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The aging population and the size of the welfare state: Is there a puzzle?

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Abstract

Razin, Sadka, and Swagel [Razin, Asaf, Efraim Sadka, and Phillip Swagel (2002) "The Aging Population and the Size of the Welfare State" The Journal of Political Economy, vol. 110, no. 4, pp. 900–918.] unveil a puzzling fact: the welfare state appears to be shrinking even as the dependency ratio rises. While they formulate an elegant political economy model to explain the coexistence of an aging population and declining transfers, the resolution of the puzzle turns out to be much simpler. Labor tax rates and per capita transfers are negatively correlated with the dependency ratio in advanced economies only because this measure includes children as well as retirees. Both labor tax rates and per capita transfers in advanced economies are, in fact, historically positively correlated with the ratio of retirees to the working-age population and negatively correlated with the ratio of children to the working-age population. Increasing the number of retirees shifts preferences toward higher taxes and transfers by increasing the fraction of the population that receives transfers. In contrast, workers with more children prefer to spend more of their lifetime income while raising dependents, so they prefer smaller public pension systems. These results suggest that fiscal leakage from workers to retirees is not required to explain the broad trends in the transfer policies of advanced economies.

Razin, Sadka, and Swagel (2002) present the surprising result that per capita social transfers and the dependency ratio are negatively correlated in a sample of 13 advanced economies. In their words, "this occurs despite the increased political clout of the dependent population implied by the aging of the population." They take this as evidence of a negative correlation between a group's size and its per capita transfers and proceed to construct a political economy model to explain this curious finding. However, they mis-measure the retired fraction of the population by using the dependency ratio, which includes children as well as retirees. I show that when children and retirees enter the regression separately, both per capita transfers and labor tax rates are positively correlated with the retired fraction of the population.

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Their model is a clever derivative of the Meltzer and Richard (1981) model to which they have added a new channel: fiscal leakage from the working to the retired. As in Meltzer–Richard, voters with varying levels of income choose a flat income tax rate the proceeds of which are then redistributed as a lump sum grant to each voter. However, in Razin, Sadka, and Swagel's model, voters live and are politically active for two periods but work only in the first period. As a result, there is a population of retirees who receive benefits but pay no taxes. The net effect on taxes from increasing the fraction of retirees in the population is the sum of two competing effects. On the one hand, increasing the fraction of the population which is retired decreases the income of the median voter relative to the mean thereby increasing the median voter's preferred tax rate. On the other hand, if a greater fraction of the population is not working, then any given tax rate yields a smaller per capita benefit which decreases the median voter's preferred tax rate. The first effect is the classic Meltzer–Richard effect. The authors describe the second effect as "fiscal leakage" from the working population to the retirees. For some parameter values, fiscal leakage dominates the Meltzer–Richard effect and therefore increasing the fraction of retirees in the population actually leads to smaller per capita transfers. They interpret their empirical work as evidence that fiscal leakage has played a major role in the tax and transfer policies of advanced economies between 1965 and 1992.

This is an elegant model but, ultimately, it solves an empirical puzzle which does not exist. The negative correlation between per capita social transfers and the fraction of retirees in the population is due entirely to mis-measurement of the latter. The parameter which governs the extent of fiscal leakage is the ratio of retirees to the working age population. In their empirical work, Razin, Sadka, and Swagel measure this with the dependency ratio, defined as one minus the fraction of the population in the labor force. But the labor force excludes children as well as retirees. Were the youthful fraction of the population uncorrelated with both the retired fraction and the welfare state, this would simply be white-noise measurement error biasing the slope coefficient toward zero. However, this is not the case: in both demographic models and practical experience, population shares of youth and retirees are highly negatively correlated. Moreover, children and retirees likely have different effects on social transfers (the former do not vote and have a lifetime of work ahead of them, the latter do vote, but no longer work), hence restricting their coefficients to be equal imposes a mis-specification.

