Liquidity in Retirement Savings Systems: An International Comparison

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Abstract: What is the socially optimal level of liquidity in a retirement savings system? Liquid retirement savings are desirable because liquidity enables agents to flexibly respond to pre-retirement events that raise the marginal utility of consumption. On the other hand, pre-retirement liquidity is undesirable when it leads to under-saving arising from, for example, planning mistakes or self-control problems. This paper compares the liquidity that six developed economies have built into their employer-based defined contribution (DC) retirement savings systems. We find that all of them, with the sole exception of the United States, have made their DC systems overwhelmingly *illiquid* before age 55.

We thank Susanne Schwarz for helpful research assistance. We are grateful for suggestions from Sumit Agarwal, Julie Agnew, Keith Ambachtsheer, Bob Baldwin, James Banks, Hazel Bateman, Richard Blundell, Christopher Carroll, Jeremy Duffield, Alexandre Laurin, Raimond Maurer, Olivia Mitchell, Jessica Pan, John Piggott, Mark Rozanic, and Wenlan Qian. This research was supported by the Pershing Square Fund for Research on the Foundations of Human Behavior and NIA grant awards R01AG021650, P01AG005842, and P30AG034532. The content is the sole responsibility of the authors and does not represent the official views of NIA, NIH, or the NBER. The authors have been compensated to present academic research at events hosted by financial institutions that administer retirement savings plans. See the authors' websites for a list of outside activities.

What is the socially optimal level of liquidity in a retirement savings system? Liquid retirement savings are desirable because liquidity enables agents to flexibly respond to pre-retirement events that raise the marginal utility of consumption, like medical emergencies or income shocks.[1] On the other hand, pre-retirement liquidity is undesirable when it leads to under-saving arising from, for example, planning mistakes or self-control problems.[2]

This paper compares the liquidity that six developed economies have built into their employer-based defined contribution (DC) retirement savings systems. We find that all of them, with the sole exception of the United States, have made their DC systems overwhelmingly *illiquid* before age 55.

In the United States, employer-sponsored DC account balances can be moved to an Individual Retirement Account (i.e., a "rollover" IRA) once the individual no longer works for the employer, which provides considerable scope for liquidation before the withdrawal-eligibility age of 59½. Pre-eligibility IRA withdrawals may be made for any reason by paying a 10 percent tax penalty, and certain classes of pre-eligibility IRA withdrawals are exempt from this penalty.[3]

Liquidity generates significant pre-retirement "leakage" in the United States: for every $1 contributed to the DC accounts of savers under age 55 (not counting rollovers), $0.40 simultaneously flows out of the DC system (not counting loans or rollovers).[4] This amount of leakage may or may not be socially optimal, an issue that is beyond the scope of the current paper.[5]

I. Analytic Framework

We focus on the five highest-GDP developed countries that have English as an official language: the United States, the United Kingdom, Canada, Australia, and Singapore.[6] We also

[1] For example, see Carroll (1992, 1997).

[2] See Laibson (1997); Gul and Pesendorfer (2001); and Fudenberg and Levine (2006).

[3] For example, no penalty is charged on withdrawals made for (i) permanent and total disability; (ii) unreimbursed medical expenses exceeding 10% of adjusted gross income; (iii) buying, building, or rebuilding a home if the withdrawal does not exceed $10,000 and the account holder has not owned a home in the past two years; (iv) higher education costs; (v) tax payments resulting from an IRS levy; (vi) health insurance premiums if unemployed for more than 12 weeks; (vii) a series of substantially equal periodic payments made over one's life expectancy; (viii) distributions to an alternate payee under a qualified domestic relation order; or (ix) recovery from designated natural disasters.

[4] See Argento, Bryant, and Sabelhaus (2015).

[5] However, see Laibson, Repetto, and Tobacman (1998); Amador, Werning, and Angeletos (2006); and Beshears et al. (2015).

[6] South Africa is coded as economically developing and is omitted.

analyze Germany, the largest developed economy with a substantial pool of DC savings that does not have English as an official language.[7]

We analyze employer-based DC plans instead of defined benefit (DB) plans for three reasons. First, DC plans are gaining assets relative to DB plans in almost all countries around the world, including the six that we study. Second, DC plans already have more than half of retirement wealth in three of the countries that we study: Australia, Singapore, and the United States.[8] Third, in most circumstances, DC assets are at least as liquid as DB assets, so DC assets are the relevant margin for a household considering liquidating retirement wealth to augment pre-retirement consumption.

