DATA CHOICE IN CAPITAL GAINS REALISATION RESPONSE STUDIES — A REVIEW

JOHN MINAS*

This article reviews the literature from the United States on capital gains realisation response studies. The studies reviewed use the econometric technique of regression analysis to estimate the responsiveness of capital gains realisations to tax rates, and this is reported as an elasticity point estimate. The literature review reveals that the use of cross-sectional tax return data for only one tax year is the least preferred of three data types considered. In concluding, the article considers the implications of the reviewed literature for a forthcoming Australian study on capital gains realisation response.

---

*   Associate Lecturer, Tasmanian School of Business and Economics, University of Tasmania and PhD candidate at Atax, University of New South Wales.

I Introduction

The focus of this article is upon the choice of three types of data used in capital gains realisation response studies.[1] In particular, it reviews the strengths and weaknesses of various types of data used in such studies. The article refers primarily to literature on studies undertaken in the United States.[2] Its principal motivation is to establish which of these types of data would be most appropriate for a contemporary Australian study of capital gains realisation response. This is a highly relevant and topical tax policy consideration for Australia.

Capital gains realisation response studies are concerned with how responsive realisations of capital gains are to a change in the tax rate applying to those capital gains. In the research to date, an elasticity[3] point estimate is the most common means of measuring the realisations response. Elasticity in the context of capital gains describes the percentage change in realisations divided by the percentage change in the tax rate.[4]

Typically, empirical studies of the capital gains realisation response use the statistical technique of regression analysis. This technique applies a regression equation which estimates the mean value of a dependant variable in terms of the known values of the independent variables. In capital gains realisation response studies undertaken to date, the dependent variable is usually a measure of capital gains realisations, and the independent variables consist of a measure of the marginal tax rate on capital gains, as well as a number of other non-tax factors that are seen as influencing capital gains realisations.[5]

The three types of data approaches considered in this article are cross-section, aggregate time series and panel data.[6] The choice of data type is an important consideration given the wide range of responses that have been estimated in the United States econometrics literature — ranging from no significant response to 4 or 5 in absolute value.[7] A review of the literature indicates that while early research on capital gains realisation response used a cross-sectional approach, the problems inherent in this method are such that research that is more recent has not contemplated the use of this method.

---

[1]   Also referred to as elasticity studies.

[2]   The article is principally limited to studies conducted in the United States, since this is where most of the realisation response studies have been conducted. Recently, a study using a long panel was undertaken in Sweden, however, that study has not been extensively reviewed in this article. See Martin Jacob, 'Taxes and life cycle capital gains realizations' (2013) 20(12) *Applied Economic Letters*, 1130.

[3]   The percentage change in one variable resulting from a one per cent change in another variable.

[4]   Jane Gravelle, *The Economic Effects of Taxing Capital Income* (MIT Press, 1st ed, 1994) 144.

[5]   George Zodrow, 'Economic Analyses of Capital Gains Taxation: Realizations, Revenues, Efficiency and Equity' (1993) 48(3) *Tax Law Review* 419, 431–2.

[6]   'Panel data' can refer to several types of data; the references to 'panel data studies' in this article are to studies that track the same taxpayers over the time of the study. Another type of study that some of the literature refers to as panel data is a pooled cross-section time-series, which includes several taxpayers for a number of years but does not track the same taxpayers over time.

[7]   Gravelle, above n 4, 148. An elasticity point estimate of this magnitude represents a very significant realisation response.

The literature identifies a trend in the relative estimates of realisation responses: generally, the estimates of elasticity are relatively small in time series studies while cross-section estimates are relatively large.[8] A United States Congressional revenue estimate prepared by the Joint Committee on Taxation (JCT) in 1990 asserted that estimates of realisation elasticity from time series data better described how taxpayers responded to a permanent change in the tax rate.[9] The United States Treasury, however, has argued that time series studies may underestimate realisations elasticity.[10]

The methodology used in econometric studies to estimate realisations response appears to have developed and improved over time. The literature includes references to various econometric problems that have been a limitation of some studies.[11] An example of one such limitation is that some of the econometric analysis of capital gains realisation behaviour has weak theoretical economic foundations;[12] more specifically, few predictions are made in the theoretical literature about how and why capital gains are realised.[13] Furthermore, the type of data that is adequate for answering policy makers' questions can be difficult to determine.[14]

The literature also reveals that capital gains realisations response studies have tended to produce a wide range of elasticity point estimates, due to the model specification being sensitive to minor changes. In some cases, the differences in results can be significant.

One of the limitations of this article is that it does not consider the question of whether regression analysis is the best tool for estimating the capital gains realisation response. Because the article is concerned with the choices of data type in the capital gains econometric studies, there is an implicit assumption that these can be a useful tool for examining the realisation response question.

This article reviews some of the literature that uses an econometric approach to modelling the capital gains realisations response. The purpose of the literature review is to compare the available data choices available for econometric analysis of capital gains realisations response. Notwithstanding that the number of studies undertaken indicates that econometric analysis is a common approach to estimating realisation response, the

---

[8]   Leonard Burman, *The Labyrinth of Capital Gains Tax Policy: A Guide for the Perplexed* (Brookings Institution Press, 1999) 62.

[9]   Gerald Auten and Joseph Cordes, 'Policy Watch: Cutting Capital Gains Taxes' (1991) 5(1) *The Journal of Economic Perspectives*, 185. The estimates of the JCT are used by Congress to inform their decisions. US Treasury are part of the Executive Branch and it may be that it is subject to more political pressure than the JCT. This might lead, on occasion, to choices that are more partisan than those of the JCT. See Jane Gravelle, 'Limits to Capital Gains Feedback Effects' CRS Report for Congress (1991) for a notable example of different revenue estimates between JCT and Treasury. Specifically, in 1990, the JCT estimated that a 30 per cent capital gains exclusion would cost US$10.6 billion in revenue between 1991 and 1996, whereas Treasury estimated a US$9.5 billion revenue gain over the same period.

[10] Auten and Cordes, above n 9, 186.

[11] Ibid.

[12] Gerald Auten, Leonard Burman and William Randolph, 'Estimation and Interpretation of Capital Gains Realization Behaviour: Evidence from Panel Data' (1989) 42(3) *National Tax Journal* 353.

[13] Zodrow, above n 5, 433.

[14] Auten et al, above n 12.

tax literature refers to the long-run realisation response as an issue surrounded by considerable uncertainty.[15]

For researchers contemplating a study on capital gains realisation response that uses Australian data, it is important to consider institutional differences between the capital gains tax systems of the United States and Australia. One such example is the event of death, where capital gains bequeathed to heirs receive a step-up in basis (cost base) in the United States. In Australia, however, the cost base of the inheriting taxpayer will be the same as the original cost base of the asset (unless it was a 'pre-CGT' asset in the hands of the deceased, in which case cost base will be market value).[16] The US treatment of capital gains at death appears to act as a disincentive to realise capital gains as a taxpayer's age increases.[17] A second notable difference between the two tax systems is in the treatment of capital losses. In the United States, a taxpayer can offset up to US$3,000 against ordinary income, before applying the remainder to capital gains. In Australia, capital losses can only be offset against capital gains. It therefore appears that taxpayers in Australia with a relatively small amount of capital losses would have an increased incentive to realise capital gains, compared to US taxpayers with the same amount of capital losses.[18] These differences should not influence the choice of data type, of themselves, but they might result in modifications to the variables in an empirical study using Australian data.

