

## United Kingdom: Selected Issues

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UNITED KINGDOM

**Selected Issues**

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Approved by European Department

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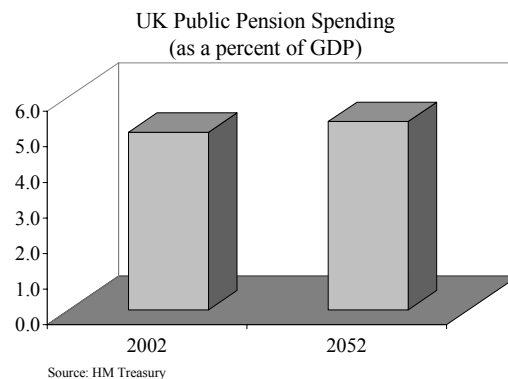
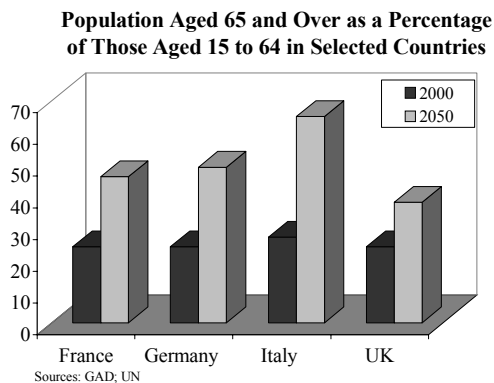
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## I. AGING AND THE U.K. PENSION SYSTEM<sup>1</sup>

### A. Introduction

1. **The U.K. population is expected to age significantly over the next few decades.** Although cross-country comparisons show that the U.K. is subject to less demographic pressure than other major EU countries, the aging of its population is still substantial. In particular, the U.K. old-dependency ratio—defined as the ratio of the population aged 65 and over to the population aged 15 to 64—is set to rise by about 60 percent over the next five decades.



2. **In spite of this demographic shock, the government’s projections show no commensurate increase in the public spending on pensions as a percent of GDP over the next fifty years.** For instance, the December 2002 Pensions Green Paper published by the Department of Work and Pensions states that “...total public pension spending is projected to remain relatively stable over the next five decades, fluctuating around 5 percent of GDP.”<sup>2</sup>

3. **The purpose of this paper is threefold.** First, it analyzes the official baseline projections of public pension spending and their assumptions. Second, the paper assesses the main risks and uncertainty surrounding these projections. Third, it discusses the key elements of the government’s current approach to tackling the demographic challenge to the pension system.

4. **The rest of the paper is organized as follows.** Section B outlines the main features of the U.K. pension system and their implications for the current and future levels of public pension liabilities. Section C details the government’s projections of long-term pension

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<sup>1</sup> Prepared by Petya Koeva.

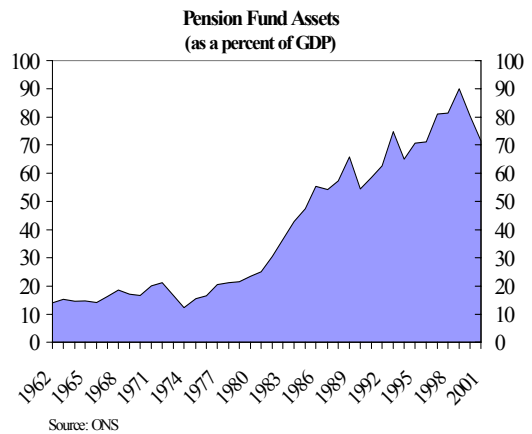
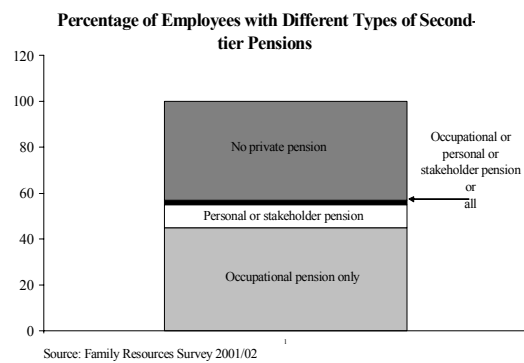
<sup>2</sup> More recently, HM Treasury (2003a) also mentions that “public pension spending is projected to remain stable over the next 50 years, fluctuating between 4.9 and 5.4 percent of GDP.” Note that public service pensions are not included in these projections.

spending presented in the December 2002 Pensions Green Paper and their underlying assumptions.<sup>3</sup> Section D quantifies the risks to these projections related mostly to the expected growth of private pension income. Section E assesses the government's strategy to increasing private pension provision. Section F concludes.

## B. Features of the U.K. Pension System

5. **The U.K. pension system has a very complex structure, evolving from decades of reforms.** A full description of the U.K. pension system is beyond the scope of this paper, although a brief overview is provided in Box 1. Instead, the focus is on features of the pension system that are relevant for the long-term pension liabilities of the state.

6. **The private pillar plays an important role in the U.K. pension system.** The U.K. has a long tradition of private pension provision, with the first pension scheme (for Royal Navy Officers) dating back to the 1670s. Even after the introduction of a state pension in the late 1940s, it was understood that people who wished to have a level of retirement income above subsistence had to purchase additional private insurance. At present, more than half of U.K. employees have a private second-tier pension. This private pension could be occupational, personal, or stakeholder (see chart, Box 1). Occupational pensions can be done either on a defined-benefit or defined-contribution basis. Personal and stakeholder pensions are defined-contribution schemes only. Not surprisingly, U.K. private pension wealth—held in self-administered pension funds and life insurance companies—is very high by international standards. For example, the pension assets held by U.K. self-administered pension funds exceeded 70 percent of GDP in 2001, despite the fall of equity markets.



<sup>3</sup> The *Long-term Public Finance Report* (HM Treasury, 2003a) provided more recent aggregate estimates of the long-term public pension projections. However, as these estimates did not include a breakdown of the components of pension spending and were broadly similar to those in the 2002 Pension Green Paper, the discussion in Sections C and D focuses on the latter.

### Box. The Three Tiers of the U.K. Pension System

#### First-tier pensions

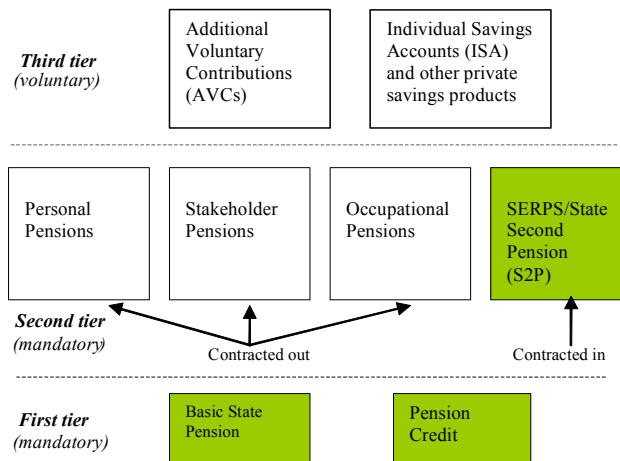
The *first tier* consists of two types of state benefits—the Basic State Pension (BSP) and the Pension Credit (PC).

The BSP is a contributory benefit, paid from the National Insurance Fund. If a person is above the state retirement age and has a full contribution record (44 qualifying years for men and 39 for women), he is entitled to receive the standard, flat-rate weekly BSP rate of £77.50. People with incomplete contribution records receive the BSP on a graduated basis. Since 1980, the (standard and graduated) BSP rates have been uprated annually in line with prices.

The PC has two components—the guarantee credit, providing a minimum income (greater than the BSP) of £102.1, and the savings credit, paying a proportion of any qualifying income between £77.50 and £139.10. The PC is a non-contributory benefit, paid from general taxation.

#### Second-tier pensions

Participation in some component of the *second tier* is mandatory for most of the employed. Since 1978, all employees (earning above a specified lower earnings limit) have had to enroll in a second-tier pension, either the additional earnings-related state pension (SERPS until April 2002 and Second State Pension thereafter) or a private pension scheme. Originally, SERPS was designed to provide a maximum addition to the BSP of 25 percent of a person's earnings (between a



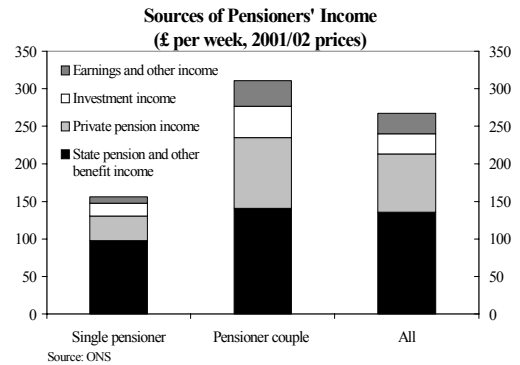
lower and upper earnings limit) over the best twenty years of an employee's career.

Subsequently, its generosity has been reduced significantly. If an employee contracts out of SERPS into a private second-tier pension, she pays a reduced National Insurance contribution or gets a rebate paid into her private pension. The second-tier private pensions can be occupational, personal, or stakeholder. While the majority of occupational pensions are defined-benefit, personal and stakeholder pensions are defined-contribution.

#### Third-tier pensions

The *third tier* comprises of additional, mostly tax-privileged, contributions to private pensions beyond the compulsory element of second-tier provision. The Individual Savings Accounts (ISA) are an example of such pension vehicle.

7. **At present, private pensions are a significant source of pensioners' income.** Recent household data suggest that 29 percent of average pensioner's income comes from private pensions. Other private sources of income are investment and earnings, which contribute 20 percent of the average pensioner's income. The state provides the remaining 51 percent of the average pensioner's income.<sup>4</sup>



8. **In spite of a well-developed private pillar, the state continues to be the largest source of income for the average pensioner.** In particular, the state system offers a universal basic pension, an additional earnings-related pension, and means-tested pension benefits.

- **Basic State Pension.** Traditionally, the Basic State Pension (BSP) has been the main element of the U.K. social insurance system for old age. The National Insurance Act of 1946 introduced it as a contributory state pension for all. Given a full contribution record, the BSP is paid at a flat rate, unrelated to past earnings.<sup>5</sup> In 1948, the standard BSP weekly rate for a single pensioner (with a full contribution record) was £1.30. In 2003, the corresponding rate is £77.45. Interestingly, the retirement age set in the original legislation—65 for men and 60 for women—is still in effect today. The current government policy is to increase the BSP rates each year in line with RPI inflation, subject to a minimum increase of 2.5 percent. The payments for the BSP come from the National Insurance Fund, operated on a pay-as-you-go basis.
- **Additional earnings-related state pension (SERPS/State Second Pension).** Introduced in 1978, the State Earnings Related Pension Scheme (SERPS) is a second-tier pension (see Box 1), replaced in 2002 by the State Second Pension (S2P). Since

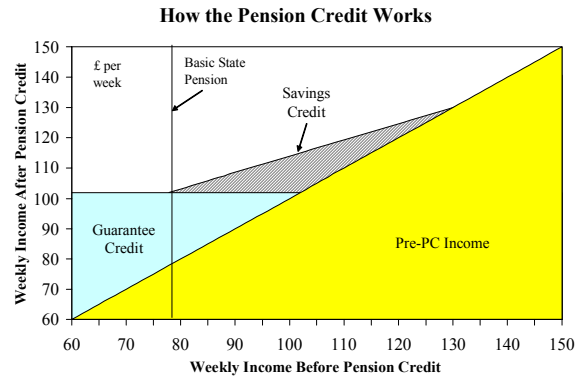
<sup>4</sup> For a single pensioner, the breakdown is: 21 percent from private pensions, 16 percent from investment and earnings, and 63 percent from state benefits. For a pensioner couple, the corresponding figures are: 30 percent from private pensions, 24 percent from investment and earnings, and 45 percent from state benefits. Note that some of the private pension income comes from contracted out SERPS/S2P rebates, and so in effect is state support.

<sup>5</sup> This paper refers to the BSP as a flat-rate benefit for presentational purposes. References to the BSP rate are to the standard weekly amount received by a person with a full contribution record. Strictly speaking, the BSP is not paid at a flat rate, but depends on each person's National Insurance Contribution (NIC) record. To qualify for the standard weekly BSP rate, men need to have 44 qualifying years (39 for women). If a person does not have a complete contribution record, he receives proportionately less.



1978, employees have been able to opt out (“contract out”) of SERPS and into second-tier private pensions. For example, in 2001/02 about 34 percent of the employees were contracted out into defined-benefit occupational pensions and about 20 percent into defined-contribution occupational, personal or stakeholder pensions (GAD, 2003). In return for contracting out of state provision, employees pay lower National Insurance Contributions (NIC) or receive NIC rebates. As in the case of the basic pension, entitlements under the SERPS/S2P are paid from the National Insurance Fund, also on a pay-as-you-go basis.

- **Means-tested pension benefits (Pension Credit).** Income support for pensioners has a long history in the U.K.—in 1908, the Old Age Pensions Act introduced a means-tested pension for people aged 70 and over. In present times, income support to pensioners is provided with the Pension Credit (PC), which is paid from general taxation and operated by the Department of Work and Pensions.



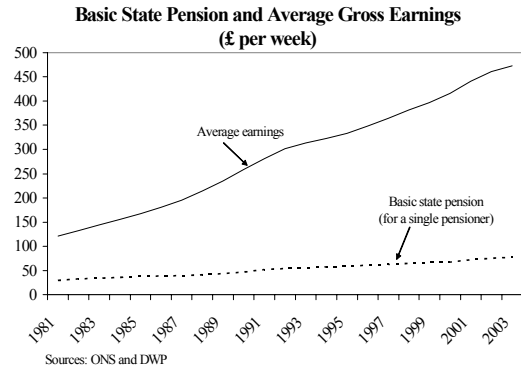
The PC has two components—the guarantee credit and the savings credit—that operate as follows (see chart). The guarantee credit ensures a minimum income of £102.1 for all single pensioners aged 60 and above, topping up their (pre-PC) income from other sources. (Note that the current level of the guarantee credit is above the BSP level). The savings credit rewards any additional saving (i.e., income from a private pension) above its starting point (“the savings threshold”), which currently coincides with the BSP rate. While the current government has committed to uprating the guarantee credit in line with earnings and the savings credit in line with prices for the remainder of this Parliament, there is no commitment beyond that, i.e., the future uprating of these thresholds is uncertain.

9. **A number of past reforms reduced the generosity—and thus the cost—of the current state pension system, while encouraging growth in private pension provision.** These reforms were partly motivated by the aging of the population, which started earlier in the U.K. than in other major countries.<sup>6</sup> The key changes to the U.K. pension system were as follows:

<sup>6</sup> The old dependency ratio for the Basic State Pension increased by about 40 percent between 1950 and 1990 (see GAD (2003b)).

- ***A change in the indexation of the BSP.***

The 1980 Social Security Act established the current indexation of the BSP to prices, abolishing the previous indexation to earnings *or* prices (whichever was more favorable to the pensioners) between 1975 and 1979.<sup>7</sup> Nevertheless, discretionary (above-inflation) increases in the BSP rates—as in 2001 and 2002—are still allowed under current legislation. In historical context, the implications of the



indexation of the BSP to prices can be easily demonstrated (see chart). After the link to earnings was broken in 1980, the value of the basic pension<sup>8</sup>—relative to average earnings—declined from 24 percent in 1981 to about 16 percent in 2002.

- ***Reductions in the generosity of the additional earning-related state pension and changes in its contracting-out rules.*** The 1986 Social Security Act reduced significantly the pension benefits of SERPS and encouraged individual employees to opt out of SERPS and into defined-contribution private pension schemes.<sup>9</sup> The 1993 Social Security Act renewed some of the incentives to contract out of SERPS into private pension schemes.<sup>10</sup> The 1995 Pensions Act took a further step in reducing the generosity of SERPS by changing the calculation method for entitlements as of April

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<sup>7</sup> From 1946 to 1974, the indexation of the Basic State Pension was done on a discretionary basis.

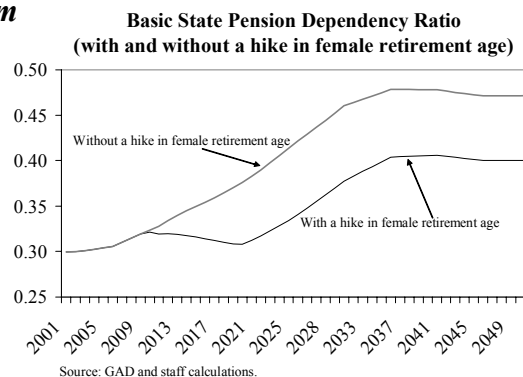
<sup>8</sup> For a single pensioner under 80.

<sup>9</sup> In particular, the SERPS benefits were reduced—over a ten-year transition period—from 25 percent of average revalued band earnings (i.e., between the lower and upper earning limit) over the best 20 years to 20 percent of average revalued band earnings over the entire working career. At the same time, the 1986 Social Security Act proposed to decrease the spouse's benefits to 50 percent (rather than 100 percent) of the member's pension. In addition, it encouraged employees to contract into a personal pension scheme by: (i) providing an extra two percent National Insurance rebate if a member contracted out of SERPS between April 1988 and April 1993; and (ii) allowing members of occupational pension schemes to join personal pension schemes.

<sup>10</sup> The 1993 Social Security Act provided a one percent National Insurance rebate for members of contracted-out personal pension schemes aged 30 and over not to contract back into SERPS between April 1993 and April 1997 and continued (but less generous) National Insurance age-related rebates after April 1997.

1999. In addition, the legislation relaxed the requirements on occupational pensions allowed to contract out of SERPS, providing another boost to private provision.<sup>11</sup>

- ***A hike in the female retirement age from 60 to 65.*** The 1995 Pensions Act announced that the BSP’s retirement age for women would rise gradually from 60 to 65 (the retirement age for men) between 2010 and 2020. As a result, the overall old-dependency ratio for the BSP is set to increase by about 35 percent—rather than 60 percent—by 2050, reducing substantially the cost of the pension.<sup>12</sup>



10. **More recent reforms of the pension system have increased the generosity of the state to low-income pensioners, while aiming to promote further private pension provision.** The most significant change has been the rise in means-tested benefits for pensioners with the introduction of the Minimum Income Guarantee in 1999 and its successor, the Pension Credit, in 2003. As discussed above, the current level of the means-tested benefits exceeds that of the BSP. Another reform has involved increasing the generosity of the additional earnings-related state pension to its low-income members with the introduction of the State Second Pension in 2002.<sup>13</sup> While providing a safety net for the poor, the government also committed to foster private provision among the middle- and high-income pensioners. In particular, the 1998 Pensions Green Paper stated that “by 2050, the proportion of pensioner incomes coming from the State, now 60 percent, will have fallen to 40 per cent, and the proportion coming from private pension provision will have increased

<sup>11</sup> The 1995 Pensions Act abolished the requirement that occupational schemes provide Guaranteed Minimum Pensions (GMPs), substituting it with a less stringent “reference test” requirement. However, it required occupational schemes to pay the full cost of inflation indexation of their pensions (up to 5 percent), ending the state’s commitment to pay for part of the indexation cost. In addition, the legislation introduced age-related rebates for contracting into a defined-contribution (personal or occupational) scheme as of April 1997. A new rebate schedule, which revised upward the rebates for personal pensions and downward the rebates for defined-contribution occupational pensions, was introduced in April 1999 (GAD, 2003b).

<sup>12</sup> Using the interim 2001-based population projections.

<sup>13</sup> Starting in April 2002, no new SERPS rights could be accumulated. Instead, rights to the S2P began to accrue. People who retire between 2002 and 2050 with contributions to both schemes will receive a pension that is a mixture of the two.

from 40 to 60 per cent.” The introduction of stakeholder pensions in April 2001 was part of this reform agenda. The main elements of the government’s current strategy to increase private pension provision are discussed in detail in Section E.

### **C. Long-term Public Spending on Pensions: The Government’s Projections and Assumptions**

11. **The government’s projections show that total public spending on pensions will remain relatively stable around 5 percent of GDP over the next five decades, although its composition will change.**<sup>14</sup> Pension spending is defined as the combined cost of the BSP, SERPS/S2P, the Pension Credit, and other pension spending.<sup>15,16</sup> The composition of public pension spending is projected to change significantly over the same period, as the decreasing cost of the BSP is offset by the rising cost of the PC and SERPS/S2P.<sup>17</sup>

12. **While the projections of BSP, SERPS/S2P and PC are based on common macroeconomic and demographic assumptions, they also reflect several important assumptions specific to each scheme:**<sup>18</sup>

- The gradual decline in the cost of the BSP—from 3.8 percent to 2 percent of GDP—is driven mainly by the assumption that the BSP rates are indexed to prices rather than earnings. The prospective hike in the retirement age (see Para. 9) also plays a

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<sup>14</sup> See 2002 Pensions Green Paper.

<sup>15</sup> Other pension spending comprises Winter Fuel payments and TV licenses for people aged 75 and over.

<sup>16</sup> This is the definition of aggregate pension spending used in the 2002 Pensions Green Paper and the 2002 Pre-Budget document *Long-term Public Finance Report: An Analysis of Fiscal Sustainability*. An alternative definition includes two additional components—the housing/council tax benefit and attendance/disability living allowance—amounting to about 1.1 percent of GDP in 2001/02. In 2050/51, the combined cost of these benefits is projected to be 1.2 percent of GDP (GAD, 2003b).

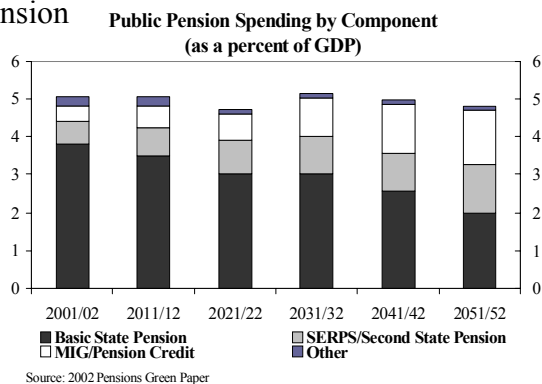
<sup>17</sup> The projections of BSP and SERPS/S2P are produced by the Government Actuary’s Department, which is responsible for estimating the contribution rates required to meet the long-term expenditures of the National Insurance Fund. The projections of the PC are calculated by the Department of Work and Pension (see its 2002 publication, *The Pension Credit: Long-term Projections*).

<sup>18</sup> The demographic assumptions are based on the interim 2001-based projections. In all years after 2007/08, inflation and productivity growth are assumed to be 2.5 percent and 2 percent, respectively, while employment growth is driven by the demographic projections.

role, although the increasing number of pensioners and the growing share of women entitled to a full basic pension act as countervailing factors.

- The steady rise in the cost of the additional earnings-related state pension—from 0.6 percent to 1.3 percent of GDP—is related to the growing entitlements to SERPS<sup>19</sup> and the increasing number of pensioners (GAD, 1999).<sup>20</sup>

- The continual increase in the cost of the Pension Credit<sup>21</sup>—from 0.4 percent to 1.5 percent of GDP—mainly reflects three important assumptions. First, the guarantee credit is assumed to be indexed to earnings, while the savings credit threshold is assumed to be indexed to prices. Second, on average, the pensioners’ income brought to account in the Pension Credit is expected to increase with earnings. Third, the take-up of the Pension Credit is assumed to be 80 percent.