There are many ways to measure liquidity, including the actual quantity of liquidations or the marginal price of liquidations. We use the marginal price because statistics on actual liquidations are difficult to obtain. Even if such statistics were readily available, it is unclear how they should be compared across countries. For example, should liquidations be normalized by DC balances, retirement assets, total assets, or GDP? Also, from an economic perspective, the most natural object to study is the marginal price because it summarizes the incentives that consumers face.

Accordingly, we compute the *marginal rate of transformation* (*MRT*) between withdrawal-funded consumption at ages when the household is "*pre*-eligible" for withdrawals and withdrawal-funded consumption at ages when the household is "eligible" to make withdrawals (in all countries that we study, eligibility begins no earlier than 55 and no later than 63):[9,10,11]

[7] Since 2002, DC arrangements have been permitted in three of the five types of occupational schemes in Germany. German savers had also set up over 14 million Riester plans as of 2011 (Börsch-Supan, Coppola, and Reil-Held 2012). DC saving in Japan is still in its infancy.

[8] In 2013, the Social Security trust fund contained $2.8 trillion, and other retirement plan assets totaled $23.0 trillion, summing to $25.8 trillion. DC plans (including the federal government's Thrift Savings Plan and state and local DC plans) had assets of approximately $13.2 trillion, more than half of the $25.8 trillion total. (Sources: Social Security Trust Fund, Investment Company Institute, Thrift Savings Plan, and authors' calculations.)

[9] Singaporeans turning 55 after 2012 may only withdraw S$5,000 of their Central Provident Fund (CPF) balances plus amounts exceeding the Minimum Sum and Medisave Minimum Sum between age 55 and the drawdown age (currently 64). The remainder is paid out as an annuity beginning at the drawdown age.

[10] In Germany, access to vested occupational pension benefits is typically linked to eligibility for state-provided pension benefits. Benefits can only commence when the member provides a pension approval certificate (i.e., proof that she receives state-provided pension benefits). The early state retirement age for the long-term insured is currently 63.

[11] We do not model provisions allowing for early access to small balances upon job separation. For example, employers in Canada (Ontario) may allow (or require) separated employees to withdraw balances of less than 20% of the Year's Maximum Pensionable Earnings (YMPE) (as defined under the Canada Pension Plan) applicable to their

(1) $$MRT = \frac{1-\tau(pre,\ y)}{[1-\tau(eligible,\ Y)]\times R^n}.$$

In this equation, $\tau(pre, y)$ is the marginal tax rate (accounting for penalties and phase-outs of means-tested benefits) on a $1 withdrawal from the DC plan when (i) the household is young enough to be at a pre-eligible withdrawal age *and* (ii) the household's employment income, y, in the withdrawal year is less than or equal to the household's permanent income, Y. Likewise, $\tau(eligible, Y)$ is the marginal tax rate on a $1 withdrawal from the DC plan when (i) the household is old enough to be eligible to make withdrawals *and* (ii) household earnings in the withdrawal year equal permanent income, Y. Because we are studying a situation in which the household may have a liquidity need at a pre-eligible age, we calculate how the *MRT* varies as we change y. We assume permanent income is Y = US$60,000, which is approximately the median household income in each of the six countries. For simplicity, we set the gross real interest rate, R, to one (i.e., we set the net real interest rate to zero). Cross-country comparisons are not affected by this interest rate assumption.

We need to make additional demographic assumptions to pin down the household's marginal tax rate. We assume the household is a one-earner married couple with no dependents that rents housing, takes the standard income tax deduction and is not disabled. In the pre-eligible withdrawal state, the earner is any age strictly under 55; in the eligible withdrawal state, the earner is at least 65 years old.

In some situations, withdrawals are completely prohibited in the pre-eligible state. We treat such a ban as a 100 percent marginal tax rate—i.e., $\tau(pre, y) = 1$. High values of the *MRT* are associated with high levels of liquidity (early withdrawals are potentially encouraged), and low values of the *MRT* are associated with low levels of liquidity (early withdrawals are discouraged or completely banned).

