An Economic Analysis of Proposals to Limit the Recognition of Valuation Discounts for Transfers of Interests in Large Family Businesses

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Table of Contents

Executive Summary

Large family businesses play a substantial role in the U.S. economy, despite their modest numbers.

- The estimated 237,361 current family businesses with 20 or more employees and annual revenues of at least $5.85 million represent 4.1 percent of all U.S. firms with employees.
- Those businesses account for 31.8 percent of U.S. business revenues, 30.7 percent of U.S. private employment, and 31.1 percent of U.S. payrolls.

Large family businesses also provide certain distinctive benefits to the U.S. economy.

- Compared to comparable non-family enterprises, large family businesses have less employee turnover, leaner cost structures, and smaller debt burdens; they also invest at higher rates and over longer time horizons than comparable non-family businesses.
- As a result, numerous studies have found that large family businesses generate higher profits and returns than comparable non-family run companies.

Another distinctive feature of family businesses is that changes in top management are often linked to transfers of ownership, especially when they occur at the death of the company's founder. Hence, while all businesses pay income and other taxes, these large family companies also are subject to a one-time 40 percent estate tax on the value of their assets.

When a founder transfers ownership to children or other family members, at death or otherwise, and the founder's controlling interest in the business is often divided into multiple non-controlling interests, the family business's estate tax burden is moderated because the combined fair market value of the minority interests is less than the value of the former controlling interest.

- In those circumstances, the Internal Revenue Service (IRS) discounts the value of the business under the estate tax, following Generally Accepted Accounting Principles (GAAP) and economic theory and evidence.
- The IRS reports that these "valuation discounts" average about 37 percent.

On August 4, 2016, the Treasury Department and IRS issued a proposed rule that would substantially limit the recognition of control and liquidity discounts by the IRS for applicable transfer tax returns. The proposal would increase the transfer tax burden on large family businesses by 14.8 percentage points and their estate tax burden by as much as 60 percent. Treasury offered no economic basis or evidence supporting its claim that the inherent attributes of minority interests – limits on control and marketability – have no impact on the underlying value of those interests.

We assessed the economic effects of this proposed increase in the estate tax for current large family businesses, based on an analysis of when those businesses would be subject to the additional tax burden over the next 46 years, given the current ages and genders of their founders.

- Limiting valuation discounts under the Proposed Rule would increase estate taxes for large family businesses by $633.3 billion, in present discounted dollars, over the next 46 years.
- To prepare for this additional burden, these businesses would divert resources, equivalent to the additional tax they will owe, from their normal business investments.
- The projected reductions in their investments in equipment and machinery would reduce GDP growth, in 2016 dollars, by $2,476 billion from 2016 to 2062.
- This slower growth also would reduce job creation over the next decade by 105,990 jobs.

An Economic Analysis of Proposals to Limit the Recognition of Valuation Discounts For Transfers of Interests in Large Family Businesses[1]

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I. Introduction

Estate and other transfer taxes receive considerable attention from economists and policymakers, even as those taxes directly affect a relatively small number of people. The Internal Revenue Service (IRS) reports that 5,498 estates paid estate taxes in 2014 or two-tenths of one percent of the 2,626,418 deaths that occurred in the United States in that year.[2] However, estate taxes can have significant economic effects, because the assets of the few thousand estates that pay the tax each year include substantial or whole ownership of major businesses employing millions of Americans. As a result, changes that significantly increase the burden of estate taxes can have broad economic effects.

This study analyzes the economic effects of one such change that would substantially increase the estate taxes owed on family-owned businesses. In 2016, the Treasury Department and the IRS proposed to change how the IRS values the assets of family businesses subject to transfer taxes by sharply curtailing the recognition of market-based discounts on the market value of those assets when ownership is transferred under certain conditions. The proposal, described in more detail below, would have wide-reaching effects, because the large family businesses potentially affected by it play a significant role in the American economy. More than three-quarters of all businesses in the United States are family-owned enterprises, or more than 21 million firms in 2012. Most of these enterprises are sole proprietorships that survive for one generation or less, but some 1.7 million family companies employ others and had combined revenues or sales of nearly $12.2 trillion in 2012. Among those businesses, a smaller set are large family businesses whose transfer will trigger significant estate tax liability. Most large family businesses, defined here as family-run and owned companies with annual revenues exceeding $5.85 million and at least 20 employees, are privately-held enterprises. However, the group also includes a considerable number of publicly-traded firms run by a founder or family member and under effective family control. In 2012, large public and private family businesses covered about 237,000 firms with 35.6 million employees and combined revenues or sales of about $10.4 trillion.

Beyond their substantial economic footprint, economists have found that large family-owned companies operate in distinctive ways that can broadly benefit the economy. Studies show that compared to other companies of comparable size and industry, large family-owned businesses invest over longer-time horizons, maintain work environments with less employee turnover and better communication, and generally have leaner cost structures and smaller debt burdens.[3] Researchers also report that these family businesses invest at higher rates than other businesses:

[1] I want to acknowledge my colleagues Siddhartha Aneja and Michel Udell for their superb research assistance, as well as the support provided by the Independent Community Bankers of America, Associated Builders and Contractors, the Real Estate Roundtable, the Private Investor Coalition, and the S Corporation Association. The analysis and views expressed in this study are solely those of the author.

[2] Internal Revenue Service (2016-A); National Center for Health Statistics (2016).

[3] For example, Miller, Le Breton-Miller and Scolnick (2008); Hoffman, Hoelscher and Dorenson (2006); and Kackaner, Stalk, Jr. and Boch (2012)

Publicly-traded family businesses invest 8.6 percent of their revenues in equipment, compared to 6.0 percent for non-family companies; and privately-held family businesses invest the equivalent of nearly 10.0 percent of their assets annually.[4] These differences often produce superior financial results. One leading study comparing family-owned and run public companies with other firms comparable in age, size, R&D intensity, stock market volatility and debt burdens found that the family businesses generate profits and returns that outpaced their counterparts by 6.65 percent;[5] and other analysts report similar findings.[6]

Another distinctive feature of large family businesses is that changes in their chief executives are often linked to transfers of ownership, especially when they occur at the death of a firm's founder. Moreover, the 40 percent estate tax currently applied to the value of all assets above $5.49 million when these transfers occur imposes a very large burden on most family businesses. However, the common pattern of inheritance of a family business, in which a founder wills ownership of the business to his or her children, has provided a natural strategy to reduce the large estate tax burden. When a founder leaves ownership of a business to multiple relatives, often no single heir holds a controlling or majority share. Since a minority owner cannot control the business and its operations – determine how to invest, what to purchase, what to produce, whom to hire, and so on – the market value of the multiple minority owners is less than the value of single ownership. Some founders also include provisions limiting their heirs' ability to sell the stock in the family business; and such restrictions on a stock's marketability also reduce its market value.

As a result, for many decades the IRS has followed Generally Accepted Accounting Principles (GAAP) and discounted the fair market value of the assets of a large family business when its transfer involves a shift from a single owner with majority control to multiple owners each with a minority interest, or when the transfer of stock in a family business includes provisions limiting the heirs' ability to sell the stock. As we will see, analysis of IRS data has found that these discounts have averaged 37 percent, substantially lessening the impact of the estate tax. .

The recent proposal by the Treasury and IRS would categorically "disregard" those discounts and bar estates from presenting evidence about the fair market value of heirs' interest in a family business based on the lack of majority control or the marketability of their shares. Instead, the Treasury and IRS propose that for purposes of the estate tax, the sum of several minority interests in a company has the same market value as the value of a single owner, and shares that cannot be sold on the open market are equal in value to shares that can be so traded. These positions are inconsistent with economic reasoning, the large body of economic research on these matters, the long-accepted valuation rules under GAAP and holdings by the Financial Accounting Standards Board, and even the long-held positions of the Treasury and IRS.

The new Treasury-IRS position rests on the seemingly reasonable proposition that the transfer of an asset does not in itself alter its value. In this context, however, this proposition conflates the value of an asset with the value of ownership of that asset, and then ignores how the terms of ownership can affect the value of ownership. The transfer of a family business from a founder to the next generation under the estate tax is a transfer not of the business itself, but of its ownership; and it clearly entails a change in the terms of that ownership when the transfer involves a shift from a controlling majority interest to a group of minority non-controlling interests. As

[4] Hoffman, Hoelscher and Dorenson (2006); and Asker, Farre-Mensa and Ljungqvit
[5] Anderson and Reeb (2003)
[6] Barontini and Caprio (2006); and Martikainen, Nikkinen and Vahamaa (2009).

such, the Treasury and IRS effectively deny that the rights of majority ownership have distinct value. There is no economic theory or evidence to support this position. As a legal matter, the Treasury and the IRS may be able to rewrite the rules that value assets subject to the estate and other transfer taxes. However, they cannot claim to apply those taxes to family businesses based on their fair market value while also holding that their valuation will "disregard" a central aspect of their ownership that affects the fair market value.

Since these valuation discounts are substantial, and the current assets of large family businesses that eventually will be subject to that tax are considerable, abolishing the discounts would have economic and financial ramifications. As noted above, valuation discounts reduced the taxable value of family business assets by 37 percent in 2007, and the value of all large family businesses that eventually will be subject to estate tax was an estimated $1,986 billion to $2,924 billion to $4,017 billion in 2007, depending on how those assets are defined. Ending these discounts would raise the effective estate tax rate on family business assets exceeding $5.49 million by 14.8 percentage points, from 25.2 percent (0.40 x 0.63) to the statutory 40.0 percent.[7] This increase could be paid by the estate by liquidating assets or, more likely, owners of family businesses over time would set aside additional funds in liquid form to cover the additional cost or purchase additional life insurance to cover the increase. In one way or another, the change would reduce the funds the owner or his or her heirs could invest in the business by at least the amount of the increased tax burden.

To estimate the effects of this reduced investment, we analyzed scenarios in which future investment by the current owners of large family businesses is reduced by the amount of the additional tax, spread over the expected remaining lifespans of those owners. These scenarios draw on IRS surveys of the current ages and genders of owners of family businesses. As we describe in detail later, we estimated the value of large family businesses over the expected remaining lifespans of their owners from the present to 2062, assuming that value will grow at the historic average annual rate of the S&P 500, and converted those values to their present discounted value. Based on how those assets are counted, their present value in 2016 ranged from $2,831 billion to $4,168 billion to $5,727 billion. Further, the present discounted value of those assets when they will be subject to estate taxes ranges from $2,907 billion to $4,279 billion to $5,880 billion. We focus on the middle value: What is the impact on GDP and employment over the next 46 years of ending valuation discounts on family business assets with a present discounted value of $4,279, based on the expected lifespans of their owners over the next 46 years.