13. **Since the projections in the 2002 Green Paper, the Government Actuary’s Department (GAD) has produced new long-term projections of the BSP and SERPS/S2P.** While the main assumptions used to calculate the cost of these schemes (outlined above) are unchanged, their combined cost is now projected to be somewhat higher (by about 0.5 percent of GDP) in 2051/52. This is mainly due to the introduction of S2P and the lower number of employees assumed to contract out.<sup>22</sup> As these new projections are the most current and broadly similar to the previous ones, they will be used in the discussion throughout the rest of the paper.

#### D. Risks to the Long-term Public Pension Projections

14. **Examining the effect of a “full aging pass-through” on pensioners’ income is a useful starting point for discussing the risks to the above projections.**<sup>23</sup> At the aggregate

<sup>19</sup> As new pensioners with higher entitlements replace older pensioners with little or no entitlement.

<sup>20</sup> The earnings limits of SERPS/S2P are assumed to increase with prices.

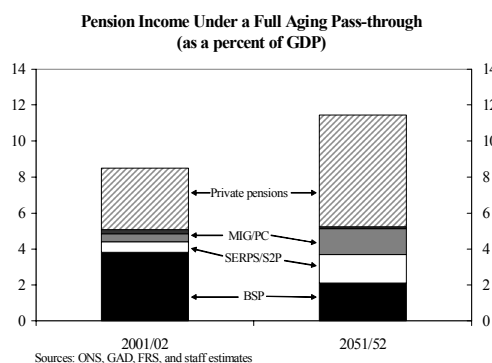
<sup>21</sup> See DWP (2002a).

<sup>22</sup> See Table 5.15 (GADb, 2003).

<sup>23</sup> Jaeger (2003) uses the concept of a full aging pass-through to evaluate the effect of aging on public finances.

level, full aging pass-through captures the necessary increase in total pension income (as a percent of GDP) that keeps the “replacement rate” (i.e., the income of the average pensioner relative to the income of the average worker) constant. Given a projected increase in the old-dependency ratio of about 35 percent and an estimate of total pension income of 8.5 percent of GDP in 2001/02,<sup>24</sup> the total pension income consistent with a full aging pass-through is 11½ percent of GDP in 2051/52. A caveat to these simple calculations—and a potentially important mitigating factor—is that the effective retirement age and the labor force participation of people above state pension age are likely to rise as the dependency ratio worsens.<sup>25</sup> Abstracting from this effect, if the income of the average pensioner is to remain stable relative to the average earnings, the aging of the U.K. population will require a rise in total pension income of about 3 percent of GDP over the next five decades.<sup>26</sup>

15. **In this context, the government’s projections for public pensions imply that private pension income would have to double as a percent of GDP, if the average pensioner were to maintain his current pension income relative to average earnings.**<sup>27</sup> Estimating the exact increase in contribution rates to private pensions required to double the income from such schemes in fifty years is virtually impossible, given the involved institutional arrangements in the U.K. private pension system.<sup>28</sup> Nonetheless, the growth



<sup>24</sup> This estimate is obtained using information from aggregate data (on state spending on BSP, SERPS/S2P, MIG, other state benefits) and household-level data (the sources of income for the average pensioner discussed in Para. 7). For the sake of consistency and given the emphasis on pensions, income from earnings, investment, and housing/council and attendance/disability benefits is excluded from the calculation.

<sup>25</sup> Indeed, recent empirical evidence suggests that maintaining living standards is one of the main motivations for working past the state pension age (McKay and Smeaton, 2003).

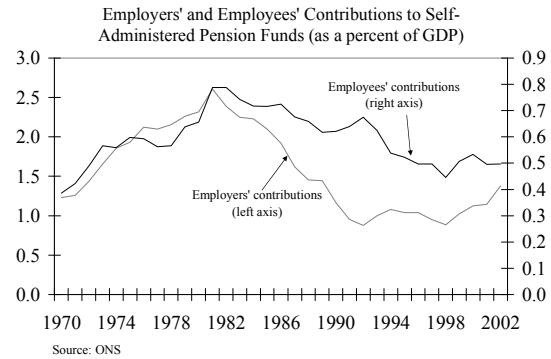
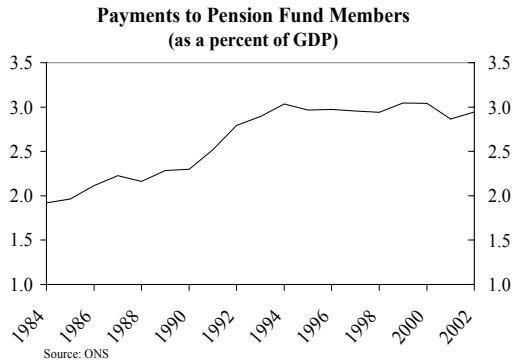
<sup>26</sup> This rise becomes significantly larger—to about 4 percent of GDP—if one uses the projected increase in the dependency ratio implied by the recently released 2002-based population projections.

<sup>27</sup> This is also a point made recently by Adair Turner, the head of the independent pensions commission, in a lecture to the actuarial profession entitled “The Macroeconomics of Pensions.”

<sup>28</sup> The U.K. private pension system comprises thousands of different defined-benefit and defined-contribution schemes, whose assets are held in various pension funds and life

(continued)

of occupational schemes during the second half of the 20<sup>th</sup> century provides a useful benchmark. Aggregate data on self-administered pension funds reveal that the funds' assets quadrupled as a percent of GDP from the early 1980s to the late 1990s (see Para. 6). Over the same period, the income paid to fund members rose by about 1 percentage point of GDP, while contribution rates declined in the early 1980s, possibly owing to the growth in the funds' equity income and the shift to personal pension schemes.



**16. If the increase in private pension income does not occur, the replacement rate for the average pensioner will decline, which could lead to significant public pressure to revive the earnings indexation of BSP.** This possibility is reinforced by the fact that the replacement rate for public pensions (BSP and SERPS/S2P) is already at a low level (about 18 percent of average earnings), both in historical and international context. However, the projected decline in the replacement rate shown below is likely to be dampened by the growing benefits under the PC.

Average replacement rate for BSP and SERS/S2P (as a percent of average earnings)			Projected joint (employer and employee) NI contribution rate required to balance the National Insurance Fund	
Indexation to:	Prices	Earnings	Prices	Earnings
2001/02	18	18	19.1	19.1
2010/11	17	19	18.4	20.5
2020/21	17	21	16.4	21.2
2030/31	15	21	16.4	24.1
2040/41	14	21	15.4	25.2
2050/51	13	21	14.9	25.8

Source: GAD (2003)

insurance companies. There is limited information about past contribution rates and current liabilities.

Nevertheless, the support for the earnings indexation of the BSP may be strong given the universal nature of this pension.<sup>29</sup> If

implemented, this indexation will raise the cost of the National Insurance pensions by about 3 percentage points of GDP in 2051/52 (see table). Under this scenario, the joint (employee and employer) contribution rates required to balance the National Insurance Fund are projected to rise from about

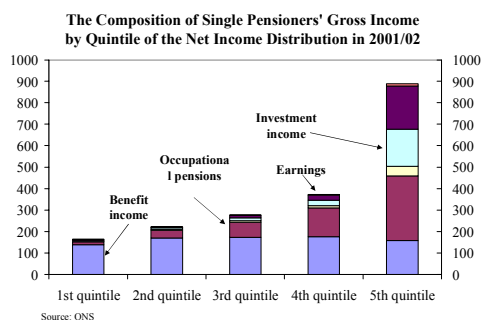
	BSP		SERPS/S2P		Both NI pensions	
	Prices	Earnings	Prices	Earnings	Prices	Earnings
2001/02	3.7	3.7	0.6	0.6	4.3	4.3
2010/11	3.5	4.0	0.9	0.9	4.3	4.9
2020/21	3.0	4.2	1.0	1.0	4.0	5.2
2030/31	3.0	5.0	1.1	1.1	4.1	6.1
2040/41	2.6	5.4	1.3	1.2	3.9	6.6
2050/51	2.1	5.4	1.6	1.4	3.8	6.8

Sources: GAD (2003) and staff calculations

19 percent (of earnings) in 2001/02 to over 26 percent in 2050/51. However, the overall cost of the public pensions may increase by less than 3 percentage points, as the implied cost of the PC will be lower by about 0.5 percentage point of GDP in 2050/51.<sup>30</sup> This suggests that the additional cost imposed by the earnings indexation on public pension spending is likely to be about 2.5 percentage points of GDP in 2050/51.

**17. Another risk to the long-term spending projections, arising from the cost of the PC, is also linked to the prospective growth in private pension income.**

Even if the risk discussed in the previous paragraph never materializes, the long-term cost of public pensions could be higher than currently projected. According to Department of Work and Pensions estimates (confirmed in staff's analysis), if average pensioner income from non-PC sources increases with prices rather than earnings, the cost of the PC could be higher by about 2 percentage points of GDP in 2050/51.<sup>31</sup> While this is an extreme assumption, it is not the only one that produces



<sup>29</sup> In a paper on the optimal design of public pensions, Miles and Sefton (2002) illustrates that voters have a preference for a flat rate pension system over a means-tested system, unless the generosity of the means-tested system is considerably higher. However, the authors find that the optimal public pension scheme has some degree of means testing, although the scale of its benefits is very low.

<sup>30</sup> The top-up benefit under the PC will be lower, given the higher income received as a result of the earnings indexation of BSP.

<sup>31</sup> See answer to parliamentary question of June 3, 2003 (<http://www.parliament.the-stationery-office.co.uk>).

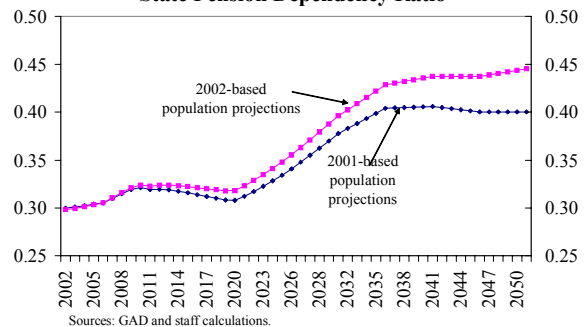


higher long-term estimates of the PC. Staff analysis<sup>32</sup> suggests that the cost of the PC is quite sensitive to the assumption that the distribution of (pre-PC) pensioner income remains constant over time. Given the projected (below-earnings) growth of the BSP and the relative importance of this pension in the first three quintiles of the income distribution (see chart), the long-term cost of the PC could exceed its current estimate by about 1 percentage point of GDP, if private pension income does not grow sufficiently fast to offset this effect.

**18. Aside from the risks stemming from the increase in private pension provision, the long-term projections are subject to considerable uncertainty related to demographic assumptions.** Over long horizons, the estimated cost of public pensions depends heavily on demographics. But long-term

population projections are inherently uncertain, and they tend to surprise on the downside. For example, the Government Actuary's Department recently released a new set of (2002-based) population projections—not incorporated in the long-term pension projections discussed in this paper—indicating a more significant increase in the state pension dependency ratio than in the previous (2001-based) projections. This upward revision is mostly due to a higher life expectancy assumption and a higher estimate of the 2001 base population aged 16 to 44. If these latest demographic projections are taken into account, public pension spending could be about  $\frac{3}{4}$  percent of GDP higher in 2050 than currently envisaged.

**Impact of Revised Population Projections on State Pension Dependency Ratio**



### E. The Government's Strategy

**19. The government has formulated a strategy to address the demographic challenge to the U.K. pension system.** One aspect of this strategy has been to make it clear that individuals are expected to take responsibility for their pension savings. In particular, the 2002 Pensions Green Paper states that:

*“...the Government provides the foundation of support for retirement income through the BSP and the Second State Pension. The amount that individuals should save in addition will depend on their circumstances and preferences...The Government has*

<sup>32</sup> The staff's projections are obtained by estimating the costs of the PC across the quintiles of the income distribution for single pensioners and pensioner couples. The initial income distribution is based on household data from the 2001/02 Family Resources Survey. Productivity (and earnings) growth is assumed to be 2 percent, and employment growth is consistent with demographic trends. The assumption about the indexation of the PC parameters is the same as in the 2002 Pensions Green Paper.

*no specific objective on earnings replacement. The state system, through the MIG and the Pension Credit, guarantees a level of income rather than a specific replacement rate. It is the responsibility of the individual, where possibly supported by their employers, to determine the level of income in retirement they want over and above that provided by the state system.”*

20. **Nonetheless, the focus of the government’s strategy has been to promote voluntary private saving for retirement.** The 2002 Pensions Green Paper reports that about 3 million people are seriously under-providing for their retirement, while a larger group of 5 to 10 million may need to save more or work longer. Having identified this sizable “savings gap,” the paper highlighted a number of initiatives to boost saving, with an emphasis on encouraging private pension provision and extending working lives:

- ***Implementation of informed choice program.*** Given the complexity of the U.K. pension system, the goals of this broad program are to help people understand their choices, increase financial literacy, and provide personalized (state and combined) pension forecasts. The desired effect of the informed choice program is to prompt people to save more for retirement. While this is an interesting and innovative idea, it is still largely untested. If people do not save because they are liquidity-constrained, there is little reason to believe that the availability of more information will change their savings pattern, although they may still choose to work longer.
- ***Simplification of pension taxation.*** This overdue initiative proposes a radical simplification of the tax treatment of pensions, replacing the current eight tax regimes with a unified system of pension taxation. The immediate implications of this change for individual savers are unclear. In the long run, however, the simplification of the tax regime will make it easier for people to compare different pension products. The government has proposed replacing the existing regimes by a single regime with a lifetime allowance on the amount of tax-privileged pension saving.
- ***Protection for occupational pension holders.*** Specific proposals in this area include the appointment of a new pensions regulator, the establishment of a clearing house for defunct pension schemes, and the amendment of the creditors’ priority order. The purpose of this initiative is to address some of the problems experienced by members of occupational pension schemes in recent years. However, the increased protection of existing pensions could jeopardize the emergence of new schemes.
- ***Implementation of stakeholder savings products.*** This initiative follows up on the proposals of the Sandler Review (2002) to provide simple and highly-regulated savings products and pensions, which offer better protection for consumers.<sup>33</sup>

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<sup>33</sup> See HM Treasury (2003b).

- ***Introduction of better incentives to work.*** In this area, the primary objective is to increase further the labor market participation and employment rates of older people (including those who are past the state pension age) and to raise the effective retirement age, which is currently lower than the state pension age. The planned increase in the qualifying age for the guarantee part of the PC from 60 to 65 between 2010 and 2020 is complementary to this objective, as it would mitigate any possible adverse effect of means-testing on labor supply. New proposals put forward in the Green Paper include increasing the qualifying age for state pensions, creating financial incentives for people to defer receipt of the BSP, and more generally, helping older workers to remain or return to work. The paper rejects firmly the idea of raising the state pension age from 65 to 67, although it discusses the merits of using an individual-specific retirement age, possibly linked to past labor market participation.

21. **A final (and crucial) part of the government’s strategy has been to monitor the progress made under the current system.** For this purpose, an independent pensions commission—established at the time of the Pensions Green Paper in December 2002—issued its work plan in June 2003. The remit of the commission is to evaluate the performance of the existing voluntary approach to saving, focusing on the adequacy of private provision. The members of the commission are expected to review the current system and make preliminary policy recommendations in mid-2005. In principle, the commission could propose a shift towards compulsion if it concludes that private provision is unlikely to increase sufficiently.

## **F. Conclusions**

22. **The discussion in this paper leads to the following conclusions:**

- Over the past thirty years, the U.K. pension system has undergone structural reforms that consistently fostered the growth of its private pillar. As a consequence, the overall cost of the U.K. public pension system is currently lower than in most other EU countries.
- Still, the aging of the U.K. population presents a significant challenge to both the public and the private pension pillars. While providing a more generous safety net for the poor, the government’s response has been to encourage people to increase their private savings for retirement. So far the government’s approach to achieving this increase in private savings has been purely voluntary. Key elements of this strategy include streamlining the tax treatment of pensions; introducing simple and regulated (“stakeholder”) private pensions; providing personalized pension forecasts; increasing the protection of occupational pension holders; and improving the incentives for people to work longer before and during retirement.
- If this voluntary strategy succeeds in increasing private pension saving and in extending working lives, it will provide a “first-best” solution to the aging problem.

However, many of its initiatives are new and untested. At this point, it is too early to tell if they will achieve a tangible increase in private retirement saving.

- Nonetheless, the outlook for the government's spending on pensions depends critically on the desired increase in private pension and other income. If this outcome is not attained, the U.K. public pension system could be exposed to contingent liabilities of up to 2½ percent of GDP in 2050.
- These risks to the long-term public spending on pensions will be substantially mitigated if the government considers other, more forceful, options to increasing private pension savings. Clearly, this is a "second-best" solution to the aging problem. The appointment of an independent pensions commission—to monitor the implementation of the current strategy and make recommendations about its future, including a possible shift to compulsion—is very sensible, as it will allow a change of course if the current voluntary approach does not work.

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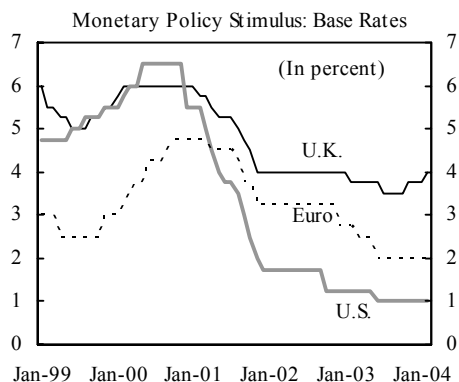
## II. THE INTEREST RATE SENSITIVITY OF UK DEMAND

### HOW DIFFERENT IS IT FROM THE EURO AREA AND THE UNITED STATES?<sup>1</sup>

#### A. Introduction

1. **Given its relatively greater openness, one would expect the UK economy to have been more vulnerable to the recent global slowdown.**

Yet, in response to this slowdown, the Bank of England cut its policy rate by no more than the monetary authorities in the euro area and the United States and in fact maintained rates at higher levels. In the event, the UK economy weathered the downturn relatively well, with a more resilient growth performance than the other two economies. A possible explanation of these developments is that the UK economy is more responsive to interest rates.



2. **The interest rate sensitivity of the UK economy was a central issue in the recent UK decision regarding whether to join the European Economic and Monetary Union (EMU).**<sup>2</sup> The UK Treasury's background studies provide an extensive comparison of the UK economy vis-à-vis that of the euro area. The June 2003 assessment of the five tests draws the conclusion that cyclical and structural differences between the UK and euro area economies are the key risk factors posed by EMU entry in the near term. In part, these differences are attributable to relatively greater sensitivity of the UK economy, especially consumption, to changes in interest rates. One important source of this greater sensitivity is the influence on economic activity of the housing sector.

3. **This paper attempts to gauge the interest sensitivity of UK aggregate demand and its key components relative to both the euro area and the United States.** It is organized as follows. Section B provides a comparison of stylized facts regarding business cycle developments in the three economies. It suggests that the cyclical properties of the three are broadly similar, with a few notable exceptions, especially that consumption in the United Kingdom has been consistently more volatile relative to output than in the other two economies. Section C presents an analysis of how these cyclical differences reflect the way monetary policy changes impact the three economies. It concludes that, while the overall interest sensitivity of output is broadly similar, consumption is more sensitive to interest rate changes in both the United Kingdom and the United States than in the euro area. Section D

<sup>1</sup> Prepared by Keiko Honjo.

<sup>2</sup> See Chapter III for more details on the UK Treasury's assessment of the five tests on the EMU entry.

analyzes consumption in the United Kingdom and the key role played by the housing sector. The final section summarizes the paper's main findings.

## B. Properties of the UK, Euro Area, and US Business Cycles

4. **GDP growth in the United Kingdom over the period 1980–2003 was stronger on average than in the euro area, although it was more volatile.** This result, however, reflects the performance of the UK economy in the 1980s and early 1990s. After the early 1990s, the United Kingdom continued to grow faster than the euro area, but the volatility of output declined to around the same level as in the euro area. This development partly owes to the strengthening of macroeconomic policy frameworks in the United Kingdom as well as structural factors, including the flexibility of labor, product, and financial markets which have been reformed over the past. In contrast, UK growth has been lower than that of the United States over the whole period, although it has been less volatile.

United Kingdom: Comparison of GDP Growth Rates 1/

	Mean			Standard Deviations		
	1980:1-2003:1	1980:1-1993:3	1993:4-2003:1	1980:1-2003:1	1980:1-1993:3	1993:4-2003:1
Growth rate						
United Kingdom	2.3	1.9	2.9	2.7	3.3	1.4
Euro area	2.0	2.0	2.1	2.2	2.6	1.4
United States	2.9	2.7	3.2	3.1	3.6	2.2

1/ Annualized quarter-on-quarter growth rates.

5. **The key features of business cycles in the United Kingdom, the euro area, and the United States are similar, but there are also important differences** (Table 1).<sup>3</sup> Cross-correlations of detrended GDP with its major components indicate that in all three countries consumption and investment are highly pro-cyclical. Investment also is more volatile than consumption. Government consumption in all three economies is counter-cyclical, while short-term interest rates are positively correlated with GDP at short leads and lags. Significant differences across the three economies are:

- Consumption tends to be more positively correlated with GDP in the United Kingdom and the United States than in the euro area;
- Consumption in the United Kingdom is more volatile (both in absolute terms and relative to the standard deviation of GDP) than in either the euro area or the United States; and

<sup>3</sup> To analyze business cycles, a Hodrick-Presscott (HP) filter was used to detrend seasonally adjusted quarterly data for GDP and its major components for the three economies over the period 1980:1-2003:1.

- Investment tends to be more highly correlated with GDP in the euro area than in the United Kingdom, and this correlation tends to be higher in both of these economies than in the United States.

Moreover, correlations between detrended GDP in the three economies indicate that UK business cycles have been more correlated with those in the United States than with those in the euro area. However, this relationship has changed over time; since 1993, the UK cycle has become more correlated with the euro area than with the United States.

Comparison of Business Cycles (1980:1-2003:1) 1/

	1980:1-2003:1			1980:1-1993:3			1993:4-2003:1		
	C	I	Y	C	I	Y	C	I	Y
<i>1. Standard Deviations</i>									
United Kingdom	1.5	4.9	1.3	1.9	5.8	1.6	0.6	3.1	0.5
United States	1.0	6.4	1.4	1.2	7.4	1.6	0.6	4.5	0.9
Euro	0.8	2.4	0.8	0.8	2.4	0.9	0.8	2.5	0.7
<i>2. Standard Deviations Relative to GDP</i>									
United Kingdom	1.2	3.9		1.2	3.7		1.2	6.4	
United States	0.8	4.7		0.8	4.6		0.7	5.2	
Euro	1.0	2.9		0.9	2.7		1.0	3.3	
<i>3. Cross-Correlations of GDP deviation from the trend</i>									
	U.K.	U.S.	Euro	U.K.	U.S.	Euro	U.K.	U.S.	Euro
United Kingdom	1.00			1.00			1.00		
United States	0.53	1.00		0.53	1.00		0.54	1.00	
Euro	0.37	0.34	1.00	0.35	0.27		0.74	0.62	1.00

1/ Sample moments were computed from detrended series using the Hodrick and Prescott filter.

Sources: ONS, ECB, BEA and Fund staff estimates.

