sound. Further, each genre requires a different set of skills and capabilities of the developer and the publisher as they appeal to distinct consumer groups with different preferences. Each game is classified into one or more genres. We rely on the classification by MobyGames into eight different basic genres: action, adventure, role playing game, strategy, sports, simulation, racing and educational. The first term in our measure captures the *actual* number of all changes in all genres in relation to all *possible* changes in all genres. The right hand side is a weight that takes a minimum value of one if the publisher does not enter a new genre in a certain year and values above 1 if the publisher does so. The weight captures the idea that entering a new niche is riskier than just moving games across existing niches since entering a new niche often requires the acquisition of new genre-specific capabilities. The composite variable *portfolio change* ranges between 0 and 2. While a value of 0 indicates no change at all, a value of 2 means a complete overhaul of the portfolio. A numerical example of our measure is given in Appendix A.

We build this variable to measure how risky the product portfolio change of the publisher is and the extent of shifts in resource commitments. A publisher who makes more substantial changes in the release portfolio is exposed to higher financial risks. To illustrate this, we split our sample by the mean of *portfolio change.* As shown in **Error! Reference source not found.** we find that the mean of the return on assets is -.036 for high change and -.005 for low change. A t-test reveals that the difference between the means is not significant, indicating that low and high portfolio change lead to the same

return on assets on average. However, the standard deviation of the return on assets increases from .255 for low portfolio change to .361 for high portfolio change. Using Levene's robust tests for equality of variances we find that the variances are significantly different from each other. This indicates that although low and high portfolio change lead to the same average performance, they differ in terms of risk as the variance of high portfolio change is significantly higher than the variance of low portfolio change.

Figure 3

Distribution of Return on Assets depending on the Level of Portfolio Change



Independent variables. A central tenet of the behavioral theory of the firm is that performance is evaluated in light of organizational goals acting as reference points or aspiration levels (Cyert & March, 1963; March, 1988; Greve, 2003). Aspiration levels may be formed by looking at the historical performance of an organization, and performance feedback is then achieved by comparing recent performance with this historical aspiration level. Following this notion, we built our first independent variable *historical comparison* as the difference between the performance of the publisher and its historical aspiration level. We use return on assets (measured as profit before tax divided by total assets) as a proxy for the performance of the publisher. Following prior

work dating back to Levinthal and March (1981), the historical aspiration level is constructed as follows:

$$A_t = \alpha P_{t-1} + (1-\alpha) A_{t-1}, \quad (2)$$

where A denotes the aspiration level, P is the performance measure, i.e. return on assets, t is a time subscript and □ is the weight of the historical aspiration level in the previous period. The weight parameter □ can be interpreted as the speed of goal adjustment and lies between zero and one. Following the procedure suggested by Greve (2003), we determine the appropriate value of □ by performing a grid search, i.e. we calculated firm-specific historical aspiration levels for values of □ between 0.01 and 0.99 and then ran our baseline regression. The best overall model fit was obtained for a value of □ = 0.25, indicating relatively slow adjustment of aspiration levels in the industry (Greve, 2002).

In contrast to historical comparison, an organization may also compare its performance with that of similar organizations and therefore engage in a process of *social comparison* to evaluate current performance. Our second measure of performance feedback, *social comparison,* is thus built as the difference between the annual performance (return on assets) of a publisher and its social aspiration level. The social aspiration level is calculated as the average return on assets of all other active firms in the same year.[1]

We further include three resource variables to study the direct and moderating influence of flexible and specific resources on strategic change. The first variable that represents a flexible resource is *industry experience* which measures the flexible knowledge assets of a company. The intuition is that firms acquire industry-specific expertise that helps them compete (Levinthal, 1991; Klepper & Simons, 2000). This knowledge is flexible in the sense that it is not genre-specific and might help firms to sense and seize business opportunities across genres (Teece, 2007). *Industry experience* is constructed as the difference between the year in which the publisher released its first game and the focal year.

[1] Restricting the social comparison group to closer peer groups, e.g. firms of similar size or structure gives qualitatively identical results.

Our second type of flexible resource is *unabsorbed slack.* This measures the financial resources of a firm that are not committed to any particular genre or game and that can easily be deployed across different genres (Greve, 2003; Singh, 1986). Following prior studies (Mishina, Dykes, Block, & Pollock, 2010; Combs & Ketchen, 1999) we measure *unabsorbed slack* using the quick ratio, the ratio of cash and cash equivalent divided by current liabilities.[2]

Lastly, we include the variable *share of games based on IP* as a measure of a specific resource*.* Intellectual property (IP) in the video game industry can be classified into two different categories: externally acquired intellectual property like licenses from books (e.g. Harry Potter), movies (e.g. Indiana Jones), sports leagues and players' associations (e.g. National Football League) as well as internally developed intellectual property in the form of specific content (e.g. Grand Theft Auto) or software code (e.g. quake engine). Externally acquired licenses let the publisher build on an audience that is already familiar with the brand and thus substitute for its own brand-building efforts. Internally developed intellectual property is used to facilitate internal product development efforts by turning games into series. As both types of intellectual property are mostly tied to specific genres and capture prior resource commitments into these specific genres (Tschang, 2007) the variable *share of games based on IP* proxies for specific resources. *Share of games based on IP* is measured as the percentage share of newly released games drawing on external or internal intellectual property.