We found that this change in the estate tax would increase the estate tax burden on those businesses by $633.3 billion, in present discounted terms, over the 46-year period. Stated differently, ending the valuation discount would reduce the present discounted value of family business assets and therefore the U.S. capital stock by $633.3 billion over 46 years. To estimate the economic impact of this reduction in the capital stock, we created a baseline of projected GDP and business capital investment over the next 46 years, assuming current estate law and the

[7] Under the estate tax, in 2017, the first $5.49 million in assets is effectively exempt from the tax, the next $1 million in assets are subject to tax rates that increase from 18 percent to 40 percent, and assets above $6.5 million are taxed at the 40 percent rate. Technically, because of its integration with gift taxes, the 40 percent tax rate applies to taxable estates over $1 million, where the taxable estate is the gross estate less charitable deductions, funeral expenses, attorney fees, and state and local taxes. The estate tax exemption of $5.49 million in 2017, which also includes gifts during the estate owner's lifetime to family members that exceed the annual gift tax exclusion, is used to calculate an "estate tax credit" applied against the estate tax on the taxable estate.

valuation discount. Next, we distributed the reduction in investment corresponding to the impact of ending the valuation discount over the expected lifespans of current large family business owners. Economists have studied the impact on GDP of changes in investment in machinery and equipment, so we focused on the impact on GDP of the expected reductions in investments in equipment and machinery over the 46-year period.

The results: We estimate that over the next 46 years, ending the valuation discount would reduce real GDP, in 2016 dollars, by $154 billion from 2016 to 2025, by $423 billion from 2026 to 2035, by $612 billion from 2036 to 2045, by $734 billion from 2046 to 2055, and by $556 billion from 2056 to 2062. Over the entire period, America's cumulative output would be $2,476 billion less than it would be if the valuation discount is preserved.

This slower GDP growth also will affect employment levels. To estimate the expected impact on jobs, we applied the most recent calculation of "Okun's Law," under which a 2 percent decline in GDP is accompanied by a 1 percent decline in the unemployment rate, a 0.5 percent increase in labor force participation, and a 0.5 percent increase in the average hours worked per-worker. Economists do not apply a single value for Okun's Law over long periods, because conditions for employment growth change over time. Therefore, we estimate the employment effects of the slower GDP growth arising from ending the valuation discount only over the first decade. Compared to a baseline that assumes the valuation discount is retained, the annual job losses range from 8,208 to 17,962, and the cumulative losses total 105,990 jobs over 10 years.

This study establishes that the recent Treasury-IRS proposal to end the valuation discount long applied to the assets of large family businesses under the estate tax would substantially increase their estate tax burden. We further find that such a substantial increase in the estate tax for transfers of ownership of current large, family businesses would induce their current owners to prepare for the additional burden by reducing investments in their businesses. Such responses to the increase in their expected estate tax burden would have significant adverse effects on GDP and employment. Finally, we find no economic basis for ending valuation discounts. The Treasury-IRS proposal to do so is inconsistent with not only economic reasoning and the large body of economic research, but also the long-accepted valuation rules under GAAP, holdings by the Financial Accounting Standards Board, and even the long-held positions of the Treasury and IRS.

II. The Significance of Family-Owned Businesses in the U.S. Economy

While most public discussions of business taxes focus on public corporations, the U.S. private sector is more multifaceted than that focus suggests. To begin, a majority of business enterprises in the United States are non-corporate entities, including limited partnerships (LPs), limited liability corporations (LLCs), S corporations, and sole proprietorships. These non-corporate entities are taxed as pass-through entities through their owners and account for a majority of U.S. business revenues. The Census Bureau collects data on all U.S. businesses, corporate and non-corporate and public and private, through an "Economic Census" conducted every five years. As part of that exercise, Census collects data on the characteristics of privately-held companies through its "Survey of Business Owners," also conducted every five years. The 2012 Economic Census found a total of 5,726,160 public and privately-held employer businesses with total receipts of $32,638 billion in 2012, 115,938,468 employees and total payrolls of $5,414 billion.[8]

[8] U.S. Census Bureau (2013-A).

Small, privately-held enterprises dominate the number of businesses. Sixty-nine percent of all U.S. companies in 2012 were "sole proprietorships" consisting of one self-employed individual each; and among the 20.1 percent of companies that employ others, 61.9 percent had fewer than five employees, and 89.6 percent had fewer than 20 people on their payrolls.[9] While sole proprietorships and firms with fewer than 20 employees account for about 87 percent of all U.S. businesses, they represent much more modest shares of all business activity: In 2012, their combined business receipts of $4,639 billion accounted for 13.8 percent of all business receipts, their combined employment of 20,408,789 people represented 17.6 percent of all privately-employed persons, and their combined payroll of $753 billion accounted for 13.9 percent of all private payroll.[10] The vast majority of receipts, employees and employment arise from larger businesses, many of them public companies. However, U.S. businesses also include many large privately-held companies, such as Cargill, Koch Industries, Dell, the supermarket chain Albertson's, PricewaterhouseCoopers, as well as the substantial number of very large public companies. In 2016, *Forbes Magazine* identified 223 large, privately-held businesses with combined revenues of $1,620 billion and more than 4.5 million employees.[11]

Family businesses account for a considerable share of these large enterprises, although precisely how large a share depends on the definition of a family business. Many analysts classify as family businesses any enterprise in which a single family controls a company's strategic direction. Other analysts define family businesses as enterprises managed exclusively by members of a single family over multiple generations.[12] The Census Bureau's 2012 Survey of Business Owners defines a family business as an enterprise in which "two or more members of the one family own the majority" of a business with employees.[13] By this definition, the Survey found 1,706,839 privately-held family-owned businesses in 2012, or 29.8 percent of all privately-held employer businesses. In 2012, these family-owned firms employed a total of 41,720,777 people or 36.0 percent of all private employment, generated $11,547 billion in revenues or 35.4 percent of all business revenues, and their combined payrolls of $1,882 billion accounted for 34.8 percent of all business payrolls.[14] Applying the growth rates of private employment, business revenues and business payrolls since 2012 to these findings, we estimate that family-owned firms in 2016 employed 45,316,532 people, generated total business revenues of $12,159 billion, and paid wages and salaries totaling $2,237 billion.[15]

As noted above, a relatively modest number of large companies dominate the category of family-owned firms. The Census Bureau found that in 2012, 147,724 family-owned firms had between 20 and 49 employees with total revenues of $815 billion, total employment of 4,186,457,

[9] U.S. Census Bureau (2013-C)

[10] Business receipts are calculated for all businesses, but employment and payroll are calculated only for employer businesses; U.S. Census Bureau (2013-A).

[11] Murphy, Andrea (2016).

[12] Astrachan and Shanker (2003).

[13] The Survey of Business Owners covers only privately-held businesses. We derive the numbers of publicly-held family businesses andtheir employees, revenues and payroll by applying ratios in S&P data published in 2005 by Villalonga and Amit (2005) to data from the 2012 Economic Census on publically-held businesses.

[14] U.S. Census Bureau (2013-D)

[15] From December 2012 to December 2016, total nonfarm private employment increased from 113,216,980 to 122,974,720 or 8.61percent; total business sales increased from $1,287.7 billion to $1,355.9 billion or 5.30 percent; and total private wages and salaries increased from $5,893.9 billion to $7,004.6 billion or 18.8%. See Federal Reserve Bank of St. Louis.

and total payrolls of $151 billion. An additional 89,637 family-owned firms had 50 or more employees each in 2012, with total revenues of $9,571 billion, 31,370,513 employees and total payrolls of $1,532 billion. These large family firms include a number of the major public corporations which continue to be effectively controlled by their founders and/or their families, including such well-known enterprises as Amazon, Berkshire Hathaway, Charles Schwab, Comcast, Ford Motor Company, Home Depot, Microsoft, Oracle, and Wal-Mart.

We focus here on family businesses with 20 or more paid employees, equivalent to those family businesses that generate annual revenues of at least $5.85 million. (Employees generate an average of $292,552 in sales or revenues per-year, and 20 x $292,552 = $5,851,050). In 2012, these companies generated 31.8 percent of all U.S. business revenues and accounted for 30.7 percent of all private-sector employment. (Table 1, below)

Table 1. Selected Economic Dimensions of Large Family Businesses, 2012[16]

	All Employer Businesses	**Large Family Firms (Revenues > $5.85 million)**	**Large Family Firms' Share of Private Economy**
Number of Businesses	5,726,659	237,361	4.1%
Revenues/Sales	$15,189 billion	$10,386 billion	31.8%
Employment	110,645,869	35,556,971	30.7%
Wages & Salaries	$5,741 billion	$1,683 billion	31.1%

These data clearly establish that large family businesses represent a substantial part of the economy, so policy changes directed at those companies can have significant economic effects.

Distinguishing Features of Family Owned Businesses

Many studies have found that family-owned and managed businesses operate in certain distinctive ways, compared to non-family owned businesses. The most basic difference is the separation of ownership and control seen in other large businesses, especially those publicly traded, is absent. Since the 1930s, economists have studied the incentives and dynamics which can induce managers of such businesses to advance their personal interests at the cost of those shareholders.[17] In family-owned and managed companies, however, the interests and incentives of owners and managers align more closely, because the managers are the owners. In such cases, these "agent-principal" issues are generally limited to cases in which control or management of the business is divided among two or more members of the family with conflicting interests, or when an owner-manager uses company resources to help family members.[18]

Numerous studies have found other significant differences in the normal operations of family-owned businesses compared to their professionally-managed counterparts. One study found that family managers of family-owned businesses are more focused on their firms' long-term prospects and connections to their customers, and adopt longer time horizons for their investments.[19] Other analysts have found that the work environments in family-owned and managed businesses inspire greater loyalty from employees, which results in lower turnover and

[16] Bureau of Economic Analysis (2016).
[17] The seminal work in this area is Berle and Means (1934). .
[18] Chrisman, Chua and Steirer (2003).
[19] Miller, Le Breton-Miller, and Scolnick (2008).

recruitment costs, and better communication.[20] Further, a study of large family businesses in the United States, Canada, France, Spain, Portugal, Italy and Mexico found that those businesses had leaner cost structures and thus fewer layoffs in bad times, less exposure to risky investments, smaller debt burdens, and more diversification than their non-family business counterparts.[21]