### C. Comparison of Interest Rate Sensitivity

6. **The differences in business cycles in the UK, euro area, and US economies in part reflect how they respond to monetary policy changes.** Economic theory suggests that monetary policy has no long-run impact on output, which is determined largely by real variables. However, in the short and medium run, it can affect output primarily owing to price and wage rigidities in the economy. To identify the sensitivity of output to interest rate changes, this paper uses vector autoregressions (VARs), which have become a standard technique in the economic literature.<sup>4</sup> Most of the studies on the euro area have focused on

<sup>4</sup> Other approaches include the use of large-scale country specific models to compare the overall strength of the interest rate sensitivity. See HM Treasury background study “EMU and the Monetary Transmission Mechanism” (2003b). For a comprehensive survey of the VAR for the United States, see Christiano et al (1999). For euro area, Angeloni, Kashyap and Mojon (2003) provide an overview of 16 recent VAR studies on euro area countries.



identifying compatibility and differences between individual countries. Peersman and Smets (2001) apply a VAR to “synthetic” euro area data<sup>5</sup> to focus on the area-wide responses to interest rate changes. The authors show that, overall, the impacts of monetary policy shocks in the euro area and the United States are broadly similar. Bean, Larsen, and Nikolov (2002) extend the comparison to the United Kingdom and find that the impulse responses to a monetary shock in the United Kingdom are qualitatively similar to the euro area and the United States. However, the validity of this conclusion is open to some question because the specification of the VAR used for the United Kingdom, which included house prices as an endogenous variable, is different than that used in Peersman and Smets (2001).

7. **To allow comparability, a stylized VAR model for the United Kingdom, euro area, and United States was estimated for the period 1980:1 to 2003:1 using a similar specification for all three economies.** The model for each economy includes four variables in levels—real GDP, consumer prices, the short-term interest rate, and the real effective exchange rate, along the lines of the models estimated by Peersman and Smets (2001). In addition, the VAR for both the United Kingdom and the euro area includes a world commodity price index as an exogenous variable, while the VAR for the United States includes it as an endogenous variable.<sup>6</sup> To control for changes in world demand and inflation, the VAR for the euro area and the United Kingdom also includes US real GDP and the US short-term interest rate. Given the relatively small sample period used for the estimation, no explicit assumption is imposed on the long-run cointegrating relationship among the variables in the models.<sup>7</sup>

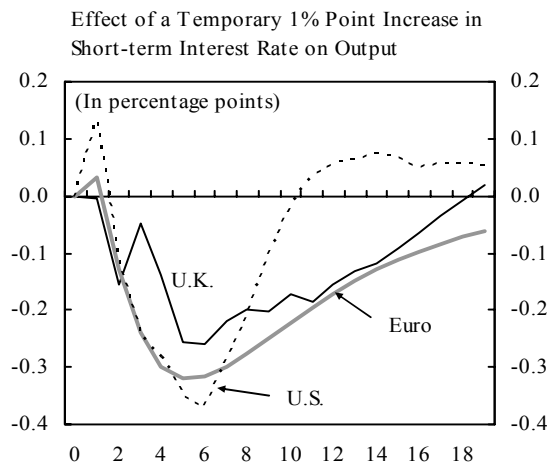
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<sup>5</sup> Weighted averages of data for the euro area countries for the period before the formation of the euro area in 1999; see Fagan et al (2001) for a description of these data.

<sup>6</sup> The commodity price index is included in each model to reduce the impact of the price puzzle—a tendency in VAR models for the price level to rise in response to an increase in interest rate policy shock; see Sims (1992). It is treated as endogenous in the case of the United States because US demand is generally considered to have a significant impact on world commodity prices given the economy’s size.

<sup>7</sup> All data are seasonally adjusted in logs, except for the short-term interest rates which are expressed in percentage points. Standard likelihood ratio tests are used to determine the lag-order of the VARs. The identification of monetary policy shocks is obtained using a Choleski decomposition. This involves the assumption that the monetary authorities observe the contemporaneous values of all variables in the model when setting the policy interest rate; however, all variables, excluding the exchange rate, respond with a lag to changes in the policy interest rate. The policy shocks have no contemporaneous impact on output and prices, but they may affect the exchange rate immediately.

8. **The results show that interest rate sensitivity of output is roughly similar across the three economies** (Figures 1–3 and text figure). In all three VAR models, a temporary rise in the nominal short-term interest rate is followed by a decline in output; the response is prolonged and hump-shaped, with the peak effect occurring in about six quarters. However, there is a difference in the duration of the response—the adverse impact on output lasts longer in the United Kingdom and the euro area than in the United States where the impact dissipates relatively quickly.



9. **While the interest rate sensitivity of output is similar across the three economies, the composition of the output response is very different.** The motivation for analyzing the composition is twofold. First, this could enhance our understanding of how the interest rate changes feed through the economy. Second, whether consumption or investment responds more, or more promptly, to an interest rate change is an issue of clear importance in the policy debate and in welfare analyses. For instance, in an economy with stronger response of consumption would suggest that consumer behavior is what needs to be monitored carefully in setting monetary policy.

10. **The paper uses two approaches to examine the effects of a monetary policy shock on consumption and investment.** The first simply involves re-estimating the VAR models substituting in turn real private consumption and real investment for real GDP. The second approach follows the methodology applied by Erceg and Levin (2002) and Angeloni et al. (2003), and replaces real GDP in the original VAR models with its main components—specifically, private consumption, investment<sup>8</sup>, and the rest of real GDP (government and net exports). The response of private domestic demand to a monetary policy shock is then obtained as the sum of the responses of real private consumption and investment, weighted by their shares in real GDP. The contributions from consumption and investment are then normalized to be comparable across the three economies.<sup>9</sup>

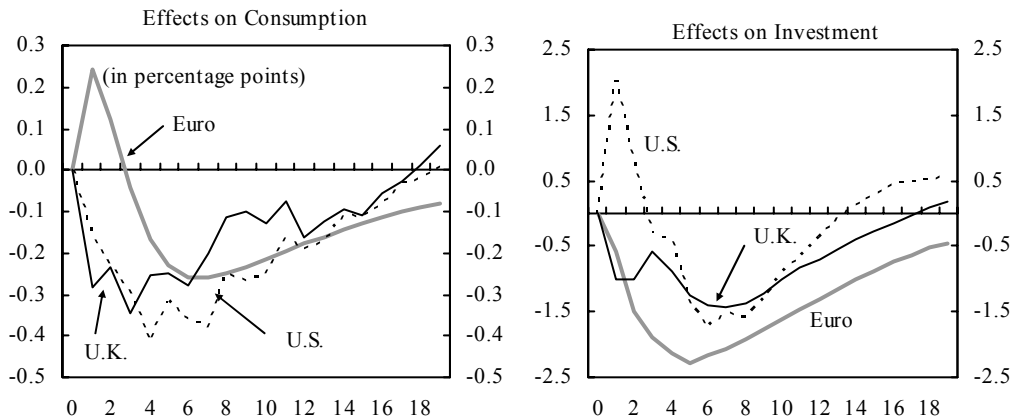
11. **The results from the two approaches suggest that consumption is more sensitive to interest rates in the United Kingdom and the United States than in the euro area.** In

<sup>8</sup> The analysis uses private investment for the United Kingdom and the United States, and total investment for the euro area due to data availability.

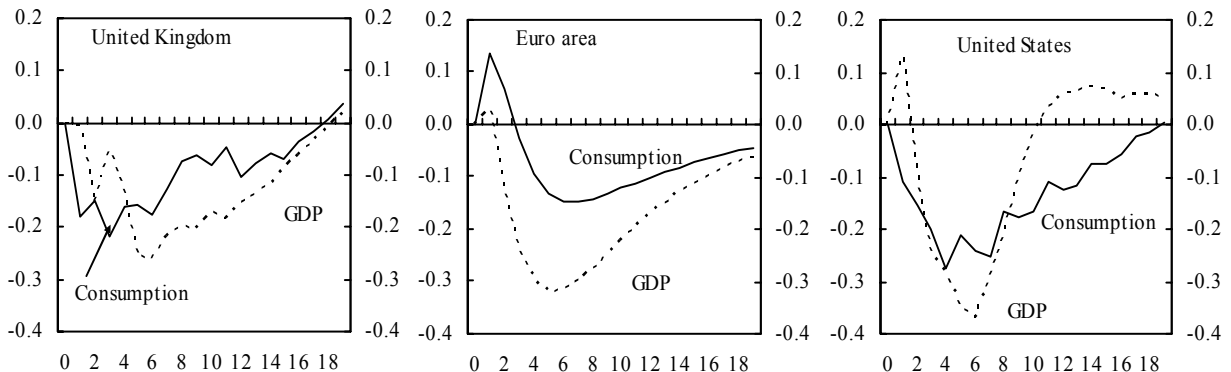
<sup>9</sup> As Angeloni et al. (2003) note, the relative contributions of private consumption and investment are evaluated in relation to real private domestic demand instead of real GDP because of the shortcut their approach takes in modeling the rest of GDP.

the first approach, consumption is not only more responsive to a unit interest rate shock in the United Kingdom and the United States, but the decline in consumption also leads a fall in GDP (see text figures). In contrast, the decline in investment following a unit increase in interest rate is larger and more persistent in the euro area. In the second approach, the contribution of consumption to the total response of private sector domestic demand is also significantly larger in the United Kingdom and the United States relative to the euro area. In the eight quarters following a monetary shock, the responses of consumption account for about three-quarters of the changes in the private domestic demand in the United Kingdom and the United States. In contrast, the contribution of consumption is substantially less in the euro area. In the euro area and to a lesser extent in the United Kingdom, investment maintains a significant contribution for a sustained period following the shock, while it disappears relatively more quickly in the United States.

Effect of a Temporary 1 percent Increase in Short-term Interest Rate



Comparison of Consumption and Output Responses 1/



1/ The responses of consumption are weighted by its share in GDP in each economy.

The Contribution of Consumption in the Total Response of Private Sector Domestic Demand 1/  
(Share in the responses of private sector domestic demand)

	United Kingdom	Euro area	United States
Quarters			
4	0.58	0.25	0.91
8	0.74	0.42	0.71
12	0.73	0.47	0.75
16	0.78	0.49	0.91
20	0.77	0.51	1.06

1/ Cumulative effects. Contribution of consumption is calculated by obtaining the response of consumption and investment weighted by their shares in GDP, and then normalize the results so that they add up to one. The shares of each GDP components were calculated as the average shares from 1980:1 to 2003:1.

#### D. Housing and Consumption

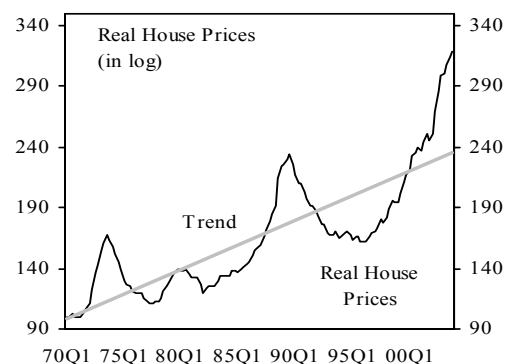
12. **These results raise a question as to what factors might explain why the structures of the UK and US economies are such that consumption tends to be more sensitive to interest rate changes.** Differences in access to financial markets, regulations, flexibility of labor markets, legal frameworks, and other institutional and cultural influences are some of the key factors. However, in focusing on the housing sector, some important similarities emerge. In both the United Kingdom and the United States there is a competitive and well liberalized mortgage market; the housing sector plays an important role in the economy; interest rates have an important impact on housing; and housing exerts a significant influence on consumption. Moreover, particularly in the United Kingdom, the dominance of variable rate mortgages implies that the interest rate sensitivity of the household sector may be higher.<sup>10</sup>

13. **Interest rates affect consumption via the housing sector directly and indirectly.** Directly, the cash flow of households changes as debt service payments move in line with changes in mortgage rates (reflecting a pass-through from official policy rates). Indirectly, interest rate movements affect consumption through their impact on housing prices and subsequent effects on wealth and households' access to credit.

14. **Strong demand and a relatively slow supply response over time in the UK housing market have contributed to a significant rise in housing prices over the past 30 years.** The United Kingdom has experienced three episodes of strong house price gains in the early 1970s, the late 1980s, and more recently since the mid-1990s (see text figure

<sup>10</sup> The UK Treasury's EMU study "Housing, Consumption, and EMU" (2003) identifies the housing market to be one of the key structural differences between the United Kingdom and the euro area countries.

below). The recent sharp rise in housing prices reflects in part an increase in the demand for housing associated with a reduction in mortgage interest rates and greater access to credit. Although the debt burden of households has increased from around 95 percent of disposable income in the mid-1990s to about 125 percent by September 2003, the debt service as a proportion of disposable income has remained broadly unchanged.



15. **House prices are highly correlated with consumption** (Figure 4). First, rising house prices reflect increasing demand for housing, and consumption of housing-related durable goods is closely correlated with this demand. But second, there is also an inverse relationship between household savings ratio and house prices, reflecting wealth effects driven by house prices. However, the impact of this wealth effect on consumption depends on households' perception of its "permanence". Given the high past volatility of house prices in the United Kingdom, there may be a some lag between a change in house prices (and the associated impact on wealth) and its effect on consumption. Moreover, housing equity withdrawal has provided an additional source of financing for consumption, generally at a substantially lower cost than other forms of credit available to households.

16. **To examine the channels through which interest rate changes impact consumption via the housing sector, another VAR model for the United Kingdom was estimated for the period 1980:1 to 2003:1.**<sup>11</sup> The model includes five variables: real consumption, consumer prices, real house prices, the ratio of outstanding loans to households secured on dwelling to total loans (bank and building societies), and the short-term interest rate.<sup>12</sup> Real house prices are included primarily as a proxy for wealth effects on consumption. The ratio of loans secured on dwellings was included as a proxy for measuring households' access to credit (although the house price variable might also pick up some of this effect). The ratio captures both changes in the availability of mortgage credit and of housing equity withdrawal.

17. **As expected, results from the VAR model indicate that there is a significant interest rate effect on consumption coming through the housing sector.**<sup>13</sup>

<sup>11</sup> The model was only estimated for the United Kingdom due to lack of data availability on key housing variables for the euro area, particularly housing prices.

<sup>12</sup> All variables are expressed in logs, except the secured lending ratio and the interest rate variables, which are expressed in percentage points.

<sup>13</sup> The results are consistent with the household consumption function estimated in IMF Country Report 02/46, Ch. II.

Impulse Responses of a 1 Percent Temporary Increase in the Short-term Interest Rate

	Consumption	Secured Loan Ratio	House Prices
(Percentage Points Deviation from the Baseline)			
Quarters following the interest shock			
4	-0.27	-0.13	-1.33
8	-0.17	-0.08	-1.76
12	-0.08	0.08	-0.40
16	-0.14	0.02	-0.39
20	-0.08	-0.01	-0.74
Cumulative effects			
4	-0.93	-0.50	-2.99
8	-2.16	-0.93	-9.97
12	-2.55	-0.80	-13.84
16	-2.96	-0.62	-14.92
20	-3.36	-0.65	-17.59

A temporary rise in the short-term interest rate is followed by a decline in house prices and the secured loan ratio. Consumption, in turn, is strongly correlated with changes in house prices and with the secured loan ratio. A variance decomposition analysis suggests that house prices explain a large share of UK consumption volatility. Although the initial impact is rather muted, after two years, changes in house prices explain about 45 percent of the fluctuations in UK consumption. Overall, consumption declines in response to a temporary one percentage point rise in the short-term interest rate with a short lag and reaches its maximum at nearly 0.4 percentage points below the baseline in 6 quarters. This impact is somewhat larger than results obtained from the other VAR models for the United Kingdom that exclude house prices.

Variance Decomposition of Private Consumption

Forecast Horizon	<i>St. error</i>	Proportion of Forecast Error (Percent)		
		Loan Ratio	House Price	Interest Rate
1	0.01	0.26	3.19	4.64
2	0.01	0.54	7.27	4.23
3	0.01	0.37	17.53	5.44
4	0.01	0.33	20.92	6.58
5	0.01	0.29	26.78	7.83
6	0.01	0.66	34.85	9.17
7	0.01	1.57	40.44	9.13
8	0.01	3.62	44.31	8.12
9	0.02	6.04	45.86	7.30
10	0.02	8.55	46.04	6.63
11	0.02	10.71	45.98	6.15
12	0.02	12.25	45.83	5.86

Sources: Fund staff estimates.

## E. Conclusion

18. **The evidence presented in this paper suggests that the interest sensitivity of output in the UK, euro area, and US economies are roughly similar, but that the main channels through which interest rates affect total demand differ significantly.** In the United Kingdom, there is a high correlation between total output and private consumption. In turn, the analysis shows that consumption is highly sensitive to changes in interest rates. This sensitivity appears to reflect the importance of the housing sector and the development of UK financial markets, which provide greater access to credit to UK households. In this, the United Kingdom more closely resembles the United States than the euro area.

19. **These results presented here, however, need to be interpreted with some caution.** The estimates tend to be sensitive to the sample period reflecting the relatively short available data; and confidence bands around the impulse responses are generally wide, especially in the case of the United Kingdom. This reflects the fact that available data cover a period of significant structural changes in the UK economy and in its financial markets. In addition, with the recent increase in household debts combined with the dominance of variable rate mortgages, the economy's interest rate sensitivity may have increased. In time, the interest sensitivity of euro area consumption to interest rates could rise, especially if structural reforms remove some of the barriers that prevent the euro area from developing mortgage markets more like those in the United Kingdom. In turn, the increase of long-term fixed rate mortgages in the United Kingdom may dampen the interest rate sensitivity of consumption. In the meantime, monetary policymakers in the United Kingdom need to monitor more carefully consumption and housing price developments in formulating policy than their euro area counterparts.

Table 1. United Kingdom: Cross-Correlations with GDP (1980:1-2003:1)

	Cross-Correlation of GDP with								
	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
<i>United Kingdom</i>									
GDP	0.39	0.53	0.69	0.83	1.00				
Consumption	0.46	0.53	0.66	0.73	0.86	0.76	0.67	0.52	0.39
Government consumption	0.00	-0.06	-0.16	-0.28	-0.30	-0.32	-0.37	-0.34	-0.37
Investment	0.45	0.57	0.64	0.69	0.79	0.66	0.54	0.45	0.35
Interest rates	0.34	0.33	0.31	0.29	0.28	0.11	-0.02	-0.13	-0.21
Real exchange rate	0.30	0.27	0.22	0.10	-0.10	-0.12	-0.14	-0.19	-0.21
<i>United States</i>									
GDP	0.20	0.43	0.64	0.83	1.00				
Consumption	0.17	0.34	0.51	0.65	0.85	0.78	0.68	0.56	0.40
Government consumption 1/	0.09	0.01	-0.08	-0.18	-0.19	-0.29	-0.38	-0.45	-0.47
Investment	0.02	0.29	0.51	0.75	0.91	0.74	0.55	0.37	0.16
Interest rates	0.18	0.25	0.25	0.26	0.25	0.10	-0.05	-0.14	-0.24
Real exchange rate	0.05	0.05	0.04	0.03	-0.01	-0.05	-0.10	-0.12	-0.13
<i>Euro area</i>									
GDP	0.34	0.47	0.63	0.79	1.00				
Consumption	0.50	0.60	0.66	0.70	0.78	0.63	0.48	0.37	0.27
G	0.22	0.10	-0.06	-0.15	-0.22	-0.29	-0.35	-0.39	-0.38
Investment	0.39	0.53	0.65	0.77	0.92	0.78	0.66	0.55	0.44
Interest rates	0.22	0.23	0.22	0.21	0.20	0.11	0.02	-0.06	-0.11
Real exchange rate	-0.08	-0.07	-0.03	-0.06	-0.12	-0.19	-0.22	-0.15	-0.05

1/ For period 1987:1-2003:1 due to data limitations.