Table 1
Splitting the dependency ratio

	Labor tax rate				Log per capita transfers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependency ratio (1 — labor force)/pop	−0.382 (0.095)**				−7.493 (0.850)**			
Dependency ratio (1 — age15–64)/pop		−0.877 (0.098)**				−7.730 (0.980)**		
Youth, 0–14/15–64				−0.418 (0.042)**				−3.813 (0.421)**
Retirees, 65+/15–64			0.406 (0.153)**	0.254 (0.135)‡			3.474 (1.499)*	2.081 (1.344)†
Government jobs/total emp.	0.915 (0.075)**	0.963 (0.062)**	0.858 (0.100)**	0.640 (0.090)**	4.467 (0.673)**	6.376 (0.620)**	5.498 (0.976)**	3.515 (0.896)**
Openness, (xgs+mgs)/gdp	0.198 (0.024)**	0.129 (0.024)**	0.219 (0.025)**	0.146 (0.023)**	0.740 (0.219)**	0.210 (0.239)	0.997 (0.247)**	0.340 (0.232)
Per cap. real GDP growth	−0.187 (0.066)**	−0.169 (0.060)**	−0.196 (0.067)**	−0.157 (0.058)**	−2.716 (0.591)**	−2.662 (0.604)**	−2.901 (0.655)**	−2.549 (0.584)**
Ratio of income shares: 1st to 2–4th quintiles	−0.055 (0.020)**	−0.036 (0.018)*	−0.036 (0.020)	−0.028 (0.018)	0.276 (0.178)	0.554 (0.180)**	0.550 (0.198)**	0.629 (0.177)**
Observations	330	330	330	330	330	330	330	330
Countries	13	13	13	13	13	13	13	13
R-squared	0.75	0.79	0.75	0.81	0.62	0.60	0.53	0.63

Estimated via OLS with country fixed effects.
Sample: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, UK, and US.
Standard errors in parentheses.
* Significant at 5%, ** Significant at 1%.
† Significant at 12%, ‡ Significant at 6%.

I have re-estimated Razin, Sadka, and Swagel's specification while replacing the dependency ratio with two variables: the ratio of children to workers and the ratio of retirees to workers. They were kind enough to give me their original data and programs so my replication of their regressions is an exact match of their original results. To their data I have added population data from the World Development Indicators database. Children are defined as those aged 0–14, retirees are those 65 and older, and the remainder are the working-age population. Columns (1) and (5) of Table 1 are my replication of their results. Next, I run the regression with Retirees instead of the Dependency Ratio (columns (3) and (7)). When the fraction of the retired population is measured directly, the coefficient is positive, indicating that retirees are associated with a larger welfare state. Finally, I control for the fraction of youthful dependents in the population (columns (4) and (8)). The results are clear: more retirees means higher labor tax rates and higher per capita transfers; more children means lower tax rates and transfers.

Razin, Sadka, and Swagel define the dependency ratio as 1 — labor force/population. Because labor force participation is not identical to those between 15 and 65, there are two differences between their specification and mine: the labor force participation rate and the treatment of children. To be sure that the different results are due to the latter rather than the former, I defined an alternate dependency ratio as the fraction of the population either below 15 or above 65 and reran their specifications with this dependency ratio (columns (2) and (6)). The coefficient on the dependency ratio in this alternate regression remained negative and of similar magnitude and significance to those generated by Razin, Sadka, and Swagel's original regressions suggesting it is the treatment of youth rather than the labor force participation rate that delivers my results.