Beyond these intangible factors, family businesses also invest at higher rates than other businesses. One large study found that family-controlled public corporations with founder CEOs spent an average of 8.6 percent of their revenues on capital investments, compared to 6.2 percent by comparable non-family and founder CEO companies, and 5.4 percent more on research and development than the comparable companies.[22] There is also substantial evidence that privately-owned companies, which cover most family businesses, invest at higher rates than public companies. One study covering the years 2000 to 2007 found that privately-held firms, on average, invest the equivalent of nearly 10 percent of their total assets per-year, compared to 4 percent by publicly-held, publicly-traded firms.[23] Finally, an academic survey of CEOs found that the investments by privately-held firms have considerably longer time horizons than those of publicly-held companies.[24]

Most important, several studies have found that family-owned companies, on average, generate superior financial results than their counterparts. These analyses draw on data from family-owned and managed public companies, because privately-held businesses do not release the necessary financial data. The first rigorous study of this matter focused on the financial returns of public corporations with substantial family ownership and a family member serving as CEO, compared to their counterparts from the Standard & Poor's 500 over the years from 1992 to 1999.[25] After controlling for industry, firm age, firm size, R&D intensity, stock volatility and debt burden, the authors found that companies with continuing family control produced profits and returns that outpaced their counterparts by an average of 6.65 percent.[26]

A number of additional studies also have found that family ownership is associated with superior financial results.[27] One often-cited analysis compared the performance of 2,361 public companies with large family ownership and a founder CEO with the performance of comparable companies over the decade from 1992 to 2002.[28] The researchers found that the CEO-founder firms produced average annual returns on an equal-weighted basis of 16.3 percent compared to 10.0 percent for comparable non-family companies; and average annual returns on a value-weighted basis of 13.9 percent versus 8.5 percent for their non-family firm counterparts. These differences in returns of 6.3 percent and 5.4 percent are consistent with the first study's findings of 6.65 percent. Another study focused on manufacturing companies and similarly found that manufacturers controlled and managed by their founders and their families generated higher returns and valuations than their counterparts in the S&P 500.[29] Those researchers traced the

[20] Cited by Hoffman, Hoelscher and Sorenson (2006).
[21] Kackaner, Stalk, Jr., and Boch (2012).
[22] *Ibid.*
[23] Asker, Farre-Mensa and Ljungqvist (2011).
[24] Poterba and Summers (1995).
[25] Anderson and Reeb (2003).
[26] *Ibid.*
[27] For example, Barontini and Caprio (2006); and Maury, C. (2006).
[28] Fahlenbrach (2009).
[29] Martikainen, Nikkinen and Vahamaa (2009).

superior results of family manufacturing businesses to their relative efficiency and productivity. Productivity gains are closely associated with income progress, so if family control and management of a business have positive effects on productivity, family firms may contribute disproportionately to rising living standards.

The superior average performance of family businesses is not limited to the United States. One study of European businesses found that founder-controlled companies generated superior returns and higher valuations than comparable, non-family controlled firms, although the descendants of European family-firm founders produced returns and valuations equivalent to the comparable companies.[30] Other researchers report that while large German and Spanish family-owned businesses that went public (IPOs) did not perform significantly better than their non-family owned counterparts, those with strong family involvement in management did outperform their counterparts.[31] Finally, a study by McKinsey and Company found that a broad index of publicly-traded family companies in Western Europe and the United States generated shareholder returns two-to-three percentage points greater than the returns for the MSCI World Index, the S&P 500, and the MSCI Europe Index over the years 1997 to 2009.[32] This analysis also found that the family companies had lower levels of financial leverage than their counterparts, consistent with a longer investment time horizon, and paid less to borrow funds.[33]

Economists have offered a variety of explanations for these results. Some analysts note that compared to typical professional managers, family-owners often have greater knowledge of a firm's operations and stronger incentives to strictly monitor its performance.[34] Other researchers point to evidence that founding family executives are driven to produce high returns by the importance they assign to "family name" and reputation.[35] Finally, one recent study examined how family relationships can influence a company's governance, structure and management, and its authors concluded that the connections, networks, norms and trust fostered by family leadership in a sustained common effort promote greater efficiency and lower transaction costs.[36]

III. The Succession Challenge Facing Large Family Businesses

Large family businesses face many of the same challenges as their non-family counterparts, but often with a difference. For example, while most companies have to raise new capital, family businesses have to do so without compromising the family's control over the enterprise.[37] All businesses also have to deal with succession issues involving their most senior executives,

[30] Barontini and Caprio (2005). A similar result was reported for Fortune 500 firms over the 1994-2000 period: See Villalonga and Amit (2004).
[31] Jaskiewicz, Gonzalez, Menendez-Requejo and Schiereck (2005).
[32] Caspar, Dias, and Elstrodt (2010).
[33] *Ibid.* The median level of financial leverage from 2004 to 2007 averaged about 15 percent for family businesses, compared to about 19 percent for their peer companies – and as credit conditions tightened in 2008, the financial leverage level for family companies rose to 23 percent, compared to nearly 40 percent for their counterparts. Further, the average yield spread on corporate bonds was 32 basis points lower for family-owned firms than for their counterparts
[34] Anderson and Reeb (2003).
[35] For example, Barontini and Caprio (2006); and Maury, C. (2006).
[36] Hoffman, Hoelscher and Sorenson (2006).
[37] For example, family firms reinvest profits to fund new capital investments at a higher rate than other businesses; and some family businesses create subsidiaries that include publicly-owned companies which then borrow the capital. See Caspar, Dias, and Elstrodt (2010).

including the CEO and board chair. For family businesses, however, the transfer of management control is often linked to the transfer of ownership control, usually from a founder to his or her children. As a result, replacing the top person in a large family company is often a taxable event, when the founder's controlling interest is passed on to others and subject to the estate or gift tax.

Governments have imposed estate taxes on people's assets at their death since at least the time of Caesar Augustus.[38] The United States is no exception, rejecting John Locke's view that a child's inheritance is a natural right in favor of William Blackstone's argument that rights to possess an asset end with the death of the asset's owner. The United States enacted its first estate tax in 1797, and the current estate tax system began a century ago, in 1916. Numerous researchers have found that about half of all current wealth in the United States has been transferred from one generation to another and thus subject at some time to estate and/or gift taxes.[39]

Most taxes distort incentives in some way, and most economists share the view first articulated by Adam Smith and David Ricardo that estate and gift taxes can slow capital formation by reducing incentives to save and invest.[40] To whatever degree these transfer taxes affect the behavior of those building the assets that later will be transferred, it is self-evident that estate and gift taxes, like all taxes on capital, reduce the total capital in productive private use. It is reasonable to assume that the government uses most of the funds collected through transfer taxes for consumption purposes, such as Social Security and Medicare payments. How much of the capital given up to estate or gift taxes would have been invested, and how much consumed, is less clear. One leading study estimated that each dollar transferred through the estate tax, on balance, reduced the U.S. capital stock by 70-cents.[41] This study also estimated that since its enactment in 1916, the modern estate tax reduced the capital stock in 1980 by a cumulative $497 billion.

The owners and families of large family-owned businesses have an acute interest in the terms of the estate and other transfer taxes. U.S. transfer taxes include the estate tax, gift taxes, and generation-skipping taxes (the latter for transfers of assets in trust to or for the benefit of unrelated persons more than 37.5 years younger than the donor or related persons more than one generation younger than the donor, such as grandchildren). The small family businesses that comprise the vast majority of U.S. enterprises are not subject to these taxes: The current estate tax provides a "lifetime exemption" of $5.49 million in 2017 (including gifts during the owner's lifetime) and an unlimited marital exemption for a spouse. As a technical matter, the estate, gift and generation-skipping taxes are applied to all assets, and the estate receives a "unified credit" for the tax owed on the first $5.49 million. The large exemption or unified credit reflects the role family businesses play in the economy and concerns that a broader estate tax would force many families to sell or dissolve small family businesses to pay the tax. As a result, these taxes affect a very small share of all estates. In 2014, 11,953 estate tax forms were filed with the IRS, comprising 0.45 percent of the 2,626,418 U.S. deaths that occurred in 2014.[42] Moreover, after accounting for charitable bequests, marital bequests, and other deductions and credits, less than 46 percent of

[38] Johnson and Eller.
[39] Kotlikoff and Summers (1981); Gale and Scholz (1994); and Aaron and Munnell (1992).
[40] For example, Keynesian economists such Lawrence Summers and Joseph Stiglitz argue that higher estate taxes reduce savings and capital formation. See Gale and Perozek (2001) in Gale, Hines and Slemrod (2001).
[41] Kotlikoff and Summers (1981).
[42] Internal Revenue Service (2016-A); Internal Revenue Service (2016-C). National Center for Health Statistics (2016).

estate tax returns reported any estate tax liability.[43] Applying this percentage to the 2014 data, 5,498 estates paid estate tax in 2014, equivalent to 0.21 percent of all deaths in that year.

For the modest number of estates with assets exceeding the exemption plus charitable or spousal bequests and other deductions and credits, the tax rates on the remaining assets are steeply progressive: These rates rise rapidly from 18 percent tax on the first $10,000 above the exempt amount to 40 percent on the value of assets exceeding the exemption plus $1 million. Supporters of estate taxes have estimated that some 80 percent of the value of family-owned businesses consist of unrealized capital gains which would go untaxed but for transfer taxes.[44] However, the high tax rate applied to the value of estates over $5.49 million may force the heirs of larger family businesses to sell off parts of those businesses to pay the tax. This effect is moderated by a provision of the law that allows estates to pay the tax on the assets of a family business over a 14-year period. Nevertheless, the recognition that substantial estate taxes will have to be paid at some future time in many cases reduces investment over many years prior to the actual application of the tax, by encouraging owners of large family businesses to retain additional capital in liquid form for that eventuality. Alternatively, the prospect of a large estate tax bill sometime in the future induces many family business owners to purchase life insurance to offset the expected cost of the tax,[45] a strategy that also diverts capital that otherwise could be used to expand the business. There is also substantial evidence that high estate taxes increase the incidence of complex tax planning that imposes deadweight losses on the economy.[46] One study conducted by the Federal Reserve Bank of Boston found that the planning and compliance costs associated with the estate tax consume resources equivalent to the funds raised by the tax.[47]

Economists also have investigated the question of whether the estate and other transfer taxes discourage entrepreneurs from forming or expanding their businesses. A study by the Joint Economic Committee found that estate taxes do affect entrepreneurism negatively.[48] Another study estimated the impact of these effects on entrepreneurs through the cost of capital: The authors found that the tax raises the cost of capital by 8 percent for the top 10 percent of entrepreneurs, by 10.5 percent for the top 5 percent of entrepreneurs, and by 14 percent for the top one percent.[49] However, these findings are controversial. Other researchers have noted that most entrepreneurs see the estate tax as a distant problem; after discounting its impact accordingly, they estimated that the effective federal estate tax rate applicable to the investments made by entrepreneurs age 60 or less is modest.[50] Similarly, a review of the economic literature by the Congressional Budget Office found "little direct evidence … about the effects of the estate tax on entrepreneurs."[51] A recent study partly reconciles these opposing views, finding that the estate tax has little effect on the saving and investment decisions of entrepreneurs with small businesses – consistent with its large exemption -- but distorts the decisions of entrepreneurs with larger firms.[52]

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[43] Internal Revenue Service (2016-A).
[44] Poterba and Weisbenner (2000).
[45] Gale and Slemrod (2001) in Gale, Hines and Slemrod (2001).
[46] Chapman, Harihan and Southwick, Jr. (1996).
[47] Munnell, Alicia (1988).
[48] Joint Economic Committee (1998).
[49] Holtz-Eakin and Marples (2001).
[50] Repetti (1999-A).also, Repetti (1999-B).
[51] Congressional Budget Office (2005). .
[52] As a result, the authors estimate that eliminating the tax would increase economic output by four times the amount raised by the tax. Cagetti and De Nardi (2009).

