The Effects of Technology on the Age Distribution of Health Spending: A Cross-Country Perspective [1]

Louise Sheiner
Board of Governors of the Federal Reserve System
Stop 83
Washington DC 20551
March 2004

e-mail: lsheiner@frb.gov

[1]I thank Mandeep Bains for providing me unpublished data from the European Union.
The views expressed in this paper are not necessarily those of the staff or members of the Board of Governors of the Federal Reserve System.

Abstract

The conventional method used to project a country's future health care expenditures is to assume that relative health spending by age remains constant. This method has been criticized as being too pessimistic, on the one hand, because of continued improvements in the health status of older people, and as too optimistic, on the other, because of the effects of technological innovations on increasing health spending on the elderly relative to the nonelderly. This paper uses cross-country data to shed light on this question. I find that, contrary to conventional wisdom, the theoretical effects of technology on health spending are to decrease the concentration of health spending on the elderly. Empirically, I find that relative health spending by age has been quite stable over time. I also find that countries with the most technologically intensive health sectors spend relatively less on the oldest old compared to the younger old.

1. Introduction

Understanding the relationship between health spending and population aging is critical to assessing the burden of population aging on countries' health systems, government budgets, and living standards. The simple approach to projecting future health spending is to project the growth rate of average per capita health spending in the population, and then to assume that the age distribution of health spending in the population will remain constant over the forecast horizon. Indeed, this is the approach used by most projections of health spending across countries (see, for example, Bains, 2002 and Cutler, 2003).

This approach has been criticized as being overly pessimistic. Evidence indicates that rates of disability have been declining in the US (Manton, 1997), as well as in other developed countries (Jacobzone, 1999 and Sheiner and Cutler, 2001). As disability rates decline, so too should health spending. Similarly, applying a constant pattern of spending by age group may be inappropriate in the face of increasing longevity. Health spending is concentrated in the last few years of life. Thus, increases in longevity, while increasing the number of elderly, do not necessarily raise health care costs commensurately. Taking both of these considerations into account and assuming that disability rates in the US continue to decline at 1 percent per year, Cutler and Sheiner (Cutler and Sheiner, 2001) showed that health spending by 2030 could be 10 percent lower than under the traditional assumption of a constant age-expenditure profile.

On the other hand, there is also evidence that, despite declining rates of disability and increasing longevity, the distribution of health spending has become increasingly concentrated on the old, at least in the U.S. Cutler and Meara, 1997, document the increasing concentration of spending in the U.S. between 1953 and 1987 and postulate that it is attributable to an increasing intensity of service use. Fuchs, 1998, shows that rates of use of high-cost technologies have grown much faster for the oldest old than for the younger elderly in the United States. In contrast, Freund and Smeeding, 2002, show that in the U.K., spending has not become more concentrated on the elderly, and argue that this owes to the lower technological diffusion there relative to the U.S.

The goal of this paper is to examine the concentration of health spending across countries, focusing, in particular, on the role of technology. In the following section, I propose a simple model of technology and the age distribution of health spending, in which I argue that a fast rate of technological progress is likely to lead to *less* concentration of health spending on the oldest old, not more. I then examine the evidence with time-series and cross-sectional data on the age distribution of health spending across countries.

2. The effects of technological growth on the age distribution of health spending

Technology growth is widely viewed as the main driver behind the long-term increase in health care spending. Studies of specific health innovations–for example, improvements in cataract surgery, heart attack treatment, and breast cancer treatment–find that, while technological growth tends to improve the efficiency of health spending measured as health improvements per dollar of spending, it tends to raise expenditures as new technologies allow more and more patients to be treated. While a new drug that substitutes for surgery may well be cost-reducing for those patients who would otherwise be treated with surgery ("treatment substitution"), in practice the drug will likely be used on many patients who would have been treated with less costly practices, for example, a wait-and-see approach ("treatment expansion").[2] In general, the expansion effects of new technology have outweighed the substitution effects, raising overall health spending.

But how does technology growth affect the age distribution of health spending? If new technology is equally likely to be adopted for patients of different ages, then changes in technological growth should leave the distribution of spending across age groups unchanged. If, instead, new technology is adopted at different rates for patients in different age groups, then technological growth can affect the age distribution of health spending.

Fuchs (1998) examines the diffusion of technology across age groups in the US from 1987 to 1995. He finds that, for seven different procedures, adoption rates grew much more rapidly

[2]See, Cutler and McClellan (2001).

during this period among the oldest old than the younger old. For example, he finds that angioplasties increased at a 13 percent average annual rate for 65 to 69 year old men, but at a 22 percent rate for those over 85. He finds similar differences for other intensive procedures.

Yet, other evidence suggests that older patients are significantly less likely to be treated with new technology. For example, Moise and Jacobzone (2003) and Jacobzone (2002) show that, across the OECD, older patients were significantly less likely to receive coronary artery bypass grafts for heart conditions and breast-conserving surgery with radiotherapy for breast cancer. They also found, however, that differences in usage by age group diminished over time, and that the difference in utilization rates between age groups was lowest in the US.

Given this evidence, as well as other anecdotal reports of underuse of technology for elderly patients,[3] it seems reasonable to assume that younger patients are more likely to receive the newest technology, but that, over time, the technology diffuses to a wider population, and the difference across age groups diminishes. This means that, in a technology's initial years, younger populations would experience higher growth in adoption rates, but in the later years, older patients would experience the higher growth rates, as the difference between usage rates among age groups diminished.

2.a. A heuristic model

I present a very simple model to explore the relationship between technology growth, technology usage, and the distribution of health spending.

Let S_y and S_e be per person health spending on the young and the elderly, respectively, let P_Y and P_E be the probabilities of being sick for the young and elderly, let C^N and C^O be the per capita

[3]Indeed, there has been some concern within the medical profession that physicians tend to undertreat the elderly. See, for example, Dale (2003) for the US and Brockman (2002), for Germany.

costs of new and old technology, and let U_Y and U_E be the probabilities that new technology is used on the young and the elderly, respectively. Note that new technology becomes old after one period, so U_E should be interpreted as representing the likelihood that the elderly receive new technology in its early stages, and $1-U_E$ is the likelihood that the elderly receive somewhat older technology.

