

Product Integration and Merger Success

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ABSTRACT

We examine the importance of firm integration to outcomes of mergers and acquisitions using new ex ante product-based measures of firm integration. Our framework allows us to measure ex ante integration risk for both observed acquisitions and proposed acquisitions that might not materialize. As validation, our ex ante measures predict post-merger 10-K statements by managers indicating difficulties with acquisition integration, and specific complaints about technological and product-based difficulties. Our central finding is that acquirers facing high ex ante product integration risk experience lower ex post sales growth, R&D, capital expenditures, announcement returns and long-term stock returns. The results are consistent with mergers where the acquirer is not well integrated having subsequent problems with R&D and future growth.

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I Introduction

Participants engaging in mergers frequently claim that merger integration problems are a major reason why many mergers do not succeed. A recent survey of more than 800 executives by McGee, Thomas, and Thomson (2015) cites different cultures and difficulty of integrating product lines as partially being responsible for worse ex post merger outcomes and a lower chance of achieving merger synergies. Ahern, Daminelli, and Fracassi (2015) examine international mergers and find that country-level cultural differences in trust and individualism lead to lower merger volumes and lower combined abnormal announcement returns. Yet, there is only limited evidence, other than case studies,¹ that integration failure is important within countries at the deal level, and what specific mechanisms might drive the worst outcomes. Some evidence suggests that a lack of resources to implement merger integration likely does not cause many mergers to fail. For example, Harford (1999) shows that acquisitions by cash rich acquirers are followed by declines in operating performance.

We examine whether merger integration risk can be predicted ex ante using large amounts of information about product integration from existing public firms selling products related to any candidate merging firms. Indeed, our central finding is that firms with high ex ante integration risk complain about integration failure ex post, and experience particularly poor outcomes relating to their growth options. These firms experience abnormally low R&D, capital expenditures, and sales growth. As firm valuations depend heavily on growth options, these outcomes are accompanied by negative long-term abnormal returns and announcement returns. These results suggest that mergers by poorly integrated firms impact longer term growth and growth options. In particular, integrating the transaction likely diverts management's attention away from investment in the firm's longer-term future.

We define merger integration difficulty as the possibility that there will be value loss from attempting to coordinate activities, technologies, and product line offerings to achieve the intended synergies. Rhodes-Kropf and Robinson (2008) model asset complementarity and synergies as a motive for mergers but do not consider the prob-

¹Arnold (1983) examines 5 cases studies of merger integration and Epstein (2004) examines the merger of J.P. Morgan and Chase Manhattan Bank.

lems and risks associated with achieving these synergies. Bena and Li (2014) show that innovation increases for targets and acquirers that have similar technological links from patents—evidence consistent with ex post innovation synergies. Hoberg and Phillips (2010) establish that similar targets and acquirers have higher ex post cash flows and more new product introductions. However, existing literature is silent on the likelihood and impact of not fully achieving planned synergies.

We measure ex ante product integration difficulties using individual words and the paragraph structure of the product descriptions of firm 10-Ks (Item 1). We define a perfectly integrated word as one that is equally likely to appear in any paragraph in the given firm’s business description. This word-specific construct allows us to view any real or hypothetical firm as a collection of building blocks (words). A firm likely faces challenges to product integration if the words the firm uses appear uniformly integrated across the paragraphs when they are used by other firms, but are not integrated across paragraphs when used by the given focal firm. This word-by-word approach allows us to compute integration difficulties for individual firms, or for hypothetical post-merger firms that do not yet exist. In particular, we can compute this construct for the target, the acquirer, or the newly anticipated product market synergies.

The intuition for this approach is based on a generative process for business descriptions after a merger. Suppose that the instantaneous effect of merging two firms together (without any initial integration) can be characterized by simply appending the text of the target’s business description to that of the acquirer. At this point, the text associated with both firms, while in the same document, is disjointed and unintegrated. As the firm proceeds to integrate, the product text from the two original parts should become mixed. For example, words from the target’s vocabulary effectively blend into paragraphs that previously just discussed the acquirer’s products (and vice-a-versa).

Although the concept of product integration alone might seem narrow relative to a classic view of integration difficulties, which includes employees leaving the firm, poor incentives, and poor cultural integration, we propose that these issues are at least partially linked and that technology and growth options play a crucial role.

Our empirical results support this proposition. When our ex ante measures of product integration difficulty are high, we observe increased managerial complaints regarding integration difficulties. These complaints are detailed and often focus specifically on technology, product integration, and managerial distractions. These findings are consistent with the classic view of unexpected drains on managerial time, issues relating to incentives, and a poor work environment needed to grow the firm.

One example of managers discussing integration difficulties in their 10-K (in a different section than the product description section) is Integrated Health Services in 1997:

“IHS has recently completed several major acquisitions, ..., and is still in the process of integrating those acquired businesses. The IHS Board of Directors and senior management of IHS face a significant challenge in their efforts to integrate the acquired businesses, including First American, RoTech, CCA, the Coram Lithotripsy Division and the facilities and other businesses acquired from HealthSouth. The dedication of management resources to such integration may detract attention from the day-to-day business of IHS. The difficulties of integration may be increased by the necessity of coordinating geographically separated organizations, integrating personnel with disparate business backgrounds and combining different corporate cultures.”

In all, we find that over 19% of all post merger firms in our sample make ex post statements like the one above in their 10-K. Such statements typically appear in the MD&A or the risk factors section. We view such statements as indicators of ex post integration difficulties. Thus, they are not useful in predicting integration risk ex ante, but are invaluable in assessing the validity of our ex ante measures. Indeed, measuring integration difficulties ex ante is far more difficult than identifying cases of failure ex post. For example, even managers themselves might not fully understand the risks of a proposed deal, and the post-merger firm is a concept that is not observable ex ante. Yet the ability to measure integration difficulties ex ante, and to predict its likely mechanisms, is far more valuable than the ability to identify failures ex post when it is too late.

Examining outcomes after mergers and acquisitions, we find that ex ante measures of product integration risk are associated with lower sales growth, lower R&D and capital expenditures. These results are based on single segment firms where our predictions are most transparent, as we exclude diversified conglomerate firms.

Upon announcement, we find that targets have negative announcement returns when ex ante integration risk specifically associated with the synergies is high. As synergies are ex ante unrealized, we expect risk specific to synergies to be particularly high. Although targets experience lower returns upon announcement, acquirers experience negative abnormal returns over the full year following the transaction. Moreover, our results help to explain the well-known anomaly of negative stock returns following acquisitions more broadly. We find that negative abnormal returns following acquisitions only exist in the subsample of mergers and acquisitions where ex ante integration difficulties are high. These results are also robust to controlling for product similarity as measured by Hoberg and Phillips (2010), which uses product text to capture potential product market synergies. We conclude that our ex ante measure of product integration difficulties is distinct and separate from existing measures of product similarity used in the literature.

Our finding that acquirers experience negative long-term stock returns, but only when they have high ex ante integration failure risk, suggests that markets do not price integration failure immediately. These results are particularly strong for firms that have high cash balances, and are larger in terms of market capitalization. We do not find any differences between value and growth firms. Together, the findings for high cash balances indicate that potential agency problems such as empire building might increase the risks of poorly integrated deals. The finding for larger firms is consistent with the view that larger firms are more complex and less flexible (see Loderer, Stulz, and Waelchli (2016)) and are more likely to have integration problems.

Overall, our findings illustrate the importance of product integration and its real impact on acquiring firms. Our paper adds to previous research on mergers which examines ex post outcomes after mergers. Healy, Palepu, and Ruback (1992) and Andrade, Mitchell, and Stafford (2001) document increases in industry-adjusted cash flows following mergers. Maksimovic and Phillips (2001) document increases in productivity after mergers that are related to demand shocks and acquirer skill. Rhodes-Kropf and Robinson (2008) model asset complementarity and synergies as a motive for mergers. Bena and Li (2014) and Hoberg and Phillips (2010) document evidence of synergies post merger, showing that there are increases in cash flows, new

products and patents post merger that are related to ex ante similarity of acquirer and target.

Unlike our study, these articles do not shed light on the difficulties of merger integration even for related firms. We show that ex ante measured product integration difficulty is related to the ex post likelihood of failure in a domestic context. This adds domestic product integration difficulties to the list of documented integration challenges. These findings are distinct from the international and cultural difficulties documented in Ahern, Daminelli, and Fracassi (2015) .

The remainder of the paper is organized as follows. Section II discusses our data and method for measuring ex ante product integration difficulties. Section III provides tests which validate that our ex ante measure of product integration difficulty is correlated with ex post managerial discussions of problems with merger integration. Section IV provides our tests examining the relation between ex ante measures of product integration difficulties and M&A announcement returns. Section V examines ex post real outcomes, and section VI examines ex post stock returns. Section VII concludes.

II Firm Integration and Transaction Integration

A key objective of the methods used in our paper is to examine ex ante expected levels of integration failure for any candidate merger pair (even if the target and the acquirer have not yet merged). This presents two challenges. First, we do not observe the post-merger firm until later, and we have to rely on ex ante available information. Second, a post merger firm is more than the sum of its parts. Generally, a post merger firm has three parts: acquirer assets in place, target assets in place, and synergies and assets created from the business combination. Ideally, our measures of ex ante integration difficulty will be capable of assessing integration difficulties for each component. We predict that the difficulty of integration is more salient for the synergy components of mergers and for longer term R&D than for the assets in place. This is because longer-term incentive problems are likely more severe for firms facing internal difficulties, especially when managerial attention is preoccupied with

pre-existing assets instead of investments in the future. Synergies are key because they by definition require the expertise of both firms (and thus integration) before they can be realized.

Our initial methodology is based on measuring the ex ante integration difficulties associated with each existing firm's assets in place. This can be computed for all public firms, even those not involved in a transaction. We then extend our methodology to compute the ex ante integration difficulty of firms involved in transactions. This approach can separately assess assets in place and potential synergies of the transacting firms. This flexibility is achieved by first defining the concept of integration at the atomistic word level, and then by computing integration difficulty for any firm (or parts of a transacting firm) by averaging the integration of its atomistic parts (the words associated with each part's business description vocabulary). This general framework not only allows us to explore integration specifically for merger transactions as in the current research, but it also provides a foundation for computing ex ante integration difficulty in other corporate settings. Examples of such future research might include divestitures, IPOs, new ventures, or even proposed early-stage business plans that can benefit from pre-implementation ex ante measurable information on integration. In all cases, the integration properties of each such project can be computed by linking each project's product market text to the word-specific integration difficulty scores computed from the general population of public firm 10-Ks.

Before explaining the specific calculations used for measuring the potential for integration difficulty, we first discuss the conceptual foundation for the empirical measures. Our measures capture three different concepts: 1.) Firm realized integration, 2.) Firm expected integration and 3.) Transaction or synergy integration difficulties.

A The Integration Gap: Expected Versus Actual Integration

Central to our analysis is the ability to measure a firm's level of potential for integration success relative to a strong counterfactual or benchmark. A key issue is that,

in some product markets such as agriculture, overall integration levels are low. In this setting, a firm that achieves an average level of realized integration relative to economy-wide averages can be viewed as quite successful. In contrast, in markets where integration levels are high, such as medical devices and services, a firm that achieves an average level of integration relative to economy-wide averages can be viewed as lagging, since expectations should be higher in such markets. This issue is particularly important when we assess longer-term integration success.

We assess each firm’s integration success by comparing its realized integration to an appropriate counterfactual level of expected integration. We define a firm’s “integration gap” as the difference between a firm’s expected and its realized integration as follows (specific formulas and methods are in the next section):

$$\text{Integration Gap}_{i,t} = \text{Expected Integration}_{i,t} - \text{Actual Integration}_{i,t} \quad (1)$$

A firm with a high integration gap has a realized level of integration that is low relative to its expected counterfactual level of expected integration. We might expect that such firms are failing to fully integrate their acquired product offerings, and are thus more likely to experience negative outcomes when they acquire. In particular, firms with a larger integration gap might realize lower profits, higher administrative costs in the form of SG&A, higher rates of ex post divestiture, and lower ex post stock returns if they acquire other firms.