Control and indicator variables. We include several control variables to account for factors other than performance feedback and resources that might affect change of product portfolios. *Portfolio size* measures the number of games a publisher introduced in a given year. As portfolio change might not only be influenced by the size of the portfolio but also by its composition we include the variable *portfolio concentration*, measured as the sum of squares of the share of each genre on the total portfolio of the publisher. To control for the influence of publisher size on portfolio

[2] *Cash and cash equivalent* is the total of all immediate negotiable media of exchange or instruments normally accepted by banks for deposit and immediate credit to a customer account; this item represents funds that can be used to pay current invoices. *Current liabilities* includes all short term liabilities, namely accounts payable, short-term debt, current portion of long term debt, and other current liabilities.

change we include *firm size*, defined as the natural logarithm of the revenue of the publisher in '000s USD in a given year. We use the natural logarithm to account for the skewed revenue distribution. As publishers might change the structure of their portfolio when a new platform hits the market, we include a dummy *platform introduction* equal to one if a new platform is introduced. All independent and control variables are lagged by one year.

Estimation Method

To test our hypotheses we use a random-effects generalized least square (GLS) approach for linear panel regression models that have a first-order autoregressive error term and are unequally spaced over time (Baltagi & Wu 1999). The method is appropriate for several reasons. First, a test for serial correlation proposed by Wooldridge (2002: 176-177) revealed that the error terms are serially correlated ($F = 11.04$, $p<.01$). As serial correlation in cross-sectional time-series models biases the standard errors and reduces the efficiency of the results (Drukker 2003) we control for AR(1) serially correlated errors in our analysis. Second, while it is possible to control for this type of error term in feasible generalized least square (FGLS) regression models, FGLS models require that the observations are equally spaced over time. However, as not every publisher releases new games in each year this is not the case in our data. Third, a robust version of the Hausman test that accounts for serial correlation across time and heteroskedasticity (Wooldridge 2002: 291) shows that a random effects model is preferred over a fixed effects model ($\chi^2 = 11.82$, $p > .1$). To avoid problems of reverse causality all independent and control variables are lagged by one year. We ran our regressions using STATA 11.

To test Hypothesis 1 we first investigated if more positive performance feedback in general decreases portfolio change. In a second step we wanted to see whether the effect is different for positive performance feedback (i.e. performance above the aspiration level) and negative feedback (performance below the aspiration level). To do so, we specified a spline function (Greene, 2008: 111-112) of the following form:

$$Y_{t+1} = F\left[\beta_1(P_t - A_t)I_{P_t>A_t} + \beta_2(P_t - A_t)I_{P_t\leq A_t} + \beta X_t\right], \quad (3)$$

where Y_{t+1} is the portfolio change at time t+1, P_t is the performance realized at time t, A_t is the aspiration level at time t, I is an indicator equal to 1 if the expression in the subscript is true and 0 otherwise, and X_t is a set of control variables. β_1 is the slope of the feedback effect if the feedback is positive, β_2 is the slope of the feedback if the performance is below the aspiration level, and γ is the slope of the controls. Put simply, using a spline function allows the variables *historical comparison* and *social comparison* to have different slopes above and below zero. We then checked with an F-Test whether β_1 equals β_2. Hypotheses 2 and 4 are tested by including the linear values of *industry experience* and *unabsorbed slack* (H2) and *share of games based on IP* (H4), respectively. Hypothesis 3 is tested by interacting *industry experience* and *unabsorbed slack* with performance feedback. We run all our regressions using *historical* and *social comparison* as our two measures of performance feedback.

RESULTS

Error! Reference source not found. provides pairwise correlations and descriptive statistics of the variables used in the analysis. The correlation between our two measures of performance feedback, i.e. *social* and *historical comparison*, is quite large (r = .78) indicating that performance feedback on both dimensions tends to go in the same direction.

Table 2

Descriptive Statistics and Correlations[a]

	Variable	Mean	S.d.	Min	Max	1	2	3	4	5	6	7	8	9
1	Portfolio Change	0.48	0.35	0	2	1								
2	Historical Comparison (α=.25)	-0.04	0.48	-5.41	1.87	-0.27*	1							
3	Social Comparison	-0.03	0.46	-6.05	0.90	-0.30*	0.78*	1						
4	Industry Experience	12.68	6.89	0	30	-0.28*	-0.02	0.12*	1					
5	Unabsorbed Slack	0.85	1.15	0	9.13	-0.03	0.1	0.16*	0.13*	1				
6	Share of Games based on IP	0.59	0.26	0	1	-0.29*	0.14*	0.25*	0.31*	0.15*	1			
7	Portfolio Size	22.96	23.58	1	146	-0.48*	-0.05	0.05	0.39*	0.01	0.20*	1		
8	Portfolio Concentration	0.38	0.21	0.15	1	0.29*	0.11	-0.05	-0.32*	0.02	-0.03	-0.37*	1	
9	Firm Size	12.49	2.62	4.38	18.30	-0.32*	0.04	0.20*	0.46*	0.06	0.26*	0.48*	-0.28*	1
10	Platform Introduction	0.89	0.31	0	1	-0.02	0.06	0.01	0.02	0.03	-0.01	0	-0.06	0.01

[a] n(observations)=493.

