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Summary

This paper defines four basic business models based on what asset rights are sold (Creators, Distributors, Landlords and Brokers) and four variations of each based on what type of assets are involved (Financial, Physical, Intangible, and Human). Using this framework, we classified the business models of all 10,970 publicly traded firms in the US economy from 1998 through 2002. Some of these classifications were done manually, based on the firms' descriptions of sources of revenue in their financial reports; the rest were done automatically by a rule-based system using the same data. Based on this analysis, we first document important stylized facts about the distribution of business models in the U.S. economy. Then we analyze the firms' financial performance in three categories: *market value*, *profitability*, and *operating efficiency*. We find that no model outperforms others on all dimensions. Surprisingly, however, we find that some models do, indeed, have better financial performance than others. For instance, *Physical Creators* (which we call *Manufacturers*) and *Physical Landlords* have greater cash flow on assets, and *Intellectual Landlords* have poorer *q's*, than *Physical Distributors* (*Wholesaler/Retailers*),. These findings are robust to a large number of robustness checks and alternative interpretations. We conclude with some hypotheses to explain our findings.

Do Some Business Models Perform Better than Others?

Few concepts in business today are as widely discussed—and as seldom systematically studied—as business models. Many people attribute the success of firms like eBay, Dell, and Amazon, for example, to the ways they used new technologies—not just to make their operations more efficient—but to create new business models altogether (e.g., Gurley (2001)). In spite of all the discussion about business models, however, there have been very few large-scale systematic empirical studies of them. We do not know, for instance, how common different kinds of business models are in the economy and whether some business models have better financial performance than others.

This paper provides a first attempt to answer these basic questions about business models. We first develop a comprehensive typology of business models. We hypothesize that this typology can be used to classify any for-profit enterprise. As partial confirmation of this hypothesis, we classify the business models of the 10,970 publicly-traded US companies in COMPUSTAT from 1998 through 2002. Finally, we analyze six measures of financial performance for the different kinds of business models to determine whether some models perform better than others.

We find that some business models are much more common than others, and that some do, indeed, perform better than others. For example, the most common business model for large US firms involves making and selling ownership of physical assets (*i.e.*, manufacturers). While no one model seems to do better than another across all six measure of performance, some models do seem to be superior on specific measures. For example, manufacturers do better than Distributors of physical assets (*i.e.,* wholesalers and retailers) on cash flow return on assets, and Brokers of financial assets (*e.g.,* stock and insurance Brokers) do better than the physical Distributors on Tobin's *q*. A study like ours involves very significant empirical challenges. We show a wide range of robustness tests to address issues of endogeneity (*e.g.*, perhaps good performance leads firms to pick certain business models?), measurement error (*e.g.,* how would mis-reporting by firms affect our analyses?), and many others.

Although we provide a theory-grounded proposal for a typology of business models, our

contribution is primarily empirical. Specifically, we are interested in the first-order question of *whether* business models have performance implications. Given the pervasive reference to business models in the industry and the dearth of rigorous study on the subject, we believe it is significant to carefully document whether some models do better. This study does not attempt to answer deeper questions about *why* the performance implications exist. In particular, we do not investigate whether the rents arising from some business models might have been monopolistic (as in industrial organization, such as Bain (1959)), game-theoretic (*e.g.,* Ghemawat (1991)), Ricardian (as in the resource-based perspective, *e.g.* Wernerfelt (1984) for a modern statement), Schumpeterian (as in the dynamic capabilities perspective; Teece, et al. (1997)), or evolutionary (*e.g.,* Nelson and Winter (1982)). We also do not address the normative question of how individual firms can exploit or modify their business models to improve their performance. We hope that the work described here provides a foundation for future work on these questions.

Background

Even though the concept of business model is potentially relevant to all firms, in our search of the organization, economic, and strategy literatures, we found few articles on the subject, and just one large-scale empirical study (*i.e.,* Amit and Zott (2001)). Instead, several authors have provided useful frameworks for analyzing businesses, such as profit models (Slywotzky, et al. (1997)) and strategy maps (Kaplan and Norton (2004)). These approaches are based on a tradition of classifying firms into "internally consistent sets of firms" referred to as strategic groups or configurations (*e.g,* Cool and Schendel (1987)). These groups—typically conceived of, and organized through the use of typologies and taxonomies (*e.g.,* Miles and Snow (1978)) are often used to explore the determinants of performance.

Most of the academic research on business models has been done in the context of e-business— new ways of doing business enabled by information technology. Research on e-business models has focused primarily on two complementary streams: taxonomies of business models and definitions of components of business models. For example, Timmers (1998) defines a business model as including an architecture for the product, service, and information flows, a description of the benefits for the business

actors involved, and a description of the sources of revenue. Business model definitions and descriptions have proliferated since Timmers. Tapscott, et al. (2000) focus on the system of suppliers, distributors, commerce service providers, infrastructure providers, and customers, labeling this system the business-web or "b-web." They differentiate business webs along two dimensions: control (from self-control to hierarchical) and value integration (from high to low). Weill and Vitale (2001) include "roles and relationships among a firm's customers, allies, and suppliers, major flows of product, information, and money, and major benefits to participants" in their definition of a business model. They describe eight atomic e-business models, each of which can be implemented as a pure e-business model or combined to create a hybrid model. Rappa (2003) defines a business model as "the method of doing business by which a firm can sustain itself" and notes that the business model is clear about how a firm generates revenues and where it is positioned in the value chain. Rappa presents a taxonomy of business models observed on the web, currently listing nine categories. Osterwalder, et al. (2005) provide an ontology based on nine dimensions, such as value proposition, target customer, revenue model, and cost structure.

Other definitions of business models emphasize the connections a business model provides between technical potential and the realization of economic value (Chesbrough and Rosenbloom (2002)), the design of the transactions of a firm in creating value (Amit and Zott (2001)), the blend of the value stream for buyers and partners, the revenue stream, and the logical stream (the design of the supply chain) (Mahadevan (2000)), and the firm's core logic for creating value (Linder and Cantrell (2000)). In an attempt to integrate these definitions, Osterwalder, et al. (2002) propose an e-business framework with four pillars: the products and services a firm offers, the infrastructure and network of partners, the customer relationship capital, and the financial aspects.

Common to all of these definitions of business and e-business models is an emphasis on how a firm makes money. Magretta (2002) argues that the strength of a business model is that it tells a story about the business, focusing attention on how pieces of the business fit together—with the strategy describing how the firm differentiates itself and deals with competition. The idea of business model is also consistent with the work on interdependencies (e.g., Levinthal (1997)). In this line of research, value

added stems from an enhanced idea of the production function, "based not only on aggregate supplies of capital and labor, but also on a firm's specific mix of activities, practices, and resources." (Lenox, et al. (2006), pg. 760).

We are aware of only one econometric study that links business models to performance. Amit and Zott (2001) look at how the fit of business model themes (novelty- versus efficiency-centered) and product-market strategy (differentiation versus low-cost, and timing of entry) affect firm performance, as measured by market value. Using a sample of Internet-related firms that have gone public between 1996 and 2000, they find that the novelty-centered business model fits all their types of product-market strategies, but the efficiency-centered business model fits only a low-cost product-market strategy. Our study is different from theirs on a number of dimensions. First, we look at large US-listed firms rather than Internet-related ones that have just gone public. Second, as we describe below, we use a different definition of business model that captures what firms do and how they create value. This typology also has the empirical advantage of being observable (*e.g.*, whether a firm sells or distributes products). The typology aims to be mutually exclusive and collectively exhaustive, whereas Zott and Amit focus on "design themes that are neither orthogonal…nor…mutually exclusive" (pg. 7). Their study and ours are consistent in finding that business model is a useful construct and can predict performance.