Figure 1 provides four illustrative examples of firm realized integration levels over time (with the specifics of how we calculate these integration levels in the next section). For example, Apple’s integration initially declined around 2002 as the firm began to retool itself from a PC maker into a firm that ultimately would offer a well-integrated array of products including smart phones and tablets and laptops among other offerings. The figure shows that over the period of a decade, Apple’s integration gradually soared and it became one of the highly integrated firms in the economy despite the apparent complexity of its products. The figure illustrates that successful integration is likely the result of ongoing investment over time. Apple’s new products are not only innovative, but are also well-integrated as they share

many common features, presumably relating to internet, software, casings, screen technology and other aspects. The figure also shows that Google has traversed a similar path since its IPO in 2004.

Whirlpool is an example of a firm that was able to integrate its products far earlier and has maintained one of the highest levels of integration during our sample. In contrast, and not surprisingly, Berkshire Hathaway is among the least integrated firms in our sample. Critically, Berkshire acts more as a investment-driven holding company and its objective is not to integrate its business lines. We view the observed lower level of integration of Berkshire to be an indirect validation of our measures. We provide more formal tests of validation in section IV.

[Insert Figure 1 Here]

III Methodology and Data

A Methodology: Measuring Integration Using Words

We now discuss in more detail how we use individual words to measure integration. Consider a firm i that has a business description with N_i paragraphs. Further let L_i denote the number of words in each paragraph. We define the firm’s distribution of paragraph lengths as the following N_i -vector $D_{i,full}$ (where $\mathbb{1}$ is a vector of ones):

$$D_{i,full} = \frac{L_i}{L_i \cdot \mathbb{1}}. \tag{2}$$

Let k denote a given word and let $D_{i,k}$ denote the N_i -vector distribution of word k ’s usage in the N_i paragraphs for firm i . For example, a word that appears in just one paragraph would have a vector $D_{k,i}$ that is zero in all elements and one in the row corresponding to that paragraph. A firm that uses a word twice in one paragraph and once in another would have a vector $D_{i,k}$ that contains all zeros, except one element would contain two-thirds and one element would contain one third.

Individual words that appear with a frequency of occurrence across paragraphs that matches this aggregate frequency would be deemed to be “fully integrated”. In contrast, words having a distribution that is highly dissimilar to the aggregate

distribution are “disintegrated”. The primitive concept driving our approach is that a word is integrated if it appears somewhat “uniformly” across the firms’ paragraphs. A word that appears only in a cluster of paragraphs but otherwise is not mentioned is a relatively disintegrated word. Visual examples of distributions of integrated and non-integrated words are depicted in Figure 2.

[Insert Figure 2 Here]

We thus define word k ’s realized integration for firm i ($IW_{i,k}$) as the distributional proximity of word k ’s usage to firm i ’s aggregate usage distribution of word paragraph lengths:

$$IW_{i,k} = \frac{D_{i,k}}{\|D_{i,k}\|} \cdot \frac{D_{i,full}}{\|D_{i,full}\|} \quad (3)$$

We note that $IW_{i,k}$ can be computed fully from firm i ’s 10-K. We thus define this construct as a measure of “realized integration”, as it is the observed level of integration for word k in firm i ’s 10-K in the given year (note that all variables in this section have an implied t subscript for the given year, which we omit for parsimony).

In addition to realized integration levels, we also compute levels of benchmark “expected integration” for each word k and firm i . This is done by simply computing the average of $IW_{j,k}$ across all single segment firms j such that $j \neq i$ such that firm j uses word k in its 10-K. We base this calculation on single segment firms only because integration computed for conglomerates measures integration both at the product level but also integration related to the firm’s more complex organizational structure. Expected integration is thus a quantity that is also unique for each firm i and word k , and we denote expected integration as $\overline{IW_{i,k}}$ whereas realized integration is $IW_{i,k}$. Expected integration indicates the extent to which word k normally appears as an integrated word across firms in the economy that use word k . Therefore, it serves as a natural benchmark to which realized integration can be compared. For example, we propose that a given firm has an integration shortfall if the words it uses generally have low levels of realized integration and high levels of expected integration. This concept will be important when we later introduce firm-level measures.

B Measuring Firm-level Integration

We now describe how we compute firm-level actual and expected integration levels for any firm in isolation, regardless of whether the given firm is experiencing or has experienced a transaction. The main intuition is that we compute integration levels at the word level for each firm in the previous section. Firm-level integration is simply the weighted average integration of the words it uses in its 10-K business description. In our main results, we focus just on firms producing only in single industries. We exclude diversified conglomerate firms based on firms having two or more segments on the COMPUSTAT Business segment tapes. We focus on single industry firms to emphasize that the integration differences we find are not just relevant for diversified conglomerate firms. In robustness, we include diversified conglomerate firms and find similar results.

We define I_i for firm i as a Q -vector where each element k contains each word's level of realized integration $IW_{i,k}$, which we defined in equation (3). Q denotes the number of unique words in the sample of all firms in a given year. Firm realized integration is then computed by averaging the realized integration of the words the firm uses as follows:

$$\text{Actual Integration}_i = V_i \cdot I_i \tag{4}$$

where V_i is a Q -vector that contains the relative frequency each word k is used by firm i in its overall business description section of its 10-K. In particular, V_i indicates the density of words used, and satisfies $V_i \cdot 1 = 1$. As a result, equation 4 intuitively defines firm integration as a simple weighted average of individual word-specific integration levels.

We next consider firm “expected integration”, which is computed in a parallel fashion as realized integration, except that it is based on expected word-level integration ($\overline{IW_{i,k}}$) instead of realized word-level integration ($IW_{i,k}$). We thus define \overline{I}_i for firm i as a Q -vector where each element k contains each word's level of expected integration $\overline{IW_{i,k}}$ (as defined in the previous section). Firm expected integration is

thus the average expected integration of the words the firm uses as follows:

$$\text{Expected Integration}_i = V_i \cdot \bar{I}_i \quad (5)$$

We emphasize that both realized and expected integration are not highly correlated with measures of similarity or competitiveness such as those used in Hoberg and Phillips (2016). This is by design, as the concept of integration has a different foundation than does competitiveness or the concept of across-firm relatedness. In particular, firm integration is a property of the paragraph structure and its distributional properties *within* a firm (measuring the degree to which words are mixed), and is not a property of how similar a firm’s disclosure is to other firms.

From the expected and actual integration levels, we then can compute a firm’s integration gap as:

$$\text{Integration Gap}_{i,t} = \text{Expected Integration}_{i,t} - \text{Actual Integration}_{i,t} \quad (6)$$

C Measuring Synergy Integration Risk

To measure synergy integration difficulty on actual or proposed merger transactions, we consider words that are likely to appear in a post-merger firm that are not currently present in either the pre-merger acquirer or target. In order to do so, for each transaction, we first identify the ten other firms (i.e. selected from the universe of publicly traded firms in the given year excluding the given target and the acquirer) that are most proximate to the vocabulary in the target’s and the acquirer’s 10-K. This is done using the pairwise similarities from Hoberg and Phillips (2016). For a given acquirer firm “a”, target firm “t”, and a given other firm j , let $S_{j,a}$ and $S_{j,t}$ be firm j ’s produce market similarity to “a” and “t” respectively, where similarity is based on the cosine similarity between each firm pair’s 10-K business description.

We then sort all public firms “j” (again excluding the acquirer and target) based on the product of the two similarities ($S_{j,a}S_{j,t}$). We take the top ten firms with the highest product for each acquisition. Firms scoring highly by this metric contain significant amounts of vocabulary overlap with the acquirer and with the target. To

compute synergy integration risk, we now define Q_j for each firm j as the frequency vector of words used by the given firm j that are *not* used by either the acquirer or the target (normalized to sum to one). These words, given revealed association with the acquirer and target vocabularies, likely identify the product market words that will associate with the synergies of the given merger-pair acquisition. They are specifically synergy words because they, by construction, are not currently in the vocabulary of either the acquirer or the target, and yet they are likely to appear if the given acquirer and target are combined. We thus compute expected synergy integration for the given merger pair as predicted by a single firm j as the following weighted average:

$$\text{Expected Synergy Integration}_{a,t,j} = Q_j \cdot \bar{I}_i \quad (7)$$

We then average this quantity over the top ten firms j based on the sort above to obtain Expected Synergy Integration_{a,t} (now without the j subscript). This is an estimate of the expected level of integration needed to be comparable to existing firms in the synergy product market. The synergy integration gap is the expected synergy integration of the merger pair less the weighted average actual firm integration of the acquirer and target as follows (where M_a and M_t are the market capitalizations of the acquirer and target, respectively):

$$\begin{aligned} \text{Synergy Integration Gap}_{a,t} &= \text{Expected Synergy Integration}_{a,t} \quad (8) \\ &- \left[\frac{M_a}{M_a + M_t} \text{Actual Integration}_a + \frac{M_t}{M_a + M_t} \text{Actual Integration}_t \right] \end{aligned}$$

This quantity is carefully constructed to be fully measurable for any candidate pair of firms even before they actually merge. Our central prediction is that merger pairs facing a high ex ante synergy integration gap are more likely to face integration failure ex-post if they do merge. If markets are at least partially efficient informationally, we also expect more negative announcement returns when the given pair announces a merger.

The reason why the synergy integration gap can be calculated in full even before a candidate merger is consummated is because it is a function of only pre-merger

10-K business descriptions, along with the pre-merger business descriptions of other firms operating in markets related to the intersection of the two merging firms. The ability to estimate synergy integration failure even before a merger is consummated makes the measure particularly useful as a potential tool for evaluating integration difficulty for candidate mergers at the time of proposal or evaluation. We are not aware of any existing measures that have this important property.

D Data

We begin with Compustat firms with fiscal years ending in 1996 to 2015 and we exclude firms that have less than one million dollars in assets and in sales. We then identify, extract, and parse machine readable 10-K annual firm business descriptions from the SEC Edgar database. We thus require that firms have machine readable filings of the following types on the SEC Edgar database: “10-K,” “10-K405,” “10-KSB,” or “10-KSB40.” These 10-Ks are merged with the Compustat database using the central index key (CIK) mapping to gvkey provided in the WRDS SEC Analytics package. These minimum criteria leave us with a baseline panel database of 94,153 observations. After dropping conglomerate firms (those with multiple operating segments), our main testing sample includes 70,811 single segment firm observations in our merged Compustat/Edgar universe. Following Hoberg and Phillips (2016), we only consider words that are nouns or proper nouns, and we only include words that appear in no more than 25% of all 10-Ks in the given year. We also drop any words that appear in less than three 10-Ks to reduce the size of our underlying data matrices and because these words are not highly informative about integration due to their scarcity.

We also use metaHeuristica to access other parts of the 10-K. In particular, we use metaHeuristica to identify managerial mentions of integration difficulties in the 10-K, which we discuss more in the next section.

We identify merger and acquisition of asset transactions using SDC Platinum. We obtain 74,600 announced transactions where the acquirer is in our merged Compustat/Edgar universe and 34,916 announced transactions in which the target is in

this universe. When we restrict this sample to single segment firms (as we do for our main tests), these numbers are 46,587 and 19,910, respectively. We use these samples to examine stock returns and long-term real outcomes following acquisition transactions. We also identify a smaller subsample with available lagged machine readable 10-Ks available for both the target and the acquirer, available linked CRSP data for both target and acquirer, and adequate coverage to compute control variables. This sample is used to examine announcement returns, and it contains 7,381 transactions, 3,248 of which are transactions between a target and acquirer that are both single segment firms (our main sample).

We use the CRSP database for two purposes. First, we use the daily return tapes to compute the announcement returns for both targets and acquirers. Second, we use the monthly CRSP return tapes to construct a database of monthly stock returns that we use to test our predictions regarding the negative ex post acquirer stock return anomaly. After merging the monthly stock return database our with the standard Davis, Fama, and French (2000) and momentum controls, and our merged Compustat/Edgar universe, we are left with 781,019 monthly stock return observations from July 1997 to December of 2015. 551,318 observations remain for single segment firms, which we present in our main sample.

We note that in all tests that follow, we report results based on our sample of single segment firms only. We limit the sample in this way because our measures of integration risk are most easily interpreted for single segment firms. However, we also note that all our results are robust to including conglomerates in our sample. We rerun all tests using this combined sample of single segment firms and conglomerate firms and we report the results in the online appendix to this paper.

IV Statistics and Validation

Table I displays the summary statistics for the key variables considered in our study. Panel A reports summary statistics for firm-level variables based on 10-K business descriptions and also for control variables. Although the mean values for realized and expected integration do not have a simple interpretation, the table shows that

both variables have similar means. Expected integration has roughly half the standard deviation, reflecting the fact that it is based on average levels of word-by-word integration, which are less noisy. It is thus not surprising that the difference, the integration gap, has a mean that is close to zero and that spans both positive and negative values. A negative value indicates firms whose realized integration is low relative to benchmark levels implied by other firms using similar vocabularies.