* denotes significance at the 1% level.

We present the results of historical comparison on portfolio change in **Error! Reference source not found.** and replicate our analysis with social comparison as measure of performance feedback to assess the robustness of our results in **Error! Reference source not found.**..

Table 3

Results of Random-Effects Panel GLS Regression of Historical Comparison on Portfolio Change[a]

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
Intercept	0.65***	(0.11)	0.51***	(0.11)	0.50***	(0.11)	0.52***	(0.11)	0.52***	(0.11)	0.56***	(0.11)	0.56***	(0.10)	0.58***	(0.10)
CONTROLS																
Portfolio Size	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)
Portfolio Concentration	0.25***	(0.08)	0.31***	(0.07)	0.30***	(0.07)	0.30***	(0.07)	0.30***	(0.07)	0.32***	(0.07)	0.34***	(0.07)	0.33***	(0.07)
Firm Size	-0.01	(0.01)	-0.00	(0.01)	-0.00	(0.01)	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)	-0.00	(0.01)
Platform Introduction	-0.01	(0.04)	0.00	(0.04)	0.00	(0.04)	0.00	(0.04)	0.00	(0.04)	-0.00	(0.04)	0.01	(0.04)	0.01	(0.03)
PERFORMANCE FEEDBACK																
Historical Comparison			-0.23***	(0.03)			-0.23***	(0.03)	-0.23***	(0.03)	-0.22***	(0.03)	-0.42***	(0.05)	-0.43***	(0.05)
Historical Comparison<0					-0.25***	(0.03)										
Historical Comparison>0					-0.20***	(0.06)										
F-Test for Equality of <0 and >0					0.43											
RESOURCES																
Industry Experience							-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Unabsorbed Slack									-0.01	(0.01)	-0.00	(0.01)	-0.00	(0.01)	-0.01	(0.01)
Share of Games based on IP											-0.18***	(0.05)	-0.16***	(0.05)	-0.16***	(0.05)
INTERACTION TERMS																
Historical Comparison*Industry Experience													0.02***	(0.00)	0.02***	(0.00)
Historical Comparison*Unabsorbed Slack															0.07***	(0.02)
Overall R^2	0.254		0.342		0.345		0.345		0.344		0.364		0.388		0.400	
Incremental overall R^2 (F)			65.66***[b]		33.75***[b]		1.88*[c]		-4.66[d]		14.77***[e]		19.41***[f]		9.27***[g]	
Wald $\chi 2$	105.1***		186.2***		188.0***		188.3***		188.1***		205.4***		240.0***		251.5***	

[a] n(publishers)=69; n(observations)=493.
[b] compared to Model 1.
[c] compared to Model 2.
[d] compared to Model 4.
[e] compared to Model 5.
[f] compared to Model 6.
[g] compared to Model 7.
* p<.10
** p<.05
*** p<.01
Two-tailed test for variable coefficients.

Table 4

Results of Random-Effects Panel GLS Regression of Social Comparison on Portfolio Change[a]

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
Intercept	0.65***	(0.11)	0.50***	(0.11)	0.50***	(0.11)	0.50***	(0.11)	0.51***	(0.11)	0.55***	(0.11)	0.60***	(0.10)	0.66***	(0.10)
CONTROLS																
Portfolio Size	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)	-0.01***	(0.00)
Portfolio Concentration	0.25***	(0.08)	0.25***	(0.07)	0.25***	(0.07)	0.24***	(0.07)	0.24***	(0.07)	0.27***	(0.07)	0.25***	(0.07)	0.23***	(0.07)
Firm Size	-0.01	(0.01)	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)	0.01	(0.01)	-0.00	(0.01)	-0.01	(0.01)
Platform Introduction	-0.01	(0.04)	-0.01	(0.04)	-0.01	(0.04)	-0.01	(0.04)	-0.01	(0.04)	-0.01	(0.04)	-0.01	(0.03)	-0.01	(0.03)
PERFORMANCE FEEDBACK																
Social Comparison			-0.22***	(0.03)			-0.22***	(0.03)	-0.22***	(0.03)	-0.20***	(0.03)	-0.48***	(0.05)	-0.50***	(0.05)
Social Comparison<0					-0.23***	(0.03)										
Social Comparison>0					0.07	(0.13)										
F-Test for Equality of <0 and >0					4.01**											
RESOURCES																
Industry Experience							-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Unabsorbed Slack									-0.00	(0.01)	-0.00	(0.01)	-0.01	(0.01)	-0.01	(0.01)
Share of Games based on IP											-0.18***	(0.05)	-0.16***	(0.05)	-0.15***	(0.05)
INTERACTION TERMS																
Social Comparison*Industry Experience													0.03***	(0.01)	0.03***	(0.01)
Social Comparison*Unabsorbed Slack															0.12***	(0.04)
Overall R^2	0.254		0.319		0.322		0.321		0.320		0.337		0.393		0.413	
Incremental overall R^2 (F)			47.03***[b]		24.55***[b]		0.91[c]		-4.55[d]		12.04***[e]		44.73***[f]		16.11***[g]	
Wald $\chi 2$	105.1***		166.1***		168.7***		166.9***		166.5***		180.5***		244.4***		267.7***	

[a] n(publishers)=69; n(observations)=493.
[b] compared to Model 1.
[c] compared to Model 2.
[d] compared to Model 4.
[e] compared to Model 5.
[f] compared to Model 6.
[g] compared to Model 7.
* p<.10
** p<.05
*** p<.01
Two-tailed test for variable coefficients.

