

# RISK POOLING AND THE MARKET CRASH: LESSONS FROM CANADA'S PENSION PLAN

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## Introduction

Defined contribution plans are now the nation's primary private retirement income program and repository of retirement savings. About two thirds of the assets held in such plans are invested in equities, as is the case in the defined benefit plans they largely replaced. Equities can dramatically reduce the cost of providing retirement incomes, given their high expected returns. But, as illustrated by the recent market crash, equities are also risky.<sup>1</sup> The resulting losses (and gains) in retirement income are also distributed very unevenly in the nation's 401(k)-IRA system. The crash hardly affected the retirement prospects of the young: the bulk of the retirement income they will draw from 401(k)s and IRAs will come from future contributions and future returns. Those at the cusp of retirement, by contrast, are heavily exposed: retirement savings are then at their peak and there is little time to adjust work, saving, and retirement plans in response to the market crash.

This concentration of risk is highly troubling, as the 401(k)-IRA system has become the nation's primary private retirement income program, and has led to calls to reform. The challenge is to capture the higher expected returns equities offer in a way that

provides reasonably secure and reliable incomes in retirement. One approach would make individual retirement accounts more secure and reliable through the use of mandates, defaults, guarantees, or risk-sharing arrangements.<sup>2</sup> This *brief* offers a different approach, examining the Canada Pension Plan (CPP) and how it manages the risk that comes with investing retirement savings in equities.

The *brief* is organized as follows. The first section describes the CPP. The second section examines the reaction of the CPP to the recent market crash in terms of risk-bearing and investment decisions. The conclusion draws implications for the United States.

## The Canada Pension Plan

The CPP is a national defined benefit pension program covering workers in all Canadian provinces except Québec, which has a similar provincial program. The CPP only covers earnings up to an amount roughly equal to 115 percent of national average earnings. In exchange for mandatory contributions of 9.9 percent of covered earnings, split equally between employers and employees, the program pays

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pensions, for retirement at age 65, roughly equal to 25 percent of average indexed covered earnings.<sup>3</sup> These pensions are an important supplement to the government's modest Old Age Security (OAS) demogrant, which provides a flat payment roughly equal to 15 percent of national average earnings to all long-term Canadian residents age 65 or over. Many retirees also receive benefits from the government's means-tested Guaranteed Income Supplement (GIS) program. GIS guarantees retirees an income, over and above their OAS demogrant, roughly equal to 20 percent of national average earnings, with GIS benefits reduced at a rate of \$1 for each \$2 of income, including income from the CPP. Even a retiree with the maximum CPP pension would get a small GIS benefit, if that retiree had no other income.

