Analyzing the Fiscal Impact of U.S. Immigration

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In recent years, the renewed strength of immigration to the United States has sparked a debate about the economic effects of immigration. A central issue in this debate has been the fiscal impact of immigrants. Most research in this area has adopted a static, cross-section approach in assessing the net impact of immigrants on the economy's fiscal position. However, recent work has extended this perspective to consider the impact of immigrants over time. A dynamic approach is important because of the age-dependency of tax and expenditure programs, and the necessity to take the descendents of immigrants into account. For example, a large working-age immigrant population might appear from cross-section analysis to lessen the fiscal burden of a pay-as-you-go social-security pension system, even if these immigrants will eventually receive benefits from the system that exceed the taxes they pay, in present value. On the other hand, a large population of school-age immigrants might appear to add fiscal pressure via added expenditures, even if the subsequent income taxes paid by them in their adulthood and by their native offspring more than compensate for the increased spending.

This paper reconsiders the fiscal impact of immigrants over time, using the technique of generational accounting introduced by Auerbach et al. (1991) and applied subsequently by a number of others.[1] Of particular value in the present context is that generational accounting permits us to consider not only the net contribution of immigrants to fiscal balance, but also the size of this impact relative to the overall imbalance. Generational accounting also allows us to compare changes in immigration policy to other policies in terms of their impact on fiscal balance and the welfare of different generations.

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[1] For a recent compilation, see Auerbach et al. (1999).

I. Methodology and Data Sources

Generational accounting is based on the government's intertemporal budget constraint. This constraint, written as equation (1), requires that the present value of all future net tax payments made by current and future generations must be sufficient to cover the present value of future government consumption as well as to service the government's initial net indebtedness:

$$(1)\quad \sum_{s=0}^{D}(N_{t,t-s}+F_{t,t-s}) + \sum_{s=1}^{\infty}(1+r)^{-(s-t)}(N_{t,t+s}+F_{t,t+s}) = \sum_{s=t}^{\infty}G_s(1+r)^{-(s-t)} - W_t^g.$$

Equation (1) differs from past analyses by distinguishing the generational accounts of natives and immigrants. The first summation on the left-hand side of (1) adds together the generational accounts (the present value of the remaining lifetime net payments) of native and immigrant members of existing generations. The term $N_{t,t-s}$ represents the account of the native generation born in year $t - s$. The index s in this summation runs from age 0 to age D, the maximum length of life. The term $F_{t,t-s}$ is defined in parallel fashion for each existing immigrant cohort. The second summation on the left-hand side of (1) adds together the present values of net payments of future generations, with s representing the number of years after year t that the generation is born. The second set of $F_{t,t-s}$ terms contained in this summation represents the net payments for all immigrants to future cohorts.

The first term on the right-hand side of (1) expresses the present value of government consumption. In this summation the values of government consumption in year s, given by G_s, are discounted by the pretax real interest rate, r. The remaining term on the right-hand side, W_t^g, denotes the government's net wealth in year t (its assets minus its explicit debt). As in past applications, we ignore real government assets and the flows from such assets in calculating G_s and W_t^g, so that the latter simply corresponds to -1 times the value of government debt.

Note that these generational accounts reflect only taxes paid less transfers received. Therefore, the accounts do not show the full net benefit or burden that any generation receives from government policy as a whole, although they can show a generation's net benefit or burden from a particular policy change that affects only taxes and transfers. Thus, our calculations will tell us which generations will pay for government spending, rather than which generations will benefit from that spending.

The left-hand side of equation (1) is estimated assuming current projected fiscal policy and then compared to the right-hand side. If the sum of the current and future generational accounts is smaller in present value than total future government consumption and initial net debt, current policy is unsustainable, and a policy that adjusts at least part of the equation is required. There is, of course, no unique way to make this adjustment. Our base case assumes that any residual amount needed to satisfy the government's budget constraint will be borne entirely by future generations. The traditional approach has been to spread this burden among future generations in such a way that the average present-value lifetime net tax payment per initial member of each future generation is constant except for productivity growth. This approach does not work well when we include immigrants. We can no longer simply assign to each future native generation the same (adjusted for growth) per capita generational account, for this leaves open the question of what adjustment should be imposed on future immigrants.

To deal with this problem, we propose an alternative method of assigning the residual. The method, which is evaluated in more detail in Auerbach and Oreopoulos (1998), involves first calculating the burdens on future generations (both native and immigrant) under current policy, and then adjusting proportionally some combination of taxes paid and transfers received by these future generations until expression (1) is satisfied. This allocation of the extra burden on future generations typically will yield different percentage increases for men and women, and for natives and immigrants, but will be based on a concrete change in actual policy variables. Below, we consider the simultaneous adjustment of all taxes and transfers and also consider making the adjustment immediately, so that the policy affects current as well as future cohorts.