Several control variables are significant in all models. *Portfolio size* has a negative and significant (p<.01) impact on portfolio change, indicating that larger portfolios get adjusted less. Conversely, *portfolio concentration* has a positive and significant (p<.01) effect on portfolio change so that portfolios with a games concentrated on a few genres change more.

Hypothesis 1 predicts that negative performance feedback leads to more strategic change. We first discuss our results for historical comparison. In **Error! Reference source not found.** we see a consistently negative and significant (p<.01) influence of *historical comparison* on portfolio change. In column (3) we split the variable in performance below and above the historical aspiration level. Both the coefficient of performance below the historical aspiration level and the coefficient of performance above the historical aspiration level are negative and significant (p<.01) as well as similar in size, and the F-test shows no significant difference between the two. Results for social comparison, reported in Table 4, are identical with the exception that in column (3) the coefficient of performance below the social aspiration level is negative and significant (p<.01) while the coefficient of performance above the social aspiration level is not significant. Further, the difference between the two coefficients is statistically significant (F = 4.01, p<.05). In sum, we find strong support for Hypothesis 1.

Hypothesis 2 predicts that firms with larger stocks of flexible resources engage in more strategic change. However, neither the coefficient of *industry experience* nor of *unabsorbed slack* are statistically significant in any of the models in **Error! Reference source not found.** and **Error! Reference source not found.**. Hence, Hypothesis 2 is not supported.

Hypothesis 3 states that the relationship between performance feedback and portfolio change is negatively moderated by larger stocks of flexible resources. The interaction between historical comparison and industry experience is positive and significant (p<.01) in columns (7) and (8). The marginal effect of historical comparison for different levels of industry experience (shown in **Error! Reference source not found.**is increasing from -.43 for firms with no industry experience to .16 for firms with 25 years of experience. The interaction effect of historical comparison and unabsorbed

slack in column (8) is positive and significant (p<.01). The marginal effect of historical comparison, shown in Error! Reference source not found., is increasing in the amount of unabsorbed slack, but remains below zero.

Figure 4

Marginal Effect of Historical Comparison on Portfolio Change as Industry Experience Changes

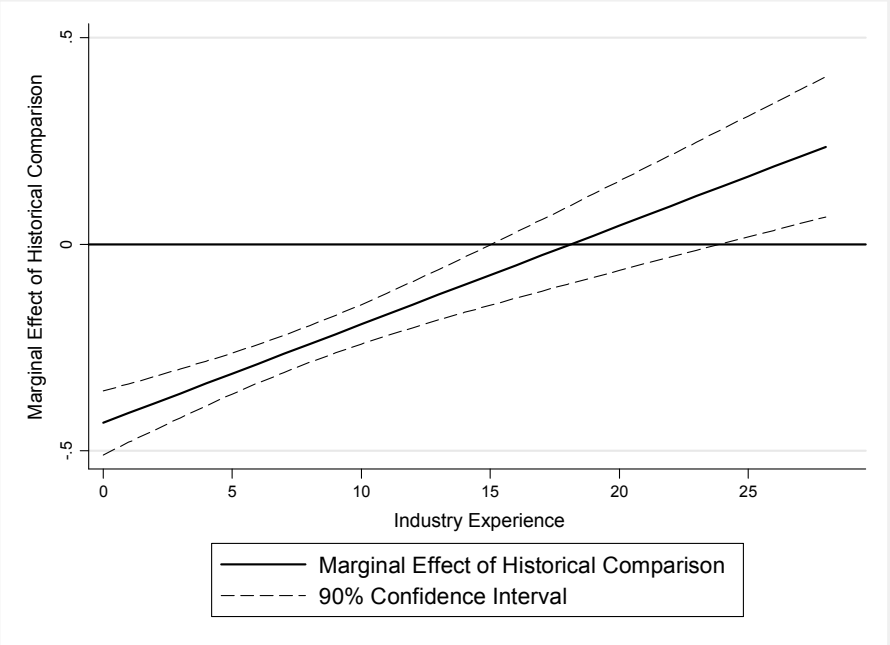
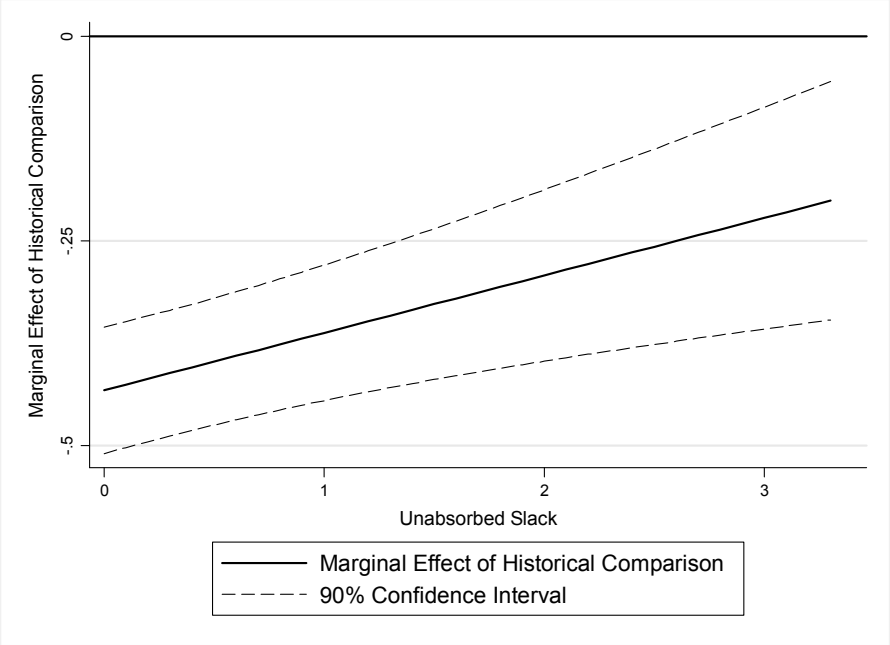