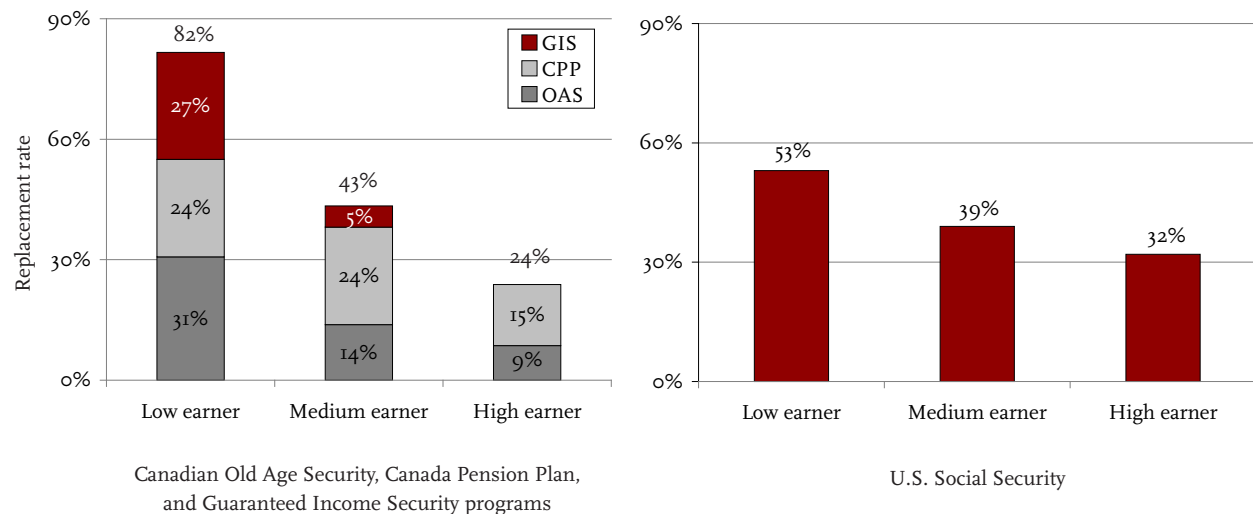
Figure 1 shows earnings replacement rates in three hypothetical cases roughly analogous to the "low," "medium," and "high" earner replacement rates reported in the U.S. Social Security Administration *Trustees' Report*.<sup>4</sup> OAS and CPP combined replace a similar share of earnings as the U.S. Social Security program for low and average earners, and a distinctly smaller share of earnings for high earners.<sup>5</sup> The figure shows the maximum GIS benefit available to the low and medium Canadian earner, assuming they have no source of income other than OAS and

CPP. As low earners generally receive GIS benefits, Canada's public programs replace a significantly higher share of the earnings of low earners than the U.S. Social Security program.<sup>6</sup>

Intergenerational equity – defined as each generation contributing much the same share of earnings while working and receiving benefits that replace much the same share of earnings in retirement – is an explicit goal of the CPP program.<sup>7</sup> Given rapid aging over the next several decades, this notion of intergenerational equity requires the CPP to build up a large fund to help pay benefits down the road. To do so effectively and to sustain the program's ability to pay benefits, CPP assets are invested in a diversified and actively-managed portfolio of securities, with a significant share in equities.

In the United States, proposals also emerged in the 1990s to invest Social Security assets in equities. Political concerns, however, torpedoed such proposals, even for investing the program's assets in equities using passive index funds. Similar concerns were raised in Canada during the 1997 debates that created the current program. In response, the politicians that designed the current program did their best to make the CPP a largely autonomous entity with investment decisions placed well beyond the reach of any politician or interest group (see Appendix for details).<sup>8</sup>

FIGURE 1. COMPARATIVE REPLACEMENT RATES BY EARNINGS LEVEL, CANADIAN AND U.S. SOCIAL SECURITY PROGRAMS



Notes: Hypothetical earnings replacement for retirement at age 65. Canada: for retirees who earned 45%, 100%, and 160% of maximum pensionable earnings (= c.115% of national average earnings); GIS amounts are maximum GIS benefits for retirees with no income other than OAS and CPP. United States: for retirees who earned 45%, 100%, and 160% of national average earnings.

Sources: Service Canada (2009b); U.S. Social Security Administration (2008).

## The Canada Pension Plan's Response to the Crash

The CPP's financial plan calls for the accumulation of a large pool of assets, expected to total 6.5 times annual benefit outlays by 2080. Investment income is then projected to be about 30 percent of benefit outlays, with contributions about 15 percent less than benefit outlays. To build a fund that will produce enough income to make up the difference between contributions and benefits (plus a substantial cushion in the event of shortfalls) requires a 4.2 percent real return on assets. Given the stock and bond returns the CPP financial program projects, this target rate of return implies 50 percent of assets invested in equities. As the CPP is currently building up its investment fund and does not need investment income to meet benefit obligations, roughly 65 percent of assets are currently invested in equities.<sup>9</sup>

Equity investments entail risk. Part of this risk is addressed by a conservative funding program that targets investment income that exceeds amounts needed to meet benefit obligations and results in a rising ratio of assets to annual benefit outlays. The CPP, like other retirement savings vehicles invested in equities, nevertheless saw a decline in the value of assets in the recent stock market crash.<sup>10</sup> The key issues discussed below are: 1) how such losses are borne; and 2) how the crash affects CPP investment decisions.