Construction of generational accounts requires population data and projections, tax and transfer profiles for different demographic groups within each cohort, projections for the path of government purchases, a value for the initial stock of government debt, and assumptions about the government's discount rate. For much of this, we rely on the recently updated calculation for the United States by Jagadeesh Gokhale et al. (1999). In particular, we use their base year of 1995 and their aggregate projections for the growth of government spending, G_t, through the year 2070, based on the actual long-term CBO forecast. We benchmark age-based profiles of government spending used by Auerbach et al. (1991) to the 2070 aggregate and assume that these profiles grow with the rate of labor productivity after 2070. Thus, government-spending growth is permitted to deviate from the general growth rate to the extent that there are shifts in the age structure of the population. We also use Gokhale et al.'s projections of aggregate taxes and transfers, based on the CBO forecast through 2070 and assumed to grow with labor productivity thereafter. Finally, we use their assumption of a 1.2-percent rate of labor-productivity growth after 2070, their real discount rate of 6 percent, and their initial value of $W_t^g = -\$2.1$ trillion.

As Gokhale et al.'s (1999) population projections and tax and transfer profiles are disaggregated only by sex, and not by nativity, we must supplement them with data from other sources. For population projections, we

simply use an alternative source that provides information at a more disaggregated level. For tax and transfer profiles, we combine the information in Gokhale et al. with that provided by another data source. Our alternative population projections were kindly provided by Barry Edmonston, based on an adaptation of the population projection model used in the recent study by the National Research Council (1997 appendix 3.A). The model generates annual population projections through the year 2100, broken down by age, sex, and nativity, the last of which has three categories: first-generation immigrants, second-generation immigrants (i.e., native children of immigrants), and all others, to whom we refer simply as natives. We assume a stationary population after 2100. Tax and transfer profiles, also broken down by nativity, come from estimates by Ronald D. Lee and Timothy Miller (1997). However, these profiles were not broken down by sex, and the profiles in Gokhale et al. (1999) were not broken down by nativity. Therefore, we developed an algorithm to use the two sets of profiles together to generate tax and transfer profiles disaggregated by both sex and nativity (see Auerbach and Oreopoulos, 1998).

TABLE 1—GENERATIONAL ACCOUNTS (IN THOUSANDS OF DOLLARS)

Immigration policy assumption	Initial fiscal-balance assumption: No change Males	No change Females	Immediate change Males	Immediate change Females
Current Newborns (burdens under baseline immigration policy):				
Baseline	71.6	49.6	79.2	55.5
Future Generations (absolute burdens and percentage changes in taxes and transfers):				
Baseline	121.3 [0/42]	87.6	79.0 [6/6]	55.2
No immigration after 2000	125.6 [0/46]	91.0	74.9 [6/3]	52.1
No immigration after 2000; defense a public good	131.9 [0/51]	95.8	81.2 [6/8]	56.9

Note: Numbers in brackets show percentage changes in taxes and transfers (current/future).

II. Results

What impact would a change in immigration have on the fiscal burdens of current and future generations? To address this question, we must first specify the exact change in policy envisioned. While we do not consider it a realistic policy option, simply halting all immigration in the year 2000 provides a useful polar case for analyzing the impact of less extreme changes in policy. Thus, we consider such a policy, based on an alternative set of population projections, which takes account not only of the direct effect of a drop in first-generation immigrants, but also the drop in the second-generation immigrant and native descendents of these excluded immigrants.

It is also necessary to specify a fiscal-policy environment in which the change in immigration policy takes place. We consider two such environments. In the first, the burden of the government's intertemporal fiscal imbalance falls entirely on future generations. In the second fiscal environment, the government's fiscal policy is assumed to change immediately, with taxes being raised and transfers being cut on *all* generations from the base year onward, until the government's fiscal imbalance is eliminated, under the current immigration scenario. This policy leaves the current newborn and first future native generations with roughly the same generational accounts, adjusted for growth. The accounts for the first future generation are slightly lower, reflecting their greater life expectancy and the predominance of transfer payments during the last years of life. Note, too, that this policy implies a much lower burden on future generations than does the other scenario.