Every sick patient either gets new or old technology. In this model, we assume that technology is "new" for one period, and then becomes old. Assume that new technology costs g more than old technology: $C^0 = C^N \cdot (1+g)$. As discussed above, while, g can either be positive or negative in theory, in practice, g has been positive *on average*, reflecting the diffusion of technology across patients who otherwise would have received low-intensity treatment only.

Then, we can write average health spending per elderly as follows:

$$\begin{aligned} S_E &= P_E \cdot (C^N \cdot U_E + C^O \cdot (1-U_E)) = \\ &P_E \cdot C^O \cdot ((1+g) \cdot U_E + (1-U_E)) = \\ &P_E \cdot C^O \cdot (1+g\,U_E) \end{aligned}$$

Similarly, average health spending per young person can be written:

$$S_Y = P_Y \cdot C^O \cdot (1+g\,U_Y)$$

For simplicity, assume that $U_Y = 1$; that is, all young patients receive new technology. Then, the ratio of average per-person spending on the elderly and the young would then be:

$$\frac{S_E}{S_Y} = \frac{P_E \cdot C^O (1+gU_E)}{P_Y \cdot C^O (1+g)} = \frac{P_E \cdot (1+gU_E)}{P_Y \cdot (1+g)}$$

The ratio of spending on the elderly to spending on the young depends on the relative health of the two groups, the rate of technology adoption, and the rate of technical progress. If technology adoption is the same (in this case, if $U_E = 1$), then the age distribution of spending would depend only on the distribution of health. If adoption of new technologies is lower among the elderly

($U_E < 1$), then the ratio of spending on the elderly to the non-elderly will be lower than that suggested by differences in health alone, and will depend on the rate of technical progress, g. An increase in g raises spending on the young more than on the elderly, thus *lowering* the concentration of health expenditures on the elderly, while a reduction in g would have the opposite effect. Similarly, the higher is the probability of using new technology on the elderly, the higher would be the concentration of spending.

This is a very simple model, and does not address how U_E and g are determined, nor the potential relationships between these two variables. Nonetheless, the model points out some interesting effects. If there are no new technologies, or if technology use does not depend on age, then the age distribution of spending will depend only on the age distribution of health. On the other hand, if the newest technology is used disproportionately on the young, then the higher the rate of technology growth, the more disproportionate the spending on the young. Thinking about cross-country comparisons, the relationship between technology and the age distribution of technology use becomes important–if countries that are technologically intensive (high g) also apply that technology more for the old (high U_E), then the effect on the age distribution of spending is ambiguous. In the empirical work below, I take a very simple approach and examine the broad relationships between technological intensity and the age distribution of spending.

3. International Evidence

Surprisingly little data exist on the distribution of health spending by age, particularly time-series data. I have amassed a set of international statistics from a number of different sources, and tried to ensure that the data are comparable (for example, that they cover the same services, and utilize the same age groups). The sources of these data are detailed in the Appendix. Spending patterns across countries can differ for many reasons unrelated to technology; for example, differences in the underlying health of the population or differences in payment rates for different types of services (for example, how well nursing homes are paid can affect the age distribution of health spending across countries even if the actual services received do not differ.) Nonetheless, comparing the distribution of spending among age groups across countries should eliminate many

of the differences among health systems.

In examining the age distribution of health spending, I focus on two types of comparisons: the average spending per elderly aged 65 and over relative to the average spending per person aged 65 and under, and the distribution of spending within the elderly population. For the United States, in particular, understanding the differences between elderly and non-elderly health spending is complicated greatly by the fact that elderly Americans are insured through Medicare, while the non-elderly face a variety of different insurance systems. Thus, changes in the Medicare program, or changes in private insurance, can cause spending on the elderly to diverge from the non-elderly for reasons unrelated to health care use. For all countries, the ratio of elderly to non-elderly spending will also depend on the age distribution of the elderly population (for example, countries with an older elderly population will have higher average spending). Comparing spending across age groups within the elderly population is a much cleaner exercise. If changes in technology are affecting the distribution of spending on the elderly vs the non-elderly, these effects should also be seen across age groups within the elderly population.

I also distinguish, where possible, total spending on health care from spending on acute health care, which I define as total spending less spending on long-term care (leaving primarily hospitals, physicians, and prescription drugs). The effects of technology should be most apparent in acute health spending. Furthermore, countries might differ substantially on whether long-term care is provided formally or informally, through families or other non-health system institutions, which could lead to large differences in the age distribution of spending.

3.a. Trends in the Age Distribution of Health Spending

I have been able to gather time-series data on the age distribution of health spending for Canada, Japan, and the United States.

The United States

The only time-series data on the age distribution of health spending across the entire population come from periodic surveys of the noninstitutionalized population. The data do not include any information on institutionalized individuals, nor on the costs of institutional care. Cutler and Meara (Cutler and Meara, 1997) used these data to document the increasing concentration of health spending among the elderly during the 1953 to 1987 period. I have augmented these data with results from the 1996 and 2002 Medical Expenditures Panel Survey (MEPS).

The ratio of per capita health spending on the elderly (those over 65) to the non-elderly is plotted in Figure 1. The concentration of spending identified by Cutler and Meara is evident. However, the data do not show a continuation of this trend beyond 1987; instead, there is a slight reversal.

As noted above, this comparison is difficult to interpret because of the different health institutions faced by the elderly and the non-elderly in the United States. Changes in Medicare that affect provider reimbursement--for example, the introduction of a prospective payment system in 1983--can change spending on medical care without necessarily changing actual utilization. It is more instructive to compare spending across age groups within the elderly population, as virtually all the elderly in the US are insured by Medicare. [4] There are two sources of data for this. First, data on Medicare spending by age group are available as far back as 1974. The data cover all elderly, institutionalized and not, but only cover Medicare expenditures. Thus, spending on prescription drugs and nursing homes are omitted, as are all out-of-pocket costs or costs covered by supplemental insurance programs.

Figure 2 shows the changes in the age distribution of Medicare spending over time. The top panel of the figure plots average spending by age group as a fraction of average spending on 65 to 69 year olds. This figure shows a bit of an uptrend in the early years, but a generally flat pattern after that, until the early 1990s, when the concentration of spending on the oldest old increased

[4] Many of the elderly also have supplemental private insurance, which could affect utilization.

sharply.

