Revenue and Incentive Effects of Basis Step-Up at Death: Lessons from the 2010 "Voluntary" Estate Tax Regime

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Executors of wealthy individuals who died in 2010 were not required to file estate tax returns, but if they chose not to do so, beneficiaries of the estate received assets with carryover rather than stepped up basis. The tax returns filed by executors who chose the carryover basis regime provide new insights on the importance of unrealized capital gains on assets transferred at death. These gains represented 44 percent of the aggregate fair market value of estates that chose the carryover basis regime, and an even larger share of the value of closely held stock, real estate, and corporate stock holdings. Most of the gains were accounted for by assets that the decedents held for at least two decades.

The effective tax burden on long-term investments held by many high-net-worth households in the United States is determined in significant part by the interaction between the income tax treatment of capital gains and the estate tax, in particular the tax provisions that allow basis step-up for assets that are passed to estate beneficiaries.

To illustrate the importance of basis step-up, consider a zero-basis asset on which an investor accrues a one dollar capital gain at time zero. Assume that the future expected return on this asset is r, that investor applies the same discount rate r to future capital gains tax liabilities, and that in all future periods the investor has a probability p of needing to sell the asset and a probability q of dying. If the investor has not yet sold the asset and dies after k periods, the asset passes to his beneficiaries, who will sell the asset upon receipt. Basis step-up means that the basis for the beneficiaries is $(1+r)^k$. This is also the market value at the time of sale, so there is no capital gains tax liability. The probability that capital gains taxes are ever collected on the initial one dollar gain is p/(p+q), and the probability that the gains are not taxed as a result of

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basis step-up is q/(p+q). The expected present discounted value of the capital gains tax liability on the initial gain is

$$PDV\ CG\ Tax = \sum_{j=1}^{\infty} p * (1-p-q)^{j-1} * \{\tau * (1+r)^{j-1}\} / (1+r)^{j-1}$$

$$= \tau p * \sum_{j=0}^{\infty} (1-p-q)^{j} = \frac{\tau p}{p+q}.$$

In the absence of basis step-up at death, the expected present value of the capital gains tax liability would be τ, the same as if the gain was realized upon accrual, because the asset is assumed to rise in value at the investor's discount rate.

The effect of basis step-up on effective capital gains tax burdens has attracted research attention for decades. Martin J. Bailey (1969) compared capital gain realizations reported on tax returns with an estimate of accruing stock gains for individuals over the 1926-1961 period. He inferred that more than two-thirds of individuals' gains on corporate stock were not taxed because the stocks were passed at death. This would imply that p/(p+q) is below 1/3.

More recent research has tried to estimate unrealized gains as a fraction of the fair market value of the assets that are bequeathed each year, a ratio that is provides information on the revenue impact of basis step-up but does not bear directly on p/(p+q). Poterba and Scott Weisbenner (2001) used data from the 1998 Survey of Consumer Finances that included estimates of the current market value of asset holdings and the purchase price of these assets, along with estimates of the one-year mortality rates for survey respondents, to estimate unrealized gains as a share of the market value of assets held by potential decedents who might be subject to the estate tax. Their results suggested that unrealized gains would represent about one third of the gross market value of assets that were included in taxable estates. Robert Avery, Daniel Grodzicki, and Kevin Moore (2013) applied a similar algorithm to data from the 2010

Survey of Consumer Finances, and concluded that the basis in assets that were likely to be passed by decedents represented about two thirds of the gross market value of estates that were close to the estate tax threshold, i.e. those with total values of between $5 and $10 million, while unrealized gains were more than half of the value for estates valued at more than $100 million.

The fraction of an estate's value that consists of unrealized appreciation is not a sufficient statistic for determining the effective capital gains tax rate. In the simple example above, the entire value of the asset passing at death would be unrealized gain, but without information on p, the probability of an asset sale in each year, it would not be possible to compute the present discounted value of the capital gains tax burden on the appreciated asset. Looking only at the asset composition of estates ignores the capital gain realizations that take place prior to death and that are reported on income tax returns. Nevertheless, if gains accrue each year and the annual probability of forced liquidation is high, unrealized gains will represent a smaller fraction of the fair market value of assets passed at death than if the probability p is low. Thus a low ratio of unrealized gains to estate values would imply that p/(p+q) was close to one and that the present value of capital gains taxes on an appreciating asset was close to τ. A high value of unrealized gains relative to estate value suggests a low value of p/(p+q). Further work should compare the value of realized gains reported on income tax returns with accruing gains to estimate p.

