Creative Destruction and Finance: Evidence from the Last Half Century[ψ]

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Abstract

The rate of creative destruction among public firms increases in the U.S. during the period 1960-2009. We document statistically significant increases in big business turnover, changes in market share, the difference in growth rates between firms that gain and lose market share, and other measures that show an increasingly dynamic economy. The increase in economic dynamism is driven by increasingly fast-growing firms that exhibit increasingly high growths in total factor productivity, value-added, and profit margins, and have increasingly high R&D spending and patent grants. The type of firm that generates this creative destruction changes during the sample period. Creators are increasingly smaller and younger, and increasingly issue shares and debt; the average creator would have run out of cash by year-end had it not raised capital, and this financial dependence increases throughout the sample period.

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"*The opening up of new markets, foreign or domestic, and the organizational development from the craft shop to such concerns as U.S. Steel illustrate the same process of industrial mutation—if I may use that biological term—that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism.*"

Joseph Schumpeter in *Capitalism, Socialism, and Democracy* (1942), page 83.

This paper studies creative destruction among public firms in the U.S. during the period 1960-2009. Following Schumpeter (1942), we refer to creative destruction as a process in which new goods and services and the means that create them replace existing ones. Therefore, the automobile replacing the horse-drawn carriage is an example of creative destruction, as is a more efficient means of automobile production replacing a less efficient one. The type of firm that generates these effects is unclear. Schumpeter (1942) claims that creative destruction is driven by large, profitable firms that can finance their own innovations. Schumpeter (1912) envisions innovation coming from small firms that are dependent on external finance. With these effects in mind, we report two novel findings regarding creative destruction in the U.S. economy during the last half century.

First, using several different measures that capture the levels of dynamism and innovation in the economy, we find that the rate of creative destruction among public firms in the U.S. increases during our sample period. Like Fogel, Morck, and Yeung (2008), we use big business turnover as a measure of economic dynamism, and find that turnover among the largest firms increases significantly during our sample period. We generate additional turnover measures that capture aggregate changes in market share and value-added, and find that all of these measures exhibit positive and significant trends during our sample period. The firms gaining market share are increasingly faster growing relative to the firms that suffer losses in market share. These “creator” firms exhibit increasingly high growths in total factor productivity (TFP), value-added, and profit margins relative to the firms that they replace, which is consistent with increasing innovation. Also consistent with increasing innovation, creators spend increasingly more on R&D, and have increasingly more patent grants relative to firms that lose market share. Taken in their entirety, our findings are consistent with the rate of creative destruction among public firms increasing during the last half century.

Our second main finding is that the type of firm that generates creative destruction has changed. Creators are increasingly younger and smaller, and issue increasingly larger amounts of shares and debt. The average creator would have run out of cash by year-end had it not issued shares or debt, and this financial dependence increases throughout the sample period. This does not show that external finance is *causing* creative destruction; issuing shares or obtaining a bank loan does not cause innovation. What we show is that creators are different than before, and increasingly need external finance to fund their chosen investments and operations. Our findings therefore show that creative destruction increasingly resembles the process described in Schumpeter (1912), but not Schumpeter (1942).

Our paper contributes to the literature along several dimensions. Greenwood and Jovanovic (1999), Hobjin and Jovanovic (2001), and Chun, Kim, Morck, and Yeung (2008) argue that information technology induced a surge of creative destruction during the late 20th century. Greenspan (2002) contends that deregulation caused a wave of creative destruction in the U.S. economy during the later part of the 20th century. Black and Strahan (2002) and Kerr and Nanda (2009) show that bank deregulation in the 1990s caused an increase in new incorporations.[1] Ramey and Shapiro (1998) document an increase in capital reallocation across

[1] Our findings are therefore also consistent with Bertrand, Schoar, and Thesmar (2007), who contend that deregulation of the banking sector in France promoted creative destruction in that country.

firms. Comin and Philippon (2005) and Comin and Mulani (2009) study the increase in idiosyncratic volatility among U.S. firms, and show that turnover of industry leaders increases. Our study builds on these findings by documenting increases in big business turnover and more broad changes in market shares that are driven by both within-industry and across-industry effects. We then link these effects to increasing creative destruction, as changes in market share can be caused by factors unrelated to innovation (e.g. price competition). We show that the increase in turnover is caused by more innovative firms replacing less innovative firms; these effects have not been show previously. We further link creative destruction to finance, by showing that creators are increasingly financially dependent; this effect also has not been shown previously.

With respect to the type of firm that generates creative destruction, the extant literature, like Schumpeter, is unclear on this issue. Some authors echo Schumpeter (1942), and claim that innovation is likely to come from large and established firms. Galbraith (1967) posits that large firms can better absorb marketing costs, which he contends are necessary for creating demand for new products. Romer (1986) and Chandler (1990) reason that large firms can apply their innovations over a larger scale, and therefore have a greater incentive to innovate. Holmstrom (1989) notes that innovative investments are riskier, so managers and employees of small companies may avoid such undertakings due to career concerns. Other studies are more in line with Schumpeter (1912). The findings and arguments in Aghion and Howitt (2006), King and Levine (1993a), Rajan and Zingales (2003a and 2003b), and Fogel, Morck, and Yeung (2008) suggest that young firms and financially dependent firms are more likely to be the engines of innovation. Like these studies, our findings show that in the U.S. creative destruction increasingly resembles the Schumpeter (1912) vision. [2]

King and Levine (1993a) extend and formalize Schumpeter's (1912) vision, and model external finance promoting innovation. Consistent with this idea, several papers show that across countries, financial development is associated with higher business turnover and higher entry and exit (see Guiso, Sapienza, and Zingales (2004), Klapper, Laeven, and Rajan (2006), Alfaro and Charlton (2006), Aghion, Fally, and Scarpetta (2007), Beck, Demirguc-Kunt, Laeven, and Levine (2008), and Samaniego (2009)). These studies interpret their findings as consistent with financial development being necessary for creative destruction, as in Schumpeter (1912). Several studies show U.S. financial development increasing during our sample period.[3] Our first main finding therefore shows that creative destruction among public firms increases during a period in which financial development increases, which is consistent with the cross-country findings in the above-mentioned studies.[4] Our second main finding shows that as creative destruction increases, creators increasingly rely on capital markets to fund their operations and investment. We therefore document a firm-level association between finance and creative destruction, which complements the above-mentioned cross-country studies.

Hall (2002), Brown, Fazzari, and Petersen (2009), and Brown and Petersen (2010) show that equity financing is important for research and development (R&D) spending among high technology firms, especially younger firms. Although our financing results are consistent with

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[2] Our findings are also consistent with Fulghieri and Sevilir (2009), who contend that increasing competition will cause large firms to invest in start-ups, rather than try to innovate internally. The intuition is that smaller, standalone firms can more quickly bring new innovations to the marketplace, so it is advantageous for large firms to invest in innovation externally when faced with intense competition.

[3] Brown and Kapadia (2008) show that several stock market development measures from Rajan and Zingales (2003) increase during our sample period. Fama and French (2004) show that new listings increase during our sample period. Fama and French (2005) and Pontiff and Woodgate (2008) show that the portion of U.S. firms issuing shares increases during our sample period, which is consistent with the cost of share issuance declining.

[4] Frank and Goyal (2003), Fama and French (2005), and McLean (2011) show that public firms increasingly issue shares and debt in the U.S. during our sample period.

these studies, the effects that we document are not limited to high technology firms or even industries that are R&D intensive. Patents also reflect innovation, and in our sample many firms and industries with low R&D spending have high levels of patent grants.[5] Moreover, creative destruction can result from efficiency improvements in production processes, which are reflected in TFP growth, rather than new products and services, resulting from R&D spending. As an example, the creative destruction that Greenwood and Jovanovic (1999), Hobjin and Jovanovic (2001), and Chun et al. (2008) study is driven by the manufacturing sector's adoption of information technologies, which are not reflected in R&D expenses.

Schumpeter (1912 and 1942), Aghion and Howitt (1992, 1998, and 2006), Klette and Kortum (2004), Lentz and Mortensen (2008), and Fogel, Morck, and Yeung (2008) contend that creative destruction causes economic growth. Our sample consists of public firms, and the U.S. economy consists of more than just public firms (e.g., recently government spending accounts for almost 40% of GDP), so it is not clear how tightly our findings should align with macroeconomic effects. Schumpeter (1912 and 1942) and Fogel, Morck, and Yeung (2008) stress that creative destruction precedes economic growth. In their cross-country study, Fogel, Morck and Yeung (2008) show that big business turnover measured during the period 1975-1996 correlates with economic growth during the period 1990-2002. Viewing our findings within this framework, one might expect elevated TFP growth during the later years of our sample, and indeed U.S. TFP growth surged during the 1990s and early 21st century (see Jorgenson, Ho, and Stiroh (2004) and Fernald, Thipphavong, and Trehan (2007)). Moreover, during these same years U.S. economic growth exceeded the growth of other developed countries, an effect that Aghion and Howitt (2006) attribute to greater U.S. creative destruction.

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[5] As examples, the agriculture, consumer goods, and rubber and plastics industries have below average R&D spending, but high levels of patent grants.

The remainder of this paper is organized as follows. Section 1 describes the paper's sample and measures, and reports summary statistics and correlations. Section 2 reports the findings regarding the increases in business turnover and creative destruction. Section 3 reports the findings regarding the type of firm that generates creative destruction. Section 4 concludes the paper.

1. Measurement and Data

1.1. Data and Sample

We obtain firm-level accounting data from Compustat for the period 1960-2009. We exclude financial companies, utilities, and American Depositary Receipts from our analyses. All of the accounting variables are winsorized at the 1st and 99th percentiles. Data on inflation and gross domestic product (GDP) comes from the Bureau of Economic Analyses (BEA). Patent grants data are obtained from the NBER Patent Data Project (PDP), which compiles U.S. utility patent grants from 1976 to 2006. We obtain industry definitions from Ken French's website. The final sample consists of 211,072 firm-year observations during the period 1960-2009.

1.2. Measures of Economic Dynamism

We create the economic dynamism measures described below with Compustat data, which consists of public firms. This is suitable for our purposes, as we are interested in turnover among larger firms, which tend to be public throughout our sample period. We do not study the rate of new incorporations, because Kerr and Nanda (2009) show that most newly incorporated firms do not survive for very long, and therefore never create or destroy anything of real importance.[6]

Big Business Turnover. Fogel, Morck, and Yeung (2008) use big business turnover as a measure of creative destruction. Fogel, Morck, and Yeung (2008) explain that big business turnover reflects large and therefore important changes in an economy, making it a preferable measure of the economy's dynamics. To measure big business turnover, we generate a subsample that consists of all firms that are in our sample in both years *t* and *t-5*. We rank firms on revenues in year *t*, and then measure the percentage of firms that are in the top revenue decile in year *t-5*, but not in year *t*. A higher value of this measure shows more turnover among big businesses.

$$Big\ Business\ Turnover_t = \frac{1}{n}\sum_{i=0}^{n} E_i$$

$$E = 1\ if\ the\ firm\ is\ not\ in\ the\ top\ declie\ in\ year\ t; 0\ otherwise$$

In parts of the paper we study the characteristics of the new entrant firms that create the turnover by replacing the big businesses. In some years we have as few as 15 new entrants, and we don't want our findings to be driven by outliers. We therefore remove firm-year sales growth outliers from our sample when we construct this measure. We calculate annual sales growth for each firm each year and remove firm-year observations with annual sales growth above the 99th percentile of the entire sample.

[6] Similarly, Fama and French (2004) show that initial public offerings increase in the U.S. during our sample period, but that the survival rates of new firms is low, and declines during their sample period. For this reason, we do not study entry and exit among public firms, as it can reflect the entry and exit of the same firm, rather than one firm replacing another, although in unreported tests we do find that entry and exit increases during our sample period.

Big Business Share Turnover. Big business share turnover is the aggregate, beginning of period market share of the big businesses that exit the big business decile during a period. To compute this measure, we measure the market share of each firm in the top revenue decile. Market share is the firm's revenue in year *t-5*, scaled by the aggregate revenue of all of the firms in the top revenue decile in year *t-5*. *Big Business Share Turnover* is the aggregate market share in year *t-5* of the firms that are no longer in the top revenue decile in year *t*.

$$Big\ Business\ Share\ Turnover_t = \sum_{i=0}^{n} Top\ Decile\ Market\ Share_{i,t-5} * E_i$$

$$E = 1\ \ if\ the\ firm\ is\ not\ in\ the\ top\ declie\ in\ year\ t; 0\ otherwise$$

Revenue Share Change. This measure reflects the aggregate change in market share among all of the firms in our sample. We generate a subsample of firms that exist in both years *t-1* and *t*. We then measure each firm's market share in both years. The firm's market share in a year is the firm's revenue scaled by the aggregate revenue of all the firms in the sample during that year. We measure each firm's change in market share from one year to the next, and sum up the absolute value of the market share changes to create a single yearly measure.

$$Revenue\ Share\ Change_t = \sum_{i=0}^{n} abs(Share_{i,t} -\ Share_{i,t-1})$$

Like big business turnover, this measure is unaffected by the number of firms in the sample. A large number of firms results in a lower market share, however this is offset by the larger number of observations in the summation.