Panel B of Table I reports the mean value of the dummy variable indicating textual integration difficulties surrounding mergers (overall integration failure dummy) as well as a number of specific reasons managers cite for the failures. We explain the construction of these variables in the next section. Here we note that 37.9% of firms in our sample disclose direct statements indicating concerns about risks of failed merger integration. These results indicate that potential integration difficulty is salient for a large number of firms in our sample, as they discuss this issue directly in their 10-K. Finally, Panel C reports the summary statistics for our variables based on real outcomes including sales growth, R&D expenses and capital expenditures, and post merger rates of acquisition.

[Insert Table I Here]

Table II displays the Pearson correlation coefficients. The table shows that, not surprisingly, realized and expected levels of integration are positively correlated at 64.6%. This indicates that when firms operate in markets where high integration is the norm, they usually are able to generate a realized level of integration that is also quite high. However, there are also material differences in the information in these variables. For example, realized integration is lower for larger and older firms, and also for firms facing more competition in the form of total product similarity. In contrast, expected levels of integration do not strongly correlate with these variables.

We also consider the integration gap, which is the difference between expected and realized integration. A high value indicates that a firm's realized integration is low relative to its benchmark, which in turn should be an indicator of integration failure following a merger. In rows (5) and (6), we thus report correlations between our key variables and dummy variables indicating whether managers directly indicate challenges with merger integration in their 10-K (these variables are formally

explained in the next section). We find that the integration gap, as we would predict, is positively correlated with these variables. In particular, when a firm's level of integration is low relative to its benchmark, managers are more likely to report that the firm is facing difficulties in integrating its business lines following a merger.

[Insert Table II Here]

Table III displays sample industries based on the Fama-French 12 classification and average levels of realized and expected integration.² We report results both in the first year of our study (1997) and the last year (2015). The results suggest that for many of these broad industry classifications, that average realized integration is generally in a band between 0.4 and 0.5. The health industry has materially lower average levels of integration at 0.409 in 1997, which drops further to 0.360 by 2015. Shops and durables have higher levels of integration near 0.50. Comparing realized to expected integration, we observe similar patterns. Also, comparing 2015 in Panel B to 1997 in Panel A, we only observe modest shifts in the industry rankings.

[Insert Table III Here]

A Managerial Mentions of Integration Difficulties

We use 10-K text to identify instances where managers explicitly indicate that they are facing difficulties with merger integration, and also specific reasons associated with these difficulties. We use these measures primarily for validation of our aforementioned measures of ex ante integration difficulty based on business descriptions, but also to provide insights into the specific reasons for failure. These managerial statements are important as we previously noted that 37.9% of firm 10-Ks contain a direct statement about integration challenges, and moreover, these statements are detailed and specific, and thus are not boilerplate. We utilize this richness in a second test to further illustrate which specific issues related to integration are most salient for the firms in our sample. We specifically examine issues relating operational

²We thank Ken French for providing classification data on his website.

integration, product integration, technological integration, employees, managerial distraction, and timing delays.

To identify managerial mentions, we use the metaHeuristica software package and run queries on the entire 10-K - thus we use content in 10-Ks that is distinct from the firm's business description (which we use to construct our aforementioned measures of ex ante integration risk). The majority of managerial mentions relating to integration challenges are in the managerial discussion and analysis (MD&A) and risk factor sections of the 10-K. Our objective is to use the results of this query for validation, and in particular, to examine if our ex ante measures of integration difficulty based on product descriptions indeed predict ex post instances of managers explicitly complaining about integration difficulties. Strong evidence regarding this prediction would mitigate concerns that our ex ante measures based on distributional mixture and product market vocabulary primitives are measuring something other than integration.

In order to identify firms that complain about integration difficulties, we run a metaHeuristica query requiring that one word from each of the following three buckets must all jointly appear in a paragraph. We use word buckets that contain an array of synonyms because there are a number of ways to express to a reader that the firm is experiencing integration difficulties. We identified the synonyms to use in these queries using the sentence tree views in metaHeuristica following Hoberg and Maksimovic (2015).

Integration Difficulty List 1: merger OR mergers OR merged OR acquisition OR acquisitions OR acquired

Integration Difficulty List 2: integration OR integrate OR integrating

Integration Difficulty List 3: challenge OR challenging OR difficulties OR difficulty OR inability OR failure OR unsuccessful OR substantial expense

To avoid general statements about integration risk, and to focus on specific dis-

cussions about transactions, we run this query on the whole 10-K but exclude any paragraphs that are in the 10-K’s risk factor section. If a given firm has a hit on this query, we define the “Integration Failure Dummy” to be one. We also compute an “Integration Failure Intensity” variable as the total number of paragraphs that hit on this query divided by the total number of paragraphs in the 10-K.

Table IV presents examples of the first ten paragraphs returned from metaHeuristica in 1997 that hit on our verbal query intended to measure managerial mentions of integration difficulties, where we query metaHeuristica using the word list searches discussed above. The identification of a relevant paragraph requires that at least one word from each of the three integration difficulty buckets discussing acquisitions and integration problems appears in a paragraph. The examples clearly indicate specific mergers being discussed and integration problems with these mergers. We also note that these discussions appear ex post, after the acquisitions have taken place.

[Insert Table IV Here]

We now regress these merger integration and employee discussion variables on our ex ante measures of merger integration risk. Table V presents the results. We include control variables for size, age, overall textual similarity to rivals, Tobin’s q, and document length. All regressions also include industry and year fixed effects with standard errors clustered by industry.

[Insert Table V Here]

The results in Panel A of Table V show that firms are more likely to mention integration problems when expected integration is high. If the firm has a high level of ex ante realized firm integration, they mention integration failure problems ex post less often. More importantly, we consider our composite measure “Integration Gap,” which is the difference between expected integration and realized firm integration. This measure is positively related to mentions of integration problems. Firms with a larger ex ante integration gap, indicating that their realized level of integration falls short of their expected level, experience more ex post managerial discussions of merger integration failure.

Overall, these results validate that our measures of product integration based on the uniformity of word distributions across paragraphs are indeed picking up integration gaps. Our integration measures are calculated using product description text, whereas our test measures of integration difficulties are specific statements about risk exposures and outcomes, and are not rooted in product market discussions. These tests support the conclusion that our ex ante measures of integration difficulty do predict observed instances of integration failure being discussed directly in the firm's ex post disclosure, which is a key result motivating the use of our variables as valid measures of ex ante integration risk.

As noted earlier, these managerial discussions of integration failures are highly detailed. We examine which specific ex post integration failures are most likely to appear when our ex ante measures of integration gap are higher. We specifically examine issues relating to operational integration, product integration, technological integration and managerial distractions. To examine this issue, we construct more specialized versions of our integration failure variable.

We define the following new dummy variables also using the metaHeuristica program. The operations dummy is one if the paragraph describing the firm's integration failures also contains one of the following words: operations, operation, operated, or operational. The products dummy is one if, analogously, at least one of the following words is present: product, products, customer, customers, consumers, or demand. Technological failures are based on the following words: technological, technology, technologies, information, systems or system. Management failures are based on the following words: management, managements, manage, distract, devote, coordination, divert, diversion, or disrupt. Analogous to those in Panel A, we consider regressions in which these dummy variables are the dependent variable.

The results are displayed in Panel B of Table V. Reassuringly, row (4) shows that the integration gap variable most strongly predicts issues with product integration. This is quite remarkable given that our ex ante measure was based on product market vocabulary in a different part of the 10-K. We also find strong support that our measures specifically predict integration failures relating to managerial distractions and technology. We thus conclude that ex ante measures of product market

integration intuitively predict ex post failures most related to product market and technology integration issues.

V Ex Post Real Outcomes

We now examine the relationship between post-merger real outcomes and ex ante integration risk. We examine ex post sales growth and changes in R&D and capital expenditures. Lastly, we examine if firms with high potential integration difficulty are less likely to acquire ex post. This would suggest that firms might learn from past mistakes after they face real integration challenges.

Table VI reports the results of OLS regressions in which the dependent variable is a measure of ex post sales growth or changes in R&D and capital expenditures scaled by sales and assets. Our framework is based on cross terms where we interact a three-year merger dummy with our ex ante measure of integration challenges. Thus, we are comparing acquirers with high ex ante integration challenges to firms with similar integration challenges that do not acquire, and to acquirers facing low integration challenges. We include industry and year fixed effects and controls for size, age, Tobin's Q and document length. We also consider outcomes measured as changes over both a one-year horizon and a three-year horizon, where the horizon begins in year t of the merger and ends in year $t + 1$ or $t + 3$. We standardize all variables prior to running regressions for ease of interpretation.

[Insert Table VI Here]

Inspection of the results in Table VI reveals that ex post sales growth is significantly lower for acquiring firms with high ex ante merger integration gaps. We also find lower R&D and capital expenditures for these firms. Put together, this indicates a broad-based reduction in innovation, investment and future growth.

In particular, rows (1) and (2) show that sales growth is 1.6 to 6.2% lower for acquirers with a 1 standard deviation higher expected integration risk. Analogously, rows (3) and (4) indicate that R&D decreases by 2.8% to 4.2% when the ex ante integration gap is high. The interpretation of the integration gap is very intuitive.

When the ex ante difference between the expected integration and actual integration is high for the acquirer, it indicates that the firm's realized integration is below the expected levels achieved by other firms operating in markets using similar vocabularies. Our hypothesis is that such a firm is less likely to realize the full potential of its M&A activities, and we thus predict lower expenditures on longer-term investments given the distraction to management that a difficult integration process entails. These results are significant at the 1% level and strongly support this conclusion. In addition, rows (7) and (8) show decreased capital expenditures, although the decline in CAPX is less severe than that for R&D. This result is consistent with R&D requiring more effort and incentives relative to CAPX, and thus R&D is more sensitive to integration failure.

Table VII examines whether subsequent withdrawal of future acquisitions, the rate of future acquisitions and net acquisitions (acquisitions minus divestitures) are related to ex ante merger integration risk. We consider regressions in which these ex post measures of acquisition activities are regressed on our ex ante measure of integration risk. We also include controls for size, age, target fraction of acquirer, market to book and also text-based similarity measures from Hoberg and Phillips (2010), which have been shown to impact mergers.

[Insert Table VII Here]

In Panel A of Table VII, one observation is one firm in one year, and the dependent variable is the fraction of a given firm's announced transactions in the given year that were withdrawn. A firm-year observation is only included in the regression if the firm had at least one announced acquisition in the given year. The table shows that proposed mergers and acquisitions are more likely to be withdrawn when the integration gap is high. In addition, when rivals and targets have similar products, or when they have higher valuations, deals are less likely to be withdrawn. Overall the results support the conclusion that our measure of the integration gap captures ex ante information about likely challenges a transaction will face, and managers are more likely to withdraw such transactions.

Panel B of Table VII reveals that acquisitions and net acquisitions decrease in

the years after a firm does an acquisition with a high ex ante merger integration gap. These results are significant at the 5% level overall, and are significant at the 1% level for net acquisitions. We note that the ex ante integration variables are measured before the transaction, thus providing evidence that ex ante shortcomings in integration are associated with subsequent reductions in acquisition activity. This suggests that managers who face difficult integrations ex ante might learn from the experience and then they do fewer such transactions ex post.

VI Stock Market Returns

Given we have documented that outcomes differ on the real side, we turn to an examination of the impact of ex ante integration difficulty in the stock market. We examine whether merger integration difficulty relating to the assets in place, and also specifically relating to the likely synergies, induce lower stock market returns. We examine both announcement returns and also longer term ex post stock returns.

A Announcement Returns

We first examine stock market announcement returns. We regress stock market announcement returns on our measures of potential merger integration difficulty and synergy integration risk. We include both our measure of the synergy integration gap and separate measures of the integration gap for the assets in place of the acquirer and target. We also consider our measure of synergy uniqueness. We consider announcement returns measured just on day $t = 0$, and also a 3-day window, where all windows are centered around $t = 0$. Announcement returns are market-adjusted. We include control variables for size, age, the fraction of the acquirer the target represented, the firm market to book, text-based similarity variables based on Hoberg and Phillips (2010), and document size.

