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20 Generational Accounting in Portugal

Alan J. Auerbach, Jorge Braga de Macedo, José Braz, Laurence J. Kotlikoff, and Jan Walliser

20.1 Introduction

This study uses generational accounting, a new method of long-term fiscal planning, to derive the future net taxes that will balance Portugal's government budget accounts. Specifically, it computes a set of generational accounts and uses them to reach an important conclusion: Portuguese fiscal policy is unsustainable.

Current budgetary policy includes ceilings on the budget and the debt until the year 2000, which fulfill the convergence criteria set out in the Treaty on European Union for accession to the euro. Yet, under current fiscal rules, future Portuguese generations face a net tax (taxes paid net of transfer payments received) burden, relative to income, that is well in excess of that faced by current generations. Significant increases in taxes or reductions in expenditures are required to satisfy the government's long-term (intertemporal) budget constraint and avoid unfairly burdening future generations.

Generational accounting offers an intuitive measure of the sustainability of fiscal policy, namely, *generational balance*—the condition that future genera-

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tions pay the same share of their lifetime labor income in net taxes (taxes paid net of transfer payments received) as is paid by current generations. In addition to showing the substantial current imbalance in Portuguese generational policy, alternative means of achieving generational balance are suggested in this study.

Because it is forward looking and deals explicitly with implicit as well as explicit liabilities, generational accounting can provide more insight into a nation's fiscal affairs than can the simple consideration of its official budget deficit. Generational accounting is particularly helpful in understanding the prospects for national economies, such as the Portuguese, undergoing profound change in their fiscal and monetary regimes. Section 20.2 describes recent Portuguese economic reforms, traces out their implications, and suggests additional measures needed for Portugal to attract foreign investment and to converge to European levels of income. The size of the net tax burden facing future generations is documented by section 20.3's generational accounting and the alternative means of facing it are contrasted. As stated in the conclusion, section 20.4, Portugal's generational accounts provide a way for international investors to judge whether fiscal stability is actually being achieved by the Portuguese government.

20.2 Regime Change and Fiscal Evolution

European economic integration influenced Portugal for decades, even when restricted civil rights and the absence of political parties hindered mutual political responsiveness with the member states of the Common Market. Export-led growth of the 1960s, associated with membership in the European Free Trade Association, changed much of Portuguese industry. Agriculture and finance, however, remained traditional. Large-scale industrial projects were directed toward fostering economic integration with the African colonies, whereas trade and emigration were overwhelmingly directed toward Europe. Following decades of conservative social and economic policies, a bloodless military coup (the "carnation revolution") in April 1974 paved the way for a radical swing to the left, with widespread nationalizations and the adoption of many philosophical and institutional tenets of central planning.

Under pressure from military leaders, the two newly created major political parties, the left-of-center Partido Socialista (PS) and right-of-center Partido Social Democrata (PSD), approved a constitution in 1976 that included an explicit prohibition of privatization. With traditional agriculture in the hands of cooperatives and a state-owned financial system (which incorporated most large-scale industrial projects), the only sizable firms remaining in private hands were in export-oriented manufacturing.

The main constraint on inflationary policies came from the balance of payments and led to attempts to restore external balance via exchange rate depreciation and credit restrictions, which introduced a marked "stop and go" pattern

Table 20.1 Convergence Indicators

Year	Growth Rate of Labor Productivity[a]	Nominal Real Wage Growth Rate[a]	Long-Term Nominal Interest Rate[a]	Real Exchange Rate	Deficit (% of GDP)
1989	1.8	8.9	7.0	−3.2	2.5
1990	1.7	12.4	5.9	−8.7	5.6
1991	−1.8	12.5	8.1	−15.1	6.7
1992	0.5	2.6	5.6	−6.0	3.6
1993	−0.7	4.9	4.5	1.0	6.9
1994	−2.3	4.9	2.0	−2.2	5.8
1995	1.0	1.9	3.0	−3.1	5.1
1996	0.5	2.4	1.4	−1.8	4.0
1997	0.5	1.8	0.8	−2.0	2.9
1998	0.4	0.9	0.6	−0.6	2.9

[a]Portugal vs. EU average as presented in Braga de Macedo (1997).

in private economic activity. Market-oriented policies for internal balance did not begin to regain prominence until EU accession in 1986.

Under the leadership of Cavaco Silva the PSD obtained a majority in two successive general elections in July 1987 and in October 1991. Between 1985 and 1995, the PSD rule achieved a stable democratic government and rapid convergence toward European levels of most economic and social indicators. Indeed, Portugal now appears to be a serious contender for inclusion in the initial group of countries to join the Economic and Monetary Union (EMU) and adopt the euro as a single currency.

20.2.1 The Change in Economic Regime

In order to reduce the public sector of the Portuguese economy, a constitutional amendment allowing privatization was necessary. This amendment required a two-thirds majority and, thus, had to be supported by both the PS and PSD parties. This bipartisan support was achieved in the summer of 1989. Table 20.1 reports indicators of real and nominal convergence between Portugal and the average of its EU partners. The indicators are the rate of labor productivity growth, the rate of nominal wage growth, and long-term nominal interest rates according to the European Commission forecasts of winter 1996. The real effective exchange rate relative to the Organization for Economic Cooperation and Development (OECD) average (up is depreciation) and the general government deficit as a percentage of GDP are also reported in table 20.1.