Throughout this literature on the estate and other transfer taxes, the central concern of most economists is that estate and other transfer taxes shift capital that otherwise would be directed to investment to the government, and thereby mainly to consumption. This concern is properly focused on large family businesses and the impact of the estate and other transfer taxes on their savings and investment, and thereby on the growth of the country's capital stock.[53]

IV. Proposed Rule – Internal Revenue Code (IRC) Section 2704

Our focus here is not the general case about the impact of the estate and other transfer taxes, but the economic implications for large family companies and their employees of the new regulations proposed by the Treasury Department and the IRS that would prohibit taxpayers from continuing to use a long-accepted metric for valuing those businesses in determining transfer tax liability. Under that proposal, which would affect section 2704 of the Internal Revenue Code, the value of a family business for transfer tax purposes would be unaffected when its transfer from one generation to another divides control of the business among multiple heirs, so that no one has a controlling interest in the assets and operations of the business, or when its transfer carries restrictions on the marketability of those assets.[54].

The issue here is whether a family company in which a founder or other single family member has a controlling interest – and thus the authority and ability to undertake investments, acquisitions, sales and operational changes – has greater market value than the combined value of the owners of the same company when each owner holds a non-controlling or minority interest.

This issue is central to the transfer tax treatment of large family businesses seeking to survive beyond their founders, since the shift in leadership and ownership to the next generation is an essential event for the enterprise's continuing operation and often entails a shift from one owner with a controlling interest to several owners with minority interests. For decades, the tax courts, financial experts and auditors applying Generally Accepted Accounting Principles (GAAP) have concurred that minority interests in a firm have less fair market value than an equivalent share of a controlling or majority interest. Accordingly, the IRS has recognized such reduced values for non-controlling ownership interests when determining the applicable transfer tax liabilities.

This practice reflects the proposition that outside parties (the market) will pay less for a non-controlling interest in a company, proportionate to its value as a share of the company when controlled by the founder. The reasoning is clear: The buyer of a minority interest cannot by his or her own decision take steps such as distributing earnings, liquidating assets, undertaking investments, mergers or acquisitions, or changing its operations. The right of owners with controlling interests to make those decisions imparts a premium on the value of their ownership; if each member of the next generation of owners lacks that right, the premium disappears and the effective reorganization of the company's executive management process lowers the fair market value of their combined minority interests. In simple terms, the inability of an owner with a non-controlling interest to make those decisions reduces the economic value of his or her ownership.

This issue also can be framed economically in terms of "liquidity," or the impact on an asset's value of the ease or difficulty involved in selling it. An asset's liquidity is commonly based on the number of interested buyers and the costs involved in the process of purchasing the asset.

[53] Poterba (1997).
[54] Internal Revenue Service (2016-B)

An asset that attracts no buyers cannot be sold, and its market value generally increases with the number of interested buyers. In this regard, the most common measure of the liquidity is the "bid-ask" spread of publicly traded stock, which is the gap between the price asked by the seller and the nearest price offered by a potential buyer. If they agree on the price and the spread is zero, the stock is perfectly liquid; if the spread is substantial, the sale may not occur at all. An asset whose owners are unable or unwilling to sell it also is illiquid. In the case of a family business with multiple non-controlling owners, those owners may be unable to agree to sell or agree on a price that potential purchasers will pay, rendering it illiquid.

The Treasury-IRS proposal would disallow discounts on the value of a family business for transfer tax purposes not only when no owner holds a controlling interest, but also when the new owners' ability to sell their shares is otherwise restricted. This proposed change is inconsistent with economic reasoning and the vast bulk of research showing that restrictions on the ability to sell an asset reduce its market value. For example, one study found that shares issued by public firms and sold privately with the condition that they could not be resold in open markets for one year traded at average discounts of 33.8 percent to 35.4 percent.[55] Some of this discount reflects the private placement, as other studies have shown that registered private placements of stocks without restrictions on their future marketability sold at discounts ranging from 7.2 percent to 13.3 percent. This suggests that the one-year illiquidity of the shares in the prior study reduced their value by 20.5 percent to 28.2 percent. Similarly, another analysis found that shares sold prior to a company's IPO and thus unmarketable for a designated period were priced 45 percent lower than IPO prices, although again some of that discount reflects factors other than their temporary illiquidity.[56] Finally, valuations of private companies typically apply a fixed "illiquidity discount" ranging from 25 percent to 35 percent, since their shares cannot be sold on public markets.[57]

The capacity or incapacity to sell or otherwise control the assets of a family business affects their value in much the same manner as restrictions on the sale of those assets: Buyers will pay substantially more for 50.1 percent of an asset such as a company than for 49.9 percent of the same asset, and they also will pay substantially more if they can resell the asset without restrictions.[58] The value of control can be thought of generally as the product of the additional returns that control may produce and the likelihood of it happening. An asset is worth more to a buyer if that buyer can increase the cash flow from the asset by, for example, taking steps to lower its cost of capital, increase its rate of reinvestment, or extend a period of high growth. The value of control of a company, therefore, is based in part on the buyer's perception of how well the company is managed and operated, so control is worth more from a buyer's perspective when the buyer believes a firm can be better managed. The specific premium on a company's value based on that belief depends on the potential buyer's ability to use his or her control to improve company management.

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[55] Damodaran, (2005).

[56] *Ibid.* Market factors also affect an asset's liquidity and consequent value. For example, the sale of large blocks of a stock can drive down its share price, because there are fewer buyers, a common sign of illiquidity. Similarly, shares of young companies often draw fewer buyers than shares of an established firm such as Facebook, rendering the young firm relatively illiquid.

[57] Damodaran (2016). Here again, many factors may affect a potential buyer's valuation of a private firm apart from its illiquidity. For example, a private firm whose assets are primarily shares in money market funds that can be cashed out easily is more liquid than one whose assets lie mainly in real estate or specialty equipment.

[58] Damodaran (2010).

In this context, a standard text on Generally Accepted Accounting Principles and its application to the value of control and the discount for a minority interest states,

> "In applying the appropriate valuation technique to determine the fair value of the non-controlling interest, it is likely that there will be a difference in the fair value per share of that interest and the fair value per share of the controlling interest. This difference arises from what has been referred to as a "minority interest discount" applicable to the non-controlling shares. Obviously, an investor would be unwilling to pay the same amount per share for equity shares in an entity that did not confer control of that entity than it would pay for shares that did convey control.[59]

This analysis is also supported by the Financial Accounting Standards Board (FASB), the private, non-profit organization designated by the Securities and Exchange Commission to set accounting standards for U.S. enterprises and establish GAAP. Notably, the FASB changed its official terminology applied to this question in its Statement no. 160, issued December 2007: The FASB formally retired the term "minority interest" in favor on "non-controlling interest (NCI)" and directed that in reporting a NCI, companies use a fair market value which on a per-share basis is considerably less than the fair market value of a controlling interest.[60] When the FASB announced this change, the *Journal of Accountancy* wrote, "to summarize the underlying concept, a change in the ownership percentage resulting in a loss of control has a real economic impact."[61]

In accordance with these terms and the economic reality they reflect, the IRS has long estimated the fair market value of non-controlling shares of a family business, for purposes of the estate tax, by applying substantial discounts to the valuation of that business and other assets divided among multiple heirs. The IRS does not specifically report the average valuation discount on family-owned businesses under the estate tax; but it does report the average percentage discount applied to the value of assets held in family limited partnerships (FLPs), which often hold family-owned businesses as well as other assets, for purposes of the estate tax. In 2007, the IRS applied an average discount rate of 37 percent to assets held in FLPs reported on federal estate tax returns.[62]

The Treasury Proposal to End Valuation Discounts

The Treasury-IRS proposal appears to be based on the view that the use of discounts in valuing family-business assets when their transfer entails a shift from a majority, controlling interest to several non-controlling minority interests, or entails restrictions of the future marketability of those assets, results in the undervaluation of family businesses for estate, gift and generation-skipping tax purposes.[63] The Treasury offers no evidence of such systematic undervaluation, and the proposed regulation would bar estates from presenting evidence about the fair market value of heirs' interests in a family business based on those factors.

In the "Supplementary Information" and "Background" materials accompanying the proposal, the Treasury simply asserts that the value of majority control and unrestricted marketability should be treated as "the excess of the fair market value of all interests held by the

[59] Epstein, Nach and Bragg 2009).
[60] Bahnson, McAllister and Miller (2008).
[61] *Ibid.*
[62] Raub, Brian (2008).
[63] We do not address here the stipulation that deathbed transfers –those within three years of the decedent's death – are ineligible for the valuation discount based on controlling versus non-controlling interests and marketability.

transferor."[64] This approach would reverse many years of application of GAAP to these circumstances and contradict the view of the FASB that sets the accounting standards for such circumstances. The Treasury's position also contradicts or ignores numerous academic studies, including those cited above, which hold that shifting from a controlling majority interest in a family business to several minority interests or imposing restrictions on the marketability of stock in a family business reduces the asset's fair market value. In so doing, the Treasury also effectively repudiates virtually all empirical economic evidence, the expertise of the U.S. accounting profession, and the real world experience of buyers and sellers of family businesses in establishing the fair market value of those businesses.