Figure 1. Impulse responses: Base VAR Model with U.K. Output

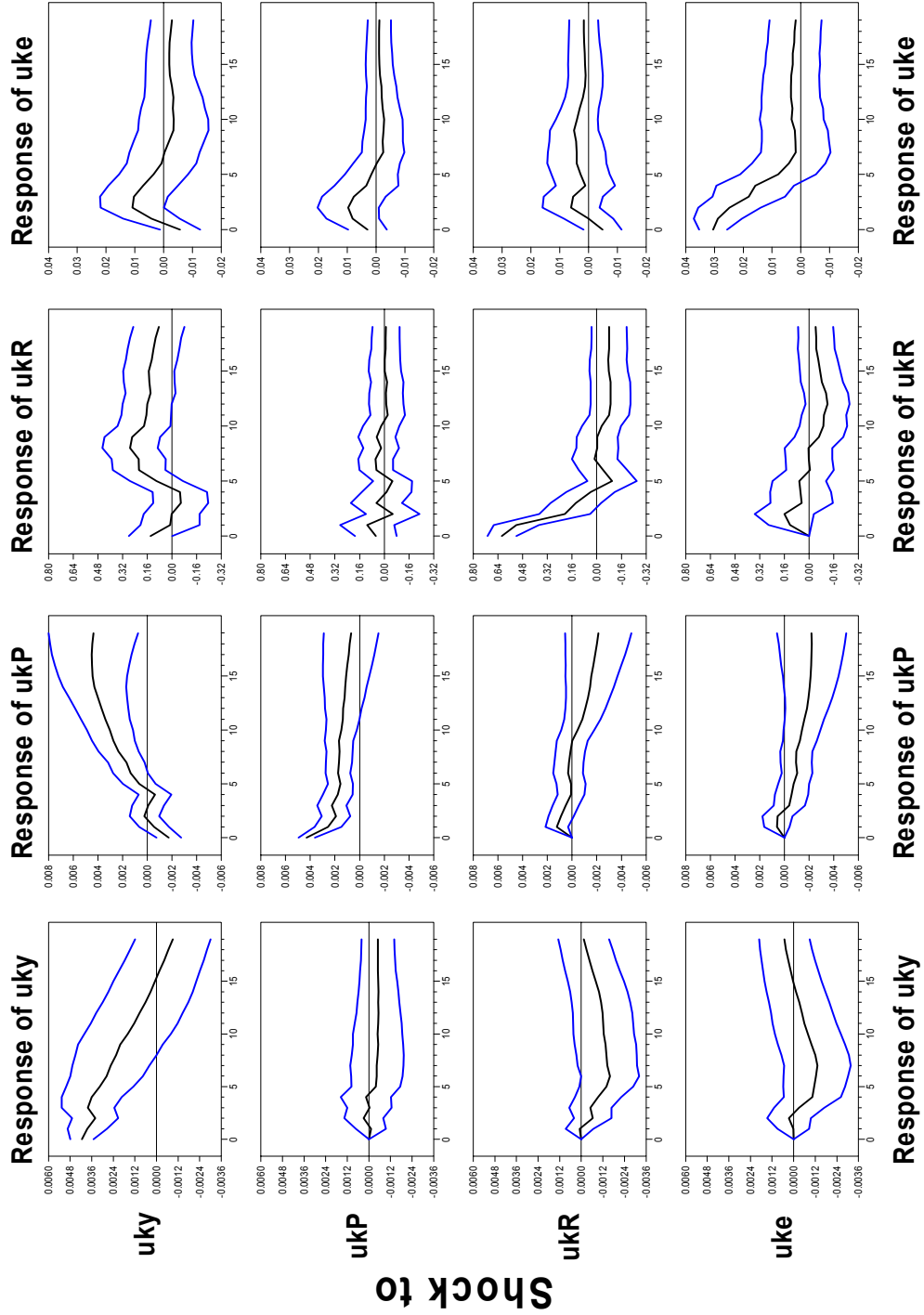


Figure 2. Impulse responses: Base VAR Model with Euro Output

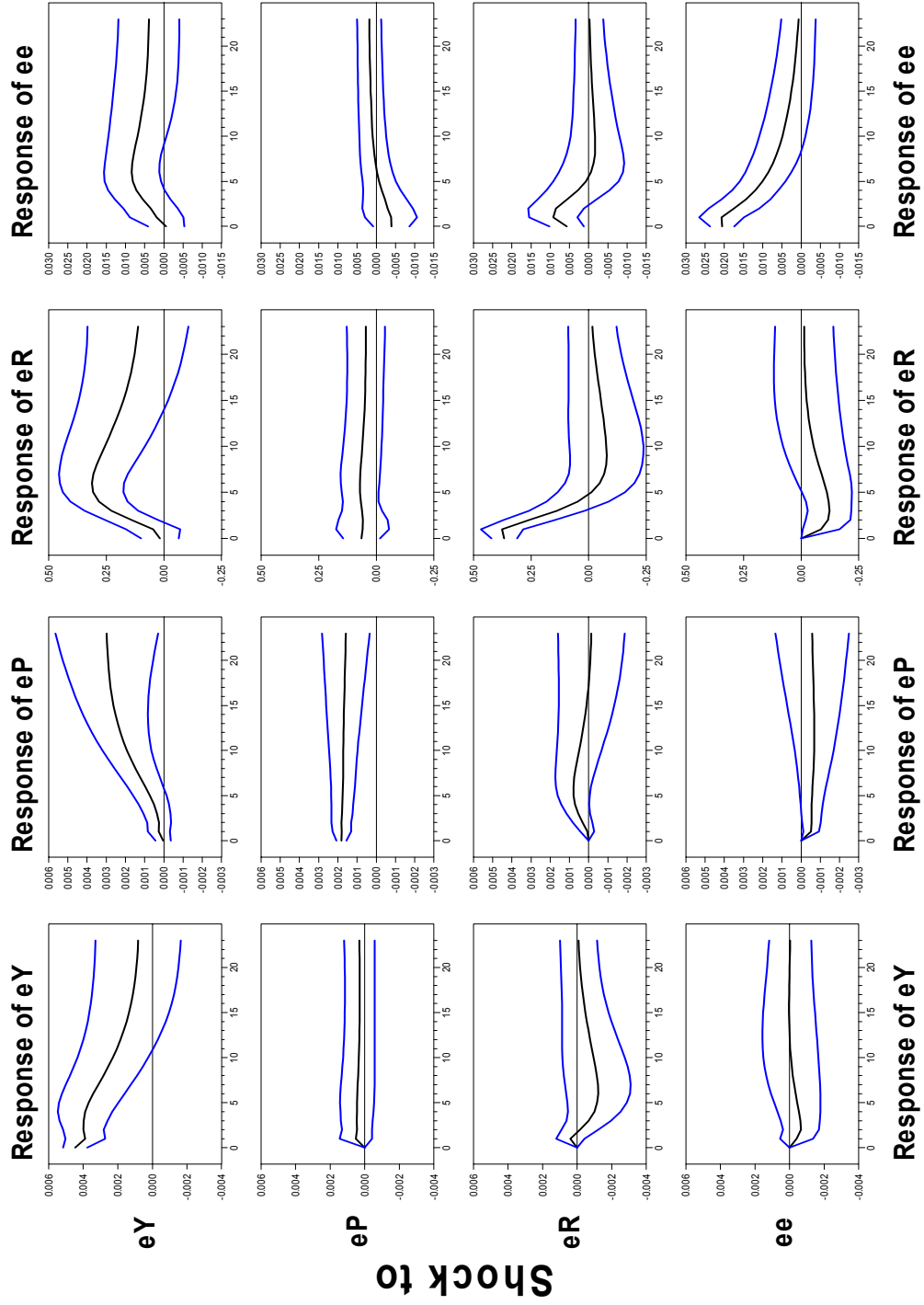


Figure 3. Impulse responses - Base VAR Model with U.S. Output

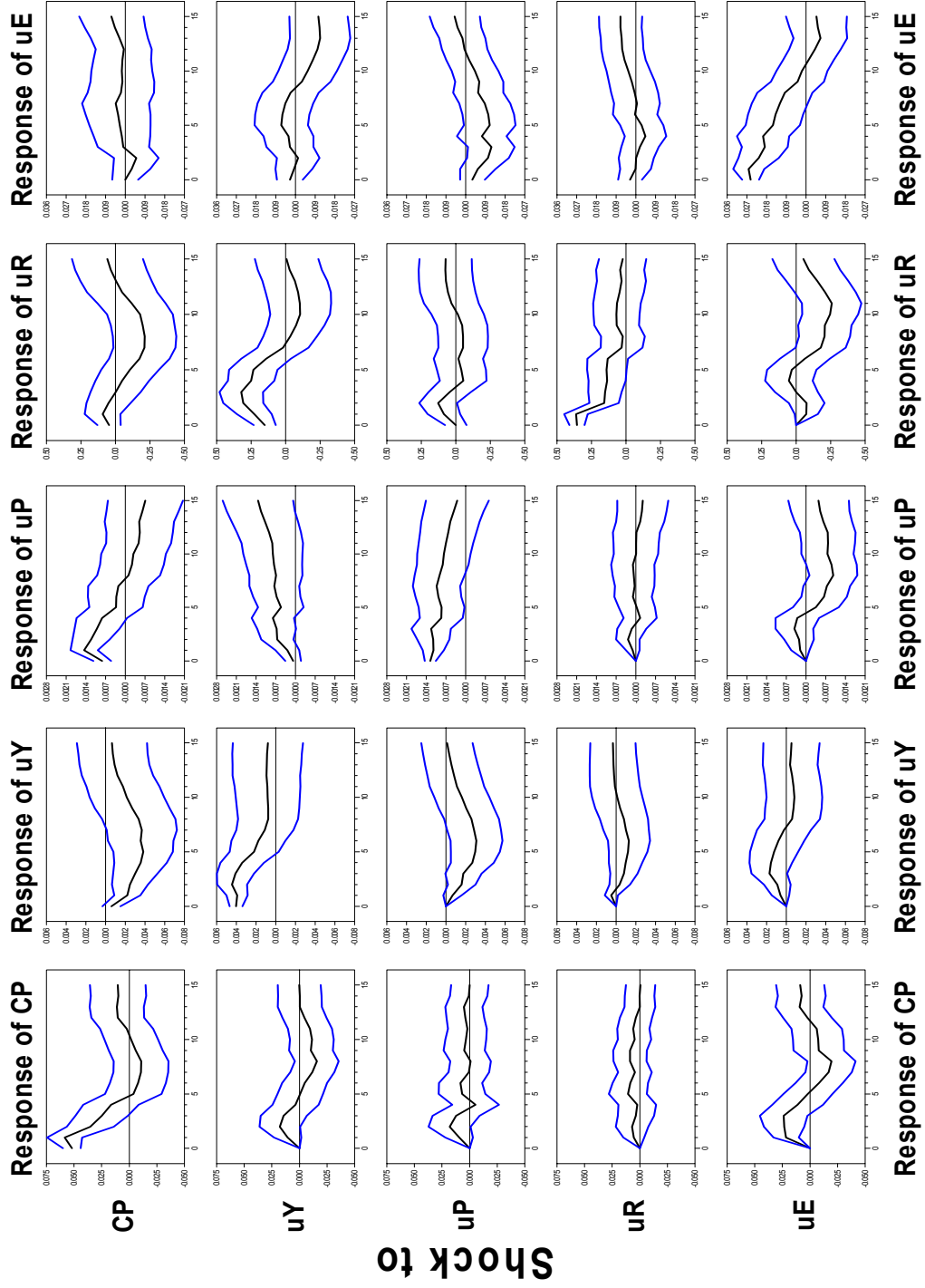
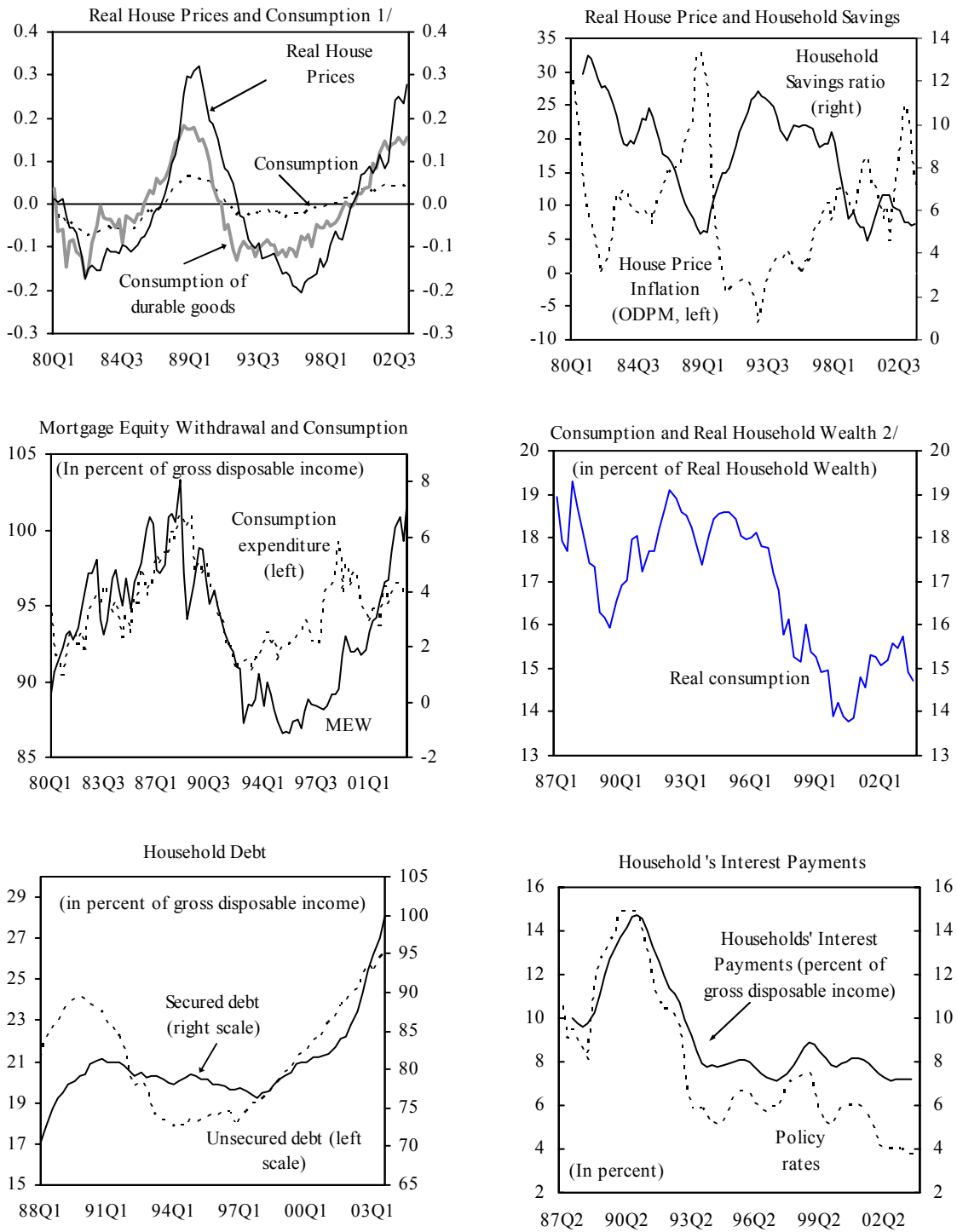


Figure 4. United Kingdom: Selected Key Housing Sector Variables

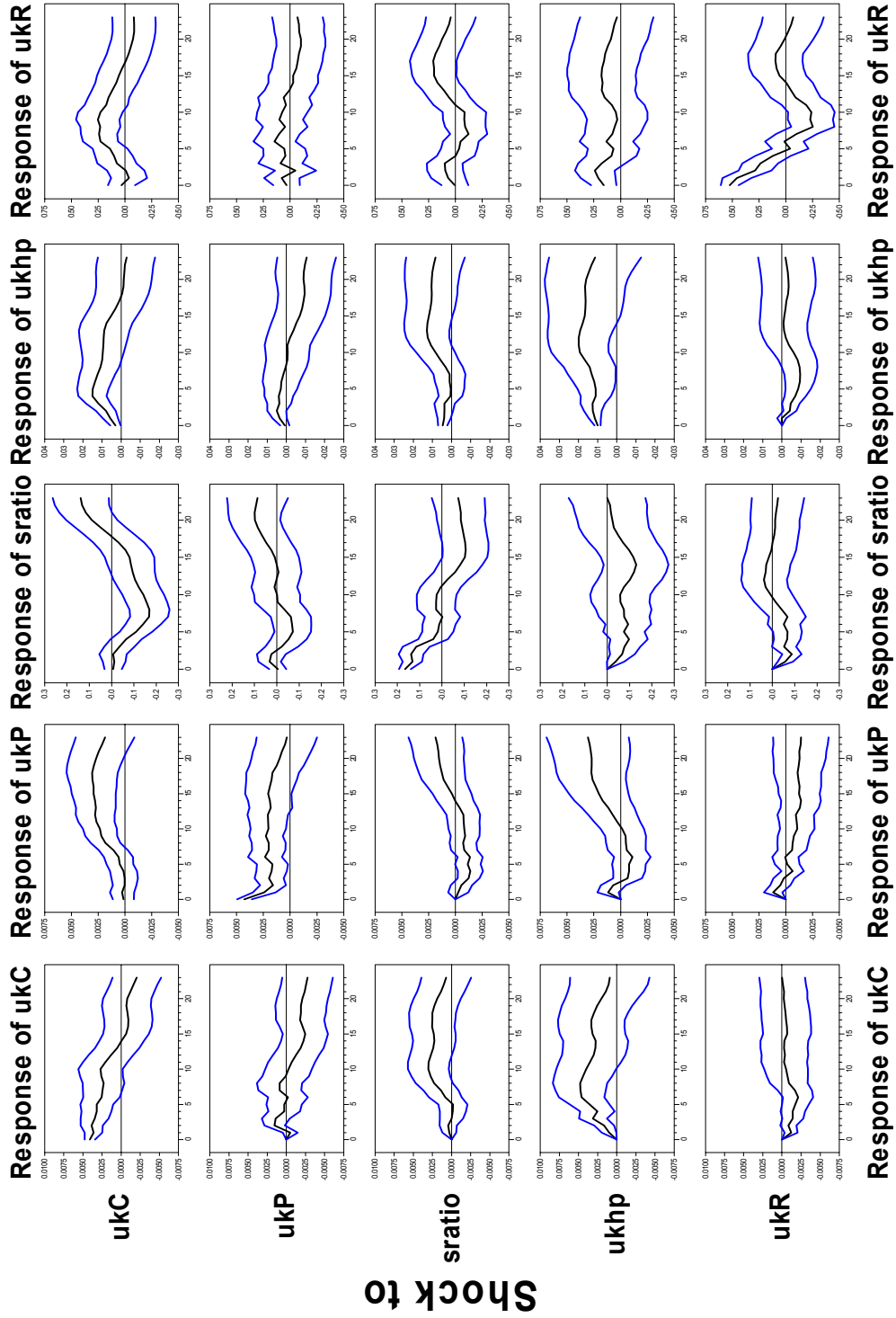


Source: Office of National Statistics, Bank of England and Fund staff estimates.

1/ Detrended variables.

2/ Household wealth deflated by consumption deflator.

Figure 5. Impulse responses of the U.K. Consumption VAR



**Data Sources and Definitions (Source in parenthesis)**

All data are in logarithmic form, seasonally adjusted excluding the short-term interest rates and secured loan ratio, which are in percentage points. Most euro area data are taken from the ECB Area Wide Model (AWM) database.

Economy	Variables	Abbreviation	Description	Source
United Kingdom	1 Real GDP	uky	Quarterly GDP in log	ONS
	2 Consumer Prices	ukP	GDP deflator	ONS
	3 Interest Rates	ukR	3 month interbank libor	BOE
	4 Real exchange rate	uke	Unit Labor Cost	IFS
	5 House Prices	ukhp	Mix-adjusted index	ODPM
	6 Secured loan ratio	sratio	Lending to households secured by housing/total loans (Banks and Building Societies)	BOE
	7 Commodity Price	CP		
Euro area	1 Real GDP	eY	Quarterly GDP in log	AWM
	2 Consumer Prices	eP	Private consumption deflator	AWM
	3 Interest Rates	eR	Short-term interest rate	AWM
	4 Real exchange rate	ee	Unit Labor Cost	IFS
United States	1 Real GDP	uY	Quarterly GDP in log	BEA
	2 Consumer Prices	uP	Private consumption deflator	ONS
	3 Interest Rates	uR	Fed Funds rates	IFS
	4 Real exchange rate	uE	Unit Labor Cost	IFS

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### III. THE JUNE 2003 EMU ASSESSMENT<sup>1</sup>

#### A. Introduction

1. **The UK government's policy on Economic and Monetary Union (EMU) membership was set by Chancellor Brown in his October 1997 statement to Parliament, which included a commitment to the principle of joining EMU.**<sup>2</sup> A key element of this policy is that at the time the actual decision to join is taken by the government the economic case for euro adoption must be "clear and unambiguous," as further specified by five economic tests. These tests relate to five questions that are here reproduced *verbatim* (with the indication in parenthesis of the term each test is commonly referred to):

- 1) *Are business cycles and economic structures compatible so that we and others could live comfortably with euro interest rates on a permanent basis?* (**convergence test**)
- 2) *If problems emerge is there sufficient flexibility to deal with them?* (**flexibility test**)
- 3) *Would joining EMU create better conditions for firms making long-term decisions to invest in Britain?* (**investment test**)
- 4) *What impact would entry into EMU have on the competitive position of the UK's financial services industry, particularly the City's wholesale markets?* (**financial services test**)
- 5) *In summary, will joining EMU promote higher growth, stability and a lasting increase in jobs?* (**growth, stability and employment test**)

Once the government has come to the conclusion that the economic case for entry is clear and unambiguous, the entry decision would be subject to a referendum. In 1997, the government concluded that the case for entry was not yet clear and unambiguous and decided to reassess it after the following elections, which took place in 2001.

2. **In June 2003, the UK Treasury issued a new assessment of the five economic tests (henceforth the Assessment),**<sup>3</sup> together with 18 related studies covering a

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<sup>1</sup> Prepared by Carlo Cottarelli and Julio Escolano. Petya Koeva contributed to parts of the main text and prepared Appendix I.

<sup>2</sup> Chancellor Brown (1997) and HM Treasury (1997).

<sup>3</sup> HM Treasury (2003a). The character ¶ will henceforth indicate paragraphs in the Assessment.



comprehensive range of issues,<sup>4</sup> and concluded that the case for entry was not yet clear and unambiguous:

- The convergence test was not yet deemed to be met. Although there had been substantial convergence since 1997, remaining differences in cyclical dynamics and economic structures between the United Kingdom and the euro area still posed significant risks to stability. Specifically, the Assessment underscored the risks stemming from differences in housing markets, which made UK consumption more sensitive to interest rates and more volatile as a consequence of house-price cycles.
- The flexibility test was not met either. While there had also been progress on this front, there was insufficient assurance that, in the absence of monetary independence, the economy could withstand idiosyncratic shocks without risking unacceptable welfare losses.
- The financial sector test was met, as entry was expected to enhance further the already strong competitive position of the City in the wholesale financial services business.
- The conclusion on the remaining two tests was that they would be met—and, hence, investment, growth, and employment would benefit from entry—once sustainable and durable convergence had been achieved. But as the convergence test was regarded as not having been met, the third and fifth tests were also not met.

The Assessment also includes several reform initiatives and proposals aiming to foster convergence and flexibility. These initiatives are also regarded to be good for economic performance independently of the EMU decision. More specifically:

- As of December 2003, the inflation target of the Monetary Policy Committee has been defined in terms of the harmonized index used in the euro area (HICP, renamed CPI), rather than in terms of the traditional UK retail price index (RPIX).

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<sup>4</sup> HM Treasury (2003b). The impressive range of topics covered by the studies is indicated by their titles: *The five tests framework; Analysis of European and UK business cycles and shocks; Estimates of equilibrium exchange rates for sterling against the euro; Housing, consumption and EMU; EMU and the monetary transmission mechanism; Modelling the transition to EMU; Modelling shocks and adjustment mechanisms in EMU; EMU and labour market flexibility; The exchange rate and macroeconomic adjustment; EMU and the cost of capital; EMU and business sectors; The location of financial activity and the euro; EMU and trade; Prices and EMU; The United States as a monetary union; Policy frameworks in the UK and EMU; Submissions on EMU from leading academics; Fiscal stabilisation and EMU—a discussion paper*. These studies, prepared by academics, researchers, and Treasury staff, survey the growing academic literature on these topics and constitute in their own right a valuable addition to this literature.

- The government has launched a program of consultations in areas related to the housing market with a view to dampening house price and consumption volatility (see main staff report).
- The Assessment reiterates the government's commitment to promote flexibility in labor, product, and financial markets, and summarizes several ongoing initiatives in these areas.
- The government opened a discussion on possible reforms of the fiscal framework after joining EMU to reinforce the stabilization role of fiscal policy, including strengthening automatic stabilizers and introducing rules for countercyclical fiscal action.

The 2004 budget (March 2004) is expected to include a progress report on the issues identified in the Assessment and on the reform initiatives and evaluate whether a further assessment of the five tests should be undertaken in 2004. However, it is widely regarded as unlikely that the tests will be actually re-assessed in the immediate future.

3. **Against this background, this paper does not aim at evaluating whether the final conclusion of the Assessment—that the moment for entry is not yet come—was “right” or “wrong”, but, rather, at discussing the rationale for this choice and whether all relevant economic aspects of the issue received sufficient attention.** The quality and breadth of the analysis carried out by the Treasury was unprecedented for an economic decision of this sort—the assessment deals with most of the issues relevant for assessing the case for euro entry thoroughly and its conclusions are typically backed up by state-of-the-art economic reasoning and empirical evidence. But improvements are possible and could usefully be taken into account when the tests are reassessed. In particular, this paper argues that it would be important to: (i) clarify the overall analytical framework from which the five tests are derived so as to highlight their specific role with respect not only to the decision of *whether* to enter, but also of *when* to enter; (ii) explore more explicitly and thoroughly some important issues; and (iii) highlight more clearly the several areas where the assessment involves a high degree of economic judgment, rather than economic measurement, so as to at least acknowledge that margins of uncertainty will inevitably remain. Exploring these issues along the lines proposed in this paper may not have necessarily changed Treasury's overall assessment. But it would have strengthened any conclusion reached.

4. **The paper is structured as follows.** Section B presents a simple analytical framework to highlight 12 key issues that are relevant to evaluate the entry decision. Section C discusses to what extent the Assessment addresses these issues. Sections D summarizes the conclusions.

## **B. An Analytical Framework**

5. **The five tests span such a broad range of economic issues that they can hardly be regarded as incomplete.** Growth, employment, trade, economic stability and flexibility,

investment, financial sector services are all covered. In this sense one has to conclude that the five tests are broadly appropriate to evaluate the economic case for entry.<sup>5</sup> However, the assessment could have benefited from a clarification of the analytical framework from which the five tests are derived, particularly with respect to the issue of the appropriate timing of entry. Granted, the tests can be generally linked to the optimal currency area literature, pioneered by Mundell (1961): entering a currency area may boost trade, investment and growth through a number of channels (this seems to be the focus of the last three tests),<sup>6</sup> but this has to be weighed against the increased output volatility that may arise from the loss of monetary independence, unless the economy is sufficiently similar to those of the common currency area (the first test) or the economy is sufficiently flexible, so that the lack of monetary flexibility does not matter much (the second test).<sup>7</sup> However, assessing not only *whether* but also *when* it is appropriate to enter a monetary area requires a more complex analytical framework. This section aims to provide such a framework and to identify twelve issues that are critical to assess the entry decision.