The key independent variables of interest are the Synergy Integration Gap, and the Target and Acquirer Integration Gaps. These measures are computed as follows. The synergy integration gap was defined earlier in equation (8) and is based on expected integration of the words used by other firms in the economy that are likely

to appear in the post merger firm's synergy vocabulary. The acquirer and target integration gaps are the standard variables defined in equation (6) computed for each of the two firms, respectively. The resulting measures of integration difficulty are ex ante measurable and target specific parts of the post merger firm based on assets in place and likely synergies.

[Insert Table VIII Here]

Panel A of Table VIII shows some evidence that the acquirer underperforms at the time of the announcement when it buys targets that are poorly integrated as the coefficient on the target integration gap is negative and significant, although at the 10% level. The synergy integration gap is not statistically different from zero for acquirers. Importantly, we document later that the biggest stock market consequence for acquirers lies in their negative longer-term abnormal stock returns, which are significantly lower for acquirers facing higher integration difficulty. This suggests that market participants might not fully anticipate the consequences of integration failure at the time of announcement.

In contrast, Panel B shows that the synergy integration gap strongly predicts lower target announcement returns, especially at the 3-day horizon, where results are significant at the 1% level. Because all independent variables are standardized prior to running the regression, the coefficients of -0.010 / -0.017 for the synergy integration gap indicate that target announcement returns are 1.1% to 1.7% lower on average when the synergy integration gap increases by one standard deviation. These results are economically meaningful. Put together with our findings for acquirers, the results suggest that the market is partially but not fully aware of likely integration challenges at the time of announcement.

Panels B and C additionally show that acquirers have higher announcement returns, and targets have lower announcement returns, when the likely synergies are more unique. Although the drivers of this result are not perfectly clear and full assessment of this finding is outside the scope of our study, it is potentially consistent with the acquirer earning at least some rents when their proposed mergers are particularly innovative. They might also suggest that the acquirer has more bargaining

power when the proposed synergies are highly unique, as the acquirer might be the only buyer that can achieve the proposed synergies.

Our results are robust to including controls for the pairwise product text similarity variables used in Hoberg and Phillips (2010). This shows that our new measures of merger integration are distinct from firm pairwise similarities. This finding is not surprising by construction, as our integration difficulties variable focuses on within firm word frequency distributions across paragraphs, whereas the similarity variables in Hoberg and Phillips (2010) are based on across-firm comparisons.

B Ex Post Long-run Stock Returns

In this section, we explore the extent to which ex ante measures of integration are associated with the ex post stock returns of acquiring firms. This issue of the stock returns to acquiring firms is important and has been studied by Asquith (1983), Aggarwal, Jaffe, and Mandelker (1992), Fama (1998), Loughran and Vjih (1997) and Mitchell and Stafford (2000). These studies show that acquiring firms underperform in the years after an acquisition. Our study extends this work and we examine the extent to which acquiring firms with higher levels of ex ante integration difficulty experience lower stock returns than do acquirers with lower levels of integration risk. Evidence supporting this link can further explain why some acquiring firms underperform, as market participants might not have full information about the extent of integration difficulty and its potential adverse affect on acquiring firms.

C Asset Pricing Variables

We consider monthly excess stock returns as our dependent variable. Our primary independent variable of interest is the acquisition dummy. We examine its relationship with the integration gap by sorting firms into quintiles based on the integration gap, and testing (using Fama MacBeth regressions and calendar time models) if the high gap firms behave differently from the low gap firms. Our acquisition dummy is set to one when a firm has a completed acquisition as indicated by the SDC Platinum database. The dummy is set to one during the one year period starting six months

after the acquisition date and is otherwise set to zero. The use of a six month lag is to maintain consistency with our other variables, and also to reflect the fact that integration failure likely materializes after the firm has had ample time to attempt to properly integrate the acquired division. This allows us to examine if the well known anomaly that acquiring firms underperform can be explained by integration failure, and also allows us to more broadly examine the cross sectional role of merger integration failure in explaining monthly stock returns.

We also include controls for size, book-to-market and momentum. We construct size and book-to-market ratio variables following Davis, Fama, and French (2000) and Fama and French (1992). Market size is the natural log of the CRSP market cap. Following the lag convention in the literature, we use size variables from each June, and apply them to the monthly panel to predict returns in the following one year interval from July to June.

The book-to-market ratio is based on CRSP and Compustat variables. The numerator, the book value of equity, is based on the accounting variables from fiscal years ending in each calendar year (see Davis, Fama, and French (2000)) for details). We divide each book value of equity by the CRSP market value of equity prevailing at the end of December of the given calendar year. We then compute the log book-to-market ratio as the natural log of the book value of equity from Compustat divided by the CRSP market value of equity. Following standard lags used in the literature, this value is then applied to the monthly panel to predict returns for the one year window beginning in July of the following year until June one year later.

For each firm, we compute our momentum variable as the stock return during the eleven month period beginning in month $t - 12$ relative to the given monthly observation to be predicted, and ending in month $t - 2$. This lag structure that avoids month $t - 1$ is intended to avoid contamination from microstructure effects, such as the well-known one-month reversal effect.

After requiring that adequate data exist to compute our integration variables and the aforementioned asset pricing control variables, and requiring valid return data in CRSP, our final sample has 551,318 single segment firm observations.

D Fama MacBeth Regressions

Table IX displays the results of monthly Fama and MacBeth (1973) regressions in which the dependent variable is the monthly excess stock return. Rows (1) to (5) show our baseline model, which we separately run in quintile subsamples based on our ex ante integration map variable. Row (6) displays the results of tests regarding whether the coefficients in the highest quintile integration gap subsample are significantly different from those the lowest quintile.

We first note that the book-to-market and momentum variables are not significant in our sample. This result for momentum is primarily due to the fact that our sample includes the financial crisis, a period during which momentum is known to strongly under perform. We now examine two hypotheses that might further explain why managers might pursue transactions in cases where integration difficulties are likely. We test whether managerial agency problems are likely, and whether integration issues are more severe for larger firms, which are likely more complex and inflexible. We also consider whether poor performance of acquirer firms is related to a lack of growth options as such firms might wish to slow their rate of decline.

[Insert Table IX Here]

Table IX displays the results. Rows (1) to (5) display results for our full sample divided into quintiles based on the ex ante integration gap. Row (6) displays our main result, that firms with a higher integration gap have significantly lower stock returns when they acquire relative to firms that have low integration gaps. We also find that underperformance following acquisitions in high integration gap firms is stronger in subsamples where firms have (A) higher cash balances and (B) firms are larger. Results are particularly strong for firms that have both features. Row (7) indicates that high minus low integration gap acquirers particularly underperform when they are firms with above-median cash balances. Here the t -statistic is -3.2 and the result is significant at the 1% level. This result is quite strong compared to the diametric-opposite subsample in row (8), where the same test produces a coefficient very close to zero and a t -statistic of -0.1. We also note that our results are a stronger for larger firms as shown in row (9), where once again we observe a result that is

significant at the 1% level.

Regarding an alternative explanation based on a lack of growth options, rows (9) and (10) suggest that such an explanation is not present. Such an explanation would predict stronger results for value firms, when in fact we find stronger results for growth firms. Yet any difference in value versus growth firms is small relative to the differences based on cash and size. Also, as we point out in the next section, any significant results for value or growth vanish in calendar time tests when profitability and investment factors are included. Thus, our evidence generally runs counter to a lack of growth option explanation, given overall we find little differences across value or growth firms.

Overall these findings support the conclusion that acquirers with high integration gaps underperform, whereas those with low integration gaps do not. The difference across these firms is statistically significant at the 5% level overall and at the 1% level in targeted subsamples where we predict stronger results. Thus we conclude that merger integration risk can explain a large fraction of the underperformance of acquiring firms documented in past studies. Because these findings are particularly sharp for firms with high cash balances and for larger firms, we conclude that agency problems and firm complexity both likely play a role. Row (13) confirms that our results are most significant and economically large when both channels are present.

Regarding economic magnitudes, our results suggest that long-short quintile portfolios based on acquiring firms with high minus low integration gaps earn roughly 0.3% per month (3.6% annual) in the full sample. These returns more than double in the high cash balance subsample to 7.7% annualized, are 6.2% for large firms, and 8.8% annualized when both traits are present. These results are economically large, particularly so given that they are stronger in the larger firm subsample where significant return predictability is usually more difficult to find.

D.1 Calendar-Time Tests

To further examine if our stock return results are robust, we consider monthly zero-cost portfolios that invest long in acquiring firms and short in non-acquiring firms.

Moreover, we examine the performance of this portfolio within subsamples of firms facing high integration gaps and compare this portfolio to an analogous one based on low integration gap firms.

In our calendar time tests, the dependent variable is the monthly return of such zero-cost portfolios, and we maintain our focus on single segment firms. Table X displays the results. In Panel A, we construct the zero cost portfolio separately for firms in each quintile based on each firm's ex ante integration gap. We regress each portfolio on four factors including the market factor, HML, SMB, RMW, and CMA.³ The table displays each portfolio's factor loadings and also its abnormal performance given the factor model (its alpha). Rows (1) to (5) show that we only observe statistically significant underperformance for the highest two integration gap quintiles. Row (6) shows that the difference between the high and low integration gap portfolios is significant at the 5% level in the full sample.

[Insert Table X Here]

For parsimony, we focus only on the difference between the high integration gap quintile and the low integration gap quintile in our additional subsample tests. Panel B reports this difference in performance when firms are further divided based on above versus below median cash balances (cash/assets). We find, consistent with our earlier results, that underperformance is stronger for firms with higher cash balances. This is suggestive evidence that agency problems might play a role in the decision to do mergers with an increased likelihood of integration failure. In Panel C, we run analogous tests based on above and below median market capitalizations. We find that differences in underperformance are only significant for larger acquirers. This finding illustrates that our results are important as they impact larger firms, and is consistent with the impact of integration difficulties being more severe for larger and more complex firms.

In Panel D, we test for differences in the subsamples of value and growth firms.

³We thank Ken French for providing factor data on his website. We also note in the internet appendix that our results are robust to an alternative Carhart model based on the market, HML, SMB, and UMD. The only difference is that results are stronger for the growth firm subsample using the Carhart model, which indicates that the profitability and investment factors are relevant to include in the model.

Here we find no significant results and the coefficients for value and growth are nearly identical. These results suggests that a lack of growth options likely cannot explain our results. Finally, in Panel E, we show that among the four permutations of above and below median size and cash balances, only the high cash balance and large firm size subsample experiences significant negative abnormal returns.

Overall, our results indicate that stock returns are lower among firms that are acquirers when they face higher ex ante integration gaps. This finding is stronger for larger firms and firms that have higher cash balances. This result also cannot be explained by common risk factors used in the literature. Our earlier findings link underperformance to specific types of integration failures, which are likely to be idiosyncratic in nature. We conclude that although the market reacts some at the time of announcement, the market likely does not fully reflect the impact of potential integration problems at this time and thus we observe subsequent longer-term price corrections.

VII Conclusions

We examine the importance of potential merger integration difficulty to merger outcomes—both for stock market and real outcomes. Our findings support the view that poor merger outcomes arise in part from the difficulty of integrating the product lines offered by the pre-merger firms and especially decreased investment in innovation and long-term growth options. These integration difficulties in turn lead to lower sales growth and negative stock market outcomes.

We focus on measuring the difficulty of integrating product lines across organizations at the firm level for acquisitions in the U.S. We use text-based analysis of business descriptions in firm 10-Ks to measure ex ante merger integration difficulty to capture the extent to which merging firms will face challenges integrating their product lines. The measures are general and are based on measuring integration at the level of individual words or word-pairs. Using this approach, we can calculate integration difficulty for both proposed mergers and actual mergers before they are consummated. We can also assess ex ante integration difficulty specifically for merger

synergies, which are most likely at risk of failed integration.

We find that when ex ante merger integration difficulty is high, the post-transaction incidence of managers discussing integration difficulties increases. These discussions are specific and often refer to issues such as technological issues, product-oriented issues and drains on managerial time. These findings are consistent with ex ante product integration risks predicting an environment that is less conducive to innovation and investment in growth options, which require strong incentives and high attention by management.