Defining business models

For a systematic study of business models, we need to define business models and distinguish their different types. For simplicity, we offer an operational definition, based on two fundamental dimensions of what a business does. The first dimension considers what types of rights are being sold. As we will describe, on this dimension, we classify a business as Creator, Distributor, Landlord, or Broker. The second dimension considers what type of *assets* is involved. Here, we distinguish among four important asset types: physical, financial, intangible, and human. The combination of these two dimensions leads to sixteen detailed business models.

In developing this typology, we went through three major versions of our typology (and

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numerous minor revisions) over the course of four years. Of course, there is no single right way to distinguish different types of business models. But some typologies are certainly better—or more useful—than others. In developing our typology, we were guided by the following desirable criteria (see Scott (1981) for a related set of criteria for organizational typologies):

(1) The typology should be *intuitively sensible*. That is, it should capture the common intuitive sense of what a business model means by grouping together businesses that seem similar in how their activities create value, and separating businesses that seem different. The names of different categories should also be self-explanatory.

(2) The typology should be *collectively exhaustive and mutually exclusive*. That is, it should provide a systematic way of classifying all businesses, not just "e-businesses" or any other restricted subset of firms. At some suitably low unit of analysis (*e.g.,* business unit), the classification should also not assign more than one business model to the same unit. We of course do not rule out higher units (*e.g.,* firms) having multiple business models (*e.g.,* because they have business units each with a different model).

(3) The typology should have *construct validity*. This means that the typology should have discriminant validity—that is, it should be sufficiently different from related typologies such as that for "business strategy" or "industry" classification. It should also have convergent validity – that is, while some amount of subjective judgment is always needed in classifying real organizations, different people should, as much as possible, classify the same firm in the same way, if given the same information.

(4) The typology should be *conceptually elegant*. Conceptual elegance is somewhat subjective, but we were guided by the desire to use as few concepts as possible, with the additional conditions that the concepts also had to be simple.

What rights are being sold?

The heart of any business is what it sells. And perhaps the most fundamental aspect of what a

business sells is what kind of legal right is conferred to the buyer upon the completion of the transaction.

The first, and most obvious, kind of right a business can sell is the right of *ownership* of an asset. Customers who buy the right of ownership of an asset have the continuing right to use the asset in (almost) any way they want including selling, destroying, or disposing of it. In the framework of Grossman and Hart (1986), the business is selling residual rights to the buyer.

The second kind of right a business can sell is the right to *use* an asset, such as a car or a hotel room. Customers buy the right to use the asset in certain ways for a certain period of time, but the owner of the asset retains ownership and can restrict the ways customers use the asset. And, at the end of the time period, rights revert to the owner.

In addition to these kinds of rights, there is one other less obvious—but important—kind of right a business can sell. This is the right to be *matched* with potential buyers or sellers of something. A real estate broker, for instance, often first secures the right to buy, sell, or lease a property on behalf of the principal. She then sells this right to a counter-party, who without the right, could not be matched to the principal, sometimes because of the norm of business practice, but often because legally, the principal and counter-party have to go through the broker.

As Figure 1 shows, each of these different kinds of rights corresponds to a different asset rights model. The figure also reflects one further distinction we find useful. For firms that sell ownership of an asset, we distinguish between those that significantly transform the asset they are selling and those that do not. This allows us to distinguish between firms that make what they sell (like manufacturers) and those that sell things other firms have made (like retailers).

We could have ignored this distinction and had only one model (called, for example, "Seller") including all firms selling ownership rights. But if we had done so, the vast majority of all firms in the economy would have been in this category, and we would have lost an important conceptual distinction between two very different kinds of asset rights models: Creators and Distributors. Conversely, making this distinction in all the other rows of the table would have divided intuitively sensible categories in ways that are of little apparent intuitive value in business. For instance, people do not usually distinguish

between Landlords that have created the assets they rent out and those that have not.

With these two distinctions—kind of rights sold and amount of transformation of assets—we arrive at the four basic asset rights models shown in Figure 1 (we give examples later):

(1) A *Creator* buys raw materials or components from suppliers and then transforms or assembles them to create a product sold to buyers. This is the predominant business model in manufacturing. A key distinction between Creators and Distributors (the next model) is that Creators design the products they sell. We classify a firm as a Creator, even if it outsources all the physical manufacturing of its product, as long as it does substantial (more than 50% of the value of) design of the product.

(2) A *Distributor* buys a product and resells essentially the same product to someone else. The Distributor usually provides additional value by, for example, transporting or repackaging the product, or by providing customer service. This business model is ubiquitous in wholesale and retail trade.

(3) A *Landlord* sells the right to use, but not own, an asset for a specified period of time. Using the word "landlord" in a more general sense than its ordinary English meaning, we define this basic business model to include not only physical Landlords who provide temporary use of physical assets (like houses and airline seats), but also lenders who provide temporary use of financial assets (like money), and contractors and consultants who provide services produced by temporary use of human assets. This asset rights model highlights a deep similarity among superficially different kinds of business: all these businesses, in very different industries, sell the right to make temporary use of their assets.

(4) A *Broker* facilitates sales by matching potential buyers and sellers. Unlike a typical Distributor, a Broker does not take ownership of the product being sold. Instead, the Broker receives a fee (or commission) from the buyer, the seller, or both. This business model is common in real estate brokerage, stock brokerage, and insurance brokerage.

Our asset-right dimension is of course consistent with the large literature on property rights (*e.g.,* Grossman and Hart (1986), Hart and Moore (1990)). It is also consistent with the literatures on contracting with transactions costs (*e.g.,* Williamson (1973), and the recent extension to leasing, in Williamson (2002)) and industrial organization (*e.g.,* the Coase (1972) conjecture suggests why some

transactions might be better constructed as leases rather than outright sales). Finally, our asset-rights dimension is also related to similar ideas in contract law. For example, Roman-based law defines property rights in terms of *usus* (right to use a good), *fructus* (right to what a good produces), and *abusus* (right to sell a good); the first two falls under our Landlord model and the last our Creator. To summarize, our point is that the asset-rights dimension is consistent with a variety of literatures, but as we next describe, the interaction of asset rights with asset types makes for an even more interesting typology of business models.

What assets are involved?

The other dimension we use to classify business models is the type of asset for which rights are being sold. We consider four types of assets: physical, financial, intangible, and human. Specifically, we define *physical* assets to include durable items (such as houses, computers, and machine tools) as well as nondurable items (such as food, clothing, and paper). *Financial* assets include cash and other assets like stocks, bonds, and insurance policies that give their owners rights to potential future cash flows. *Intangible* assets include legally protected intellectual property (such as patents, copyrights, trademarks, and trade secrets), as well as other intangible assets like knowledge, goodwill, and brand image. *Human* assets include people's time and effort. Of course, people are not "assets" in an accounting sense and cannot be bought and sold, but their time and knowledge can be "rented out" for a fee.

This distinction among assets types, of course, draws on previous literature (*e.g.,* Rajan and Zingales (2001) describe the transformation of a physical- to a financial-based economy). Much of the literature focuses on differences among types of assets, especially the specificity of different types, and how specificity is associated with organizational boundaries. Here, we are interested in the interaction between asset type and asset rights. As Figure 2 shows, each of the asset rights models can be used, at least in principle, with each of these different types of assets. This results in sixteen business models. While all of the models are logically possible, some are quite rare, and two (*Human Creator* and *Human Distributor*) are illegal in most places today.

