Population Aging as Fiscal Stabilizer

by

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I. INTRODUCTION

The accelerating rate of population aging in many industrialized countries has spawned a flurry of research on its implications for fiscal sustainability and intergenerational equity (a review of the major studies is found in Ruggeri and Zou [2006]). An aspect of population aging which has received less attention by researchers is its impact on the degree of built-in stability of the fiscal system. An attempt at filling this research gap is made in this paper. We specifically ask the following question: if the average annual growth rate of labour productivity in Canada over the next twenty years is reduced by half a percentage point, how much of the potential deterioration in the fiscal balance of all governments combined will be cushioned by the presence of an aging population? This question will be addressed in the following two sections of the paper. The second section describes the methodology while the third section presents and discusses the results. Some concluding remarks are contained in the final section.

Our findings indicate that the private income of seniors has the potential of cushioning between 15 and 33 percent of the potential decline in the projected budget surplus in response to a deceleration by half a percentage point in the growth rate of labour productivity.

II. METHODOLOGY

This section is divided into two parts. The first part explains how we measure the fiscal stabilization effect of population aging. The second part discusses the data sources and some details of our calculations.

II-A. Measures of the Stabilization Effect

Our approach to measuring the stabilization effect of population aging involves four steps. In the first step we estimate the combined fiscal position of federal/provincial-territorial/local governments in Canada over the period from 2006 to 2026. In the second step we apply a shock to the economy. In the third step we estimate the effect of this shock on the budget position under the assumption that the incomes of seniors respond to this shock in the same manner as those of non-seniors. In the fourth step, we repeat the calculations under the assumption that the private income of seniors (except for employment income) does not respond to the economic shock.

The stabilization effect of population aging is measured as the percentage of the potential change in the fiscal position of governments (step three minus step one) that is offset by the presence of population aging (step four minus step three). The shock that we apply to the economy is a reduction in the average annual growth rate of labour productivity of half a percentage point, which is directly translated into an equal change in the growth rate of real and nominal GDP. This choice has two advantages: it focuses on the fiscal effects of changes in labour productivity, separate from changes in employment, and simplifies the calculations and their interpretation because all other economic variables remain unchanged.

The magnitude of the stabilization effect depends to a large extent on the assumptions about the response of government spending to the economic shock. In our calculations we used two polar assumptions about this response. In the first case, we assumed that transfer payments to persons remain unaffected as they are mandated by statute (although in theory the statutes can be

amended), but spending on government purchases is reduced by 0.5%, indicating a full response to the economic shock. In the second case, we assumed that government spending is totally unresponsive to the economic shock. In our view, a more realistic case is one which includes a partial response. Rather than assuming an arbitrary level of this partial response we thought that it would be more useful to present the full range of the stabilization effect by simulating the two polar cases.

In the case of responsive or flexible government spending, the stabilization effect may be measured as follows. Let R= government revenues, E = government expenditures and B = budget balance, all in the base case. Then let the subscript "f" refer to the case of responsive government spending, and subscript "e" refer to the case where the economic shock reduces the incomes of both seniors and non-seniors (except for government transfers to seniors), and subscript "s" refers to the case where the private non-employment income of seniors remains unaffected by the economic shock because it is in the form of private pensions and investment income. We can then write the potential effect (PE) of the economic shock as:

$$(1) \quad PE_f = B_{f,e} - B = (E_{f,e} - E) - (R_{f,e} - R)$$

Similarly, the stabilization effect (SE) may be measured as:

$$(2) \quad SE_f = B_{f,s} - B = (E_{f,s} - E) - (R_{f,s} - R)$$

Finally, the degree of stabilization (DS) may be calculated as:

$$(3) \quad DS_f = (SE_f - PE_f)/PE_f = [(E_{f,s} - E_{f,e}) - (R_{f,s} - R_{f,e})]/PE_f$$

Since, in our calculations transfer payments to persons remain unaffected by the shock while other government spending is responsive to the shock in both cases measured by expressions (1) and (2), it follows that $(E_{f,s} - E_{f,e})$ = zero, and the stabilization effect operates strictly on the revenue side and is determined by the stability of the incomes of seniors from private pensions and investment income. In this case the degree of stabilization may be expressed as:

$$(4)\ DS_f = (R_{f,s} - R_{f,e})/PE_f$$

Similarly, we can calculate the degree of stabilization in the case of unresponsive or inflexible government spending (DS_i) as:

$$(5)\ DS_i = (R_{i,s} - R_{i,e})/PE_i$$

where the lack of response is indicated by the subscript "i".