Value-Added Share Change. This measure is like revenue share change, only we use value-added in place of revenues. Value-added is operating income before depreciation plus labour and related expenses, which follows Chun et al (2008).

Across-Industry vs. *Within-Industry Measurements*. We also estimate both share change measures across- and within-industries. To measure share changes across-industries, we use industry-aggregate revenue and industry-aggregate value-added. To measure share changes within-industry, we create each of the share change measures within each industry, and then average the industry-year values across industries to create a single yearly measure.

1.3. Finance Measures

Cash Flow. We measure internally generated cash flow as net income plus depreciation and amortization, all scaled by lagged assets.

Share Issuance and *Debt Issuance*. Share issuance is measured as change in book equity, plus the change in deferred taxes, minus the change in retained earnings. Debt issuance is measured as change in assets, minus the change in book equity, minus the change in deferred taxes. Both measures are scaled by lagged assets. Both measures follow Baker, Stein, and Wurgler (2003). Compustat coverage of book value of equity is spotty before 1963, so we begin measurement of these variables in 1963.

Financial Independence. We develop a financial independence measure that is the firm's cash holdings minus the net proceeds from share and debt issues. If this measure is positive, then the firm could have undergone its chosen operational and investment activities without external finance, showing that the firm was financially independent for that year. If this measure is negative, then the firm had to raise capital in order to complete its chosen operational and investment activities, and was financially dependent.

To see why, consider the following accounting identity:

$$Cash_t = Cash_{t-1} + Issue_t + Debt_t + Cash\ Flow_t + Other\ Sources_t - Investment_t - Other\ Uses_{t.}$$

What the above identity shows is that a firm's year-end cash balance is its beginning of year cash balance, plus cash from share and debt issuance, plus cash generated by operations and other sources, minus investment, and minus any other uses of cash. The identity can be rewritten as:

$$\underbrace{Cash_t - Issue_t - Debt_t}_{Financial\ Independence_t} = \underbrace{[Cash_{t-1} + Cash\ Flow_t + Other\ Sources_t\ ]}_{Internal\ Sources\ of\ Cash_t} - \underbrace{[Investment_t + Other\ Uses_{t.}]}_{Uses\ of\ Cash_t}$$

The left hand side of this identity is our measure of financial independence, i.e. a firm's ability to fund its operations and growth without relying on external sources of cash. If the measure is negative, then the firm could not have completed the year's operations and investments without external finance. We refer to such firms as financially dependent.

1.4. Summary Statistics and Correlations

Panel A of Table 1 reports summary statistics for the economic dynamism and financing measures used in this study. To compute the summary statistics for the external finance measures we first compute yearly averages for each measure, and then report summary statistics for the yearly averages. The mean value for big business turnover is 0.126, showing that on average during our sample period 12.6% of the firms in the highest revenue decile were replaced over the subsequent 5 years. Big business share turnover is 0.041, showing that on average the firms that leave the top decile represent 4.1% of the total revenue within the top decile. Smaller firms should be more likely to leave the top decile, so although 12.6% of the firms leave in an average year, these firms represent 4.1% of the total big business market share in year *t*-5. Both of these turnover measures display a fair amount of yearly variability. Big business turnover has a standard deviation of 0.029, so 95 percent of its observations fall between 18% and 7%. Big business share turnover's standard deviation implies that 95% of its values range between 2% and 6%.

Revenue share change has a mean value of 0.098. This means that in an average year, 9.8% of the revenue market share turns over in our sample. The turnover in value-added share is even greater, as value-added share change has a mean value of 0.153. Like the big business turnover measures, both of the share changes measures vary significantly from year to year. The 25th and 75th percentiles for the revenue share change measure are 0.078 and 0.113, while those of the value-added share change measures are 0.119 and 0.182. All of the measures in Panel A show that the level of turnover in the U.S. economy has a good deal of yearly variability.

Financial independence has an average value of -0.025, showing that the average firm in our sample could not have completed its operations and investments without external finance. Recall that financial dependence is cash holdings minus net share issues and net debt issues, all scaled by total assets. As we show in Section 1.3, a negative financial independence value shows that the average firm would have run out of cash if it had not raised external funds. Cash flow averages 0.068, while share and debt issues average 0.116 and 0.088, showing that firms get more funds from external sources than from internal sources. As with the turnover measures, the standard deviations and percentile values of the financing measures reveal a good deal of yearly variability in financing.

Panel B reports the correlations among the dynamism and finance variables, and a couple of interesting patterns emerge. First, the turnover measures are all highly correlated with one another, suggesting that the measures tend to capture a common effect. Second, the turnover measures are negatively correlated with the financial independence measure, showing that the average firm relies more heavily on external finance during years in which there is a large amount of turnover. This is especially true for equity issues, which have a correlation of 0.420 or greater with each of the dynamism measures. Moreover, each of the dynamism measures is negatively correlated with the cash flow measure, suggesting that internal cash flow does not promote turnover. If turnover reflects creative destruction, then the correlations are consistent with Schumpeter's (1912) intuition that creative destruction requires external finance, and inconsistent with Schumpeter's (1942) intuition that creative destruction requires internal cash flow.

2. Economic Dynamism and Its Causes

In this Section we report our main empirical findings. Tables 2 reports how our economic dynamism measures evolve over time. Tables 3 and 4 explore whether the firms that generate the turnover and share changes are increasingly innovative. Tables 5-8 explore whether firm age, size, financing, and financial dependence are associated with turnover.

2.1. Economic Dynamism during the Period 1960-2009

In Table 2 we study whether business turnover varies over time during our sample period. We estimate time trends by regressing each turnover measure on a time variable that is equal to 1 in the first year of the sample, and increases by 1 in each sample year. The resulting time coefficient estimates the yearly increase in the dependent variable. Visual examination of the data (displayed in Figures 1-2) suggests that some of the measures are cyclical, so we control for real gross domestic product (GDP) growth in each of our regressions. The big business turnover variables are measured with overlap, so we use the method of Newey and West (1987) to correct the standard errors in the big business turnover regressions.

The first column in Table 2 shows that the time coefficient for the big business turnover measure is 0.002 (t-statistic = 8.82), showing that big business turnover increases by 0.01 every five years. Big business turnover has a mean value of 0.126, so the time coefficient reflects an average yearly increase of 0.002/0.126 = 1.60% per year. The yearly values for the big business turnover measure are displayed in Figure 1.1.

The time coefficient in the big business share change regression is also positive and statistically significant. This shows that the amount of market share leaving the top decile increases significantly over time as well. The regression estimates a yearly increase of 1%, and this upward trend can also be observed in Figure 1.2. The GDP coefficient is positive and statistically significant in both of the big business turnover regressions, showing that big business turnover is procyclical.

The next six regressions in Table 2 show that all of the share change measures have positive and statistically significant time trends (see Figure 2). Regressions 3-5 report the regression results for the revenue share change measure. Regressions 3 shows that revenue share change increases at a rate of 0.0009 (*t*-statistic = 4.10) per year, which reflects an average yearly increase of 0.92% per year. Regressions 4 and 5 show that this increase occurs both across- and within industries; the within- and across-industry revenue share change measures increase at rates of 0.42% and 1.21% per year. The value-added share change measures tell a similar story. The time coefficients in the three regressions all have *t*-statistics greater than 2.5, and reflect yearly increases of 0.98% for the overall value-added share change, and 0.80% and 0.82% for the within- and across-industry value-added share change measures.

Interestingly, the GDP growth coefficient is negative and significant in five of the six share change regressions. This is in contrast to the positive GDP coefficient in the big business turnover regressions. Taken together, these findings show that the replacement of large firms by smaller firms happens more in expansions, while overall changes in market share are greater in contractions. One reason for this difference could be that big business turnover requires high levels of growth among medium-sized firms, and that this growth can only be achieved in economic expansions. In contractions, weak firms can lose share quickly, resulting in a negative relation between GDP growth and the share change measures.

Overall, the findings in Table 2 consistently show that the dynamism in the U.S. economy has been increasing. This effect is observed among the largest public companies, public companies in general, and both within- and across-industries. In the next Section we try to understand whether innovation causes this increase.

2.2. Why is Economic Dynamism Increasing?

In an economy with no creative destruction business is stable, with the same firms dominating the economy for long periods of time. In an economy with ongoing creative destruction, business is less stable, with new firms growing and replacing old firms. The level of business turnover could therefore be indicative of the level of creative destruction in an economy. Yet other factors could also cause increases in economic dynamism. As an example, business turnover could increase due to an increase in price competition, as studied in Irvine and Pontiff (2009). Irvine and Pontiff (2009) point to credit card solicitations that encourage consumers to transfer balances and long-distance carrier promotions that pay customers to switch carriers as examples of price competition, and provide evidence that price competition has increased during our sample period. To test whether increasing creative destruction is causing the increase in economic dynamism, we study the characteristics of the winning firms that drive the increases in economic dynamism reported in Table 2, and test whether these characteristics increase over time along with turnover.

2.2.1. Firm-Level Measures of Innovation

Value-Added Growth. Value-added is estimated as operating income before depreciation plus labour costs and related expenses. This follows Chun et al. (2008). If labour costs are missing, we assign it a value of zero. Price competition could be associated with lower value-added growth, as profit margins tend to shrink as a result of price competition. Creative destruction, on the other hand, could lead to increases in value-added growth, as firms capture the rents resulting for their innovations.

Total Factor Productivity (TFP) Growth. Schumpeter (1912) contends that creative destruction leads to gains in economic efficiency. Like King and Levine (1993b), Beck, Levine, and Loayza (2000), and Chun et al. (2008) we use total factor productivity (TFP) growth as a measure of economic efficiency. If the increase in turnover is the result of increasing creative destruction, then the firms gaining market share ought to exhibit increases in TFP growth. Increasing price competition does not predict increases in TFP growth. Our estimation of TFP growth is as follows:

$$TFP_{i,t} = g_{i,t} - \gamma_{\mathrm{L}} L_{i,t} - \gamma_{\mathrm{k}} K_{i,t}$$

The variable g is the firm's growth in revenues. L is growth in the number of employees and K is growth in the firm's capital stock. Growth is measured as the difference between the beginning and end of period log values. In unreported tests, we estimate TFP with value-added growth and have similar findings. The parameters γ_L and γ_k are the firm's capital and labour shares.

We follow many papers in the growth literature (e.g. King and Levine (1993b), Beck, Levine, and Loayza (2000), and Fogel, Morck, and Yeung (2008)) and use 0.30 for capital's share and 0.70 for labour's share. It could be that capital's and labour's shares are different for different industries. However, Casseli (2005) shows that capital's share in the U.S. has been close to 0.30 since 1970, even though the industrial composition of the economy has changed during this period. For robustness, we also measure an industry-adjusted TFP, which is the firm's TFP minus its industry's median TFP during the same period. This adjustment should correct the firm's TFP measurement if it is either overstated or understated due to measurement error at the industry level.

To estimate capital stock we convert reported net property, plant and equipment (PPE) to real terms following a procedure similar to Chun et al. (2008) and Hall (1990). First, we approximate the average age of firm *i*'s physical assets in year *t* ($a_{i,t}$) as balance sheet depreciation (accumulated depreciation and amortization) divided by income statement depreciation and amortization. If $a_{i,t}$ is more than 20 years old, it is capped at 20. A firm-year with an abnormal decline or increase of PPE age (defined as a drop or jump greater than 3 years compared with neighboring years and a deviation of at least 3 years compared with the firm's average PPE age) is treated as an outlier and the corresponding PPE is removed from the sample. Then, assuming all of firm *i*'s physical assets in year *t* are $a_{i,t}$ years old, i.e. the assets are purchased in year t-$a_{i,t}$. the reported net PPE for year *t* is deflated with the appropriate deflator for year t-$a_{i,t}$.

