

Liquidity in Retirement Savings Systems: An International Comparison

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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 U.S., 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% tax penalty, and certain classes of pre-eligibility IRA withdrawals are exempt from this penalty.³

¹ See the buffer stock savings literature (e.g., 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 (7.5% if born before 1949); (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) back 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 (e.g., Hurricanes Katrina and Sandy).

Liquidity generates significant pre-retirement “leakage” in the U.S.: 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 U.S., the United Kingdom, Canada, Australia, and Singapore.⁶ We also 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 shadow 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 shadow price because it summarizes all the marginal incentives that consumers face.

Accordingly, we compute the *marginal rate of transformation (MRT)* between withdrawal-funded consumption at ages when the individual is “pre-eligible” for withdrawals and withdrawal-funded consumption at ages when the individual is “eligible” to make withdrawals (in

⁴ See Argento, Bryant, and Sabelhaus (2014).

⁵ However, see Laibson, Repetto and Tobacman (1997), Amador, Werning, and Angeletos (2006), and Beshears et al. (2014a,b).

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

⁷ German savers had set up 14.8 million Riester plans as of 2011 (Hagen and Kleinlein 2012). Riester plans are just one of the many forms that DC plans take in Germany. 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.

all countries that we study, eligibility begins no earlier than 55⁹ and no later than 63¹⁰):

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

In this equation, $\tau(pre, y)$ is the marginal tax rate (taking account of 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 agent is old enough to be eligible to make withdrawals *and* (ii) household earnings in the withdrawal year equals 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 $Y = \text{US}\$60,000$, 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 its housing, takes the standard income tax deduction, and is not disabled. In the pre-eligible withdrawal state, the earner is assumed to be 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% 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 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.

⁹In Singapore, only S\$5,000 plus CPF funds exceeding the Minimum Sum may be accessed at age 55-62. The remainder must be paid out as a life annuity beginning at age 63.

¹⁰Most Germans cannot access their occupational pensions until age 63 (the state early pension age). Their private systems are linked to the

public system. Benefits can only commence when the member provides a pension approval certificate (i.e. proof that she receives state-provided pension benefits).

A. Germany, Singapore, and the U.K.

In Germany, Singapore, and the United Kingdom, early withdrawals are banned: $MRT = 0$ for all y .¹¹ Only permanently disabled¹² or terminally ill individuals may make withdrawals (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).

B. Canada and Australia

In Canada and Australia, the $MRT = 0$ under normal circumstances, but DC balances become liquid in the event of adverse transitory labor income shocks.¹³

Canada (Ontario) — In 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 far

enough below two-thirds of the Year's Maximum Pensionable Earnings (YMPE) to permit a withdrawal of at least CAN\$500.¹⁴ This occurs when expected income falls below US\$29,901. 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 US\$29,901, 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) non-monotonicities 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 intuitive property that, for a typical household, DC withdrawals are barred when income is near its normal level

¹¹ We do not consider the Supplementary Retirement Scheme in Singapore, a voluntary DC plan designed to complement the Central Provident Fund. More details about this plan can be found in the web appendix.

¹² In Australia, withdrawals are also possible in some cases of *temporary* disability. In this case, withdrawals must be taken as an income stream throughout the period of disability (whereas a single lump sum may be taken for permanent disability). 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 security office. If the employee is only 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.

¹³ Our analysis for Canada (Ontario) considers Registered Pension Plans, which require employer contributions and are subject to both federal tax jurisdiction and provincial pension legislation. Group Registered Retirement Savings Plans, on the other hand, do not require employer contributions and are not subject to pension legislation. A more detailed analysis of these plans can be found in the web appendix.

¹⁴ The maximum eligible withdrawal amount is $(50\% \times \text{YMPE}) - (75\% \times \text{Expected Income During the Next 12 Months})$.

but are encouraged ($MRT > 1$) when income declines substantially.¹⁵

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.¹⁶ 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 U.S. 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%. For instance, if our hypothetical household lived in Texas, its MRT with pre-eligible income equal to permanent income would be

$$(2) \quad MRT = \frac{1 - \tau(pre, y)}{1 - \tau(eligible, Y)} = \frac{1 - 0.1 - 0.15}{1 - 0.15} = 0.88.$$

¹⁵ Households with expected income below $2/3 \times YMPE$ can make a pre-eligible withdrawal whatever the level of their normal income.

¹⁶ 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.

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 U.S. MRT increases as income falls transitorily, but the rise is much more muted in the U.S.: 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 U.S.