The elasticity point estimates that realisation response studies report is of interest to tax policy makers, given its usefulness in determining the revenue effects associated with a change in the CGT rate. Such information may inform the decision of policy makers involved in determining an appropriate CGT rate. However, it does not follow that an elasticity point estimate will be predictive of future capital gains realisation behaviour.

There is an absence of any publicly available empirical study on the realisation response of capital gains in Australia. Surprisingly, the tax policy question of the revenue effects of the 50 per cent CGT discount[19] has received minimal attention from policy makers in Australia, despite the fact that the discount had an estimated revenue cost of over $4 billion in 2013–14.[20] At the time of its introduction, some policy makers had an optimistic view of its revenue effects.[21]

If capital gains realisations are not very responsive to a reduction in the CGT rate, the government might be forgoing large amounts of CGT revenue unnecessarily. This point is highly relevant to the Australian context, notwithstanding that the tax literature is

---

[15]   Matthew Eichner and Todd Sinai, 'Capital Gain Tax Realizations and Tax Rates: Evidence from Time Series' (2000) 53(3), *National Tax Journal* 665.

[16]   *Income Tax Assessment Act 1997* (Cth) s 12-5(4).

[17]   Gravelle, above n 4, 125.

[18]   Specifically, US taxpayers with capital losses below $US 3,000 do not have to realise an equivalent amount of capital gains in an income tax year in order to reduce their tax liability. Australian taxpayers with the equivalent amount of capital losses can only use these capital losses when they realise capital gains.

[19]   The 50% CGT discount is effectively a capital gains inclusion rate which results in a CGT rate preference.

[20]   Australian Treasury, *Tax Expenditures Statement,* Canberra (2013).

[21]   See for example Commonwealth, *Parliamentary Debates,* Senate, 29 November 1999, 10894 (Brian Gibson).

critical of the 50 per cent CGT discount for a number of tax policy reasons other than revenue considerations. In the event that capital gains realisations were relatively unresponsive to tax rates, there might be a justification for increasing the prevailing CGT rate[22] for personal taxpayers in Australia, which could increase tax revenue.

A review of the literature on capital gains realisation response indicates that a relatively high number of studies, completed over a long period, have been conducted in the United States compared with other countries. Although there were numerous articles from the 1980s and 1990s on capital gains realisation response, there appear to be relatively few from 2000 and later.

The remaining parts of this article consider each of the three data approaches separately, and in doing so review some of the studies in the tax literature for each. Part II is a review of cross-sectional studies, Part III is a review of time series studies, and Part IV is a review of panel data studies. Part V then considers the implications of the review of these data approaches for future research in Australia on the capital gains realisation response.

II Review of Cross-Sectional Capital Gains Realisation Response Studies

A cross-sectional capital gains realisation response study uses tax return data for a sample of taxpayers for a single year. Although the first econometric study of capital gains realisation response used cross-section data, the more recent tax literature has not contemplated use of this data type in realisation response studies. Although this part includes a brief review of two cross-sectional studies, there is no suggestion that cross-sectional data should be considered for any future capital gains realisation response studies: the articles are reviewed to provide some context and background to how the approach to the realisation response question has developed over time.

Feldstein Slemrod and Yitzhaki (1980)[23] is a US cross-section elasticity study for the year 1973;[24] most of the analysis is limited to high-income taxpayers and the only capital gains asset considered is corporate stock. Given that the tax return information itself contained no information about the portfolio value of individual taxpayers, Feldstein et al used the amount of dividends received to impute taxpayer wealth.[25] The main analysis of the study was limited to those taxpayers who had dividends of at least US$3 000 in the sample year.[26]

---

[22]   In the Australian context, the mechanism for a CGT rate increase would be reducing the rate of the 50 per cent CGT discount. The Henry Review recommended reducing the discount from 50 per cent to 40 per cent; see Review Panel, *Australia's Future Tax System: Report to Treasurer — Part One: Overview* (2009).

[23]   Martin Feldstein, Joel Slemrod and Shlomo Yitzhaki, 'The Effects of Taxation on the Selling of Corporate Stock and the Realization of Capital Gains' (1980) 94(4) *The Quarterly Journal of Economics* 777.

[24]   Using data from a sample of tax returns known as the Capital Assets Study. This dataset contains detailed information on asset sales and it oversamples high-income tax returns.

[25]   Feldstein et al, above n 23, 780.

[26]   However, when Feldstein et al fitted regression equations for the entire population, they found that there was no tax rate effect.

The Feldstein et al study found a capital gains realisations elasticity of 3.75 in absolute value. This result is in the upper range of reported elasticity point estimates.[27] Notably, several commentators have disagreed with the high elasticity found in the study, asserting that it is inconsistent with observation. The elasticity in Feldstein et al implies that a 10 per cent cut to the CGT rate would increase realisations by 37.5 per cent. However, the actual experience in the United States of a small increase in the CGT rate did not cause a virtual cessation of capital gains realisations, as the 3.75 elasticity point estimate in the Feldstein et al study implies.[28]

One of the limitations of the Feldstein et al study is that, because it uses cross-sectional data, the effect of a CGT rate cut may be overstated. Because cross-sectional studies include only one year of data, there is no way of ascertaining to what extent the elasticity point estimate is a measure of timing behaviour by individual taxpayers. Feldstein et al recognised the potential for overstatement of the sensitivity of realisations to a temporarily low tax rate, and they referred to this in their discussion of the results. Cross-sectional studies may reveal more about timing strategies than about the response to statutory changes in tax rates that are expected to be permanent or long-lasting.[29]

A criticism of the Feldstein et al study is the choice of tax rate. This choice is one of the problems that those conducting research on the capital gains realisation response face; this may be one of a 'first dollar' or 'last dollar' CGT rate or another type of CGT rate. In a capital gains realisations response study, the first-dollar CGT rate is the rate that applies to the first dollar of capital gains that the taxpayer realises. The advantage of the first-dollar CGT rate is that it is exogenous; that is, it is independent of the taxpayer's decision on the amount of capital gain to realise.[30] The last-dollar CGT rate is the rate incurred in the event that the taxpayer had increased their actual capital gains realised by one dollar. Feldstein et al consider that it is more appropriate to use a last-dollar CGT rate than a first-dollar rate. This is partly because, in the case of very wealthy taxpayers, there is the potential for substantial differentiation between the first-dollar CGT rate and the tax rate at which marginal decisions concerning capital gains realisations are made.[31] In the Feldstein et al study, an instrumental variable estimation procedure was used, whereby the average capital gains for taxpayers at a particular income level were used to predict the last-dollar CGT rate. The dependent variables used were the ratio of shares to dividends, the ratio of long-term gains on shares to dividends and a dummy variable for the sale of shares. The instrumental variables were the first-dollar CGT rate and the last dollar CGT rate.

A subsequent study by Minarik, from 1981[32] presents an alternative functional form using the same data as Feldstein et al and a weighted rather than unweighted least

---

[27]   An example of an even higher elasticity is the 5.84 reported in: Joel Slemrod and William Shobe, 'The Tax Elasticity of Capital Gains Realizations: Evidence from a Panel of Taxpayers' (NBER Working Paper Series, No. 3237, 1990).