The decade from 1974 to 1985 had been a period of severe economic disequilibrium, with the International Monetary Fund (IMF) twice being called to intervene with standby arrangements. The fiscal deficit averaged close to 10 percent of GDP during this period, and inflation rates reached nearly 30 percent. Politically, the situation was equally unstable, with governments of aver-

age duration around one year, which is one-fourth of the normal parliamentary term.

Recognizing that convergence toward the price stability and living standards of the European Community required a multiyear program, the government prepared the Program to Correct External Imbalances and Unemployment (PCEDED), or P1, which was approved in March 1987. Thanks to the international boom, and the terms-of-trade improvement, real convergence was accompanied by the elimination of the payments deficits and by sustained job creation.

The inflation differential relative to the Community average initially fell but later rose again and the debt-to-GDP ratio peaked at approximately 75 percent in 1988. In July 1989, following the acceptance of the EMU at the European Council in Madrid, the government approved a revised version of the PCEDED called P2. Under this revised program, fiscal adjustment was based on the newly reformed tax system, which introduced comprehensive income taxation for the first time. The concomitant revenue increases led the official government deficit to fall below 3 percent of GDP in 1989 (table 20.1).

The multiyear fiscal adjustment strategy contained in P2 was gradual, and before the change of the constitution, the size of the public sector remained essentially constant until 1990. Moreover, the rekindling of inflation led to an equally gradual abandonment of the policy of expected depreciation (crawling peg), which had been in place since 1977. While this mechanism was replaced in the spring of 1990 with shadowing the European Community's Exchange Rate Mechanism (ERM), the change was never announced publicly. Moreover, controls on capital inflows were introduced on top of the traditional restrictions on outflows. Because it was not based on clear rules, this shadow exchange arrangement managed by the central bank turned out to be more opaque and rigid than ERM membership. Because it preceded inflation convergence, it also brought greater volatility to the real exchange rate, as shown in table 20.1.

In 1990 and 1991, the Portuguese economy grew at approximately 1 percentage point above the Community average, while the inflation differential fell from 8 to 7 points. However, the official budget deficit deteriorated to almost 7 percent of GDP, and a reform of public sector pay led to wage increases that were 12 percentage points greater than the EU average. Exchange controls, in turn, increased rates on public bonds to 8 percentage points above the EU average. This was inconsistent with the exchange rate regime change implicit in the National Adjustment Framework for the Transition to Economic and Monetary Union, known as QUANTUM (or Q1), approved in June 1990.

The second PSD government, elected at the end of 1991, made the strategy of full participation in EMU a central part of its economic program.[1] In the convergence program for 1992–95 approved by the European Council (Ecofin)

1. The relevant national and European Community documents are summarized and interpreted in Braz (1992) and Braga de Macedo (1997) and literature cited therein.

in December, and dubbed Q2, fiscal, structural, and income policies were set in a macroeconomic framework consistent with a single European currency to which the escudo would be credibly pegged. Central features of the program were the inflation objective and the principle of nonaccommodation of nominal budgetary expenditures to any slippage in the inflation outcome. The budget process started with an overall expenditure ceiling in nominal terms, which was mandatory for the central government and recommended for the general government. To avoid higher other spending after the expected fall in interest rates, these ceilings were expressed net of interest payments on government debt. The next stage was the determination of the corresponding sources of revenue and financing. Finally, decisions were made regarding the allocation of the general government budget and, more specifically, of the central government budget.

Moderation in public sector wage increases was fundamental to compliance with the expenditure ceiling. As a participant in the process determining income policy, the government proposed target ranges for inflation consistent with convergence to the EU best performers. The average inflation range envisaged in Q2 was 7 to 9 percent in 1992 and 4 to 6 percent in the period 1993–95. At the same time, strict restraint on increases in other general government expenditures was essential to permit a significant increase in public investment in real terms, which was desirable to ease the catching-up process.

Monetary policy was kept compatible with the shadow exchange rate regime until the entry of the escudo in the ERM in April 1992, opening the way for the removal of the controls on capital inflows that had been introduced in 1991 and full liberalization of capital movements in December 1992.

Budgetary and structural policies were also important features of Q2. One goal was the reduction of the public sector deficit. In line with the projected macroeconomic framework, the general government deficit was to decline to 3 percent of GDP and the debt-to-GDP ratio to 53 percent on average for the three-year period 1993–95. With the anticipated reduction in interest rates, the interest burden was expected to fall from 9 percent of GDP in 1991–92 to 5 percent on average in 1993–95. The 1992 budget placed an overall ceiling on total noninterest expenditures, requiring stable noninvestment spending but allowing increasing public capital expenditures. A major revision of indirect taxation—mainly changes in the value-added tax (VAT) base and rates—was responsible for increasing revenue, while the speeding up of privatization allowed the repayment of public debt.