As noted by Cutler and Meara, 1999, the acceleration in spending on the oldest old in the late 1990s is attributable solely to increased Medicare spending on long-term care. The bottom panel of figure 2 presents the Medicare data excluding Medicare spending on home health care and skilled nursing facilities--what I call acute Medicare spending. These data show much less fluctuation in the age distribution of health spending, with a bit of increase in relative spending on the older groups in the beginning years of the time period, but a bit of a decrease in the later years. The distribution of acute medicare spending by age group in 1998 was very similar to the distribution in 1974.

The second source of data on the distribution of health spending among the elderly is the Medicare Beneficiary Survey (MCBS). This survey is the most comprehensive, covering all Medicare beneficiaries and all spending, regardless of payer source. Unfortunately, the survey only began in 1992. Figure 3 presents the data, showing both patterns for total health spending (including long-term care) and acute health spending. The figure shows very little change in the age distribution of spending in the 1990s, regardless of whether long-term care is included.[5]

Canada

The Canadian Health Ministry has compiled comprehensive time-series data on health spending by age group for Canada. The top panel of Figure 4 shows the distribution of health spending between the elderly and non-elderly between 1980 and 2000. Interestingly, the data show

[5] The MCBS does not show a large increase in spending on long-term care in the late 1990s. Thus, the increase in Medicare spending seen in Figure 2 either reflects fraudulent increases in home health care spending in the Medicare program, as many suspect, or a substitution of Medicare for other health spending for home care. Data on sources of spending from the MCBS indicate that, between 1992 and 1998, the share of total long-term care spending financed by Medicare rose sharply, while the shares paid by Medicaid and out-of-pocket payments fell. Overall, long-term care spending rose at about the same rate as acute health spending.

a somewhat similar pattern as seen for the US, with total health spending becoming somewhat more concentrated on the elderly in the 1980s, but less so in the 1990s, leaving the age distribution of spending in 2000 almost unchanged from 1980. These similarities are striking given that all Canadians are insured through a national health system, whereas most of the nonelderly in the United States are insured through private health insurance, while the elderly are insured through the national Medicare program.

The bottom panel of the figure examines the distribution of health spending within the elderly population. The data show a clear, but modest, decrease in concentration on the older and oldest elderly, relative to the 65-74 year olds.

Japan

Finally, figure 5 shows the distribution of health spending between the elderly and non-elderly in Japan. While Japan does have universal health insurance system, the elderly are more likely to be insured through government plans than through private plans, and may face different financial obligations than the nonelderly.[6] Yet, as in Canada, the concentration of health spending on the elderly increased modestly during most of the 1980s, and then decreased modestly during the 1990s, leaving the ratio of spending almost unchanged from the initial year. Unfortunately, I am unable to disaggregate acute from total health spending, and also can not analyze spending by age group within the elderly population.

Discussion

Overall, spending patterns across age groups have been fairly constant in these three countries, although there is some evidence that spending became a bit more concentrated on the elderly in the 1980s (and earlier for the US), but that this pattern reversed itself in the 1990s. Further research is needed to identify the source of this pattern, whether it is changes in the

[6]See Ikegami and Campbell (1999) for a brief review of the Japanese health care system.

distribution of health across age in the underlying population, changes in the rates of introduction of new technology, or whether it is attributable to broader institutional or other factors. In any case, spending by age has been remarkably stable over all, suggesting that "naive" projections of health spending that assume constant relative spending by age are not indefensible.[7,8]

This stability of spending by age group may be surprising in light of the large declines in disability (Manton, 1997) and increases in life expectancy over most of the past 20 to 30 years. But, declines in disability and increases in life expectancy will only affect the age distribution of health spending if those improvements occur disproportionately for some age groups than others–improvements in health that have the same percentage effect across age groups (i.e., that keep the ratio P_E/P_Y in the model unchanged) will not lead to changes in the distribution of health spending, but will reduce total spending.[9] Cutler and Meara (1999) calculate that declines in disability and improvements in longevity between 1984 and 1994 should have had only minor effects on the concentration of spending among the oldest old. Cutler and Sheiner (2001) analyze the age distribution of several different measures of health--including self-reported health status, nursing home use, and disability rates. They find health improvements in all age groups, without any clear patten of differential improvement by age.

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[7]The stability of the distribution of health spending by age accords well with findings that the distribution of health spending between the top spenders and others has also remained quite stable over long periods of time. (See, Berk and Monheit, 2001)

[8]Mayhew (2000) also found that spending patterns by age in England and Wales were quite stable between 1982 and 1992.

[9]Of course, improvements in health that are the *result* of better medical technology and more medical spending, rather than exogenous factors, will not lower total medical spending.

3.b. The Concentration of Spending across the OECD

Data on the age distribution of health spending at a point in time are somewhat richer than time-series data, and I exploit this richness to analyze the determinants of the age distribution of health spending. As shown in Table 1, recent data on the age distribution of health spending across eight OECD countries show considerable variation. The ratio of spending on the elderly to the non-elderly varies from 3.8 to 5.2 for total health spending (row 1), and from 3.1 to 4.2 for acute health spending (row 5). The narrower range for acute health spending shows that spending on long-term care varies more widely across countries, reflecting, perhaps, the institutional differences in long-term care delivery systems described above. To concentrate on the impact of technological change on the age distribution of health care, I focus on acute health spending, even though the breakdown of long-term care and acute spending might also vary across countries. (For example, in some countries, long hospital stays may be used as a substitute for long-term care.)

The bottom portion of Table 1 shows a number of different age comparisons for acute health spending. Relative to 65-74 year olds, average spending on 75-84 year olds varies from a low of 1.2 times as much in the US to a high of 1.7 times as much in the UK (row 6). Relative spending on the oldest old shows similar variation: in the US and in the Netherlands, spending on those 85 and over is about the same as on those 75 to 84, whereas in Canada and the UK, spending on those 85 and over is about 60 percent higher than on those 75 to 84 (row 7).