Figure 5

Marginal Effect of Historical Comparison on Portfolio Change as Unabsorbed Slack Changes



The results of the interaction terms in the specifications with social comparison as measure of performance feedback shown in **Error! Reference source not found.** are qualitatively similar. The interaction between social comparison and industry experience is positive and significant ($p<.01$) in columns (7) and (8). **Error! Reference source not found.** graphs the moderating effect of industry experience on the impact of social comparison on portfolio change. The marginal effect of social comparison increases strongly from -.5 for firms with no industry experience to .29 for firms with 25 years of industry experience. Further support for Hypothesis 3 is provided by the positive and significant interaction of social comparison and unabsorbed slack in model 8. Error! Reference source not found. graphs the marginal effect of social comparison depending on the amount of unabsorbed slack. While the marginal effect is also increasing with larger amounts of unabsorbed slack it is always below zero. Summarizing, we find strong support for Hypothesis 3.

Figure 6

Marginal Effect of Social Comparison on Portfolio Change as Industry Experience Changes

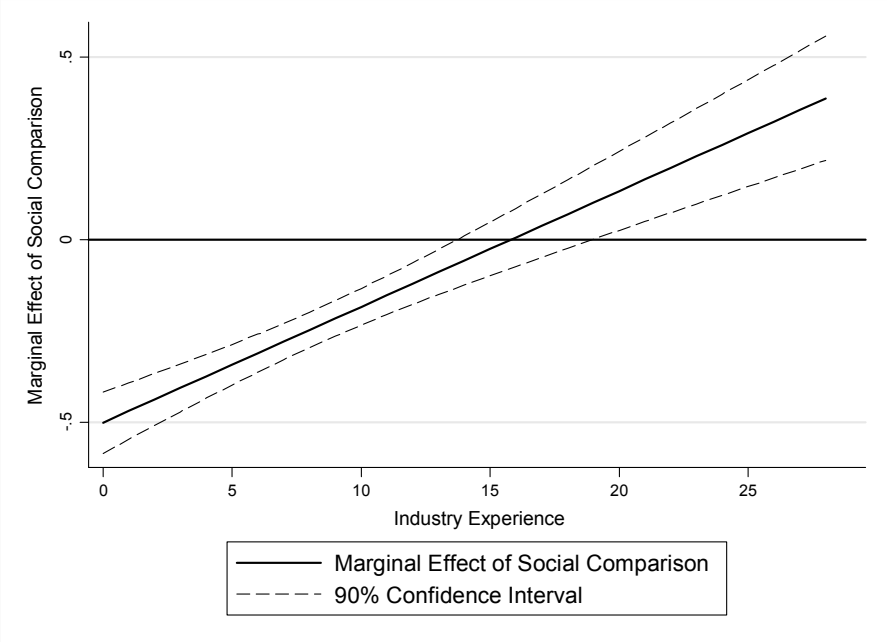
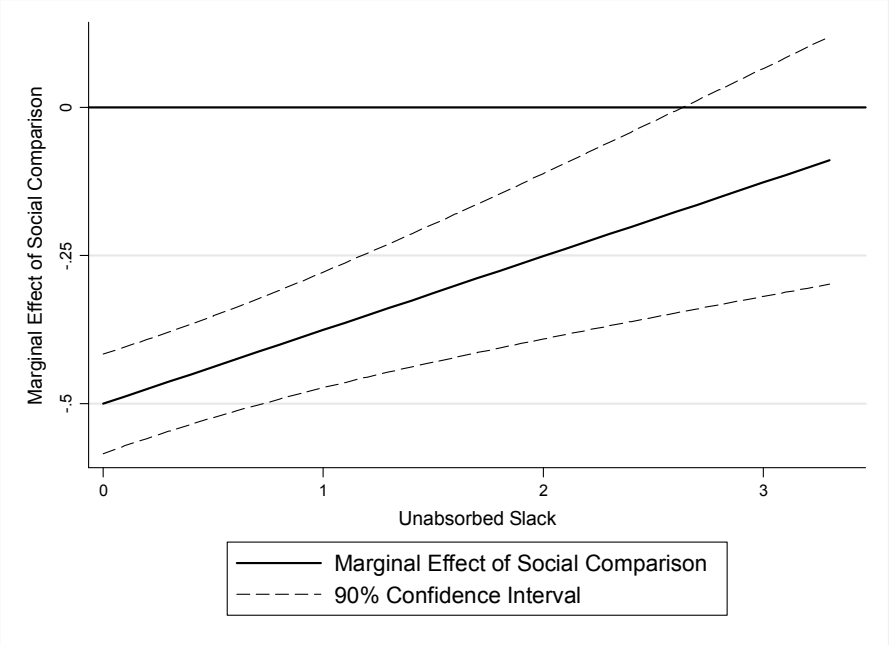