The outcome for 1992 was in line with the program, and the general government deficit declined to 3.6 percent, from 6.7 percent in 1991. Public debt fell from 69.3 to 61.4 percent of GDP, while inflation declined from 11.4 to 8.9 percent. Output growth, however, continued to slow, and GDP growth fell to 1.7 percent in 1992, from 2.3 percent in 1991. Monetary policy continued to be very cautious and real interest rates remained very high (by the end of 1992, real lending rates exceeded 10 percent on average).

The economic downturn continued in 1993, with serious consequences for the fiscal position. The nominal expenditure ceiling for the central government was adhered to, despite higher unemployment benefits, but revenues fell sharply, reflecting a weakening of tax collection in a more difficult economic climate and as a consequence of the abolition of customs within the European Union. The general government deficit doubled to about 7 percent of GDP and public debt rose to 66.6 percent, instead of declining as anticipated. The only economic variable that improved as planned was inflation, declining to 6.5 percent. Real GDP fell by 1.2 percent. A revised convergence program was presented with the 1994 budget and approved by the Monetary Committee on 30 November 1993, when the budget itself was approved in Parliament. The revised program extended the expenditure ceilings into 1997 when it was replaced by the Convergence Stability and Growth Program (CSGP), which brought the fiscal adjustment path forward until the year 2000.

Economic policy in 1994 and 1995 was geared toward gradually recovering the growth and convergence path. The overall deficit was reduced to 5.8 percent in 1994 and 5.1 percent in 1995, with the bulk of the improvement coming from reduced interest payments. The public debt service declined from 6.6 percent of GDP in 1993 to 5.6 percent in 1995, despite a continued increase in the stock of public debt (71.5 percent of GDP in 1995, up from 66.6 percent in 1993). The implicit interest rate on public debt fell from 10.6 percent in 1993 to 8.1 percent in 1995, to an estimated 7.6 percent in 1996. Inflation continued to decline, to 4 percent in 1995, and output growth recovered modestly, to 1 percent in 1994 and 2.8 percent in 1995. Economic recovery continued with ever greater vigor in 1996 and in 1997, helping considerably the attainment of the debt-to-GDP and deficit-to-GDP targets required for participation in the EMU.

The data on relative productivity reported in table 20.1 suggest a double-dip recession, in 1991 and 1994, when productivity growth in Portugal was 2 percent below the EU average. In 1991 this was mostly due to high employment growth, whereas in 1994 it was a consequence of a delayed recovery from the 1993 trough. This pattern may explain why the perception of the change in regime was delayed until the end of the recession. It is also consistent with the observed slowdown of structural reforms.

20.2.2 Structural Reforms

Since the mid-1980s, the evolution of the public finances has been determined by several major structural reforms. In 1986, a VAT was introduced and subsequently has been harmonized with EU levels. Comprehensive income taxation was introduced in 1989. In 1993, tax exemptions were rationalized and a reform of tax administration initiated; the reform was further consolidated in 1994 and 1995. This involved successive tax amnesty plans, especially for firms and for the self-employed. The method has continued to be used by the new government, under the so-called Mateus plan. It is difficult, however,

to sort out the effects of amnesty and improved tax collection from the general improvement in profitability and consumer confidence stemming from the recovery in economic activity.

The privatization law opened the way for a large-scale privatization program, with the bulk of the proceeds allocated to the reduction of public debt. Until 1993, a mandatory 80 percent of privatization receipts was used for debt reduction; thereafter, at least 40 percent had to be used for that purpose, with the remainder used to provide capital for the restructuring of public enterprises. Between 1989 and 1995, Portugal's privatization program raised an amount equivalent to about 10 percent of GDP, which made Portugal the OECD's third largest privatizer after the United Kingdom and New Zealand. The state's presence in the economy (particularly the financial sector) was reduced from about 20 percent of value added in 1989 to 10 percent in 1994, and from 6.5 percent of employment to 3 percent. Major privatizations in 1994 included banking and cement enterprises, and in 1995 the privatization of the telecommunications sector was initiated. The process continued with the PS government and has benefited from the recovery in economic activity.

Debt management policy led to a shift from central bank borrowing to market-based domestic and foreign borrowing and the introduction of long-term fixed rate instruments. In the late 1980s, central bank policy came to depend increasingly on issuing short-term domestic debt to compensate for the growing capital inflows attracted not only by the favorable investment climate but also, increasingly, by the highly remunerative real interest rates to be earned on pure arbitrage operations. In spite of strict controls on capital inflows, the central bank's foreign reserves more than doubled, from $10 billion in 1989 to $20.6 billion in 1991, with disastrous consequences for the bank's operating results. The bank was effectively accumulating huge dollar deposits earning a 5 percent rate of return, while paying 20 percent on the escudo debt being issued to mop up the resultant "excess" liquidity. The cost of this policy, during the period 1990–92, is estimated to have exceeded the structural funds received from the European Community in the same period.

