

Disaggregating the health sector in MONASH for forecasting and policy.

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Background

The health sector in Australia is, like the health sectors of most countries, large and growing. It had an annual average real growth rate of 4.5% over the last decade. As demand grows, with changes in demographics and in technology, even more will be expected in the future from a health care system that is fragmented, and perceived to be inefficient and ill prepared.

Despite the importance of the health policy choices, Australia does not currently possess the modelling infrastructure required to help choose the most effective and equitable options. There has been almost no systematic approach in Australia to modelling the health system, its interaction with the broader economy and the impact of the system upon the distribution of costs and benefits. Rather, policy has been based upon *ad hoc* and partial analyses or, in some cases, upon no systematic evaluation of the evidence. Policy makers have been frustrated by a lack of adequate tools to help them assess the effectiveness and impact of possible policy changes.

This paper is a preliminary part of an ongoing research project funded by the Australian National Health and Medical Research Council. The aim of the project is to build capacity and modelling infrastructure in the area of health services, including the development of the MONASH computable general equilibrium model to include sectoral and behavioural detail about the health sector

Overview of the MONASH model

MONASH is large and detailed, making it impractical to provide a full description of its theoretical structure and database in a paper of this size. In this section we provide a brief overview of the main features of the model. The reader is referred to Dixon and Rimmer (2002) for a detailed discussion of the full model.

MONASH is a dynamic computable general equilibrium model of the Australian economy, and is descended from the earlier comparative-static model ORANI (Dixon et al., 1982). The model features detailed sectoral disaggregation, with the version employed in this paper featuring 107 industries and commodities. Familiar neoclassical assumptions govern the behaviour of the model's economic agents. Decision-making by firms and households is assumed to be governed by maximising behaviour. Each representative industry is assumed to minimise costs subject to constant returns to scale production technologies and given input prices. Household commodity demands are modelled via a representative utility-maximising household. Investors allocate new capital to industries on the basis of expected rates of return. Units of new capital are assumed to be a cost minimising combination of inputs sourced from Australia and overseas.

Imperfect substitutability between the imported and domestic varieties of each commodity is modelled using the CES assumption of Armington. The demand for any given Australian commodity by foreigners is assumed to be inversely related to its foreign-currency export price. The model recognises both the consumption of commodities by government, and a variety of direct and indirect taxation instruments. In general, markets are assumed to clear and to be competitive. Purchasers' prices differ from producer prices by the value of indirect taxes and margin services. Dynamic equations describe stock-flow relationships, such as those between capital and investment, and debt and savings. Dynamic adjustment equations allow for the gradual movement of a number of variables towards their long-run values. For example, in year-on-year deviation simulations, real wages are assumed to be sticky in the short-run, adjusting over a period of about five years to return the number of unemployed to its base-case level following some economic shock. Other features of the model allow it to produce time-paths for a large number of economic variables

under a variety of scenarios. In particular, the model contains many relationships that facilitate the use of extraneous data from official statistical publications and forecasting organisations during simulations designed to either track history or forecast the future. The model is solved with the GEMPACK economic modelling software (Harrison and Pearson, 1996).

Population ageing

Due to declining fertility and increased life expectancy, Australia's population distribution will age considerably over the next twenty years (ABS, 1996). Whilst clearly the mix of health services demanded by the population will change as the population ages, the effects on total spending are less clear.

At first blush, this seems surprising, since both private and government expenditures on health are strongly related to age. Health costs rise sharply for individuals over 50 years old (Table 1). Health costs overall for those over 65 are around four times those of younger Australians. (Productivity Commission, 2004 pxxix). The idea that as a population ages, health costs will rise because older people experience higher health costs has intuitive appeal.

The link between health costs and ageing – or at least the strength of the link – has, however, been disputed. Whilst there are other sources of disagreement,¹ the major point emphasised by those who deny a strong link between ageing and health costs is that it is GDP growth rather than demographic factors that drives health expenditures. Under this view, overall and cohort health budgets are only weakly related to medical need. Even if medical needs rise with an ageing population, they can be accommodated by health budgets determined by political rather than market processes and increasing with GDP (Richardson and Robertson, 1999).

This view is supported by econometric evidence that “little or no relationship between national health expenditures and the demographic profile of OECD countries” (Richardson, 2004 p2).

¹ For example whether higher costs for older age groups reflect greater mortality amongst those groups.