I. The 2010 "Voluntary" Estate Tax

The temporary expiration of the estate tax and associated basis carry-over regime in 2010 provides a unique opportunity to explore the importance of unrealized capital gains in the portfolios of decedents. The Economic Growth and Tax Reform Reconciliation Act of 2001 included a set of rising thresholds for estate tax liability between 2001 and 2009, and a one-year estate tax repeal effective January 1, 2010. While most tax policy analysts and tax planners

expected the estate tax to be re-instituted prior to this date, it was not. During 2010, the estate tax was not in force. It was replaced by a basis carryover regime, in which assets transferred to heirs retained the decedent's tax basis.

The Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010**,** which was became law in December 2010, reinstated the estate tax effective January 1, 2010. For estates of 2010 decedents, however, the estate tax was voluntary. While the default was for executors of such estates to file estate tax returns, and to receive basis step-up on assets passed to beneficiaries, these executors could also choose not pay estate tax, and to carry over the basis of the decedent's assets to beneficiaries. For some estates, the estate tax liability was less than the present discounted value of the capital gains tax liability associated with carry-over basis. A number of executors therefore chose to file estate tax returns and to pay estate tax on the estates of 2010 decedents, even though they were not required to do so.

To provide some perspective on the estate tax filings for 2010 decedents, it is helpful to present data for adjacent years. The estate tax filing threshold, the value of the estate plus taxable gifts that required an estate tax filing and triggered estate tax liability, was $3.5 million in 2009 and $5 million in 2010 and 2011. Executors filed 7,948 estate tax returns for 2009 decedents with wealth of over $5 million. There were 9,285 such filings for 2011 decedents. For 2010 decedents, by comparison, there were 2,788 estate tax returns filed, roughly one third the number of filings for estates worth over $5 million in the previous year. The distribution of estate tax returns for 2010 was also quite different from that for 2009. Returns for which the gross estate and gifts were valued at between $5 and $10 million accounted for about two thirds of the estate tax returns for 2009 decedents, but for over 80 percent of those for 2010 decedents.

There were 1,046 estate tax returns with gross value of more than $20 million filed for 2009 decedents, 1,206 such returns for 2011 decedents, but only 146 such returns for 2010 decedents.

The sharper decline in the number of estate tax filings for decedents with large estates than for those whose estate only modestly exceeded the filing threshold is consistent with the comparison of potential estate and capital gains tax liabilities presented in Gordon, Joulfaian, and Poterba (2015). Because the estate tax for 2010 applied only to the net value of assets in excess of $5 million, and because the capital gains tax rate for most beneficiaries would be less than the estate tax rate, for very large estates even with substantial unrealized gains the estate tax was likely to exceed the present value of the capital gains tax liability.

II. Unrealized Capital Gains and 2010 Estates

The unique feature of the 2010 tax year, which provides a rich opportunity to learn about the value of unrealized capital gains that are stepped up at death, arises from the optional carry-over basis regime. If executors chose not to pay estate tax, they were required to file Form 8939, which contains information on the fair market value (FMV) of assets in the estate, their basis, and the allocation of the "additional basis" that was permitted under the basis carry-over regime. Some assets, such as cash and cash-equivalent assets and holdings in retirement plans, did not have to be reported on Form 8939. The beneficiaries of any estate that elected carry-over basis were eligible for a $1.3 million increase in basis; spousal beneficiaries qualified for an additional $3 million basis allocation. Thus for an estate of a 2010 decedent for which the decedent's spouse was the sole beneficiary, the basis on assets with up to $4.3 million in unrealized gains could be "stepped up" just as under the prior estate tax regime.

The Office of Tax Analysis (OTA) (2014) summarizes the information on unrealized gains as a share of market value for a subset of Form 8939 filings which were processed by

Internal Revenue Service Statistics of Income (SOI) division in early 2014. It presents detailed tabulations of the value of unrealized gains for decedents in different net worth, age, and gender categories. OTA (2014) was based on a sample of 5,505 returns. Our tabulations differ from those reported in OTA (2014) because they are based on the full set of Form 8939 filings, 8,047 returns. Our findings, however, are broadly similar.

Executors filed 4,152 Forms 8939 for 2010 decedents for whom the fair market value of gross assets in their estate, plus taxable gifts that were reported between 2002 and 2010, exceeded $5 million. The gross value of the estate, plus gifts, was between $5 and $10 million for 2,075, or just over half, of these returns. Another 853 returns fell in the $10-15 million range, 360 were in the $15-20 million range, and 864 corresponded to estates for which gross assets plus gifts exceeded $20 million.

The Form 8939 filings provide a rich source of information on the basis and the fair market value of assets of assets in estates. Although we begin with a sample of 8,047 Form 8939 filings, the sample is reduced to 7,937 after we drop duplicate returns, typically amended returns, as well as returns rejected by the IRS because they were incomplete, corresponded to the wrong year, or had other filing problems. The total fair market value (FMV) for the assets on these 7,937 returns was $96.1 billion, with corresponding unrealized gains of $41.8 billion. The ratio of unrealized gains to FMV, which we label the Unrealized Gain Ratio (UGR), was 0.436. This ratio is somewhat greater than previous estimates. OTA (2014), Poterba and Weisbenner (2001), and Avery, Grodzicki, and Moore (2013) all estimate UGRs of about one-third.