The Sixteen Business Models

Definitions and examples of these business models follow:

(1) An *Entrepreneur* creates and sells financial assets often creating and selling firms. Examples: serial entrepreneurs, "incubator" firms, other active investors in very early stage firms like Kleiner, Perkins, Caufield & Byers. We do not include in this business model entrepreneurs who never sell the firms they create.

(2) A *Manufacturer* creates and sells physical assets. Manufacturer is the predominant type of Creator. Examples: General Motors, Bethlehem Steel.

(3) An *Inventor* creates and then sells intangible assets such as patents and copyrights. Firms using this business model exclusively are relatively rare, but some technology firms generate part of their revenues this way. Example: Lucent's Bell Labs (see patentsales.lucentssg.com). Firms that license the use of their intangible assets while still retaining ownership are not classified as Inventors; they are Intellectual Landlords (see below).

(4) A *Human Creator* creates and sells human assets. Since selling humans—whether they were created naturally or artificially or obtained by capture—is illegal and morally repugnant in most places today, this business model is included here for logical completeness and as a historical footnote about a form of business model that was more common in the past.

(5) A *Financial Trader* buys and sells financial assets without significantly transforming (or designing) them. Banks, investment firms, and other financial institutions that invest for their own account are included in this business model. Example: when Merrill Lynch becomes the investment banker for a to-be-listed firm on a commitment offering basis, it.purchases the shares of the firm (the industry standard is at a 7% discount) and effectively re-sells them on public listing.

(6) A *Wholesaler*/*Retailer* buys and sells physical assets. This is the most common type of Distributor. Examples: Wal*Mart, Amazon.

(7) An *Intellectual Property* (*IP) Trader* buys and sells intangible assets. This business model includes firms that buy and sell intellectual property such as copyrights, patents, domain names, etc.

Example: NTL Inc.

(8) A *Human Distributor* buys and sells human assets. Like Human Creators, this business model is illegal and rare in most places and is included here only for logical completeness.

(9) A *Financial Landlord* lets others use cash (or other financial assets) under certain (often time-limited) conditions. There are two major subtypes of this business model:

(9a) *Lenders* provide cash that their customers can use for a limited time in return for a fee (usually called "interest"). Examples: Bank of America, Fannie Mae.

(9b) *Insurers* provide their customers financial reserves that the customers can use only if they experience losses. The fee for this service is usually called a "premium." Examples: Aetna, Chubb.

(10) A *Physical Landlord* sells the right to use a physical asset. The asset may, for example, be a location (such as an amusement park) or equipment (such as construction equipment). Depending on the kind of asset, the payments by customers may be called "rent", "lease", "admission", or other similar terms. This business model is common in industries like real estate rental and leasing, accommodation, airlines and recreation. Examples: Marriott, Hertz division of Ford.

(11) An *Intellectual Landlord* licenses or otherwise gets paid for limited use of intangible assets. There are three major subtypes of Intellectual Landlord:

(11a) A *Publisher* provides limited use of information assets such as software, newspapers, or databases in return for a purchase price or other fee (often called a subscription or license fee). When a Publisher sells a copy of an information asset, the customer receives certain limited rights to use the information, but the publisher usually retains the right to make additional copies and resell the information. Example: Microsoft. Many publishers also receive revenues from advertising that is bundled with the information assets, but this revenue is classified as part of the Attractor business model (see below).

(11b) A *Brand Manager* gets paid for the use of a trademark, know-how, or other elements of a brand. This includes franchise fees for businesses such as restaurant or hotel chains. Example: Wendy's.

(11c) An *Attractor* attracts people's attention using, for example, television programs or web

content and then "sells" that attention (an intangible asset) to advertisers. The Attractor may devote significant effort to creating or distributing the assets that attract attention, but the source of revenue is from the advertisers who pay to deliver a message to the audience that is attracted. This business model is common in radio and television broadcasting, some forms of publishing, and some Internet-based businesses. Example: New York Times, Google.

(12) A *Contractor* sells a service provided primarily by people, such as consulting, construction, education, personal care, package delivery, live entertainment or healthcare. Payment is fee for service, often (but not always) based on the amount of time the service requires. Examples: Accenture, Federal Express.

In most cases, *Contractors* also require physical assets (such as tools and workspace), and *Physical Landlords* also provide human services (such as cleaning hotel rooms and staffing amusement parts) associated with their physical assets. In cases where substantial (more than 50% in value) amounts of both human and physical assets are used to provide a service, we classify a firm's business model (as *Contractor* or *Physical Landlord*) on the basis of which kind of asset is "essential" to the nature of the service being provided.

For example, a passenger airline would generally be considered a *Physical Landlord*—even though it provides significant human services along with its airplanes—because the essence of the service provided is to transport passengers from one place to another by airplane. Conversely, a package delivery service (like Federal Express) would generally be classified as a Contractor because the essence of the service provided is to have packages picked up and delivered (usually by people) regardless of the physical transportation mode used (bicycle, truck, train, etc.).

(13) A *Financial broker* matches buyers and sellers of financial assets. This includes insurance Brokers and stock Brokerage functions in many large financial firms. Examples: e*Trade, Schwab.

(14) A *Physical broker* matches buyers and sellers of physical assets. Examples: eBay, Century 21.

(15) An *Intellectual property (IP) broker* matches buyers and sellers of intangible assets.

Example: Valassis.

(16) A *Human Resources (HR) broker* matches buyers and sellers of human services. Examples: Robert Half, EDS.

As the subtypes of *Financial landlord* and *Intellectual landlord* listed above illustrate, it is possible to subdivide these sixteen business models even further. For now, however, we have found that the sixteen-model level of granularity provides a useful level of analysis.

Finally, we see that the typology just described mostly satisfies the earlier criteria laid out for a good typology. For example, in the detailed description of business models below, most models map to intuitive concepts (*e.g., Entrepreneur*). Also, our framework collectively exhausts the space of possible models along the two dimensions defined. Our typology also has discriminant validity against industry classification, probably the most obvious alternative. In a factor analysis using each firm's main business model and primary industry, we obtained a uniqueness of 0.849. Finally, later in the paper, we also provide evidence that the typology has convergent validity.

Data and Method

To answer our basic questions about business models, we selected a sample of firms, classified their business models, and then analyzed their financial performance.

Sample of firms

We chose the set of publicly traded United States firms in COMPUSTAT-CRSP, from 1998 through 2002. We include any restatements available up until September 30, 2003. Figure 3 shows their summary statistics.

Classifying firms' business models

We classified firms' business models using the firms' revenue as a guide. We posited that many firms would have more than one business model, so we classified a firm's business models separately for each revenue stream (or segment) the firm reported. More specifically, we used: (a) the dollar amounts of

the firm's revenue segments as reported by COMPUSTAT or the publicly filed SEC Form 10-K and (b) the textual descriptions of the revenue segments as reported in the 10-Ks.

For the top 1,000 firms by revenues in 2000 (we call these the SeeIT1000 firms), we did manual classifications of every revenue stream. For the rest of the firms and years in our sample, we used a rule-based computer program to do the classifications automatically.

Manual classification. For manual classification, we read 9,833 textual descriptions of the revenue segments and used the definitions of business models above to classify the revenue according to which business model it represented. We faced two major issues in classification. First, we had to interpret the qualitative, textual descriptions each firm provided for its different business segments. Even though there is, of necessity, some subjective judgment involved in this process, we trained a team of raters to do this in a verifiably reliable and consistent way.

The team included eight MIT students and one senior MIT research staff member (Herman). Each firm's business models were classified by at least one of the students and all the classifications were also reviewed (and, if necessary, corrected) by the senior research staff member. We used an interactive online database to record all the classifications along with comments about how classifications were determined.