Following entry in the ERM, the currency became fully convertible for the first time since leaving the gold standard in 1891 (except for a short-lived attempt in 1931). As real interest rates declined, maturities were lengthened, with the issue of three-year, five-year, and eight-year government bonds (previously, practically all borrowing was at three- and six-month maturities). Further downward pressure on domestic interest rates was achieved by shifting some of the government's borrowing needs abroad. Benchmark issues in yen and deutsche mark in the first half of 1993 were followed by an upgrade of Portugal's rating to AA− grade and the successful placement of a U.S. dollar global issue in September and a global ECU issue in early 1994. These operations opened the way for Portuguese enterprises to borrow directly abroad, ending the long-lasting protectionism enjoyed by the financial sector. In mid-1996, the Azores Regional Government became the first Portuguese quasi-

sovereign entity to borrow abroad without state guarantees. One year later, the approval of the CSGP by Ecofin was widely seen as the culmination of the medium-term-oriented macroeconomic policy initiated six years earlier.

Despite the achievements of the past decade, several areas require further attention. There is general consensus that the justice, education, and health delivery systems benefited from significant investment in expanding facilities during the past 10 years but that the quantitative increase now needs to be complemented by improvements in quality and efficiency. However, public sector reform and social security reform are more germane to the fiscal discussion.

The government elected at the end of 1991 made some progress in restructuring the major spending ministries, but the double-dip recession, subsequent slow recovery, and rising unemployment have effectively removed public sector reform from the political agenda.

Within public sector reform, the most important item, in terms of financial magnitude and fiscal pressures, is social security.[2] Portugal's growth in per capita expenditure on social protection benefits during 1985–95 was the highest in the European Union, albeit from relatively low initial levels. The social security system provides pensions and a wide range of welfare benefits, mostly on a universal basis. Funding is from payroll contributions and residually by the state. The contribution rate (almost 40 percent, including compulsory accident insurance) is one of the highest in the European Union and amounts to a very significant tax on labor utilization, contributing to unemployment.

With an aging population and real increases in benefits reflecting real wage increases of the past decade, the financial imbalance will continue to grow. The dependency ratio is projected to peak at 44 percent in 2045, from 37 percent in 1995 (table 20.2). The residual financing from the state budget will continue to increase unless the system is reformed. Additionally, civil servant pensions cost 3 percent of GDP in 1995 and are projected to increase further. Unless significant reform is undertaken soon, the social security financial imbalance promises to be the major economic problem facing future generations.

20.3 Portuguese Generational Accounts

The generational accounts technique requires a choice of base year, in this case 1995, and future population projections and an accounting of fiscal aggregates for the base year. Using incidence profiles, all taxes and transfers in the base year are distributed across existing generations, obtaining per capita measures of taxes and transfers for each cohort, broken down by age (from 0 to 90 years) and sex. Generational accounts for existing generations are then calculated by projecting these tax and transfer profiles forward based on an assumed

2. See Kotlikoff (1996). Braga de Macedo's introduction to United Nations (1997) has a discussion of convergence and divergence in social security policies.

Table 20.2 Dependency Ratios, 1995–2070

Year	Elderly	Children	Total
1995	0.15	0.22	0.37
2000	0.16	0.21	0.36
2005	0.16	0.20	0.36
2010	0.16	0.20	0.37
2015	0.17	0.20	0.37
2020	0.18	0.20	0.38
2025	0.19	0.20	0.39
2030	0.20	0.20	0.40
2035	0.21	0.20	0.41
2040	0.23	0.21	0.43
2045	0.24	0.21	0.44
2050	0.23	0.21	0.44
2055	0.22	0.21	0.43
2060	0.20	0.22	0.42
2065	0.20	0.22	0.41
2070	0.19	0.22	0.41

Source: Authors' calculation based on population data of the World Bank.

rate of productivity growth and discounting back to the present with an assumed discount rate. Generational accounts for future generations are obtained as a residual, equal to the sum of existing government net debt and the present value of future government purchases, less the generational accounts of all existing generations.

20.3.1 Data and Basic Assumptions

Our population data come from the World Bank.[3] Table 20.2 shows the projections of the dependency ratios, expressed as the ratio of children (younger than age 18) and the elderly (those older than age 64) to the working-age population (18 to 64 years). As is true in most other developed countries, the elderly dependency ratio is projected to grow during the coming decades, increasing by more than half over the next 50 years.

Fiscal data come primarily from the OECD general government accounts. In 1995, direct taxes amounted to 1,469.0 billion escudos. They were distributed across workers according to wages earned, based on a profile of wage earnings estimated from the household survey Inquérito ao Patrimônio e Endividamento das Famílias de 1994. (This survey was also used to estimate profiles for consumption, self-employment plus property income, and receipt of transfer payments.)[4]

This assignment of all income taxes, including corporate income taxes, to

3. We thank Eduard Bos for making his projections available.

4. We are grateful to Pedro Neves of Banco de Portugal for providing his data. Carlos Andrade of the Catholic University of Portugal also did some of the initial data work.

labor reflects our assumption that as a small open economy, Portugal cannot impose a burden on internationally mobile capital. Because they are imposed as employment taxes, social security contributions of 1,783.4 billion escudos were also distributed according to the wage profile. Indirect taxes of 2,207.6 billion escudos, generally taxes on consumption, were distributed according to a consumption profile. Property and entrepreneurial taxes of 354.5 billion escudos were distributed according to a combined self-employment plus property profile.