### *How Losses are Borne*

The CPP is designed to operate as an independent financial institution. Should the Chief Actuary report that the minimum contribution needed to sustain the program is greater than the current rate, the federal and provincial "stewards" could agree to increase contributions and/or reduce benefits to restore balance. They can also agree to defer any change in contributions or benefits until the next triennial review. If the stewards fail to reach such an agreement, the automatic stabilizers take effect: First, contributions are raised, up to 0.2 percent of covered earnings per year, to an amount equal to one half the difference between the current rate and the minimum rate needed to restore sustainability in 75 years. Second, benefit cost-of-living adjustments are eliminated until the next triennial review. If that review again reports a shortfall, for whatever reason, the process is repeated.

The next triennial evaluation of the financial status of CPP, as of year-end 2009, is scheduled to appear in 2010. Many factors, such as changes in projected longevity, immigration, birth rates, and the like, will affect the evaluation in addition to the performance of CPP investments. However, should the only change be a 50-percent decline in the value of equities held by the CPP, the minimum contribution needed to keep the program sustainable would rise by 0.3 percent of covered earnings.<sup>11</sup> The current minimum rate, set at the last triennial evaluation, is about 9.8 percent of covered earnings. A 0.3 percentage point rise would thus push the minimum rate to 10.1 percent, 0.2 percentage points above the CPP's current 9.9 percent rate.

The CPP's federal and provincial stewards could respond to this shortfall in different ways. They could cut benefits or raise contributions, introduce the adjustments immediately or over time, or target certain participants for benefit cuts or tax increases. Politicians, however, are quite averse to raising con-

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*Pooling equity risk dampens the effects of a market crash.*

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tributions or cutting benefits just to keep social insurance programs sustainable over the long term. That is why the CPP program

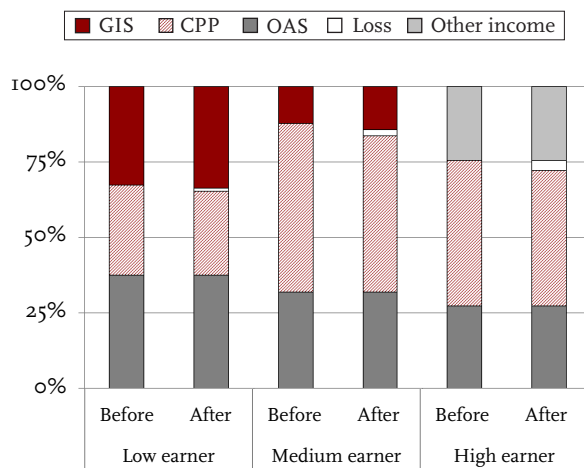
includes the automatic stabilizers described above. Should the stewards fail to act and the automatic stabilizers go into effect, the contribution rate would rise by 0.1 percentage points – half the difference between the current and new minimum rates, to 10.0 percent – and cost-of-living adjustments would be eliminated until the next triennial review. As the Chief Actuary estimates the effect of the benefit freeze as equivalent to a 0.15 increase in the contribution rate, the two adjustments would restore sustainability.<sup>12</sup>

The automatic stabilizers concentrate much of the burden on current retirees. The benefit freeze not only has a greater effect on CPP finances than the increased contributions, it also affects far fewer people. Eliminating cost-of-living adjustments would reduce the benefits of current retirees an estimated 7 percent over the remainder of their retirement years.<sup>13</sup>

A 7 percent cut in CPP benefits is not a 7 percent cut in retirement incomes. OAS benefits and other sources of income are unaffected. Means-tested GIS benefits actually offset up to half the CPP reductions; a portion of the burden the automatic stabilizers assign to current retirees is thereby transferred to federal government taxpayers, to be paid off immediately or added to the national debt.