[28]   Gravelle, above n 4, 145.

[29]   Burman, above n 8, 60.

[30]   Feldstein et al, above n 23, 780.

[31]   Ibid 781.

[32]   Joseph Minarik, 'The Effects of Taxation on the Selling of Corporate Stock and the Realization of Capital Gains: Comment' (1984) 99(1) *The Quarterly Journal of Economics* 93.

squares regression technique. After recapping the Feldstein et al methodology and findings, Minarik uses a series of steps to present and apply what he considers a superior methodology and subsequently finds a significantly lower elasticity point estimate. According to Minarik, the high elasticity found by Feldstein et al was due largely to the way the observations were weighted; it is Minarik's view that using similar data and a different weighting method would produce a significantly lower elasticity point estimate.[33]

Minarik notes that the elasticity point estimate of the Feldstein et al study implies that an increase in the CGT rate of 0.6 per cent from 20.6 to 21.2 per cent would cause the average shareholder with at least US$1.5million of shares to stop realising capital gains on those shares.[34] Minarik also notes that the Feldstein et al elasticity point estimate implies that in the event of a 0.6 per cent CGT rate cut from 20.6 to 20 per cent, the same taxpayer would double their realisations.[35] According to Minarik, the use of a last-dollar tax rate by Feldstein et al is not appropriate, given that this is relevant to the taxpayer's decision to realise additional gains rather than a CGT rate that reflects the amount of capital gains they did realise.[36] According to Minarik, the use of an average tax rate for predicted gains would have been more appropriate. The literature notes that although Minarik's comment on the rate used in Feldstein et al highlights the difficulty of having to use a single tax rate in an elasticity study to represent an entire tax schedule, there is no theoretical justification for any one type of such a tax rate.[37]

Minarik is one of several researchers disputing the Feldstein et al finding on capital gains realisations being as highly responsive to changes in tax rates as their -3.75 elasticity implies.[38]After applying all of his suggested changes to the Feldstein et al equation, Minarik finds an elasticity of realisations of long-term capital gains of -0.6; this implies a level of realisations response that is too low to cause an increase in CGT revenue overall in the event of a small rate decrease.

Although cross-sectional studies have a higher number of observations than time series studies, this, in itself, does not justify using cross-sectional data, given its many disadvantages. Perhaps the main shortcoming of cross-section studies is that they are unable to account for the dynamics of the capital gain realisations response.[39] Other more specific criticisms of cross-sectional studies include, first, that they fail to distinguish between transitory and permanent effects; secondly, that they include effects specific to individual taxpayers and thirdly, that they fail to include a measure of accrued unrealised capital gains.[40] Furthermore, there is a fourth problem of the need to separate the income and price effects as well as a fifth problem of a lack of information about the components of the model specification and a sixth problem of 'heterogeneity

---

[33]   Ibid.
[34]   Ibid, 95.
[35]   Ibid, 96.
[36]   Ibid, 109.
[37]   Alan Auerbach, 'Capital Gains Taxation in the United States: Realizations, Revenue, and Rhetoric' (Brookings Papers on Economic Activity No 2, 1988) 614.
[38]   See for example Auten and Cordes, above n 9.
[39]   Auten et al, above n 12.
[40]   Gravelle, above n 4, 147.

bias'. Gravelle has noted that the problems inherent in cross-section studies are such that the results do not adequately estimate the realisations response.[41]

Given the absence of taxpayer data in cross-sectional studies, the only way to estimate the relationship of the tax rate to the taxpayer's tax rate in other years is to compare it with the tax rates of otherwise similar taxpayers in the same sample and year.[42] The results of cross-section studies can show a negative relationship between CGT rates and realisations even in instances where there is no permanent effect. Specifically, part of the realisation response captured in the results of cross-section studies may be due to timing effects pertaining to a taxpayer facing an atypically low marginal tax rate in that year rather than a measure of the, more important, long-run or permanent effect. On this basis alone, the cross-section methodology is inferior to the alternative methodologies, both of which use more than one year of data.

Cross-sectional data studies overstate the elasticity of capital gains realisations to the extent that they include transitory, individual-specific effects as part of the elasticity point estimate. The unreliability of cross-sectional studies is such that revenue-estimating agencies in the United States have chosen not to rely on the results of such studies that reported very high elasticity point estimates.

Furthermore, cross-section studies suffer from the problem of heterogeneity bias, which results from the absence of a variable in the estimating equation to control for the investment preferences of individual taxpayers. The problem, more specifically, is that observed changes in the tax rate variable are not independent (or exogenous), but are rather dependent on (determined endogenously by) differences in individual behaviour reflecting differences in taxpayer investment preferences that are not captured by the explanatory variables in the equation.[43] The endogeneity of the explanatory variable is more problematic in cross-section studies, where much of the variation is due to circumstances of the individual taxpayer; this is in contrast with time series studies where the problem is not as apparent because the major source of variation is due to CGT rate changes.[44] The literature notes that, in a cross-sectional study, because the individual's tax rate is endogenous to their behaviour, this can result in a spurious correlation between tax rates and realisations.[45] One way the literature explains this problem is that the difference in taxpayers' investment preferences can simultaneously affect a taxpayer's tax rate and the amount of their capital gains realisations; thus the independent variable—the tax rate—is dependent on taxpayer behaviour.[46]

In short, cross-section capital gains realisation response studies are now considered to be a discredited approach: they are unreliable in estimating the permanent elasticity of capital gains realisations, as confirmed in the wide range of results they have produced and the known problems with the methodology used. It is apparent from the review of

---

[41]   Ibid.
[42]   Auerbach, above n 37, 616.
[43]   Auerbach, above n 37.
[44]   Jane Gravelle, 'Capital Gains Tax Options: Behavioral Responses and Revenues' (CRS Report for Congress, No 700, 10 August 2010), 13.
[45]   William Bogart and William Gentry, 'Capital Gains Taxes and Realizations: Evidence from Interstate Comparisons' (1995) 77(2) *The Review of Economics and Statistics*, 267.
[46]   Jane Gravelle, 'Can a Capital Gains Tax Cut Pay for Itself?' (1990) *Tax Notes*, 214.

the literature on cross-section studies that timing behaviour is an important consideration in capital gains realisation response studies. Without data spanning several tax years, it is not possible to ascertain whether taxpayers in the sample are responding to the statutory CGT rate or the fact that their income in the year of the sample might be atypically low.

III TIME SERIES REALISATION RESPONSE STUDIES

A capital gains realisation response study using a time series approach relates total capital gains realisations, on a year-by-year basis, over several years to the CGT rate in each particular year. Time series studies use aggregate tax return data rather than individual tax return data and this, to some extent, may be considered one of their limitations.

In the United States, time series studies have tended to report elasticity point estimates that are lower than those reported in cross-section studies. The range of results from time series studies typically range from those estimates that are not statistically significant, to an elasticity of approximately 1, in absolute value.