We document the impact of ex ante integration difficulty throughout the merger process and on ex post outcomes. We find that firms performing mergers and acquisitions in markets with high product integration difficulty experience lower ex post sales growth, R&D and capital expenditures. Target firms experience lower announcement returns when integration difficulties are likely whereas acquirers experience negative longer-term abnormal returns after the transaction. Regarding long-term returns, our findings suggest that the anomaly that acquiring firms have lower longer-term stock returns primarily occurs for firms most exposed to our ex ante integration difficulties measure and for firms with high cash balances and larger more complex firms. Additionally, we find no support for an alternative explanation that our results can be explained by firms with poor growth opportunities attempting to slow their decline using acquisitions.

Our results lend support to the conclusion that the consequence of integration problems are less focus on growth options, as managers are forced to devote more attention to pre-existing operations at the cost of investment in growth options. These findings illustrate the importance of product integration within the firm and its direct impact on the longer term future of acquiring firms and the success of a firm's acquisition.

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Table I: Summary Statistics

Notes: Summary statistics are reported for our sample of 70,811 single segment firm-years from 1996 to 2015. Realized integration is the extent to which a firm’s individual words appear in the firm’s actual paragraphs in a distribution proportional to observed paragraph word counts. Expected integration is the extent to which a firm uses vocabulary that generally appears in a this proportional distribution across paragraphs in all firms that use the given word in the economy in the given year. The integration gap is expected minus realized integration. TNIC total similarity is the summed TNIC similarity of firms in the given firm’s TNIC industry. The Overall integration Complaints dummy in Panel B is one if the firm’s 10-K has a paragraph where the firm mentions integration in the context of a discussion about acquirers and vocabulary that indicates difficulty. The remaining integration complaints variables additionally require tabulated paragraphs to mention specific types of integration failures ranging from operations to technology to employees, etc. The profitability and expense variables in Panel C are based on Compustat data. The change in target (acquirer) rate is the natural logarithm of one plus the number of asset sales (purchases) in year t divided by one plus the number of asset sales (purchases) in year $t - 1$.

Variable	Mean	Std. Dev.	Minimum	Median	Maximum
<i>Panel A: Integration Variables and Firm Characteristics</i>					
Firm Integration	0.431	0.109	0.237	0.415	1.000
Expected Integration	0.400	0.054	0.247	0.393	0.586
Integration Gap	-0.031	0.082	-0.720	-0.015	0.170
TNIC Total Similarity	12.308	21.509	1.000	2.886	132.931
Log Assets	5.781	2.060	0.001	5.782	14.986
Log Age	2.431	0.760	0.000	2.398	4.190
<i>Panel B: Managerial Mentions of Integration Difficulties</i>					
Overall Integ Complaints	0.074	0.261	0.000	0.000	1.000
Operations Integ Complaints	0.041	0.198	0.000	0.000	1.000
Products Integ Complaints	0.043	0.203	0.000	0.000	1.000
Technology Integ Complaints	0.042	0.201	0.000	0.000	1.000
Management Integ Complaints	0.034	0.182	0.000	0.000	1.000
<i>Panel C: ex post Outcome Variables</i>					
Sales Growth	1.178	0.705	0.127	1.074	25.859
Δ R&D/Sales	0.029	1.487	-48.043	0.000	71.144
Δ R&D/Assets	0.002	0.064	-1.553	-0.000	1.384
Δ CAPX/Assets	-0.002	0.045	-0.531	-0.000	0.505
Δ Target Rate	0.011	0.335	-2.833	0.000	2.485
Δ Acquirer Rate	-0.004	0.501	-3.526	0.000	3.807

Table II: Pearson Correlation Coefficients

Notes: Pearson Correlation Coefficients are reported for our sample of single segment firms from 1996 to 2015. Please see Table I for variable descriptions.

Row Variable	Realized Integration	Expected Integration	Integration Gap	TNIC Total Similarity	Log Assets	Log Age
	<i>Correlation Coefficients</i>					
(1) Expected Integration	0.682					
(2) Integration Gap	-0.874	-0.240				
(3) TNIC Total Similarity	-0.267	-0.261	0.181			
(4) Log Assets	-0.142	-0.158	0.083	0.223		
(5) Log Age	0.177	0.099	-0.169	-0.166	0.257	
(6) Integration Complaints Dummy	-0.049	-0.024	0.049	-0.062	-0.008	-0.074

Table III: Integration Across Industries

The table displays the average realized and expected integration for the Fama-French-12 industries in 1997 (Panel A) and 2015 (Panel B). Realized integration is the extent to which a firm's individual words appear within its own paragraphs in a distribution close to a uniform distribution. Expected integration is the extent to which a firm uses vocabulary that generally appears in a uniform distribution across paragraphs in all firms that use the given word in the economy in the given year. The integration gap, our key variable, is expected minus realized integration.

Row	FF12 Industry	Realized Integration	Expected Integration	Integration Gap	# Obs.
<i>Panel A: 1997 Industries</i>					
1	Telcm	0.408	0.418	0.011	92
2	Hlth	0.416	0.407	-0.009	243
3	Enrgy	0.430	0.412	-0.018	109
4	BusEqSv	0.437	0.414	-0.023	558
5	Money	0.418	0.390	-0.029	558
6	Manuf	0.478	0.440	-0.038	274
7	NoDur	0.496	0.456	-0.040	143
8	Utils	0.450	0.410	-0.040	31
9	Other	0.465	0.420	-0.045	377
10	Durbl	0.508	0.455	-0.053	61
11	Shops	0.504	0.448	-0.057	301
12	Chems	0.521	0.443	-0.079	52
<i>Panel B: 2015 Industries</i>					
1	Hlth	0.358	0.351	-0.007	163
2	Telcm	0.433	0.423	-0.010	60
3	Enrgy	0.406	0.390	-0.016	93
4	Money	0.410	0.380	-0.030	549
5	BusEqSv	0.448	0.408	-0.040	403
6	Other	0.443	0.390	-0.054	254
7	Utils	0.460	0.395	-0.066	57
8	Manuf	0.463	0.389	-0.073	215
9	Shops	0.488	0.414	-0.075	159
10	NoDur	0.483	0.405	-0.078	91
11	Durbl	0.496	0.400	-0.097	46
12	Chems	0.503	0.401	-0.102	56

Table IV: Sample Managerial Statements of Integration difficulty

The table displays the first ten paragraphs returned from metaHeuristica in 1997 that hit on our verbal query intended to measure managerial measures of integration risk. The query was run using metaHeuristica and requires that one word from each of three buckets must appear in a paragraph. The first bucket is acquisition words: {merger, mergers, merged, acquisition, acquisitions, acquired}. The second bucket is integration words: {integration, integrate, integrating}. The third bucket is an indication of difficulty: {challenge, challenging, difficulties, difficulty, inability, failure, unsuccessful, substantial expense}. The results from this query are then used to compute the integration challenges dummy and the integration challenges intensity variables.

Row	Sample Paragraph
1	[Integrated Health Services] IHS has recently completed several major acquisitions, including the acquisitions of First American, RoTech, CCA and the Coram Lithotripsy Division and the Facility Acquisition, and is still in the process of <u>integrating</u> those acquired businesses. The IHS Board of Directors and senior management of IHS face a significant challenge in their efforts to <u>integrate</u> the acquired businesses, including First American, RoTech, CCA, the Coram Lithotripsy Division and the facilities and other businesses acquired from HEALTHSOUTH. The dedication of management resources to such <u>integration</u> may detract attention from the day-to-day business of IHS. The difficulties of <u>integration</u> may be increased by the necessity of coordinating geographically separated organizations, <u>integrating</u> personnel with disparate business backgrounds and combining different corporate cultures.
2	[Siebel Systems] The Company has acquired in the past, and may acquire in the future, other products or businesses which are complementary to the Company's business. The <u>integration</u> of products and personnel as a result of any such acquisitions has and will continue to divert the Company's management and other resources. There can be no assurance that difficulties will not arise in <u>integrating</u> such operations, products, personnel or businesses. The failure to successfully <u>integrate</u> such products or operations could have a material adverse effect on the Company's business, financial condition and results of operations.
3	[Cable Design Technologies] Although the Company has been successful in <u>integrating</u> previous acquisitions, no assurance can be given that it will continue to be successful in <u>integrating</u> future acquisitions. The <u>integration</u> and consolidation of acquired businesses will require substantial management, financial and <u>other</u> resources and may pose risks with respect to production, customer service and market share. While the Company believes that it has sufficient financial and management resources to accomplish such integration, there can be no assurance in this regard or that the Company will not experience difficulties with customers, personnel or others. In addition, although the Company believes that its acquisitions will enhance the competitive position and business prospects of the Company, there can be no assurance that such benefits will be realized or that any combination will be successful.
4	[Star Telecommunications] Additionally, on November 19, 1997, the Company entered into an agreement to acquire UDN. The acquisition of UDN is subject to approval of UDN's stockholders and to various regulatory approvals, and the Company may not complete this acquisition. These acquisitions have placed significant demands on the Company's financial and management resources, as the process for <u>integrating</u> acquired operations presents a significant challenge to the Company's management and may lead to unanticipated costs or a diversion of management's attention from day-to-day operations.
5	[Sun Healthcare Group] The <u>integration</u> of the operations of Retirement Care and Contour, to the extent consummated, will require the dedication of management resources which will detract attention from Sun's day-to-day business. The difficulties of <u>integration</u> may be increased by the necessity of coordinating geographically- separated organizations, <u>integrating</u> personnel with disparate business backgrounds and combining different corporate cultures. As part of the RCA and Contour Mergers, Sun is expected to seek to reduce expenses by eliminating duplicative or unnecessary personnel, corporate functions and other expenses.
6	[Sunquest Information Systems] management has limited experience in identifying appropriate acquisitions and in <u>integrating</u> products, technologies and businesses into its operations. The evaluation, negotiation and <u>integration</u> of any such acquisition may divert the time, attention and resources of the Company, particularly its management. There can be no assurance that the Company will be able to <u>integrate</u> successfully any acquired products, technologies or businesses into its operations, including its pharmacy systems.
7	[Waterlink Inc] Waterlink has grown by completing ten acquisitions consisting of seventeen operating companies. The success of the Company will depend, in part, on the Company's ability to <u>integrate</u> the operations of these businesses and other companies it acquires, including centralizing certain functions to achieve cost savings and developing programs and processes that will promote cooperation and the sharing of opportunities and resources among its businesses. A number of the businesses offer different services, utilize different capabilities and technologies, target different markets and customer segments and utilize different methods of distribution and sales representatives. While the Company believes that there are substantial opportunities in <u>integrating</u> the businesses, these differences increase the difficulty in successfully completing such <u>integration</u> .

Table V: Post-Merger Integration and Reasons for Integration Failure

The table reports the results of a linear probability model in which the dependent variable is ex post (year $t + 1$) integration failure complaints by the acquirer. Panel A reports the results for the overall level of complaints regarding integration failure, and Panel B reports results that zero in on specific reasons managers cite as being related to integration failure. As our goal is to examine ex post outcomes for acquirers, we focus on the cross term where the past acquirer dummy is interacted with the integration gap variable. The integration failure dummy is one if the firm's 10-K has a paragraph where the firm mentions integration in the context of discussing acquisitions alongside vocabulary that indicates difficulties or failure. We tabulate all such paragraphs, excluding any that are in a risk factors section (which tend to be more boiler plate and less about specific transactions), and consider a dummy equal to one if a firm has any such paragraphs and an intensity equal to the number of such paragraphs divided by the total paragraphs in the 10-K. The reasons for integration failure in Panel B identify paragraphs that satisfy the aforementioned conditions for measuring integration failure, but that additionally have the following features. The operations dummy is one if the paragraph describing the firm's integration difficulties also contains one of the following words related to operational failures: operations, operation, operated, or operational. The products dummy is one if, analogously, at least one of the following words is present: product, products, customer, customers, consumers, or demand. Technological failures use the following words: technological, technology, technologies, information, systems or system. Management failures use the following words: management, managements, manage, distract, devote, coordination, divert, diversion, or disrupt. Results are similar if we instead use logistic regressions for the dummy variable. All regressions include industry fixed effects and year fixed effects, and standard errors are clustered by industry.