*Euro entry as an investment decision: full convergence (or flexibility) and no uncertainty*

**6. The decision on whether and when a country (henceforth “the United Kingdom”) should enter a currency area (henceforth, the “euro area”) can be assessed as if it were an investment decision, that is, by looking at the net present value (NPV) of the entry decision (“the investment”) at the time the assessment is made (“today”).** The United Kingdom can decide to enter today or not to enter today. If it decides not to enter today it may be because entry is never going to be appropriate or because entry at a later date may be more appropriate.<sup>8</sup> An entry assessment made today should then focus on establishing the moment when today’s NPV from entry is maximized. All this does not take into account the existence of uncertainty, and whether the latter can be reduced by waiting, and the asymmetry in the decision set (the decision not to enter is reversible, while that of entering is irreversible). We will discuss these complications later. Let us assume for the moment the absence of uncertainty. Let us also assume that the United Kingdom has already “fully converged”.

**7. More specifically, assume that: (i) the economic shocks hitting the UK economy all fully correlated with the shocks hitting the euro area; and (ii) the transmission**

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<sup>5</sup> See IMF (2000) and IMF Country Report 03/48, February 5, 2003 (paragraph 37, in particular).

<sup>6</sup> Note, however, that the last test is presented as a summary tests (“In summary, ...”), which makes it difficult to see it as a separate test.

<sup>7</sup> See ¶18–44 in the Introduction of the Assessment.

<sup>8</sup> This disregards, for simplicity, the inevitable lags between the entry decision and the actual entry. The duration of this lag is difficult to assess, as it does not depend only on the political process in the United Kingdom (including a referendum), but also on euro-areas procedures.

**mechanism of monetary policy in the United Kingdom is equal to the average of the euro area.** This means that the monetary policy setting in the euro area will be optimal for the United Kingdom. Alternatively, assume that the United Kingdom economy is fully flexible (in the sense that the setting of nominal monetary policy instruments becomes entirely irrelevant).

8. **In this case, the return from entering the euro area may be described by the curve  $f_{\tau}(t)$  in the upper panel of Figure 1 (the “relative return curve”), which expresses the relative deviation of output in case of entry from its “baseline” in the absence of entry.** The curve is always positive starting from the entry date  $\tau$ , as euro-entry, at least under full convergence and flexibility, is expected to raise output, albeit gradually, through a number of channels: increased trade, higher investment and FDI, reduced transaction costs, reduced exchange rate variability, being the most important ones. The area under the curve is directly related to the net present value (NPV) of entering the euro area.

9. **From an economic perspective, the right question to ask is what is the value of  $\tau$  (the entry date) that maximizes the NPV at time 0 of the total return curve**

$F_{\tau}(t) = (1 + g)^t f_{\tau}(t)$ , or:

$$\max_{\tau} \text{NPV}_0^{\tau} = \sum_{t=0}^{\infty} \frac{(1+g)^t f_{\tau}(t)}{(1+r)^t} \quad (1)$$

Where  $g$  is the growth rate of output in the case of not entering EMU (assumed to be constant over time for simplicity), and  $r$  is the time discount rate. If the curve  $f_{\tau}(t)$  is always positive, the entry decision has clearly a positive return. In this case, and if the curve is time invariant, there is a clear case for entering today because of the time discount factor: delaying entry would simply postpone reaping the benefit from entry.<sup>9</sup>

10. **However, the shape under the curve  $f_{\tau}(t)$  may be time dependent, and this is the general case described in (1), where the relative return curve  $f_{\tau}(t)$  is marked by a subscript  $\tau$  (the entry date).** Even if the difference affects only the return in the early years and not the long-term gains, the magnitude of the area under the curve will be affected and, hence, its NPV. In this case  $\text{NPV}_0^{\tau}$  could be higher than  $\text{NPV}_0^0$  for  $\tau > 0$ , and postponing entry would be appropriate.

11. **This discussion highlights a first set of issues relevant for assessing the case for entry:**

*Issue 1:* how should the entry decision problem be formulated?

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<sup>9</sup> This assumes that the time discount rate  $r$  is higher than the economy's growth rate  $g$ .

*Issue 2:* what is the return from entry (i.e., the shape of the return curve) under full convergence or flexibility?

*Issue 3:* what is the cost of delaying entry arising from the time discount factor?

*Issue 4:* how is the return curve affected by the passage of time?

*Imperfect convergence (or imperfect flexibility)*

12. **The absence of full convergence implies that the monetary policy response to shocks may be inadequate to the needs of the UK economy.** This may happen because the United Kingdom is subject to idiosyncratic shocks or because the UK transmission mechanism of monetary policy is different from the average of the euro area. These problems are bound to become less severe over time, reflecting endogenous convergence (i.e., the fact that the United Kingdom would become more similar to the euro area after EMU entry), but may initially be significant. This has three implications for the shape of the return curve:

- The return curve would be more volatile than in the upper panel of Figure 1.<sup>10</sup>
- Average growth may also be lower if one believes that stability is important for growth.
- Entry costs would be larger if entry occurs at a time when the United Kingdom is being hit by a strong idiosyncratic shock, as these costs will be felt immediately. Cases in point may be entry in the presence of a housing market boom or when the exchange rate is far away from long-term equilibrium. To the extent that large shocks are unlikely to recur, as they will in case of endogenous convergence, there could then be a case for waiting.

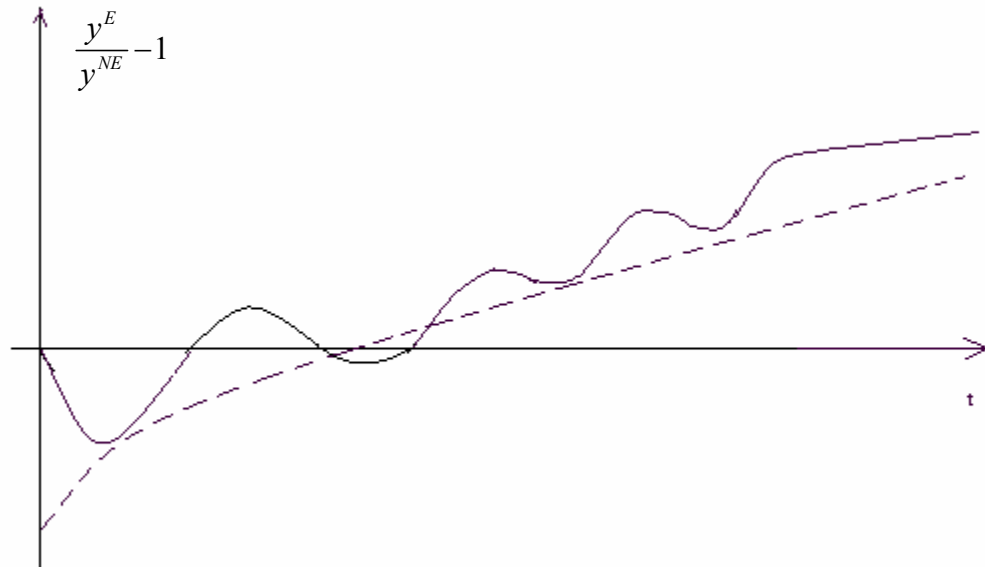
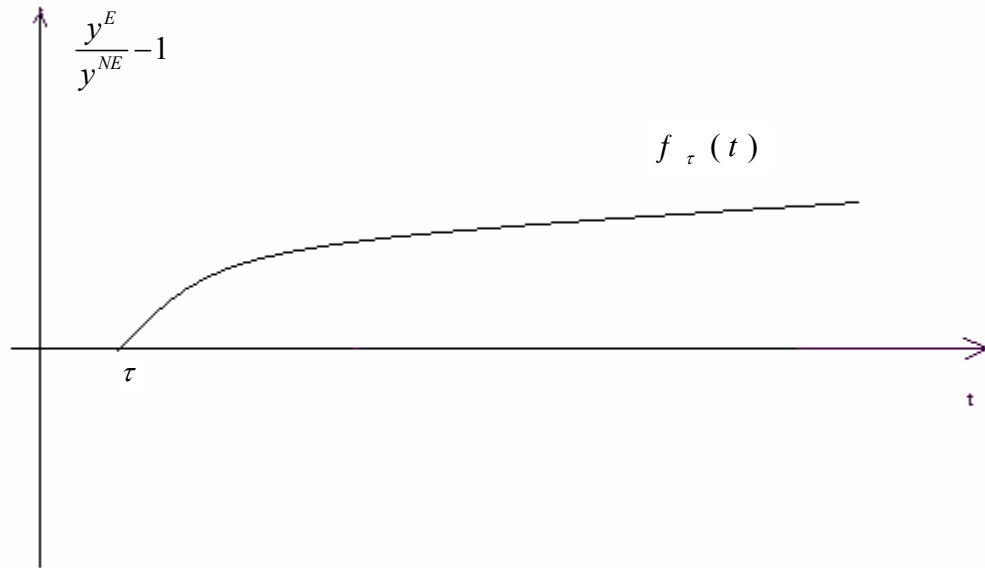
13. **The importance of these factors is higher if the economy is not flexible enough.** At least in principle, a fully flexible economy would be able to adjust to demand shocks, eliminating any impact on output.<sup>11</sup> While in practice this is unlikely to be the case, it is reasonable to argue that a more flexible economy can withstand more easily shocks that are not offset by monetary policy action.

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<sup>10</sup> This assumes that monetary policy in the United Kingdom is adequately managed. Of course, an independent monetary policy does not help if it is mismanaged, in which case a country can always benefit from entry.

<sup>11</sup> However, as discussed in the Assessment (¶ 2.31, in particular), more price and wage flexibility, while reducing output volatility, would increase inflation volatility.

Figure 1. The Relative Return Curve



14. **The full line in the lower panel of Figure 1 illustrates how the return curve could change if convergence were imperfect (or not fully offset by sufficient flexibility).**

Volatility is expected to decline over time, reflecting endogenous convergence.<sup>12</sup> Note also that the average level of the curve could be lower than under full convergence if one assumes that high output volatility discourages growth.

15. **But this is not the whole story, as, in assessing the cost of increased volatility, one has to take into account the dislike of output volatility *per se*.** Thus, a fair comparison with the case depicted in the upper panel of Figure 1 would require transforming the solid line curve in the lower panel into a curve that were welfare equivalent. This is the dotted curve in the lower panel, which is on average lower than the volatile curve, to reflect the welfare costs of output volatility. Note that now a sizable part of the curve is in negative territory, indicating a lower output level than in the no-entry case. With a sufficiently large intertemporal rate of discount, the NPV could then turn negative, in principle.

16. **In sum, in the presence of imperfect convergence or insufficient flexibility, a second set of issues needs to be addressed:**

*Issue 5:* How convergent is the UK economy with respect to the euro-area average, in terms of both idiosyncratic shocks and idiosyncratic transmission mechanism?

*Issue 6:* How flexible is the UK economy and, relatedly, how much flexibility is needed to compensate for imperfect convergence?

*Issue 7:* What is the effect of output volatility on average output growth?

*Issue 8:* What is the welfare cost of increased output volatility?

*Issue 9:* How fast is endogenous convergence?

*Issue 10:* How much can be gained in terms of improved convergence and increased flexibility as a result of waiting (as reforms are implemented)?

*Issue 11:* Is the case for no entry made stronger by current particular idiosyncratic shocks?

*Uncertainty and the value of waiting*

17. **Economic decisions typically take place in an uncertain environment reflecting not only random shocks, but also insufficient information.** The passage of time allows gathering more information and gauging trends better. This factor becomes particularly important in deciding whether to enter EMU for two reasons. First, the decision to enter EMU is not easily reversible, while the decision not to enter is reversible: the United Kingdom is not faced with a now-or-never proposition, but if it decides to enter there is no

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<sup>12</sup> The return curve illustrates the volatility of output with respect to a baseline where output volatility is expected to be minimized reflecting the use of an independent monetary policy. In principle, one should assess whether the increased volatility arising from the entry decision should really be added to the residual volatility of the baseline, or whether it could possibly offset it.

turning back. Once the decision to enter is taken, additional information becomes useless. However, if the decision is made to defer entry, additional information can still be used to decide on a later entry. Second, additional information is particularly important in the decision to enter the euro-area because the latter is *new*, and little is yet known about its actual structural implications for the economies of member states. More information will become available over the coming years on the working of euro area institutions, the effect on trade, growth, and investment not of a generic monetary union, but of the euro-area, the speed of endogenous convergence, and so on. In more technical terms, the shape of the return curve in Figure 1 (and thus the value of joining EMU) can be better assessed with the passage of time.

18. **The impact of uncertainty and irreversibility on the entry decision can be formally illustrated using a standard investment model** (see Appendix I). The main result of the model is that a simple net present rule is no longer a correct guide to the decision to join EMU. Given the opportunity cost of entering now rather than later (because of the option value of waiting for new information), it may be optimal not to enter now even if the net present value is positive. Moreover, the more uncertain the shape of the return curve, the higher should be the reluctance to enter. This raises a final issue:

*Issue 12:* what weight should be given to the value of more information that can be gathered with the passage of time?

### C. The Five Tests and the Twelve Issues

19. **We now evaluate to what extent the Assessment addresses the above twelve issues.** As we shall see, the Assessment's focus is uneven, with some issues explored at length and others discussed in considerably less detail.

*Issue 1: How should the entry decision problem be formulated?*

20. **As noted above, from an economic perspective, entry should occur at a time when the current NPV from the decision to enter (or its expected value in an uncertain environment, with appropriate corrections for risk-aversion) is maximized (equation 1 above).** Were the five tests devised to solve this maximization problem?

21. **The UK government has stated it will support entry when, based on the five tests, the economic case for entry is clear and unambiguous.** This could be taken as meaning that entry would be supported when the NPV from entry appears to be positive (in a clear and unambiguous way), and not when it appears to be maximized. But the alternative interpretation is possible, as the term "case for entry" is a rather loose one. A clarification of this point would thus be useful in a future assessment. In case the UK government has



decided to follow the less ambitious benchmark—entry when the NPV is positive, rather than maximized—it would be useful to explain why.<sup>13</sup>

22. **In a way, given the result of the Assessment, these issues may appear to be of a purely academic nature.** The Assessment seems to suggest, although it is not explicitly stated, that the NPV from entry is currently *negative* (or more precisely that the case for a positive NPV is not yet clear and unambiguous), so entry would in no case be appropriate at this point.<sup>14</sup> But clarifying the nature of the question the five tests are meant to answer would help in two respects. First, it will help interpret a future assessment. Second, it will provide better grounds for understanding the recent decision not to enter. Indeed, many of the arguments put forward in the Assessment are more convincing if used to justify the case that later entry will have a higher NPV, than if used to justify that the current NPV is negative<sup>15</sup>

***Issue 2: What is the return from entry under full convergence or flexibility?***

23. **Most of the work on the investment, financial services, and growth, stability, and employment tests (third, fourth, and fifth tests) relates to this question.** We here focus on discussing Treasury's assessment of the effect of entry on growth (or income levels), a useful bottom line.<sup>16</sup> The analysis is thorough and supports the conclusion that, under full convergence, the benefits in terms of output would be large.

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<sup>13</sup> For example, one can argue that the complexity of the problem is such that maximizing the NPV is a futile exercise and one should be happy simply with being confident that the NPV is positive.

<sup>14</sup> For example ¶5.92 argues that “*additional volatility and uncertainty resulting from EMU membership in the absence of sustainable and durable convergence could have a negative impact on the actual level of UK output in the long term*”.

<sup>15</sup> One key argument in the Assessment is that the current idiosyncrasy of the UK cyclical position will lower significantly the potential benefits from entry. This could be a sufficient reason to delay entry to a more favorable cyclical juncture, if the criterion for entry is NPV maximization. But the argument is less credible if the criterion adopted is that the NPV should be positive, as the long term gains from entry are quite high (as discussed below). Arguing that these gains are more than offset by the short term costs of entering now is a more challenging task, that would require strong evidence that lack of current convergence also lowers significantly the long-term gains.

<sup>16</sup> Indeed, one could argue that the effect of entry on investment and financial services is relevant only in so far as the latter affect income levels, and that it would have been sufficient to assess whether the fifth test was met. However, the material discussed under the financial services and investment tests are also relevant to assess the effect on output.

24. **The Treasury's study covers a variety of channels through which entry could boost output growth.** These include lower costs on cross-border transactions, lower exchange rate volatility, increased trade and competition, easier access to credit for at least some firms, and higher investment including inward FDI. These sources of growth interact and often overlap: for example, most of the benefits of lower exchange rate volatility are likely to work through increased trade. Double counting, however, is not a major problem since the output impact of increased trade alone appears to dwarf (and to some extent encompass) other factors. The Assessment estimates that: (i) under sustainable convergence, trade could rise by up to 50 percent over a 30 year period; and (ii) based on studies of the relation between trade and output levels, this would imply an increase in output over the same period of some 5–9 percent (¶5.68-¶5.82 and Box 1). Moreover, the evidence from the first few years since the euro's introduction indicates that the trade and output expansion might be frontloaded.<sup>17</sup> Other positive effects are at least one order of magnitude smaller, but still far from negligible. For example, the step increase in output due to the fall in transaction costs is estimated at 0.1–0.2 percent of GDP.<sup>18</sup>

25. **These figures are even more impressive in terms of their NPV.** Assuming that, following entry, the deviation of output from the baseline increases log-linearly during a 30 year horizon and then stays constant forever, the NPV of entering can be computed to be equal to 3–5 times current GDP at the time the decision is taken (corresponding to the 5-9 percentage point difference range in the output level). This assumes a real discount rate of 3½ percent, and reasonable base growth assumptions.<sup>19</sup> Note that:

- This is likely to be an underestimate of the NPV under full convergence, first because it considers only gains arising from increased trade, and not from other sources; second because, as discussed, there is evidence that the effects on trade from a monetary union tend to be frontloaded.
- The NPV of the benefits of entry would not be greatly affected by a failure to reap the benefits of entry during a limited initial period—for example due to initial lack of

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<sup>17</sup> For example, the dynamic panel estimates in Micco et al. (2003) suggest that more than ¼ of the long-run trade gains take place during the first year, and that the already realized gains in 2002 amounted to 4–10 percent of the estimated long-run gain of 34 percent.

<sup>18</sup> The European Commission (1990) estimated the reduction in transaction costs at 0.4 percent of GDP if all EU countries adopted the euro. Savings, however, were thought to be smaller for large countries (with lower cross-border transactions-to-output ratios) and for currencies that were already traded in deep and efficient markets.

<sup>19</sup> Growth is assumed to be 2½ percent through 2012, and then as in HM Treasury, November 2003 PBR: “Long-Term Public Finance Report: Fiscal Sustainability with an Aging Population.”

### Box 1. Effects of EMU on Trade and Growth

Until recently, the effects of currency unions on trade had generally been gauged as the limiting case of lower exchange rate volatility, with inconclusive results. The background study *EMU and Trade* (HM Treasury(2003b)) argues that these inconclusive results might be explained by an inappropriate focus on short-term volatility (which can often be hedged), while the relevant horizon for the creation of strong trade links is the medium to long term. Also, past volatility does not necessarily determine the degree of uncertainty on future exchange rate levels—as infrequent but large adjustments of fixed exchange rates epitomize.

A recent strain of research, prompted by the launching of the euro, has sought to identify the specific effect of currency unions. The opening shot was fired by Rose (2000), which finds that countries belonging to currency unions trade about three times more with each other than with non-members. The sample in Rose (2000) is dominated by economies that are small or have low income levels. But further research, focused on more relevant samples, has found estimates of the trade effect of EMU that are, although smaller, still very significant. Using quantitative meta-analysis techniques, Rose, in one contribution to the Treasury’s assessment, synthesizes 443 point estimates from 24 recent studies into an estimate of a 100 percent increase in trade between EMU countries and the United Kingdom, should the latter join the euro.<sup>1</sup> Recent studies have also tried to address different sources of upward estimation biases such as those resulting from adverse selection and simultaneity (e.g., countries that expect higher trade benefits will tend to form currency unions).<sup>2</sup> After correcting for these biases, estimates of the trade effect of currency unions of 60–100 percent are not uncommon.

In order to avoid sample selection problems, some of the most recent studies take advantage of the already available evidence on the euro area and avoid drawing inferences from other currency unions. Instead, they focus on the actual effect that the introduction of the euro has had on its members as compared to those that stayed out. In this vein, Micco et al. (2003) concludes that EMU membership shared by country pairs has already resulted in bilateral trade increases of 4–10 percent relative to all other country pairs in their sample; and 8-6 percent relative to trade between non-member country pairs. Remarkably, these results imply—in line with most other studies—that the trade increase among EMU members appears to have not been trade-diverting, but rather trade-creating among euro and non-euro members, albeit to a lesser extent than among members. These estimates correspond to the trade effects that had already taken place as of end-2002—which can be presumed to be only a part of the total long-run effects. Using a dynamic panel, the long-run effect on a typical EMU-member country pair is estimated at a 34 percent increase in trade, with 9 percentage points in the first year.<sup>3</sup> And the long-run effect on a pair with only one EMU member is estimated at 16 percent, 4.5 percent in the first year. The total effect of EMU on a member country’s trade is the aggregate of the increase in trade with other EMU members and with third countries. Barr et al. (2003) addresses directly the question of what would be the effect of joining EMU for the three “out” countries (Denmark, Sweden, United Kingdom).

<sup>1</sup> See Rose’s contribution to the background study *Submissions on EMU from Leading Academics* (HM Treasury (2003b)).

<sup>2</sup> For recent reviews of this literature see the background study *EMU and Trade* (HM Treasury (2003b)), and Micco et al (2003).

<sup>3</sup> Bun and Klaassen (2002), with a similar methodology, find that the long-run trade gain is 40 percent, with 4 percent in the first year.

**Box 1. Effects of EMU on Trade and Growth (Continued)**

Table 1. Implied Effect of Joining EMU (Barr et al. (2003))  
(Increases in percent)

	Effect on Trade 1/			Effect on GDP 2/
	Pure Currency Union Effect	Exchange Rate Volatility Effect	Total	
Denmark	29	4	33	6
Sweden	29	20	49	7
United Kingdom	29	43	72	7

Source: Barr et al. (2003).

1/ Increase in trade with EMU members.

2/ Assumes that 1 percent of GDP increase in trade results in 1/3 percent increase in GDP, as in HM Treasury (2003b).

The results are summarized in Table 1 and generally support other studies, including the Treasury's conclusions of a 50 percent increase in trade. Barr et al. (2003), however, finds that the quantitative estimates are sensitive to the sample length and Bun and Klaassen (2003) finds that they are also highly sensitive to the specification of time trends.