One of the advantages of a time series study is that—unlike cross-section studies—it is based on responses to actual tax rate changes.[47] According to some of the literature, time series studies provide a better mechanism to identify behavioural responses resulting from tax changes than for micro-data.[48]

On the other hand, criticisms of aggregate time series studies include concerns about the limited number of observations and problems with the imperfect aggregation of tax rates.[49] In the United States, time series studies have guided capital gains tax policy[50] and this may be due to the lower elasticity estimates that they tend to produce. That is, from a policy perspective, in a deficit budget environment, it may be more prudent to underestimate revenue gains, resulting from a behavioural response, rather than to overestimate such revenue gains.

Policy makers should be cautious about basing tax policy prescriptions on any time series estimate from an individual study.[51] Nevertheless, there is no empirical evidence to support the view that an average of several elasticity point estimates, reported in separate time series studies, is useful in informing capital gains tax policy. Considering the diversity of approaches used in each study an average may not be apt for informing CGT policy. Furthermore, time series studies are highly sensitive to minor changes in specification and sample period.[52] The literature warns that because of this, revenue estimators must necessarily supplement any conflicting statistical from such studies with their own judgement as to how markets are likely to work.[53] Time series studies are

---

[47]   Alan Auerbach, 'Capital gains taxation and tax reform' (1989) 42(3) *National Tax Journal* 391, 392.
[48]   Eichner and Sinai, above n 15, 665.
[49]   Gravelle, above n 4, 147.
[50]   Eichner and Sinai, above n 15, 664.
[51]   Zodrow, above n 5, 452.
[52]   Ibid, 453.
[53]   Congress of the United States, Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues: The Historical Evidence,* 1988, 3.

also sensitive to the sample period and in some studies, where data for an additional year was included there was a significant change to the elasticity point estimate.[54]

Furthermore, because time series studies include a smaller number of observations than the studies using micro-data,[55] there is a high dependency on factors other than tax rates that are hypothesised to influence realisations of capital gains.[56] The small number of observations in time series studies limits the number of variables that can be included in the equation, which, in turn, leads to an incomplete representation of the dynamics of adjustment.[57] There is a view in the literature that, in many cases, where important variables are omitted from a time series study, the resulting tax rate variable will be too large and will thus overestimate the realisations response.[58]

Another problem the literature identifies is that of heterogeneity bias arising from the fact that aggregate taxpayer data will not allow for the marginal CGT rate to vary according to the situation of individual taxpayers.[59]

According to some of the literature, time series studies cannot be relied on to produce a definitive elasticity estimate since the elasticity can be large or small according to the estimating equation specification.[60] However, this view may apply whatever the data type used in a study. The United States JCT has previously stated that elasticity estimates derived from time series studies are the most appropriate for revenue estimating.[61] An alternate view is that because of the statistical uncertainty of time series estimates, it would be more prudent to use estimates from panel or cross-section studies in combination with those from time series studies.[62]

The first of the articles considered in this section is Auerbach (1988); after a brief commentary on the time series evidence available at the time, the article refers to the problem of how to model the effects of tax rates on realisations in order to permit a realistic characterisation of taxpayer behaviour.[63] It also refers to the nonstationary nature of both capital gains realisations and the variables used to explain realisations;[64] it follows that the estimating equation used must take into account the fact that these vary systematically with time. Auerbach finds that after correcting time series equations for nonstationarity and correctly accounting for expectations of changes in tax rate, there is, essentially, no measurable response of capital gains realisations to changes in CGT rates.[65]

---

[54] See for example Auerbach, above n 37.
[55] Usually individual tax returns.
[56] Congress of the United States, above n 53.
[57] Gravelle, above n 46, 214.
[58] Ibid.
[59] Auerbach, above n 37, 613.
[60] Jonathan Jones, 'An Analysis of Aggregate Time Series Capital Gains Equations' (1989) OTA Paper 65, Office of Tax Analysis, Washington DC, 1.
[61] Joint Committee on Taxation (United States) *Explanation of Methodology Used to Estimate Proposals Affecting the Taxation of Income from Capital Gains* (1990).
[62] Jones, above n 60, 20.
[63] Auerbach, above n 37, 603.
[64] Ibid, 603–4.
[65] Ibid.

Auerbach also highlights the difficulty in ascertaining the theoretical importance of the lagged tax rate variable, which is a feature of the equation in several time series studies. In previous studies, the inclusion of a lagged tax rate variable has been justified according to its usefulness in determining to what extent the CGT rate responsiveness of capital gains is temporary rather than permanent.[66] A second reason for the inclusion of a lagged tax rate variable is as a proxy for the past realisation behaviour of taxpayers.[67] Auerbach notes that the theoretical importance of such a variable is difficult to ascertain, given that it does not play a clear role in the individual taxpayer's problem of the trade-off between the gains of portfolio adjustment and the tax costs of realisation.[68]

Auerbach finds that although tax considerations are a strong influence on taxpayers' decisions on when to realise capital gains, the timing effect is most noticeable, and there is a lack of convincing evidence of a strong permanent effect.[69]

Auerbach demonstrates that, in time series studies, the responsiveness of capital gains realisations to tax rates decreases when the specification incorporates expected tax rate changes.[70] More specifically, when controlling for tax rate changes, it is considered impossible to reject the hypothesis that the tax rate has no effect on realisations in the long run.[71] This implies that time series studies may not be robust to minor specification changes.[72]

Eichner and Sinai is a 2000 time series study that includes aggregate tax return data from 1986 to 1997. According to the authors, time series studies are the best way to estimate the long-run realisation elasticity, one reason being that panel data typically span a lesser number of years than time series, so the former are not as useful for separating out long-run and transitory elasticities.[73] They also note that, in the United States, time series studies guided the policy process over the decade preceding their article.[74] Eichner and Sinai refer to the sequence of previous tax changes as an influence on the level of accrued capital gains taxpayers can realise.[75] That is, where previous tax changes encouraged realisations of capital gains, the stock of capital gains remaining in later years is diminished and fewer asset portfolios are in need of rebalancing.[76] Eichner and Sinai find a long-run realisation elasticity of between -0.8 and -1.3, and note that this estimate is higher than many previous time series studies.[77] However, they also note that their estimate is sensitive to the inclusion of 1986, a year in which there was an extraordinarily high level of capital gains realisations due to the pre-announced increase to the CGT rate. Eichner and Sinai find that, by including a dummy variable for 1986 — effectively excluding that year from the regression — the elasticity point estimate is -

---

[66]   Ibid, 604–05.
[67]   Ibid, 608.
[68]   Ibid, 605.
[69]   Ibid, 597.
[70]   Ibid, 632.
[71]   Ibid, 632–3.
[72]   Ibid, 633.
[73]   Eichner and Sinai, above n 15, 665.
[74]   Ibid, 664.
[75]   Ibid.
[76]   Ibid, 674.
[77]   Ibid, 664.

0.45.[78] It may be that the latter model specification is preferred, especially considering that timing effects are known to have influenced the realisations that occurred in 1986 before TRA86 took effect in 1987.