Profit Margins. Profit margins are measured as earnings before interest, taxes, and depreciation (EBITDA) scaled by sales. New and unique products tend to have higher margins than more mature products that have already been imitated by competitors. Innovations in production processes that have yet to be mimicked can also lead to improvements in profit margins. Increasing profit margins are therefore consistent with increasing creative destruction, but not increasing price competition. We also measure industry-adjusted profit margins, which are the firm's profit margins minus its industry's median profit margin during the same period.

R&D Expenditures. R&D spending reflects investment in the development of new products. An increase in R&D spending among firms that gain market share is therefore consistent with an increase in creative destruction. We study both overall R&D spending and industry-adjusted R&D spending.

Advertising Expenditures. Advertising spending might reflect the marketing of new products, but it can also reflect competition among existing products. An increase in advertising among firms that gain share could therefore be consistent with increasing innovation and increasing price competition. We study both overall advertising spending and industry-adjusted advertising spending.

Patent Grants. We use patent grants over the last 5 years scaled by number of employees as a measure of innovation. Patent grants are obtained from the NBER Patent Data Project (PDP). This database compiles U.S. utility patent grants from 1976 to 2006 and contains information on patent number, application year, grant date, assignee and links between patent assignees and Compustat company identifiers (gvkey).

Alternatively, we could use patent applications as a proxy for innovation. However, patent applications available in the PDP database suffer from the truncation problem discussed in

Hall, Jaffe, and Trajtenberg (2001). The issue is that because the database is based on granted patents, applied but not yet granted patents are not recorded. As a result, there is a sharp decline in patent applications in the later years of the data period. We use patent grants to avoid this bias.

2.2.2. The Effects of Mergers and Acquisitions

In a merger, the acquiring firm absorbs the sales of the target, so mergers can affect our turnover measures. Our turnover measures require that firms exist throughout the measurement period, so delistings do not affect these measures. To test whether our turnover findings are affected by mergers, we obtain mergers data from SDC. SDC merger data are fairly robust during the period 1983-2009, but before 1983 the data are less complete. In unreported tests, we exclude any firm that completed an acquisition and re-estimated all of our turnover measures, and found that the results were unchanged.

We chose to report findings that include acquiring firms because in some cases merger activity may reflect creative destruction. Hobjin and Jovanovich (2001) contend that some firms are better at adopting new technologies than others, and as a result there can be large divergences in operating efficiencies among firms. The more efficient firms should therefore acquire the less efficient firms. Hobjin and Jovanovich (2001) posit that the adoption of information technology can explain the high number of mergers in the 1980s relative to the 1970s. Consistent with this framework, Litchenberg and Siegel (1987) show that among manufacturing firms targets had TFP growth that was 5% lower than the industry average during this period. Morck, Shleifer and Vishny (1988) also show that target firms are inefficient during this period. Morck, Shleifer and Vishny (1988) find that average value of Tobin's *q* 40% is lower for targets as compared to non-targets in their sample. Eisfeldt and Rampini (2006) show that capital reallocation (which includes mergers) among firms tends to move assets from inefficient firms to more efficient firms. These studies suggest that a good deal of mergers reflect creative destruction.

What if mergers are not associated with creative destruction? Consider the case in which an acquiring firm's sales grow only because it now has the sales of the firm it acquired, and not because the acquirer did anything innovative. This type of merger would probably decrease our big business turnover measure, as large firms are more likely to acquire smaller firms, thereby making it easier for large firms to remain in the top decile. This type of merger would however increase our share change measures, as the merger increases the acquirer's revenues. Similarly, building an additional factory with no innovative improvements will also increase our share change measures, and this is why we study TFP growth. If a firm increases its sales by buying a second firm or expanding existing operations in a non-innovative manner, its non-TFP growth would increase, but its TFP growth would not, and the effects would not be recognized as growth by innovation.

2.3. Causes of Big Business Turnover: New Entrants' Characteristics

Table 3 reports results regarding the characteristics of the new entrants firms that create the big business turnover reported in Table 2. The first five regressions in Panel A test for time trends in real sales growth, real value-added growth, TFP growth, industry-adjusted TFP growth, and non-TFP growth among the new entrants. The growth variables are measured over the same 5-year period during which the business turnover measures are constructed. Recall that real sales growth is decomposed into TFP growth and non-TFP growth. The results show that new entrants' sales growth increases during the sample period. In the sales growth regression, the time coefficient is 0.018 (t-statistic = 6.33), reflecting an increase of 1.76% per year. New entrants' real value-added growth increases by 0.018 (t-statistic = 8.06) per year, which reflects a yearly increase of 1.78%. Consistent with increasing creative destruction, the next two regressions show that the increasing sales growth is largely driven by increasing TFP growth. In the TFP regression, the time coefficient is 0.007 (t-statistic = 3.98), showing an increase of 5% per year in TFP growth (see Figure 3). Industry-adjusted TFP growth shows a similar trend, so our TFP findings are not due to industry-level measurement error in TFP growth. Recall that industry-adjusted TFP is the firm's TFP minus the median TFP within the firm's industry during the same period. As we explain previously, TFP growth reflects efficiency, and is therefore indicative of creative destruction. The time coefficient in the non-TFP growth regression is 0.010 (t-statistic = 2.74), showing that non-TFP growth increased by 1.19% per year, which is a sizeable trend, although smaller than the TFP trend.

The last two columns in Panel A tests for increases new entrants' profit margins and industry-adjusted profit margins. Both measures have positive and significant trends. The regressions show that profit margins increase at a rate of 0.71% per year, while industry-adjusted profit margins increase at a rate of 3.79% per year. These findings are inconsistent with new entrants increasingly making gains by price competition, as price competition results in shrinking profit margins. Increasing profit margins are however consistent with increasing innovation, which should result in higher profits.

The first two regressions in Panel B show that new entrants spend increasingly more on R&D spending, although this effect is not observed within-industry. Taken together, these two regressions suggest that new entrants increasingly come from R&D intensive industries, however new entrants do not spend increasingly more on R&D relative to their industry peers. The next two regressions study advertising expenditures. Neither of the time coefficients is significant, showing that an increase in advertising spending did not play a role in increasing big business turnover. As we mention previously, an increase in advertising could reflect an increase in price competition, so here we find no evidence of price competition causing increasing turnover among big business.

The final two regressions in Panel B look for trends in patents among new entrants. Consistent with increasing innovation, both of the time coefficients are positive and statistically significant in the regressions. The effects are very large; time coefficients reflect yearly increases of 4.10% and 3.37% for patents and industry-adjusted patents measures. Taken in their entirety, the results in Table 3 suggest an increase in creative destruction over the last half century.

2.4. Causes of Share Changes: Differences in Creators vs. Destroyees over Time

In this Section we explore the causes behind the increasing market share changes that we document in the Table 2. To conduct our analyses, we break our sample into two types of firms: creators and destroyees. Creators are firms that gain revenue market share during the year, while destroyees are firms that lose revenue market share. If the increases in share changes reported in Table 2 are caused by increasing creative destruction, then the difference in innovation between creators and destroyees should also increase during the sample period.

The differences between creators and destroyees are reported in Table 4. Panel A reports the mean differences, while Panel B reports the results from regressions that test whether the differences increase over time. The creator and destroyee portfolios are formed by sorting firms based on gains and losses in market share, so we expect large differences in growth between between the two groups. In Panel A.1 the differences between creators and destroyees in real sales growth, real value-added growth, TFP growth, industry-adjusted TFP growth, and non-TFP growth are all large and significant. Consistent with gaining share by innovation rather than price competition, creators have higher profit margins than destroyees.

In Panel A2, we examine the differences in advertising, R&D spending, and patents (both total and industry-adjusted) between creators and destroyees. Consistent with innovation, creators spend significantly more on R&D spending and have significantly higher number of patents. Consistent with both innovation and price competition, creators spend significantly more on advertising. Hence, creators appear make their gains through both marketing and innovation, although it could be that marketing is done in effort to promote innovation.

Panel B reports the findings from the time-series regressions. Panel B.1 shows that the growth differential between creators and destroyees increases over time; the time coefficient in the sales growth regression is 0.006 (t-statistic = 8.39), representing a yearly increase of about 1.45% per year. The difference in value-added growth between creators and destroyees also increases throughout the sample period, at a rate of 0.85% per year. Panel B further shows that both the TFP and non-TFP growth differentials increase as well, at rates of about 2.35% and 1.03% per year. The industry-adjusted TFP growth trend is almost identical to the TFP growth trend, so the findings are not caused by measurement error due to differences across industries in capital's share and labour's share. Hence, creators are increasingly growing faster than destroyees, and are doing so in part by increasing TFP, which is consistent with increasing creative destruction (see Figure 4).

The difference in profit margins and industry-adjusted profit margins between creators and destroyees also increase throughout the sample period. With both measures, we estimate an statistically significant increases of 0.86% per year. As we mention previously, innovation could lead to increases in value-added, as new products and production processes may improve profit margins. Price competition by definition should shrink margins. These findings therefore reflect an increase in innovation among new entrants, but not price competition.

The time-series regressions reported in Panel B.2 show that creators have increasingly higher R&D spending relative to destroyees, but not increasingly higher advertising expenses. The time coefficient from the total R&D regression is 0.0003 (t-statistic = 3.63), representing a yearly increase of 3.33% per year. In the industry-adjusted R&D trend regressions the coefficient is 0.0002, reflecting an increase of 4.00% per year. The time coefficients in the advertising regressions are both insignificant, showing that the increase in creative destruction is not associated with an increase in advertising by creators relative to destroyees. The patent regressions reveal large increase in the number of patents among creators relative to destroyees. The time coefficients in both of the regressions are positive and statistically significant, and reflect yearly trends of 5.67% and 5.0% for the patents and industry-adjusted patents differences. These findings are consistent with creators making gains through innovation, rather than price competition.

3. Which Type of Firm Generates Creative Destruction?

In this next Section we study the type of firm that generates creative destruction. Schumpeter (1942) contends that innovation comes primarily from large firms that can finance themselves with internal funds. This sentiment is also expressed in Galbraith (1967), Romer (1986), Chandler (1990), and Holmstrom (1989). Schumpeter (1912) posits that creative destruction is generated by small firms that need external funds. Aghion and Howitt (1992, 1998, and 2006), King and Levine (1993a), Rajan and Zingales (2003a and 2003b), and Fogel, Morck, and Yeung (2008) make similar arguments. In this Section, we attempt to ascertain which of these two frameworks is best supported with empirical evidence. We therefore study the years since initial public offering (IPO) and financing of new entrants in Table 5, and the years since IPO, size, and financing differences between creators and destroyees in Table 6.

3.1. Big Business Turnover: Years since IPO and Financing of New Entrants

The first two regressions in Table 5 study the number of years since IPO for top decile new entrants, and for the entire population of firms outside of the top decile. Taken together, these two regressions show that new entrants are increasingly entering the top decile in fewer years after their IPO, even as the population that they come from becomes increasingly older in terms of years since IPO. Jovanavich and Rousseau (2001) and Fink, Fink, Grullon, and Weston (2010) show that firms are increasingly coming public at younger ages. Taken together, our findings and these papers show that during recent years new entrants entered the top decile in fewer years since coming public, and came public at earlier ages.

In the new entrants' years since IPO regression, the time coefficient is -0.143 (t-statistic = 3.44), showing that the average number of years since IPO for new entrants declined by more than 1 year during each of the decades in our sample. Hence, firms are becoming large enough to enter the top decile within fewer years since IPO. Moreover, the number of years since IPO for the firms not in the top decile increases over time, as it should, because the firms are getting older. The time coefficient for this regression, reported in Column 6, is 0.158 (t-statistic = 5.52), showing that the years since IPO within this group of firms increases by about 1 year every 6 years. This shows that there is a good deal of entry and exit among these firms, or the average years since IPO would increase by 1 each year.

The financing variables in Table 5 are financial independence, cash flow from operations, share issuance, and debt issuance. Recall that financial independence is cash holdings minus share and debt issues. A negative financial independence value indicates that a new entrant had to use external funds in order to complete its operations and investments. For business turnover measured during years *t-5* to *t*, we examine new entrants' financing from years *t*-6 to *t*-1. We lag our financing measures by 1-year because we assume that capital raised in year *t*-1 finances growth in year *t*. Tables 2-4 suggest an increase in creative destruction during the sample period. If Schumpeter (1912) is correct, and robust creative destruction requires external finance, then financial independence should decrease, while share and/or debt issues should increase over the sample period.

New entrants have positive cash flow, which averages 0.135, but it is not sufficient to finance their chosen operations and investment. The average financial independence among new entrants is -0.135. This shows that on average new entrants are heavily dependent on external finance. New entrants issue both shares and debt, with debt issues averaging 0.181 and share issues averaging 0.082. Therefore, new entrants rely more on debt issuance than share issuance to fund their financing deficits, although as we explain below, over time this gap has narrowed, and new entrants have begun to rely more on equity.