To assess consistency, we tested inter-rater reliability among our eight student raters for a random sample of 45 firms. For each firm, two raters independently rated each line item. Of these ratings, 97% of the total revenue were classified identically, with a Cohen (1960)'s Kappa statistic of 0.96 (significant at $p < .01$) confirming that the different raters applied the classification methodology consistently.

The second major classification issue arose when the text indicated that multiple business models were included in a single reported revenue segment. In these cases, we had to somehow allocate revenues across the different business models. To do this, we first used any detailed information in the 10-K to make a specific split of the revenue. In the absence of any such details, we used our judgment to allocate revenue across models. However, we did not attempt to make arbitrarily fine-grained subjective allocations. Instead, we either split the revenue evenly across all of the different models that were

included in the segment or, if the text implied that one model is much more important than the others, we assigned all the revenue to that model. To illustrate these classifications, Figure 4 shows the classification for General Electric (GE).[1]

Automatic classification. To classify firms in the rest of the dataset, we used a rule-based program that learns from the manually classified sub-sample which words are associated with which business models. The program considered five features made up of combinations of SIC codes and the words used in the revenue line item descriptions in the firms' financial reports (mainly 10-Ks). First, the program assigned weightings to these different features in a way that maximized accuracy of prediction in the "training set" consisting of the manually classified firms. Then, the program used these features and weightings to classify all remaining firms and years. (For a detailed description of the automatic classification methodology, see Apel, 2006.)

To test the validity of these automatic classifications, three random samples of 500 firms each were also rated manually. In these three samples, the rule-based program classified an average of 97% of the revenue in the same way the human rater classified it, and the Cohen's Kappa statistics were 0.95, 0.94, and 0.95, respectively ($p < .01$ for each one). Thus, the automatic classification program has approximately the same level of agreement with human raters as the human raters have with each other. We could not hope for better performance from any automated system.

Analyzing financial performance

There is no universally or even commonly used set of measures for evaluating the financial

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[1] Note, for example, that the line item "Equipment Management (GE Capital Services)" is repeated and assigned to two different business models (Lender and Contractor). The text of the Form 10-K implies that GE Capital Services both lent money and performed services for the Equipment Management line of business, but it gives no details as to how much of each is done. Therefore we split the revenue for the line item equally among the models.

performance of firms. A wide range of measures has been used in previous research assessing strategic groups or other organizational factors against firm performance (*e.g.*, Ketchen, et al. (1993); Capon, et al. (1990)). For consistency with prior work, we focused on three categories of performance: *market value and growth*, *profitability*, and *operating efficiency*. And for each category, we used measures commonly used in the literature. Specifically, for market value and growth, we used Tobin's Q (Abel and Blanchard (1986)) and Fama and French's factor-risk alpha (Fama and French (1993), Carhart (1997)). For profitability, we used return on invested capital (ROIC) and return on assets (ROA) (*e.g.,* Mcgahan and Porter (1997)). Finally, for operating efficiency, we used operating cash flow on assets and cash flow margin on sales (*e.g.*, Healy, et al. (1992)). Details of these measures are in the captions to the figures. The Fama-French alpha was obtained by regressing excess returns on their risk factors – SML (small minus large), HML (high minus low) – and Carhart's UMD (up minus down momentum), all obtained from Professor French's website[2].

Since these measures of financial performance are reported only for the firm as a whole, we used regression equations in which each business model gets "credit" for the performance of the whole firm in proportion to the amount of revenue from that business model. Our baseline specification is:

$$PERFORMANCE_{f,t+1} = \alpha + \sum_{i=1}^{n-1} \beta_i \cdot BM_{f,i,t} + \text{firm-effects}_f + \text{year-effects}_t + \mathbf{X}.\boldsymbol{\gamma} + \varepsilon_{f,i,t} ,$$

where $PERFORMANCE_{f,t+1}$ is a measure of firm *f*'s performance at one period forward $t+1$, $BM_{f,i,t}$ the percentage of total firm revenue attributable to business model i, $\mathbf{X}$ a matrix of control regressors, and ε is assumed to be a normally distributed error term. Since the sum of the BM_is is one, we used one business model as a baseline reference.

One empirical issue is that there is potentially some degree of unobserved heterogeneity among firms (*e.g.*, use of capital) and over time (*e.g.*, levels of inflation affecting their specific input or output

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mix). We estimated using fixed effects to eliminate time-constant heterogeneity. However, there might be time-varying heterogeneity, and this we accounted for in the **X** control regressors. We included in **X** an indicator on whether the firm is in the S&P 500, log assets, and log firm age. These three are standard in regressions on performance (*e.g.,* Gompers, et al. (2003)) and might potentially bias our business model coefficients. We were also concerned about confounding business model effects with concentration effects. For example, if we observed superior performance coming from a firm's heavy concentration in *Physical Broker*, we must partial out the effect of *Physical Broker* from the performance attributable to the fact that the firm is focused (on any business model). To account for this, we included in **X** the Herfindahl index of the concentration of business models by firm.

Another concern was potential endogeneity. Although somewhat implausible, it could be that firms chose business models as a result of firm performance. For example, young retail chains might have started out as *Wholesalers/Retailers*, but once they achieved the market power that comes with operating performance, they might prefer to morph into *Physical Brokers*. In this latter model, powerful book stores today accept books only on consignment, and strong supermarket chains charge slotting fees to vendors for putting their goods on supermarket shelves. To deal with this and other endogeneity issues, we included the lagged value of *PERFORMANCE* on the right hand side.

Finally, we addressed a collection of more standard econometric issues. It might be argued that error terms had varying variances. For example, unobserved shocks like the industry-specific factors might be different in the technology bubble years at the beginning of our period and the crash at the end. Therefore, we use Huber-White robust standard errors. To minimize potential serial correlation for observations within firm, we clustered on firms. We also clustered on industries and obtained similar (unreported) results. To deal with outliers, we winsorized the data at 1% and 99%. We also estimated without winsorizing, and the (unreported) results were qualitatively unchanged.

We present the results of the above baseline specification next. There were other finer empirical issues, which we discuss in the subsequent section on robustness and alternative interpretations.

Baseline Results

Distribution of Business Models

Figure 5 shows the distribution of different business models from 1998 and 2002, the years at each end of our dataset period. In panel (a), we report the "popularity" of business models by their sales. The popularity does not seem to have changed much over the period. *Creators* account for 49.6% of all revenues in our dataset at both the beginning and end of the period. *Landlord* models are next, followed by *Distributors* and *Brokers*. Along the asset type dimension, the greatest portion (about 73%) involves *Physical* assets. *Financial* and *Human* assets are next, and *Intangible* assets are only about 3%. The most popular business models are *Manufacturer*, *Wholesaler/Retailer*, *Contractor*, and *Financial Landlord*.

In panel (b), we report the "popularity" of business models by the percentage of firms that employ them. Again, *Creators* and *Physical* models are the most popular. One difference from panel (a) is that *Human* and *Intangible* asset models are considerably more popular in numbers than in sales, while the reverse is true for *Financial* models. This suggests that *Financial* models tend to generate more revenues per firm, but from this alone, it is difficult to tell whether this is due to these models requiring a large minimum efficient scale, or some other reason. We address these performance questions in the next section.

The dynamic view over the five-year time presents an interesting reduction in the number of business models, from 9,563 to 7,123 (bottom right box of panel (b)). This suggests that firms seem to be consolidating in terms of business models. Also, while the number of *Creators* decreased, from 5,080 to 3,932, their proportion has actually increased, from 53.1% to 55.2%. Taking panels (a) and (b) together, we have a tentative picture suggesting that the influence of *Creators* in the "new economy" is not diminished. The same comment holds for *Physical* models.