II. DC Liquidity Across Six Countries

We are now ready to describe the *MRT* as a function of labor income during the pre-eligible withdrawal year, y, country by country. More detailed analysis and a description of our methodology are provided in the Web Appendix.

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termination year. Employers in Germany may enforce the liquidation of balances below a restrictive minimum threshold if the separating employee does not transfer her pension rights to a new employer. Superannuation fund members in Australia may access balances of less than AU$200 from previous employers.

A. Germany, Singapore, and the United Kingdom

In Germany, Singapore, and the United Kingdom, early withdrawals are banned: *MRT* = 0 for all *y*.[12] Only disabled[13] or terminally ill individuals may receive payments (an allowance that exists in all six countries). Singapore carves out some additional exceptions: a portion of DC balances may be used for medical expenses, a home purchase (which must be repaid with interest if the home is sold), and education (which must be repaid with interest in 12 years).[14]

B. Canada and Australia

In Canada[15] and Australia, the *MRT* = 0 under normal circumstances,[16] but DC balances become liquid in the event of adverse transitory labor income shocks.

Canada (Ontario) — Employer-based DC plan balances cannot be accessed before the eligibility age unless a household's expected income in the 12-month period following the application for withdrawal falls below US$32,428.[17] Therefore, *MRT* = 0 at our hypothetical household's normal level of income: US$60,000. Once income in the pre-eligible withdrawal year falls below

[12] We do not consider the Supplementary Retirement Scheme in Singapore, a voluntary DC plan designed to complement the CPF. More details can be found in the Web Appendix.

[13] In Germany, *if* the occupational pension plan covers disability, any payments during disability will be contingent on providing an official pension approval certificate from the social insurance system. If the employee is temporarily disabled, the payment of state-provided pension benefits will be discontinued and the employee will lose the pension approval certificate once s/he returns to work.

[14] See Agarwal, Pan, and Qian (2014) for a discussion of spending that occurs in Singapore once participants can access part of their balance at age 55.

[15] Our analysis for Canada considers Registered Pension Plans, which require employer contributions and are subject to both federal tax jurisdiction and federal or provincial pension legislation. Group Registered Retirement Savings Plans, on the other hand, do not require employer contributions and are not subject to pension legislation. Legally, these plans may allow for withdrawals at any age, but sponsoring employers can and typically do place restrictions on early access, at least until separation from employment. A more detailed analysis of these plans can be found in the Web Appendix.

[16] There are some additional withdrawal provisions in these two countries, which are limited to a specific need (such as outstanding medical expenses, mortgage payments, etc.) or group (such as temporary residents permanently leaving Australia) and are explained in the Web Appendix.

[17] We assume that the pre-eligible household accesses DC funds transferred to a "locked-in retirement account." Withdrawals may be made from a locked-in account under the "low expected income" financial hardship provision if total expected income in the 12-month period following the application for withdrawal falls far enough below two-thirds of the YMPE to permit a withdrawal of at least C$500. The maximum eligible withdrawal amount is (50 percent × YMPE) – (75 percent × Expected Income During the Next 12 Months). Therefore, withdrawals of at least C$500 may be made when expected income falls to C$33,400, or about US$32,427 using the 2013 annual exchange rate: (50 percent × C$51,100) – (75 percent × C$33,400) = C$500. Due to the C$500 minimum withdrawal requirement, we calculate the *MRT* in this case based on the effective marginal tax rate on the last dollar of a C$501 pension withdrawal.

US$32,428, the *MRT* jumps from 0 to 1.11. The *MRT* increases with further declines in income, *y*, because the marginal tax rate in the pre-eligible year falls while the marginal tax rate in the eligible year is held fixed. Means-tested benefit programs generate (local) nonmonotonicities in the marginal tax rate that feed through to the *MRT*. As income approaches zero, the *MRT* plateaus at a peak value of 1.50 (see Figure 1). Hence, the Canadian DC system has the intuitively appealing property that, for a typical household, DC withdrawals are barred when income is near its normal level but are encouraged (*MRT* > 1) when income declines substantially.

Australia — In Australia, the *MRT* = 0 as long as the household remains employed, no matter how low income falls. However, if the household receives income support from the government for at least 26 weeks (e.g., unemployment benefits), the household becomes eligible for DC withdrawals.[18,19] Hence, Australia also has a rising *MRT* as income in the pre-eligible year declines if low income in the pre-eligible year is due to a long unemployment or underemployment spell and the household receives government benefits as a result (see Figure 2).