Since in both cases the stabilizing effect on the revenue side is generated entirely by the lack of response of private pension and investment income of seniors, which implies that $(R_{f,s} - R_{f,e}) = (R_{i,s} - R_{i,e})$, the difference between DS_f and DS_i is due entirely to the difference between PE_f and PE_i.

II-B Data Sources and Projections

The Fiscal Universe

As a first step, we identified the major fiscal components of federal-provincial-local governments combined. The relevant data are found in CANSIM II Table 3850001. In this database, government expenditures are divided into a variety of functional categories. Some of these

categories are broken down into several building blocks, a disaggregation which allows for a more detailed allocation among the selected age groups. In the case of social services, we were able to obtain an even finer disaggregation by combining this information with CANSIM II Table 3840009, which contains details on transfers to persons. A similar procedure was applied to the revenue side.

We excluded from our calculations revenues and expenditures associated with the Canada/Quebec Pension Plan for the following two reasons. First, this contributory public pension is not part of the government budgetary transactions, but is administered as a separate fund. Therefore it is outside the scope of our analysis, which is focused on the budgetary balance of all governments combined. Second, even if we expanded the scope of our analysis to include non-budget items, in the short and medium term a slowdown in the growth of labour productivity would reduce the revenues going into the Fund, but would likely leave the expenditures largely unchanged because the amount of the pension is formula-determined and the number of pension recipients would be unaffected by the economic shock. In the long-run, pension payments would also fall because the incomes upon which pension entitlements are based would decline. Moreover, as past experience with pension reform indicates, persistent shortfalls in the revenues would call forth structural adjustments in the program. This means that over the long-run, the assumed economic shock would have offsetting effects on the revenue and spending side, thus leaving the overall fiscal balance unchanged.

Economic and Fiscal Projections

The projections of major macro-economic variables were based on the projections contained in the November 2005 Economic and Fiscal Update [Finance 2004] and on those prepared by the Conference Board of Canada [2004]. Over the period from 2004 to 2026, they result in the following average annual growth rates: 4.42 percent for nominal GDP, 2.56 percent for real GDP, 1.00 percent for employment, and 2.00 for consumer inflation. The associated fiscal projections are derived as the sum of the projections for each major budget component.

Allocation of Revenues and Expenditures

Government revenues and expenditures were allocated among two major age groups: seniors (65+) and non-seniors. The general approach to the allocation of revenues and expenditures by the two age groups was based on the methodology employed in studies of tax and fiscal incidence [Ruggeri, Van Wart and Howard 1997, Vermaeten, Gillespie and Vermaeten 1994] with appropriate adjustments when necessary (More details are found in Ruggeri and Zou 2006).

III. RESULTS

The potential fiscal effect of a reduction in the growth of labour productivity and the stabilization power of population aging depend in part on how government expenditures respond to this shock. In our calculations we have used two opposite responses.

In the first case we assumed that government expenditures are fully sensitive to the changes in revenues resulting from the economic shock. In this case we assumed that government spending

will decline also in line with the reduction in economic growth. In the second case we assumed that government spending is unresponsive to changes in revenues induced by changes in economic conditions.

III-A. Inflexible Government Spending

The results of our calculations when all government spending is not responsive to the reduction in the growth of labour productivity are shown in Table III-1. The first column identifies the final year of a fiscal year. The next column shows the change in the governments' fiscal position in response to the assumed economic shock, namely, a reduction of half a percentage point in the annual growth rate of labour productivity (the potential fiscal effect PE_i). In this simulation we assumed that the private income of seniors falls at the same rate as private sector wages and salaries, which implies that the private income of seniors is entirely in the form of labour compensation. The third column shows the change in the fiscal position when population aging generates a stabilizing effect by assuming that the investment income and private pension income of seniors remain unaffected by the economic shock (SE_i). The last column measures the degree of fiscal stabilization generated by the stability of the private income of seniors (DS_i).

Our calculation indicates that in the base case all Canadian governments combined have a positive fiscal balance throughout the entire period, with a surplus that increases from nearly $15 billion in fiscal year 2005-06 to $91 billion in 2025-26. When the income of seniors behaves as private sector wages, the assumed deceleration in the rate of productivity growth is estimated to reduce substantially this projected surplus. In response to this economic shock the surplus is

projected to fall by 24 percent in 2009-10, by 58 percent in 2019-20 and by 81 percent in 2025-26.