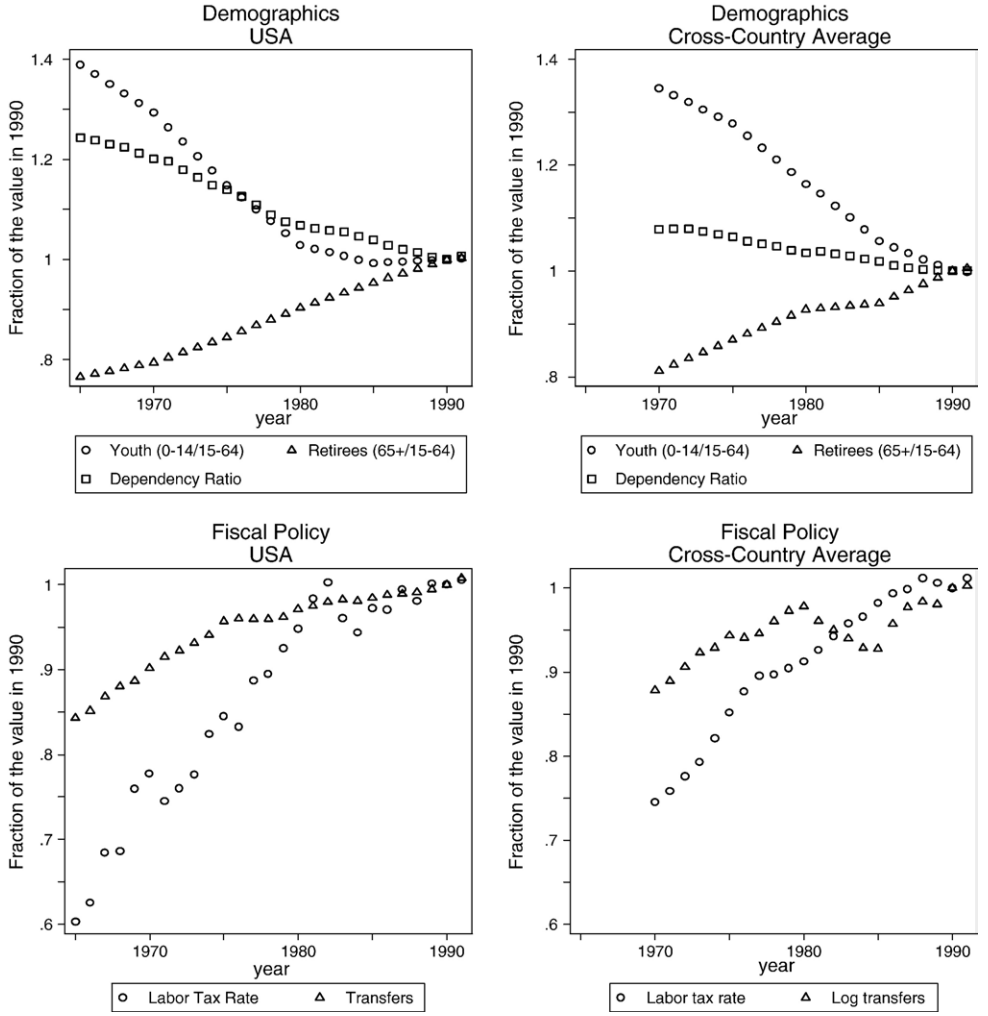

Fig. 1. Trends in demographics and redistribution.

Essentially, over the time period in question, most of the variation in the dependency ratio is due to variation in the fraction of the population who are children rather than the fraction who are retirees. In particular, in most of the countries in the sample, the ratio of children to working age declines quite steeply until the mid-eighties after which the decline is milder (see Fig. 1). This is due to the drop in fertility rates in most advanced countries beginning in the late sixties. On the other hand, while the ratio of retirees to working adults does increase over the sample period, it does not keep pace with the decline in the youthful fraction of the population. As a result, the dependency ratio gradually declines over the sample period even as the number of retirees is growing. Meanwhile, both labor tax rates and real per capita social transfers steadily increase in all advanced countries.[2] As a result, Razin, Sadka, and Swagel associate a decline in the youthful fraction of the population with an increase in per capita transfers and mistake it for evidence that transfers to retirees decline even as their numbers grow. Table 1 shows that, in fact, the ratio of retirees to the working age population is associated with an increase in per capita transfers.