While the views of the Treasury and IRS here are seriously flawed, they rest on a seemingly plausible assertion: The transfer of the assets of a family business does not in itself alter those assets, and therefore the assets' value should be the same regardless of who controls them. From an economist's perspective, this proposition conflates the value of an asset with the value of the ownership of that asset, and then ignores how the terms of ownership can affect the value of ownership. The Treasury proposition also ignores the legitimate business interests of many family-owned firms in maintaining family control and ownership of the business. The transfer of a family business from a founder-CEO to his or her children, more often than not, is guided by the founder-CEO's desire to preserve the family-led character of the business, rather than to avoid transfer taxes. One of the main ways to advance that objective is to limit who can own the business and who can control it when its ownership is transferred to the next generation. The U.S. Tax Court has long recognized such family-centered concerns as legitimate business objectives.[65]

Technically, the Treasury and IRS do not claim that U.S. accountants and deal makers have undervalued large family businesses after a transfer that leaves no individual with a majority controlling interest or restricts the sale of shares in those businesses. Rather, the position of the Treasury and IRS is that U.S. accountants and deal makers have systematically overvalued family businesses with a majority controlling owner and no restrictions on the future sale of its shares. The Treasury and IRS offer no economic theory or evidence to support this novel view and the implicit conclusion that markets, those who set the market's rules, and those who study them cannot accurately measure the fair market value of large family businesses.

As a practical matter, the Treasury and IRS position discards decades of findings from the FASB, U.S. accountants and deal makers, by stipulating that for purposes of determining the fair market value of a family business under the estate and other transfer taxes, terms of transfer which include restrictions limiting the ability to liquidate an heir's interest in the family business, or restrictions limiting or deferring the proceeds from such liquidation, shall be "disregarded."[66] In so doing, the Treasury and IRS tacitly concede that the valuation of family businesses transferred under the new rules will not be their fair market value and that the IRS will no longer use economic value as the basis for the taxation of family businesses under the estate and other transfer taxes.

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[64] Internal Revenue Service (2016-B).

[65] "[T]he maintenance of family ownership and control constitutes a legitimate business consideration." *Estate of Bischoff v. Commissioner*, 69 T.C. 32, 39-40 (1977), citing *Estate of Reynolds v. Commissioner*, T.C. 172 (1970); *Estate of Littick v. Commissioner*, 31 T.C. 181 (1958); and *Baltimore National Bank v. United States*, 136 F. Supp. 642 (D, MD, 1955).

[66] The proposed rules also direct that terms of transfer which allow for payment of the proceeds from a liquidation of interest in any form other than cash or property also shall be disregarded.

Other aspects of the explanation for the new regulation raise additional concerns. In the background materials for the proposed regulation, the Treasury and IRS cite the case of *Kerry v. Commissioner*, which held that IRC Section 2704(b) applies to restrictions on the ability to liquidate a business and not a transferred interest in that business.[67] But the case did not question the economic finding that majority control conferred additional value on ownership, compared to the sum of minority interests. Moreover, the case turned on the fact that a person holding a minority share of a family business or other asset cannot on his or her own liquidate that share or an interest in it. As a matter of law, the Congress, Treasury and the IRS can create new rules to value the assets subject to the estate and other transfer taxes. But they cannot claim to apply those taxes to family businesses based on their fair market value while also stipulating that their valuation shall "disregard" features of their ownership which affect their fair market value.

Finally, the Treasury and IRS defend their proposed regulation by noting that it is "no more restrictive than that of the state law that would apply in the absence of the restriction."[68] Yet, the state laws cited by the Treasury and IRS explicitly restrict the ability of minority interests to withdraw or liquidate their position without majority consent, consistent with GAAP and with the impact of such restrictions on the value of the minority interest(s).

V. Economic Effects of a Substantial Increase in the Estate Tax Burden on Large Family Businesses

A substantial increase in the estate tax burden on family businesses could have significant economic effects. Family businesses account for a significant share of all business capital in the American economy, and the GAAP-approved discount applied to the value of those businesses for purposes of the estate tax has been substantial. Earlier, we estimated that the value of family businesses owned by people subject to estate taxes at some future time was $1,986 billion to $2,924 billion to $4,017 billion in 2007, depending on how the assets are counted. In 2007, as noted earlier, the IRS discounted the value of family business assets, for purposes of the estate tax, by an average of 37 percent based on the considerations explored above. Valuing family business assets for purposes of the estate tax in a way that overstates their economic value to a substantial degree would have significant economic effects. While our estimates of those effects are based on the proposed Treasury regulation, the economic effects would be the same following any change that raised the estate tax burden on family businesses to a similar extent.

As the discount for a family business shifting from majority control to minority interests or limiting the marketability of its shares has averaged 37 percent of the value of the business, and since the estate tax rate applied to the taxable share of family businesses is 40 percent, the regulation would increase the estate tax rate by 14.8 percentage points (0.40 x 0.63 = 0.252, 40.0 – 25.2 = 14.8). Moreover, it would increase the burden of the estate tax on family businesses by as much as 60 percent. For example, setting aside other provisions that affect estate tax burdens, the tax due on the transfer of a family business valued at $20 million before the decedent's death and transferred to multiple heirs, with a unified credit equivalent to the tax on the first $5.5 million of its value, would increase from $3.65 million to $5.8 million or by 58.9 percent.[69] Applying the

[67] *Kerry v. Commissioner* (1999).

[68] Internal Revenue Service (2016-B).

[69] $20 million - $5.5 million = $14.5 million x (1-0.37) = $9.135 million x 0.40 = $3.65 million tax; $20 million - $5.5 million = $14.5 million x 0.4 = $5.8 million; $5.8 million - $3.65 million = $2.15 million / $3.65 million = 0.589.

same terms, the estate tax due on the transfer of a family business valued at $1 billion before its transfer to multiple heirs would increase from $250.6 million to $397.8 million or by 58.7 percent. It is clear that the regulation would sharply increase estate taxes on large family businesses.

Such a major change would affect how many family businesses are managed and operate. If the founder of a $20 million family business knows that the expected estate tax due upon her death has increased from $3.65 million to $5.8 million, she could reasonably respond in a variety of ways. She could divert the additional $2.15 million, over time, from planned business investments or expenditures to more liquid forms that could be easily converted to pay the additional tax. Alternatively, she could purchase an additional $2.15 million in life insurance. Finally, she could do nothing and let her heirs deal with the additional estate taxes by liquidating other resources or selling off some of the assets of the family business.

The General Economic Costs of a Substantial Increase in the Estate Tax

The economic costs of a substantial increase in the estate tax burden on family businesses are not limited to their founders and their heirs. Given the significant role of large family businesses in the U.S. economy, changes in law or regulation that substantially increase the estate tax applied to those businesses would have broader economic effects. To investigate those effects, we examined the implications of the Treasury-IRS proposal. First, we enlisted Michael Udell, formerly an estate tax expert at the Joint Committee on Taxation of the U.S. Congress, to assess the assets of family businesses that would be affected by the proposal. His assessment focused on assets held in family limited partnerships (FLPs) and closely-held stock in family businesses. Using data from a study by the Statistics of Income (SOI) Division of the IRS, Udell reported that in 2007, family business assets held in family limited partnerships totaled $1,986 billion to $2,924 billion to $4,017 billion, depending on assets included.[70] Next, Udell used a 2004 SOI study of the ages of male and female owners of family businesses to distribute the assets held in FLPs and the closely-held stock based on estimates of when they would be subject to estate tax over the next 46 years, based on the expected life expectancies of those owners given their age and gender.

To assess the economic affects, we first updated Udell's estimates of the value of family business assets in 2007 to 2016 by applying the S&P 500 long-term compounded rate of return (6.18 percent) and subjecting the annual gains to the corporate tax (35 percent). Next, we applied the average return of the S&P 500 and the corporate tax to estimate the value of those assets when, based on the distributional analysis given the ages and genders of the owners, they would be subject to the estate tax over the next 46 years. Starting with the range of family business assets totaling $1,986 billion (low), $2,924 billion (medium) and $4,017 billion (high) in 2007, we estimate that the value of those assets will rise to, respectively, $8,579 billion, $12,629 billion and $17,352 billion over their owners' expected lifespans. Next we converted those estimates to present discounted value (PDV): Using the 10-year Treasury bond rate of 3.91 percent as the discount rate and applying it to the distribution of family business assets for the period of their owners' expected lifespans, we found that the present discounted value of current family business assets that will be subject to federal estate taxes over the next 46 years ranges from $2,907 billion (low) to $4,279 billion (medium) to $5,880 billion (high).

Federal estate tax returns report the "fair market value" of taxable assets before their transfer and the "taxable value" of those assets based on any valuation discount associated with

[70] Raub, Brian and Joe Newcomb (2012).

their transfer. Again, the SOI division of the IRS studied the reported dimensions of this discount and, as noted earlier, found that the valuation discount applied to the assets held in family limited partnerships in 2004 was about 37 percent.[71] We adopted this finding to calculate the estate tax on family business assets with and without that discount. If the discount is applied, those assets would be taxed at a 25.2 percent rate under current estate tax law; if the discount were eliminated, family business assets would be taxed at the 40 percent rate.[72]

Next, we calculated those tax payments under both scenarios across the 46-year time distribution and derived the present discounted value of those payments. We found that the present discounted value of the estate taxes to be collected on current family business assets, assuming the valuation discount is preserved, ranges from $729.9 billion to $1,078.4 billion, to $1,481.7 billion, compared to $1,162.7 billion to $1,711.7 billion to $2,351.9 billion if the discount were eliminated. Ending the current valuation discount would reduce the total current stock of family business assets over the next 46 years, and thus the capital stock of the U.S. economy, by an amount with a present discounted value of $433 billion to $633 billion, to $870 billion. In Appendix A, we present the calculations described above for the middle or medium case. The analysis of the low-end and high-end cases are identical in form and detail, except each starts with a different level of assets.

From this point, we will use the middle or medium case to analyze how an estate tax change that would reduce the present discounted value of all family business assets subject to the estate tax over the next 46 years by $633 billion, lowering the U.S. capital stock by the same amount, would affect two basic measures of the economy, GDP and employment. This analysis also requires several simplifying assumptions. As noted earlier, eliminating valuation discounts could alter the behavior of family business owners in various ways. Some owners may respond by working, saving and investing less, since the change would increase the cost of leaving their assets to their heirs. Other owners may respond by working, saving, and investing more in order to compensate for the expected reduction in their heirs' inheritance. We assume here that these effects offset each other, and investors do not increase or reduce their consumption. We also assume that the owners of family businesses affected by the change take steps to prepare for the additional tax burden. Since these owners do not know how long they will live – and thus when their businesses will be subject to estate tax without valuation discounts – we expect that some will overcompensate and others undercompensate for the additional burden. We assume that these two responses offset each other, and the family business owners reduce investment and other expenditures on an annual basis by the amount required to offset the additional burden divided by the number of years left in their projected lifespans. This assumption of perfect information does not affect the long-term impact of the increased estate tax burden on current family businesses; it affects only the distribution of those effects, year by year, by distributing the owners' responses to the change evenly over the remaining years of their lifespans.