Aggregate information on the UGR conceals substantial variation across asset classes, which is likely due both to differences in the underlying rate of asset appreciation and to differences in the likelihood of selling the asset while alive. Table 1 presents information on the

UGR for the most widely-held asset categories reported on Form 8939 filings. Not surprisingly, fixed income instruments show very low UGRs, while equities and some real estate categories show much higher values. For state and local bonds, for example, unrealized gains were only 4.3 percent of the market value; for federal bonds, the UGR was 1.2 percent. By comparison, for vacant land the UGR was 61.7 percent, for closely held stock it was 72.5 percent, for corporate stock it was 63.1 percent, and for depletable assets and intangibles it was 83.6 percent. Since the value of basis step-up may vary across different asset categories, this tax code provision is likely to have different effects on the effective capital gains tax rates on different assets.

Even within asset classes, there is substantial heterogeneity in UGRs across Forms 8939. Table 2 reports on this variation for three asset classes with high average UGRs: closely held stock, other stock, which is typically publicly traded stock, and real estate. Although the average UGRs for these three asset classes were 0.725, 0.631, and 0.453, respectively, a substantial number of Form 8939 filings showed losses for each category. For closely held stock, 22 percent of the Form 8939 filings showed losses; for other corporate stock, 19 percent, and for real estate, 21 percent. There were also a substantial number of Form 8939 filings for which gains represented most of the FMV of these asset classes. Forty-two percent of the Form 8939 filings that included closely held stocks reported an unrealized gain of more than 70 percent of the fair market value of this asset position. For corporate stock the analogous value was 20.5 percent, and for real estate it was 29.5 percent. The dispersion of UGRs even within asset classes is an important reminder of the range of possible return outcomes for risky assets. It also suggests the need to consider loss-offset limitations in assessing the effective burden of capital gains taxes.

The basis step-up provisions that apply in tandem with the U.S. estate tax require beneficiaries to value assets at the time of the decedent's death. Losses that accrued during the

decedent's lifetime are not passed forward to the beneficiary; there is no "step down" in basis. A beneficiary cannot sell assets that are worth less than the decedent's basis and use the resulting losses to offset taxes on other gains. When estimating the revenue consequences of shifting to a carryover basis regime, it is important to recognize the possibility of revenue losses associated with some taxpayers who will be able to pass forward losses that are currently lost at death.

The evidence presented in Bailey's (1969) study of gain realization rates suggested that many of the assets that passed to beneficiaries might have been held for decades by the decedents. The Form 8939 filings provide direct information on this issue. Table 3 presents data on the date of acquisition of closely held stocks, other stocks, and real estate. For each of these asset categories, the executor could not identify the date of purchase for a significant fraction of the reported holdings: 17.1 percent for closely held stocks, 15.4 percent for other stocks, and 11 percent for real estate. Among the positions that could be identified with a purchase date, most of the gains were associated with assets that were held for more than twenty years. For closely held stock, 64.2 percent of all gains, and 85 percent of all gains for which the purchase date was known, corresponded to assets that the decedent held for more than twenty years. For real estate, the analogous values are 49.3 percent and 64.8 percent, respectively. For other corporate stock, only 24.8 percent of all gains correspond to positions that were known to have been purchased more than twenty years ago, but these gains represent 71.9 percent of all gains on stock positions with known start dates. These data are consistent with low realization rates and long holding periods for at least some assets held by high net worth investors.

III. Conclusions

The information on the unrealized gains and losses on assets that were included in the estates of decedents who passed away in 2010 provides important data for estimating the

potential revenue cost of basis step-up. This information must be augmented with data on the value of unrealized gains on assets held by decedents who were not required to file estate tax returns, because their estates were valued at more than $5 million, but who could still take advantage of basis step-up. OTA (2014) uses Survey of Consumer Finances data for potential decedents with net worth below the estate tax filing threshold, and that use the Form 8939 data to augment the SCF data for older decedents with high net worth.

There are two limitations in using the Form 8939 data from 2010 for either revenue estimates or effective tax rate calculations. The first arises from the voluntary nature of the estate tax for 2010 decedents. If executors decided whether to elect the carry-over basis regime or the estate tax-cum-basis step-up regime based on the expected tax liability under the two regimes, then the observed Forms 8939 represent a selected sample from the set of all estates. Gordon, Joulfaian, and Poterba (2015) present evidence that the projected differential in tax liability between the two tax regimes helped predict whether an executor would file an estate tax return or take advantage of the carry-over basis regime. The selection would lead to estates for which the value of basis step-up was smallest filing Form 8939. It is difficult to determine how the reported Form 8939 data should be adjusted to take account of this selection phenomenon. It nevertheless seems likely that the UGR on Form 8939 filings is an under-estimate of the ratio for the entire decedent population, thus underestimating the revenue loss from basis step-up. While our analysis focuses on net gains, some decedents hold assets with substantial losses. Basis step-up erases these losses and potentially increases the capital gains tax liability of the beneficiaries of these decedents.