Figure 7

Marginal Effect of Social Comparison on Portfolio Change as Unabsorbed Slack Changes



Hypothesis 4 predicts that firms with larger stocks of specific resources engage in less strategic change. The coefficient of the *share of games based on IP* is negative and significant (p<.01) in columns (6)-(8) in our specifications in **Error! Reference source not found.** for historical comparison and **Error! Reference source not found.** for social comparison. Hypothesis 4 is therefore strongly supported.[3]

Taken together, these results suggest that negative performance feedback, be it from historical or social comparison, leads to more portfolio change. While we find no empirical evidence for the direct influence of larger stocks of flexible resources on portfolio change, we find strong support for its moderating effect between performance feedback and portfolio change. We further find that specific resources have a direct, negative effect on portfolio change.

[3] For completeness, we included the interaction term of historical and social comparison and the share of games based on IP and found no statistically significant effect.

DISCUSSION

Our results confirm our basic hypothesis (Hypothesis 1): Better-performing firms will change their strategy less, and underachieving firms will try something new to change their fortunes. While this result confirms findings from prior work, it is interesting and novel for several reasons: First, our empirical context and the resulting dependent variable differ from settings studied previously: We consider an industry in which change happens on a regular basis and firms enter and exit genres frequently. Therefore, a study simply tracking the likelihood of this happening would not be useful. Our (continuous) measure of change takes into account both quantitative (how many games?) and qualitative (how novel?) aspects of strategic change in a highly dynamic industry. To see established findings confirmed in this setting is reassuring and suggests that the strategic redeployment of resources we measure indeed reacts to performance feedback in similar ways to discrete changes in other industries. Second, in the video game industry exit and bankruptcy is a common occurrence. Indeed, in our study period eight firms exited. Hence, an underperforming firm will have to consider bankruptcy a real possibility when considering different strategic options. Prior research has shown that this can lead to threat rigidity in firms (Audia & Greve, 2006; Miller & Chen, 2004) (Staw, Sandelands, & Dutton, 1981), leading them to stick to their core activities and abandon everything else, rather than engage in new, risky activities. Our results suggest that this is not the case. Indeed, firms below their aspiration level appear to react more strongly to performance feedback than firms above it, and the bigger the performance shortfall, the greater the change. Our results suggest that firms in distress still engage in change, perhaps indicating that they are taking “one last roll of the dice”.

Our second hypothesis on the direct effect of flexible resources was not confirmed. Firms with plentiful flexible resources do not appear to spend it to engage in “unprovoked” strategic change. The intuition behind the hypothesis was that overhauling a firm’s portfolio requires unattached resources and that firms with such resources will spend them to initiate strategic change. If strategic change led to better firm

performance, this might lead to path-dependencies: firms accumulate flexible resources because they perform well, and they can use these resources to extend their lead. Financially constrained firms will find it difficult to catch up. However, **Error! Reference source not found.** shows that more change does not lead to significantly higher (or lower) performance. In combination with the finding that Hypothesis 2 is not confirmed we conjecture that constraints in flexible resources are not a key limiting factor of performance-enhancing strategic change.

Hypothesis 3 refers to the moderating influence of flexible resources on the effect of performance feedback on strategic change. Our regressions confirm this hypothesis: Firms with large amounts of flexible resources react less strongly to performance feedback. That Hypothesis 2 is not confirmed implies resource constraints do not reduce firms' propensity to change across the board. By contrast, the significant (and positive) interaction term suggests an interesting intuition: In periods of low performance, firms without a sizable financial "war chest" and with comparatively low industry experience may feel pressured into taking risks and initiating strategic change – without a clear expectation of increased performance as shown by **Error! Reference source not found.**. Conversely, firms with flexible resources can afford to act largely independent of short-term (negative) performance feedback. Note that flexible resources could be used for any activity unlike specific ones that will bias a firm towards stability. Still, it appears that such flexible resources will not be used for short-term strategic changes, which again suggests that in an industry in which bankruptcy is a real danger being shielded from short-term pressures to act is a luxury afforded by sufficient financial resources and industry experience.