Table 2 shows the correlations between the different measures of the age distribution of health spending. While the ratio of elderly to non-elderly acute health care (column 1) is not that correlated with measures of the age distribution of spending within the elderly population, those measures are all highly correlated with each other. For example, countries that spend a lot on 75 to 84 year olds relative to 65 to 74 years olds also spend a lot on those 85 and over relative to those 75 to 84. This is true both for acute health spending (the correlation coefficient in column 2, row 3 is 0.8) and total health spending (the correlation coefficient in column 6, row 7 is 0.76).

In the theoretical section above, I argued that technology adoption can have two opposing

effects on the concentration of spending by age. Holding constant the relative use rates of technology by age, countries with high rates of technology growth in the health sector should spend relatively less on the aged. But, if countries with high rates of technology growth are also likely to use them disproportionately more on the elderly, then the net effect on the age concentration of spending is ambiguous. Thus, the question is an empirical one.

To test the question of technology adoption, I examine the relationship between the age distribution of spending and three readily available measures of technology availability and use: the number of computerized axial tomography (CAT) scanners per million population, the number of magnetic resonance imaging machines (MRIs) per million population, and the number of coronary angioplasties (heart bypasses) performed per million population. The ordering of the countries according to these three measures accords well with anecdotal views of technological intensity in the health care sectors across countries. Figure 6 plots the relationship between spending on the older old, those 75 to 84, relative to spending on the younger old, those 65 to 74. The results show that countries with technology-intensive health care sectors spend relatively less on their oldest old. The results hold true for each of the technologies studied, and are significant at the 15 percent level.[10] Figure 7 examines the relative spending on those 85 and older relative to those 75 to 84. The relationship is even more striking, and the univariate regressions (relative spending against technology) are highly significant for all three measures of technology.

The conventional wisdom that the US has a high concentration of spending on the oldest old because of its greater-than-average reliance on expensive high-technology (Oxley and Jacobzone, 2001) does not seem to hold true; while the US clearly does rely more on expensive high-technology than many other countries, it does not appear to do so disproportionately on the oldest old. Of course, these are macro-level data, and can not account for the many differences in health care across countries that could potentially lead to differences in the age distribution of spending. Further work examining the patterns of spending by age across countries, for example, the detailed studies

[10]The results are based on simple univariate regressions of relative health spending on measures of technology.

being undertaken by the Ageing-Related Diseases (ARD) group at the OECD and the Technological Change in Health Care (TECH) Research Network[11], will surely prove instructive.[12]

4. Conclusions

This paper has a few basic findings. First, increases in technology growth will only affect the concentration of health spending to the extent that new technology is adopted differentially by age group. To the extent that the elderly are less likely to receive new technology, increases in the rate of technological growth should reduce the concentration of spending on the elderly. Second, empirically, the concentration of medical spending by age appears relatively stable, at least in the three countries examined. Finally, contrary to conventional wisdom, the age distribution of health spending tends to be *less* concentrated on the oldest old in countries with *more* technologically advanced health sectors.

The naive method used to project health spending–assuming a constant distribution of health spending by age-- seems reasonable. While changes in disability and life expectancy may lower total health care costs going forward, they will not necessarily change the distribution of health spending across age groups. Finally, the fear that, over time, health spending will become increasingly concentrated on the oldest old seems unfounded.

[11]See, for example, OECD, 2003 and TECH Research Network, 2001.

[12]I am also planning to examine how Medicare spending varies by age across states in the U.S.

Table 1

Age Distribution of Health Spending across Countries

	US (1999)	Canada (1999)	Germany (1998)	Netherlands (2000)	Australia (1998)	New Zealand (1998)	UK (1998)	Belgium (1998)
Ratio of Total Spending								
1. >65/<65		5.2		4.9	4.1	4.7	3.9	4.5
2. 75-84/65-74	1.4	1.9		2.2		1.9	2.3	1.7
3. 85+/75-84	1.7	2.2		2.3		2.0	2.0	1.9
4. 75+/65-74	1.7	2.4		3.8	2.0	2.3	2.9	2.1
Ratio of Acute Spending								
5. >65/<65	3.7	4.1	3.1	2.9	3.2	4.2	3.1	3.5
6. 75-84/65-74	1.2	1.6	1.3	1.3		1.3	1.7	1.4
7. 85+/75-84	1.0	1.6	1.1	1.0		1.5	1.6	1.2
8. 75+/65-74	1.4	1.8	1.3	1.3	1.4	1.5	2.0	1.5