This approach is consistent with the economic literature. Numerous studies have found that increasing estate taxes moderately reduces the size of estates. One study analyzed estate return data from 1916 to 1996, as well as individual return data, and found that the estate tax laws in effect 45 years prior to the deaths of those individuals or 10 years prior to their deaths had a

[71] This finding may underestimate the actual dimensions of the discount, since the closely-held stock included in the high estimate would all be eligible for discounts.
[72] 1.0 – 0.37 = 0.63 x 0.40 = 0.252, or 25.2 percent.

significant influence on the estates of high net worth individuals.[73] Another study drew on estate tax data from 1950 to 2000, converted estate tax rates to their income tax equivalents, and found that higher estate tax rates had a modest effect on the size of estates.[74] A third analysis examined data on state estate taxes and differences in state estate tax rates, and similarly concluded that higher estate taxes moderately reduce the net value of estates.[75] Using different methodologies, the three studies generally found that a one percent increase in the estate tax rates reduced the ultimate value of taxable estates by 0.1 percent to 0.2 percent or, in an economist's terms, the "elasticity" of estate taxes is 0.1 to 0.2. For our purposes, we assume only that the increase in the estate tax burden arising from the elimination of valuation discounts reduces the post-tax value of the affected estates by the amount of the additional tax burden. These studies, however, suggest that our estimate is conservative: Based on the elasticity of estate taxes, the reduction in the value of those estates arising from ending valuation discounts could be 5.9 percent to 11.7 percent.

To estimate the impact on GDP and employment of reductions in the assets of current family businesses in response to ending valuation discounts, we set aside two ancillary effects. First, the higher estate tax would government revenues, which government would use for spending, mainly consumption, and/or deficit reduction; we do not address any consequent impact on GDP and jobs. Second, there is evidence that increases in the estate tax rate increase donations to nonprofits,[76] and we do not take account of the effects of those donations on GDP or employment.

Given those simplifying assumptions, we could estimate the impact of ending the valuation discount by drawing on a leading analysis of the economic effects of reductions in the capital stock, based on lower business investment in machinery and equipment. This study by economists J. Bradford Delong and Lawrence Summers used international, country-level data from 1960 to 1985 for eight high-productivity economies, including the United States, to estimate the impact of investment in equipment and other machinery on GDP growth.[77] They found that each four and one-half percentage points in additional investment in equipment and machinery as a share of GDP produced roughly a one percentage point increase in GDP per worker. We use this finding to estimate the impact on GDP of ending valuation discounts for current large family businesses.

This impact will be felt over the next 46 years as the owners of current family businesses die. For this analysis, we assume that these family firms smooth their reductions in investment over the remaining course of their founders' lives. Thus, older owners with fewer years to live will reduce their investments more rapidly than younger owners with longer expected lifespans.

For our technical analysis, we first created a baseline for GDP and business investment over that period. In 2016, U.S. businesses invested $1,058 billion in equipment and machinery or 5.7 percent of GDP; and based on historical data, we project that investments in business equipment and machinery will grow at an average annual real rate of 2.7 percent. Similarly, U.S. GDP totaled $18,567 billion in 2016, and CBO currently projects that real GDP will grow at an average annual rate of 2.1 percent for the foreseeable future (10 years). Using these projected growth rates, we estimate that in 2017, U.S. real GDP will total $18,957 billion ($18,567*1.021)

[73] Kopczuk and Slemrod (2001) in Gale, Hines, and Slemrod (2001).
[74] Joulfaian (2006).
[75] Holtz-Eakin and Marples (2001).
[76] A study by Treasury Department economist David Joulfaian found a one percent increase in after tax wealth raises charitable bequests by 1.2 percent. Joulfaian (2006).
[77] Delong and Summers (1992).

and investment in equipment and machinery will total $1,087 billion ($1,058*1.027); by 2026, GDP and equipment investment will reach $22,856 billion and $1,385 billion, respectively. Our baseline estimates for the next 40 years, in 2016 dollars and assuming current estate tax law including the valuation discount, are presented in Table 2, below.

Table 2: Projected Real GDP and Investment in Equipment, 2016-2056, Under Current Law (billions, 2016 $)[78]

Year	GDP	Equipment Investment	Equipment as a Share of GDP
2016	$18,567	$1,058	5.7%
2017	$18,957	$1,087	5.7%
2026	$22,856	$1,385	6.1%
2036	$28,136	$1,813	6.4%
2046	$34,635	$2,374	6.9%
2056	$42,635	$3,108	7.3%

Earlier, we found that ending the valuation discount would reduce the capital (total investment) of current large family businesses over the next 46 years by $433 billion to $633 billion to $870 billion in present discounted terms, depending on how we count current family business assets. The Bureau of Economic Analysis reports that investment in equipment and machinery accounts for 47.6 percent of all fixed business investment. Therefore, we can estimate that the owners of current large family businesses will reduce their expected investment in equipment and machinery by $206 billion to $301 billion to $414 billion over the remaining course of their lives, in present discounted terms. To illustrate using the middle scenario, if the Treasury or Congress had ended the valuation discount in 2015, the change would have reduced investment by current large family businesses in 2016 by $40.6 billion and investments in equipment and machinery by $19.3 billion (40.6 x 0.476 = 19.3). Under these terms, total U.S. business investment in equipment and machinery in 2016 would have been $1,038.6 billion instead of $1,057.9 billion, or 5.6 percent of GDP ($1,039/$18,567) instead of 5.7 percent ($1,058/$18,567).

Applying the findings of the DeLong-Summers study and our estimates of the impact of ending the valuation discount on investments in equipment and machinery, we can estimate the impact of that change on GDP. Again, we present the middle estimate of current family business assets. The DeLong-Summers analysis found that a decline of about one-tenth of one percentage point in the ratio of equipment investment to GDP leads to a decline of 0.023 percentage point in GDP per worker, and thus GDP growth, the following year. Hence, real GDP in 2017 would rise 2.077 percent instead of 2.1 percent and total $18,953 billion ($18,567*1.0277) instead of $18,957 billion as projected in the baseline: Ending the valuation discount for transfer tax treatment of large family businesses would reduce GDP in 2017 by about $4 billion.

In 2017, if current family businesses invested in equipment and machinery as projected by the baseline – if the valuation discount remained in place -- those investments would grow again 2.7 percent from $1,057.9 billion to $1,086.8 billion (Table 2, above), as they would have in 2016. However, if the valuation discount had been eliminated, we would expect those family businesses to reduce their expected baseline investments in equipment and machinery by $15.2 billion in

[78] Full table found in Appendix B.

2017. Therefore, we find that these investments in 2017 would total $1,071.6 billion, and total investments in equipment would be 5.65 percent of GDP, compared to 5.73 percent of GDP in our baseline. Based on the DeLong-Summers study, the difference of eight-hundredths of one percent would produce a reduction in GDP in 2018 of 0.017 percentage point (0.08*0.22), compared to the baseline. The reductions in GDP, compared to the baseline, arising from the impact of ending the valuation discount on investment in equipment and machinery by large family businesses, grow larger over time. For example, ending the valuation discount for current large family businesses in 2015 would reduce real GDP by $31.7 billion in 2026, by $53.8 billion in 2036, by $68.9 billion in 2046, and by $77.8 billion in 2056. (Table 3, below)

Table 3: Projected Impact of Ending Valuation Discounts on Real Investment in Equipment and Real GDP, Selected Years (2016$, billions)

Year	GDP	Equipment Investment	Equipment as a Share of GDP	Reduction in GDP	Reduction in GDP (%)
2016	$18,566.90	$1,038.61	5.59%	$0.00	0.000%
2017	$18,952.56	$1,071.56	5.65%	$4.24	-0.022%
2026	$22,824.12	$1,374.41	6.02%	$31.70	-0.139%
2036	$28,081.63	$1,806.42	6.43%	$53.84	-0.191%
2046	$34,565.78	$2,370.37	6.86%	$68.94	-0.199%
2056	$42,557.45	$3,106.51	7.30%	$77.82	-0.183%

The cumulative losses in GDP arising from ending the estate-tax valuation discount for large family businesses would be substantial. Over the first decade (2016-2025), total real output would be reduced by $153.5 billion (2016 $) relative to the baseline. (Table 4, below) In the following decade (2026-2035), total real output would be $422.7 billion less than it would have been if the valuation discount were retained. By the decade 2046 to 2055, the reduction in real output, compared to the baseline, would total $733.8 billion. Over the entire 46-year period, covering the expected lifespans of all current owners of large family businesses, ending the valuation discount would reduce investment in equipment and machinery by those businesses by $301 billion); and those reductions would reduce total GDP over that period by nearly $2.5 trillion.

Table 4: Impact on GDP of Ending Valuation Discounts, By Decade, 2016-2062 (2016 $, billions)

Decade	Baseline GDP	GDP If the Valuation Discount Ends	Reduction in GDP	Reduction in GDP (%)
2016-2025	$204,234.3	$204,080.8	$153.5	-0.08%
2026-2035	$251,412.1	$250,989.3	$422.7	-0.17%
2036-2045	$309,487.8	$308,875.4	$612.4	-0.20%
2046-2055	$380,979.0	$380,245.2	$733.8	-0.19%
2056-2062	$317,921.2	$317,365.4	$555.8	-0.17%
Total	**$1,464,034.3**	**$1,461,556.1**	**$2,478.2**	**-0.17%**

These calculations significantly *underestimate* the effects of ending the valuation discount under the estate tax, because they describe the estimated impact of that change only on *current*

large family businesses, given their expected growth from the present to the time when ownership would be transferred to the next generation. Our analysis cannot take account of family businesses created in the future and small family firms existing today that grow sufficiently to be subject to transfer taxes and valuation discounts. Hence, our estimates of the impact of ending the valuation discount on future investments in equipment and machinery and GDP are very conservative.

The Impact on U.S. Employment

As reduced investment slows GDP growth, so slower GDP growth also affects employment gains. To estimate this expected impact on jobs, we use "Okun's Law," named for Yale University economist Arthur Okun who extensively analyzed the empirical relationship between output and employment. In the current characterization of this relationship, as former Federal Reserve chairman Ben Bernanke has noted, a 2 percent increase in GDP is accompanied by a 1 percent decline in the unemployment rate, as well as a 0.5 percent increase in labor force participation and a similar increase in the hours worked per-worker.[79] This rule originally described the nexus of growth and jobs in the United States in the 1950s and 1960s, and subsequent analyses have shown that the relationship varies with time period as well as country. Researchers also have found that Okun's Law does not always apply over long periods, since national and global conditions for employment growth change over time. Therefore, our analysis of these jobs effects is limited to the first decade of estate tax treatment without valuation discounts for large family businesses.