Performance of Business Models

Figure 6 shows estimation results, with each model corresponding to a different measure of performance as dependent variable. Panel (a) regresses various measures of performance on business

models. The baseline model was *Wholesaler/Retailer*.

The first interesting observation is that business models matter. In a joint test of the significance of business models on performance, the *p* values, shown in the bottom-most row of the panel, are significant except for margin on sales.

Second, some business models appear to perform better than others, although none seem superior across all performance measures. For example, we see that *Entrepreneur, Manufacturer, Physical Landlord, Physical Broker,* and *Contractor* have superior cash flow on assets, while *HR Broker* is significantly worse on this measure (*IP Trader* also has a negative coefficient on this measure, but it, and *IP Broker*, have so few observations that we do not make any claims about them). Similarly, *Physical Brokers* did significantly better on FF alpha (abnormal stock return), ROIC, and ROA than *Wholesaler/Retailers*, but *Entrepreneurs* did significantly worse on FF alpha.   These results are not only statistically significant, but also economically so. For example, an additional percentage allocation of revenues coming from *Entrepreneur* reduces FF alpha by 4.8 percentage points, holding "all else equal." "All else," of course, cannot be equal since the percentage revenues must sum to one. We address this issue in the robustness section. Considering that the median abnormal stock return is 0.4% (see the summary in Figure 3), this is very large point estimate of the impact of *Entrepreneur*.

Taken together, we interpret these results as evidence that some business models did better than others in the period examined. In the next section, we check how robust this conclusion is. Following that, we offer some preliminary explanations for why some models did better than others.

Robustness Checks, Alternative Interpretations

The estimation of the contribution of business models to firm performance involves several empirical challenges. We incorporated many of these into the baseline specification. Here, we discuss modifications to the baseline to see if our conclusions are robust.

One issue is whether our classification of business models has overly large measurement error. For example, two firms might have simultaneously decided to be *Financial Brokers*, but one generated

and reported sales in that model earlier than the other, perhaps because of synergies from other parts of its business. We would have classified the latter firm as starting *Financial Broker* later, and incorrectly attributed better performance to the model as a whole because we understated the latter firm's poorer performance. Measurement errors in general would not introduce biases if they were random, but one could never be sure. One way to address this issue is to "discretize" the business model variables (see, Morck, et al. (1990)). We tested a specification in which we used dummies for each business model, which were set to 1 only if the percentage of sales is above a threshold and 0 otherwise. We experimented with different thresholds—1%, 5%, and 10%. The results were qualitatively unchanged so we do not report results of this discretized specification here (but we do report results from a discretized version of a more complex specification, below).

A second issue is the difficulty in interpreting the coefficients for the $BM_{f,i,t}$ variables. For example, if *PERFORMANCE* were measured using q and the coefficient for a BM_i is 0.3, the specification taken literally means that a 10 percentage point increase (say) in the portion of firm revenues coming from BM_i would be associated with a 0.03 increase in q, holding the portion of revenues coming from other business models constant. The last condition, of course, is not possible since the total percentage of revenues sums to 100%. To address this issue, we employed a technique that also took care of another empirical issue: whether it is specific *combinations* of business models that determine performance rather than the models themselves. Specifically, we measured $BM_{f,i,t}$ with indicators of firm-level business model *combinations*. For example, if previously we had a firm-year observation with 10% of revenues from *Manufacturer* and 90% from *Financial Landlord*, we now have the firm-year observation with an indicator of 1 for "*Manufacturer–Financial Landlord*" (assuming that in this case, we say that a firm has a business model if at least 5% of its revenues comes from that model) and 0 on all other combinations of business models in the dataset. As in the previous paragraph, we used different cut-offs and found the results invariant, so we report results for the 5% threshold.

Panel (a) also raises another issue: *IP Trader* and *IP Broker* have just two observations each. Disregarding these two models does not invalidate our conclusion; there are still a number of significant

coefficients. More important, in the next estimation using combinations of business models, we see that this concern is addressed.

In Figure 6, panel (b), we report the results of this specification. Once again, business models—in combination form—matter, as we see with the p-values in the bottom-most row. Also, of the 258 coefficients in the table (these are for model combinations with at least ten observations), 49 are significant. Taken together, we interpret this as evidence that some business models combinations are superior to others. Consistent with our baseline conclusion, we see that no combination is superior on all measures of performance. As with panel (a), we defer discussion of how and why some models or combinations might be superior to the next section, and focus on confirming our main conclusion that "some models are superior to others."

A third empirical issue is about measurement error that could result from how firms account for segments. When reporting, firms might classify revenues as a new segment only when revenues of that segment are large enough. Therefore, our classification methodology would have a delayed recognition of the true distribution of revenues among business models. We did not have a simple way to deal with this problem, but it seemed reasonable to assume that the delay is not systematically more in some business models than others. This assumption is not justified if, however, there was a rush to specific models (*e.g.,* to *Entrepreneur* during the Internet boom), so our findings are subject to this qualification. Even this phenomenon, however, is mitigated if the rush is from a varied assortment of models to one model, so that we might understate the popularity of this one model and not overstate by too much the reduced popularity of many others.

Fourth, another potential measurement error is associated with the use of auto-classification. The SeeIT1000 sub-sample was manually classified and the rest of the sample was classified automatically. Two issues arose. First, even though we had a reasonable inter-rater reliability score in the SeeIT1000 sub-sample, it is possible that the unobserved reliability score *within* the auto-classified sub-sample might still be different. To check this, we re-estimated the results using just the SeeIT1000 sub-sample. We then used a likelihood ratio test to compare if the coefficients were the same as those we reported here.

Furthermore, we re-estimated a second time using the SeeIT1000 sub-sample but with the Heckman sample correction procedure using the rest of the dataset. The specification for our selection model is based on inspection of the difference between characteristics of the observation in and outside the SeeIT1000 sub-sample. We tried different specifications and the most parsimonious one (with the highest adjusted R-squared) is the following probit:

$$SELECTED = f(MKTCAP, S\&P500, ASSETS, AGE),$$

where *MKTCAP* was log market capitalization, *S&P500* was whether the firm was ever in the S&P 500, *ASSETS* was log total assets, and *AGE* was the log of age of the firm in the COMPUSTAT-CRSP dataset. In both estimations, the results were qualitatively unchanged. For example, when the performance measure is q, the statistic in the likelihood ratio test is 4.80, with a p-value of 0.99, so we cannot reject the null that the coefficients are systematically different. As an example of the Heckman correction, when we regress FF alpha, our inverse Mills ratio is not significant at conventional levels ($p=13.6\%$). Furthermore, the business model coefficients are hardly changed. *Entrepreneur* goes from -4.83 (in Figure 6, panel (a)) to -3.53, *Physical Broker* from 5.40 to 5.54. *Physical Landlord* does become more significant, with a coefficient of 2.18. However, the p value of 9.3% is not too significant. Since the results are mostly unchanged, we do not report the rest.

Fifth, there was the issue of whether the 1998-2002 dataset had significant survivorship bias—*i.e.*, was it missing firms in earlier years, which were substantively different? To test this, we employed the same Heckman sample selection correction procedure, this time using all COMPUSTAT firms from 1985 through 1997. The result (unreported) was an inverse Mills ratio that was insignificant, so that we were reasonably assured that there was no significant bias.