On the transfer side, the only breakdown is between social security and other transfers. These two categories, a total of 2,516.8 billion escudos, are lumped together and distributed according to a profile of general transfer receipts.

Government spending is the sum of government consumption (2,730.9 billion escudos), subsidies (136.6 billion escudos), and government net investment (437.2 billion escudos) minus transfers received, primarily from the European Union (121.9 billion escudos). The resulting total of government purchases is 3,182.8 billion escudos. By our measures, the resulting government primary surplus (taxes less transfers and government purchases) in 1995 was 114.9 billion escudos. The government net financial debt (obtained from Portugal's own fiscal accounts) is 10,724.9 billion escudos.

As an alternative to treating government expenditures on education as a government purchase, as done in the base case, we treat these expenditures as transfer payments, allocated across cohorts.[5]

To maintain comparability with the estimates for the other countries in this project, all generational accounts are converted into U.S. dollars, using the exchange rate of 0.006104 dollars per escudo.

For future years, the profiles for taxes, transfers, and educational expenditures remain fixed, except for productivity growth. This means that shifts in the composition of the population will exert an impact on the GDP shares of each of these items, as cohorts vary in their intensity of tax payments and receipt of transfers and educational expenditures. We assume that government purchases other than education grow with productivity and contrast the case in which education is a government purchase with the one in which the benefits are directed toward the younger generations, thus lowering their net lifetime taxes relative to what they would otherwise be.

20.3.2 Generational Accounts

Table 20.3A presents the base-case generational accounts for males and females combined, using a discount rate of 5 percent and a productivity growth rate of 1.5 percent and treating government educational expenditures as government purchases (i.e., not allocated to individual generations). For cohorts at

5. The data, based on unpublished Portuguese government data on expenditures by educational level, were provided by Jose Manuel Bracinha Vieira, former education secretary, to whom we wish to express our gratitude.

Table 20.3A **Generational Accounts for Males and Females Combined: Base Case (thousands of U.S. dollars)**

Generation's Age in 1995	Net Payment	Income Taxes	Property and Proprietors	Social Insurance Contribution	Indirect Taxes	Trans-fers	Edu-cation
0	61.8	17.8	3.9	21.6	36.4	17.9	0.0
5	67.1	21.0	4.5	25.6	37.1	21.1	0.0
10	73.0	24.8	5.3	30.1	37.6	24.7	0.0
15	79.6	29.1	6.3	35.4	37.9	29.0	0.0
20	86.0	33.7	7.3	41.0	37.9	33.9	0.0
25	85.1	35.5	8.3	43.1	37.6	39.3	0.0
30	75.0	33.9	8.6	41.2	36.2	45.0	0.0
35	60.0	30.9	8.5	37.5	33.8	50.7	0.0
40	39.7	26.3	7.8	32.0	30.5	56.8	0.0
45	15.9	20.9	6.8	25.4	26.7	63.9	0.0
50	−10.6	14.6	5.4	17.7	22.2	70.6	0.0
55	−33.9	8.9	4.1	10.9	17.7	75.4	0.0
60	−47.1	5.0	2.8	6.1	13.7	74.6	0.0
65	−49.4	2.7	1.8	3.2	10.5	67.6	0.0
70	−42.7	1.4	1.1	1.7	8.0	54.9	0.0
75	−33.3	0.6	0.6	0.8	5.9	41.2	0.0
80	−24.8	0.0	0.4	0.0	4.0	29.3	0.0
85	−15.4	0.0	0.2	0.0	2.5	18.1	0.0
90	−4.1	0.0	0.1	0.0	0.6	4.8	0.0
Future generations	91.8						
Percentage difference	48.7						

five-year intervals between ages 0 and 90, the table shows the total generational account (the net present value fiscal burden over that generation's remaining lifetime) as well as the tax and transfer components of that generational account. According to the table, a representative newborn in 1995 faces a generational account of $61,800, the difference between taxes of $79,700 and transfers of $17,900. Following the typical pattern, the accounts increase initially with age, as generations move closer to the primary taxpaying years, and then decline, as the retirement years of lower taxes and higher receipt of transfer payments approach. The highest value of the account, $86,000, occurs at age 20, with the accounts turning negative after age 45.

Under current policy, a representative member of future generations will have to pay $91,800 adjusted for productivity growth, or 48.7 percent more than current newborns, who are assumed to pay taxes and receive transfer payments according to current fiscal rules.

Table 20.3B presents the generational accounts for current and future generations allocating educational spending to individuals. Because educational spending is heavily concentrated among the young, the net payment of Portu-

Table 20.3B **Generational Accounts for Males and Females Combined: Base Case, Education Treated as Transfer Payments (thousands of U.S. dollars)**