C. United States

In contrast, even at a normal level of income, the US DC system is liquid. Workers can roll over balances from a previous employer's DC plan into an IRA and then liquidate those balances under any circumstances with a maximum tax penalty of 10 percent. For instance, if our hypothetical household lived in Texas, its *MRT* with pre-eligible income equal to permanent income would be

(2) $$MRT = \frac{1-\tau(pre,\ y)}{1-\tau(eligible,\ Y)}$$

$$= \frac{1-0.1-0.15}{1-0.15} = 0.88.$$

[18] The severe financial hardship provision that allows early access in this case restricts the withdrawals to AU$10,000 (with a minimum of AU$1,000) to cover reasonable and immediate family living expenses, such as general outstanding bills, insurance premiums, or mortgage payments. These withdrawals must be approved by the plan trustee. Given the AU$1,000 minimum withdrawal requirement in this case, we calculate the *MRT* based on the effective marginal tax rate on the last dollar of a AU$1,001 pension withdrawal.

[19] In Australia, withdrawals are also possible during temporary disability. In this case, withdrawals must typically be taken as an income stream throughout the period of disability (whereas a single lump sum may be taken for permanent disability).

As pre-eligible income falls below its normal level, the *MRT* tends to rise (as in Canada and Australia) due to falling marginal tax rates in the pre-eligible withdrawal year. As pre-eligible income approaches zero, the *MRT* eventually exceeds one (see Figure 3). Hence, like the Canadian and Australian systems, the US *MRT* increases as income falls transitorily, but the rise is much more muted in the United States: the *MRT* increases from 0 to 1.50 in Canada, from 0 to 1 in Australia, and from 0.88 to 1.06 in the United States.

III. Conclusions

The six countries that we study fall into three groups. In Germany, Singapore, and the United Kingdom, withdrawals from general funds in employer-based DC plans are essentially banned no matter what kind of transitory income shock the household realizes. By contrast, in Canada and Australia, liquidity in employer-based DC plans is sharply state-contingent. For a household that normally earns US$60,000, DC accounts are completely illiquid unless annual income falls substantially, at which point the DC assets may be accessed. Canadian workers who temporarily have very low income face strong incentives to *withdraw* their DC balances (*MRT* = 1.50). The United States stands alone with respect to the high degree of liquidity in its DC system. Penalties for early withdrawals are relatively low, and early withdrawals are slightly subsidized as income falls transitorily.

Explaining these cross-country differences in employer-based DC plans is beyond the scope of the current paper. Nevertheless, we list four (mutually compatible) hypotheses for future research.

First, the differences in liquidity across DC regimes might matter little for welfare because the benefits of commitment (addressing a self-control problem) and the benefits of flexibility (liquidity during financial emergencies) are approximately equal in magnitude. Under this first hypothesis, differences across countries are neutral mutations, so it is not unexpected to see wide variation. See Beshears et al. (2015) for analysis that reaches this conclusion.

The second hypothesis is akin to the first. If a country's DC system was designed to only be a minor supplement to a larger retirement income system, then its liquidity properties would have little welfare consequence. Thus, wide variation in these properties could ensue. The US DC system was first conceived as a top-up for DB pension plans. Only by historical "accident" did it instead become a substitute for DB plans over time, as DB plans lost appeal because of

their non-portability and balance sheet risk. The United States was not intended to have a highly liquid workplace pension system, but this is what resulted from the unforeseen atrophy of the DB leg. The German DC system was also designed as a top-up to a DB system, but unlike in the United States, it is essentially illiquid before retirement.

Third, cross-country differences might reflect different ideological preferences. If a country's citizens have a relatively strong preference for economic freedom (potentially as an end in itself), this would tilt the retirement savings system toward more flexible institutions.

Finally, variation in the employer-based DC plans might result from other cross-country differences, like the strength of the social safety net. Liquid DC accounts are particularly useful if other sources of income support (e.g., unemployment benefits) are not sufficient during periods of financial duress. However, if this were the explanatory mechanism for the US DC system's liquidity, we would expect to see US liquidity being made contingent on the presence of an income/expenditure shock (e.g., withdrawals that are only liquid during an unemployment spell or coincident with a large health shock). Instead, US households are able to access their balances under any circumstances by paying no more than a 10 percent penalty.