The second limitation concerns the generalizability of the asset gain and loss positions for 2010. The voluntary estate tax regime occurred two years after the onset of the recent financial

crisis. The values of assets in some categories, such as real estate and corporate stock, may have been lower for this tax year than in a more typical year. The 2010 data on both the level of unrealized gain ratios, and the variation in those ratios as a function of taxpayer characteristics, nevertheless provide valuable insights on a much-debated feature of the U.S. tax system.

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Table 1: Fair Market Value (FMV) and Basis of Assets Reported on Basis Carryover Returns

Asset Category	Number of Form 8939 Returns With Asset Class	Conditional on Positive Holding		
		Mean FMV (000s)	Mean Unrealized Gains (000s)	Unrealized Gain/ FMV
All	7,937	12,110	5,285	0.436
Corporate Stock	5,998	5,333	3,365	0.631
Personal Residence	4,314	1,004	379	0.378
Other Assets	4,107	305	62	0.203
State/Local Bonds	4,088	2,766	118	0.043
Real Estate (not land)	4,050	1,958	887	0.453
Corporate/Foreign Bonds	2,368	621	37	0.060
Limited Partnerships	1,915	3,326	1,322	0.398
Cash	1,824	948	61	0.064
Real Estate Mutual Funds	1,577	222	84	0.379
Other Federal Bonds	1,505	1,203	14	0.012
Mutual Funds	1,461	377	29	0.077
Vacant Land	1,397	1,006	621	0.617
Closely Held Stock	1,297	6,912	5,011	0.725
Other Non-corporate Businesses	1,253	3,580	806	0.225
Mortgages / Notes	1,160	2,360	-92	-0.039
Bond Funds	1,141	242	17	0.070
Annuities and Retirement Assets	766	1,553	821	0.529
Farms	756	2,628	1,567	0.596
Art	681	1,601	1,052	0.657
Real Estate Partnerships	628	3,817	2,066	0.541
Hedge Funds / Private Equity	626	1,856	131	0.071
Depletable / Intangible Assets	540	1,111	929	0.836

Source: Authors' tabulation using 8939 returns filed in 2010.

Table 2: Distribution of Unrealized Gain Ratios by Asset Class

Ratio of Gains to Fair Market Value	Closely Held Stock (N = 1297)		Corporate Stock (N = 5998)		Real Estate (N = 4050)	
	% of Returns	Cumulat-ive %	% of Returns	Cumulat-ive %	% of Returns	Cumulat-ive %
G/FMV <0	22.1%	22.1%	19.0%	19.0%	20.8%	20.8%
0 < G/FMV < .2	10.6	32.7	24.7	43.7	12.8	33.6
0.2 < G/FMV < 0.4	9.7	42.4	17.1	60.8	13.6	47.3
0.4 < G/FMV < 0.7	14.7	58.1	18.8	79.5	23.3	70.5
G/FMV > 0.7	41.9	100	20.5	100	29.5	100

Source: Authors' tabulations using 8939 return filings for 2010. N denotes the number of Form 8939 reporting some holdings of the asset class.

Table 3: Holding Period and Unrealized Gain Ratios by Asset Class

Holding Period at Time of Death	Closely Held Stock (2,051 Positions)			Corporate Stock (26,798 Positions)			Real Estate (7,408 Positions)		
	% of Returns	% of Gains	UGR	% of Returns	% of Gains	UGR	% of Returns	% of Gains	UGR
< 5 Years	11.4%	0.3%	7.1%	29.1%	2.2%	13.2%	14.3%	-0.2%	-0.6%
5 – 10 Years	12.5	4.8	38.8	18.3	2.3	35.5	13.7	5.2	18.3
10 -15 Years	12.4	2.7	40.9	12.4	2.8	50.4	12.4	10.8	41.6
15 – 20 Years	9.8	3.5	53.7	8.0	2.4	68.2	9.4	10.0	52.8
> 20 Years	36.8	64.2	84.7	16.9	24.8	88.3	39.2	49.3	72.3
Unknown	17.1	24.5	76.0	15.4	65.5	66.1	11.1	24.9	49.3

Source: Authors' tabulations using Form 8939 return filings for 2010. Tabulations for the share of gains are drawn from information on the net gain for each position, so some entries underlying the gain calculation are losses.