The Eichner and Sinai study also examines the specific question of the revenue effects of the *Taxpayer Relief Act* of 1997 (TRA97), under which there was a reduction of the top CGT rate from 28 to 20 per cent and the 15 per cent rate to 10 per cent. The authors use a range of elasticity point estimates to examine revenue effects of the 1997 CGT rate reductions. The authors find that although there was an increase in realisations in 1997 compared with 1986, there was also a significant decrease in the average tax rate weighted by predicted 1986 realisations—from 23.4 per cent to 16.5 per cent.[79] Eichner and Sinai consider the offsetting effects of TRA97 leading to additional capital gains realisations and the decrease in revenue collected as a result of the CGT rate change and conclude that the net revenue loss for 1997 was $US2.8 billion per year, approximately 5 per cent of 1996 CGT revenue.[80] Eichner and Sinai note the unusual realisation dynamics of the years around TRA86 resulting from the pre-announcement of the higher CGT rates to take effect in 1987. Specifically, even though US$165.5 billion of capital gains realisations in 1985 was a record at that time, taxpayers realised US$317 billion of capital gains in 1986 in order to take advantage of the lower rate relative to the increased CGT rate to take effect in the following year.[81] According to the authors, there is evidence of some of these realisations in 1986 being a result of timing behaviour. A tax year with an atypically large timing response may interfere with the measurement of estimated long-run elasticity. That is, although the aggregate data imply that periods of low tax rates are associated with higher realisations, and periods of high tax rates are associated with lower realisations, the true situation may be a re-shuffling of the timing of capital gains realisations with no effect on the aggregate amount realised over the years concerned.[82]

Eichner and Sinai refer specifically to the issue of 'path dependence', which describes the dampening effect of previous CGT rate reductions on the future unlocking effects in subsequent years of additional rate reductions. It follows that a failure to consider path dependence in an elasticity equation for a period during which there are several CGT rate cuts means there will be an overstatement of the elasticity point estimate for the later years of the study. By way of example, Eichner and Sinai explain that a CGT rate reduction in the United States shortly after TRA86 may not generate the same realisation response as a comparable rate reduction in 1997, given the relative amounts of capital gains that taxpayers realised in the years preceding 1986 and 1997 respectively.[83]

Eichner and Sinai identify another factor which in their view caused a lowering of the sensitivity of capital gains realisations to the CGT rate over the period of their study, namely, the increase in the share of household equity held in mutual funds.[84] They

---

[78] Ibid.
[79] Ibid, 676.
[80] Ibid.
[81] Ibid, 668.
[82] Ibid.
[83] Ibid, 665.
[84] Ibid, 664.

believe this is suggestive of mutual fund managers realising more gains than would individual taxpayers, which may lead to the conclusion that fund managers are not as tax efficient as individual investors.[85] However, other literature notes that mutual stock funds have higher turnover rates because of their professional management and lower brokerage fees.[86] Eichner and Sinai explain that extending their sample causes the elasticity point estimate to fall, and that this is consistent with mutual funds comprising only a small proportion (5.8 per cent) of equities between 1954 and 1985 and a larger proportion (22.8 per cent) of equities after 1985.[87]

In their conclusion, Eichner and Sinai note the sensitivity of their results to the way 1986 is modelled, and they identify a need for future research using micro-data, rather than time series data, in a structural framework.[88]

The review of the literature has revealed that time series studies have been used in several capital gains realisation response studies in the United States and that there is a mass of elasticity point estimates between -0.5 and -0.9. One of the benefits of a time series study is that the required taxpayer data is more likely to be publicly available than a panel of individual tax returns. However, two of the main potential shortcomings of a time series study relate to the possibility for aggregation bias and the low number of observations. The number of observations, however, is not the only consideration, and the literature considers time series studies to be superior to cross-section studies. Aggregation bias in time series has serious implications for the results, given that the relationship between capital gains realisations and marginal tax rates is not linear, which in turn means that the aggregate response to CGT rate changes is not the sum of individual responses.[89]

IV PANEL DATA CAPITAL GAINS REALISATION RESPONSE STUDIES

Panel data studies, as defined in this article, use tax return data for a number of consecutive years. In these studies, the same taxpayers are tracked over the years of the study. The literature considers panel data studies as an improvement on cross-section studies insofar as they attempt to address the problem of reporting of a transitory effect[90] rather than the effect of when the CGT rate is lowered permanently.[91] According to the literature, however, some of the earlier panel data studies that attempted to separate permanent and transitory effects were not completely successful in achieving this, as the panels used were too short.[92] The remainder of this section reviews some of the panel data studies in the literature.

Auten and Clotfelter is a seven-year panel data study which used a random sample of individual taxpayers from 1967 to 1973. The study is notable as one the first to

---

[85]   Ibid.
[86]   Gravelle, above n 46, 215.
[87]   Eichner and Sinai, above n 15, 673.
[88]   Ibid, 678.
[89]   Auten, Burman and Randolph, above n 12, 356–7.
[90]   Specific to the individual taxpayer's income being relatively lower in a particular year.
[91]   Gravelle, above n 46, 213.
[92]   Ibid.

separately measure the permanent and temporary responses to changes in the tax rate. It found a permanent elasticity of between -0.37 and -0.55.[93]

Auten and Clotfelter distinguish between transitory and permanent tax effects using their panel data set,[94] noting that it is important to include both permanent and transitory components of income as explanatory variables in their equation, as movements in transitory income can cause movements in marginal tax rates.[95] The Auten and Clotfelter study uses capital gains from all sources as its dependent variable, part of the rationale being that the data set did not contain information on the type of capital gains asset.[96] The explanatory variables in the study are permanent and transitory income, current capital income, age, retirement, marital status and the carryover of long-term capital losses.[97] The panel of tax returns used in the study included information on the exact age of taxpayers.

As part of their study, Auten and Clotfelter examined the extent to which marginal tax rates varied over time, given the importance of transitory effects and the timing of realisations by taxpayers when their tax rate is temporarily low. Auten and Clotfelter use a basic income measure as a value in their study, a predicted Adjusted Gross Income (AGI), intended to be independent of the capital gains for an individual taxpayer.[98] The predicted Adjusted Gross Income is AGI minus capital gains plus the average capital gains of the taxpayer's income class. Auten and Clotfelter use the predicted AGI to calculate a measure of permanent income: the logarithm of the average value of the predicted AGI for the current and previous two years.[99] The Auten and Clotfelter study includes dummy variables for individual years for exogenous factors affecting capital gains realisations such as the change in share prices.[100]

The Auten and Clotfelter study calculates the individual taxpayer's marginal tax rate as the total of their 'normal' marginal rate and a transitory component. The normal marginal rate is a simple three-year average of the individual's tax rate and the transitory component is the difference between the taxpayer's tax rate in the year of income and their normal tax rate.[101]

Auten and Clotfelter find that the elasticity for all asset types is not as large as the elasticity for company shares, as estimated in previous studies such as Feldstein et al.[102] Auten and Clotfelter use several additional equations in order to estimate the variation in responsiveness to marginal tax rates for different taxpayer groups. One of their findings here was that the transitory and permanent tax rate effects were larger for taxpayers under 65 than for the total sample.[103] The sample was also divided into two

---

[93]   Gerald Auten and Charles Clotfelter, 'Permanent versus Transitory Tax Effects and the Realization of Capital Gains' (1982) 97(4) *Quarterly Journal of Economics* 613, 614.
[94]   Ibid.
[95]   Ibid, 620.
[96]   Ibid.
[97]   Ibid.
[98]   Ibid.
[99]   Ibid.
[100] Ibid.
[101] Auten and Clotfelter, above n 93, 620.
[102] Ibid, 628.
[103] Ibid.

classes of taxpayer income — taxpayers with income[104] of less than US$25,000 and those with income of more than US$25,000. Here, the transitory tax rate effect was slightly higher for the high-income group, whereas the permanent tax rate effect was only significant for the low-income group.[105] The authors consider this result somewhat unexpected and they explain that it may reflect that few high-income taxpayers are included in their panel, which may in turn make the results for these taxpayers less reliable and more sensitive to extreme values.[106]

In their conclusions, Auten and Clotfelter identify some of the difficulties in undertaking empirical research on tax-induced behaviour. First, there is the problem of attempting to calculate a correct marginal tax rate. In the US context, such a calculation requires assumptions about the order in which taxpayers realise their short-term and long-term gains as well as their use of loss carryovers.[107] Auten and Clotfelter note that taxpayers may not be able to estimate the tax consequences of a particular transaction, given the complexity of the capital gains tax law.[108] This point may have implications for this type of research generally, to the extent that it is correct.