To estimate the impact on jobs from the slower GDP growth associated with ending the valuation discount under the estate tax, we first estimate the size of the labor force over the next decade using CBO's projection that it will grow at an average annual rate of 0.5 percent over this period. Next we applied Okun's 2 percent/1 percent rule to estimate the job effects from ending the discount. Over a decade, those losses could total nearly 106,000 jobs. (Table 5, below)

Table 5: Estimated Employment Losses from Ending the Valuation Discount

Year	U.S. Labor Force	Annual Slowdown in GDP Growth	Increase in Unemployment Rate	Fewer Jobs Per-Year	Cumulative Job Losses
2016	159,640,000	0.000%	0.000%	0	--
2017	160,438,200	-0.022%	0.011%	17,962	17,962
2018	161,240,391	-0.017%	0.009%	13,730	31,692
2019	162,046,593	-0.016%	0.008%	12,832	44,524
2020	162,856,826	-0.015%	0.007%	12,102	56,626
2021	163,671,110	-0.014%	0.007%	11,497	68,123
2022	164,489,466	-0.013%	0.007%	10,770	78.893
2023	165,311,913	-0.012%	0.006%	9,873	88,766
2024	166,138,472	-0.011%	0.005%	9,016	97,782
2025	166,969,165	-0.010%	0.005%	8,208	105,990

[79] Bernanke, Ben (2012).

This analysis does not mean that ending the valuation discount will drive up unemployment: More fundamental factors will determine the direction and dimensions of U.S. output and employment over the next decade, including investment, productivity, inflation and trade flows. The likely effect of ending the valuation discount will be slower job gains than would otherwise occur if the valuation discount were preserved. Nevertheless, ending the discount will affect the number of Americans with jobs for at least the following decade, and likely longer.

VI. Conclusion

This study has established, first, that large family businesses – those with annual revenues of $5.85 million or more and at least 20 employees – represent a significant share of the U.S. economy. They account for only 4.1 percent of all businesses with employees; but among businesses with employees, they account for 30.7 percent of all employment, 31.8 percent of all revenues or sales, and 31.1 percent of all wages and salaries. Based on how their assets are defined and counted, these large family businesses today have a combined value of some $2.8 trillion to $4.2 trillion to $5.7 trillion. Large family-owned and managed businesses also operate in distinctive and beneficial ways. Compared to other companies of comparable size and industry, they invest at higher rates and over longer time horizons, they maintain work environments that produce less employee turnover and better communication, and they have leaner cost structures and smaller debt burdens. As a result, family-owned and managed businesses produce annual profits and returns that outpace their counterparts by an estimated 6.65 percent.

This study also established that a significant increase in the estate tax applied to the owners of family businesses would have meaningful, adverse economic effects. With regard to the estate tax, family businesses are unique. In addition to the corporate and other taxes paid by all companies, nearly the total value of a large family company is subject to a 40 percent tax when the founder dies and transfers ownership to the next generation. Many founders take steps to ensure that the estate tax can be paid without liquidating the enterprise or selling off substantial assets from that business, principally by purchasing large life insurance policies to meet part of the burden and/or maintaining other assets in liquid forms that can be cashed in to help cover the tax.

In this context, the Treasury and the IRS recently proposed a measure that would substantially increase the estate tax burden on these businesses. They propose to eliminate the valuation discount applied to the assets of family businesses when a controlling majority owner transfers his or her ownership to several heirs, who each receive minority, non-controlling interests, and/or when the majority owner transfers ownership to heirs with restrictions on their ability to sell their shares. For decades, the IRS has followed Generally Accepted Accounting Practices, the rules of the Financial Accounting Standards Board, and a very large body of economic research and analysis holding that the fair market value of minority, non-controlling interests in a company is substantially less than the fair market value of a majority controlling interest of equal size, and that the fair market value of shares that cannot be easily sold is also substantially less than the value of shares with no such restriction. As a result, the IRS has long provided valuation discounts of about 37 percent when valuing family business assets transferred from one generation to the next generation. Ending these discounts would increase the estate tax burden on large family businesses by as much as 60 percent, and the recent proposal to do so has no basis in economic reasoning or evidence.

Finally, this study establishes that ending these discounts would have adverse consequences not only for those businesses and their heirs, but also for the overall economy. To

measure these effects, we first distributed the current assets of large family businesses over a timeline based on the current age and gender of their founders. This allowed us to estimate the value of those businesses when they be subject to estate tax, based on the remaining lifespans of their founders. We converted those results to their present discount value and found that the present discounted value of those assets when they would be subject to estate taxes ranges from $2,907 billion to $4,279 billion to $5,880 billion. We expect that the founders or other controlling family interests of large family businesses will take steps to prepare for the additional estate tax burden, and that these steps will cost those businesses over time an amount at least equal to the additional burden. Therefore, we reduced capital investments in those businesses to cover the additional tax, distributed across time based on the remaining lifespans of their founders.

To estimate the impact of those reductions on business investment, we first created a baseline of business investment and GDP over the next 46 years. Economists have analyzed the relationship between changes in business investment in equipment and machinery and changes in GDP, so we calculated the reductions in investment in equipment and machinery based on their historic average share of all fixed business investment. Since these reductions are distributed over 46 years, we calculated the impact on the baseline GDP for each year, assuming that the discount had ended in 2015. We found that eliminating the valuation discount would reduce real GDP, in 2016 dollars, by $2,478 billion over the next 46 years: GDP would be reduced by $153.5 billion from 2016 to 2025, by $422.7 billion from 2026 to 2035, by $612.4 billion from 2036 to 2045, by $733.8 billion from 2046 to 2055, and by $555.8 billion from 2056 to 2062.

Economists also have analyzed the relationship between changes in GDP and job creation. We applied those findings to estimate the job losses, relative to the baseline, arising from the impact of ending the valuation discount on GDP. These estimates are limited to one decade, because the relationship between changes in GDP and changes in jobs shifts over time, as the conditions for job creation evolve. We estimate if the Treasury-IRS proposal had taken effect in 2015, the impact on GDP would slow job creation by 105,900 jobs over the decade, 2016 to 2025.

We conclude that measures that substantially increase the estate tax burden on large family businesses, such as the Treasury-IRS proposal for valuation discounts, would reduce business investment and, with it, economic growth and job creation. The Treasury-IRS proposal has no sound or reasonable economic basis.

Appendix A: Impact of Valuation Discount on the Estate Tax Burden of Current Family Business Assets, values in billions, 2016$

Current Age	Gender	Years to Tax	Current value	Value at Death	Tax, Current Law (25.2%)	Tax without Discount (40%)	PDV of Assets at Founder's Death	PDV of Tax, Current Law	PDV of Tax without Discount	Impact of Discounts on Estate Tax
All	**All**		**$4,167.58**							
All	**Male**		**$2,544.97**							
All	**Female**		**$1,622.61**							
Under 50	*Male*		*$620.54*							
40	Male	43.8	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
41	Male	42.96	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
42	Male	42.12	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
43	Male	41.28	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
44	Male	40.44	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
45	Male	39.6	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
46	Male	38.76	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
47	Male	37.92	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
48	Male	37.08	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
49	Male	36.24	$62.05	$62.05	$15.64	$24.82	$62.05	$15.64	$24.82	$9.18
50-59	*Male*		*$579.30*							
50	Male	35.4	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
51	Male	34.56	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
52	Male	33.72	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
53	Male	32.88	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
54	Male	32.04	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
55	Male	31.2	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
56	Male	30.36	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
57	Male	29.52	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
58	Male	28.68	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
59	Male	27.84	$57.93	$57.93	$14.60	$23.17	$57.93	$14.60	$23.17	$8.57
60-69	*Male*		*$639.87*							
60	Male	27	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
61	Male	26.16	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
62	Male	25.32	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47

Annual Increase in Asset Value: 6.18% (S&P 500); Discount Rate: 3.91% (10-Year Treasury);
Annual Tax on increased value: 35%; Statutory Estate Tax Rate: 40%; Valuation Discount: 37.23%

Appendix A: Impact of Valuation Discount on the Estate Tax Burden of Current Family Business Assets, values in billions, 2016$

Current Age	Gender	Years to Tax	Current value	Value at Death	Tax, Current Law (25.2%)	Tax without Discount (40%)	PDV of Assets at Founder's Death	PDV of Tax, Current Law	PDV of Tax without Discount	Impact of Discounts on Estate Tax
63	Male	24.48	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
64	Male	23.64	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
65	Male	22.8	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
66	Male	21.96	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
67	Male	21.12	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
68	Male	20.28	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
69	Male	19.44	$63.99	$63.99	$16.12	$25.59	$63.99	$16.12	$25.59	$9.47
70-79	*Male*		*$381.15*							
70	Male	18.6	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
71	Male	17.82	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
72	Male	17.04	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
73	Male	16.26	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
74	Male	15.48	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
75	Male	14.7	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
76	Male	13.94	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
77	Male	13.18	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
78	Male	12.42	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
79	Male	11.66	$38.11	$38.11	$9.60	$15.25	$38.11	$9.60	$15.25	$5.64
80-89	*Male*		*$263.29*							
80	Male	10.9	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
81	Male	10.16	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
82	Male	9.42	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
83	Male	8.68	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
84	Male	7.94	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
85	Male	7.2	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
86	Male	6.46	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
87	Male	5.72	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
88	Male	4.98	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90
89	Male	4.24	$26.33	$26.33	$6.63	$10.53	$26.33	$6.63	$10.53	$3.90

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90 plus	*Male*		*$60.81*							
90	Male	3.5	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
91	Male	2.76	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
92	Male	2.02	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
93	Male	1.28	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
94	Male	0.54	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
95	Male	0	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
96	Male	0	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
97	Male	0	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
98	Male	0	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
99	Male	0	$6.08	$6.08	$1.53	$2.43	$6.08	$1.53	$2.43	$0.90
Under 50	*Female*		*$294.55*							
40	Female	45.6	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
41	Female	44.78	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
42	Female	43.96	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
43	Female	43.14	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
44	Female	42.32	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
45	Female	41.5	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
46	Female	40.68	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
47	Female	39.86	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
48	Female	39.04	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
49	Female	38.22	$29.45	$29.45	$7.42	$11.78	$29.45	$7.42	$11.78	$4.36
50-59	*Female*		*$335.23*							
50	Female	37.4	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
51	Female	36.58	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
52	Female	35.76	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
53	Female	34.94	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
54	Female	34.12	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
55	Female	33.3	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96