In response to arguments of this kind, the Productivity Commission comments:

Two clear features of the relationship between age and health expenditure in Australia are that:

- higher needs translate to higher health expenditure for older age groups; and
- this relationship has been stable over time (with some evidence that the disparity between expenditure on the old and young is growing).

It follows that an ageing population must create *pressure* for expenditure increases. (Productivity Commission, 2005 p166)

The pressure created by growing needs underlies the Productivity Commission's approach. Whilst this seems appropriate, it is not clear that the alternatives to dealing with the pressure of growing needs amount to assuming they "are borne privately or through a technology deficit" (*ibid.*). These would be the alternatives if the current spending patterns and technologies reflected need. If, however, the current pattern of spending is only weakly associated with needs and the adoption of appropriate technology, the increased needs associated with an ageing population could be accommodated without increased government or private spending and without incurring a technology deficit.

For many sectors of the economy, this would seem a strange view, but features of the health care sector suggest that it is at least arguable. Whilst for most products and technology there is a strong presumption that a unit consumed has net benefits for that consumer and that new technology adopted reduces costs of production, this presumption is substantially weakened for the health care sector. The paucity of good information about the effectiveness of treatments means that patients or even doctors ought not to be presumed to know whether undertaking a treatment or adopting a new technology is cost effective. The dominance of insurance (whether public or private) in the sector also means that incentives to minimise costs and monitor the behaviour of other agents are largely absent.

Less direct age-related effects on health costs

In addition to the “pure” effect of ageing upon health costs discussed above, there are two important channels by which population ageing can have an impact on health costs.

The first of these is that technological change may increase costs or spending for some age groups more than others. Costly improvements in treatments mainly used by the aged – such as hip replacements or drugs used to treat arthritis – would amplify any cost increases driven by population ageing *per se*.

The second way in which an ageing population may indirectly affect health costs is through the labour force. If, as the population ages, the labour force participation rate declines, health costs will be increased as the cost of labour inputs grows. Should labour shortages occur in skill categories intensively employed in the health care sector, this effect will be larger. A computable general equilibrium model such as MONASH is the ideal tool to examine the interaction between the labour force and the health sector, but further disaggregation of the model and detail about the composition of the labour force in the health sector is needed before more than rudimentary analysis can be undertaken.

Strategy for MONASH simulations

The remainder of this paper is organized as follows:

- What does historical simulation tell us about the health care sectors?
- What light can alternative forecasts shed on the quantitative significance of pure and indirect ageing effects on health costs?
- What further model development is required to examine this and other health-related policy issues?

Overview of the historical simulation

A large-scale computable general equilibrium model such as MONASH contains many economic relationships linking variables describing *observable* features of the economy (such as macroeconomic aggregates, commodity prices and outputs, household consumption by commodity) with variables describing *structural* features

of the economy (such as production technologies and household tastes). Dixon and Rimmer (2002) describe how these relationships can be exploited to both analyse in detail a period of economic history, and to provide plausible values for the model's structural variables in forecasting simulations. Such analysis requires two sequential simulations: firstly, an "historical" simulation; and secondly, a "decomposition" simulation. While this paper is not concerned directly with either historical or decomposition simulations, it does rely on results for certain health-related variables from an historical simulation covering the period 1996/97 – 2001/02 (Giesecke 2004). The remainder of this section provides an overview of the historical simulation technique, before going on to discuss results for certain health-related variables from Giesecke (2004).

In an historical simulation, observed changes in the economy over some period of recent history (in the present case, 1996/97 – 2001/02) are imposed on the model as shocks. This requires that variables describing observable features of the economy be determined exogenously. These exogenous variables can be divided into two sets: those that would typically be among the set of *exogenous* variables under a standard or routine closure of the model (panel C of Table 3); and, those that would typically be among the set of *endogenous* variables under a standard or routine closure of the model (panel A of Table 3). Since the variables in panel C are naturally exogenous, they require no special treatment (in terms of model closure) to determine their values exogenously at their historical values in the historical simulation. However the variables in panel A are naturally endogenous. Hence, if they are to be determined exogenously at their historical values in the historical simulation, then corresponding variables describing the structure of the economy must be determined endogenously (panel B).