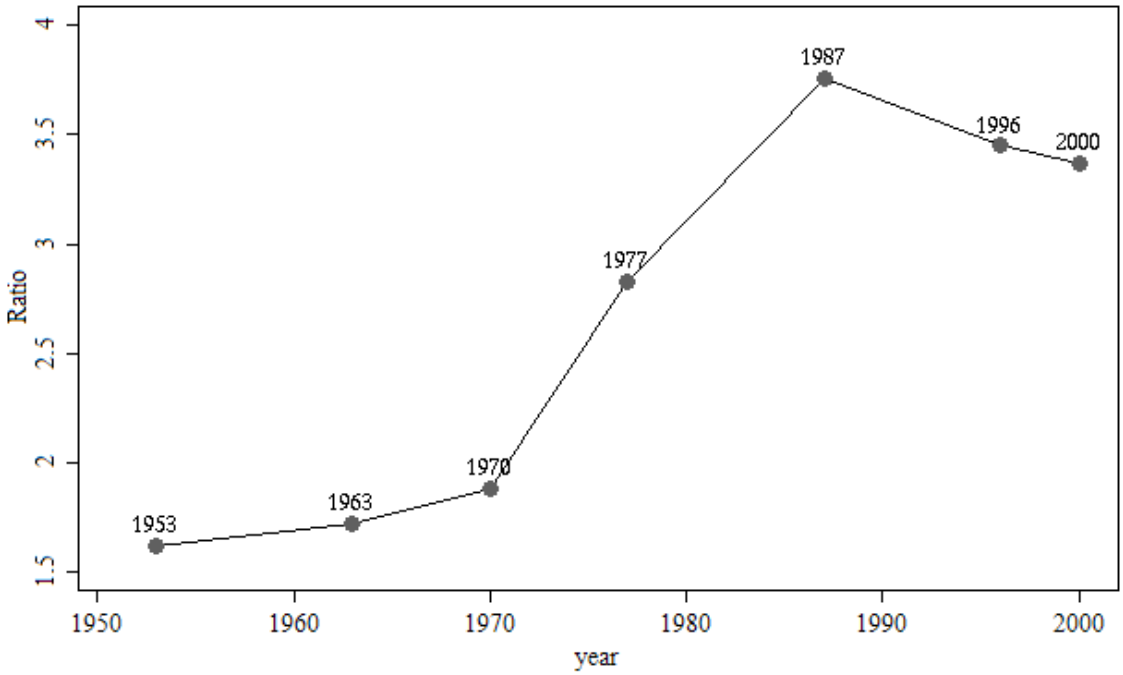
Source: see Appendix

Table 2
Correlations between Age Distribution Measures*

	1. Acute >65/<65	2. Acute 75-84/65-74	3. Acute 85+/75-84	4. Acute 75+/65-74	5. Total >65/<65	6. Total 75-84/65-74	7. Total 85+/75-84	8. Total 75+/65-74
1. Acute >65/<65	1							
2. Acute 75-84/65-74	-.01	1						
3. Acute 85+/75-84	.48	.80	1					
4. Acute 75+/65-74	.19	.96	.88	1				
5. Total >65/<65	.54	-.48	-.14	-.24	1			
6. Total 75-84/65-74	-.49	.61	.46	.51	-.44	1		
7. Total 85+/75-84	-.29	.30	.23	.14	.75	.76	1	
8. Total 75+/65-74	-.52	.16	-.03	.06	.19	.84	.86	1

* Each cell represents the correlation coefficient for all the countries for which data exist; thus the observation number differs by cell.

Figure 1
Ratio of Elderly to Nonelderly Acute Health Spending:US



Source: Cutler and Meara, 1953–1987; MTIF, 1996, 2000

Figure 2
Trends in the Age Distribution of Medicare Spending

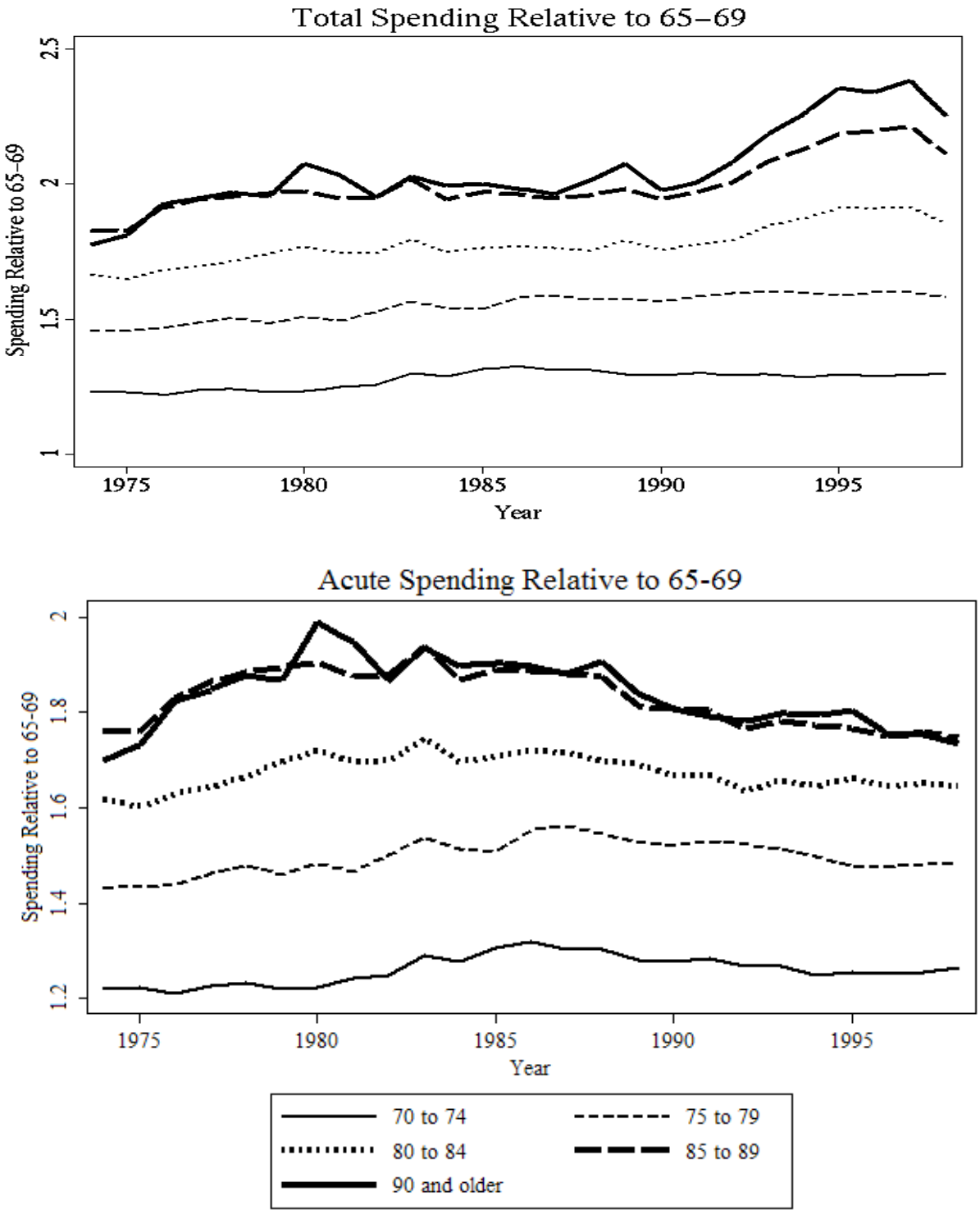
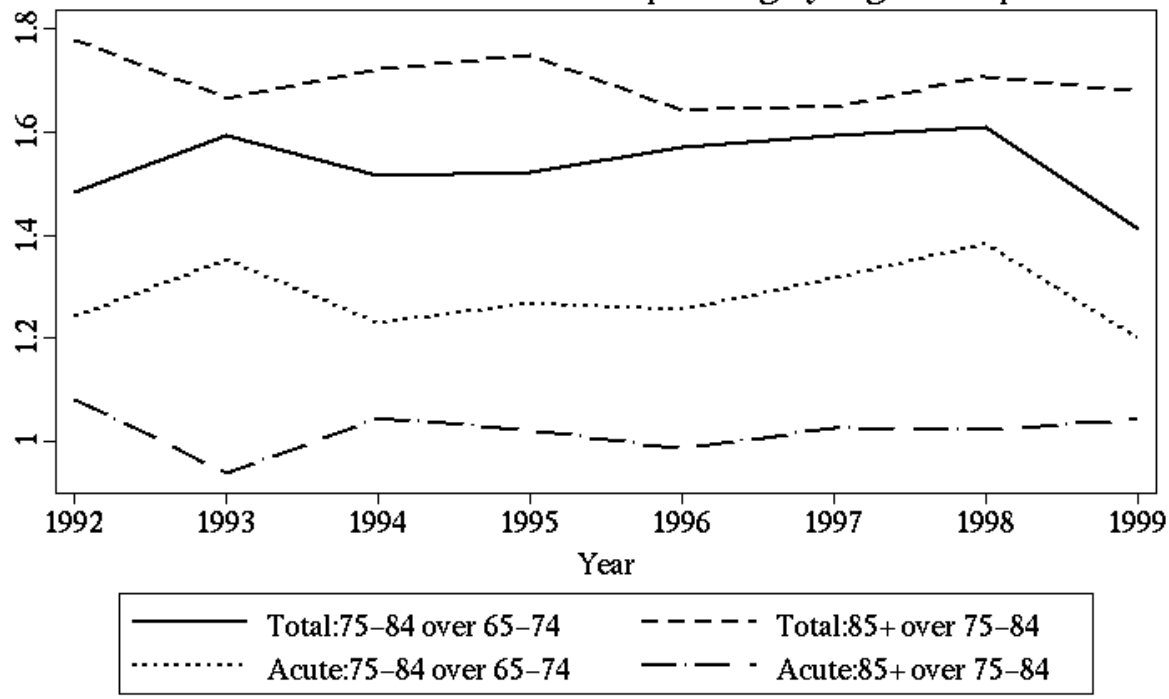