III. Conclusions

The six countries that we study fall into three categories. In Germany, Singapore, and the U.K., withdrawals from employer-based defined contribution 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 defined contribution plans is highly state-contingent. For a household that normally earns US\$60,000, employer-based 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 U.S. stands alone in 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.

This cross-country heterogeneity begs the question of why the U.S. has chosen a different path from its peers, a question we leave to future research.

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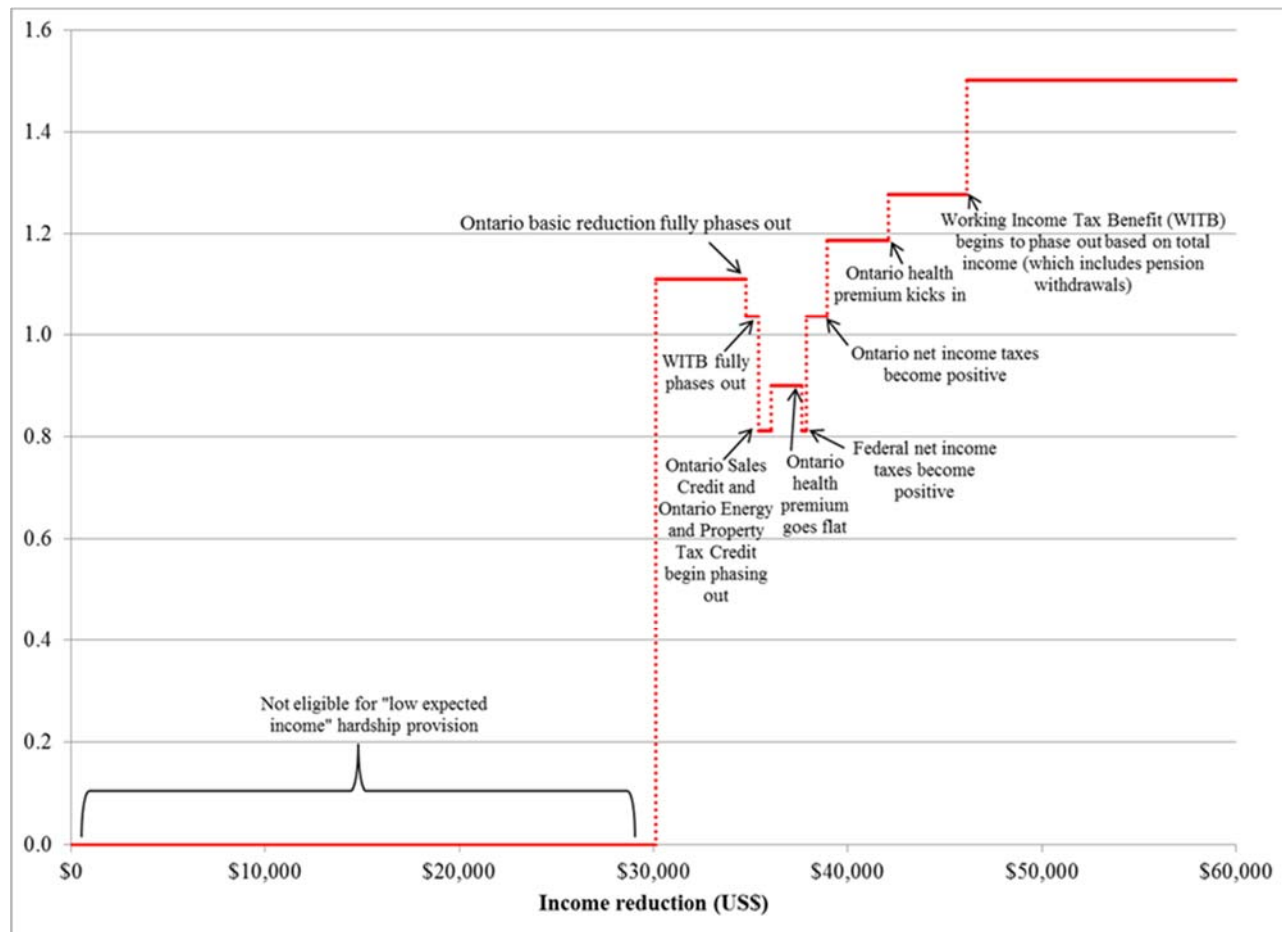


FIGURE 1. *MARGINAL RATE OF TRANSFORMATION (MRT)* FOR CANADA (ONTARIO)

Note: This figure reports the *MRT* for a household residing in Ontario, Canada with assets in a standard employer-based DC pension (RPP). For more details see the web appendix.