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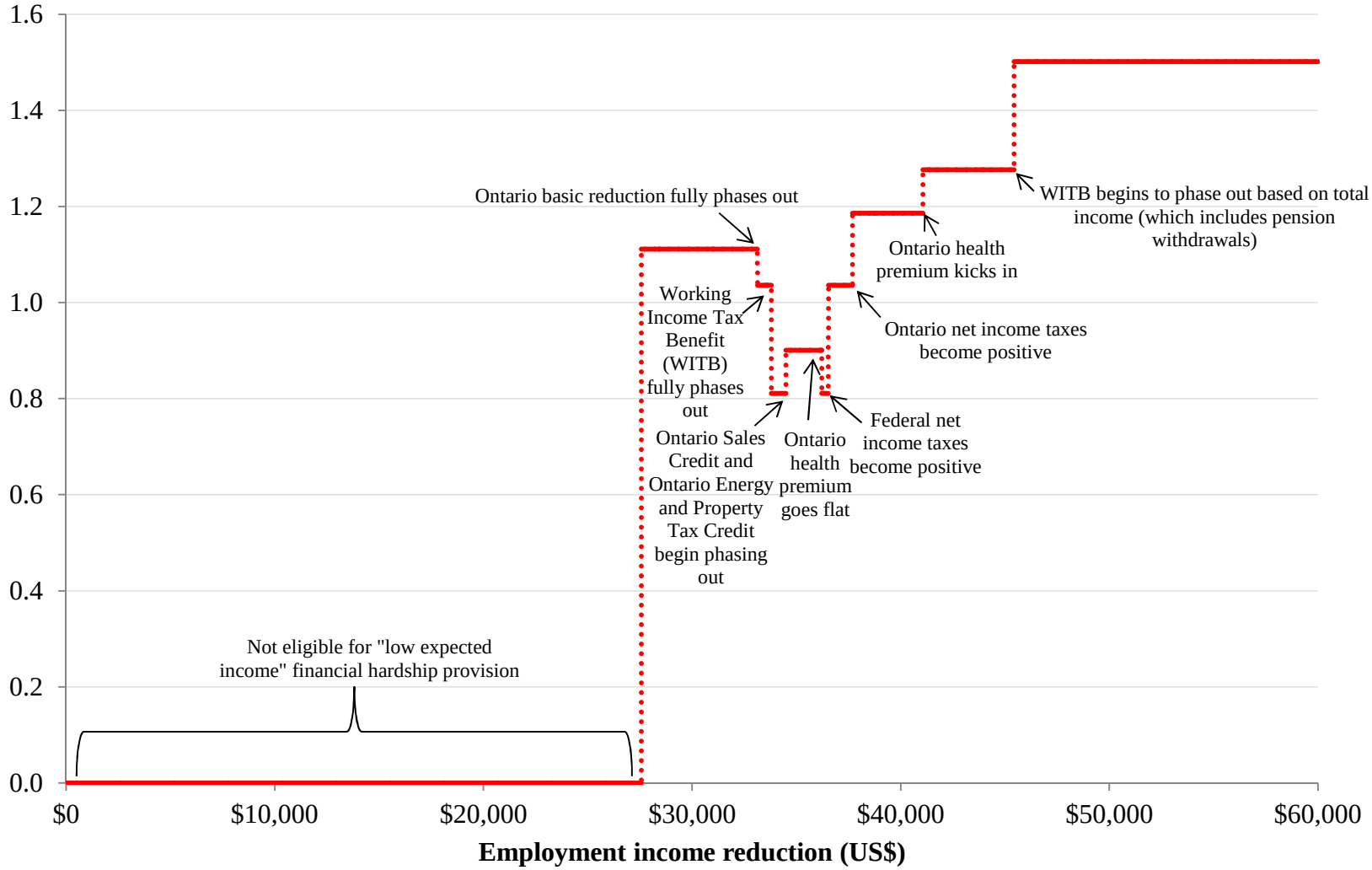