The regressions show that new entrants' financial independence declined during the sample period (see Figure 5.1). The time coefficient in this regressions is -0.004 (t-statistic = 3.67), which represents a yearly decline of 2.96% per year. This means that financial dependence among new entrants increases over the sample period. The trend regressions show that cash flow does not have a significant trend. Debt issues do have a significant tend, and increase at a rate of 1.1% per year. Share issues also have a significant trend. The time coefficient in the share issues regressions is 0.004 (t-statistic = 7.60), which represents a yearly increase of 4.88% per year, so equity plays an increasingly important role in financing new entrants. The time series variations in the equity, debt, and cash flow measures are displayed in Figure 5.2.

Taken together, the results in Table 5 show that the firms that generate big business turnover tend to have strong internal cash flow, but not enough to sustain their chosen operations and investments; these firms are dependent on external finance, and issue large amounts of share and debt. Over time, this financial dependence increases, and the amounts of debt issuance and especially share issuance increase. At the same time, the average number of years since IPO of the new entrant decreases. It is therefore increasingly younger firms with heavy dependence on capital markets that generate big business turnover, which is consistent with Schumpeter (1912), but not Schumpeter (1942).

3.2. Creators vs. Destroyees: Differences in Years since IPO, Size, and Financing

In Table 6 we continue to study the type of firm that generates creative destruction by comparing creators and destroyees. Like in Table 4, creators are defined as firms that gain market share, while destroyees are defined as firms that lost market share. Panel A reports whether the two groups have different mean values of the years since IPO, size, and financing variables, while Panel B tests whether any differences have changed over time.

Panel A shows that the average creator has been public for three years less, and has sales that are half a billion dollars (real 2005 dollars) less than the average destroyee. Both of these differences are significant at the 1% level. Panel A further shows that creators are on average financially dependent, but destroyees are not. Creators have financial independence of -0.090, while destroyees have an average value of 0.049, showing that destroyees do not rely on external funds to complete their operations and investments, but creators do. Creators generate slightly more internal cash flow than destroyess, but also raise almost four times as much debt and more than twice as much equity. All of the differences are significant at the 1% level. The findings show that firms that gain market share are younger and smaller, and rely more on external finance than do firms that lose market share. The findings again support Schumpeter's (1912) vision of young, small, financially dependent firms driving the creative destruction process.

Panel B reports the results from the trend regressions. In the size regressions, the trend coefficient is -8.433 (t-statistic = 2.80) representing a decrease in the size differential between creators and destroyees of 1.7% per year. This shows that creators are increasingly smaller than destroyees. The time trend for the years since IPO coefficient is -0.035 (t-statistic = 2.93), showing that over the entire sample period the years since IPO differential between creators and destroyees decreases by approximately 1% per year (creators are increasingly younger in terms of years since IPO relative to destroyees).

The results in Panel B also show that creators have become increasingly dependent on external finance relative to destroyees. The regressions reveal that the differences between creators and destroyees in cash flow and financial independence decrease, while differences in share and debt issues increase. In the financial independence regression, the time coefficient is -0.003 (t-statistic = 3.41), showing a yearly decrease of 2.19% in the financial independence of creators relative to destroyees. This reflects an increasing reliance on external funds by creators relative to destroyees. During the same period, the difference in cash flow between the two groups falls at a rate of 5.56% per year, so creators have increasingly fewer internal resources than destroyees. Differences in debt and equity issues increase by 0.96% and 4.40% per year, so like new entrants creators are increasingly relying on equity financing. The findings here are consistent with the results in the Table 5, which show that new entrants also increasingly rely on equity finance.

Taken together the results in Table 6, like those in Table 5, show that creative destruction is generated by younger, smaller firms that rely on capital markets to fund their operations and investments. These effects become more pronounced throughout the sample period, consistent with Schumpeter (1912).

3.3. Creative Destruction and Finance: Firm-Level Regressions

Table 7 further explores the relation between creative destruction and finance with firm-level regressions. In these regressions, firm-growth is the dependent variable, and financial independence, a creator dummy, and interactions between these two variables and time are the independent variables. The questions we ask here are "Are the fastest growing creators financially dependent? If so, does this effect strengthen during the sample period?" If the fastest growing creators are financially dependent, then the creator dummy * financial independence interaction will be negative. If this effect strengthens over time, then the creator dummy * financial independence * time interaction will also be negative.

Like in the previous tables, we measure growth as real revenue growth, TFP growth, non-TFP growth, and real value-added growth. The regressions include year-fixed effects. In Panel B we also include industry-fixed effects. All of the regressions have standard errors clustered on industry. The findings in Panels A and B are similar, so we focus our discussion on Panel A's findings.

In regressions 1-4 the growth measures are regressed on financial independence, a creator dummy, and an interaction between financial independence and the creator dummy. In the sales growth regression, the financial independence coefficient is 0.024 (t-statistic = 4.45), while the creators-financial independence interaction term is -0.186 (t-statistic = 21.34). The overall financial independence coefficient for a creator is therefore -0.186 + 0.024 = -0.162, showing that among creators firms that grow faster have lower financial independence and are thus more financially dependent. For a destroyee, the overall financial independence coefficient is 0.024, showing that among destroyees firms that grow faster are less reliant on external funds. Taken together these findings show that among firms that gain market share (creators), growth is increasing in financial dependence, whereas among firms that lose market share (destroyees) finance is used more heavily by slower growing firms, and therefore appears to be used more for survival, rather than to fund growth. The financial independence-creators interactions are negative and significant in regressions 2-4 as well, showing that financial dependence is more strongly related to growth among firms that gain market share.

In regressions 5-8 the financial independence-creator interaction is interacted with a time variable. This interaction therefore not only tests whether the fastest growing creators are more financially dependent, but also whether this effect has increased during the sample period. In regression 5, the financial independence coefficient is -0.003 (t-statistic = 0.50), while the financial independence-creator-time interaction coefficient is -0.004 (t-statistic = 19.56). Hence, in this regressions for a creator in 1960 the overall financial independence coefficient is -0.004 * 1 = -0.004, while for a creator in 2009 the overall financial independence coefficient is -0.004 * 50 = -0.020, or fifty times greater. The results therefore show that among creators, growth is increasingly dependent on external finance, and this effect strengthens over the sample period. The results are similar in regressions 6-9.

The results in Table 7 show that among creators, the firms that grow the fastest tend to be the most financially dependent, and that this effects increase during the sample period. This finding is consistent with the findings in tables 5 and 6, and consistent with Schumpeter's (1912) vision of creative destruction.

3.4. Share Changes and the Financial Crisis

Tables 5-7 show that there is an association between creative destruction and external finance. On average, creators could not have finished their chosen operations without external funds, and this effect increases during the sample period as creative destruction increases. As we explain in the Introduction, this does not show that finance *causes* creative destruction; giving a firm money does not cause it to innovate. However it could be that innovative firms *need* finance to bring their innovations to market. Put differently, external finance could be a necessary condition for a high rate of creative destruction, but not a sufficient one. Schumpeter (1912) thought this was the case. In this Section of the paper, we try to better understand whether there is such a finance-creative destruction relation.

To test whether finance is necessary for creative destruction an ideal experiment would exogenously remove finance from the economy, leaving all else intact, and then test whether the rate of creative destruction changes. Unfortunately, such an experiment is not possible, but in an attempt to create a similar environment we study the effect that the 2007-08 financial crisis had on changes in market share. The findings in Almeida, Campello, Laranjeira, and Weisbenner (2010), Campello, Graham, and Harvey (2010), and Ivashina and Scharfstein (2010) suggest that the financial crisis caused financing constraints; firms with valuable growth opportunities but insufficient internal funds could not invest. Brunnermier (2009) contends that the financial crisis began in August of 2007, so we test whether the rate of creative destruction changes around this date.

We estimate regressions in which the *absolute value* of the firm's change in market share between years *t* and *t*+1 is regressed on contemporaneous GDP growth, revenue measured at year *t*, and a crisis indicator variable that is equal to 1 if the year is equal to 2007, 2008, or 2009 and zero otherwise. Market share is measured as the firm's revenue (or value-added) scaled by the aggregate revenue (or value-added) in the sample in year *t*. A larger number of firms reduces each firm's market share, so we limit our sample to firms that have revenue (or value-added) data in each of the years for the period 2004-2009, making the number of firms during each of the years the same. We begin the sample in 2004, so that we have an equal number of crisis and non-crisis years. There could also be real changes in the economy during the financial crisis, which is why we include GDP growth as a control in these regressions. The regressions include revenues measured at year *t* as a control variable, because on average firms with higher revenues have larger market share and can more easily have large changes in market share. We experimented with other controls (e.g. R&D, advertising, cash flow) and found that none of them had significant effects. Although these variables might be associated with gains or losses in market share, our dependent variable is the *absolute value* of market share change, and ex-ante it is not clear why these variables would affect this measure.

We estimate each regression with either firm- or industry-fixed effects. If the regressions have firm-fixed effects, then the coefficients reflect how within-firm variations in the independent variables are associated with within-firm variations in the dependent variable. The crisis dummy then tests whether the average firm in our sample had smaller changes in market share relative to its own mean during the crisis years. When we estimate the regressions with industry-fixed effects, the crisis dummy shows whether the average firm's change in market share was greater during the crisis years relative to the average share change within the firm's industry over the entire period. There are six years of data, so we have six observations per firm; however we have over 2,000 firms, so we have a high degree of power, which is reflected in our *t*-statistics.

We report our findings in Table 8. Regressions 1 and 2 use the absolute value of revenue-market share change as the dependent variable, while the last two regressions, 3 and 4, use the absolute value of value-added share change. In all four regressions the crisis-dummy is negative and significant, showing that firms have smaller changes in market share during the crisis years. In the first regression, the crisis-dummy coefficient is -0.002 (t-statistic = 3.09). The average revenue-share change variable has a mean value of 0.004, so during the pre-crisis years the average revenue-share change is about 0.006, while the average revenue-share change during the crisis years is 0.002. The findings in Table 8 are therefore consistent with the findings in tables 5-7, and suggest that the firms that generate creative destruction tend to be financially dependent.

4. Conclusion

This paper documents a significant increase in economic dynamism in the U.S. economy during the period 1960-2009. Our findings suggest that at least part of this increase can be explained by an increase in creative destruction. Throughout the sample period we also observe increasing trends in sales growth, value-added growth, TFP growth, profit margin growth, R&D spending, and patent awards among the firms that gain market share and cause the dynamism. These findings support the notion that the increase in turnover is driven by increasing in innovation, rather than increasing price competition.

Throughout our sample period, creative destruction is generated by young, small firms, that rely on external funds to finance much of their operations and investments. Creators are financially dependent, and would have run out of cash during the year if not for share and debt issues. These effects increase over the sample period as creative destruction increases. Creative destruction has therefore become more consistent with Schumpeter's (1912) vision, and less consistent with Schumpeter (1942).

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Table 1: Summary Statistics and Correlations

This table reports summary statistics for the primary variables used in this study. Panel A shows the mean, standard deviation and 25th, 50th and 75th percentiles of the time series data for each variable. Panel B reports the correlations among the variables. Big Business Turnover in year t measure the portion of the firms that are ranked among the top decile firms in the entire sample universe by revenue in year t-5 but fail to rank among the top decile firms in year t. Big Business Share Turnover measures the total market share at year t-5 of those firms that are in the top decile in year t-5 but fail to be among the top decile in year t. These turnover rates are measured in a rolling 5-year fashion. For the measurement of Big Business Turnover between year t-5 and year t, the universe for market share calculations in years t-5 and t consists of the same group of firms - firms whose revenue figures are available from Compustat for both years t-5 and t. Sale-Based (VA-Based) Share Change in year t is the summation of the absolute value of market share change for each firm in the sample universe between year t-1 and year t. A firm's Sale-Based (VA-Based) market share in year t is measured as firm revenue (value-added) / sum of the revenue (value-added) of firms in the universe in year t. For the measurement of Sale-Based (VA-Based) Share Change between year t-1 and year t, the universe for market share calculations in years t-1 and t consists of the same group of firms - firms whose revenue (value-added) figures are available from Compustat for both years t-1 and t. Financial independence is measured as the firm's cash and cash equivalent minus the total debt and equity issues during the year scaled by lagged assets. CF/Assets is firms' cash flow scaled by lagged assets. Cash flow is calculated as net income plus depreciation. Debt Issue/Assets is the change in assets, minus the change in book equity, minus the change in deferred taxes, all scaled by lagged assets. Equity issuance/Assets is change in book equity, plus change in deferred taxes, minus change in retained earnings, all scaled by lagged assets.