The sixth issue is whether our main conclusion—that some business models are superior—accounts for the possibility that firms with these superior business models might have shown wider variance in performance. In other words, we have to compare not just the first moment (means) but also higher moments. To check this, we calculated the correlation between the coefficients in Figure 6 (setting insignificant coefficients to zero) and the within-model standard deviation of firm performance. We

found that the correlation ranges from -0.44 for cash flow on assets (*i.e.,* high performing models have lower standard deviation) to 0.80 for alpha. The range is just as wide when we weigh the standard deviation by percentage revenues derived from business models. We interpret this as evidence that variance in performance might explain some, and not all, of why some models do better than others.

Finally, there is an issue of interpretation. Once we identified a firm to have a certain business model, increases in sales attributed to that model could have been a result of momentum, rather than a conscious policy decision by the firm to invest in that model. This is a different issue than endogeneity caused by reverse causality, which we have addressed. Instead, it is about whether the right-hand variable of interest (percentage in a business model) is even a decision variable. To some extent, this issue could be addressed by discretizing the measure of business model. Unlike the previous case where we discretize the level of revenues from a business model, we now discretize the changes in revenues. In other words, if we observe a firm with say, 15% of revenues coming from *Wholesaler/Retailer* in 1998, 17% in 1999, and 20% in 2000, and if we set a threshold change of 3 percentage points, then the values we use are 15%, 15%, and 20%, respectively, because the change in 1999 was not greater than 3 points. As before, we used different thresholds—1%, 5%, 10%. We also vary when to attribute the change—*e.g.,* in the example above, we might have assigned the 20% to 1999. It turns out that these variations do not change the results qualitatively, so we do not report them here. However, there is second response to this issue of whether changes in business model reflect managerial decisions. Specifically, we could avoid interpreting the coefficient for a business model variable as the performance improvement a firm could get if it invested more in that business model. Rather, we could settle for the more modest, subtler interpretation that if, *for whatever reason*, the firm had more sales from that business model, its performance would change by the magnitude indicated by the coefficient. This interpretation is open to the challenge that it is uninteresting because sales for a business model might just be hard-wired to the performance of the firm as a whole. We believe that this view is incorrect, since the explanatory variables are *proportions* of sales derived from various business models, and it is not intuitively obvious that such proportions determine performance.

To sum up, we believe our main conclusion, that some business models perform better than others, is a very robust one.

Discussion and Future Work

The baseline results offer some interesting observations, although at this point, we can only provide some educated hypotheses about what could explain these. The intention is to suggest new avenues for research, based on the stylized facts we learned in this study.

The first issue is *why* some business models are superior to others at all. Recall that we removed time effects, so the superior performance is beyond any transient effect. There could be more than a few explanations that hold simultaneously, and we offer a couple for consideration. First, the picture we get from both panels (a) and (b) is that a number of models perform better than the baseline *Wholesaler/Retailer*. For example, in panel (a), all cells that are significant are positively signed, except for *Entrepreneur* on the alpha measure, *Intellectual Landlord* on q, and *HR Broker* on the cash flow on assets. This might be surprising, if one believes the popular literature on the rise of retailers like Wal*Mart. However, the data suggests that it is more likely that the story is that fierce competition in retailing means that "consumers may be the net beneficiaries" (Messinger and Narasimhan (1995), pg. 189), and not retailers/wholesalers. Also, we note that all three that do not do as well as *Wholesaler/Retailer*—*Entrepreneur*, *HR Broker*, and *Intellectual Landlord*—tend to be involved in more intangible assets than those that do better, such as *Manufacturer*, *Physical Landlord*, and *Physical Broker*. Furthermore, *Entrepreneur* and *Intellectual Landlord* do not do well on precisely the measures that involve market assessment of their value—*i.e.,* on q and abnormal stock return. This is consistent with a story in which the market finds it hard to evaluate intangible assets and possibly under-values these models. *HR Broker*, on the other hand, appears to have done well on q and suffers on cash flow on assets, a measure of efficiency. On closer inspection, while firms with *HR Broker* models have a lower mean cash flow on assets of 20.1% (compared with 33.4% for *Wholesaler/Retailer*), they also have a much smaller standard deviation of 14.0% (compared with 47.0% for *Wholesaler/Retailer*). This might be

consistent with a different story that *Wholesaler/Retailer* models do better than *HR Broker* because there is greater risk in the former model.

There is also a related issue of why any capital might flow to generally poor business models like *Wholesaler/Retailer* at all. As explained for the case of *HR Broker*, one possible answer is that there is a great enough variation in performance to continually attract firms that learn about their performance only after entry (*e.g.*, Jovanovic (1982)). Such a mechanism is also observed in the standard "tournament" result in labor economics (*e.g.*, Lazear and Rosen (1981)).

Another possible reason for persistence in the superiority of some business models is that they involve complex interdependencies, generally unobservable to competing firms and are difficult to imitate (see Levinthal (1997) for a pioneering view). Recently, Lenox, et al. (2006) show that interdependencies can not only explain persistence, but variation in industry profitability. It would be intriguing to determine the degree of interdependency for each business model, and see if interdependency is another channel through which business models explain performance.

Apart from understanding why, another issue for future research is *how* the superior business models drive performance. Guided by the literature, we can think of a few ways in this could happen. One possibility is that some business models have lower capital intensity. For example, Ruback and Sesia (2000) argue that Dell's business model performs well because it has lower working capital than competitors do, by purchasing supplies only when orders come in. Indeed, Sheffi (2005) reports that Dell even has negative working capital, when it could receive revenues ahead of payables. Another interesting way with which business models could affect performance is through the advantage of scale. The story is that some business models, such as *Wholesaler/Retailer*, tend to reward scale and it is through scale that a Wal*Mart gains superior performance. A third way might be leverage. Some models, such as *Physical* ones, might be more attractive to lending banks and therefore more amenable to a higher use of debt (see the large corporate finance literature on this, especially that related to debt capacity and "pledgeable income" – *e.g.*, Morellec (2001)). Higher leverage might boost performance on equity-based measures of performance. Finally, and along the lines of inefficient markets, some models might do better because

they liberate firms from financial constraints (*e.g.*, Fazzari, et al. (1988)). For example, it could be easier to access the capital market with ownership rights to physical collateral.

Conclusion

In this paper, we have taken a first step toward the systematic study of business models. We defined a reliable and practical typology for business models, and we classified all public US firms listed in COMPUSTAT for 1998 through 2002. We found that some business models do, indeed, perform better than others, but on different measures of performance.

We hope that our results will be useful to several different kinds of readers. First, they can help *researchers* systematically analyze changes over time in the business models of individual firms and whole populations of firms. Second, we hope that *managers* can use our business model concepts to understand at a deeper level the structural choices they have to make about their own firms' business models and how to manage these different business models effectively. Finally, we hope that our framework can provide *investors* with a useful lens for analyzing potential investments. Unlike well-known concepts such as industry classification, this perspective focuses on the deep structure of what firms actually do. And, since this perspective is not yet well-known, it may lead to novel insights about which investment opportunities are most attractive.

The work we have done is only the beginning of the systematic study of business models. We believe it raises more questions than it answers, and we hope it will provide a foundation for future work on these important questions

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Figure 1. Asset Rights

		How much does the business transform the asset?	
		Significant	Limited
What rights are being sold?	Ownership of Asset	**Creator**	**Distributor**
	Use of Asset	**Landlord**	
	Matching of buyer and seller	**Broker**	

Figure 2. The Sixteen Business Models

		What type of asset is involved?			
		Financial	Physical	Intangible	Human
What rights are being sold?	Creator	**Entrepreneur**	**Manufacturer**	**Inventor**	**Human Creator***
	Distributor	**Financial Trader**	**Wholesaler/ Retailer**	**IP Trader**	**Human Distributor***
	Landlord	**Financial Landlord**	**Physical Landlord**	**Intellectual Landlord**	**Contractor**
	Broker	**Financial Broker**	**Physical Broker**	**IP Broker**	**HR Broker**

* These models are illegal in the US and most places today because they involve selling human beings. They are included here for logical completeness.