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56	Female	32.48	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
57	Female	31.66	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
58	Female	30.84	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
59	Female	30.02	$33.52	$33.52	$8.45	$13.41	$33.52	$8.45	$13.41	$4.96
60-69	*Female*		*$404.54*							
60	Female	29.2	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
61	Female	28.36	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
62	Female	27.52	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
63	Female	26.68	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
64	Female	25.84	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
65	Female	25	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
66	Female	24.14	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
67	Female	23.28	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
68	Female	22.42	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
69	Female	21.56	$40.45	$40.45	$10.19	$16.18	$40.45	$10.19	$16.18	$5.99
70-79	*Female*		*$266.72*							
70	Female	20.7	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
71	Female	19.84	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
72	Female	18.98	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
73	Female	18.12	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
74	Female	17.26	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
75	Female	16.4	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
76	Female	15.62	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
77	Female	14.84	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
78	Female	14.06	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
79	Female	13.28	$26.67	$26.67	$6.72	$10.67	$26.67	$6.72	$10.67	$3.95
80-89	*Female*		*$258.79*							
80	Female	12.5	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
81	Female	11.72	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83

Annual Increase in Asset Value: 6.18% (S&P 500); Discount Rate: 3.91% (10-Year Treasury);
Annual Tax on increased value: 35%; Statutory Estate Tax Rate: 40%; Valuation Discount: 37.23%

Appendix A: Impact of Valuation Discount on the Estate Tax Burden of Current Family Business Assets, values in billions, 2016$

Current Age	Gender	Years to Tax	Current value	Value at Death	Tax, Current Law (25.2%)	Tax without Discount (40%)	PDV of Assets at Death	PDV of Tax, Current Law	PDV of Tax without Discount	Impact of Discounts on Estate Tax
82	Female	10.94	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
83	Female	10.16	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
84	Female	9.38	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
85	Female	8.6	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
86	Female	7.82	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
87	Female	7.04	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
88	Female	6.26	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
89	Female	5.48	$25.88	$25.88	$6.52	$10.35	$25.88	$6.52	$10.35	$3.83
90 plus	*Female*		*$62.78*							
90	Female	4.7	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
91	Female	3.92	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
92	Female	3.14	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
93	Female	2.36	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
94	Female	1.58	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
95	Female	0.8	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
96	Female	0.02	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
97	Female	0	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
98	Female	0	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
99	Female	0	$6.28	$6.28	$1.58	$2.51	$6.28	$1.58	$2.51	$0.93
Total				**$4,167.58**	**$1,050.23**	**$1,667.03**	**$4,167.58**	**$1,050.23**	**$1,667.03**	**$616.80**

Annual Increase in Asset Value: 6.18% (S&P 500); Discount Rate: 3.91% (10-Year Treasury);
Annual Tax on increased value: 35%; Statutory Estate Tax Rate: 40%; Valuation Discount: 37.23%

Appendix B1: GDP and Equipment, Baseline, values in billions, 2016$

Year	GDP	Equipment investment	Equipment/GDP ratio
2016	$18,566.90	$1,057.90	5.698%
2017	$18,956.80	$1,086.79	5.733%
2018	$19,354.90	$1,116.46	5.768%
2019	$19,761.35	$1,146.94	5.804%
2020	$20,176.34	$1,178.26	5.840%
2021	$20,600.04	$1,210.43	5.876%
2022	$21,032.64	$1,243.48	5.912%
2023	$21,474.33	$1,277.43	5.949%
2024	$21,925.29	$1,312.31	5.985%
2025	$22,385.72	$1,348.15	6.022%
2026	$22,855.82	$1,384.96	6.060%
2027	$23,335.79	$1,422.77	6.097%
2028	$23,825.84	$1,461.62	6.135%
2029	$24,326.19	$1,501.53	6.172%
2030	$24,837.04	$1,542.53	6.211%
2031	$25,358.61	$1,584.65	6.249%
2032	$25,891.15	$1,627.91	6.288%
2033	$26,434.86	$1,672.36	6.326%
2034	$26,989.99	$1,718.03	6.365%
2035	$27,556.78	$1,764.93	6.405%
2036	$28,135.47	$1,813.13	6.444%
2037	$28,726.32	$1,862.63	6.484%
2038	$29,329.57	$1,913.49	6.524%
2039	$29,945.49	$1,965.74	6.564%
2040	$30,574.35	$2,019.41	6.605%
2041	$31,216.41	$2,074.55	6.646%
2042	$31,871.95	$2,131.19	6.687%
2043	$32,541.27	$2,189.38	6.728%
2044	$33,224.63	$2,249.16	6.770%
2045	$33,922.35	$2,310.58	6.811%
2046	$34,634.72	$2,373.66	6.853%
2047	$35,362.05	$2,438.48	6.896%
2048	$36,104.65	$2,505.06	6.938%
2049	$36,862.85	$2,573.46	6.981%
2050	$37,636.97	$2,643.72	7.024%
2051	$38,427.34	$2,715.91	7.068%
2052	$39,234.32	$2,790.07	7.111%
2053	$40,058.24	$2,866.25	7.155%
2054	$40,899.46	$2,944.51	7.199%
2055	$41,758.35	$3,024.91	7.244%
2056	$42,635.28	$3,107.50	7.289%
2057	$43,530.62	$3,192.35	7.334%
2058	$44,444.76	$3,279.51	7.379%
2059	$45,378.10	$3,369.06	7.424%
2060	$46,331.04	$3,461.05	7.470%
2061	$47,303.99	$3,555.55	7.516%
2062	$48,297.38	$3,652.63	7.563%

Annual Real GDP Growth Rate: 2.1% (Congressional Budget Office);
Growth rate of equipment: 2.73% (Bureau of Economic Analysis)

Appendix B2: GDP and Equipment, Baseline, values in billions, 2016$

Year	GDP	Lost investment in equipment	Equipment / GDP ratio	Reduction in GDP per worker	Reduction in GDP from baseline
2016	$18,566.90	$19.29	5.594%	0.023%	$0.00
2017	$18,952.56	$15.22	5.654%	0.017%	$4.24
2018	$19,347.27	$14.66	5.695%	0.016%	$7.63
2019	$19,750.43	$14.25	5.735%	0.015%	$10.92
2020	$20,162.20	$13.97	5.775%	0.014%	$14.14
2021	$20,582.71	$13.52	5.815%	0.013%	$17.33
2022	$21,012.20	$12.85	5.857%	0.012%	$20.45
2023	$21,450.89	$12.20	5.898%	0.011%	$23.44
2024	$21,898.98	$11.57	5.940%	0.010%	$26.31
2025	$22,356.66	$11.01	5.981%	0.009%	$29.06
2026	$22,824.12	$10.54	6.022%	0.008%	$31.70
2027	$23,301.53	$10.10	6.063%	0.008%	$34.27
2028	$23,789.10	$9.64	6.104%	0.007%	$36.75
2029	$24,287.04	$9.21	6.144%	0.006%	$39.14
2030	$24,795.58	$8.79	6.186%	0.006%	$41.46
2031	$25,314.91	$8.36	6.227%	0.005%	$43.70
2032	$25,845.29	$8.00	6.268%	0.004%	$45.86
2033	$26,386.91	$7.67	6.309%	0.004%	$47.95
2034	$26,940.02	$7.33	6.350%	0.003%	$49.97
2035	$27,504.85	$7.04	6.391%	0.003%	$51.94
2036	$28,081.63	$6.71	6.433%	0.003%	$53.84
2037	$28,670.63	$6.35	6.475%	0.002%	$55.68
2038	$29,272.12	$5.98	6.516%	0.002%	$57.46
2039	$29,886.34	$5.58	6.559%	0.001%	$59.15
2040	$30,513.58	$5.21	6.601%	0.001%	$60.77
2041	$31,154.10	$4.87	6.643%	0.001%	$62.31
2042	$31,808.18	$4.51	6.686%	0.000%	$63.78
2043	$32,476.09	$4.19	6.729%	0.000%	$65.17
2044	$33,158.14	$3.85	6.772%	0.000%	$66.50
2045	$33,854.60	$3.57	6.814%	-0.001%	$67.75
2046	$34,565.78	$3.29	6.858%	-0.001%	$68.94
2047	$35,291.97	$3.03	6.901%	-0.001%	$70.07
2048	$36,033.50	$2.78	6.944%	-0.001%	$71.15
2049	$36,790.68	$2.53	6.988%	-0.001%	$72.17
2050	$37,563.84	$2.30	7.032%	-0.002%	$73.13
2051	$38,353.30	$2.07	7.076%	-0.002%	$74.04
2052	$39,159.42	$1.85	7.120%	-0.002%	$74.90
2053	$39,982.53	$1.63	7.165%	-0.002%	$75.71
2054	$40,823.00	$1.40	7.209%	-0.002%	$76.47
2055	$41,681.18	$1.19	7.254%	-0.002%	$77.17
2056	$42,557.45	$0.99	7.300%	-0.002%	$77.82
2057	$43,452.19	$0.80	7.345%	-0.003%	$78.43
2058	$44,365.78	$0.61	7.391%	-0.003%	$78.98
2059	$45,298.61	$0.42	7.437%	-0.003%	$79.49
2060	$46,251.08	$0.23	7.483%	-0.003%	$79.96
2061	$47,223.62	$0.08	7.529%	-0.003%	$80.37
2062	$48,216.63	$0.03	7.575%	-0.003%	$80.75

Annual Real GDP Growth Rate: 2.1% (Congressional Budget Office);
Growth rate of equipment: 2.73% (Bureau of Economic Analysis)

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About the Author

Robert J. Shapiro is the chairman and founder of Sonecon, LLC, a private firm that advises U.S. and foreign businesses, governments and non-profit organizations on economic and security-related matters. Dr. Shapiro has advised, among others, U.S. President Bill Clinton, British Prime Minister Tony Blair, Treasury Secretaries Timothy Geithner and Robert Rubin, UK Foreign Minister David Miliband, and numerous other officials of the Obama and Clinton Administrations and members of the U.S. Congress. He and Sonecon also have advised senior executives of many private companies including Amgen, AT&T, Elliot Management, Exxon-Mobil, Google, Liberty Mutual, Overstock, Nordstjernan of Sweden, and Fujitsu of Japan; as well as many non-profit organizations including the International Monetary Fund, DARPA, the Center for American Progress, the Johns Hopkins University Applied Physics Laboratory, and PhRMA. Dr. Shapiro also is a Senior Policy Fellow of the Georgetown University McDonough School of Business, chairman of the Globalization Initiative at NDN, an advisor to Cote Capital and Gilead Sciences, and a Director of Medici Ventures.

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