The relevance of trade derives mainly from its role in fostering output growth. There are many reasons to presume a positive effect of trade on output. These include the classical arguments for free trade (e.g., allocative efficiency) as well as those stemming from new growth theory (e.g., economies of scale, know-how and technology transfers and spillovers, increased competition and innovation, higher R&D in internationally-oriented firms). The Assessment considers that this effect ranges between  $\frac{1}{3}$  and  $\frac{2}{3}$  of a percentage point of GDP per 1 percentage point of GDP in additional trade (imports plus exports). This is considered to be a one-time level effect, taking place over an extended period of time, and not a permanent change in the growth rate. These quantitative estimates fall comfortably within the range of estimates found in the research literature (see, for example, Frankel and Romer (1999), and Frankel and Rose (2000)).

convergence—provided this does not affect the outcome of later periods. In particular, the NPV of entry during the first ten years amounts only to between 8 and 15 percent of current GDP. In other words, the large magnitude of the NPV of entry stems from the hypothesis that the benefits are enjoyed at perpetuity, and not from the short-term gains. This is important in assessing the likelihood that high entry costs could outweigh the long term benefits.<sup>20</sup>

<sup>20</sup> The Assessment, however, concludes that also the long-term benefits would not materialize in the absence of sustainable convergence (¶5.82). See discussion of issue 7.

***Issue 3: What is the cost of delaying entry arising from the time discount factor?***

26. **The time discount factor is not trivial.** The appropriate time discount factor is the difference between the intertemporal discount rate and the output growth rate. Assuming this difference at 1 percent (as often done in long-term fiscal sustainability projections) implies that a five year delay could reduce the NPV by over 5 percent. Thus, taking at face value the NPV estimate of the return under full convergence discussed under Issue 2, such delay would cost 15–25 percent of current GDP.

27. **The Assessment does mention the existence of costs from delaying entry, but, with only two minor exceptions, it does so in an unspecific way.**<sup>21</sup> The first exception is the reference in ¶3.93 to the fact that:

*There is a risk that the longer membership of the euro is delayed, the longer the potential gains in terms of increased inward investment are postponed.*<sup>22</sup>

The second exception relates to the benefits from entry for the financial services industry, “benefits which are postponed while the UK is not in EMU” (¶4.70). These points are valid but should be made with respect to all gains from entry, in particular the expected increase in output levels discussed above. Moreover, no attempt is made to quantify those costs.

28. **Neglecting the costs of postponing the benefits from entry would be justified only if it were true that the NPV from entry were assessed to be negative.** This seems indeed to be the view adopted by the Assessment (see discussion above and issue 7 below). Thus, this omission can be pardoned only if the reasons for believing the NPV is currently negative are convincing.

***Issue 4: How does the shape of the return curve change over time?***

29. **The Assessment does point at one reason why later entry can improve the return for entry.** The Executive Summary (page 6; but see also page 9 and ¶5.166, as well as the more detailed discussion spanning ¶5.12-¶5.36), notes that:

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<sup>21</sup> The Executive Summary states that: “The assessment addresses ... the risks and costs from delaying the benefits of joining” (page 4).” Later (page 6), it notes that the case for entry is not yet established, “despite the risks and costs from delaying the benefits of joining”.

<sup>22</sup> The reference in ¶3.93 to a “risk” is unfortunate. It is *certain*, indeed tautological, that the longer membership is postponed, the longer the potential gains from entry are postponed.

*The potential uncertainty created by the price stability objective of the European Central Bank (ECB) and the potential constraints on the use of fiscal policy for stabilization under the current interpretation of the Stability and Growth Pact (SGP) increase the chances that output and employment would be less stable inside EMU.*

As the Assessment (page 6 of the Executive Summary) also notes that the monetary and fiscal frameworks are evolving in the right direction, late entry would allow participation in a monetary union that is managed through more appropriate rules.<sup>23</sup> Assessing the validity of the argument—which hinges on the belief that the current monetary and fiscal frameworks of the United Kingdom are currently superior to those of the euro area—goes beyond the scope of this paper. Suffice it here to say that, even if it were correct, the argument would be inherently difficult to quantify in a number of respects (notably the pace of expected improvement over time of the euro framework, and the effect of this improvement on output volatility).

30. **The factors that may reduce the return from entry are not discussed in the Treasury’s assessment.** However, euro-supporters have pointed at the risk of “missing the train” if entry were delayed. The basic argument, made for example by Professor Richard Layard (Layard (2002)), is that euro area will experience (indeed is already experiencing) a front loaded relocation of productive activities and the establishment of new business contacts, accompanying the surge in intra-euro area trade.<sup>24</sup> As Layard’s puts it:

*We cannot wait and see because, by the time we joined, the new pattern of the European economy would have been established. It would be much harder then than it would be now to find our own niche.*

The argument is not far fetched. First, FDI may flow more than before to the euro area (see Appendix II). If this relocation of investment decision does not occur evenly over time, but is front loaded, countries that are not euro-members in the early years of the euro area will miss the first and larger wave of FDI.<sup>25</sup> Second, the quantitative estimates of the trade expansion prompted by EMU do suggest that this expansion is also frontloaded. Then, hysteresis effects in international trade links may make it difficult to enter new markets once they are settled.

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<sup>23</sup> Note that this applies also to the fiscal framework. As a non-euro EU area member, the United Kingdom is now expected to *endeavor* to avoid deficits exceeding 3 percent of GDP, while, in principle, would be *obliged* to avoid breaching that ceiling once in the euro area (as highlighted in ¶5.36).

<sup>24</sup> The costs of a delay in joining EMU are also analyzed in Begg et al. (2003).

<sup>25</sup> As noted above, ¶3.93 does note that the longer entry is delayed, the longer the potential gains in terms of FDI are postponed. But this is not the cost we are referring to here. With respect to the analytical framework used here, ¶3.93 focuses on the cost of shifting the return curve to the right (Issue 3 above), not to the change in the shape of the return curve (Issue 4).

Although, ultimately, the trade opportunities opened to the United Kingdom will depend on comparative advantage, in the short and medium term, expansion into new EMU markets would be facilitated by joining when these markets are undergoing an expansion or, at least, a reshuffling. Altogether, a discussion of these issues would have strengthened the quality of the Assessment.

***Issue 5: How convergent is the UK economy with respect to the euro-area average, in terms of both idiosyncratic shocks and idiosyncratic transmission mechanism?***

31. **Many of the background studies in Treasury (2003b), and most of the material on the “convergence test” in the Assessment cover extensively different aspects of these issues.**<sup>26</sup> More specifically, the Assessment looks at the differences in the current cyclical phase between the United Kingdom and the euro area (¶1.8-¶1.40), evidence of past correlation of business cycles and shocks (¶1.40-¶1.65), and underlying differences in the structure of these economies (¶1.69-¶1.116). Overall, the Assessment finds that convergence has increased since 1997, but is still insufficient. The key idiosyncrasies arise from differences in housing and households credit markets.<sup>27</sup> On the one hand, the link between consumption and house price movements in the United Kingdom appears to be particularly strong and has added an element of UK specific cyclical to regular business cycles. On the other hand, the large size of the mortgage market, as well as its specificities, have raised the elasticity of consumption to interest rates above the euro average. In sum, the peculiarities of the housing and household debt market not only give rise to idiosyncratic shocks, but also generate an idiosyncratic response to monetary policy shocks. The current cyclical phase epitomizes these developments (Box 2).

32. **The case made by the Assessment that the features of the housing market involve the risk of significant idiosyncratic shocks is convincing.** Less convincing is the case that these features also involve an idiosyncratic response to monetary policy impulses. The Assessment does show that monetary policy has a stronger effect on consumption in the United Kingdom than in the average of the euro area. But, it also acknowledges that the effect of monetary policy on aggregate demand is similar, as the higher elasticity of

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<sup>26</sup> See *Analysis of European and UK business cycles and shocks; Housing, consumption and EMU; EMU and the monetary transmission mechanism; Modelling the transition to EMU; Modelling shocks and adjustment mechanisms in EMU; EMU and labour market flexibility; The exchange rate and macroeconomic adjustment; The United States as a monetary union; Submissions on EMU from leading academics; Fiscal stabilisation and EMU—a discussion paper* in Treasury (2003b). For an earlier discussion see IMF (2000).

<sup>27</sup> Discussing the risks to convergence posed by structural differences, the Assessment states that “*differences in the UK and euro area housing markets are high risk, differences in investment linkages and financial structures are low to medium risk and sectoral and trade differences are lower risk.*” (¶1.112).

## Box 2. Consumption and the Housing Market

Private consumption has been the main driver behind U.K. demand growth during the 1990s. The contribution of private consumption to GDP has been significantly larger in the United Kingdom than in the euro area in the period 1992–2002 (except in 1992 and 1995) with annual average contribution of 2.1 and 1 percentage points of GDP respectively (Figure 2). This is not only because GDP grew faster in the United Kingdom: Figure 3 shows that private consumption contributed also substantially more to each percentage point of GDP growth in the United Kingdom than in the euro area in all years in 1992–2002 (except 1995).

This strength of consumption has been supported not only by rising incomes and high rates of employment, but also by the dynamics of the housing market. In the United Kingdom, the evolution of consumption has been closely correlated with the housing market, at least since the 1960s (Figure 4), and to a larger extent than in other EU economies (Figure 5). Research studies have documented the differential responsiveness of consumption to housing wealth in the United Kingdom relative to other countries.<sup>1</sup> These studies generally find that the elasticity of consumption to real house prices is larger in the United Kingdom, Ireland, Netherlands, and some Nordic countries than in the large euro-area economies.

Different consumption responses to changes in house prices appear related to different features of the housing and financial markets. First, owner-occupied housing is more prevalent in the United Kingdom, at 69 percent, than in large euro-area countries (Table 2), strengthening the wealth effects of house price changes.<sup>2</sup> Second, highly developed mortgage and credit markets as well as deep and liquid housing markets (Table 2) allow U.K. households to cash in housing wealth increases through trade-downs or, more often, through mortgage equity withdrawal (house-collateralized borrowing in excess of spending in residential purchases and house improvements). And finally, increases in housing wealth coupled with the opportunity to withdraw housing equity also relaxes liquidity constraints.

Moreover, the housing market itself seems to be characterized by idiosyncratic features. Real house prices in the United Kingdom have shown higher trend growth and higher volatility than in the euro area,<sup>3</sup> partly reflecting a relatively price-inelastic supply.<sup>4</sup> This has made U.K. housing prices more sensitive to demand shocks and to potential bubbles. Also, error-correction models indicate that U.K. housing prices exhibit high persistence. Thus, following a deviation from trend, re-equilibrating forces are weak—resulting in prolonged over- and under-shooting (IMF (2002) and *Housing, consumption and EMU* (HM Treasury (2003b))).

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<sup>1</sup> Recent work is discussed in detail in *Housing, consumption and EMU* (HM Treasury (2003b)). See also Ludwig and Slok (2002).

<sup>2</sup> House price increases prompt both positive and negative wealth effects, since they result in a redistribution of wealth from first-time buyers (and those trading up) to house owners. This, and a relatively limited mortgage market, could be behind a low or negative elasticity of consumption to house prices, which for example is often estimated for Italy. In most EU countries, positive wealth effects are found to predominate.



## Box 2. Consumption and the Housing Market (Continued)

This behavior of consumption and housing markets has also an important bearing on the response of the economy to monetary policy. Empirical studies indicate that U.K. private consumption is more responsive to interest rates, reflecting several factors.<sup>5</sup> First, the policy rate pass-through to banks' lending rates appears quicker in the United Kingdom, with variable-rate mortgages reacting typically in just a few days.<sup>6</sup> Second, household exposure to variable-rate debt is higher in the United Kingdom than in most other EU countries. This is mainly due to the structure of the mortgage market. The outstanding stock of mortgages is about 60 percent of GDP in the United Kingdom, most of which are at variable rates or with rates fixed only for a few initial years (Table 2). In contrast, mortgages represent 19 percent of GDP in France and 10 percent of GDP in Italy. They represent a higher proportion in Germany (55 percent of GDP), but it appears that a large part are held by for-rent landlords (owner-occupied housing is a low 42 percent), and long-term fixed rate mortgages prevail (as they do in France, Netherlands, Belgium, Denmark and other EU countries)—thus, minimizing the direct impact of interest rate changes on household consumption demand.<sup>7</sup> And third, a more diversified financial market allows U.K. households to realize more easily part of their housing wealth gains through mortgage equity withdrawal.

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<sup>3</sup> Over the long run, U.K. real house prices have grown at 3.3 percent, perhaps the fastest rates in the EU (see Table 2), and significantly faster than Germany (0.1 percent), France (1.2 percent), and Italy (1.5 percent). U.K. house prices have also been more volatile than in France and Germany, although not out of line with respect to some other EU countries (i.e., Spain, Italy, the Netherlands, Ireland, and Finland).

<sup>4</sup> See IMF (2003). Swank et al. (2002) estimates the following price elasticities of new housing supply: Denmark 0.7, France 1.1, Germany 2.1, Netherlands 0.3, UK 0.5, US 1.4.

<sup>5</sup> See the Chapter "The Interest Rate Sensitivity of U.K. Demand" in this document and *EMU and the monetary transmission mechanism* (HM Treasury 2003b).

<sup>6</sup> Estimates of the pass-through of one percentage point increase in policy rates to variable-mortgage rates after three months are: UK 0.97, Germany 0.78, Italy 0.62, Spain 0.66, and France 0.33 (*EMU and the Monetary Transmission Mechanism* (HM Treasury (2003b)).

<sup>7</sup> Taking into account only the share of mortgages in GDP and the proportions of variable-rate mortgages, *EMU and the Monetary Transmission Mechanism* (Chart 3.6, HM Treasury (2003b)) estimates that the impact on household spending of one percentage point rise in interest rates is about (in percentage points of GDP): UK 0.37, France 0.07, Italy 0.03, and virtually nil in Spain and Germany. These estimates may still underestimate the U.K. idiosyncrasy, however, as they do not consider, inter alia, owner-occupancy rates or incomplete pass-through into mortgage interest rates.

## Box 2. Consumption and the Housing Market (Continued)

Table 2. Selected Housing Market Features

	Owner occupation rate 1/ (%)	Housing transactions as percent of owner-occupied dwellings	Outstanding mortgage debt (% GDP)	House price inflation 1999-2001 (annual average %)	HICP inflation 1999-2001 (annual average %)	Real house price inflation 1971-2001 (annual average %)	Proportion of mortgages at variable rates (% of total) 3/	Mortgage market completeness (0 to 100) 4/
Belgium	74	3.4	26.9	3.2	2.1	2.1	25	...
Finland	58	5.8	29.9	1.9	2.3	0.7	97	...
France	55	5.4	19.1	7.4	1.4	1.2	20	72
Germany	42	3.4	54.6	-3.3	1.3	0.1 5/	30	58
Ireland	78	8.3	33.2	9.3	3.9	3.1	70	...
Italy	68	3.8	10.2	4.4	2.2	1.5	56	57
Netherlands	53	7.5	79.2	11.4	3.1	2.8	26	79
Spain	81	...	31.6	10.2	2.8	3.3	75	66
Denmark	51	5.6	70.2	3.7	2.4	1.3	25	75
Sweden	53	1.7 2/	48.5	8.1	1.5	0.0	62	...
UK	69	8.5	59.5	10.3	1.1	3.3	72	86

Sources: *Housing, Consumption and EMU* (HM Treasury 2003b); ECB (2003); Eurostat; and European Mortgage Federation.

1 / As of latest available date within 1999-2001.

2/ 1995.

3/ See Hardt and Earley (2003).

4/ See Dubel et al. (2003). Index ranges 0-100, from less to more complete.

5/ West Germany.

consumption to interest rates is offset by lower elasticity of investment.<sup>28</sup> Thus, assuming that total demand, rather than just consumption, is the relevant determinant of inflationary pressures, an optimal response of monetary policy to demand shocks that are common between the United Kingdom and the euro area would be possible.

### ***Issue 6: How flexible is the UK economy and, relatedly, how much flexibility is needed to compensate for imperfect convergence?***

33. **The discussion of the degree of flexibility the UK economy spans nearly 60 pages of the Assessment.** It deals primarily with wage and price flexibility, but also covers other aspects of labor and product markets, such as geographical/sectoral labor mobility, and of the capital market. Finally, the Assessment discusses to what extent a more flexible use of fiscal policy, within a revised fiscal framework, could compensate for the loss of monetary flexibility.

<sup>28</sup> This lower elasticity is usually explained by the higher resort to long-term capital markets financing—as opposed to bank lending—by UK firms and by higher external financing.

34. **The discussion is thorough and succeeds in showing that UK flexibility has improved and is high compared with other European countries.** The case is also made (although it is backed up by less detailed discussion) that “challenges remain” in the labor market (see, for example, ¶2.83), and that product market flexibility is still not as high as in the United States (¶2.111, for example).

35. **But the conclusion of the Assessment—that flexibility is not sufficient to compensate for the insufficient convergence—is not clearly demonstrated.** How much flexibility is needed?<sup>29</sup> How much is the United Kingdom away from the degree of flexibility needed to compensate for imperfect convergence? More generally, how much increased flexibility is needed to offset differences in the degree of convergence? And how much can further progress in reforming the UK economy over the next few years buy in terms of increased flexibility? These questions are not addressed directly.<sup>30</sup> Answering these questions is not, and will not be, easy. This is an area where informed judgment, rather than precise economic calculations, will remain inevitable. Waiting will likely improve flexibility further, which will help, but the marginal benefit of waiting is hard to assess.

***Issue 7: What is the effect of output volatility on average output growth?***

36. **This issue plays a key role in Treasury’s assessment.** Given the huge potential output gains from entry under full convergence, and the fact that the NPV from entry is very much affected by what happens in the long run, rather than what happens in the short run, it would be hard to argue that the NPV turns negative only as a result of the welfare costs arising from output volatility (see discussion of issue 8), or of the one-off entry costs if entry takes place at the “wrong time” (see discussion of issue 11). However, the Assessment takes the view that average output growth *over the next decades*, would be much lower in the absence of full convergence.<sup>31</sup> Indeed, it explicitly indicates that, in the absence of

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<sup>29</sup> A section of the assessment (¶2.29-2.33) is titled: *How much flexibility is needed in principle?*. However, it primarily deals with the effect that increased flexibility would have on inflation volatility, and with implications for macroeconomic management of different degrees of flexibility between the United Kingdom and euro-area members.

<sup>30</sup> As to indirect approaches, the “what if” simulations presented in the Assessment regarding the effect of euro-entry in 1999 do show that entry at that time would have increased output volatility, which could imply that flexibility was not yet sufficient to compensate for the loss of monetary independence. But those simulations are necessarily based on models estimated on historical data and, thus, cannot evaluate the effect of the increased flexibility and convergence of the UK economy since 1997. The same argument can be made with respect to the discussion in ¶2.34-2.40, which takes a similar model-based approach.

<sup>31</sup> In particular, the assessment takes the view that the benefits arising from increased trade would accrue only in the presence of sustainable convergence: *Without the maintenance of continued stability, the trade benefits of joining EMU would be negligible.* (¶5.82)

sustainable convergence, entry could have a negative impact on the level of UK output in the long term (¶5.92). It follows that to reap the growth-enhancing benefits from euro entry, a sufficient degree of convergence must first be secured. This is the essence of the conclusion that the investment and growth tests would be met only if the convergence test is met.

37. **The Assessment does not elaborate much on why sustainable convergence is a condition for reaping the output benefits from euro entry.** However, this link seems obviously to be provided by the fact that, in the absence of convergence, output growth would be more volatile, and output volatility would depress average output growth. This interpretation is consistent with several passages of the Assessment.<sup>32</sup>

38. **The existence, in principle, of a link between stability (or its counterpart output volatility) and potential growth is hardly contentious.** The more interesting issue is, however, by how much increased output volatility lowers potential growth, and whether this effect is linear or not (for example, whether it is negligible below a certain volatility threshold). Given the role that this link is playing in the Assessment, it would have been useful to provide a clear discussion of this point.<sup>33</sup>

***Issue 8: What is the welfare cost of increased output volatility?***

39. **Increased output volatility has a cost *per se* as people dislike volatility.** Quantifying this effect is not easy, and the assessment does not address this issue. However, following the approach in Lucas (2003), one should conclude that the welfare cost of volatility, while not trivial, should not be overemphasized. As detailed in Box 3, even assuming a strong aversion to risk, and a fairly sizable increase in volatility, the cost of volatility, in terms of consumption-equivalent, would be of the order of 0.1 percent of GDP on an ongoing basis (or, in terms of NPV, a one-time loss of 10½ percent of GDP, at a

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<sup>32</sup> For example, ¶5.2 notes that one of the pillars of the UK government's strategy to increase output and productivity has been "*maintaining macroeconomic stability*". Indeed, stability "*helps individuals and business to plan for the longer term, improving the quality and quantity of investment in the economy, and helping to raise productivity and the sustainable rates of growth and employment*" (¶5.12).

<sup>33</sup> Cross-country evidence of the detrimental effect of volatility on growth is presented, for example, in Ramey and Ramey (1995). The latter finds that volatility has a strong negative effect on growth. However, it does not focus on whether the effect of volatility on the level of output is permanent or temporary. The relation between volatility and growth in the context of the UK EMU decision is discussed in Barrell (2002) and Pain (2002). Barrell indicates that volatility in nominal macroeconomic variables has had a larger effect on UK growth than real volatility. Both types of volatility, however, have been closely correlated in recent times making it difficult to discriminate between their specific effects.

### Box 3. Quantifying the Welfare Cost of Output Volatility

The discussion here follows the approach proposed in Lucas (2003). Consider the simplest representation of an intertemporal utility (welfare) function with risk aversion:

$$W_0 = E \left\{ \sum_{t=0}^{\infty} (1/(1+\rho))^t \frac{c_t^{1-\gamma}}{1-\gamma} \right\}$$

where the parameter  $\gamma$  represents risk aversion, with typical estimates ranging between 1 and 4; the time discount  $\rho$  can be set at 3½ percent as in the long-term public finance analysis used by the U.K. Treasury in the documents accompanying the 2003 Pre-Budget Report. For analytical purposes, one can assume the stream of consumption  $c_t$  to be deterministic in case the UK stays out of EMU (say  $c_t = Ae^{\mu t}$ , with growth  $\mu$  at 2½ percent). If the UK joins EMU, consumption is assumed to be subject to random shocks:

$$c_t = Be^{\mu t} e^{-0.5\sigma^2} \varepsilon_t$$

with the logarithm of  $\varepsilon_t$  normally distributed with 0 mean and  $\sigma^2$  variance. Then

$\sigma^2$  is the variance introduced in the consumption stream  $c_t$  by EMU entry (that is, the variance of the logarithm of consumption around its trend). For the consumer to be indifferent between the entry and no-entry alternatives, the random consumption stream under entry should be higher, on average, than the deterministic consumption stream. The proportion  $\lambda$  by which the random consumption stream must be larger, on average, than the deterministic stream indicates the cost of volatility from EMU entry. An approximate expression for lambda is  $\lambda \approx 0.5\gamma\sigma^2$ , which is proportional to the risk aversion and the volatility introduced by euro adoption. For example, if the risk aversion is 4 (high, but within a reasonable range), and the volatility is set at 0.0004—equivalent to an increase in the standard deviation of consumption of 2 percentage points of consumption, in line with the EMU assessment simulations, then  $\lambda$  equals 0.08 percent. That is, consumption should be higher, on average, by 0.08 percent after entering EMU to compensate for an increase in volatility of about 2 percentage points of consumption. This is a very small number. However, consideration should be given to several factors—such as distributional inequalities, liquidity constraints, etc.—which could increase the losses from more volatility for some consumers.

discount rate of 3½ percent). This might underestimate the true costs for the society if allowance were made for the higher costs that output volatility would cause to lower income/liquidity constrained individuals. On the other hand, because of endogenous convergence, volatility is unlikely to remain permanently higher. In any case, the figure is dwarfed by the potential gains from entry under convergence estimated above (3-5 times GDP).