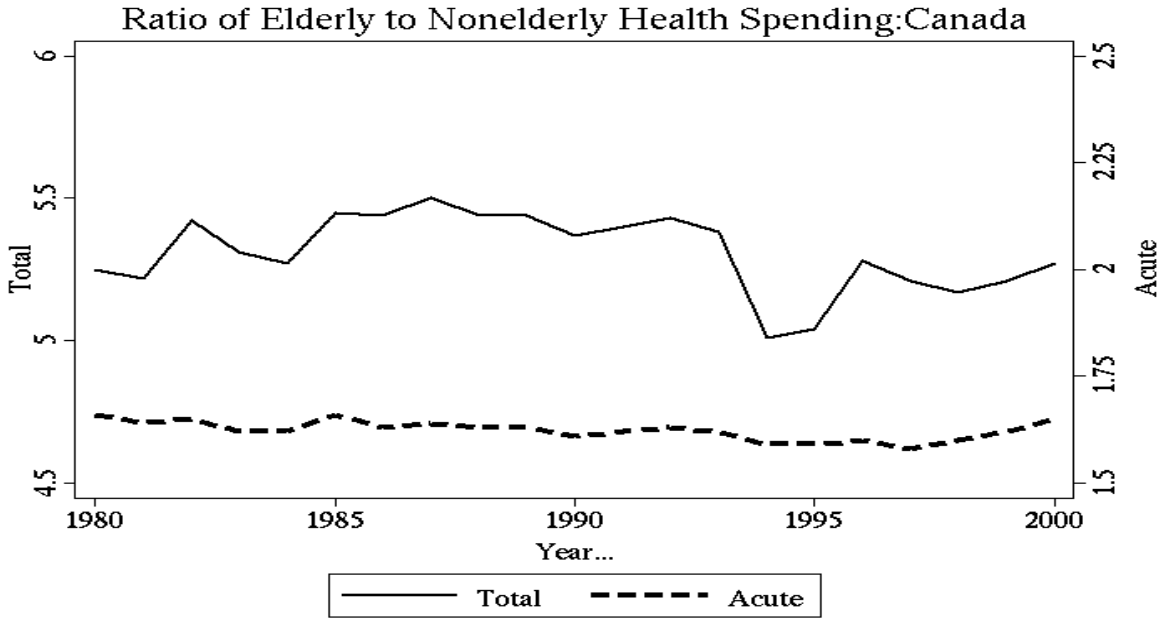
Figure 3
Distribution of US Health Spending by Age Group