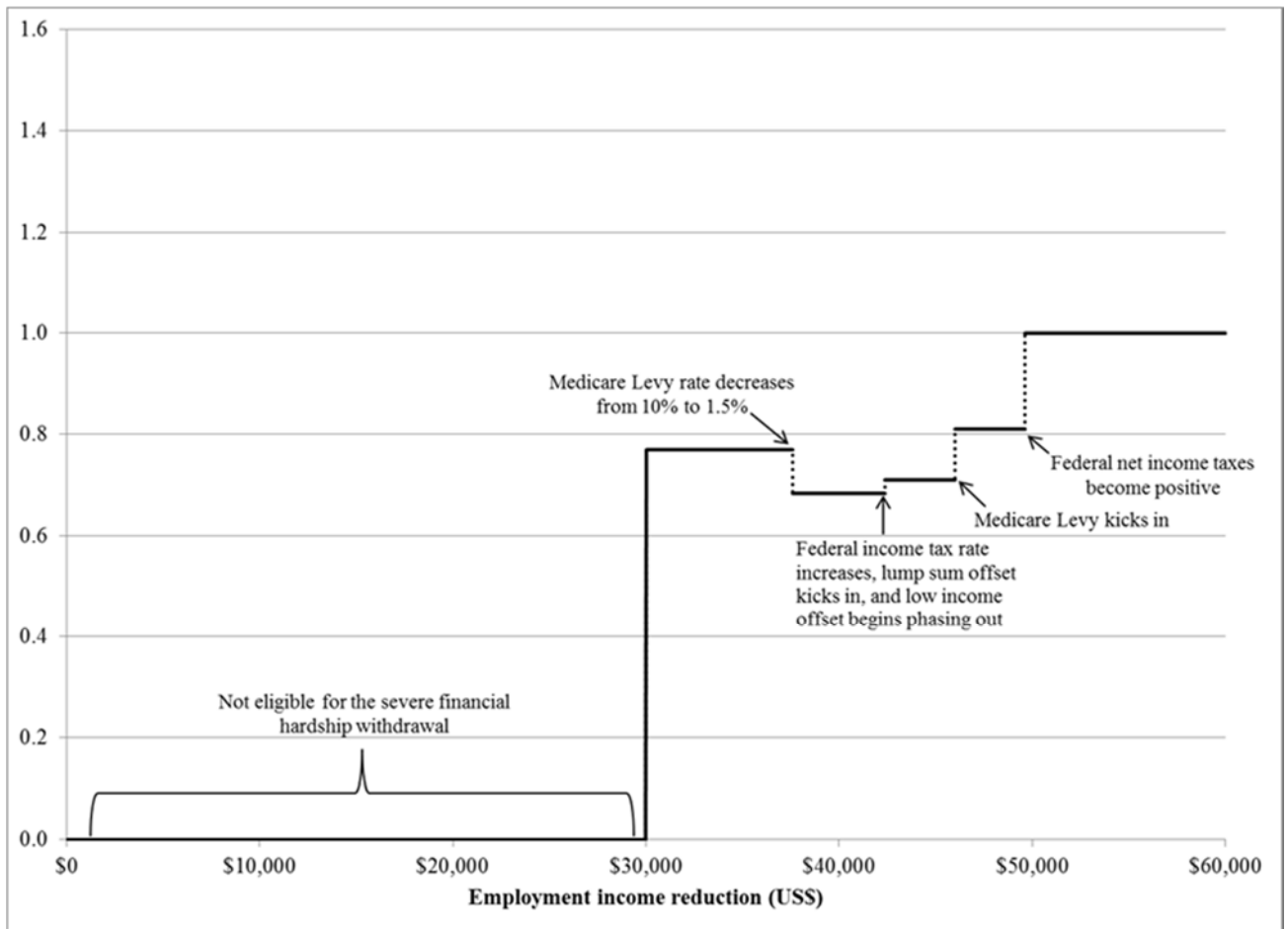


FIGURE 2. *MARGINAL RATE OF TRANSFORMATION (MRT)* FOR AUSTRALIA (NEW SOUTH WALES)

Note: This figure reports the *MRT* for a household residing in New South Wales, Australia, with defined contribution assets in a superannuation fund. For detailed demographic assumptions see the web appendix. We assume that the reduction in employment income is due entirely to an unemployment spell (holding hourly income fixed throughout the rest of the year). Hence, an $x\%$ reduction in income is engendered by $x\%$ 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.