Hypothesis 4 is also confirmed by our empirics. A high proportion of specific resources in the form of externally acquired or internally developed intellectual property renders firms less prone to strategic change across the board, i.e. independent of performance feedback. This is intuitive as abandoning games or genres in which specific investments have been made would entail high costs of reentering them. This effect holds across all levels of performance feedback. Hence, it appears that specific assets in the form of intellectual property have an option value to the firm: Regardless of their current contribution to performance specific resources are retained by the firm in

anticipation that they might generate value in the future. This poses an interesting managerial question: Does investing in specific assets pay off even if the market is highly volatile as suggested by Dezsö et al. (2010)? Our results indicate that firms seem to think so given they continue to use those assets even if current performance is below par and they do not abandon them if performance is high which could trigger a period of strategic experimentation.

Our results on different resource types point in different directions: First, flexible resources have no discernible impact on a firm's overall inclination to strategic change, but they make firms less reactive to performance feedback. That is, flexible resources afford firms the flexibility to navigate through turbulent times without having to change course frequently and perhaps inefficiently. This suggests that resources afford firms stability rather than flexibility. We offer two explanations for this: First, firms might be able – they have the resources – but not willing to act on negative performance feedback. This is supported by the observation that firms engaging in more change do not perform better on average. In other words, external pressure from investors and the threat of bankruptcy may drive firms to initiate change for change's sake in situations where a steady hand may offer more promising long-term returns. A second, related explanation may be that firms with flexible resources simply do not believe that they need to change. This suggests that stability is not an explicit strategy to weather periods of low performance, but a failure to interpret signals from the market as valid feedback. Organizational inertia may result from superior past performance, which in turn may have led to large amounts of disposable cash (and therefore high unabsorbed slack) or survival (and therefore high industry experience). This reading relies on firms' confidence in their own capabilities and judgment, and future research should aim at distinguishing between the two explanations outlined above.

Conversely, specific resources reduce a firm's flexibility overall, not just in periods of sub-par performance. This is likely down to the lock-in effect of specific resources (Ghemawat, 1991; Dixit, 1989). The intuition is as follows: As any activity in a particular genre requires resources to build up complementary expertise and reputation, a genre in which some of these investments have already been made through the acquisition of external intellectual property (substituting to some extent for the game

publisher's own brand-building efforts) or the development of own internal intellectual property, the marginal return of continuing to invest in these genres is higher than for new genres, which reinforces specialization into these genres. The strategic redeployment of resources is thus determined by the marginal returns of the invested resources, which in turn depends on the prior investments made. We thus expect this tendency to persist over time, especially given the lack of clear performance implications of strategic change.

More broadly, our research contributes to three distinct research streams. First, we extend the resource-based view of strategy by highlighting the role of performance feedback for resource deployment. A central tenet of the resource-based view is the path-dependency of firm strategies, i.e. the existing stock of strategic resources channels and constrains future firm behavior. Our results support this conjecture for strategic, specialized resources. However, we also find that flexible resources strengthen the path dependency of strategic behavior in the sense that strategic choices once taken are not abandoned in response to short-term performance shortfalls. We cannot resolve empirically whether flexible resources confer stability advantages or reinforce organizational inertia based on our findings, but intend to resolve this in future work.

Second, and related, our research speaks to the challenges of strategy-making in volatile business environments. Following Brown and Eisenhardt (1997), successful firms in such settings engage in proactive, time-paced evolution. They create temporal links in project portfolios and "get from the present to the future through choreographed steps" (Brown and Eisenhardt (1997: 29). In our study, it appears that time paced evolution requires a certain level of stability to preserve the intended choreography in the product portfolio. Unabsorbed slack resources provide stability and enable an organization to hold on to a previously chosen choreography. Industry experience helps to interpret immediate performance feedback and to decide when to hold on to a choreographed portfolio – and when to abandon it in favor of a new one. In contrast, event-paced evolution is primarily focused on the present, with firms reacting to current events. Performance feedback are events that firms may respond to and responding to them may result in excessive change. Thus, the flexible resources of a firm may confer

stability advantages by enabling and supporting time paced evolution in volatile markets.

Third, we add to the growing body of literature that highlights the moderating factors for organizational risk taking (Sitkin & Pablo, 1992; Audia & Greve, 2003). Our findings point to the organizational resource base as an important moderator of performance feedback in volatile markets. An open issue is whether the hypothesized relationship – larger stocks of flexible resources make organizational risk-taking less sensitive to performance feedback – also holds in more stable environments. Based on the theoretical arguments developed above, we would assume performance feedback to be more consequential for organizational adaptation in such settings (Greve, 2003; March, 2010). This would diminish the stability advantages afforded by unabsorbed slack resources and industry expertise in more volatile settings. Thus, flexible resources should continue to moderate the link between performance feedback and risk-taking, yet make firms more sensitive to performance feedback. By contrast, specific resources are also expected to stabilize the strategic behavior of firms in stable settings. Based on our theoretical arguments then, we expect a differential effect of resource classes on feedback sensitivity.