Source: Medicare Beneficiary Survey

Figure 4

Distribution of Spending by Age in Canada



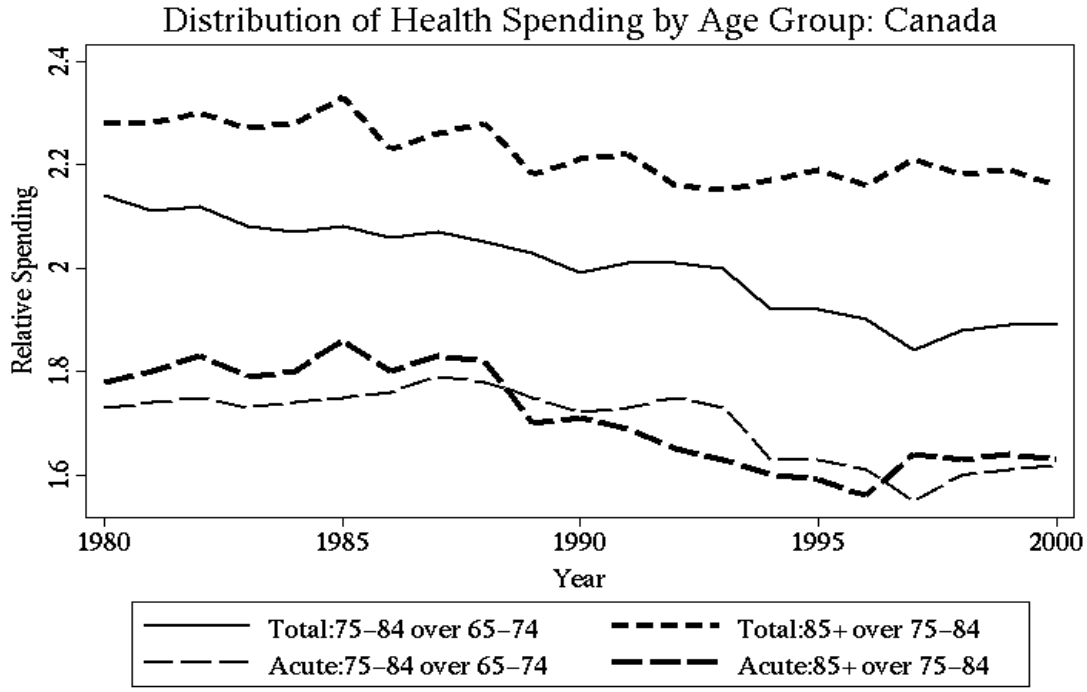


Figure 5

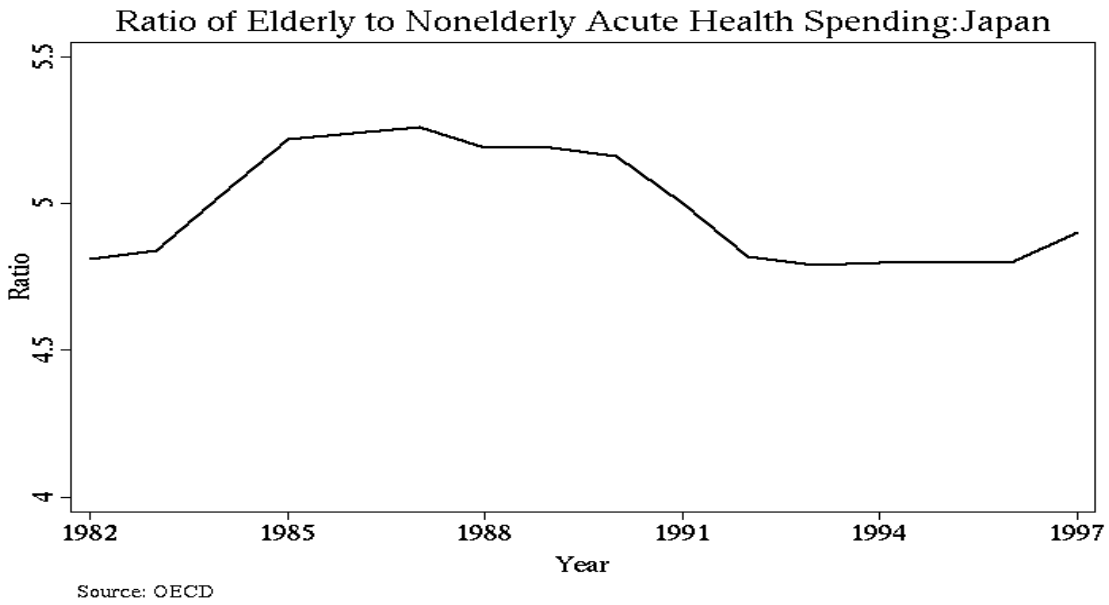

Ratio of Elderly to Nonelderly Acute Health Spending:Japan
Ratio
5.5
5
4.5
4
1982
1985
1988
1991
1994
1997
Year
Source: OECD