Figure 2 shows the net effect of the benefit freeze on the retirement incomes of the three hypothetical retirees in Figure 1. In this example, the low and medium earners have no income other than OAS, CPP, and GIS; the high earner has just enough other income to be ineligible for GIS benefits even after the benefit freeze. As other income dilutes the effect of the reduction in CPP benefits, these examples represent upper bounds on the effect on retirement incomes. These upper-bound reductions, barely visible, are 1 percent for the low earner; 2 percent for the medium earner, and 3 percent for the high earner.<sup>14</sup> While significantly less than the reduction in CPP benefits alone, these reductions in retiree incomes are dramatically greater than the loss in worker incomes resulting from a rise in CPP contributions equal to 0.1 percent of covered earnings.

FIGURE 2. EFFECT OF A CPP BENEFIT FREEZE ON THE RETIREMENT INCOME OF A HYPOTHETICAL LOW, MEDIUM, AND HIGH EARNER



Source: Authors' calculations.

Using a three-year benefit freeze to counteract adverse financial shocks also undermines the attractiveness of the CPP as a vehicle for investing retirement savings in equities. CPP benefits are primarily financed by current worker contributions, not the retirement savings held by the CPP. Even in the out-years, CPP assets will finance only 15 percent of CPP benefits. Thus the 7 percent reduction in CPP benefits resulting from a benefit freeze cuts the income provided by the CPP's funding program nearly

50 percent. If the retirement savings that provided 15 percent of CPP benefits were instead held in individual accounts, retirees would only suffer a comparable loss had they invested the entire account in equities and had the stock market crashed as it did last year.

As noted above, these automatic adjustments were not designed to go into effect but to pressure the stewards to act. Concentrating the burden on current retirees is clearly at odds with general notions of social insurance objectives. The distribution of losses is also quite unfair: workers who will retire soon will pay the modestly higher contributions and then retire on unreduced benefits; workers just a few years older will have their CPP benefits substantially reduced. A small reduction in all benefits paid out over the next 76 years, a reduction akin to the increase in contributions, would be far more consistent with social insurance objectives. The drafters of the 1997 legislation, however, designed the automatic stabilizers as a political device: they expected the threat of a benefit freeze would mobilize retirees to "put a cannon" at the head of the stewards to restore the program in some other way.<sup>15</sup>

### *How the Market Crash Affects Investment Decisions*

Many financial market participants reduce their tolerance for risk in response to a market downturn. While this limits further losses, it locks in losses already incurred.<sup>16</sup> Market downturns also typically result in a re-pricing of risk. This increased risk aversion and re-pricing of risk raise the expected returns of risky vis-à-vis less risky assets.

It could well be the case that many CPP participants are less willing to hold equities and other risky assets in response to the market crash. The CPP's capacity for inter-temporal risk-sharing, however, dramatically attenuates the risk exposure of any particular participant (assuming retirees are not at risk of a benefit freeze). The CPP could thus be far more willing to bear risk than almost any other participant in the post-crash financial market. Given the significantly higher expected returns on risky assets, the CPP could then be expected to increase its investment in risky assets while other investors – most significantly many U.S. households at the cusp of retirement dependent on 401(k)s – can be expected to increase their investment in low-risk assets with diminished expected returns.

Conversations with officials at the Canada Pension Plan Investment Board (CPPIB), the independent investment organization that manages CPP assets, confirm that they view their risk-bearing capacity as essentially unchanged. The CPPIB uses a risk budget to control the fund's overall risk exposure and the market crash initially had no effect on the risk budget. The availability of "bargains" in the financial marketplace – much larger expected future cash-flows at a given price and risk exposure – has actually induced the CPPIB to expand the amount of risk in the CPP portfolio. The bargains are especially good in less liquid long-term investments, as are the prices the CPPIB can get selling liquid, short-term, low-risk assets. If the expectations of higher returns prove accurate, they will help offset the adverse effects of the market crash on the CPP's financial position.