Panel A: Summary Statistics

Variables	Mean	25th Percentile	50th Percentile	75th Percentile	Standard Deviation	Sample Period	Frequency
Turnover Measures:							
Big Business Turnover	0.126	0.100	0.127	0.147	0.029	1965-2009	Rolling 5-yr
Big Business Share Turnover	0.041	0.036	0.041	0.047	0.009	1965-2009	Rolling 5-yr
Sale-Based Share Change	0.098	0.078	0.093	0.113	0.026	1960-2009	Annual
VA-Based Share Change	0.153	0.119	0.150	0.179	0.042	1960-2009	Annual
Finance Measures:							
Financial Independence	-0.025	-0.060	-0.026	0.009	0.064	1963-2009	Annual
CF / Assets	0.068	0.031	0.065	0.110	0.047	1960-2009	Annual
Debt Issue/Assets	0.088	0.059	0.089	0.109	0.036	1963-2009	Annual
Equity Issue/Assets	0.116	0.037	0.098	0.182	0.084	1963-2009	Annual

Table 1: Continued

Panel B: Correlations

	Big Business Turnover	Big Business Share Turnover	Sale-Based Share Change	VA-Based Share Change	Financial Indep.	CF / Assets	Debt Issue/Assets	Equity Issue/Assets
Turnover Measure								
Big Business Turnover	1							
Big Business Share Turn.	0.908	1						
Sale-Based Share Change	0.618	0.509	1					
VA-Based Share Change	0.545	0.389	0.830	1				
Finance Measures								
Financial independence	-0.082	-0.021	-0.160	0.142	1			
CF / Assets	-0.751	-0.516	-0.620	-0.707	0.013	1		
Debt Issue/Assets	0.014	0.030	0.036	-0.300	-0.862	0.193	1	
Equity Issue/Assets	0.613	0.420	0.478	0.417	-0.561	-0.737	0.272	1

Table 2: Time Trends of Turnover Measures

This table reports the mean values and time trends of the turnover measures. The time trends are tested by regressing the time series data against time. Real GDP is included to control for overall economic growth. Big Business Turnover in year t measures the portion of the firms that are ranked among the top decile firms in the entire sample universe by revenue in year t-5 but fail to rank among the top decile firms in year t. Big Business Share Turnover in year t measures the total market share at year t-5 of those firms that are in the top decile in year t-5 but fail to be among the top decile in year. These turnover rates are measured in a rolling 5-year fashion. For example, Big Business Turnover Rate for year 1965 measures turnover from year 1960 to year 1965, and that for year 1966 measures turnover from year 1961 to 1966 and so on. For the measurement of Big Business Turnover between year t-5 and year t, the universe for market share calculations in years t-5 and t consists of the same group of firms - firms whose revenue figures are available from Compustat for both years t-5 and t. Sale-Based (VA-Based) Share Change in year t is the summation of the absolute value of market share change for each firm in the sample universe between year t-1 and year t. A firm's Sale-Based (VA-Based) market share in year t is measured as firm revenue (value-added) / sum of the revenue (value-added) of firms in the universe in year t. For the measurement of Sale-Based (VA-Based) Share Change between year t-1 and year t, the universe for market share calculations in years t-1 and 1 consists of the same group of firms - firms whose revenue (value-added) figures are available from Compustat for both years t-1 and t. We estimate each of the share change measures both within- and across-industries as well. For across-industries measures, we use aggregate-industry revenues (value-added) for Share Change. For within-industry measures, we create each of the measures within each industry, and then average the industry-year values across industries to create a single yearly measure. The standard errors are Newey-West standard errors with 4 lags. The t statistics are shown in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

	(1) Big Business Turnover	(2) Big Business Share Turnover	(3) Total Share Change (Sales)	(4) Within Share Change (Sales)	(5) Across Share Change (Sales)	(6) Total Share Change (VA)	(7) Within Share Change (VA)	(8) Across Share Change (VA)
Mean	0.126	0.041	0.098	0.096	0.050	0.153	0.201	0.085
Time Trend regressions								
Time	0.002***	0.0004***	0.0009***	0.0004**	0.0006***	0.0015***	0.0016**	0.0007***
	(8.82)	(6.16)	(4.10)	(2.48)	(3.11)	(5.49)	(2.57)	(3.15)
Real GDP Growth	0.263***	0.080***	-0.292*	0.052	-0.463**	-0.706***	-1.421*	-0.704***
	(3.49)	(2.81)	(1.82)	(0.57)	(2.53)	(2.97)	(1.89)	(2.91)
Constant	0.038**	0.018***	0.084***	0.084***	0.049***	0.135***	0.203***	0.088***
	(2.56)	(3.94)	(9.08)	(13.62)	(5.28)	(12.42)	(8.92)	(8.55)
Observations	45	45	50	50	50	50	50	50
R-squared	0.60	0.35	0.37	0.11	0.36	0.54	0.34	0.43
Yearly % Change	1.59%	0.97%	0.92%	0.42%	1.21%	0.98%	0.80%	0.82%

Table 3: Time Trends of New Entrants' Characteristics

This table reports the mean values and time trends of new entrants' characteristics. New entrants are those firms that do not belong to the top decile in year t-5 (ranked by total sales), but are in the top decile in year t. The time trends are tested by regressing the yearly observations against time. Real GDP growth over five years is included to control for overall economic growth. Real Sales Growth is measured as log real sales growth from year t-5 to year t. Real Value-Added growth is the log growth of value-added from year t-5 to year t. Value-added is measured as operating income before depreciation plus labour and related expenses. Total Factor Productivity Growth is measured as total real sales growth minus 0.3 times total real capital stock growth (growth in property, plant, and equipment) and 0.7 times total employee growth. Real capital stock is adjusted by following Hall (1990) and Chun et al. (2008). Industry-adjusted TFP growth subtracts the industry's median TFP growth during the same period from the firm's TFP growth. Non-TFP growth is the real sales growth not resulting from the growth in factor productivity. Profit margin is earnings before interest and tax plus depreciation (EBITDA) divided by sales, and then averaged over the 5-year period from year t-5 to year t. Industry-adjusted profit margin subtracts the industry's median profit margin during the same period from the firm's profit margin. R&D/assets is average research and development expenditure scaled by lagged assets during year t-6 to t-1. Advertising/Assets is average advertising expenditure scaled by lagged assets during year t-6 to t-1. Patents Per Employee is the average number of patent per employee during years t-6 to t-1. Industry adjustment is calculated as each variable minus its industry's median. The standard errors are Newey-West standard errors with 4 lags. The t-statistics are shown in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A

New Entrants	(1) Real Sales Growth	(2) Real Value-Added Growth	(3) TFP Growth	(4) Industry-Adjusted TFP Growth	(5) Non-TFP Growth	(6) Profit Margin	(6) Industry-Adjusted Profit Margin
Mean	1.020	1.014	0.140	0.072	0.840	0.145	0.030
Time	0.018***	0.018***	0.007***	0.003***	0.010***	0.001***	0.001***
	(6.33)	(8.06)	(3.98)	(2.63)	(2.74)	(4.01)	(5.31)
Real GDP Growth	4.062***	5.396***	0.272	-0.208	3.404***	-0.100*	-0.039
	(7.60)	(11.53)	(0.73)	(0.74)	(4.60)	(1.83)	(0.84)
Constant	-0.049	-0.259**	-0.063	0.033	0.054	0.137***	0.010
	(0.35)	(2.21)	(0.58)	(0.45)	(0.26)	(10.46)	(1.24)
Observations	45	45	45	45	45	45	45
R-squared	0.68	0.70	0.51	0.35	0.47	0.54	0.64
Yearly % Change	1.76%	1.78%	5.00%	4.34%	1.19%	0.71%	3.79%

Table 3: Continued

Panel B

New Entrants	(1) R&D / Assets	(2) Industry-Adjusted R&D / Assets	(3) Advertising / Assets	(4) Industry-Adjusted Advertising / Assets	(5) Patent Per Employee	(6) Industry-Adjusted Patent Per Employee
Mean	0.021	0.006	0.018	0.011	0.732	0.534
Time Trend Regressions						
Time	0.0003*	-0.0001	0.0001	0.0001	0.030**	0.018*
	(1.98)	(1.19)	(0.27)	(0.58)	(2.54)	(1.88)
Real GDP Growth	-0.016	0.005	-0.093*	-0.055*	0.028	1.102
	(0.45)	(0.43)	(1.88)	(1.84)	(0.02)	(0.71)
Constant	0.015*	0.007**	0.030**	0.017**	0.276	0.093
	(1.80)	(2.43)	(2.59)	(2.45)	(1.37)	(0.45)
Observations	45	45	45	45	29	29
R-squared	0.23	0.08	0.15	0.16	0.35	0.20
Yearly % Change	1.58%	1.35%	0.34%	0.66%	4.10%	3.37%

Table 4: Creator versus Destroyee Differences

This table reports the difference between creators and destroyees. Creators are firms that gained market share from year t-1 to year t, and destroyees are firms that lose market share from year t-1 to year t. In Panel A, we report the means of the yearly differences between creators and destroyees over the sample period. In Panel B, we report time time trend regressions of the annual differences for each of the variables in Panel A. Real Sales Growth is measured as log real sales growth from year t-1 to year t. Real Value-Added growth is the log growth of value-added from year t-1 to year t. Value-added is measured as the operating income before depreciation plus labour and related expenses. Total Factor Productivity Growth is measured as total real sales growth minus 0.3 times total real capital stock growth (growth in property, plant, and equipment) and 0.7 times total employee growth. Real capital stock is adjusted by following Hall (1990) and Chun et al. (2008). Industry-adjusted TFP growth subtracts the industry's median TFP growth during the same period from the firm's TFP growth. Non-TFP Growth is the real sales growth not resulting from the growth in factor productivity. Profit margin is earnings before interest and tax plus depreciation (EBITDA) in year t divided by sales. Industry-adjusted profit margin subtracts the industry's median profit margin during the same period from the firm's profit margin. R&D/assets is the research and development expenditure scaled by lagged assets. Advertising/Assets is advertising expenditure scaled by lagged assets. Patents Per Employee is the average number of patents per employee at year t-1. Industry adjustment is calculated as each variable minus its industry's median during the same year. Real GDP growth over year t-1 to t is included to control for overall economic growth. The t-statistics are calculated with robust standard errors (following White (1980)) and shown in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Mean Differences

Panel A1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Real Sales Growth	Real Value-Added Growth	TFP Growth	Industry-Adjusted TFP Growth	Non-TFP Growth	Profit Margin	Industry-Adjusted Profit Margin
Creators	0.283	0.227	0.100	0.080	0.156	0.125	0.010
Destroyees	-0.131	-0.127	-0.070	-0.079	-0.039	0.081	-0.029
Difference	0.415***	0.354***	0.170***	0.159***	0.195***	0.044***	0.039***
	(26.62)	(33.68)	(17.38)	(17.58)	(26.83)	(17.04)	(18.90)
Observations	50	50	50	50	50	50	50

Panel A2

	(1)	(2)	(3)	(4)	(5)	(6)
	R&D / Assets	Industry-Adjusted R&D / Assets	Advertising / Assets	Industry-Adjusted Advertising / Assets	Patent Per Employee	Industry-Adjusted Patent Per Employee
Creators	0.036	0.014	0.014	0.009	1.661	1.575
Destroyees	0.027	0.009	0.012	0.008	1.467	1.394
Difference	0.009***	0.005***	0.001*	0.001***	0.194***	0.180***
	(8.45)	(7.53)	(1.88)	(2.97)	(4.34)	(4.15)
Observations	50	50	50	50	31	31

Table 4: Continued

Panel B: Time Trend of Differences - Creators vs. Destroyees

Panel B1

	(1) Real Sales Growth	(2) Real Value-Added Growth	(3) TFP Growth	(4) Industry-Adjusted TFP Growth	(5) Non-TFP Growth	(6) Profit Margin	(7) Industry-Adjusted Profit Margin
Time	0.006***	0.003***	0.004***	0.004***	0.002***	0.0004***	0.0003***
	(8.39)	(6.94)	(11.10)	(11.60)	(5.20)	(2.82)	(2.70)
Real GDP Growth	0.375	-1.093***	-0.360	-0.360	0.516	-0.498***	-0.285***
	(0.83)	(3.19)	(1.54)	(0.16)	(1.58)	(6.63)	(3.56)
Constant	0.247***	0.301***	0.080***	0.063***	0.120***	0.049***	0.039***
	(11.18)	(17.46)	(6.48)	(5.46)	(8.03)	(9.50)	(9.11)
Observations	50	50	50	50	50	50	50
R-squared	0.63	0.68	0.76	0.76	0.39	0.54	0.37
Year % Change	1.45%	0.85%	2.35%	2.39%	1.03%	0.86%	0.86%