Auten and Clotfelter found that capital gains taxes cause a significant effect on the timing of realisations as reflected by the transitory effect that they estimated; they also concluded that it is likely there is a permanent lock-in effect of capital gains taxes, but that the coefficient is not always significant.[109] They conclude that the absolute level of realisations increases with permanent income, but that the increase is not proportionate.[110] They estimate short-run elasticities for a range of specifications as well as a long-run elasticity of -0.5.

One of the limitations of the Auten and Clotfelter study is that because it uses a three-year average of federal tax rates, there is a correlation with the transitory component of the tax rate, meaning that the permanent and transitory rates cannot be separately estimated, since the three-year average constitutes a combination of the two.[111] According to Auten and Clotfelter it is important to determine how much marginal tax rates vary over time given the importance of transitory effects.[112] Auten and Clotfelter find, in conclusion, that although CGT rate reductions may produce increases in realisations of long-term capital gains, their study does not provide strong support for the hypothesis that such rate reductions lead to increased revenue for the Treasury.[113]

Auten, Burman and Randolph (1989) is a five-year panel data study. These authors refer to a number of advantages of panel data over cross-section data. One is that panel data allows the dynamics of the individual response to CGT rate changes to be estimated due

---

[104]   Adjusted gross income less capital gains.
[105]   Auten and Clotfelter, above n 93, 629.
[106]   Ibid.
[107]   Ibid.
[108]   Ibid.
[109]   Ibid, 627.
[110]   Ibid, 621.
[111]   Leonard Burman and William Randolph, 'Measuring Permanent Responses to Capital-Gains Tax Changes in Panel Data' (1994) 84 *American Economic Review*, 794, 800.
[112]   Auten and Clotfelter, above n 93, 619.
[113]   Ibid, 630.

to the availability of lagged data.[114] Another is that panel data provides information about permanent income of taxpayers and allows for corrections for individual-specific fixed effects.[115]

Auten et al consider taxpayer wealth to be an important component of a model that measures elasticity and they note that such information is not available from tax returns. The authors used the results of the '1981–82 US Treasury Estate-Income Tax Match Study' to impute the total wealth of the taxpayers in their sample since there was no direct information on taxpayer wealth available in the tax return data they used.[116] Auten et al include a number of demographic variables in their equation in an attempt to control for variances in trading strategies as a result of taxpayer preferences. For wealthier taxpayers there is a decision of whether or not to realise capital gains — which is distinct from the decision on the amount of capital gains to realise — and the failure to model this distinction may have led to biased estimation results in some previous micro-data studies.[117]

Auten et al note that previous studies that used a fixed marginal tax rate may have overstated the response of taxpayers to changes in CGT rates. Further, they note that focusing on individual capital gains realisation behaviour may ignore some important determinants of the aggregate revenue effects of CGT rate changes.[118]

Part of the purpose of the Auten et al study was to gain an understanding of why capital gains realisations equations from previous studies have yielded a wide range of varying results as well as the relevance of panel data to answering this question.[119] The results of the Auten et al study suggest that one of the main reasons for the past variance in elasticities could be the simultaneity between marginal tax rates and capital gains realisations and the failure of previous studies to correctly deal with bias in sample selection.[120] Auten et al use a simulation method to examine the effect of changes in the individual income tax on aggregate capital gains and tax revenue.[121] Jonathan Jones confirmed the problem of simultaneity between realisations and tax rates in a 1989 study.[122]

Auten et al identify that using a lagged tax rate detected a short-term capital gains realisation response that was significantly greater than the long-run response.[123] They argue that data from a long panel are essential to separate the components of capital gains realisation responses that are due to tax policy from those due to individual-specific factors.[124] They also note that the five-year panel in their study is probably not

---

114   Auten, Burman and Randolph, above n 12.
115   Ibid.
116   Ibid.
117   Ibid.
118   Ibid.
119   Ibid.
120   Ibid.
121   Ibid.
122   Jones, above n 60.
123   Auten, Burman and Randolph, above n 12.
124   Ibid.

long enough, and that one of the problems this poses is that it cannot identify the differential between capital gains tax rates and other income.[125]

Auten et al also identify deficiencies associated with panel data per se that a longer panel would not remedy, for example that focusing on individual capital gains realisation behaviour may ignore some important determinants of the aggregate revenue effects of capital gains tax changes.[126] This is notwithstanding another point they make, that panel data has the advantage of a lack of aggregation bias.

In their discussion of the estimation results, Auten et al note that older taxpayers are more likely to realise capital gains than younger taxpayers, but that older taxpayers realise lower levels of capital gains.[127] They also note that taxpayers with higher permanent income are more likely to realise higher amounts of capital gains.[128] As part of their study, Auten et al use a simulation model they developed to examine the effects of changing the inclusion rate on long-term capital gains. They found that where there was a small change in the inclusion rate, long-run elasticity was -1.63 and short-run elasticity was -1.98.[129] In the case of increasing the inclusion rate to 60 per cent, long-run elasticity was -1.67.[130]

Auten et al call for more research to be undertaken on the effects of CGT policies on growth and rates of return in financial markets; they note that predictions about CGT revenue consequences CGT are tenuous in the absence of an understanding of the effects of CGT on Gross National Product, interest rates, dividend payouts and asset values.[131]

Slemrod and Shobe (1990) is a six-year panel data study. In their discussion of heterogeneity bias, the authors note that capital gains realisations behaviour is influenced by factors that are not observable by the econometrician and that unobservable explanatory variables can lead to inconsistent estimates of parameters.[132] Notwithstanding this, Slemrod and Shobe assert that where the unobserved influences are specific to the individual taxpayer, it may be possible to minimise or avoid heterogeneity bias in panel data studies.[133] They attempt to achieve this by using a fixed-effects model to control for differences in permanent tax rates and other unobservable fixed effects that may have an effect on parameter estimates.[134]

The panel used in Slemrod and Shobe was non-stratified and randomly selected. The number of individual taxpayers present in all six years of the initial sample was 6,152. The authors, however, limit their study to a 5 per cent subsample of tax returns consisting of 307 taxpayers. They selected the 5 per cent subsample based on their having the highest values of real positive income, excluding capital gains, when averaged

---

[125] Ibid.
[126] Ibid.
[127] Ibid.
[128] Ibid, 363.
[129] Ibid, 366.
[130] Ibid.
[131] Ibid, 371.
[132] Slemrod and Shobe, above n 27.
[133] Ibid.
[134] Burman and Randolph, above n 111, 800.