The CPPIB's response to shifts in asset prices resulting from the market crash has another beneficial effect, albeit unintended. Its purchase of long-term illiquid assets expands demand in areas of the financial marketplace where demand is unusually weak; its sale of liquid, low-risk assets likewise expands supply where demand is unusually strong. The CPPIB, acting on behalf of a multi-generational financial institution, thus helps stabilize the financial markets.

## Conclusion

Retirement savings must be invested in equities to keep down the cost of retirement. Holding equities in 401(k)s and IRAs, however, fully exposes individual households to the risk of sudden market downturns. Millions of Americans now approaching or in retirement and dependent on such accounts must now deal with such a collapse. Those who retain their equity investments risk further losses. Those who sell lock in their losses and a much diminished income in retirement. Given the *likelihood* of such sudden downturns in equity markets, the nation needs a far more secure and reliable second tier.

The "stress test" provided by the recent market crash has highlighted key advantages of a CPP-type institution. The CPP invests in equities to reduce the cost of retirement. The program's existing automatic stabilizers concentrate risk on current retirees. But the CPP, as a multi-generational institution with mandatory participation, could easily pool the risk in equity investments far more broadly and dramatically dampen the effects financial shocks have on individual households. This capability stands in stark contrast to the concentrated effect of financial shocks on households approaching or entering retirement dependent on 401(k)s or IRAs. The CPPIB, as perhaps the longest term investor in the marketplace, is also using the downturn as an opportunity to purchase assets offering unusually high expected returns at given risk exposures. In addition to benefiting the retirement savings program, this response helps stabilize financial markets.

The Canada Pension Plan is a national pension program that was established by the government but operates as an independent financial institution. The CPP relies on mandatory participation and contributions and on its federal and provincial government stewards to maintain long-term sustainability. Its obligations, however, are not government obligations and its assets are not government assets. Its governance system keeps investment decisions beyond the reach of any politician. The program's primary reliance on the political process to assure long-term sustainability could be largely replaced by automatic stabilizers designed to optimize social insurance objectives. Given its clear financial advantages and innovative institutional framework, the CPP design merits serious consideration as the United States rebuilds its retirement income system.

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# APPENDIX

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## Appendix

The CPP's governance system is widely viewed as successful in meeting its objective of ensuring the independence of the CPP and CPPIB from political influence.<sup>17</sup> The CPP governance system has the following features:

1. While the federal and provincial governments created the CPP and remain its "stewards," the assets and liabilities of the CPP are not considered government assets or liabilities. The legal obligation to pay benefits does not reside with the federal or provincial governments and government budgets are in no way affected by CPP finances.
2. Management of CPP assets is vested in the CPP Investment Board (CPPIB), an independent asset management organization governed and managed independently of the CPP and at arm's length from the federal and provincial governments. The 1997 legislation explicitly rejected all political or social investing objectives and defined the welfare of plan participants as the single focus of the CPPIB – the same fiduciary standard established by the Employee Retirement Income Security Act (ERISA) for U.S. employer plans. The legislation also created elaborate procedures for selecting an independent board, devoid of politicians and government employees, and for reporting CPPIB activities.
3. To assure the program remains sustainable over the long term, the 1997 legislation prescribes triennial evaluations of the CPP's financial status by Canada's Chief Actuary and a review of the Actuary's report by the program's federal and provincial government "stewards." If the report finds the minimum contribution rate needed for long-term sustainability is greater than the current legislated rate (currently 9.9 percent), the stewards could raise contributions and/or cut benefits to bring the program back into balance. As politicians typically avoid imposing such pain on constituents, the 1997 legislation includes automatic stabilizers, discussed in this *brief*, that go into effect should the stewards fail to act. These stabilizers were designed as a *political* device to pressure the politicians to act, not an *economic* device designed to spread the burden of absorbing shortfalls in an efficient and equitable fashion. Whether they force the stewards to act or go into effect, the stabilizers nevertheless make the CPP a self-correcting institution.
4. To protect the program against changes that could undermine its long-term viability, the founding legislation requires changes to the CPP program – including changes to the set-up of the CPPIB and its investment mandate, or to CPP benefits and contribution rates – be approved by the federal government and two-thirds of the provinces representing two-thirds of the population. This level of exigency is *greater* than that required to change the Canadian constitution.