Panel B2

	(1) R&D / Assets	(2) Industry-Adjusted R&D / Assets	(3) Advertising / Assets	(4) Industry-Adjusted Advertising / Assets	(5) Patent Per Employee	(6) Industry-Adjusted Patent Per Employee
Time	0.0003***	0.0002***	-0.00001	0.00001	0.011**	0.009**
	(3.63)	(2.77)	(0.18)	(0.32)	(2.59)	(2.21)
Real GDP Growth	0.037	0.049	-0.054	-0.027	-0.380	-0.072
	(1.07)	(1.56)	(1.51)	(1.40)	(0.18)	(0.04)
Constant	0.001	-0.000	0.003	0.002	0.028	0.033
	(0.27)	(0.02)	(1.44)	(1.62)	(0.27)	(0.32)
Observations	50	50	50	50	31	31
R-squared	0.27	0.18	0.08	0.06	0.17	0.12
Year % Change	3.33%	4.00%	0.67%	0.71%	5.67%	5.0%

Table 5: Top Decile New Entrants – Years Since IPO and Financing

This table reports the mean values and time trends for the new entrants' years public and financing measures. New entrants are those firms that do not belong to the top decile in year t-5 (ranked by total sales), but are in the top decile in year t. Years Since IPO-New Entrants is the average number of years since IPO (to year t-5) for firms not in the top decile in year t-5, but in the top decile in year t. Years since IPO-Non-Top Decile is the average number of years since IPO (to year t-5) for firms that are not in the top decile in year t-5. We measure each of the financing variables over years t-6 to t-1, and report the 5-year averages in the table. Financial independence is the firm's cash and cash equivalent minus the total debt and equity issues scaled by lagged assets. CF/Assets is cash flow scaled by lagged assets. Cash flow is calculated as net income plus depreciation. Debt Issue/Assets is the change in assets, minus the change in book equity, minus the change in deferred taxes, all scaled by lagged assets. Equity issuance/Assets is change in book equity, plus change in deferred taxes, minus change in retained earnings, all scaled by lagged assets. The time trends are tested by regressing the time series data against time. Real GDP growth over year t-5 to t, is included to control for overall economic growth. The standard errors are Newey-West standard errors with 4 lags. The t-statistics are shown in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)
	Years Since IPO-New Entrants	Years Since IPO-Non-Top Decile	Financial Indep.	CF / Assets	Debt Issue /Assets	Equity Issue /Assets
Mean	20.92	14.42	-0.135	0.135	0.181	0.082
Time Trend Regressions						
Time	-0.143***	0.158***	-0.004***	-0.0001	0.002***	0.004***
	(3.44)	(5.52)	(3.67)	(0.42)	(3.12)	(7.60)
Real GDP Growth	-13.528	0.408	-0.999***	0.033	0.788***	0.398***
	(1.32)	(0.06)	(3.40)	(0.51)	(5.38)	(2.81)
Constant	26.998***	10.519***	0.120*	0.133***	-0.001	-0.070**
	(11.58)	(7.00)	(1.83)	(7.72)	(0.02)	(2.64)
Observations	45	45	42	45	42	42
R-Squared	0.39	0.76	0.55	0.03	0.51	0.73
Yearly % Change	0.68%	1.10%	2.96%	0.07%	1.10%	4.88%

Table 6: Creators vs. Destroyees: Size, Years Since IPO, and Financing Trends

This table reports the difference in size, age and financing trend among creators and destroyees. Creators are firms that gained market share from year t-1 to year t, and destroyees are firms that lose market share from year t-1 to year t. Panel A reports the mean differences between creators and destroyees in each of the variables. Panel B test the time trend of the annual difference between these two groups. Real sales is value of sales in 2005 constant dollars at year t-1. Years Since IPO is the average number of years since the firm's IPO (to year t-1). The financing variables are measured with a 1-year lag. Financial independence is measured as the firm's cash and cash equivalent minus the total debt and equity issues scaled by lagged assets. CF/Assets is net income plus depreciation scaled by lagged assets. Cash flow is calculated as net income plus depreciation. Debt Issue/Assets is the change in assets, minus the change in book equity, minus the change in deferred taxes, all scaled by lagged assets. Equity issuance/Assets is change in book equity, plus change in deferred taxes, minus change in retained earnings, all scaled by lagged assets. The time trends are tested by regressing the time series data against time. Real GDP growth over year t-1 and t is included to control for overall economic growth in the time trend regressions. The t-statistics are calculated with robust standard errors (following White(1980)) and shown in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A: Mean Differences - Creators vs. Destroyees

	(1) Real Sales	(2) Years Since IPO	(3) Financial Indep.	(4) CF / Assets	(5) Debt Issue /Assets	(6) Equity Issue /Assets
Creators	1,035	12.10	-0.090	0.085	0.138	0.153
Destroyees	1,534	15.49	0.049	0.067	0.034	0.064
Differences	-499***	-3.39***	-0.137***	0.018***	0.104***	0.091***
	(11.65)	(19.24)	(14.43)	(7.55)	(21.05)	(8.11)
Observations	50	50	47	50	47	47

Panel B: Time Trend Regressions of the Differences

	(1) Real Sales	(2) Years Since IPO	(3) Financial Indep.	(4) CF / Assets	(5) Debt Issue/Assets	(6) Equity Issue/Assets
Time	-8.433***	-0.035***	-0.003***	-0.001***	0.001**	0.004***
	(2.80)	(2.93)	(3.41)	(3.07)	(2.52)	(5.88)
Real GDP Growth	-5,982.18***	-16.683**	-0.730*	-0.124	0.355	0.937**
	(2.80)	(1.99)	(1.93)	(1.37)	(1.56)	(2.44)
Constant	-100.019	-1.992***	-0.047*	0.037***	0.066***	-0.050**
	(0.74)	(4.43)	(1.87)	(6.56)	(4.52)	(2.17)
Observations	50	50	47	50	47	47
R-squared	0.24	0.18	0.26	0.22	0.16	0.49
Yearly % Change	1.69%	1.03%	2.19%	5.56%	0.96%	4.40%

Table 7: Firm-Level Regressions of Growth on Financial Independence

This table reports results from firm-level regressions in which the dependent variables are real sales growth, total factor productivity growth, sales growth not resulting from factor productivity, and value-added growth. Real Sales Growth is log real sales growth from year t-1 to year t. Total Factor Productivity Growth is real sales growth minus 0.3 * total real capital stock growth (growth in property, plant, and equipment), and 0.7 * total employee growth during the same period. Real capital stock is adjusted by following Hall (1990) and Chun et al. (2008). Non-TFP Growth is real sales growth not resulting from the growth in factor productivity. Real Value-Added growth is the log growth of value-added from year t-1 to year t. Value-added is operating income before depreciation plus labour and related expenses. Financial independence is measured as the firm's cash and cash equivalent minus the total debt and equity issues scaled by lagged assets. Creator equals 1 for firms that gained market share from year t-1 to year t, and zero otherwise. Time is a discrete variable that equals one for the beginning sample year and increases by one each year. In Panel A, year dummies are included in each of the regressions. In Panel B, both year dummies and industry dummies are included in the regressions. Time does not enter the regressions by itself because we include year dummies the regressions. Standard errors are clustered by industry. * Significant at 10%; ** significant at 5%; *** significant at 1%.

Panel A

	(1) Real Sales Growth	(2) TFP Growth	(3) Non-TFP Growth	(4) Real Value-Added Growth	(5) Real Sales Growth	(6) TFP Growth	(7) Non-TFP Growth	(8) Real Value-Added Growth
Financial independence	0.024***	-0.012**	0.036***	0.007	-0.003	-0.024***	0.019***	-0.015*
	(4.45)	(2.15)	(5.65)	(0.71)	(0.50)	(3.71)	(3.01)	(1.69)
Creators	0.398***	0.164***	0.198***	0.355***	0.399***	0.164***	0.198***	0.355***
	(15.55)	(7.67)	(21.41)	(21.24)	(15.51)	(7.67)	(21.36)	(21.24)
Creators* Financial Indep.	-0.186***	-0.106***	-0.080***	-0.089***				
	(21.34)	(14.55)	(11.59)	(5.47)				
Creators* Financial Indep.*Time					-0.004***	-0.003***	-0.002***	-0.002***
					(19.56)	(17.04)	(9.17)	(4.80)
Constant	-0.340***	-0.125***	-0.179***	-0.557***	-0.330***	-0.119***	-0.175***	-0.552***
	(13.33)	(5.90)	(19.54)	(33.56)	(12.96)	(5.64)	(19.21)	(33.09)
Observations	162,308	139,212	139,215	129,201	162,308	139,212	139,215	129,201
R-squared	0.40	0.13	0.18	0.19	0.40	0.13	0.18	0.19
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Continued

Panel B

	(1) Real Sales Growth	(2) TFP Growth	(3) Non-TFP Growth	(4) Real Value-Added Growth	(5) Real Sales Growth	(6) TFP Growth	(7) Non-TFP Growth	(8) Real Value-Added Growth
Financial independence	0.024***	-0.013**	0.035***	0.007	-0.003	-0.024***	0.020***	-0.015*
	(4.35)	(2.13)	(5.60)	(0.63)	(0.47)	(3.79)	(3.08)	(1.74)
Creators	0.397***	0.164***	0.196***	0.354***	0.398***	0.164***	0.196***	0.353***
	(15.53)	(7.74)	(21.05)	(21.06)	(15.49)	(7.74)	(21.01)	(21.07)
Creators* Financial Indep.	-0.186***	-0.107***	-0.079***	-0.087***				
	(21.28)	(14.53)	(11.40)	(5.36)				
Creators* Financial Indep.*Time					-0.004***	-0.003***	-0.002***	-0.002***
					(19.40)	(17.02)	(9.14)	(4.74)
Constant	-0.381***	-0.129***	-0.215***	-0.609***	-0.372***	-0.123***	-0.211***	-0.604***
	(15.20)	(6.21)	(23.02)	(35.88)	(14.75)	(5.95)	(22.62)	(35.33)
Observations	162,308	139,212	139,215	129,201	162,308	139,212	139,215	129,201
R-squared	0.400	0.136	0.186	0.188	0.398	0.135	0.184	0.188
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Share Changes and the Financial Crisis

This table reports differences in changes in market share before and during the 2007-2008 financial crisis. Only firms that have non-missing data for the years from 2004 to 2009 are included in these tests. The dependent variables are the absolute value of Sale-Based Share Change, and the absolute value of VA-Based Share Change. A firm's Sale-Based (VA-Based) market share in year t is measured as firm revenue (value-added) / sum of the revenue (value-added) of all the firms in year t. Share changes are measured between years t-1 and t. Financial Crisis is the dummy variable equal to one for firm year observations at years 2007, 2008 and 2009, and zero otherwise. Log(sales) is the log of sales at year t-1. Real GDP growth is included as control variable. Industry fixed effects are included in regressions 1 and 3; firm fixed effects are included in regressions 2 and 4. Standard errors are robust and clustered at industry-level.. * Significant at 10%; ** significant at 5%; *** significant at 1%.

	(1)	(2)	(3)	(4)
	Share Change (Sale-Based)	Share Change (Sale-Based)	Share Change (VA-Based)	Share Change (VA-Based)
Financial Crisis	-0.002***	-0.001**	-0.002***	-0.002**
	(3.09)	(2.34)	(2.96)	(2.32)
Real GDP Growth	-0.051***	-0.063***	-0.084***	-0.105***
	(3.62)	(4.05)	(3.88)	(4.51)
Log(Sales)	0.003***	0.001***	0.005***	0.002***
	(7.72)	(3.24)	(8.43)	(3.54)
Observations	16,124	16,124	16,106	16,106
R-squared	0.112	0.006	0.123	0.008
	Industry Fixed Effects	Firm-Fixed Effects	Industry Fixed Effects	Firm-Fixed Effects

Figure 1: Big Business Turnover and Big Business Share Turnover

Big Business Turnover in year t measure the portion of the firms that are ranked among the top decile firms in the entire sample universe by revenue in year t-5 but fail to rank among the top decile firms in year t. Big Business Share Turnover measures the total market share at year t-5 of those firms that are top decile firms in year t-5 but fail to be among the top decile in year t. These turnover rates are measured in a rolling 5-year fashion. For the measurement of Big Business Turnover between year t-5 and year t, the universe for market share calculations in years t-5 and t consists of the same group of firms - firms whose revenue figures are available from Compustat for both years t-5 and t. The first year of our turnover variables is 1965, as they are measured over 5-year intervals beginning in 1960.