Row	Dependent Variable	Integration Gap	Past 3-Year Acquirer Dummy	Past Acquirer x Integration Gap	Log Assets	Log Age	TNIC Total Similarity	Tobins Q	Doc. Length	Obs.
<i>Panel A: Ex Post Integration Failure</i>										
(1)	Integration Failure Dummy	0.425 (3.26)	2.641 (9.61)	0.640 (3.72)	1.544 (8.11)	-1.480 (-6.24)	-0.640 (-4.50)	1.569 (7.57)	0.506 (3.31)	62,850
(2)	Integration Failure Intensity	0.002 (4.20)	0.008 (7.19)	0.001 (2.34)	0.005 (6.42)	-0.006 (-6.34)	-0.002 (-3.34)	0.006 (7.53)	0.002 (3.34)	62,850
<i>Panel B: Reasons for Ex Post Integration Failure</i>										
(3)	Operations Dummy	0.244 (2.71)	1.614 (5.96)	0.327 (3.28)	1.134 (7.97)	-1.110 (-5.90)	-0.521 (-3.86)	0.819 (5.14)	0.434 (3.37)	62,850
(4)	Operations Intensity	0.001 (2.97)	0.004 (5.37)	0.001 (1.81)	0.004 (5.92)	-0.004 (-5.43)	-0.002 (-3.46)	0.003 (6.39)	0.001 (3.00)	62,850
(5)	Products Dummy	0.334 (3.08)	1.480 (8.84)	0.438 (2.74)	0.721 (4.79)	-0.827 (-5.46)	-0.241 (-2.38)	1.096 (6.79)	0.234 (1.96)	62,850
(6)	Products Intensity	0.001 (3.52)	0.004 (6.61)	0.001 (2.06)	0.003 (4.02)	-0.003 (-6.07)	-0.001 (-1.57)	0.004 (8.08)	0.001 (1.62)	62,850
(7)	Technology Dummy	0.188 (2.25)	1.268 (7.45)	0.534 (4.02)	0.725 (4.40)	-0.865 (-6.40)	-0.356 (-2.40)	1.223 (7.57)	0.537 (3.67)	62,850
(8)	Technology Intensity	0.001 (3.24)	0.003 (5.29)	0.001 (3.19)	0.003 (3.77)	-0.003 (-6.42)	-0.001 (-1.75)	0.004 (10.1)	0.001 (2.96)	62,850
(9)	Manage Dummy	0.132 (1.68)	1.400 (6.26)	0.274 (2.92)	0.648 (5.43)	-0.949 (-5.54)	-0.347 (-2.79)	0.898 (4.35)	0.306 (2.88)	62,850
(10)	Management Intensity	0.001 (2.44)	0.004 (5.57)	0.001 (2.35)	0.002 (4.70)	-0.003 (-5.80)	-0.001 (-2.61)	0.003 (6.26)	0.001 (2.38)	62,850

Table VI: Post-Merger Growth and Innovation and Ex ante Integration Gap

The table reports the results of OLS regressions in which the dependent variable is a measure of ex post real growth and innovation. Our sample only includes single segment firms (see Online Appendix for results when all firms are included). We consider outcomes measured as changes for both a one-year horizon and a three year horizon, where the horizon begins in year t of the merger and ends in year $t + 1$ or $t + 3$. We consider the following ex post change outcomes: Sales Growth, R&D, and CAPX. The key independent variables are the integration gap, the past acquirer dummy, and the interaction between both. All regressions include industry and year fixed effects, RHS variables are standardized prior to running regressions, and standard errors are clustered by industry.

Row	Dependent Variable	Integration Gap	Past 3-Year Acquirer Dummy	Past Acquirer x Integration Gap	Log Assets	Log Age	TNIC Total Similarity	Tobins Q	Doc. Length	Lagged Dep. Var.	Obs.
<i>Ex Post Growth and Innovation</i>											
(1)	Yr 1 Sales Growth	0.009 (1.90)	0.029 (4.47)	-0.016 (-2.93)	0.010 (2.30)	-0.086 (-19.1)	-0.009 (-1.64)	0.133 (14.0)	0.026 (5.05)	0.000	62,780
(2)	Yr 3 Sales Growth	0.013 (0.77)	0.024 (1.13)	-0.062 (-3.18)	-0.025 (-1.77)	-0.224 (-14.8)	-0.045 (-2.20)	0.250 (12.4)	0.103 (4.84)	0.000	62,780
((3)	Yr 1 Δ R&D/Sales	-0.003 (-0.49)	-0.022 (-2.11)	-0.028 (-3.51)	-0.045 (-6.87)	-0.008 (-1.36)	0.119 (6.69)	0.024 (2.47)	0.064 (4.75)	-0.247 (-5.70)	62,780
(4)	Yr 3 Δ R&D/Sales	-0.007 (-0.60)	0.006 (0.27)	-0.042 (-3.01)	-0.105 (-7.61)	-0.009 (-0.73)	0.169 (6.41)	0.035 (2.48)	0.124 (4.93)	-0.433 (-6.22)	62,780
(5)	Yr 1 Δ R&D/Assets	0.001 (4.29)	-0.003 (-6.30)	-0.002 (-3.77)	-0.003 (-9.08)	-0.002 (-6.23)	0.004 (8.21)	-0.000 (-0.81)	0.003 (7.38)	-0.162 (-19.1)	62,780
(6)	Yr 3 Δ R&D/Assets	0.001 (2.45)	-0.003 (-3.97)	-0.001 (-1.88)	-0.005 (-9.01)	-0.002 (-3.62)	0.006 (7.34)	0.002 (2.25)	0.004 (5.66)	-0.258 (-18.7)	62,780
(7)	Yr 1 Δ CAPX/Assets	0.001 (2.54)	-0.001 (-2.96)	-0.001 (-2.41)	0.002 (6.20)	-0.001 (-5.56)	-0.002 (-8.14)	0.003 (11.8)	-0.000 (-0.79)	-0.434 (-47.7)	62,780
(8)	Yr 3 Δ CAPX/Assets	0.001 (1.50)	-0.001 (-2.87)	-0.001 (-1.38)	0.001 (2.47)	-0.000 (-1.13)	-0.001 (-3.08)	0.001 (4.76)	-0.000 (-0.64)	-0.634 (-56.9)	62,780

Table VII: Post-Merger Acquisitions and Ex ante Integration Gap

The table reports the results of OLS regressions in which the dependent variable is the fraction of withdrawn acquisitions (Panel A) and a measure of ex post acquiring activity (Panel B), or ex post net acquisitions (Panel C). We consider outcomes measured as changes for a one-year horizon and a three year horizon, where the horizon begins in year $t + 1$ after the merger. The use of a forward window avoids having the calculation load on the year of the merger itself, and reflects our objective of examining longer-term outcomes. We compute deal withdrawals as the fraction of a given firm's announced mergers or acquisitions in the given year that were withdrawn. We compute the growth in acquisitions and the growth in net acquisitions, which is equal to the growth in acquisitions minus the growth in divestitures. These variables are computed as follows: let $N_{acq,t}$ is the number of acquisition transactions a given firm has in year t , the one-year increase in acquisitions and net acquisitions thus are computed as the following logarithmic formula: $\log[\frac{1+N_{acq,t+1}}{1+N_{acq,t}}]$. The three year growth variables are computed in an analogous fashion using year three year-transaction counts ($t + 1$ to $t + 3$) instead of just year $t + 1$ counts. This form computes growth in a relative way while avoiding the overweighting of outliers. The key independent variables are the integration gap, the past acquirer dummy, and the interaction between both. All regressions include industry fixed effects and year fixed effects, and standard errors are clustered by industry.

Row	Dependent Variable	Integration Gap	Past 3-Year Acquirer Dummy	Past Acquirer x Integration Gap	Log Assets	Log Age	TNIC Total Similarity	Tobins Q	Doc. Length	Lagged Dep. Var.	Obs.
<i>Panel A: Deal Withdrawals</i>											
(1)	Deal Withdrawals	-0.002 (-1.05)	-0.009 (-3.58)	0.005 (2.03)	-0.012 (-5.76)	0.002 (1.30)	-0.005 (-2.84)	-0.003 (-4.52)	0.003 (2.58)		17,261
<i>Panel B: Acquisitions</i>											
(2)	Yr 1 Δ Acquisitions	0.001 (0.64)	0.047 (8.35)	-0.010 (-2.56)	0.111 (31.9)	-0.012 (-5.02)	-0.014 (-3.98)	0.034 (14.8)	-0.016 (-6.74)	-0.631 (-51.9)	62,780
(3)	Yr 3 Δ Acquisitions	-0.002 (-0.70)	0.033 (5.39)	-0.010 (-2.27)	0.106 (25.8)	0.001 (0.43)	-0.009 (-2.16)	0.022 (9.74)	-0.013 (-4.57)	-0.799 (-58.6)	62,780
<i>Panel C: Net Acquisitions</i>											
(4)	Yr 1 Δ Net Acquisitions	-0.001 (-0.29)	0.060 (12.0)	-0.013 (-3.12)	0.072 (18.3)	-0.028 (-10.5)	-0.012 (-2.97)	0.041 (16.2)	-0.016 (-5.60)	-0.725 (-72.9)	62,780
(5)	Yr 3 Δ Net Acquisitions	-0.004 (-1.52)	0.036 (6.98)	-0.011 (-2.22)	0.059 (12.8)	-0.007 (-2.28)	-0.009 (-1.87)	0.024 (9.31)	-0.014 (-4.31)	-0.874 (-83.3)	62,780

Table VIII: Ex ante Merger Integration Gap and Announcement Returns

The table reports the results of OLS regressions in which the dependent variable is either the announcement return of the acquirer (Panel A) and the target (Panel B). Our sample only includes acquirer and target pairs where both are single segment firms (see Online Appendix for results when all firms are included). We consider announcement returns measured just on day $t = 0$, and also a 3-day, a 5-day, and a 7-day window, where all windows are centered around $t = 0$. The key independent variables of interest are the Synergy Integration Gap, the Target Integration Gap, and the Acquirer Integration Gap. The Target and Acquirer Integration Gap are computed as discussed in Table I. The Synergy Integration Gap can only be computed if the target and acquirer are publicly traded and is computed in three steps. First, for every firm in the economy excluding the target and the acquirer, we compute the cosine similarity of each firm’s business description with the target business description and separately with the acquirer’s business description. Second, we take the product of these two cosine similarities for each firm, and take the ten firms with the highest product. These firms are most similar to the “combination” of the acquirer and the target as they load highly regarding similarity to both. Third, we extract the words in these top ten firms that are not in the pre-merger target and acquirer. Expected Synergy Integration Gap is then the weighted average expected integration of these words, which identifies the expected level of integration the likely synergies of the merger pair will likely have to realize for success. We also compute synergy uniqueness as minus one times the average of the product of the pairwise similarities of the top ten firms to the target and the acquirer. This measure is high when the top ten firms are in fact relatively dissimilar to the acquirer and the target, indicating that the likely synergies are highly unique as few firms in the economy operate in the synergy space. The resulting measures of integration difficulty are ex ante measurable and assess integration for both the target and acquirer assets in place, and also the likely synergies. The remaining variables are discussed in Table I. All regressions include industry and year fixed effects, RHS variables are standardized prior to running regressions, and standard errors are clustered by industry.