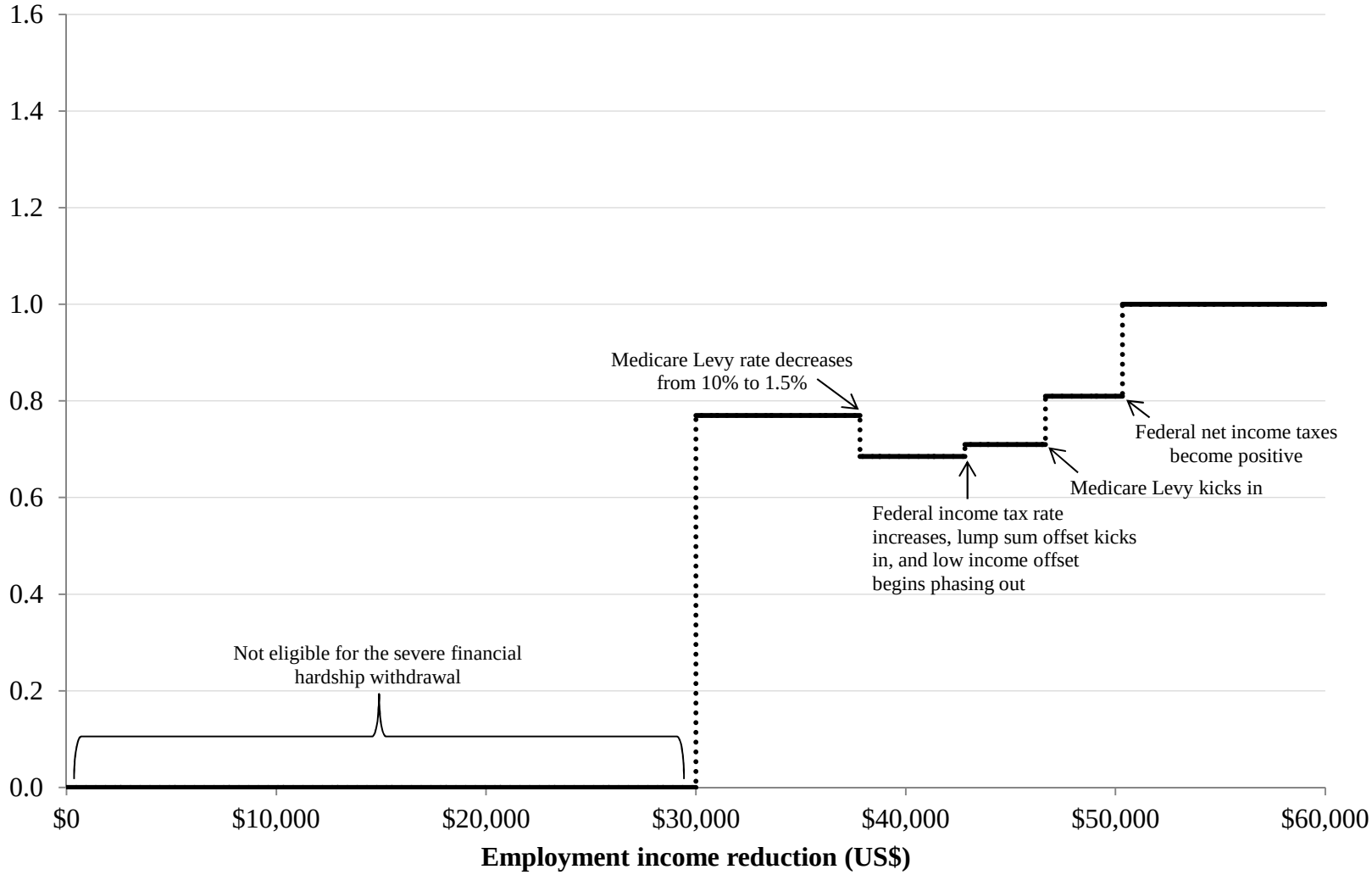
Figure 1. Marginal Rate of Transformation (MRT) for Canada