Figure 1.1: Big Business Turnover

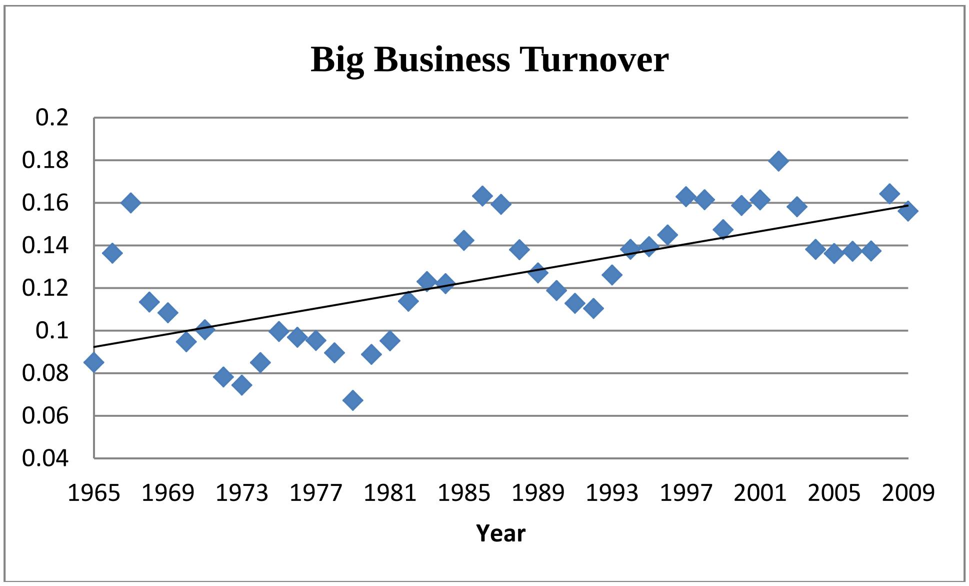


Figure 1.2: Big Business Share Turnover

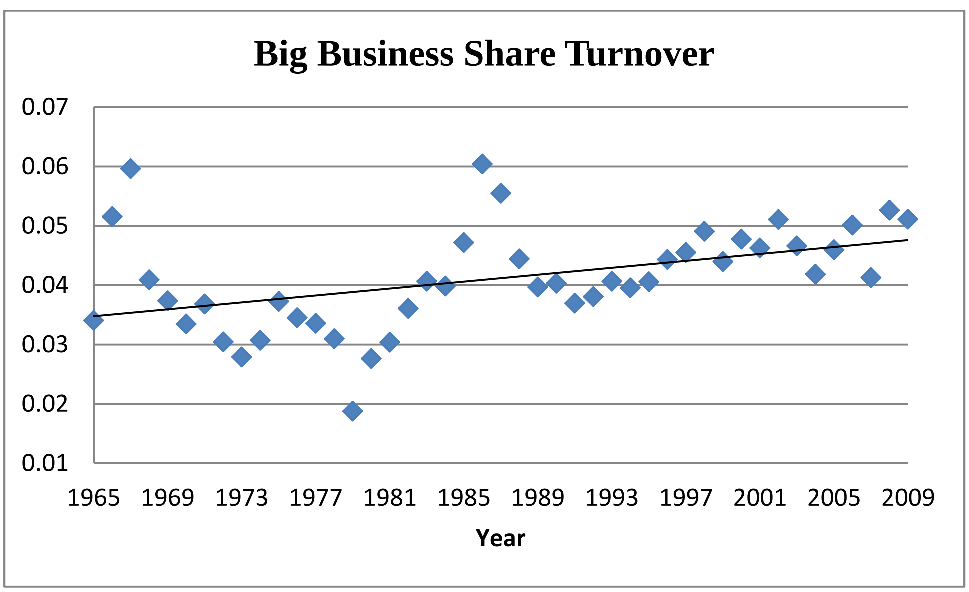


Figure 2: Share Change over Time

This Figure plots the 5-year moving averages of the yearly Share Change measures against time. Sale-Based (VA-Based) Share Change in year t is the summation of the absolute value of market share change for each firm in the sample universe between year t-1 and year t. A firm's Sale-Based (VA-Based) market share in year t is measured as firm revenue (value-added) / sum of the revenue (value-added) of firms in the universe in year t. For the measurement of Sale-Based (VA-Based) Share Change between year t-1 and year t, the universe for market share calculations in years t-1 and t consists of the same group of firms - firms whose revenue (value-added) figures are available from Compustat for both years t-1 and t. Our sample begins in 1960, so the first observation for a 5-year moving average is in 1965.

Figure 2.1 Total Sale-Based Share Change

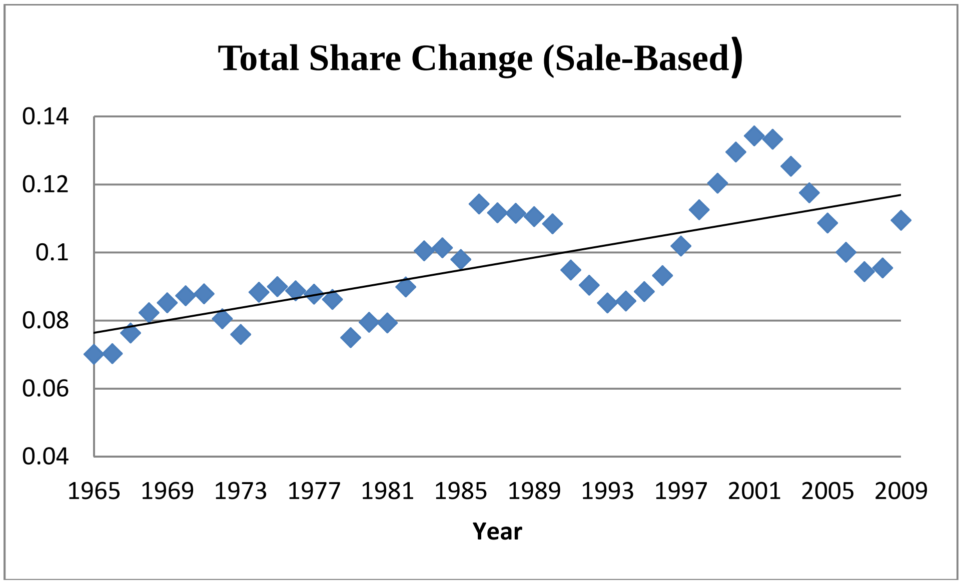


Figure 2.2 Total Value-Added Based Share Change

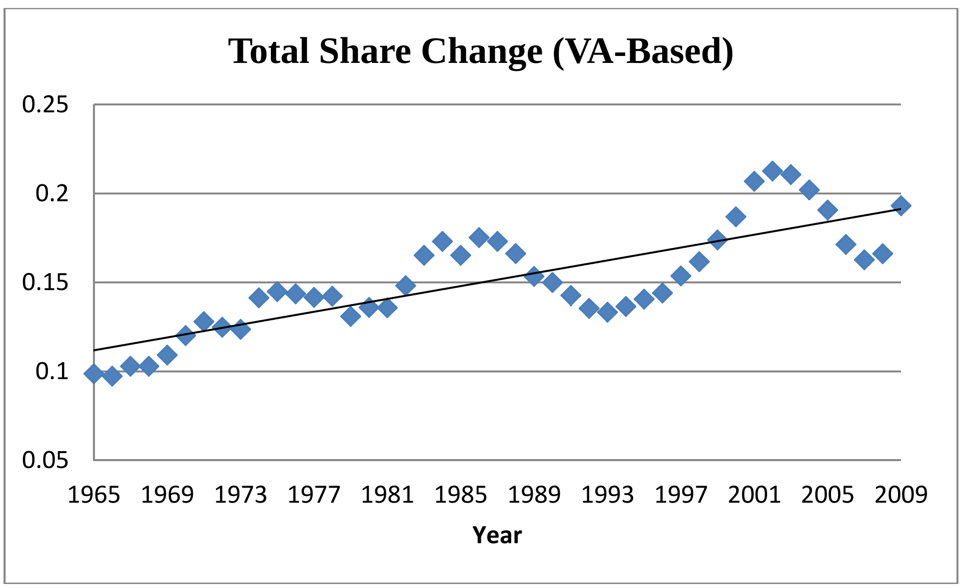


Figure 3: Growth of Top Decile New Entrants

This Figure plots top decile new entrants' total factor productivity (TFP) growth against time. New entrants are those firms that do not belong to the top decile in year t-5 (ranked by total sales), but are in the top decile in year t. Total Factor Productivity Growth is measured as total real sales growth minus 0.3 times total real capital stock growth (growth in property, plant, and equipment), and 0.7 times total employee growth. Real capital stock is adjusted by following Hall (1990) and Chun et al. (2008). New entrants' TFP growth is measured over 5-year intervals, so the data first observation is in 1965.

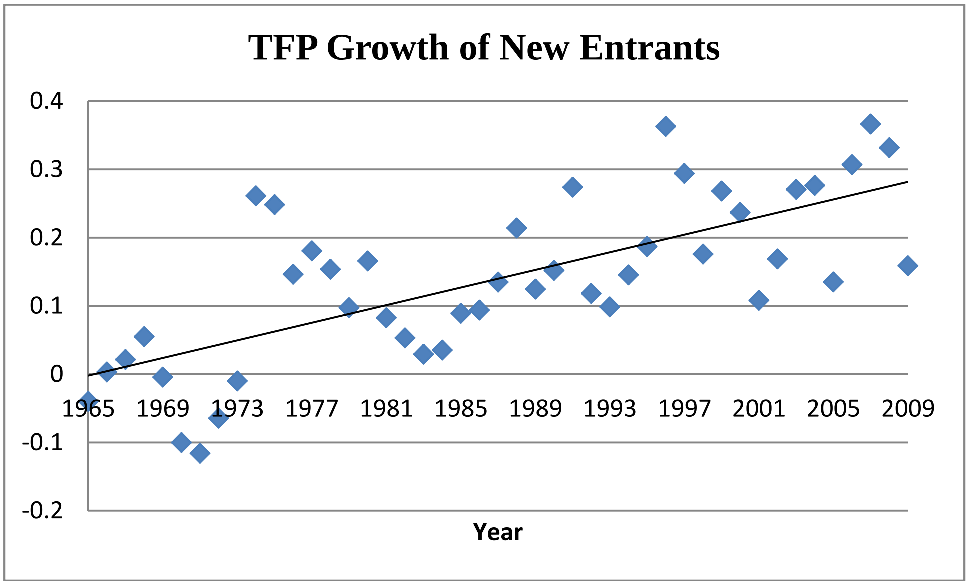


Figure 4: Creators vs. Destroyees and TFP Growth

This figure plots the 5-year moving average (starting from 1960, with the first moving average therefore in 1965) of the yearly differences in total factor productivity growth between creators and destroyees. Creators are firms that gained market share from year t-1 to year t, and destroyees are firms that lose market share from year t-1 to year t. Total Factor Productivity Growth is measured as total real sales growth minus 0.3 times total real capital stock growth (growth in property, plant, and equipment), and 0.7 times total employee growth. Real capital stock is adjusted by following Hall (1990) and Chun et al. (2008).