**Issue 9: How fast is endogenous convergence?**

40. **The Assessment acknowledges that endogenous convergence—first of policies, and, over time, of economic structures through increased trade and investment links—is likely, and that this would reduce the risks from entry (¶1.117-1.132).** It also points at evidence on increased intra euro-area trade as the force that will foster convergence. It, however, concludes that endogenous convergence will operate only gradually and thus will not help in reducing the initial shock from EMU entry (see issue 11 below). The discussion of endogenous convergence is less extensive than other parts of the Assessment, but one has to acknowledge that, just a few years after the beginning of EMU, it is hard to evaluate how fast endogenous convergence is proceeding. This is an area where the passage of time will allow gathering more specific information.

***Issue 10: How much can it be gained in terms of improved convergence and increased flexibility as a result of waiting (as reforms are implemented)?***

41. **As a result of the Assessment, and in order to facilitate any possible entry at a later date, the UK government has taken or started considering some reform steps aimed at facilitating convergence.** Moreover, it is continuing its underlying effort to increase the flexibility of the UK economy.

42. **Critics of this approach have noted that the reforms that are being considered will inevitably take time to be implemented and, even more, to have effect.**<sup>34</sup> Things are unlikely to change rapidly in just a few years. Thus, unless entry is postponed by several years, waiting will not make much difference.

43. **Whether this is a valid point depends on the actual reforms that will be implemented, in particular to reduce the idiosyncrasies in the behavior of the housing market.** But the specific nature of the reforms is not yet known (the two reviews of related issues will only be completed in the Spring of 2004), and thus it is difficult to draw a conclusion on this issue. It appears unlikely, however, that at the time of the 2004 budget (less than one year after the Assessment was published), there will be sufficient information on the impact of the reforms, or on other developments, that could make a material difference to the conclusion reached by the Assessment.

***Issue 11: Is the case for no entry made stronger by current idiosyncratic shocks?***

44. **Large idiosyncratic shocks are unlikely to be frequent.** Thus, the case could be made that it is unwise to enter at a time when a large idiosyncratic shock is in progress. The NPV from entry could be raised by entering after the idiosyncratic shock is gone.

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<sup>34</sup> See, for example, the article by Ed Crooks, Economic Editor of the *Financial Times*, in the *Financial Times* of June 11, 2003 (*A year may be a short time in five-test politics.*)

Endogenous convergence, boosted by reform, will make sure that later idiosyncrasies are less relevant.

45. **Developments in housing and household debt market in the last few years do suggest that the United Kingdom is currently affected by a strong idiosyncratic shock and that, as a result, euro-area interest rates would currently be particularly inappropriate, giving rise to high entry costs (Box 4).**<sup>35</sup> It could be argued that, given the present phase of the UK housing cycle and the sensitivity of consumption to short-term interest rates, the monetary impetus that EMU entry would imply could destabilize the UK economy over a medium-term transition period, as it could exacerbate the housing and consumption boom and make more likely a later abrupt correction, as occurred in the late 1980s and early 1990s.

46. **This argument seems to have played an important role in leading to the conclusion that entry is not appropriate at this stage.** ¶1.152-1.163 focus on this issue and, specifically, on the 1¼ percentage point fall in interest rates (the interest rate differential when the Assessment was published) that would arise from euro entry.<sup>36</sup> Also, the Assessment includes an extensive discussion of what would have happened if the United Kingdom had joined in 1999, when the differential was even larger (Box 4). Altogether, the case that entering now would involve higher costs with respect to entry when cyclical conditions are more favorable is reasonable. Of course, this is not to say that these costs are sufficient to make the NPV from entry negative, nor that entry at a later date has a higher NPV, as the lower costs of entry would have to be assessed against the costs of delaying entry discussed above.

47. **The Assessment also discusses the policy options to reduce the euro entry shock, including a fiscal tightening aimed at offsetting the expansionary effects of the**

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<sup>35</sup> In principle, significant costs would also arise in case entry occurred when the exchange rate is being hit by a strong shock (that is, when it is far away from equilibrium, assuming that entry could not occur at a rate that is too different from the market rate). Indeed, as recalled in ¶1.134, in one of the EMU studies Professor Mundell notes that: *“The issue of timing is important. If Britain enters when its economy is in a strong boom compared to Europe, the pound would be high against the euro, and that might in the long run put Britain at a competitive disadvantage.”* The weakening of sterling since early 2003 has reduced the practical relevance of this issue for the moment. Thus, while the Assessment pays quite a lot of attention to it (¶1.133-1.151), the discussion of the transition costs primarily focuses on the implications of lowering interest rates at a time when a housing and households debt boom is in progress.

<sup>36</sup> ¶1.117 notes that the mechanism of endogenous convergence that can reduce the costs from entry over time would not alleviate the costs related to the immediate “shock of entry.”

#### **Box 4. Is The United Kingdom Currently Affected by an Idiosyncratic Shock?**

Since their trough around 1996, U.K. annual real house price increases have averaged close to 10 percent, reaching a deviation from their (log-linear) trend of about 30 percent by mid-2003 (Figure 6). An update of the estimates in IMF (2002) also indicates a similar overvaluation of 2003 U.K. house prices relative to their long-run equilibrium—as determined by real disposable income per household and real interest rates. As the rise in house prices contributed to the strength of aggregate demand, U.K. policy and short-term market interest rates have remained on average 1½ percentage points above those of the euro area since 1999. In fact, given inflation differentials, the average gap in short-term real interest rates since January 1999 between the United Kingdom and the euro area has been about 2½ percentage points.

Several background studies in HM Treasury (2003b) undertake extensive simulations of the impact that joining EMU would have had under these circumstances on the basis of large-scale macro-econometric models and of structural vector auto-regressions.<sup>1</sup> Overall, the results indicate that output and inflation volatility would have increased significantly. For example, the Assessment (HM Treasury (2003a)) reports the simulation of a counterfactual U.K. entry at the time of the launching of the euro in 1999, based on the NiGEM model of the National Institute of Economic and Social Research (NIESR). This simulation indicates that output growth would have been about 2 percentage points higher in 2000, followed by a 1½ percentage points lower growth by 2002, which would have remained significantly lower over the medium term. Also, inflation would have been 4½ percent by end-2000, with real interest rates remaining negative until mid-2003. Thus, adopting the prevailing euro-area interest rates would have resulted in a sizable inflationary stimulus and, since nominal interest rates would only have reacted mildly, U.K. real interest rates would have declined further, additionally stimulating the economy. Eventually, the re-equilibrating process would have gathered pace through a real exchange rate appreciation and losses in competitiveness, with inflation, output, and employment variation taking most of the burden of adjustment.

But informative as these simulations are, they do not capture the risks of nonlinearities and abrupt corrections that could result from the housing and credit markets developments discussed above. Results from standard statistical techniques are better interpreted as representing an average (essentially linear) response based on past behavior averaged over a long period of time. But, in practice, as the correction in real house prices at the end of the 1980s exemplifies, re-equilibrating forces may first lag the evolution in fundamentals and then manifest abruptly, resulting in a protracted period of depressed demand.

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<sup>1</sup> See *Modelling the Transition to EMU* and *Modelling shocks and adjustment mechanisms in EMU* (HM Treasury (2003b)). The models used include the Treasury Public Model, the NIESR's NiGEM, IMF Multimod, and a specifically constructed "Three Bears Model"—so called because it consists of a small economy (UK), a medium-size economy (the euro-area), and a large economy (the rest of the world).



**monetary relaxation.**<sup>37</sup> However, the feasibility of this change in the policy mix is not fully explored. The Assessment argues that there is some uncertainty on the scale of the needed fiscal tightening (¶1.162) and that “the first best solution is to ensure economic conditions are sustainable at entry” (¶1.163). Admittedly, calibrating the appropriate degree of fiscal tightening would have not been easy, given the potential nonlinearities that may arise in the presence of an asset price bubble. However, the Assessment could have clarified why only the “first best solution” was regarded as feasible, in spite of the potential costs of delaying entry.

***Issue 12: What weight should be given to the value of more information that can be gathered with the passage of time?***

48. **The value of additional information that becomes available over time on issues relevant for the entry decision is not explicitly appraised in the Assessment.** However, this is an underlying theme in the UK government approach to the decision. Indeed, the very idea that entry will take place when the case is established in a clear and unambiguous way can be related to the desire to acquire sufficient information on the effects of entry on the UK economy before an “irrevocable” decision is taken (¶ 5.10).

49. **More generally, the high uncertainty surrounding the quantitative estimates provided in the Assessment may have played an important role in influencing the overall conclusion that the economic case for entry is not yet established in a clear and unambiguous way.** If taken at face value, the gains from entry under full convergence are so high (3–5 times current GDP) that it is hard to believe that they could be fully offset (so that the NPV from entry becomes negative) when the hypothesis of full convergence is relaxed. However, even with a positive expected NPV, the decision to delay entry could be justified by arguing that the assessment of the gains under convergence, even when expressed in terms of ranges, remain subject to a high degree of uncertainty. Indeed, available evidence provides only a partial view of the long-term effects of EMU and research in this area is still in its incipient stages. In particular, the mechanisms by which currency unions foster trade and output are not yet well understood, especially at the microeconomic level (a point the Assessment does not fail to make; see ¶5.78). More information on the effects that EMU is having on its current members would also allow a better assessment of the effect that entry would have on the United Kingdom. This highlights the value of waiting and may provide an alternative way of interpreting the conclusion that the five tests have not yet been met.

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<sup>37</sup> Box 1.8 in the Assessment provides an estimate of the reduction in government spending that might be necessary. Also, one of the background studies includes a detailed estimate of the percentage cut in government spending (about 6 percent) that would be required to offset the relaxation of monetary conditions caused by EMU entry (see Wren-Lewis, S. (2003)).

50. **It is not clear to what extent this argument played a role in informing the actual decision that entry at this stage would not be appropriate.** A more thorough discussion of this issue would have facilitated the interpretation of the decision not to enter.

#### **D. Conclusions: Seven Areas for Further Work**

51. **The breadth and depth of the Assessment prepared by the UK Treasury is impressive by any standards.** The sheer length of the Assessment and background studies (reportedly some 1½ million words)<sup>38</sup> seems unprecedented for an economic decision of this kind. The Assessment deals with most of the issues relevant for assessing the case for euro entry thoroughly and its conclusions are typically backed up by state-of-the-art economic reasoning and empirical evidence. This includes the analysis of the long-term benefits from increased trade, growth, and employment arising in case of full convergence; the evaluation of entry costs, at a time when the UK economy is in a different cyclical position than the euro area, reflecting a strong idiosyncratic shock; the evaluation of the potential risks over the medium term from the loss of monetary independence; and the thorough evaluation of the structural degree of convergence and progress in flexibility since the 1997 assessment.

52. **A future assessment could, however, benefit from a more complete discussion of several important issues that the Assessment does not fully cover.** To start with, it would be useful to clarify, particularly with respect to the issue of the most appropriate timing of entry, the analytical framework from which the five tests are derived, as that would provide a clear “checklist” of all the issues that are relevant for the entry decision. We have attempted to provide a framework for such decision in section B above and this allowed the identification of the areas that could have been covered more thoroughly. They relate particularly to:

- The question of whether entry is expected to take place when the return from entry is positive or when the return from entry is maximized. This distinction is important as, in many ways, the arguments that the Assessment brings forward are more convincing if used to argue that later entry will have a higher return, than to argue that entry now would have a negative return.
- The quantification of how much insufficient convergence would lower the long run benefits from entry in terms of higher trade and growth.
- The reasons why flexibility is not regarded to be sufficient and, relatedly, the parameters by which sufficient flexibility should be assessed.
- The discussion of the costs of delaying entry arising from the time discount factor, and from missing the chance of entering in a phase when the new business structures that are forming as a result of increased intra euro-area trade have not yet crystallized.

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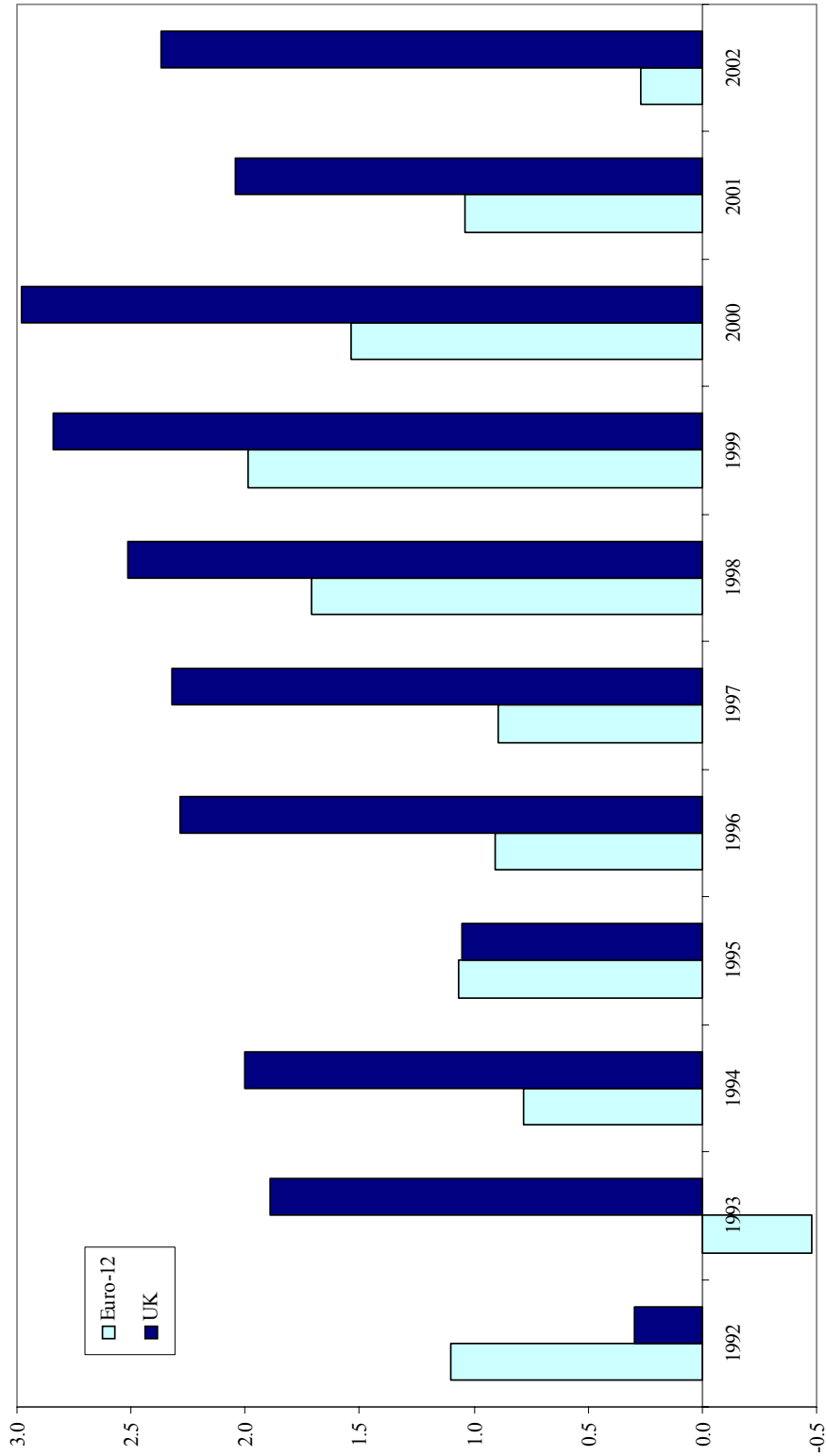
<sup>38</sup> See *Financial Times*, “Euro rows to go on as Brown puts off verdict”, June 10, 2003.

- The reasons why the differences in the speed of the transmission mechanism with respect to consumption are regarded as problematic in spite of evidence that the elasticity of overall demand in the United Kingdom seem to be close to the euro average.
- The costs that arise from higher output volatility *per se*, regardless from the effect that output volatility may have on output growth.
- The policy options to reduce the euro entry shock, in particular the possible change in the policy mix in case entry should occur at a time when interest rates in the United Kingdom are higher than in the euro area.

53. **A more thorough discussion of the above seven points would not necessarily have changed the conclusion of the Assessment. But it would have strengthened any conclusion reached.**

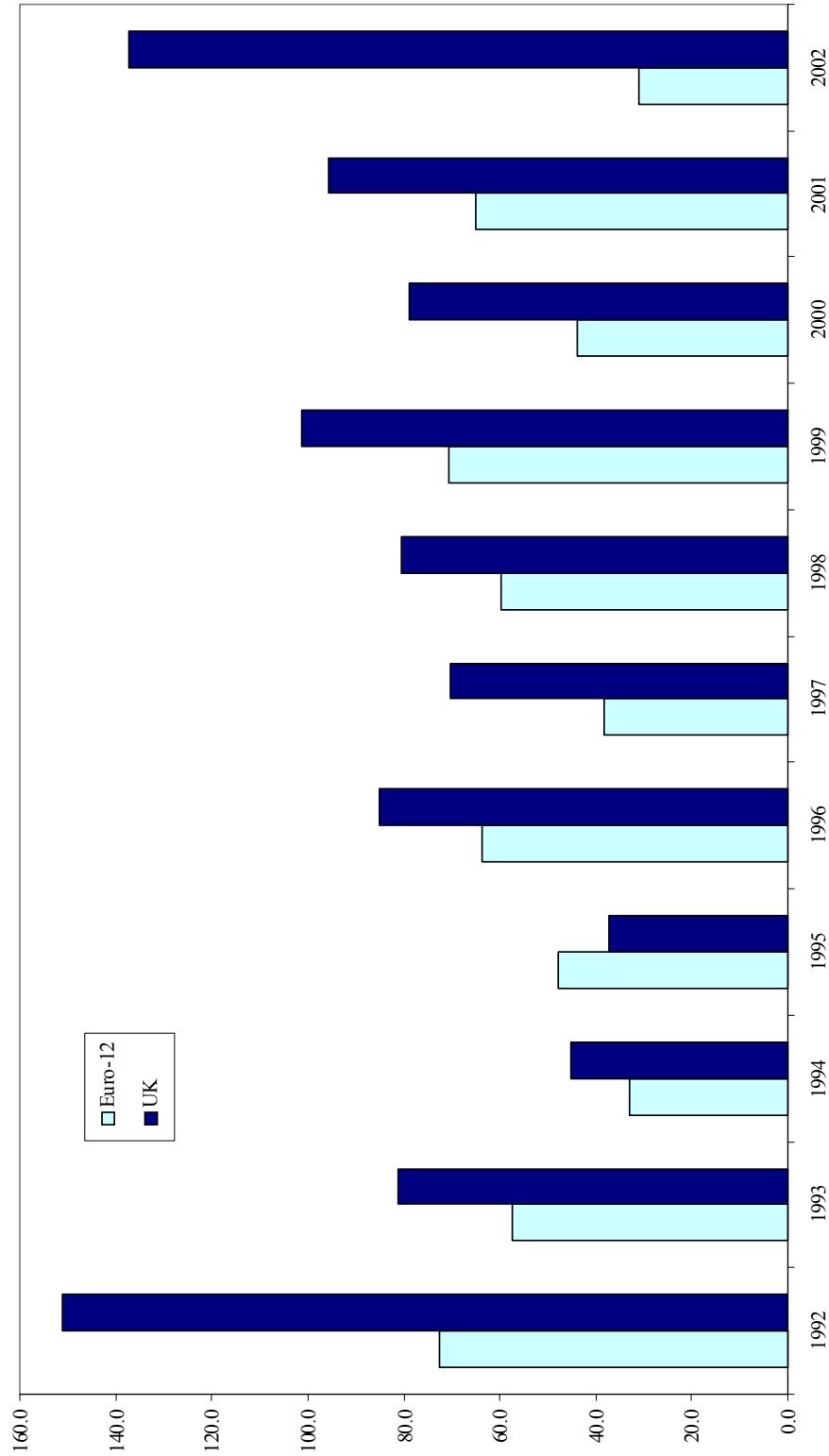
54. **At the same time we have highlighted that in many of the areas that are relevant for euro entry, including many of those summarized above, in spite of any reasonable attempt the margin for uncertainty will remain significant.** Further work can reduce the uncertainty, but not eliminate it altogether. In a way, as it happens in most economic decisions, the case will never be “clear and unambiguous”. Indeed. It could be argued that, for a complex decision of this kind, a more realistic benchmark should be to condition entry to the existence of a sufficiently clear and unambiguous economic case.

**Figure 2. Private Consumption Contribution to GDP Growth  
(In percentage points of GDP)**

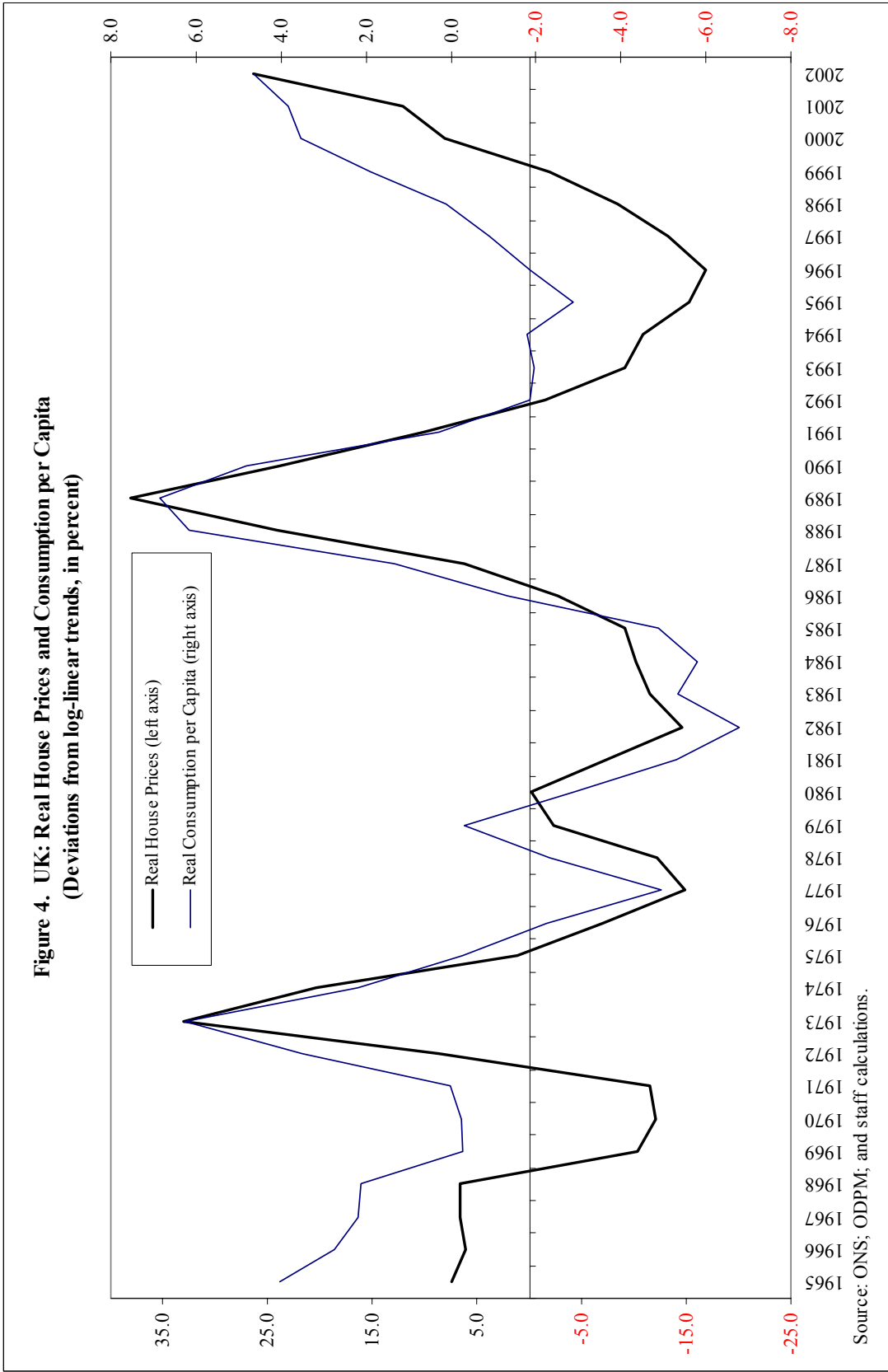


Sources: ONS, and Global Insight.