Figure 3. Summary Statistics
This core data is obtained from the COMPUSTAT-CRSP merged tapes, supplemented from a variety of sources, such as SEC 10-K's. Each observation is a firm-year.

	Obs	Median	Std. Dev.
Year	42,547	2,000	1.4
Sales ($M)	42,547	103	4,069
Income bef. extraor. items ($M)	33,128	2	294
Operating inc. bef. depr. ($M)	33,128	11	748
Capital expenditures ($M)	33,128	5	332
Total book assets ($M)	33,128	192	8,652
Property, plant, equipment (net)	33,128	25	2,006
Employees ('000)	31,029	0.8	17.8
Market capitalization ($M)	32,631	145	6,724
q	33,102	1.3	2.5
Fama-French alpha	22,586	0.4%	3.8%
ROIC (return on invested capital)	33,070	13%	54%
ROA (return on assets)	33,102	8%	31%
Op cash flow on assets	33,083	19%	50%
Cash flow margin on sales	33,128	13%	304%

Figure 4. Classification of General Electric Revenue for FY2000

Firm Segment	Revenue in $000	% of Revenue	Business Model Archetype	Split
Aircraft Engines	10,779	8.16	*Manufacturer*	
All Other (GE Capital Services)	4,582	3.47	*Distributor*	
Appliances	5,887	4.46	*Manufacturer*	
Consumer Services (GE Capital Services)	23,893	18.09	*Financial Landlord (Lender)*	
Equipment Management (GE Capital Services)	7,374	5.58	*Financial Landlord (Lender)*	50%
Equipment Management (GE Capital Services)	7,374	5.58	*Contractor*	50%
Industrial Products & Systems	11,848	8.97	*Manufacturer*	
Mid-Market Financing (GE Capital Services)	5,483	4.15	*Financial Landlord (Lender)*	
NBC	6,797	5.15	*IP Landlord*	
Plastics	7,776	5.89	*Manufacturer*	
Power Systems	14,861	11.25	*Manufacturer*	
Specialized Financing (GE Capital Services)	5,648	4.28	*Financial Landlord (Lender)*	
Specialty Insurance (GE Capital Services)	11,878	8.99	*Financial Landlord (Insurer)*	
Technical Products & Services	7,915	5.99	*Manufacturer*	
Total Revenue	$132,094			

Figure 5 - Distribution of Business Models: 1998–2000
The top set of numbers in each cell is for 1998, the bottom for 2002. Numbers may not add up due to rounding.

Panel (a) - Percent of total sample revenue in business model

Figures in brackets are revenues in billions of nominal dollars.

		What type of asset is involved?				Total by Asset Right
		Financial	**Physical**	**Intangible**	**Human**	
What rights are being sold?	**Creator** (ownership of asset with significant transformation)	0.0% ($4) 0.0% ($0)	49.6% ($6250) 49.6% ($6863)	0.0% ($0) 0.0% ($0)	-	49.6% ($6254) 49.6% ($6863)
	Distributor (ownership of asset with limited transformation)	0.2% ($20) 0.3% ($46)	14.6% ($1836) 14.9% ($2063)	0.0% ($0) 0.0% ($0)	-	14.7% ($1856) 15.2% ($2108)
	Landlord (use of asset)	14.4% ($1811) 12.5% ($1723)	8.8% ($1106) 8.9% ($1230)	2.4% ($305) 3.0% ($412)	9.6% ($1205) 9.9% ($1372)	35.1% ($4427) 34.3% ($4737)
	Broker (matching of buyer and seller)	0.4% ($54) 0.7% ($96)	0.1% ($13) 0.2% ($22)	0.0% ($0) 0.0% ($0)	0.0% ($4) 0.0% ($1)	0.6% ($71) 0.9% ($120)
	Total by Asset Type	15.0% ($1889) 13.5% ($1865)	73.0% ($9206) 73.6% ($10178)	2.4% ($305) 3.0% ($412)	9.6% ($1209) 9.9% ($1373)	100.0% ($12608) 100.0% ($13828)

Panel (b) - Percent of firms with any revenue in business model

Figures in brackets are number of firms. Rows and columns do not add up because a single firm can appear in multiple cells.

		What type of asset is involved?				Total by Asset Right
		Financial	**Physical**	**Intangible**	**Human**	
What rights are being sold?	**Creator** (ownership of asset with significant transformation)	0.1% (7) 0.1% (6)	53.1% (5074) 55.1% (3927)	0.0% (0) 0.0% (0)	-	53.1% (5080) 55.2% (3932)
	Distributor (ownership of asset with limited transformation)	0.7% (71) 1.0% (72)	11.4% (1091) 11.4% (811)	0.0% (0) 0.0% (0)	-	12.1% (1160) 12.4% (880)
	Landlord (use of asset)	8.2% (787) 8.1% (579)	11.4% (1093) 12.0% (852)	11.5% (1103) 12.2% (872)	21.4% (2046) 22.5% (1606)	46.8% (4474) 47.0% (3346)
	Broker (matching of buyer and seller)	0.9% (84) 1.2% (82)	0.1% (11) 0.2% (11)	0.0% (0) 0.0% (0)	0.1% (8) 0.1% (5)	1.1% (102) 1.3% (96)
	Total by Asset Type	8.8% (845) 8.9% (633)	70.4% (6737) 72.2% (5141)	11.5% (1103) 12.2% (872)	21.4% (2047) 22.6% (1607)	100.0% (9563) 100.0% (7123)

Figure 6. Baseline Regressions of Performance on Business Models
Figures in brackets are standard errors. Estimations are with fixed effects, clustered at the firm level, with one lag of the dependent variable. *** Significant at 1%, ** at 5%, * at 10%.

Panel (a) – Business models (base is *Wholesaler/Retailer*)
The specification is:

$$PERFORMANCE_{f,t+1} = \alpha + \sum_{i=1}^{n-1} \beta_i \cdot BM_{f,i,t} + \text{firm-effects}_f + \text{year-effects}_t + \mathbf{X}.\boldsymbol{\gamma} + \varepsilon_{f,i,t} \; .$$

$PERFORMANCE_{f,t}$ is one of six measures for firm f at year t. The six measures are: (1) Tobin's q, defined as (total assets + market capitalization – common equity – deferred taxes) / total assets, (2) Fama-French alpha, from a standard four factor regression of annual returns on SMB, HML, and UMD (see Fama and French (1993), Carhart (1997)), (3) ROIC (return on invested capital), defined as operating income before depreciation / invested capital, (4) ROA (return on assets), operating income before depreciation / total assets, (5) CFOA (cash flow margin on assets), defined as (sales – COGS – SGA + depreciation) / (market capitalization + preferred carrying stock + long-term debt + current debt) (see Healy, et al. (1992)), (6) MOS (margin on sales), defined as (operating income before depreciation + interest expense + income taxes) / sales (see Healy, et al. (1992)). $BM_{f,i,t}$ the percentage of total firm revenue attributable to business model i. $\mathbf{X}$ is a matrix of control regressors, which include the contemporaneous value of $PERFORMANCE_t$, an indicator on whether the firm is in the S&P 500, log assets$_t$, log firm age, and the Herfindahl$_t$ for the concentration of business models by firm. *Inventor* is not reported because it has no observations in the regression.