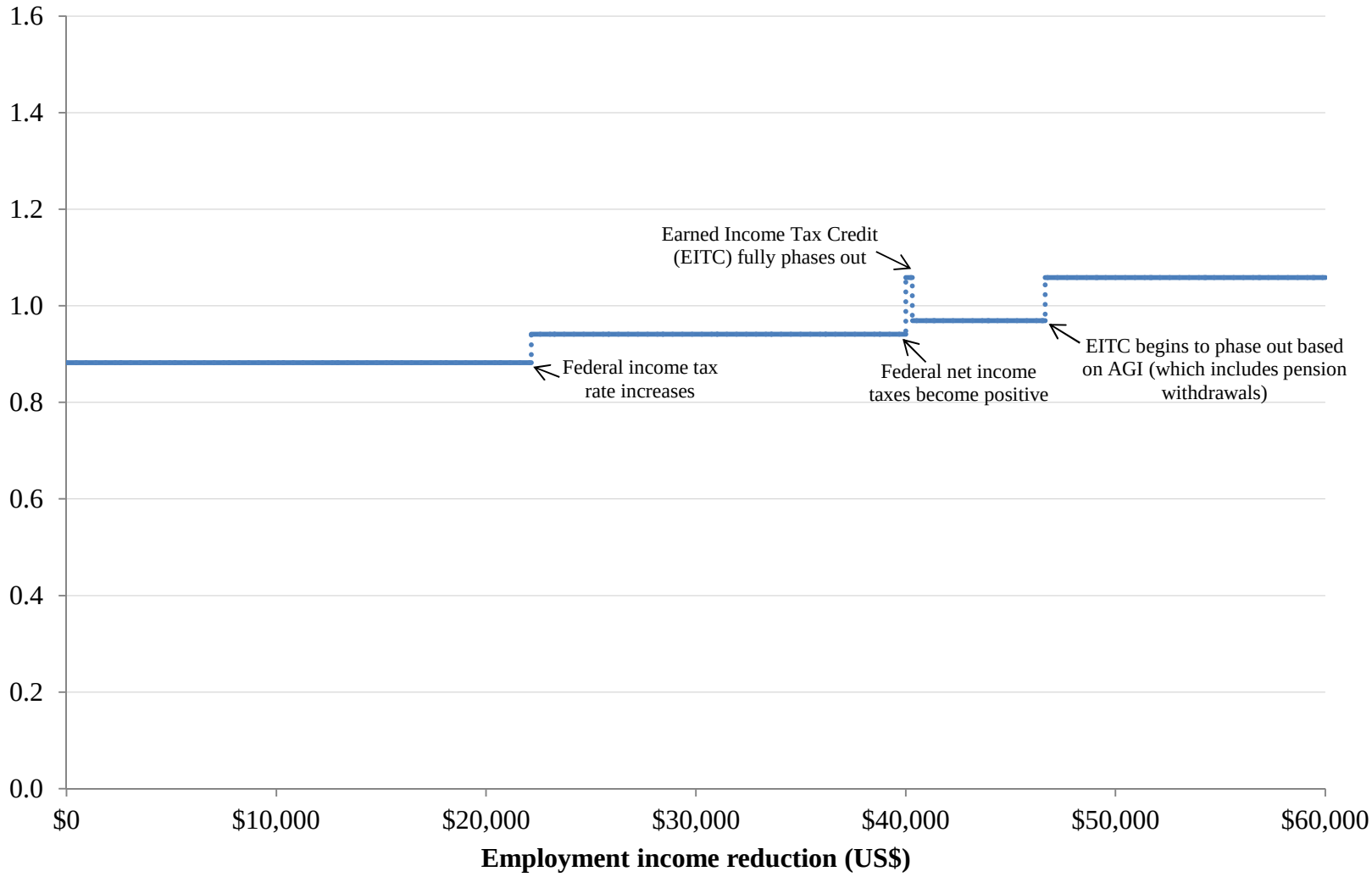
Notes: This figure reports the *MRT* for a household in Ontario, Canada with assets from a DC Registered Pension Plan that have been rolled over to a locked-in retirement account. For more details see the Web Appendix.

Figure 2. Marginal Rate of Transformation (MRT) for Australia



Notes: This figure reports the *MRT* for a household in New South Wales, Australia, with DC assets in a superannuation fund. We assume that the reduction in employment income is due entirely to an unemployment spell. Hence, an x percent reduction in income is engendered by x percent of 52 weeks of unemployment. We also assume that the household receives unemployment benefits throughout the unemployment spell. For more details see the Web Appendix.

Figure 3. Marginal Rate of Transformation (MRT) for the United States



Notes: This figure reports the *MRT* for a household in Texas, with some DC assets that have been or can be rolled over to an IRA. For more details see the Web Appendix.