Meanwhile, the coefficient on Youth is negative.[3] With an alteration of the Razin–Sadka–Swagel model, we can get a sense of the role of children in the concept of fiscal leakage. Imagine that each active worker has k kids. Children do not vote but they do receive transfers. Assume that children are financially dependent on their parents and that their parents care about their welfare so that transfers to a child are simply paid to the child's parent. Then a worker essentially receives labor income, pays taxes, and receives $(1+k)b$ in transfers whereas a retiree earns nothing, pays nothing, and receives b. The effect of these children is to reduce the fiscal leakage.[4] If there are d retired dependents per worker, then where formerly the fiscal leakage to retirees was a fraction $d/(1+d)$ of total taxes, now, in the presence of k youthful dependents per worker, it is only $d/(1+d+k)$. This reduction in the fiscal leakage leads to an increase in the tax rate preferred by workers. So a model based on fiscal leakage argues for a positive coefficient on Youth and a negative coefficient on Retirees.

The data from Table 1 suggest the opposite. The positive coefficient on Retirees shows that the increased demand for welfare brought on by an increase in retirees does result in a larger welfare state. The negative coefficient on Youth implies that an increase in children somehow leads to a decrease in the size of the welfare state. Since children do not vote, the most likely channel by which children affect the extent of the welfare state is through the preferences of their parents. The welfare state is essentially a combination of redistribution and mandatory savings. Parents generally prefer a lower savings rate than their child-less counterparts because they need the money now to pay for their dependent children rather than later when those children are grown up and financially independent. The Razin–Sadka–Swagel model does not include the savings aspect because they are careful that both retirees and workers receive benefits. Paying benefits to current workers ensures they do not drive the tax rate to zero. Consider the following derivative of their model which is designed to highlight the role of children in the demand for social security.

Imagine that instead of two generations, there are three generations: each worker now has k kids. And imagine that workers internalize the welfare of their children such that a citizen's utility over her politically active life equals

$$U_i = u(c_i^1) + ku(c_{i+1}^0) + u(c_i^2)$$

with a period utility function, $u(c)$, for which $u'>0$ and $u''<0$, where superscripts refer to the agent's stage of life (childhood=0) while the subscript refers to the generation (generation i's children are generation $i+1$). Labor income is earned as in Razin, Sadka, and Swagel's model and the voting-age population (workers and retirees) votes over a flat labor tax which, via the balanced budget condition, determines the size of per capita transfers. But in this version, the

[2] The decline and subsequent abrupt return of the log of per capita transfers in the cross country sample during the 1980s is due to the concurrent appreciation and subsequent planned devaluation of the dollar. Notice that this dip does not occur in the US data. Since Razin, Sadka, and Swagel convert per capita transfers to real dollars via the nominal exchange rate rather than on a PPP basis, the appreciating dollar means transfers in European economies fell in dollar terms during this period even though they continued to grow as a fraction of GDP. In spite of this abberation, the broad trend is for transfers to increase.

[3] One might suspect that the United States, which is younger and has a smaller public sector than European economies, might be driving the results. In fact, omitting the US results in no great change in any of the coefficients.

[4] One can question whether children receive the full share of transfers that are due workers and retirees. Razin, Sadka, and Swagel clearly state they are interested in incentive compatible contracts in which the current workers do not rely on the benefice of future workers but enjoy concurrent benefits. As a result, they conceive and measure transfers in the broadest sense, including not only social security but also healthcare and other benefits consumed by workers. Many transfers, such as education assistance and healthcare are paid to the parents of children. Paying (the parents of) children only a fraction of the benefits received by adults would simply reduce the degree to which children alleviate the fiscal leakage from working voters to non-working voters but would not change the sign of the effect.