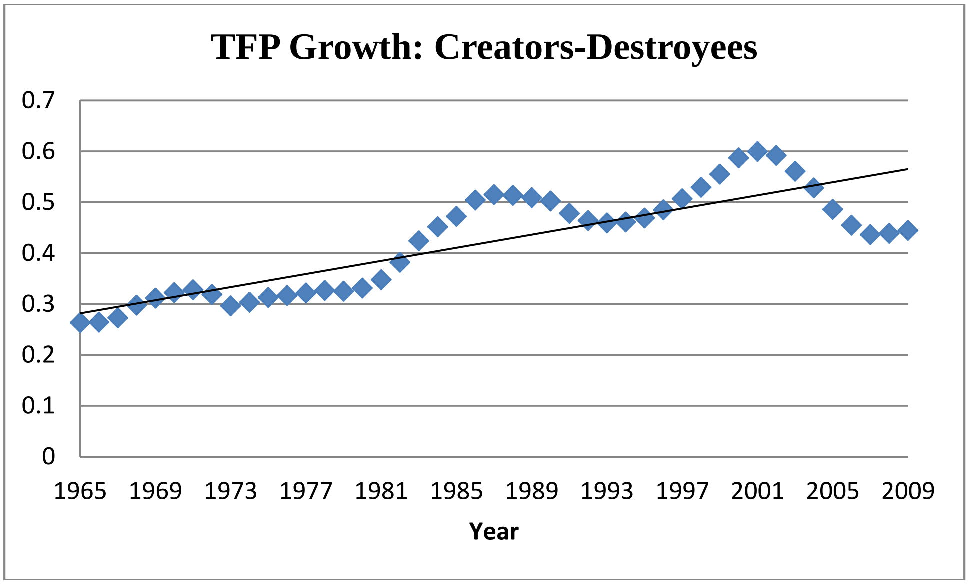
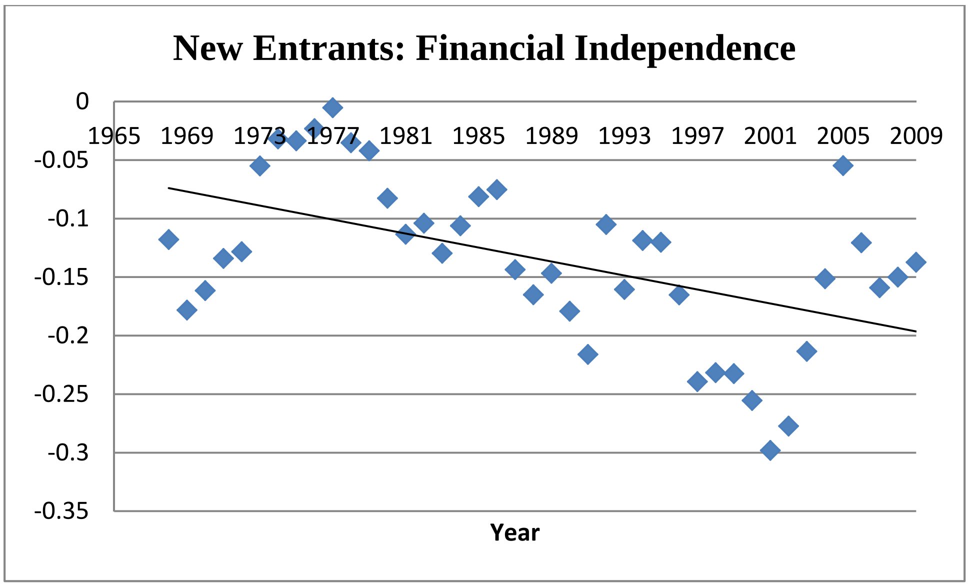


Figure 5: Top Decile-New Entrants' Financing

Figure 5 provides plots of new entrants' financial independence (Figure 5.1) and different components of financing (Figure 5.2). New entrants are those firms that do not belong to the top decile in year t-5 (ranked by total sales), but are in the top decile in year t. Financial independence is the firm's cash and cash equivalent minus the total debt and equity issues scaled by lagged assets. CF/Assets is cash flow scaled by lagged assets. Cash flow is calculated as net income plus depreciation. Debt Issue/Assets is the change in assets, minus the change in book equity, minus the change in deferred taxes, all scaled by lagged assets. Equity issuance/Assets is change in book equity, plus change in deferred taxes, minus change in retained earnings, all scaled by lagged assets. Our financing measures begin in 1963, so the new entrants' financing, which is measured over a 5-year interval starts in year 1968.

Figure 5.1



Firgure 5.2

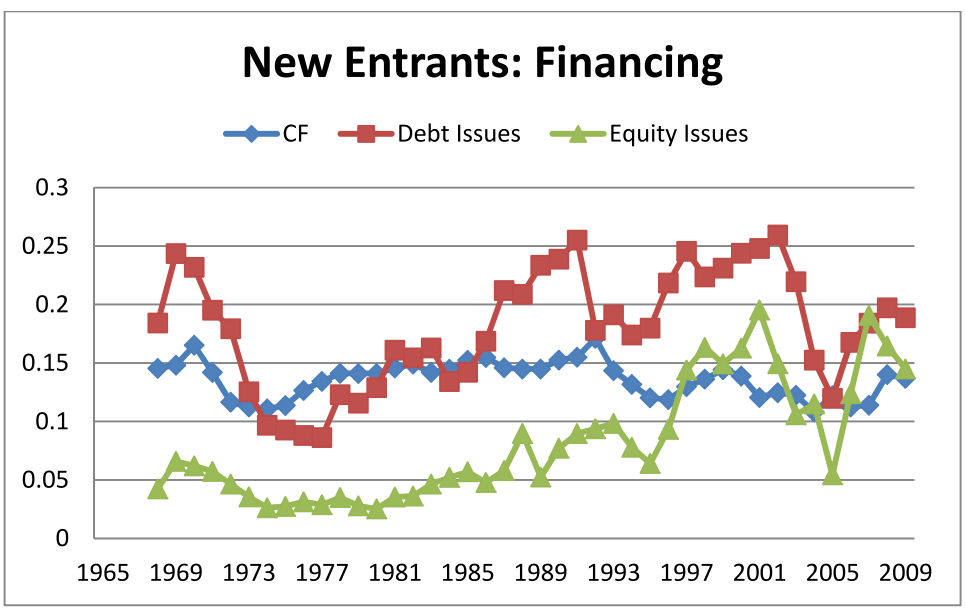


Figure 6: Creators vs. Destroyees and Financing

Figure 6 provides plots the 5-year moving average (starting from 1963, with the first moving average therefore in 1968) of yearly differences in financial independence (Figure 6.1) and the different components of financing (Figure 6.2) between creators and destroyees. Creators are firms that gained market share from year t-1 to year t, and destroyees are firms that lose market share from year t-1 to year t. The financing variables are measured with a 1-year lag. Financial independence is measured as the firm's cash and cash equivalent minus the total debt and equity issues scaled by lagged assets. CF/Assets is net income plus depreciation scaled by lagged assets. Cash flow is calculated as net income plus depreciation. Debt Issue/Assets is the change in assets, minus the change in book equity, minus the change in deferred taxes, all scaled by lagged assets. Equity issuance/Assets is change in book equity, plus change in deferred taxes, minus change in retained earnings, all scaled by lagged assets.

Figure 6.1

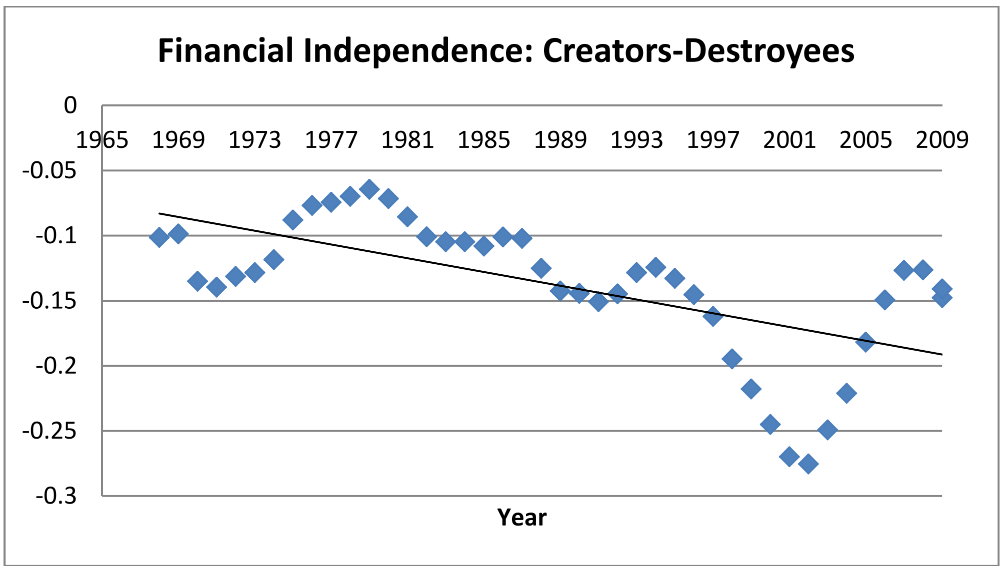
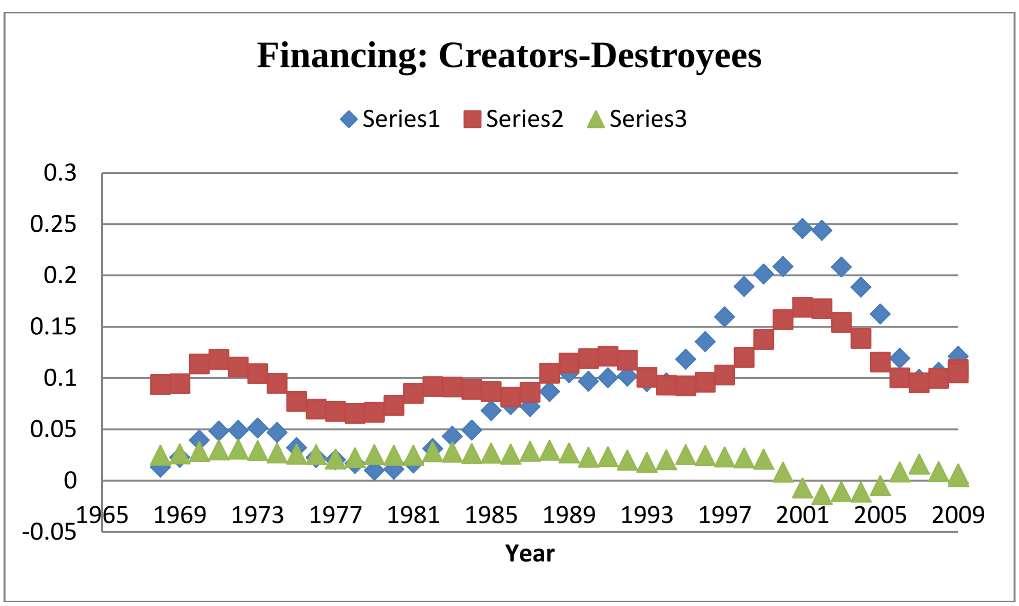


Figure 6.2



Appendix A1: Time Series of Dynamism Measures

year	Big Business Turnover	Big Business Share Turnover	Sale-Based Share Change	VA-Based Share Change
1960			0.061	0.159
1961			0.075	0.109
1962			0.071	0.101
1963			0.062	0.117
1964			0.071	0.081
1965	0.085	0.034	0.072	0.085
1966	0.136	0.052	0.076	0.103
1967	0.160	0.060	0.101	0.129
1968	0.113	0.041	0.092	0.117
1969	0.108	0.037	0.085	0.112
1970	0.095	0.033	0.083	0.140
1971	0.100	0.037	0.078	0.142
1972	0.078	0.030	0.064	0.114
1973	0.074	0.028	0.069	0.111
1974	0.085	0.031	0.147	0.201
1975	0.100	0.037	0.091	0.157
1976	0.097	0.035	0.072	0.135
1977	0.095	0.034	0.059	0.104
1978	0.090	0.031	0.061	0.114
1979	0.067	0.019	0.091	0.144
1980	0.089	0.028	0.113	0.182
1981	0.095	0.030	0.072	0.135
1982	0.114	0.036	0.112	0.166
1983	0.123	0.041	0.114	0.199
1984	0.122	0.040	0.096	0.183
1985	0.142	0.047	0.096	0.143
1986	0.163	0.060	0.153	0.185
1987	0.159	0.055	0.100	0.155
1988	0.138	0.044	0.113	0.165
1989	0.127	0.040	0.091	0.119
1990	0.119	0.040	0.085	0.126
1991	0.113	0.037	0.085	0.148
1992	0.110	0.038	0.077	0.119
1993	0.126	0.041	0.087	0.154
1994	0.138	0.040	0.094	0.136
1995	0.139	0.041	0.099	0.146
1996	0.145	0.044	0.108	0.166
1997	0.163	0.046	0.121	0.167
1998	0.161	0.049	0.140	0.194
1999	0.147	0.044	0.133	0.197
2000	0.159	0.048	0.145	0.211
2001	0.161	0.046	0.132	0.265
2002	0.180	0.051	0.116	0.195
2003	0.158	0.047	0.101	0.184
2004	0.138	0.042	0.094	0.153
2005	0.136	0.046	0.101	0.155
2006	0.137	0.050	0.089	0.169
2007	0.137	0.041	0.088	0.152
2008	0.164	0.053	0.106	0.201
2009	0.156	0.051	0.164	0.288