Business model	N	(1) q_{t+1}	(2) FF alpha$_{t+1}$	(3) ROIC$_{t+1}$	(4) ROA$_{t+1}$	(5) CFOA$_{t+1}$	(6) MOS$_{t+1}$
Entrepreneur	39	-.28 (.38)	-4.83 (.73)***	.04 (.14)	.04 (.03)	13.71 (6.14)**	.22 (.20)
Financial Trader	383	-.35 (.32)	.87 (.99)	-.01 (.08)	.04 (.04)	9.94 (8.66)	.11 (.26)
Financial Landlord	3444	-.17 (.20)	.56 (.78)	-.07 (.06)	-.04 (.03)	1.33 (3.98)	-.06 (.24)
Financial Broker	458	.56 (.28)**	-.16 (.76)	-.02 (.07)	-.02 (.02)	-.13 (3.57)	.06 (.18)
Manufacturer	22693	-.21 (.13)	-.08 (.43)	-.07 (.04)*	-.01 (.02)	10.31 (3.21)***	-.12 (.15)
Physical Landlord	5108	-.13 (.21)	-.04 (.55)	.01 (.06)	.00 (.02)	13.28 (4.20)***	.01 (.16)
Physical Broker	67	-.86 (1.10)	5.40 (2.43)**	.18 (.08)**	.11 (.04)***	16.06 (5.87)***	.77 (.34)**
IP trader	2	20.58 (2.75)***	9.97 (5.61)*	-.72 (.78)	-.72 (.31)**	-533.31 (48.30)***	2.81 (3.31)
Intellectual Landlord	5424	-.57 (.26)**	.20 (.54)	-.13 (.08)	-.06 (.03)*	2.88 (5.08)	.14 (.31)
IP Broker	2	-7.28 (.38)***	1.69 (.89)*	-.93 (.09)***	.13 (.04)***	5.43 (5.85)	.36 (.37)
Contractor	9626	-.06 (.20)	.12 (.42)	-.11 (.06)*	-.01 (.02)	9.80 (3.78)**	.20 (.21)
HR Broker	34	.87 (.48)*	-7.92 (7.20)	.05 (.17)	-.01 (.06)	-22.32 (7.33)***	.40 (.44)
N		28612	20308	28567	28612	28577	28913
p-value of regression		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj. *R*-sq.		0.7200	0.7541	0.5824	0.8046	0.7741	0.7412
p-value for test of business models		0.0000	0.0000	0.0000	0.0000	0.0000	0.4225

Panel (b) – Discretized business model combinations (base is *Wholesaler/Retailer*)

In this panel, we use discretized versions of the business model measures, setting them to 1 if the percentage of sales exceeds 5% and to 0 otherwise. Furthermore, we use indicators for firm-level *combinations* of the discretized business models at each firm. The p values for a joint test of the business models are all zero. Rows are ranked by the coefficients on q_{t+1}. We rank only combinations with at least ten observations. The model abbreviations are as follows: Mfg=Manufacturer, Fin=Financial, Phy=Physical, Int=Intellectual, Lord=Landlord, Dist=Distributor.

Business model combos	N	(1) q_{t+1}	(2) FF alpha$_{t+1}$	(3) ROIC$_{t+1}$	(4) ROA$_{t+1}$	(5) CFOA$_{t+1}$	(6) MOS$_{t+1}$
IntLord Mfg PhyLord	18	0.63	-2.96	-0.04	0.02	-1.98	0.14
FinBroker Contractor	62	0.45**	0.84	-0.01	0.01	2.23	0.16
HRBroker Contractor	13	0.45	-0.87	-0.07	0.02	-6.3	0.63
Contractor PhyLord	29	0.29	0.76	0.43**	0.03	-8.89	0.13
Wholesaler	34	0.27	-0.39	-0.02	0.01	2.16	-0.16
Mfg PhyLord Wholesaler	849	0.24**	-0.09	-0.03	0.01	-1.36	-0.06
Mfg Wholesaler	57	0.24	-0.41	-0.13	-0.02	-1.4	-0.11
Contractor Mfg Wholesaler	307	0.23	0.15	-0.09	-0.01	2.32	-0.11
Mfg PhyLord	287	0.17	-0.12	-0.03	-0.01	6.28	0.12
Contractor PhyLord	206	0.15	0.46	0.02	0.04	-5.65	0.14
Contractor Wholesaler	98	0.14	0.68	-0.08	-0.04	-4.58	-0.04
FinLord PhyLord	29	0.14	0.37	-0.10*	-0.05	-3.28	-0.12
FinLord Mfg PhyLord	104	0.13	0.22	-0.02	-0.01	1.81	0.11
FinBroker	24	0.12	0.27	-0.24***	-0.01	-4.58	-0.13
FinBroker FinLord Contractor	11	0.12	0.93	-0.19*	-0.01	-109***	0.02
FinLord PhyLord Wholesaler	28	0.11	0.26	-0.06	-0.07	-2.85	-0.16
FinLord Contractor Mfg	14	0.09	5.73*	-0.15*	0	1.19	-0.03
FinDist FinLord Contractor	12	0.06	0.5	-0.08**	-0.03	-5.4	-0.05
FinLord Mfg Wholesaler	57	0.04	0.28	-0.17**	-0.01	-2.13	-0.04
FinBroker FinLord	1,028	0.03	0.16	-0.09*	-0.02	5.21*	0.03
Contractor Mfg	5,760	0.02	0.44	-0.11*	-0.01	3.37	0.19
Contractor	11	0	-0.69	-0.16**	0.01	-6.5	0.05
FinBroker FinDist Contractor	399	-0.01	1.25*	-0.01	0.02	9.05*	0.15
FinLord Contractor	19,290	-0.06	0.44	-0.08**	-0.01	4.1	-0.11
Mfg	3,523	-0.08	0.16	-0.02	0	8.04**	0
PhyLord	1,955	-0.12	0.89	-0.07	-0.02	0.28	-0.02
FinLord	109	-0.15	-0.07	-0.01	0.03	12.45***	0.01
PhyLord Wholesaler	30	-0.19	0.19	-0.47*	-0.04	-12.59*	0.08
Contractor IntLord Mfg	15	-0.19	1.93	-0.10*	-0.03	-3.87	-0.04
Contractor Mfg PhyLord	128	-0.26	-0.32	-0.06	-0.08	-1.98	0.09
FinLord Mfg	241	-0.29	0.94**	-0.11*	-0.06*	-5.97	0.33
IntLord Mfg	21	-0.3	0.05	-0.02	-0.01	0.69	-0.03
FinDist FinLord	19	-0.31	1.16*	0.2	-0.12	-7.41*	0.15
Contractor IntLord Wholesaler	29	-0.38*	0	-0.01	0.07***	1.44	0.47*
FinDist	532	-0.42	0.88*	-0.1	-0.03	-6.08	0.2
Contractor IntLord	57	-0.44*	0.25	-0.12	-0.08	-12.32	0.51
IntLord Wholesaler	3,796	-0.45*	0.27	-0.13*	-0.06*	-2.82	0.02
IntLord	39	-0.48**	0.7	-0.14**	-0.05**	-3.45	-0.01
FinLord Wholesaler	161	-0.53*	2.37***	-0.13*	-0.04	3.28	0.22
IntLord PhyLord	23	-1.04**	0.52	0.04	0.02	3.5	0.15
Contractor IntLord PhyLord	12	-1.37	1.31**	-0.02	0.02	-5.45	0.29
FinLord IntLord	15	-1.65	0	-0.02	0.05	-2	0.46
PhyBroker	10	-1.74***	-0.08	-0.26	-0.19***	-16.60*	0.18
IntLord Mfg Wholesaler							
Adjusted R-squared		.72	.75	.58	.80	.77	.74
p-value on bus. model combos		.00	.00	.00	.00	.00	.00

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