The impact of these alternative fiscal scenarios may be seen by comparing the first two and last two columns in Table 1, which present the burdens on current newborns and initial future generations of males and females under the alternative fiscal policies. The first row under ''Current Newborns'' corresponds to the case of present immigration policy. Reading across the table, observe that stabilizing fiscal policy immediately would require an increase

of $7,600 in the burden on newborn males, and $5,900 in the burden on newborn females, corresponding to a 6-percent increase in all taxes and a 6-percent cut in all transfers. This immediate adjustment would permit a significant drop in the burdens on future generations.

Now, consider the impact of eliminating immigration. Eliminating immigrants also eliminates the taxes they pay and the transfers they receive. It may also have some impact on the level of government purchases, depending on what we wish to assume about the nature of these goods (i.e., ''public'' goods vs. ''private'' goods) and how their provision changes with population. Initially, we assume that government-purchase profiles remain constant, meaning, for example, that a reduction in the population size with no change in population structure will induce a reduction of equal proportion in the level of government purchases.

Under this assumption about government purchases, the impact of eliminating immigration is shown in the first two sets of numbers under ''Future Generations'' in Table 1. For the fiscal scenario that allocates the entire burden to future generations, eliminating immigration hurts the remaining population, raising the burden on males by $4,300 and the burden on females by $3,400. Thus, immigration is helpful in restoring fiscal balance. However, this picture changes under the alternative assumption that fiscal policy is immediately adjusted to institute balance under present immigration policy. As shown in the table's last two columns, eliminating immigration after restoring fiscal balance *reduces* the burdens of those that remain in future generations, implying that a smaller adjustment would have been needed with immigrants absent; future generations of males gain $4,100, and females gain $3,100.

What explains the difference for the two fiscal policies? Under this ''responsible'' fiscal-policy scenario, more of the burden is being placed on current generations, and less on future generations. Because *new* immigrants represent a greater fraction of future generations than of present ones, their fiscal contribution is weighted more strongly toward that of future generations than that of existing generations. Thus, their average contribution is lower under the policy of immediate adjustment than under the policy of ''letting future generations pay,'' so eliminating them from the population has a relatively more beneficial fiscal impact under the scenario of immediate fiscal adjustment. Put another way, with an immediate fiscal adjustment, each immigrant's net contribution to fiscal balance is now negative, once one takes account of the associated change in government purchases.

This conclusion hinges, of course, on our assumption regarding the change in government purchases and in some sense represents an extreme case in which there are no economies of scale in the consumption of the goods and services government provides. While this may be a reasonable assumption for some government-provided goods, there may be others for which their ''public-goods'' nature implies significant economies of scale in consumption. To evaluate the importance of this issue, we consider the alternative extreme assumption that all spending on defense, roughly 25 percent of all government purchases, is purely ''public'' in nature and does not vary at all with the size of the immigrant population. This means that eliminating immigrants has no impact on this portion of government purchases, which will make reducing immigration appear less attractive from the fiscal perspective.

The last set of numbers under ''Future Generations'' in Table 1 illustrates the impact of this change in assumption. Now, eliminating immigration after the year 2000 increases the fiscal losses under the ''irresponsibility'' scenario and converts the gains to losses under the ''responsibility'' scenario. In the latter case, the losses to future generations from eliminating immigration are $2,200 for males and $1,700 for females. One may also express this loss relative to the population of all generations, not just future generations. That is, we estimate the increase in generational accounts that would result from the *immediate* adjustment of taxes and transfers (for all generations) required by a ban on immigration. For the scenario that holds defense spending fixed, the answer (not shown in the table) is $300 for each newborn male and $200 for each newborn female (growing with the economy over time), much smaller than the

corresponding values of $2,200 and $1,700 if the burden fell only on future generations. Whichever way this calculation is done, the impact is very small relative to the overall fiscal imbalance, equal to $49,700 for newborn males and $38,000 for newborn females.

As discussed in Auerbach and Oreopoulos (1998), these results are qualitatively robust to differences in assumptions regarding the government discount rate, the economy's growth rate, and the extent to which fiscal adjustments are made by changes taxes or transfer payments.

III. Conclusions

These findings lead us to three conclusions. First, whether immigration contributes to or helps alleviate fiscal stress depends on the extent to which that stress will be borne by future generations. If the entire fiscal imbalance currently estimated for the United States is placed on future generations, then the presence of new immigrants reduces the burden borne by natives. Second, when a policy of ''fiscal responsibility'' is followed, the fiscal gain from immigration is reduced. Indeed, whether there is a gain at all depends on the extent to which government purchases rise with the immigrant population. Third, the impact of immigration on fiscal balance is extremely small relative to the size of the overall imbalance itself. Thus, immigration should be viewed neither as a major source of the existing imbalance nor as a potential solution to it.

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