over the six-year study period.[135] The 5 per cent subsample in the study realised 52 per cent of total net capital gains.[136] The authors explain two considerations that motivated their focusing on the highest income taxpayers in the sample. First, most capital gains are realised by higher-income taxpayers, with most lower-income taxpayers realising no capital gains.[137] Secondly, focusing on the top 5 per cent of taxpayers avoids a potentially serious econometric problem whereby a regression equation is estimated for which a large proportion of the observations on the dependant variable are zero.[138] Using the top 5 per cent allows for the linearity of the model and the normality assumption to be maintained with a minimal effect on the results.[139]

Slemrod and Shobe analyse the panel data using a slightly modified version of the model estimated in Feldstein et al (1980). The dependent variable in the study is the long-term gains or losses divided by the sum of dividends and interest receipts.[140] Although it is a panel data study, they do not attempt to separately identify the transitory and permanent responses. The study uses ordinary least squares as the method of estimation for all four of their specifications.[141]

Slemrod and Shobe conclude that there is consistent support for an inverse response of capital gains realisations to changes in their rate of taxation.[142] Although the elasticity estimates in Slemrod and Shobe are high, greater than 1 and greater than 5 in some cases, the authors qualify their findings by reference to a standard error quantum whereby even in the case of an elasticity that is in excess of 1, the coefficient may not be statistically different from zero.[143] Commentary on the study refers to possible limitations including that it appears to have captured transitory effects, as well as its use of the Feldstein et al (1980) methodology.[144] Slemrod and Shobe themselves refer to some limitations, such as the fact that their study is restricted to higher-income taxpayers and that elasticity studies generally are very sensitive to many dimensions of specifications.[145] They acknowledge that their results may capture some transitory effects.

Burman and Randolph (1994) is a panel data study in which the equation models the long-run relationship between capital gains realisations and rates as well as two transitory or timing effects. One of these transitory effects considers the tax cost of realising a capital gain in the current year, compared with waiting to do so in a later year. The second transitory effect relates to the influence of prior-year CGT rates on realisations. The rationale for the inclusion of this effect appears to be that past CGT rates can be an influence the stock of unrealised capital gains.

---

[135]   Slemrod and Shobe, above n 27, 13.
[136]   Ibid.
[137]   Ibid.
[138]   Ibid.
[139]   Ibid.
[140]   Ibid, 16.
[141]   The four specifications are full sample and high income only for 1981–84 and full sample and high income only for 1979–84.
[142]   Slemrod and Shobe, above n 27, 24.
[143]   Ibid.
[144]   Gravelle, above n 4, 14.
[145]   Slemrod and Shobe, above n 27, 24.

Burman and Randolph separated the transitory and permanent responses by using the variation in state tax rates to estimate the permanent elasticity; they considered state tax rates to be an easily measurable exogenous source of variation.[146] The study found a very large transitory elasticity of 6.42 and a very small permanent elasticity of 0.18.[147] Although the transitory elasticity is a large in comparison with most estimates of other studies at that time, it is consistent with the volume of the increase in realisations that occurred as a result of the *Tax Reform Act 1986*.[148] Burman and Randolph note that given the relatively large standard error, the hypothesis that permanent changes in CGT rates have no long-term effect on capital gains realisations cannot be rejected.[149]

The data used in the Burman and Randolph study was taken from a panel of approximately 11,000 individual income tax returns for the years 1979–83.[150] Generally, a panel study of five years is considered to be short. The sample of taxpayers was stratified according to income and although unweighted data was used in the study, testing was conducted to ascertain whether endogenous stratification biased the estimates.[151]

Burman and Randolph's elasticity point estimates imply that the permanent elasticity is significantly less than the transitory response.[152] Burman and Randolph use a lagged tax rate as a proxy for the unobservable size of accrued gains; they note, by way of example, that if the previous year's CGT rate was unusually high, then accrued gains in the current year should be higher than usual, given that the taxpayer would have postponed a proportion of realisations.[153] The sample includes the year 1981, in which the Economic Recovery Tax Act reduced the tax rates on ordinary income and capital gains.[154] The authors identify an advantage and disadvantage of including this year. The advantage is that significant variation in tax rates is introduced into the study, while the disadvantage is that some of the response to the CGT rate reduction may have been transitory.[155]

Observations on individual taxpayers were included in the study whenever the current and lagged data were considered valid, and this process yielded 42,406 included observations.[156] The dependent variable in the study was net long-term capital gains before the carryover of prior-year losses.[157] The tax rate measure used in the study was determined with reference to the taxpayer's income and deductions and the applicable tax law for the year concerned.[158] Burman and Randolph calculated the marginal tax rate on capital gains transactions using defined realisation transactions rather than a single dollar of capital gains. The capital gain on each defined transaction was the maximum of

---

146 Burman and Randolph, above n 111, 795.
147 Ibid, 805.
148 Ibid.
149 Ibid.
150 Ibid, 801.
151 Ibid.
152 Ibid, 795.
153 Ibid, 797.
154 Ibid.
155 Ibid.
156 Ibid, 801.
157 Ibid.
158 Ibid.

US$1,000 or the square root of imputed wealth.[159] The authors imputed permanent income by using the panel sample to regress the logarithm of a five-year average of real positive income on taxpayer characteristics.[160]

Burman and Randolph note that previous micro-data studies lacked appropriate instruments for the permanent tax rate and that the estimates of tax effects in those studies could only be considered consistent if transitory and permanent responses were the same.[161] Burman and Randolph find that capital gains realisations are significantly positively related to permanent income, but negatively related to transitory income, which suggests a consumption motive for realisations.[162] They also conclude that wealthier taxpayers are much more likely to realise capital gains and that this demographic realises larger capital gains than average.[163] The study found that the composition of capital gains assets was also an influence on whether taxpayers were more likely to realise gains; that is, where shares comprised a larger share of the overall asset portfolio, the taxpayer was more likely to realise capital gains.[164] Burman and Randolph estimated an elasticity of 0.18 at an 18 per cent CGT rate.

Burman and Randolph concluded that there is a large and statistically significant difference between the transitory and permanent responses to CGT rate changes.[165] They used a first-dollar tax rate to estimate the transitory effect and they conclude that the lagged tax rate coefficient in their study is insignificantly small and that this implies that lagged taxed rates do not affect capital gains realisation decisions, provided current and permanent tax rates are held constant.[166]

Burman and Randolph identified a number of limitations of their study. First, the effects of CGT on the cost and allocation of capital are ignored.[167] Secondly a reduced form model is used, as per other elasticity studies and this has the limitation of the estimated parameters being subject to change over time since they are a function of the macroeconomic environment and the tax law.[168] Secondary commentary on Burman and Randolph suggests imprecision caused by using the same set of explanatory variables in modelling the decision to realise capital gains as well as the amount of capital gains to be realised.[169]

Auerbach and Siegel (2000) is a panel data study that uses the same empirical model as Burman and Randolph (1994), applying it to a different panel of taxpayers over the years 1985 to 1994 (a different period). For their main equation, Auerbach and Siegel