Generation's Age in 1995	Net Payment	Income Taxes	Property and Proprietors	Social Insurance Contribution	Indirect Taxes	Trans-fers	Edu-cation
0	43.5	17.8	3.9	21.6	36.4	17.9	18.2
5	45.5	21.0	4.5	25.6	37.1	21.1	21.6
10	50.9	24.8	5.3	30.1	37.6	24.7	22.0
15	65.3	29.1	6.3	35.4	37.9	29.0	14.3
20	82.7	33.7	7.3	41.0	37.9	33.9	3.3
25	84.5	35.5	8.3	43.1	37.6	39.3	0.6
30	75.0	33.9	8.6	41.2	36.2	45.0	0.0
35	60.0	30.9	8.5	37.5	33.8	50.7	0.0
40	39.7	26.3	7.8	32.0	30.5	56.8	0.0
45	15.9	20.9	6.8	25.4	26.7	63.9	0.0
50	−10.6	14.6	5.4	17.7	22.2	70.6	0.0
55	−33.9	8.9	4.1	10.9	17.7	75.4	0.0
60	−47.1	5.0	2.8	6.1	13.7	74.6	0.0
65	−49.4	2.7	1.8	3.2	10.5	67.6	0.0
70	−42.7	1.4	1.1	1.7	8.0	54.9	0.0
75	−33.3	0.6	0.6	0.8	5.9	41.2	0.0
80	−24.8	0.0	0.4	0.0	4.0	29.3	0.0
85	−15.4	0.0	0.2	0.0	2.5	18.1	0.0
90	−4.1	0.0	0.1	0.0	0.6	4.8	0.0
Future generations	73.2						
Percentage difference	68.3						

guese aged 25 or younger is smaller once educational spending is accounted for. The net payment of Portuguese newborns is thus $18,200 smaller in table 20.3B than in table 20.3A. Allocating education to individuals also changes the percentage difference between the payments of current and future generations. As table 20.3B shows, future generations face a 68.3 percent higher burden than current generations under that calculation.

Tables 20.4 (males) and 20.5 (females) break down the generational account in table 20.3A by sex, based on the assumption of equal percentage imbalances by sex between current and future newborns. A comparison of these tables shows that males face higher generational accounts because of their higher tax payments, due to higher labor market earnings, and their lower receipt of transfer payments, attributable primarily to their lower life expectancy.

Table 20.6A presents alternative estimates, for males and females combined, for three different discount rates (3, 5, and 7 percent) and three different rates of productivity growth (1, 1.5, and 2 percent), a total of nine combinations that span a broad range of possible values. Our base-case results from table 20.3A, for an interest rate, r, of 5 percent and a productivity growth rate, g, of 1.5 percent, are presented in boldface, in the center column of the table.

Table 20.4A **Generational Accounts for Males: Base Case (thousands of U.S. dollars)**

Generation's Age in 1995	Net Payment	Income Taxes	Property and Proprietors	Social Insurance Contribution	Indirect Taxes	Trans-fers	Edu-cation
0	71.1	21.5	5.5	26.1	36.6	18.6	0.0
5	78.7	25.5	6.5	31.0	37.7	22.0	0.0
10	86.9	30.0	7.6	36.4	38.6	25.8	0.0
15	96.3	35.3	9.0	42.8	39.4	30.2	0.0
20	105.9	41.2	10.5	50.0	39.9	35.6	0.0
25	107.2	43.8	12.0	53.2	40.0	41.9	0.0
30	98.5	42.9	12.9	52.1	39.1	48.6	0.0
35	83.1	39.9	13.0	48.4	37.2	55.4	0.0
40	60.6	34.9	12.2	42.4	34.2	63.0	0.0
45	32.4	28.4	10.7	34.5	30.3	71.5	0.0
50	0.4	20.7	8.8	25.2	25.5	79.9	0.0
55	−29.9	13.0	6.7	15.8	20.3	85.8	0.0
60	−49.1	7.4	4.7	9.0	15.7	85.9	0.0
65	−55.3	3.7	3.0	4.5	12.0	78.5	0.0
70	−48.2	1.9	1.8	2.4	9.0	63.4	0.0
75	−37.9	0.8	1.1	1.0	6.5	47.3	0.0
80	−29.1	0.0	0.8	0.0	4.4	34.3	0.0
85	−18.8	0.0	0.5	0.0	2.6	21.9	0.0
90	−5.5	0.0	0.2	0.0	0.7	6.3	0.0
Future generations	105.7						

Table 20.4B **Generational Accounts for Males: Base Case, Education Treated as Transfer Payments (thousands of U.S. dollars)**

Generation's Age in 1995	Net Payment	Income Taxes	Property and Proprietors	Social Insurance Contribution	Indirect Taxes	Trans-fers	Edu-cation
0	52.9	21.5	5.5	26.1	36.6	18.6	18.2
5	57.1	25.5	6.5	31.0	37.7	22.0	21.6
10	64.8	30.0	7.6	36.4	38.6	25.8	22.0
15	81.9	35.3	9.0	42.8	39.4	30.2	14.3
20	102.6	41.2	10.5	50.0	39.9	35.6	3.3
25	106.6	43.8	12.0	53.2	40.0	41.9	0.6
30	98.5	42.9	12.9	52.1	39.1	48.6	0.0
35	83.1	39.9	13.0	48.4	37.2	55.4	0.0
40	60.6	34.9	12.2	42.4	34.2	63.0	0.0
45	32.4	28.4	10.7	34.5	30.3	71.5	0.0
50	0.4	20.7	8.8	25.2	25.5	79.9	0.0
55	−29.9	13.0	6.7	15.8	20.3	85.8	0.0
60	−49.1	7.4	4.7	9.0	15.7	85.9	0.0
65	−53.3	3.7	3.0	4.5	12.0	78.5	0.0
70	−48.2	1.9	1.8	2.4	9.0	63.4	0.0
75	−37.9	0.8	1.1	1.0	6.5	47.3	0.0
80	−29.1	0.0	0.8	0.0	4.4	34.3	0.0
85	−18.8	0.0	0.5	0.0	2.6	21.9	0.0
90	−5.5	0.0	0.2	0.0	0.7	6.3	0.0
Future generations	88.9						