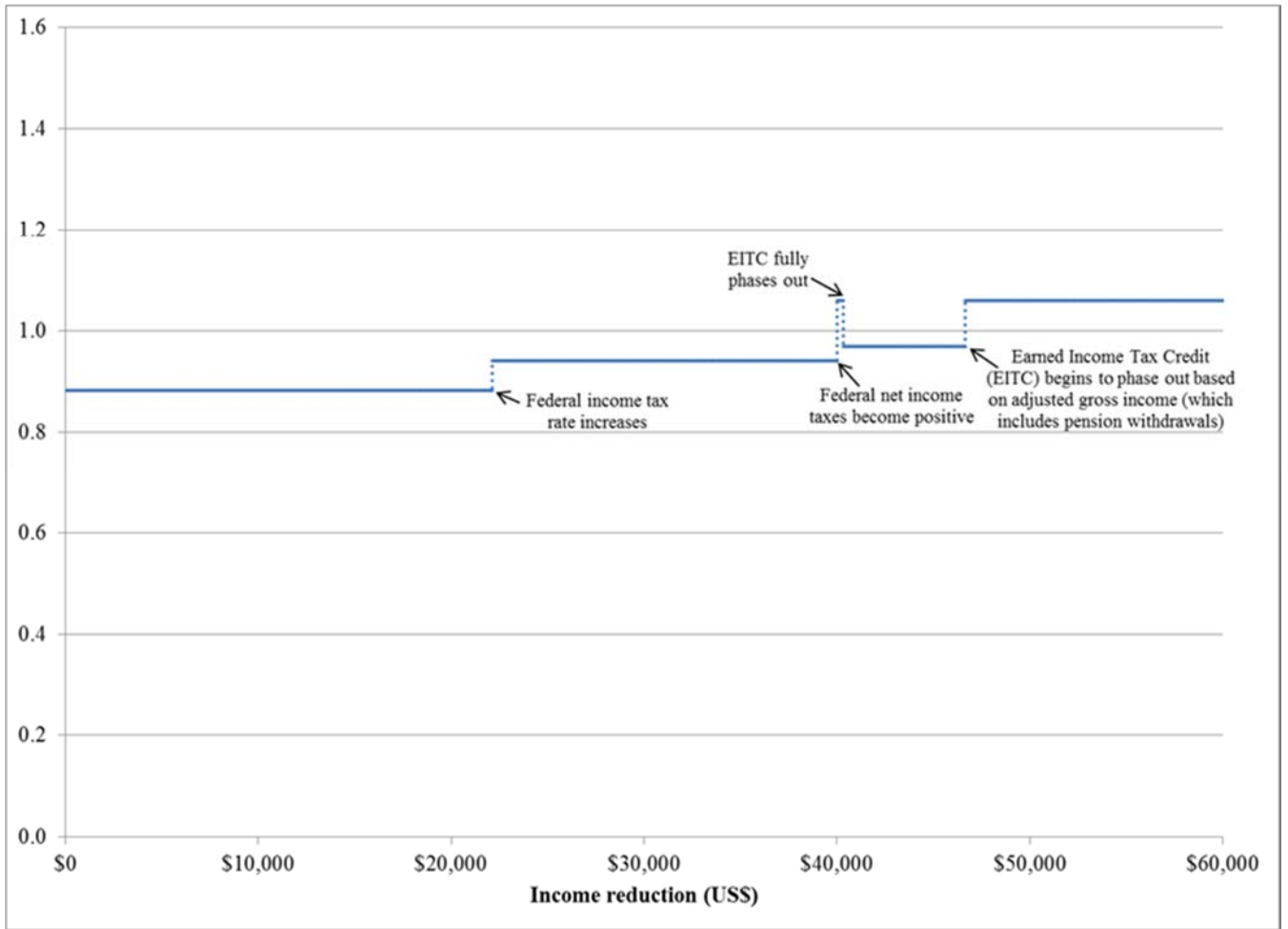


FIGURE 3. *MARGINAL RATE OF TRANSFORMATION (MRT)* FOR THE UNITED STATES (TEXAS)

Note: This figure reports the *MRT* for a household residing in Texas, with some defined contribution assets that have been or can be rolled over to an IRA. For more details see the web appendix.