---

[159]   Ibid, 802.
[160]   Ibid.
[161]   Ibid, 798.
[162]   Ibid, 806.
[163]   Ibid.
[164]   Ibid.
[165]   Ibid.
[166]   Ibid, 803.
[167]   Ibid.
[168]   Ibid.
[169]   Tim Dowd, Robert McClelland and Athiphat Muthitacharoen, 'Heterogeneity in the Tax Responses of Personal Capital Gains Realizations' (2012) 65(4) *National Tax Journal* 827,833.

find a long-run elasticity of 0.34 and a transitory elasticity of 4.91;[170] however their study does not report the marginal tax rate used in determining the elasticities. They refer to the improved precision of their elasticity estimate compared to some earlier studies (such as Burman and Randolph) due to the large sample size and the improved spread of state tax rates over the sample period.[171] The authors note that they are able to reject an elasticity of zero with a high confidence level, but that they can also exclude much above 0.5.[172]

Auerbach and Siegel also run an alternative specification under which the elasticity point estimate increases from 0.34 to 1.75. This may be considered a high elasticity point estimate and its magnitude is similar to some of the panel and cross-section studies of the 1980s. The higher elasticity estimate may have been caused in part by the inclusion of a current first-dollar tax rate, which is likely to add a transitory element to the measurement of the permanent tax rate.[173]

One of the most recent studies on the capital gains realisation response using panel data is a 2012 article by Dowd, McClelland and Muthitacharoen.[174] The authors explain their methodology, which improves the identification of elasticities by including a variable that affects the decision to realise capital gains, but not necessarily the amount of capital gains realised.[175] Dowd et al uses the term 'persistent elasticity', rather than permanent elasticity referred to in several previous studies, persistent elasticity is described as a measure of a tax rate increase that has persisted over the previous year and is expected to persist in the next year.[176] Dowd et al note that any attempt to decompose elasticities into those attributable to permanent changes in tax rates and those attributable to transitory changes in tax rates presupposes the existence of a permanent tax rate.[177] Dowd et al find a 'persistent' elasticity of 0.792.[178]

The panel data studies have a compelling advantage over times series in that they include significantly more observations. If the panel includes information on asset types, it will also allow the researcher to identify differences in the behavioural responses between different types of investors and for realisations of different types of assets.[179] One of the weaknesses of panel data studies is the attrition of the population, with taxpayers in the panel who exit not replaced. Reasons for this attrition include the death of some members, the fact that some are no longer required to lodge tax returns due to incomes falling below the tax-free threshold, and because some tax returns may be lost

---

[170]   Alan Auerbach and Jonathan Siegel, 'Capital-Gains Realizations of the Rich and Sophisticated' (2000) 90(2) *American Economic Review* 276, 279.
[171]   Ibid.
[172]   Ibid.
[173]   Gravelle, above n 4, 16.
[174]   Tim Dowd, Robert McClelland and Athiphat Muthitacharoen, 'New Evidence on the Tax Elasticity of Capital Gains' (2012), CBO Working paper 2012-09.
[175]   Ibid, 4.
[176]   Ibid.
[177]   Dowd, McClelland and Muthitacharoen, above n 169, 834.
[178]   Dowd, McClelland and Muthitacharoen, above n 174, 24.
[179]   Auerbach, above n 18, 613.

due to processing errors.[180] Furthermore, the aging of a panel population is a contributor to the problem of nonstationarity.[181]

V Conclusions and Implications for Future Australian Research

Although capital gains realisation response studies from the United States have produced elasticity point estimates that vary widely, the literature identifies a core of time series studies with elasticity point estimates between 0.5 and 0.9 in absolute value. Some of the literature considers time series studies to be less variable overall and therefore more reliable. However, some of the consistency in the results of time series studies could relate, in part, to the fact that there is more similarity in the taxpayer data for time series.[182]

According to some of the literature, time series studies are the best method of estimating long-run elasticity, despite the known problem of aggregation bias.[183] The Congressional Budget Office (CBO) considered the specific issue of aggregation bias in a 1988 study, which included separate estimates for the top one per cent and bottom 99 per cent of the population; the CBO found the effect of aggregation to be statistically insignificant.[184] Although aggregation bias is not a characteristic of studies that use micro-data, these types of studies have their own shortcomings, and this is particularly the case with cross-section studies. That is, where the data used does not allow the identification of, separate, timing effects they may result in an overstated elasticity estimate.

It appears that, irrespective of that data type chosen, the elasticity point estimate is sensitive to the specification of the estimating equation. Some of the capital gains realisation response studies reviewed included a sensitivity analysis as a way of testing the robustness of the results. The literature also notes the problem of choosing an appropriate tax rate to use in time series studies. The choice can be seen as something of a compromise given that, although a single tax rate must be decided on for the purpose of these studies, in practice, realisations decisions are made by many personal taxpayers who collectively face a wide range of tax rates on their capital gains realisations. Furthermore, the literature explains that elasticity will not necessarily be constant at all marginal tax rates or for all capital gains asset types.

While the review of the literature has confirmed there is no possible justification for the use of cross-sectional data, there are several arguments for and against the use of time series and panel data.

---

[180]   Alan Auerbach, Leonard Burman and Jonathan Siegel, 'Capital Gains Taxation and Tax Avoidance: New Evidence from Panel Data' in Joel Slemrod (ed), *Does Atlas Shrug* (Harvard University Press, 2000) 355, 359.

[181]   Ibid.

[182]   That is, differences in taxpayer data are more likely to arise from the years chosen for the time series study. In theory, two studies spanning the same years would have little or no difference in the taxpayer data.

[183]   Eichner and Sinai, above n 15, 665.

[184]   Gravelle, above n 46, 214.

The literature refers to the consistency of the time series estimates and the fact that many of these studies report elasticities that are lower than 1 in absolute value. The consistency of the estimates and their tendency to be relatively low in some cases may be appealing to revenue estimators. However, panel data appears to be a superior data choice for decomposing the permanent and transitory responses. This is because the problem of the loss of important information about timing responses through aggregated time series data appears to be quite difficult to overcome.

The case for using panel data in an Australian elasticity study, while compelling, must also consider the main practical impediment, being the non-availability of a suitable taxpayer panel data set.[185] A possible means of overcoming this issue is to stratify the aggregate time series data by taxpayer income classes.[186] Although this would not represent a panel of individual tax returns, each income class could count as a separate observation in each year. Although this method is not commonly used in regression analysis on capital gains realisations, part of the justification — apart from its increasing the number of observations — is that the elasticity of capital gains realisations is not necessarily constant at all levels of taxable income. The literature notes that generally, there would be a higher elasticity at higher tax rates.[187]

In conclusion, panel data appears to be the most appropriate data type for separating permanent and transitory effects. In the absence of suitable panel data, the publicly available time series data can be utilised by researchers concerned with capital gains realisation response in the Australian context. The results of such a study would be useful for informing CGT policy in Australia.

---

[185]   Specifically, there is currently no panel data set of taxpayer returns available to researchers spanning years before and after the introduction of the 50 per cent CGT discount for personal taxpayers. Pooled data is available for several years after the CGT discount, but this may not be as useful as a long panel for separating the permanent and transitory responses to the introduction of the CGT discount.

[186]   For example, the dataset could be stratified according to the marginal tax rate brackets for individuals. An issue that may confound the treatment of each income class as an observation is the fact that, over time, there have been several changes to the marginal tax rates and the thresholds at which these rates commence.

[187]   Ibid.