Row	Group	Expected Synergy Integration Gap	Acquirer Integration Gap	Target Integration Gap	Synergy Uniqueness	Acq. Numb. Paragraphs	Target Numb. Paragraphs	Log Assets	Log Age	Target Fraction of Acquirer	Pairwise TNIC Simil. Score	Expected Gain in Product Diff.	Market to Book	Document Size	Obs.
<i>Panel A: Acquirer Firm Announcement Returns</i>															
(1)	Acquirer	0.000	.	.	0.086	0.003	0.001	-0.004	0.002	-0.002	0.001	0.002	-0.001	-0.003	3,248
	1-day	(0.31)			(1.63)	(1.62)	(0.81)	(-2.04)	(1.54)	(-0.72)	(1.46)	(2.22)	(-0.53)	(-1.37)	
(2)	Acquirer	-0.001	.	.	0.242	0.001	0.002	-0.006	0.001	-0.003	0.000	0.002	-0.000	-0.002	3,248
	3-days	(-0.40)			(2.55)	(0.32)	(0.76)	(-2.78)	(1.01)	(-1.01)	(0.05)	(1.45)	(-0.13)	(-0.61)	
(3)	Acquirer	0.000	-0.000	-0.002	0.097	0.003	-0.000	-0.004	0.002	-0.002	0.001	0.002	-0.001	-0.003	3,248
	1-day	(0.30)	(-0.01)	(-1.89)	(1.78)	(1.80)	(-0.05)	(-2.06)	(1.55)	(-0.74)	(1.62)	(2.19)	(-0.55)	(-1.30)	
(4)	Acquirer	-0.001	-0.000	-0.003	0.263	0.001	-0.000	-0.006	0.001	-0.003	0.000	0.002	-0.000	-0.002	3,248
	3-days	(-0.46)	(-0.03)	(-1.72)	(2.77)	(0.36)	(-0.01)	(-2.77)	(1.01)	(-1.06)	(0.22)	(1.45)	(-0.14)	(-0.55)	
<i>Panel B: Target Firm Announcement Returns</i>															
(5)	Target	-0.011	.	.	-0.086	0.001	0.000	-0.038	0.003	0.001	-0.005	-0.005	-0.008	0.001	3,248
	1-day	(-2.62)			(-0.52)	(0.16)	(0.04)	(-5.09)	(0.75)	(0.45)	(-1.47)	(-1.43)	(-2.04)	(0.17)	
(6)	Target	-0.018	.	.	-0.307	0.009	0.004	-0.064	0.008	0.006	-0.005	-0.010	-0.012	-0.007	3,248
	3-days	(-3.84)			(-1.73)	(1.51)	(1.41)	(-6.21)	(1.78)	(3.66)	(-1.19)	(-2.44)	(-3.37)	(-1.28)	
(7)	Target	-0.010	0.008	0.009	-0.199	0.004	0.005	-0.038	0.002	0.001	-0.005	-0.005	-0.009	0.003	3,248
	1-day	(-2.34)	(1.63)	(3.14)	(-1.20)	(0.71)	(1.68)	(-5.13)	(0.72)	(0.47)	(-1.64)	(-1.59)	(-2.13)	(0.51)	
(8)	Target	-0.017	0.008	0.007	-0.404	0.012	0.007	-0.064	0.008	0.006	-0.006	-0.011	-0.012	-0.005	3,248
	3-days	(-3.55)	(1.32)	(2.53)	(-2.40)	(1.91)	(2.21)	(-6.23)	(1.79)	(3.60)	(-1.28)	(-2.54)	(-3.36)	(-0.93)	

Table IX: Fama MacBeth Monthly Return Regressions (Subsample Analysis)

The table displays Fama-MacBeth regressions from July 1997 to December 2015 in which the dependent variable is the firm's monthly excess stock return. Our full sample contains 551,318 observations. We consider the full sample, subsamples based on above vs below median cash/assets, size (market capitalization), and value vs growth (book-to-market ratio). We then divide each sample into quintiles in each month based on the ex ante integration gap. For the full sample, we report results for each quintile and we then report tests indicating whether the acquisition dummy and all independent variables are significantly different in the high integration gap quintile versus the low quintile (our main test). For all remaining subsamples, we only report the differences test. The acquirer dummy is one if the firm was an acquirer in a merger or an acquisition of assets transaction in the previous one-year period (based on effective date and lagged 6 months for consistency with other variables). The integration gap variable is from the past fiscal year, and is lagged using the minimum 6 month lag required in Davis, Fama, and French (2000). The integration gap is expected integration minus realized integration, and we use a dummy variable indicating whether the given value is in the high tercile in the given year. We also consider cross terms based on the acquirer dummy and each integration variable. Finally, we include controls for the log book-to-market ratio, the log of firm market capitalization and the past one year stock return, where these variables are measured following Davis, Fama, and French (2000). All variables are ex ante measurable and quantities from any given fiscal year follow the lag structure of Davis, Fama, and French (2000). For example, any variable from a fiscal year ending in calendar year t will not be used to predict returns until July of year $t + 1$. We discard penny stock firms from our sample if they have a stock price of one dollar or less. Newey-West t -statistics with two lags are reported.

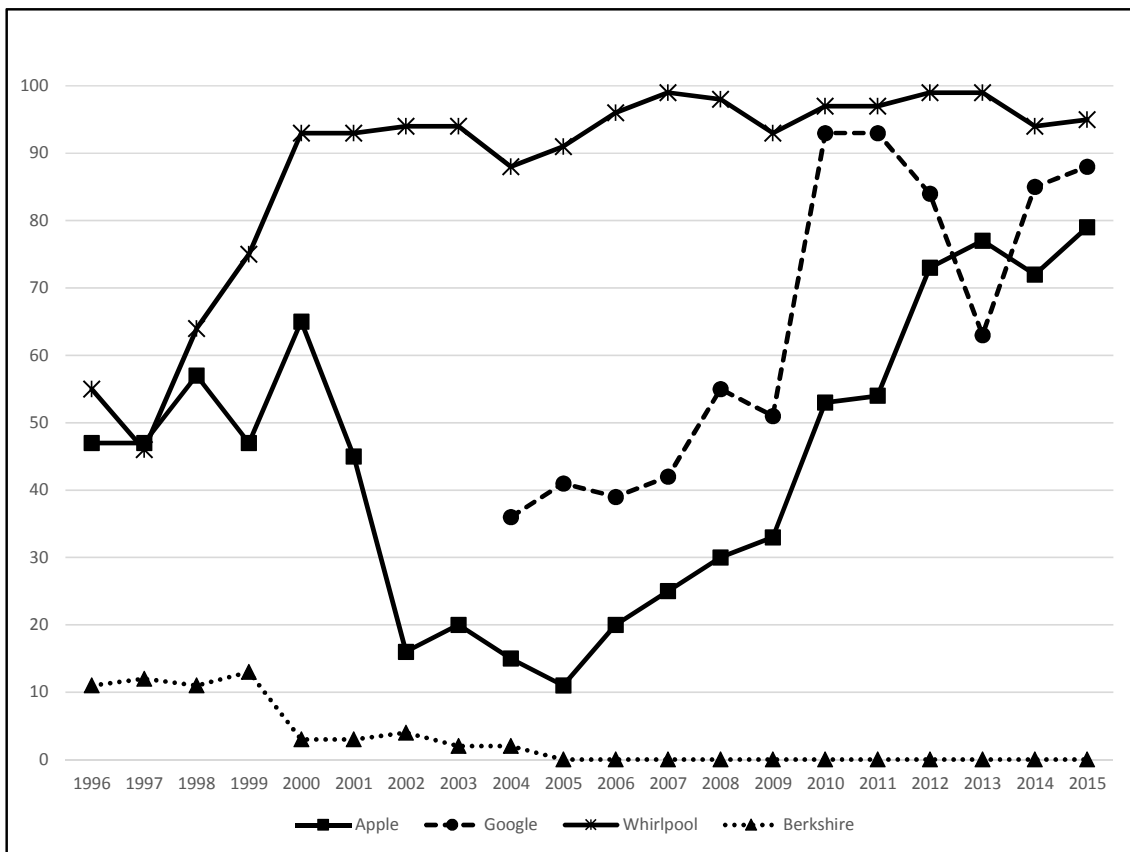
Row	Sample	Integration Gap Quintile	Acquirer Dummy	Log B/M	Log Size	Past Yr Return	Periods
<i>Entire Sample (All Single Segment Firms)</i>							
(1)	All Firms	Low Integration Gap	-0.007 (-0.1)	0.100 (1.3)	-0.020 (-0.2)	-0.075 (-0.3)	210
(2)	All Firms	Quintile2	0.037 (0.3)	0.142 (1.0)	-0.033 (-0.3)	0.117 (0.5)	210
(3)	All Firms	Quintile3	-0.038 (-0.4)	0.007 (0.1)	-0.075 (-0.5)	0.208 (0.9)	210
(4)	All Firms	Quintile4	-0.190 (-1.9)	0.098 (0.6)	-0.064 (-0.5)	0.177 (0.7)	210
(5)	All Firms	High Integration Gap	-0.302 (-2.5)	-0.065 (-0.4)	-0.042 (-0.4)	0.324 (1.0)	210
(6)	All Firms	5-1 Difference	-0.294 (-2.3)	-0.165 (-1.5)	-0.022 (-0.3)	0.399 (2.4)	210
<i>High vs Low Cash/Assets Subsamples</i>							
(7)	High Cash Balance	5-1 Difference	-0.649 (-3.2)	-0.102 (-0.9)	-0.126 (-1.1)	0.252 (1.3)	210
(8)	Low Cash Balance	5-1 Difference	-0.016 (-0.1)	-0.056 (-0.4)	0.054 (0.5)	0.571 (2.1)	210
<i>Big vs Small Firm Subsamples</i>							
(9)	Big Firms	5-1 Difference	-0.518 (-3.2)	-0.034 (-0.3)	0.045 (0.4)	0.284 (1.5)	210
(10)	Small Firms	5-1 Difference	0.089 (0.4)	-0.182 (-1.2)	0.153 (0.7)	0.502 (2.1)	210
<i>Value vs Growth Firm Subsamples</i>							
(11)	Value Firms	High Gap - Low Gap	-0.197 (-1.1)	-0.464 (-2.0)	0.073 (0.6)	0.654 (2.6)	210
(12)	Growth Firms	High Gap - Low Gap	-0.344 (-2.0)	-0.109 (-0.7)	-0.115 (-1.1)	0.107 (0.6)	210
<i>Cash and Size Interacted Subsamples</i>							
(13)	Big & High Cash	High Gap - Low Gap	-0.732 (-3.4)	-0.088 (-0.6)	-0.030 (-0.2)	0.247 (1.0)	210
(14)	Big & Low Cash	High Gap - Low Gap	-0.153 (-0.7)	0.111 (0.8)	-0.010 (-0.1)	0.632 (1.7)	210
(15)	Small & High Cash	High Gap - Low Gap	-0.362 (-1.0)	0.150 (0.8)	0.323 (1.0)	0.288 (1.0)	210
(16)	Small & Low Cash	High Gap - Low Gap	0.097 (0.4)	-0.251 (-1.3)	0.024 (0.1)	0.681 (2.1)	210

Table X: Calendar-Time Portfolio Returns (FF 5-Factor Model)

The table displays the performance of calendar-time portfolios based on monthly returns from July 1997 to December 2015. In each row, the dependent variable is the monthly return of a zero-cost calendar time portfolio. Portfolios invest long in acquiring firms and short in non-acquiring firms, and we examine various subsamples based on the ex-ante integration gap, cash balances, size (market capitalization), and value vs growth (book-to-market ratio). Our sample only includes single segment firms. In Panel A, we examine how portfolio performance varies with the ex ante integration gap. We first sort firms into quintiles based on their ex-ante integration gap, and then we form the long-short (acquirer minus non-acquirer) portfolios separately for each quintile. Panel A reports the performance of these five quintile portfolios. We then further consider the role of cash balances in Panel B, and we divide the firms in each quintile in to high and low cash balance firms based on median ex ante cash/assets. For parsimony, Panel B reports the performance of these portfolios only for the high ex ante integration gap quintile firms. In Panel C, we run analogous tests based on above and below median market capitalizations. Finally, in Panel D, we report performance statistics for the high ex ante integration gap quintile, but further consider on all four permutations of above and below median size and cash balances. All quintiles and median breakpoints are based on monthly sorts using ex ante available data. We regress each calendar time portfolio's monthly return on four factors including (MKT-RF), HML, SMB, and UMD (we thank Ken French for providing factor data on his website). We discard penny stock firms from our sample if they have a stock price of one dollar or less. Newey-West t -statistics with two lags are reported in parentheses.