CONCLUSION

We study a volatile setting in which strategic change, firm exit and performance fluctuations are common. Starting from the theories of aspiration levels and organizational change under uncertainty, we propose that the composition of a firm's resource base affects firm reactions to performance feedback. Contrary to prior findings, we find firms with a large stock of flexible (unspecialized) assets to react less to performance feedback, suggesting that it is not a lack of resources forcing firms to stay put in turbulent times. Instead, it appears that stability in the face of turbulence is a "luxury" that only well-resourced firms can afford, or that firms with a large resource base simply disregard signals about their performance and carry on with a longer-term strategy instead. Future research should look at the performance implications of these different reactions to performance feedback to distinguish between these explanations.

Our study has several limitations. First, our sample is biased towards comparably large firms that publish their financial data. These firms constitute a large part of the industry, however, and are subject to market fluctuations in the same way as smaller ones. Still, it would be interesting to study strategic decision-making in smaller firms to see if a higher risk of bankruptcy would change decisions as suggested by prior work. Second, we have no direct information on the decision-making process and proxy strategic change by observable portfolio changes. However, since structuring the product portfolio is the key strategic decision firms make in the industry, we think that we capture the outcome of the decision process well. Third, our measures of firm resources are imperfect. While we tried to rule out competing explanations by controlling for other potentially interfering variables and interpreting both linear and moderating effects, finding more accurate measures of firm resources is a line of future research.

We believe that our results are relevant both to scholars of aspiration levels and to scholars of the resource-based view of the firm. Both approaches would benefit from incorporating the other perspective in their hypotheses and tests. Even more interestingly, a firm's resource base (both in size and composition) and its performance relative to its goals interact in nontrivial ways. We thus hope that this is the first step in a series of studies in which the generalizability of our results to other contexts, industries and strategies will be tested.

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Appendix A: Numerical Example of the Dependent Variable

To better understand the construction of our dependent variable, consider the following fictitious example of a publisher whose portfolios of the years 2000-2006 are given in Table A1. For simplification, we use only four genres in our example instead of the eight genres used in our analysis.

INSERT TABLE A1 ABOUT HERE

If we assume that the publisher is founded in the year 2000 we cannot calculate a change measure for this year so that 2001 is our starting point. As the publisher does not change its portfolio in 2001 compared to 2000, *portfolio change* takes a value of 0. In 2002, the publisher releases four new action games and four new role-playing games (RPG). We first have to subtract the four games in each category from the two games in each of the genres in 2001 yielding to a difference of 2 in each genre. We then sum the differences, so that we end up with 4. This is the number of all changes in all genres. We then divide this term by 12 which is the sum of all games launched in 2001 and 2002 or put differently the number of all possible changes. This leads to a value of 0.3 for the first term of our formula, which we then multiply with the weight. As the publisher does not enter a new genre the weight takes a value of 1, leading to an overall value of 0.3 for *portfolio change*.

In 2003 the publisher cut in half its releases in every active genre. Because he does exactly the opposite of what he does in the year before where he doubles his positions in every active genre the portfolio change measures again takes a value of 0.3.

In 2004 the publisher doubles the number of new games in active genres and enters the sports genre with two games. This increases both the first and the second term of our measure. The left side (the first term) is the result of six actual changes in all genres divided by fourteen possible changes. Because the publisher enters a new genre the weight takes a value of 1 plus 0.3 that is one new genre divided by three active genres. Multiplying the two numbers we get an overall value of 0.57 for

portfolio change, which is above the 2002 value where the publisher doubles the number of games but does not enter a new genre.

In 2005 the publisher again cut in half the number of new games in the action and RPG genres but he also leaves the sports genre. This leads to an overall value of the variable of 0.43. This value is above the 2003 value when the publisher also halves the size of its portfolio but does not leave a genre, but below the 2004 value when the publisher doubles its portfolio and enters a new genre. Hence, we see that our measure takes higher values if a publisher enters a new genre compared to situations where he abandons one. This is in line with the consideration that starting something new bears more risk than ending something.

In 2006 the publisher completely changes the structure of his portfolio. He leaves the action and RPG genres and enters the sports and strategy genres with two games respectively. Here, there are eight actual changes across all genres divided by eight possible changes giving 1 for the first term. The weight takes a value of 2 (two new genre/two active genres + 1) so that *portfolio change* takes a value of 2, the highest value of our measure. Indeed, a complete portfolio overhaul occurs 6 times in our sample.

Table A1. Numerical Example of the Dependent Variable

	Action	RPG	Sport	Strategy	$\sum_{n}\lvert g_{t,n} - g_{t-1,n}\rvert$	$g_{t,n}+g_{t-1,n}$	$n_{t,new}$	n_t	portfolio change
2000	2	2	0	0	N/A	N/A	N/A	N/A	N/A
2001	2	2	0	0	0	8	0	2	0
2002	4	4	0	0	4	12	0	2	$0.\overline{3}$
2003	2	2	0	0	4	12	0	2	$0.\overline{3}$
2004	4	4	2	0	6	14	1	3	0.57
2005	2	2	0	0	6	14	0	2	0.43
2006	0	0	2	2	8	8	2	2	2