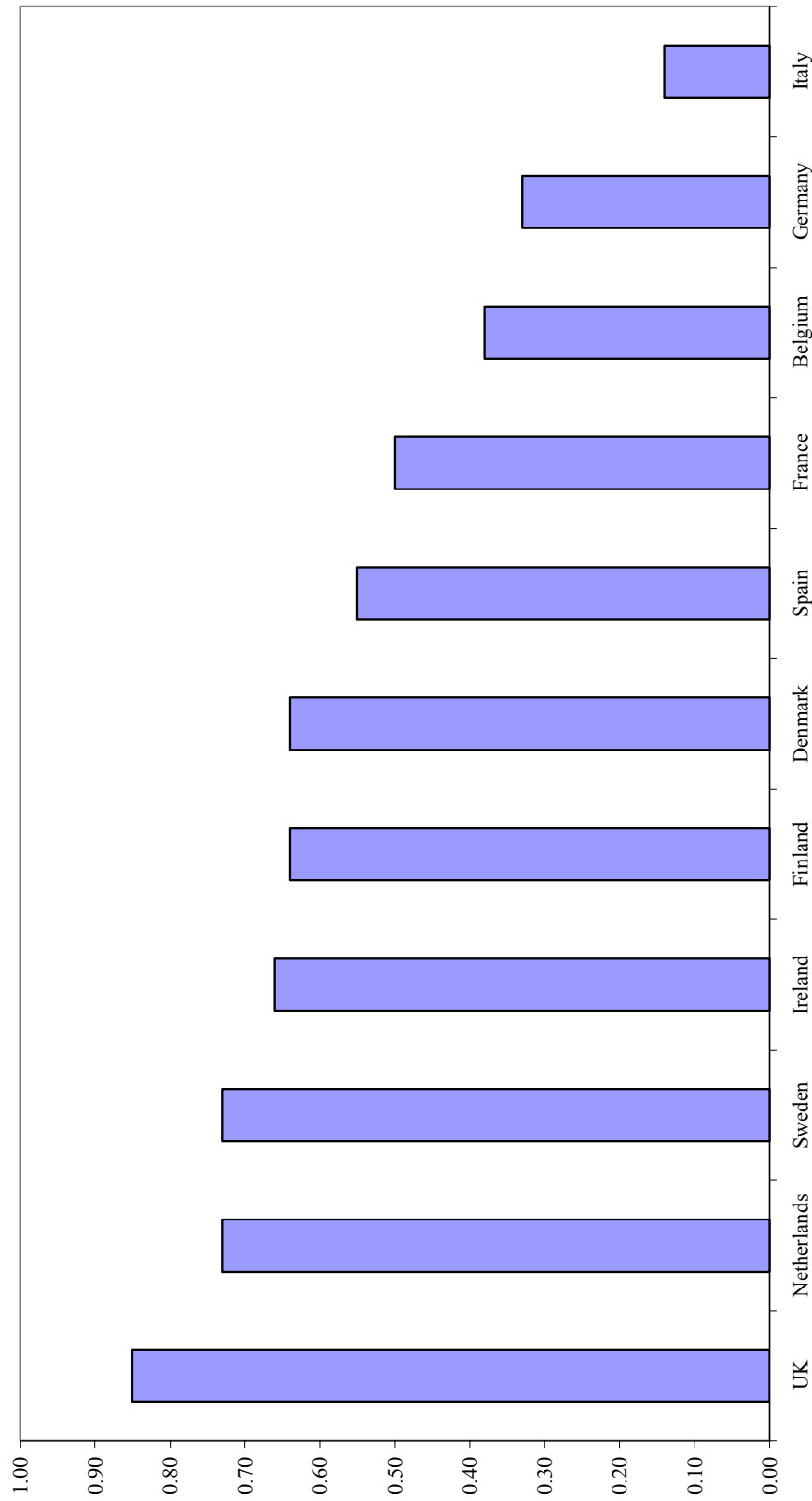
**Figure 3. Relative Contribution of Private Consumption to GDP Growth  
(Change in Consumption as a percent of change in GDP)**



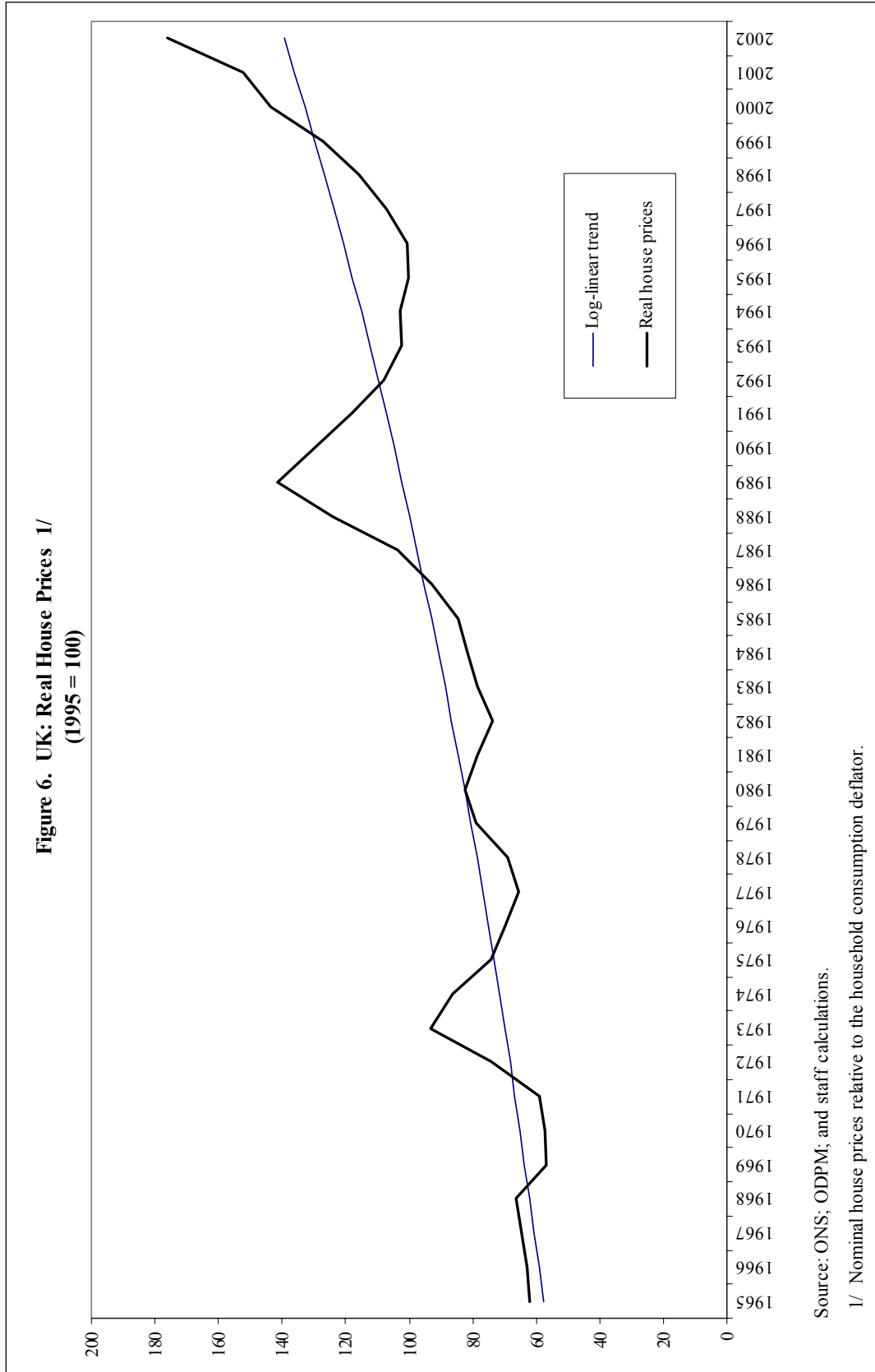
Sources: ONS; and Global Insight.



**Figure 5. Correlation Coefficients between Private Consumption Growth and House Price Inflation, 1971-2001**



Source: *Housing, Consumption and EMU* (HM Treasury 2003b).





### **The Option Value of Delaying EMU Entry**

This appendix illustrates the impact of uncertainty and irreversibility<sup>39</sup> on the decision to enter EMU using a standard investment model, originally developed by McDonald and Siegel (1986) and extensively discussed in Dixit and Pindyck (1994).

The main result of the model is that in the presence of uncertainty and irreversibility, a simple net present value rule is no longer a correct guide to the decision to join EMU. This happens because entering now involves giving up the benefit of additional information that may become available later. Given this cost, it may be optimal not to enter now even if the net present value is positive. The optimal decision rule implies a “reluctance to enter,” which depends on the amount of uncertainty about the value of joining EMU (the shape of the “return curve” in terms of the approach followed in the main text)—the more uncertain the value, the higher the reluctance to enter.

#### **Definitions**

Let the key variables in the model be defined as follows:

$V_t$  = value of joining EMU at time  $t$ ;

$I$  = sunk cost of entry;<sup>40</sup>

$\rho$  = discount rate;

$T$  = unknown time of entry.

#### **Assumptions**

The two main assumptions of the model are formalized as follows:

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<sup>39</sup> An investment project is partially or completely irreversible if its initial cost is at least partially sunk, i.e., “you cannot recover it all should you change your mind” (Dixit and Pindyck (p. 3, 1994)).

<sup>40</sup> The existence of a “sunk cost”—something that needs to be sustained by member countries at the moment of entry and cannot be recovered in case of exit—is introduced in the model to mimic the irreversibility of the entry decision. The higher the sunk cost, the more “irreversible” is the decision. Actual sunk costs in the case of EMU-entry are low (e.g., the cost of the change-over), unless one also includes those that may arise from entering when cyclical conditions are not appropriate.

*Assumption 1.* The current value of joining EMU ( $V_t$ ) is uncertain. It follows a stochastic process described by a geometric Brownian motion with a drift parameter  $\alpha$  and variance  $\sigma^2 t$ :

$$(1) \quad dV = \alpha V dt + \sigma V dz$$

where  $dz$  is the increment of a Wiener process.

*Assumption 2.* The decision of EMU entry is irreversible, i.e. it involves incurring a sunk cost  $I$ .

### Optimization problem

The objective is to find a decision rule that maximizes the expected value of joining EMU, given Assumptions 1 and 2:

$$(2) \quad F(V) = \max E \{ (V_T - I) e^{-\rho T} \}$$

where  $F(V)$  is the value of the opportunity to join EMU.

Using dynamic programming, the first-order condition (Belman equation) is:<sup>41</sup>

$$(3) \quad \rho F dt = E(dF)$$

Given the assumptions of the model and Ito's lemma, the Belman equation can be simplified to a second-order differential equation:

$$(4) \quad \rho F(V) = \alpha V F'(V) + \frac{1}{2} \sigma^2 V^2 F''(V)$$

Also, the following boundary conditions need to be satisfied:

$$(4.1) \quad F(0) = 0$$

$$(4.2) \quad F(V^*) = V^*$$

$$(4.3) \quad F'(V^*) = 1$$

### Solution

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<sup>41</sup> See Part II of Dixit and Pindyck (1994) for detailed discussion of the mathematical tools used in this annex.

The solution to the above optimization problem is a decision rule, i.e. a critical value  $V^*$  such that it is optimal to enter if and only if  $V \geq V^*$ . In this case, the critical value is given by:

$$(6) \quad V^* = \frac{\lambda_1}{\lambda_1 - 1} I = \mu I$$

where  $\lambda_1$  is a root of Equation (4), i.e.  $\lambda_1 = \frac{1}{2} - \frac{\alpha}{\sigma^2} + \sqrt{\left(\frac{\alpha}{\sigma^2} - \frac{1}{2}\right)^2 + \frac{2\rho}{\sigma^2}} > 1$ .

In addition, the following relationship holds:

$$(7) \quad \frac{\partial \mu}{\partial \sigma} > 0$$

### Interpretation

It is interesting to note how uncertainty and irreversibility affect the decision rule for EMU entry. In the absence of these two factors, the critical value  $V^*$  is identical to the sunk cost  $I$ . However, the presence of uncertainty and irreversibility creates a wedge  $\mu$  between the critical value  $V^*$  and  $I$ . Moreover, the size of the wedge increases as the uncertainty parameter  $\sigma^2$  goes up (see Equations 6 and 7). The greater the uncertainty about the value of joining EMU (arising, for example, from uncertainty about the magnitude of the potential trade gains in a currency union), the higher the option of waiting to make the (irreversible) decision to enter.

### Domestic and Foreign Direct Investment (FDI)

The Assessment considers that, given sufficient stability, EMU entry would be beneficial for investment in the United Kingdom, both because of increased return prospects and because of a lower cost of capital. Rising trade and incomes, economies of scale, enhanced competition, and price transparency, all suggest the potential for higher returns from investment within EMU. The Assessment also argues that the businesses' cost of capital is likely to decline within EMU as a result of deeper and more liquid markets, particularly for small and medium enterprises for whom transaction costs and exchange rate volatility are more likely to represent significant barriers in seeking foreign finance. In contrast with the early studies on EMU membership, it is not expected that membership of EMU would result in lower underlying long-term interest rates. This is because medium- and long-term inflation and inflation risk premia have converged to euro-area levels over the late 1990s and capital mobility can be expected to align real rates. Indeed, the differentials with the euro area on long-term government bond yields and forward interest rates implied by the government yield curve have remained generally close to nil since the introduction of the euro (Figure A1).

The effect of EMU entry on FDI is probably positive. Recent studies tend to find a negative effect of the volatility of the effective exchange rate on FDI flows—a particular case of the negative effect that macroeconomic volatility has on investment.<sup>42</sup> In this light, U.K. membership of EMU would increase FDI, as it is likely to make the effective exchange rate more stable despite a possible increase in volatility with respect to the US dollar.<sup>43</sup> However, it is possible that the latter impinges on FDI from the United States, which is a crucial source of FDI to the United Kingdom (Table 3), through the exposure of the investor to exchange rate risk relative to the country where the investment is located. Nevertheless, Barr et al. (2003), based on an analysis of stock returns, argue that this channel is unlikely to hinder FDI. In fact, FDI to the United Kingdom could expand after euro adoption if the purpose of the investment were to employ the United Kingdom as a platform to supply euro-area markets—since it would allow foreign investors in the United Kingdom to partly hedge their exposure by denominating their costs in the currency of their revenues.<sup>44</sup>

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<sup>42</sup> See Byrne and Davis (2002 and 2003). Pain (2002) offers a more skeptical view on the importance of exchange rate volatility on FDI.

<sup>43</sup> This is analyzed in the background study *The Exchange Rate and Macroeconomic Adjustment* (HM Treasury 2003b). EMU entry, while eliminating the volatility with respect to the euro, might increase the volatility with respect to the US dollar.

<sup>44</sup> See Barrell et al. (2003) and Becker and Hall (2003).

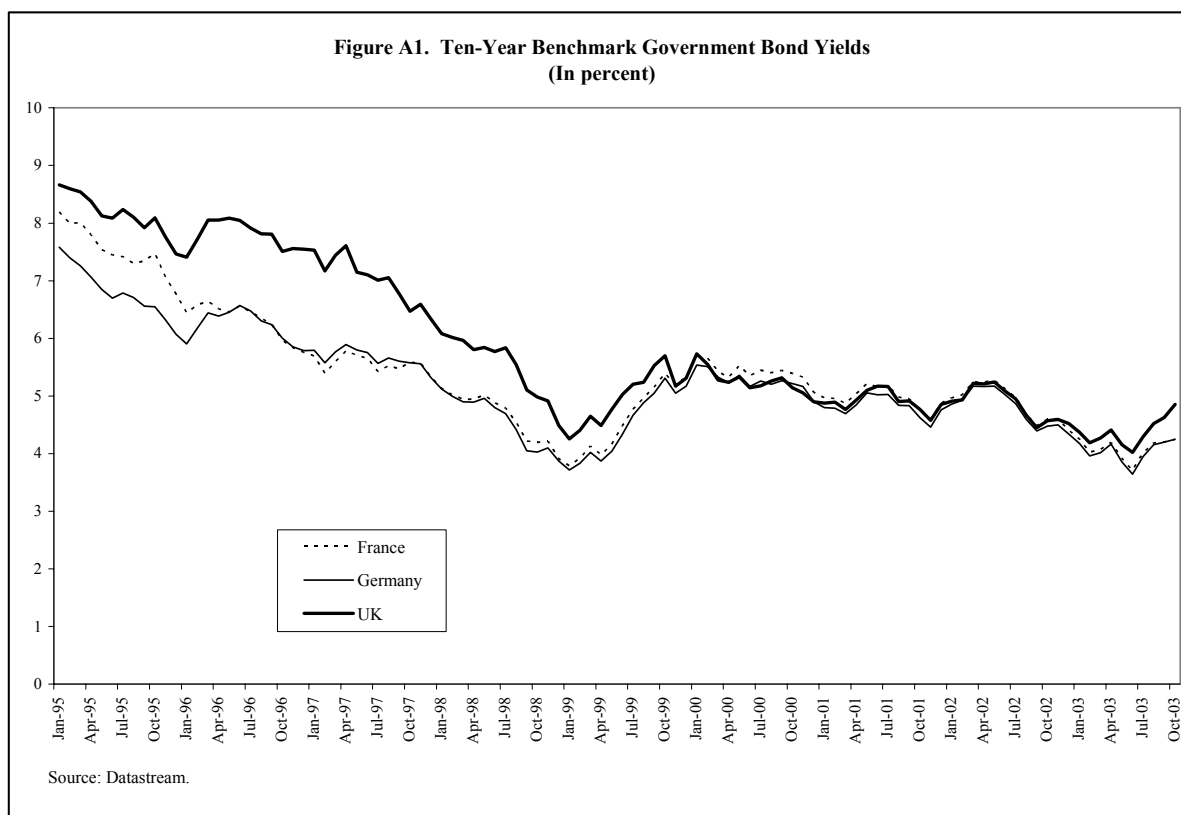


Table A1. United Kingdom: Inward FDI Flows by Origin

	1997	1998	1999	2000	2001	Average
(In percent of GDP)						
World total	2.5	5.2	6.0	8.3	4.2	5.2
EU	0.9	1.5	4.4	5.5	3.1	3.1
EMU-12 countries	0.8	1.5	4.2	5.4	3.1	3.0
Other	0.0	0.0	0.1	0.1	0.0	0.1
EFTA	0.2	1.1	-0.1	0.1	-0.1	0.2
US	1.2	2.2	1.8	1.3	0.9	1.5
Other	0.2	0.4	-0.1	1.3	0.3	0.5
(In percent of world total)						
World total	100.0	100.0	100.0	100.0	100.0	100.0
EU	34.0	28.2	73.0	66.7	73.3	55.0
EMU-12 countries	32.2	28.0	70.5	65.3	72.3	53.7
Other	1.8	0.2	2.4	1.4	1.0	1.4
EFTA	7.4	22.0	-1.2	0.9	-3.0	5.2
US	49.5	41.4	29.3	16.2	21.9	31.7
Other	9.0	8.4	-1.1	16.1	7.8	8.0

Source: ONS.

In practice, the early evidence on FDI flows, although still inconclusive, points to a possible reduction of the U.K.’s share of inward FDI flows since the introduction of the euro. Table 4 shows the share of FDI inflows into the EU countries that stayed out of the euro as a proportion of total inflows into EU countries (including from other EU countries). These shares appear to have declined overall since the introduction of the euro. These data, however, should be taken with caution as FDI flows show high volatility over time and the figures for the late 1990s and 2000 are greatly affected by the mergers and acquisitions wave. Table 5 shows that the United Kingdom has also received a lower share of the non-EU FDI into the EU since the creation of the euro in 1999, while the euro area has clearly increased its share. A possible explanation, unrelated to EMU, would be the decline since 2000 in U.S. outward FDI flows, which tend to favor the United Kingdom. This may have played a role, but nevertheless the last columns in Table 5 indicate that the United Kingdom has also received a smaller share of U.S. FDI flows to the EU since the launch of the euro. Availability of consistent cross-country data, however, is still severely limited and the evidence, although suggestive, does not allow for statistically significant inferences.

In conclusion, the results from existing research and empirical evidence on the effect of EMU entry on investment are mixed but, on balance, point to a positive effect—or equivalently, to a negative effect of remaining outside the euro. The effect on FDI is of particular importance, since FDI has played a key role in increasing productivity and TFP in the United Kingdom—including through inter- and intra-industry spillovers—a central objective of government policies.<sup>45</sup> The evidence on actual FDI flows since the introduction of the euro appears to show a positive effect of EMU membership—although this should be taken with caution since FDI is notoriously erratic and the data base is still limited.

Table A2. FDI Inflows into EU "Out" Countries  
(In percent of total FDI inflows into EU countries)

	1970	1975	1980	1985	1990	1995	2000	2001
UK	29.0	33.6	47.5	34.5	33.8	17.4	14.4	16.7
Sweden	2.0	2.7	0.2	0.8	1.3	3.6	4.0	2.2
Denmark	2.1	0.8	1.2	2.7	2.2	12.6	2.9	3.9
Total above	33.1	37.1	48.9	38.0	37.3	33.6	21.3	22.8

Source: Barr et al. (2003) from UNCTAD.

<sup>45</sup> See Griffith et al. (2002), and Hubert and Pain (2000).

Table A3. FDI Inflows from Outside the EU  
(In percent of total inflows into the EU from outside, except when indicated)

	Euro area	Non-euro area	UK	Sweden	Denmark	Share of US FDI to EU 1/	
						UK	EMU
1989	48	52	23	24	4	...	...
1990	52	48	45	2	2	...	...
1991	52	48	59	12	2	...	...
1992	52	48	44	3	1	...	...
1993	52	48	40	5	3	...	...
1994	74	26	12	9	5	32	64
1995	54	46	23	22	2	28	...
1996	65	35	29	4	1	45	53
1997	49	51	42	7	2	49	50
1998	38	62	56	1	5	38	59
1999	66	34	25	6	3	48	45
2000	71	30	22	6	2	40	39
2001	72	28	24	3	1	40	79
2002	...	...	...	...	...	34	63
2003H1	...	...	...	...	...	33	61
Average							
1989-1998	54	46	37	7	3	...	...
1999-2001	69	31	24	5	2	43	54

Source: Barr et al. (2003); and U.S. Bureau of Economic Analysis.

1/ Net outflows to the indicated jurisdiction as a percent of net U.S. FDI outflows to the EU.

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