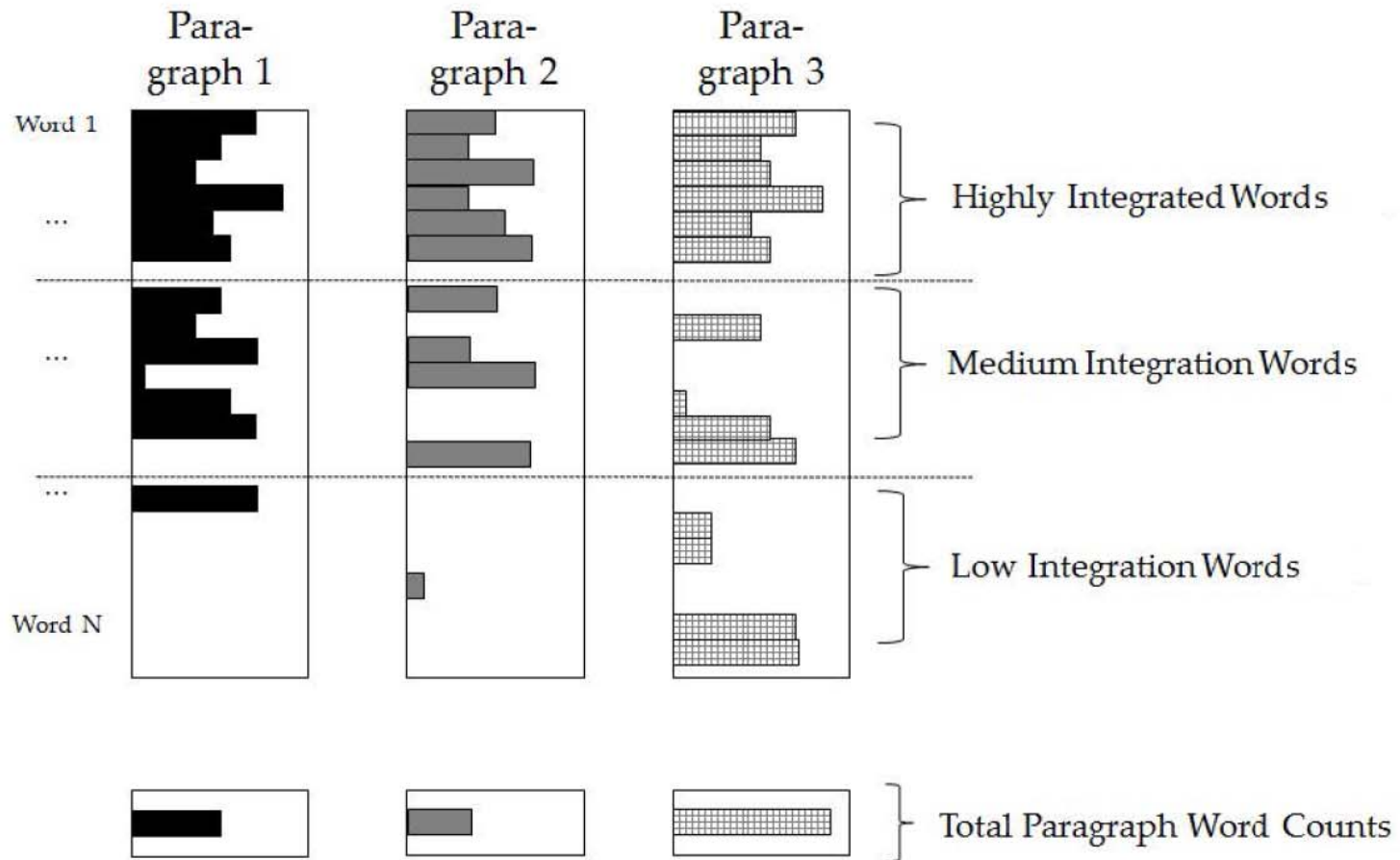
Row	Sample	Integration Gap Quintile	Alpha	MKT	HML	SMB	RMW	CMA	Obs.
Panel A: Integration Gap Quintiles (All Single Segment Firms)									
(1)	All Firms	Low Integration Gap	-0.034 (-0.6)	0.059 (4.1)	0.001 (0.1)	-0.050 (-2.6)	0.002 (0.1)	0.002 (0.1)	210
(2)	All Firms	Quintile2	0.004 (0.1)	0.038 (2.8)	0.028 (1.1)	-0.032 (-1.3)	0.023 (0.7)	-0.057 (-1.2)	210
(3)	All Firms	Quintile3	-0.054 (-0.7)	0.066 (3.2)	0.053 (1.6)	-0.083 (-4.0)	0.012 (0.3)	-0.061 (-1.4)	210
(4)	All Firms	Quintile4	-0.158 (-2.6)	0.064 (4.0)	0.002 (0.1)	-0.046 (-1.7)	0.040 (1.2)	-0.013 (-0.3)	210
(5)	All Firms	High Integration Gap	-0.176 (-2.3)	0.076 (3.9)	0.021 (0.6)	-0.093 (-2.8)	-0.006 (-0.1)	-0.066 (-0.9)	210
(6)	All Firms	High Gap - Low Gap	-0.143 (-2.0)	0.017 (0.8)	0.019 (0.5)	-0.043 (-1.2)	-0.009 (-0.2)	-0.068 (-1.1)	210
Panel B: High vs Low Cash Balance Firms (High Integration Gap Quintile Only)									
(7)	High Cash Balance	High Gap - Low Gap	-0.284 (-2.4)	0.003 (0.1)	0.015 (0.3)	-0.070 (-1.5)	-0.036 (-0.6)	0.011 (0.1)	210
(8)	Low Cash Balance	High Gap - Low Gap	0.008 (0.1)	0.012 (0.6)	0.026 (0.8)	-0.023 (-0.7)	0.019 (0.4)	-0.107 (-2.0)	210
Panel C: Big vs Small Firms (High Integration Gap Quintile Only)									
(9)	Big Firms	High Gap - Low Gap	-0.247 (-2.9)	0.023 (0.8)	0.022 (0.6)	-0.043 (-1.1)	0.030 (0.7)	-0.105 (-2.1)	210
(10)	Small Firms	High Gap - Low Gap	-0.022 (-0.2)	0.014 (0.5)	0.058 (1.0)	0.039 (0.8)	-0.006 (-0.1)	0.031 (0.4)	210
Panel D: Value vs Growth Firms (High Integration Gap Quintile Only)									
(11)	Value Firms	High Gap - Low Gap	-0.144 (-1.5)	0.021 (0.7)	-0.040 (-0.8)	0.037 (0.9)	0.118 (2.1)	-0.062 (-0.7)	210
(12)	Growth Firms	High Gap - Low Gap	-0.140 (-1.7)	0.012 (0.4)	0.098 (2.2)	-0.119 (-2.7)	-0.094 (-1.7)	-0.135 (-2.2)	210
Panel E: Size and Cash Balance Permutations (High Integration Gap Quintile Only)									
(13)	Big & High Cash	High Gap - Low Gap	-0.364 (-3.1)	0.031 (1.0)	0.032 (0.7)	-0.065 (-1.3)	-0.018 (-0.3)	-0.036 (-0.5)	210
(14)	Big & Low Cash	High Gap - Low Gap	-0.111 (-1.0)	-0.009 (-0.2)	0.003 (0.1)	-0.021 (-0.5)	0.017 (0.4)	-0.185 (-3.3)	210
(15)	Small & High Cash	High Gap - Low Gap	-0.171 (-0.8)	0.008 (0.2)	-0.001 (-0.0)	0.020 (0.2)	0.042 (0.4)	0.075 (0.5)	210
(16)	Small & Low Cash	High Gap - Low Gap	0.077 (0.6)	0.024 (0.6)	0.120 (2.1)	-0.003 (-0.0)	0.057 (0.7)	-0.024 (-0.2)	210

Figure 1:



Notes: The Figure displays the realized integration over time for four sample firms of interest: Apple, Google, Whirlpool and Berkshire Hathaway.

Figure 2:



Notes: The Figure visually illustrates examples of highly integrated and highly non-integrated words based on their distribution across paragraphs. Words that are thoroughly mixed in all paragraphs are integrated into the firm's product offerings fully. Words that appear only in one, or a small number, of paragraphs are not integrated. At the bottom of the figure, we depict the distribution of total word counts across paragraphs, which motivates our measure of word-level integration based on distributional proximity of a word's distribution to this aggregate paragraph length distribution.

Online Appendix Table 1: Calendar-Time Portfolio Returns (Carhart Model)

The table displays the performance of calendar-time portfolios based on monthly returns from July 1997 to December 2015. In each row, the dependent variable is the monthly return of a zero-cost calendar time portfolio. Portfolios invest long in acquiring firms and short in non-acquiring firms, and we examine various subsamples based on the ex ante integration gap, cash balances, size (market capitalization), and value vs growth (book-to-market ratio). Our sample only includes single segment firms. In Panel A, we examine how portfolio performance varies with the ex ante integration gap. We first sort firms into quintiles based on their ex ante integration gap, and then we form the long-short (acquirer minus non-acquirer) portfolios separately for each quintile. Panel A reports the performance of these five quintile portfolios. We then further consider the role of cash balances in Panel B, and we divide the firms in each quintile in to high and low cash balance firms based on median ex ante cash/assets. For parsimony, Panel B reports the performance of these portfolios only for the high ex ante integration gap quintile firms. In Panel C, we run analogous tests based on above and below median market capitalizations. Finally, in Panel D, we report performance statistics for the high ex-ante integration gap quintile, but further consider on all four permutations of above and below median size and cash balances. All quintiles and median breakpoints are based on monthly sorts using ex ante available data. We regress each calendar time portfolio's monthly return on four factors including (MKT-RF), HML, SMB, and UMD (we thank Ken French for providing factor data on his website). We discard penny stock firms from our sample if they have a stock price of one dollar or less. Newey-West t -statistics with two lags are reported in parentheses.

Row	Sample	Integration Gap Quintile	Alpha	MKT	HML	SMB	UMD	Obs.
Panel A: Integration Gap Quintiles (All Single Segment Firms)								
(1)	All Firms	Low Integration Gap	-0.019 (-0.4)	0.050 (3.7)	-0.016 (-0.9)	-0.050 (-3.5)	-0.021 (-1.9)	210
(2)	All Firms	Quintile2	0.022 (0.4)	0.023 (1.8)	-0.012 (-0.5)	-0.039 (-1.7)	-0.039 (-1.9)	210
(3)	All Firms	Quintile3	-0.040 (-0.7)	0.051 (3.1)	-0.003 (-0.1)	-0.080 (-3.2)	-0.045 (-3.0)	210
(4)	All Firms	Quintile4	-0.129 (-2.1)	0.044 (3.0)	-0.010 (-0.3)	-0.056 (-1.9)	-0.024 (-1.0)	210
(5)	All Firms	High Integration Gap	-0.160 (-2.4)	0.055 (3.5)	-0.054 (-1.9)	-0.079 (-2.5)	-0.068 (-2.8)	210
(6)	All Firms	High Gap - Low Gap	-0.141 (-2.0)	0.006 (0.3)	-0.038 (-1.2)	-0.028 (-0.9)	-0.047 (-2.0)	210
Panel B: High vs Low Cash Balance Firms (High Integration Gap Quintile Only)								
(7)	High Cash Balance	High Gap - Low Gap	-0.286 (-2.7)	-0.002 (-0.1)	-0.014 (-0.3)	-0.041 (-1.0)	-0.027 (-0.8)	210
(8)	Low Cash Balance	High Gap - Low Gap	0.011 (0.1)	0.001 (0.0)	-0.035 (-1.2)	-0.027 (-0.9)	-0.044 (-1.9)	210
Panel C: Big vs Small Firms (High Integration Gap Quintile Only)								
(9)	Big Firms	High Gap - Low Gap	-0.239 (-2.9)	0.008 (0.3)	-0.038 (-1.1)	-0.048 (-1.1)	-0.044 (-2.0)	210
(10)	Small Firms	High Gap - Low Gap	0.005 (0.0)	-0.009 (-0.3)	0.065 (1.6)	0.063 (1.6)	-0.041 (-1.4)	210
Panel D: Value vs Growth Firms (High Integration Gap Quintile Only)								
(11)	Value Firms	High Gap - Low Gap	-0.077 (-0.7)	-0.022 (-0.8)	-0.039 (-0.9)	0.002 (0.1)	-0.045 (-1.2)	210
(12)	Growth Firms	High Gap - Low Gap	-0.204 (-2.3)	0.034 (1.2)	-0.028 (-0.7)	-0.078 (-1.8)	-0.043 (-1.7)	210
Panel E: Size and Cash Balance Permutations (High Integration Gap Quintile Only)								
(13)	Big & High Cash	High Gap - Low Gap	-0.353 (-3.2)	0.014 (0.5)	-0.022 (-0.6)	-0.041 (-1.0)	-0.057 (-2.1)	210
(14)	Big & Low Cash	High Gap - Low Gap	-0.141 (-1.3)	-0.001 (-0.0)	-0.085 (-2.1)	-0.036 (-0.8)	-0.026 (-0.9)	210
(15)	Small & High Cash	High Gap - Low Gap	-0.129 (-0.6)	-0.017 (-0.3)	0.051 (0.6)	0.025 (0.3)	-0.006 (-0.1)	210
(16)	Small & Low Cash	High Gap - Low Gap	0.133 (1.0)	-0.017 (-0.5)	0.103 (2.2)	-0.009 (-0.2)	-0.062 (-1.9)	210