Table 20.5A **Generational Accounts for Females: Base Case (thousands of U.S. dollars)**

Generation's Age in 1995	Net Payment	Income Taxes	Property and Proprietors	Social Insurance Contribution	Indirect Taxes	Trans-fers	Edu-cation
0	51.8	13.9	2.1	16.8	36.1	17.1	0.0
5	55.1	16.4	2.5	20.0	36.4	20.2	0.0
10	58.5	19.3	2.9	23.5	36.5	23.6	0.0
15	62.3	22.7	3.4	27.6	36.3	27.7	0.0
20	65.5	26.1	4.0	31.7	35.9	32.2	0.0
25	62.5	26.9	4.4	32.7	35.1	36.7	0.0
30	51.7	25.0	4.4	30.4	33.3	41.4	0.0
35	37.4	22.2	4.1	26.9	30.4	46.1	0.0
40	20.0	18.2	3.7	22.1	27.0	51.0	0.0
45	0.0	13.7	3.1	16.6	23.3	56.7	0.0
50	−20.6	9.1	2.4	11.0	19.2	62.3	0.0
55	−37.5	5.3	1.7	6.4	15.3	66.1	0.0
60	−45.4	2.9	1.1	3.5	12.0	64.9	0.0
65	−44.5	1.8	0.8	2.1	9.3	58.5	0.0
70	−38.5	1.0	0.5	1.2	7.2	48.4	0.0
75	−30.0	0.5	0.3	0.6	5.4	36.9	0.0
80	−22.2	0.0	0.2	0.0	3.8	26.2	0.0
85	−13.8	0.0	0.1	0.0	2.4	16.3	0.0
90	−3.6	0.0	0.0	0.0	0.6	4.2	0.0
Future generations	77.0						

Table 20.5B **Generational Accounts for Females: Base Case, Education Treated as Transfer Payments (thousands of U.S. dollars)**

Generation's Age in 1995	Net Payment	Income Taxes	Property and Proprietors	Social Insurance Contribution	Indirect Taxes	Trans-fers	Edu-cation
0	33.5	13.9	2.1	16.8	36.1	17.1	18.3
5	33.5	16.4	2.5	20.0	36.4	20.2	21.6
10	36.4	19.3	2.9	23.5	36.5	23.6	22.1
15	48.0	22.7	3.4	27.6	36.3	27.7	14.3
20	62.2	26.1	4.0	31.7	35.9	32.2	3.3
25	61.9	26.9	4.4	32.7	35.1	36.7	0.6
30	51.7	25.0	4.4	30.4	33.3	41.4	0.0
35	37.4	22.2	4.1	26.9	30.4	46.1	0.0
40	20.0	18.2	3.7	22.1	27.0	51.0	0.0
45	0.0	13.7	3.1	16.6	23.3	56.7	0.0
50	−20.6	9.1	2.4	11.0	19.2	62.3	0.0
55	−37.5	5.3	1.7	6.4	15.3	66.1	0.0
60	−45.4	2.9	1.1	3.5	12.0	64.9	0.0
65	−44.5	1.8	0.8	2.1	9.3	58.5	0.0
70	−38.5	1.0	0.5	1.2	7.2	48.4	0.0
75	−30.0	0.5	0.3	0.6	5.4	36.9	0.0
80	−22.2	0.0	0.2	0.0	3.8	26.2	0.0
85	−13.8	0.0	0.1	0.0	2.4	16.3	0.0
90	−3.6	0.0	0.0	0.0	0.6	4.2	0.0
Future generations	56.4						

Table 20.6A **Sensitivity Analysis (thousands of U.S. dollars)**

	$g = 1$			$g = 1.5$			$g = 2$		
	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$
Net payment of newborns	86.9	54.8	35.5	97.2	**61.8**	39.6	107.9	69.6	44.3
Net payment of future generations	116.9	85.4	69.9	127.6	**91.8**	72.7	138.5	99.4	69.5
Difference in net payments									
Absolute	30.0	30.5	34.5	30.3	**30.1**	33.1	30.6	29.8	25.2
Percentage	34.5	55.7	97.2	31.2	**48.7**	83.7	28.4	42.8	56.9

Note: g is productivity growth rate (percent); r is discount rate (percent).