In sum, the CPP, while government created, is not beholden to government in any way. In addition, the CPPIB functions as a highly professional investment manager, independent of political influence.

## Endnotes

1 See Munnell and Muldoon (2008).

2 See Munnell et al. (2009).

3 To calculate a worker's benefit, past earnings are indexed to national average earnings up to the year of retirement and compared to maximum pensionable earnings over the period, also indexed to national average earnings. The resulting ratio determines the worker's CPP benefit as a proportion of the maximum CPP benefit in the worker's year of retirement. That maximum CPP benefit in any year of retirement is 25 percent of the average of maximum pensionable earnings over the previous five years – an amount slightly less than 25 percent of maximum pensionable earnings in the year prior to retirement. In 2009, the maximum CPP pension thus is \$10,925, 24 percent of maximum pensionable earnings in 2008; the average yearly CPP pension for all retirees was \$6,022. See Service Canada (2009a).

4 The U.S. replacement rates are for workers earning 45 percent, 100 percent, and 160 percent of national average earnings. The Canadian replacement rates are for workers earning 45 percent, 100 percent, and 160 percent of the maximum earnings covered by the CPP – earnings roughly 15 percent higher than national average earnings.

5 Canadian public programs replace a relatively small share of earnings for high earners because 1) the flat OAS demogrant replaces a relatively small share of their earnings; 2) the CPP program only covers earnings up to an amount roughly equal to 115 percent of national average earnings; and 3) most high earners have other sources of retirement income that make them ineligible for GIS. For more on the retirement income systems of Canada, the United States, and other “Anglo-Saxon” nations, see Munnell and Sass (2006).

6 As GIS benefits and eligibility thresholds are indexed to wages, while CPP benefits in payment are only indexed to prices, as retirees age more become eligible for GIS benefits and their GIS benefits tend to rise.

7 See Gollier (2007) for a very good review of intergenerational risk-sharing and risk-taking within pensions.

8 “The main fear was that a federal government might try to raid the fund some future time to suit its own purposes,” according to Martin (2007). The description of the CPP governance structure that appears in the Appendix is largely based on Denison (2006) and Little (2008).

9 Office of the Chief Actuary (2007).

10 The 2009 Annual Report of the CPPIB, which arrived as this *brief* is released, reports a loss on assets of 18.6 percent for the year ending March 31st, 2009.

11 E-mail exchange with the Chief Actuary via the staff of the CPPIB, March 18, 2009. A 50 percent reduction in the value of equities can be expected to have a similar effect on CPP finances going forward. CPP assets are projected to rise from about 4.5 to about 6.5 times annual benefit outlays, which makes the program more sensitive to investment performance. The share of assets invested in equities, however, is projected to fall from 65 percent to 50 percent. As a result, the value of equities held by the CPP is only projected to rise from 3.0 to 3.25 times annual benefit outlays. As a larger share of participants will be retired, as the Baby Boom retires and longevity rises, a benefit freeze will offset a larger portion of the loss.

12 E-mail exchange with the Chief Actuary via the staff of the CPPIB, February 7, 2009.

13 The value of benefits net of inflation would fall 7 percent if prices rise 2.5 percent a year, as projected in the Chief Actuary's estimates.

14 The stock market crash, of course, will also reduce retiree incomes to the extent they draw incomes from individual accounts invested in equities.