transfers are distributed only to retirees. So now the tax and transfer system is essentially a combination of redistribution and mandatory savings rather than redistribution with some leakage to the elderly. Suppose there is only one vote, at the establishment of the country, to fix the tax rate and assume there exists some credible commitment mechanism such that all citizens believe this system will perpetuate. This commitment enables workers to support positive rates of public savings to their elders without fear the next generation will refuse to pay them in turn.[5] Because u is concave, a worker will choose to equalize her consumption and that of each child, $c_{i+1}^0 = c_i^1$. As a result, the number of children per worker generates a weight, $1+k$, that citizens place on their consumption while working and parenting relative to consumption while retired. As this weight is increased, citizens prefer to consume more in period 1 and save less for period 2. The result is that, to the extent that (a) social security is like mandatory saving, (b) workers believe social security to be guaranteed, and (c) parents care about their children's consumption, increasing the number of children per worker will result in preferences for lower rates of taxation and fewer transfers per capita. Hence the negative coefficient on Youth: the more young dependents in a society, the more parents there are with preferences for a lower rate of mandatory savings. Younger societies spend a greater fraction of their resources on raising children and consequently have less generous social security systems. The corrected results, along with the stylized three-generation model, suggest that fiscal leakage is not required to explain the past relationship between demographics and the tax and transfers systems in advanced economies. Thus far, the partial correlations between demographic measures and taxes and transfers are exactly those one would expect from a simple model of demand shifts.

At the moment, measuring the importance of fiscal leakage is limited to estimating reduced form correlations between the size of the welfare state and country characteristics such as demographics and trade openness. This comment argues for taking care when making inferences from such rough correlations. The effect of demographics is not confined solely to the relative numbers of retirees and workers. As my stylized model with children points out, there are other channels by which demographics may shift the preferences of voters. This complicates the empirical strategy of inferring the importance of fiscal leakage via correlations of demographics and policy.

As Razin and Sadka (2005) point out in their recent book, the channel between demographics and demand for social security has implications for many of the most important policy questions currently facing advanced economies. They argue that low-skill immigration and an increasing wage-premium for skill due to trade openness are each likely to (counter-intuitively) *dampen* the demand for social security, again through the logic of fiscal leakage. These preferences in turn—through some process of preference aggregation—drive the size of the welfare state. In other words, the manner in which immigration and trade policy affect preferences for social security depends on the validity and magnitude of the fiscal leakage effect. And because the welfare state is one of the largest sources of growth in public spending, these preferences are also a significant driver of the overall size of government and thus of public debt, interest rates, and macroeconomic health. Thus, understanding the degree to which fiscal leakage affects preferences for social security is relevant to projecting the impact of demographic change on many of the most visible policy debates in advanced industrialized countries: immigration, globalization, the size of the welfare state, and the future growth of public debt.

In the past, changes in the retired fraction of the labor force have been relatively modest. But advanced economies face a tidal wave of the aging post-war generation and a dearth of children replacing them in the workforce: the ratio of retirees to workers is about to climb steeply. As public debate in these countries centers on what levels of retirement benefits are sustainable, it looks as though the historical relationship between retirees and per capita benefits will be strained as fiscal leakage becomes unsustainable. The fiscal leakage channel is not of first-order importance in describing the past but it may become relevant in the near future.

References

Meltzer, Allan, Richard, Scott, 1981. A rational theory of the size of government. The Journal of Political Economy 89 (5), 914–927.

Razin, Asaf, Sadka, Efraim, 2005. Cooperation with Chang Woon Nam. The Decline of the Welfare State: Demography and Globalization. The MIT Press, Cambridge, MA.

Razin, Asaf, Sadka, Efraim, Swagel, Phillip, 2002. The aging population and the size of the welfare state. The Journal of Political Economy 110 (4), 900–918.

[5] While this perfect commitment is unrealistic — constitutions seldom place restrictions on tax policy—policy displays a great deal of inertia and democratic institutions often foster some degree of commitment.