Note that the rows across panels A and B match each observable feature of the economy determined exogenously in the historical simulation with its corresponding endogenous structural variable. For example, in row 1, the exogenous determination of household consumption by commodity is accommodated via the endogenous determination of shifts in commodity-specific consumer preference variables. The shifts in the variables in panel B are important to our explanation for the observed

changes in the variables in panel A. For example, over the historical period, we observe very rapid growth in real consumption of pharmaceuticals by households. This is imposed as one of the exogenous shocks in row 1 of panel A. The observed growth in household consumption of pharmaceuticals was too fast to be explained by changes in real income or changes in relative prices alone. Hence the model calculates a large shift in consumer preferences (row 1, panel B) towards the use of more pharmaceuticals.

In general, results from the historical simulation are used for two modelling purposes. Firstly, they can be fed back into the model as exogenous shocks under a standard or routine closure. This simulation (the “decomposition simulation”) allows the changes in observed economic outcomes over the period (panel A of Table 3) to be explained in terms of the individual and joint contributions of the movements in the variables in panels B and C of Table 3. The decomposition simulation is not relevant to the present paper. Secondly, the results for the structural variables in the historical simulation form a key input into forecasting and policy simulations. The projections undertaken in this paper are based in part on extrapolations of the historical shifts in the variables in panel B of Table 3.

Historical results for health-related variables

Table 2 presents selected results from the historical simulation for key health-related variables. Panel A contains the variables determined exogenously at their historical values as reported by the Australian Bureau of Statistics. Panel B reports the results for the corresponding endogenous variables in the historical simulation. Four main features of the health sector over the period 1996/97 through to 2001/02 stand out: rapid growth in private consumption of Pharmaceuticals; weak growth in private consumption of Health Services; rapid growth in the price of Pharmaceuticals; and weak growth in public consumption of both Pharmaceuticals and Health Services. We discuss each of these features below.

Real aggregate household consumption spending grew at an annual average rate of approximately 4.5 per cent over the period (not shown in Table 2). Relative to this, spending on Pharmaceuticals by households grew extremely rapidly (19.8 per cent per year). This growth occurred despite a rise in the relative price of Pharmaceuticals: the

price of Pharmaceuticals grew by 4.5 per cent per year (row 1, panel A) while the consumer price index grew at an annual average rate of only 2.1 per cent (not shown in Table 2). The rapid growth in private consumption of Pharmaceuticals required a strong (16.3 per cent per annum) shift in consumer preferences towards consumption of Pharmaceuticals. That is, holding constant real income and relative prices, changing household tastes were contributing approximately 16.3 percentage points per annum towards the 19.8 percentage points of total annual growth in household consumption of Pharmaceuticals. This was among the strongest of the household preference shifts revealed by the historical simulation. The relatively rapid growth in the consumer price of Pharmaceuticals (4.5 per cent per annum) was too fast to be explained by changes in import prices, cost conditions in the domestic Pharmaceutical industry, or the price of margins. As a result, the variable t_3 in panel B – measuring the change in the power of an endogenous cost wedge between the basic price and consumer price (excluding margins) – had to grow rapidly. The rapid growth in private consumption of Pharmaceuticals was not matched by rapid growth in private consumption of Health Services. Real private consumption of Health Services grew by an average of only 3.6 per cent per annum. Hence only a modest (0.4 per cent per annum) shift was required in household tastes towards Health Services.

Real public spending on health related commodities grew very slowly over the study period. While aggregate public consumption spending grew at an annual average rate of 3.2 per cent (not shown in Table 2), public spending on both Pharmaceuticals and Health Services grew at only 0.2 per cent per annum (panel A). This opened a gap of –3.0 percentage points per annum between growth in aggregate public consumption and growth in public consumption on health-related commodities (panel B).

Alternative forecasts

The historical simulation briefly described above forms the basis of a dynamic forecast using the MONASH model. The historical simulation gives results for normally exogenous and unobservable variables. Projecting results from the historical simulation forward in time is a way of imposing changes in the structure of the economy over time in these variables. In the case of health services, the historical simulation showed an annual shift in household tastes of 0.4%. Imposing this as part

of the forecast would produce a basecase from which deviation simulations showing the effects of policy could be undertaken.

The shift in household tastes towards health services could come from a number of sources:

- A “true” taste change where people embrace a lifestyle that includes more medical services;
- A taste change that captures changes in the quality of medical services; or
- A change in aggregate tastes that reflects underlying demographic change, such as population ageing.

The historical simulation reported in Giesecke (2004) is for the period 1996/97 - 2001-02. Over this period, population ageing remained around or below its historical average (Productivity Commission 2004, xv). It is in the decade after the historical simulation that population ageing is set to accelerate. Accordingly, we have assumed that if population ageing is to translate into increasing health costs it will have its impact as an *additional* taste shift towards health services.