15 Little (2008). There is also the notion that this distribution of burden is justified by the fact that current retirees contributed a smaller share of covered earnings to the program, over much or all of their working lives, than the current 9.9 percent. This disparity, of course, will be increasingly less significant over time.

16 Under plausible assumptions regarding household risk preferences, a large loss of wealth does not raise risk aversion. In response to a market downturn, such households should in fact rebalance in favor of equities. Individuals could nevertheless reassess their willingness to bear risk if the market downturn leads them to revise their beliefs regarding the distribution of equity returns. In market downturns, non-rational factors also seem to produce “flights to quality” and a heightened aversion to risk.

17 See Sarney and Prenata (2001/2002); Palacios (2002); Weaver (2003); and Munnell and Sass (2006).

## References

- CPP Investment Board. 2009. *2009 Annual Report*. Toronto, Canada.
- Denison, David. 2006. "The Canada Pension Plan: A Model of Reform." AARP Capital Hill Briefing Series. Available at: [http://www.aarpinternational.org/resourcelibrary/resourcelibrary\\_show.htm?doc\\_id=578480](http://www.aarpinternational.org/resourcelibrary/resourcelibrary_show.htm?doc_id=578480).
- Gollier, Christian. 2007. "Intergenerational Risk-Sharing and Risk-Taking of a Pension Fund." *Journal of Public Economics* 92(5-6): 1463-1485.
- Little, Bruce. 2008. *Fixing the Future: How Canada's Usually Fractious Governments Worked Together to Rescue the Canada Pension Plan*. Toronto: University of Toronto Press.
- Martin, Paul. 2007. "Canada Pension Plan Reforms 10 Years After: Lessons and Prospects." Speech, December 10, 2007. Available at: <http://www.paulmartin.ca/en/speeches-20071210-1>.
- Munnell, Alicia H. and Dan Muldoon. 2008. "Are Retirement Savings Too Exposed to Market Risk?" *Issue in Brief* 8-16. Chestnut Hill MA: Center for Retirement Research at Boston College.
- Munnell, Alicia H., Alex Golub-Sass, Richard A. Kopcke, and Anthony Webb. 2009. "What Does It Cost to Guarantee Returns?" *Issue in Brief* 9-4. Chestnut Hill MA: Center for Retirement Research at Boston College.
- Munnell, Alicia H. and Steven A. Sass. 2006. *Social Security and the Stock Market: How the Pursuit of Market Magic Shapes the System*. Kalamazoo, MI: W.E. Upjohn Institute.
- Office of the Chief Actuary, Office of the Superintendent of Financial Institutions Canada. 2007. *23rd Actuarial Report on the Canada Pension Plan as at 31 December 2006*. Ottawa: Minister of Public Works and Government Services.
- Palacios, Robert. 2002. "Managing Public Pension Reserves Part II: Lessons from Five OECD Initiatives." Social Protection Discussion Paper 0219. Washington, DC: World Bank.
- Service Canada. 2009a. "Canada Pension Plan (CPP) – Retirement Pension." Available at: <http://www1.servicecanada.gc.ca/eng/isp/pub/factsheets/rates.shtml>.
- Service Canada. 2009b. "Income Security Programs Information Card." Available at: <http://www1.servicecanada.gc.ca/eng/isp/statistics/rates/aprjun09.shtml>.
- Sarney, M. and A. M. Prenata. 2001/2002. "The Canada Pension Plan's Experience with Investing Its Portfolio in Equities," *Social Security Bulletin* 64 (2): 46-56.
- Weaver, R. K. 2003. "Whose Money Is It Anyway?: Governance and Social Investment in Collective Investment Funds. Working Paper 2003-07. Chestnut Hill MA: Center for Retirement Research at Boston College.
- U.S. Social Security Administration. 2008. *The 2008 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and the Disability Insurance Trust Funds*. Washington, DC: U.S. Government Printing Office.

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