Table 20.6B **Sensitivity Analysis: Education Treated as Transfer Payments (thousands of U.S. dollars)**

	$g = 1$			$g = 1.5$			$g = 2$		
	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$
Net payment of newborns	64.5	37.9	22.4	73.1	**43.5**	25.6	82.0	50.0	29.4
Net payment of future generations	93.9	68.0	56.7	102.7	**73.2**	58.5	111.8	79.4	61.0
Difference in net payments									
Absolute	29.4	30.2	34.2	29.7	**29.7**	32.8	29.8	29.4	31.6
Percentage	45.6	79.7	152.7	40.6	**68.2**	128.0	36.4	58.8	107.7

Note: g is productivity growth rate (percent); r is discount rate (percent).

For both current and future generations, the generational accounts fall with an increase in the interest rate and rise with an increase in the growth rate. Each of these phenomena is easily understood. For a newborn generation, a generational account equals the present value of future taxes less future transfers. Discounting these future flows more heavily (with a higher value of r) acts to decrease the present value of both taxes and transfers and hence their difference, the generational account, as well. In principle, there is an offsetting impact, in that transfers, which typically occur later in life, should be discounted even more heavily. However, because transfers are relatively small compared to taxes in the Portuguese case, this effect is not strong enough to offset the former effect.

For a given discount rate, a higher rate of productivity growth means higher taxes and transfers in the future and, following the same logic as above, has two effects. The first is to raise the value of both taxes and transfers. The second is to raise the present value of transfers, which occur later in life, more. Again, because transfers are relatively small, the first effect dominates, and higher growth leads to a higher net tax payment in present value (generational account). In terms of the generational imbalance, the percentage gap between current and future generations rises with the interest rate and falls with the growth rate.

While the accounts may appear sensitive to these changes in r and g, note that the important calculation—the imbalance between current and future generations—is quite robust. The absolute difference between current and future newborns ranges only between $25,200 and $34,500, both values quite close to our base-case estimate of $30,100; and while the percentage differences vary more, all estimates indicate a substantial percentage difference between current and future generations.

As seen in tables 20.4B, 20.5B, and 20.6B, which correspond to tables 20.4A, 20.5A, and 20.6A for the base-case assumption for educational spending, allocating educational spending to individuals lowers the generational accounts of young and newborn current generations, who are the beneficiaries of educational spending. As shown in table 20.6B this alternative assumption has essentially no impact on the difference between the generational accounts of current newborns and future generations, which, implicitly in the calculation, also are being credited with the benefits of educational spending.

20.3.3 Understanding Portugal's Generational Imbalance

Given the small reported primary surplus in the base year, it may seem surprising that future generations face such steep tax increases. However, there are two straightforward explanations for this finding, one relating to the past, the other to the future.

The first explanation is that, as discussed above, past fiscal policy has accumulated a large financial debt, the burden of which remains. Were the current stock of financial debt zero, this would eliminate about two-thirds of the ex-

isting imbalance between current and future generations—from 48.7 percent to 16.2 percent.

Even zero debt and a current primary surplus leaves some imbalance because the changing demographic composition of the country is leading to an older population that will receive more transfers and pay less taxes. As discussed above, the dependency ratio is expected to increase sharply over the coming decades. Were the population age structure to remain constant, instead of undergoing this shift, current policy would be much closer to balance, even with the existing stock of debt—just 17.5 percent, just over a third of its current estimated level.

Given the existing stock of debt and the changing structure of the population, though, the imbalance is large, requiring net taxes to increase nearly by half if no policy changes are enacted that affect current generations. However, policy changes enacted immediately would require less draconian measures, for they would be spread over a larger population that includes those presently alive.

20.3.4 Achieving Generational Balance

We estimate that policy could be made sustainable—the difference between the generational accounts of current and future newborns eliminated—through any of the following immediate and permanent policy changes (or some combination of them):

7.6 percent reduction in government purchases (including education),
9.8 percent reduction in government purchases (excluding education),
9.6 percent reduction in all transfer payments,
4.2 percent increase in all taxes, or
13.3 percent increase in direct income taxes.

Although each change would eliminate the generational imbalance, the policies vary in the extent to which the burden would be borne by different generations. For example, a reduction in transfer payments would place a larger burden on the current elderly, while an increase in income taxes would have a much smaller impact on them and burden the young more.

20.4 Conclusions

Portugal has made significant changes in its monetary and fiscal policies over the past decade. Its current macroeconomic policies, directed toward inclusion in the new European Economic and Monetary Union, are now supported by the two major political parties. These facts notwithstanding, our findings suggest that Portugal remains far from achieving a truly sustainable fiscal policy, specifically, one that entails generational balance. Under our baseline assumptions future generations face a roughly 50 percent higher fiscal burden than do current newborns. This imbalance reflects Portugal's past debt

accumulation and the aging of its population. A variety of alternative tax increase and expenditure reduction policies can be used to achieve generational balance. Which of those policies spreads the burden most appropriately among old and young current generations is a matter for political debate.

Achieving generational balance in Portuguese fiscal policy would not only improve economic prospects for future Portuguese citizens. It would also indicate to foreign investors that Portugal is not likely to expropriate their investments in the future through extraordinary fiscal levies. While actually producing generational balance in Portuguese fiscal policy may prove difficult, the longer the delay, the more painful will be the requisite fiscal adjustments. The generational accounts constructed here can help the Portuguese public to understand the true cost of adjusting the tax and transfer system.

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