Figure 6

Effects of Technology on Relative Spending on the Older Old

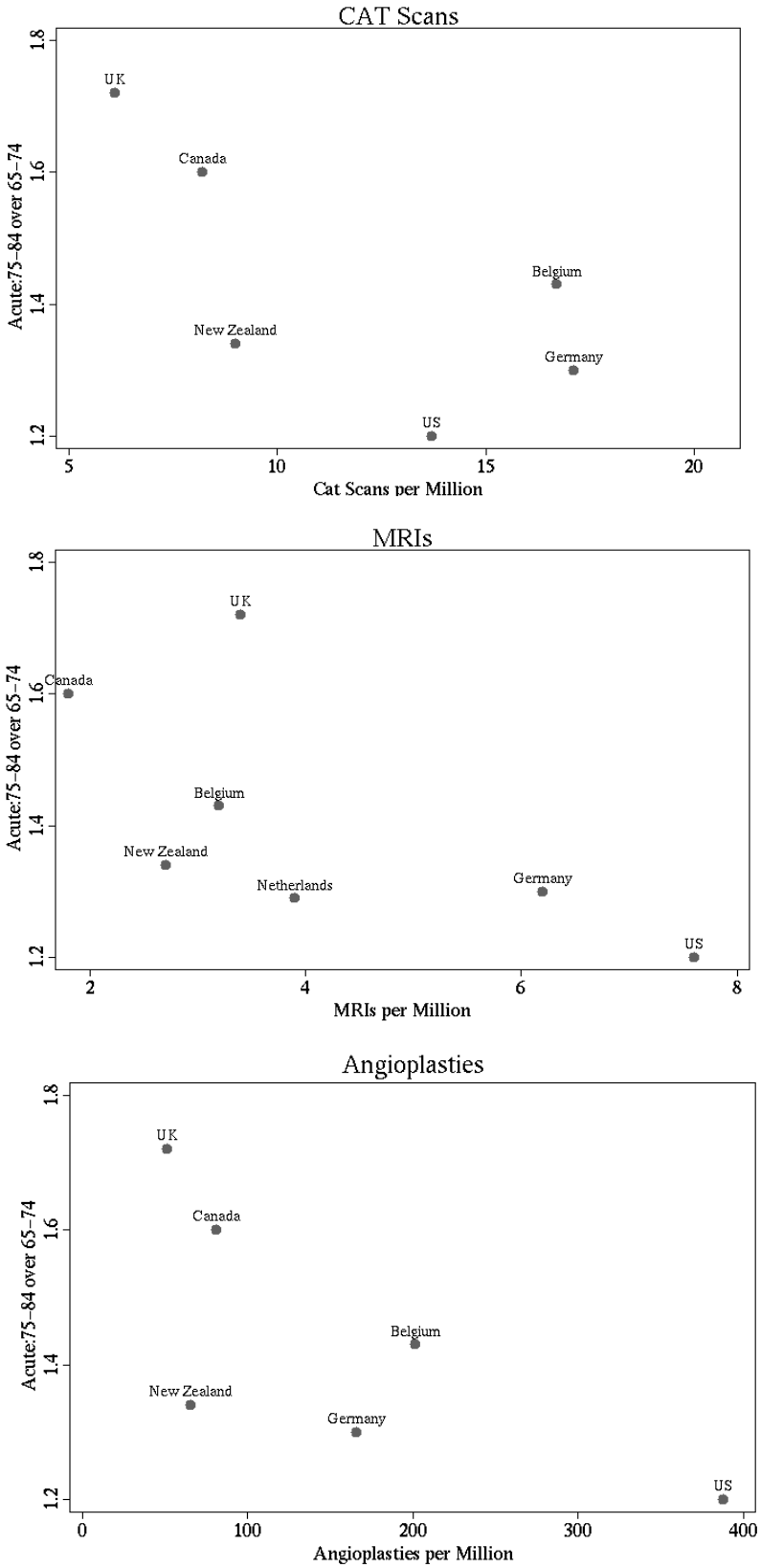
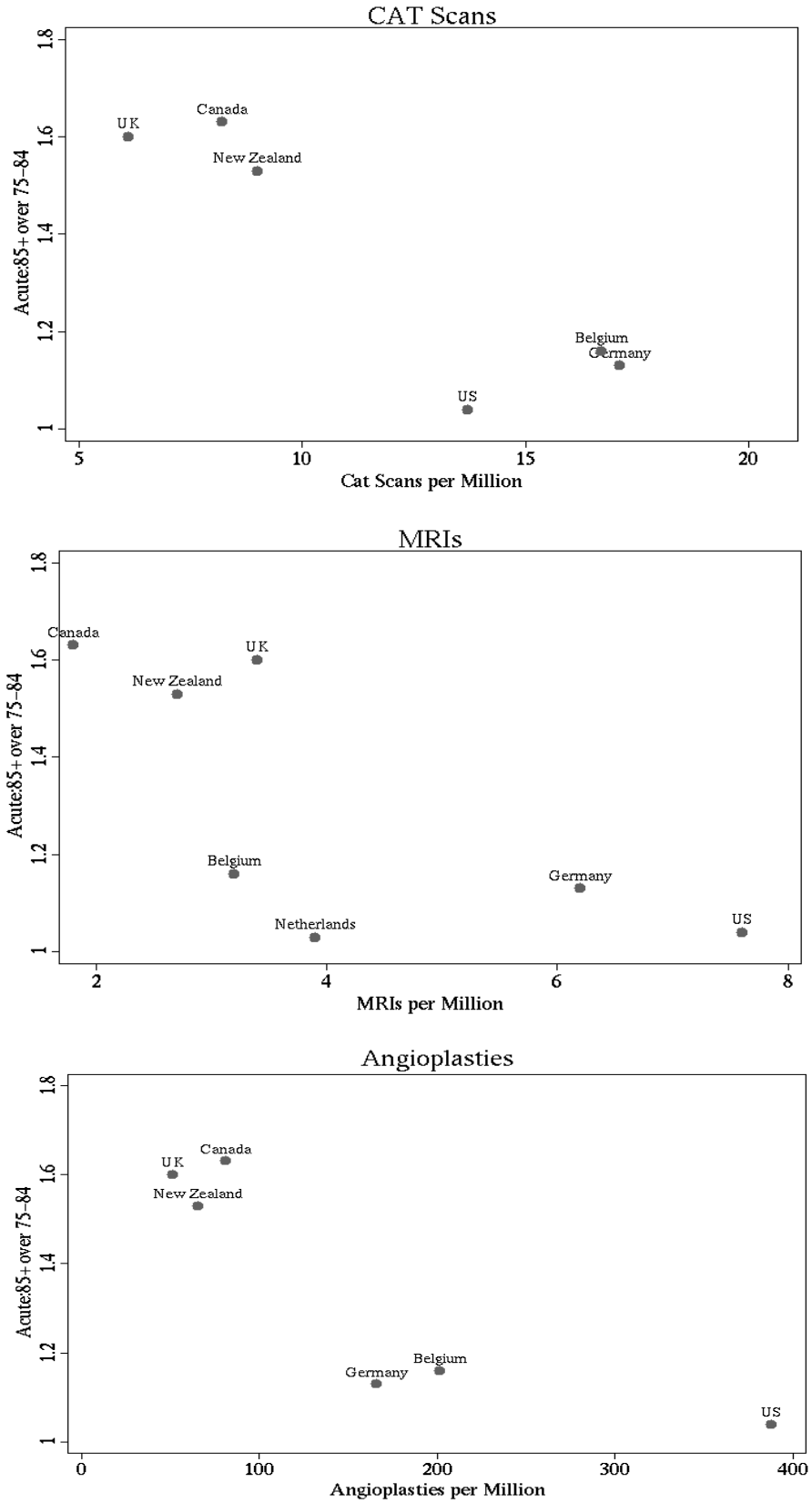


Figure 7

Effects of Technology on Relative Spending on the Oldest Old



Appendix

Sources of Data on the Distribution of Health Spending by Age (Table 1)

OECD: The OECD used to report data on the distribution of health spending by age; however, they no longer do, although the data are available on the 2002 OECD Health Data CD. Great care must be taken in using these data, as they are quite inconsistent–they are not always for the whole country, not always for all forms of health spending, and not always for the listed age group.

The Economic Policy Committee of the European Union Working Group on Ageing (WGA) collected data from member states on the age distribution of acute and long-term health spending. I received a set of spreadsheets from Mandeep Bains (European Commission) with information for the UK, the Netherlands, Germany (only acute), and Belgium.

Sources of data by country:

Australia: Older Australia at a Glance, 1999.
Belgium: Data from the WGA
Canada: Health Expenditures in Canada by Age and Sex, 1980-81 to 2000-01 - Statistical Annex.
Germany: Data from the WGA
Japan: OECD Health Data 2002
Netherlands: Data from the WGA
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