This potential reduction in the combined budget surplus is mitigated by the assumed stability of the investment income and private pensions of seniors. The degree of stabilization, which measures the proportion of this potential fall in the surplus prevented by the stability of a major component of the income of seniors, increases steadily after 2006-07 rising from 10.8 percent to 17.7 percent in 2025-26. Over the entire period it averages about 15 percent.

Table III-1. Fiscal Stabilization Effect of Population Aging: Inflexible Government Spending.

Year	Change in the Fiscal Position, $ Million		Stabilization Effect, %
	Without Stabilization	With Stabilization	
	PE_i	SE_i	DS_i
2006	- 1,019	- 906	11.2
2007	- 2,046	-1,824	10.8
2008	- 3,163	- 2,820	10.9
2009	- 4,382	- 3,902	11.0
2010	- 5,709	- 5,076	11.1
2011	- 7,149	- 6,344	11.3
2012	- 9,672	- 8,524	11.9
2013	-12,407	-10,875	12.4
2014	-15,375	-13,412	12.8
2015	-18,592	-16,145	13.2
2016	-22,060	-19,077	13.5
2017	-25,755	-22,165	13.9
2018	-29,751	-25,484	14.3
2019	-34,043	-29,026	14.7
2020	-38,628	-32,788	15.1
2021	-43,527	-36,782	15.5
2022	-48,771	-40,997	15.9
2023	-54,387	-45,478	16.4
2024	-60,366	-50,215	16.8
2025	-66,757	-55,244	17.2
2026	-73,585	-60,579	17.7

III-B. Flexible Government Spending

Different results are obtained when we assume that government spending, other than transfers to persons, responds to the economic shock in the same manner as private sector labour compensation. Since the overwhelming share of government purchases is in the form of wages and salaries, this case implicitly assumes that public sector compensation relative to private sector compensation remains unaffected by the reduction in the growth of labour productivity.

As shown in the second column of Table III-2, when government wages are flexible, the effect of a slowdown in labour productivity growth on the government's budget position is moderate because the associated reduction in government revenues is largely offset by the reduction in government spending. The second column shows that the changes in the two components of the budget position nearly offset each other until 2010-11. The effect increases over time, but it is still fairly small in 2019-20 as it reduces the budget surplus by only 19 percent. This reduction increases to 37 percent in 2025-26.

The third column of Table III-2 shows that, in fiscal year 2010-11 the revenue effect of the assumed stable income of seniors from investments and private pensions more than offsets the net effect of the changes in other revenues and government spending, thus resulting in an increase in the surplus, which results in a value greater than one in the estimated degree of stabilization (DS_f).

As the effect of slower labour productivity growth accumulates over time, its effect on government revenues is more powerful than the other effects on the budget position and the budget surplus starts to decline. The degree of stabilization starts to decline first rapidly from 2010-11 to 2014-15 and then slowly until 2020-21. After that year it changes direction and follows a slowly rising path ending with a value of 38.2 percent in 2025-26. Over the last decade of the projection period, the stability of the private income of seniors (except employment income) offsets more than one third of the potential fall in the budget surplus.

Table III-2. Fiscal Stabilization Effect of Population Aging: Flexible Government Spending.

Year	Change in the Fiscal Position, $ Million		Stabilization Effect, %
	Without Stabilization	With Stabilization	
	PE_f	SE_f	DS_f
2006	- 107	7	106.5
2007	- 122	100	181.5
2008	- 145	198	236.5
2009	- 175	305	274.0
2010	- 215	419	295.1
2011	- 263	543	306.4
2012	- 1,476	- 329	77.7
2013	- 2,800	- 1,268	54.7
2014	- 4,261	- 2,297	46.1
2015	- 5,869	- 3,422	41.7
2016	- 7,617	- 4,634	39.2
2017	- 9,486	- 5,896	37.8
2018	-11,524	- 7,257	37.0
2019	-13,728	- 8,712	36.5
2020	-16,084	-10,243	36.3
2021	-18,590	-11,845	36.3
2022	-21,306	-13,531	36.5
2023	-24,127	-15,278	36.8
2024	-27,244	-17,093	37.3
2025	-30,521	-19,008	37.7
2026	-34,031	-21,026	38.2

IV. CONCLUSION

This paper developed a measure of the extent to which the existence of a large and increasing component of the income of seniors, namely, private pension income and investment income, which is largely unresponsive to economic shocks, may mitigate the effect on the budget position of all Canadian governments combined of a slowdown in the growth of labour productivity. Our findings indicate that the magnitude of this fiscal stabilization effect depends on whether government spending is responsive to the assumed economic shock. The degree of stabilization due to population aging was estimated to be in the range of 15 to 33 percent.

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