The calculations for the shocks can be found in Table 4. The changes in real health expenditure are those that would occur if the current patterns of spending across age groups were to continue as the population ages as calculated using ABS population projections. The effects of population growth were then removed, leaving a projected amount due to population ageing.

The additional taste change towards health services is 0.6% for 2003, rising to 0.8% in 2012, the final year of the forecast. Similar calculations were performed for the other health-related sectors, pharmaceuticals and community services. The MONASH community services sector includes residential aged care services. While these are not health care services, there is in practice a close link between nursing homes and hospitals. There is also an obvious case for thinking that population ageing will affect the need for residential aged care. Half the shock was applied to the community services sector, based on an estimate that residential aged care services comprised half this industry. Further disaggregation of MONASH would clearly be useful here.

The shocks actually applied to the variable a3com(“healthsrvc”) differed slightly from 0.6%. The shock required was 0.6% relative to the average taste change for commodities. A3com_ave is not required to be zero for any year, so the shocks shown at the bottom of Table 4 were imposed to be 0.6% above a3com_ave for each year of the forecast.

The response of government is assumed to be accommodating of this shift towards health care. The variables f5dom and f5imp for each of the health-related sectors were shocked by the same percentage as the consumer taste change. This supposes that government continues to finance the same proportion of health care as it currently does. As noted above, in the period covered by the historical simulation, the government moved away from financing health care and towards other areas of government spending (notably defence). The assumption of accommodating government behaviour has been made so as to assess the degree to which continuing to finance an expanding health care sector is liable to create strong fiscal pressures for Australian governments. This focus on the fiscal consequences of unchanged policies is similar to that of work commissioned by the government, such as Productivity Commission 2004.

Results for two illustrative forecasts are given here. The health-related shocks are the same in both cases: relative to the basecase, there is a shift towards health by consumers and in government spending. **Simulation one** consists of these health-related shocks. In the **simulation two**, one of the major indirect age-related causes of health cost increases is included: a declining participation rate. We assumed that consistent with the estimates reported in Productivity Commission 2004 pp79-81, the supply of labour hours would fall by 0.6% over the period of the forecast. This translates to an annual shock of -0.059% for the variable emp_hours.

Two alterations to the standard deviation closure for MONASH found in Dixon and Rimmer 2002 should be noted. Both relate to the fact that the simulations here are not policy simulations. They are alternative forecasts. There is no policy shock here that could be thought of as causing disruption in the labour market. The simulations rather show the different directions in which the Australian economy and labour market may

be going. In both deviation simulations the labour supply is exogenous: in simulation one, it is fixed to be the same as in the basecase; and in simulation two it is exogenously determined to be below the forecast as described in the paragraph above.

The second change is that the link between the sector-specific rate of return and capital is turned off for those industries being shocked. This allows the industries to expand using both labour and capital without having to pay a higher rate of return for the capital. It keeps required rates of return equal to the cost of making capital.

Results

As expected, each of the health-related sectors expanded. In both simulations, value added in the health services sector increased by about 5.5% (Chart 1). Both the government and private consumption components of these sectors increased together.

There was a small effect on the price of health services. By 2012, the basic price of health services increased by 0.6% for simulation one and by 1.3% for simulation two. This result is due to changes in the economy-wide real wage (Chart 2). The increase in the real wage has the effect of raising the relative price of health services because it is a relatively labour intensive industry.

In simulation one, the real wage is rising because the shocks to the health sectors are shifting production in the economy towards relatively labour intensive industries. In simulation two the change in the real wage is twice as large. This is clearly explained by the reduction in the labour supply that is the difference between simulations one and two. The larger change in the real wage in simulation two explains why the effect on the price of health services is double that of simulation one.

It is important to note that the increase in prices in the health sector is only due to the economy-wide wage increase, not due to anything like an upward-sloping supply schedule for the sector. Land is not important for the sector. As described above, the closure is such that capital is free to move into the sector without requiring a premium. There are no skill shortages for the particular types of labour used intensively by the sector. Development of the MONASH model that includes detail

about occupations in the health sector is clearly desirable for better addressing the interplay between the pure and indirect cost implications of population ageing.

At the macro level, there is a small fall in simulation one in real GDP relative to basecase over the period of the forecast. The much larger fall in real GDP in simulation two once again is clearly due to the shock to the participation rate. The labour share of GDP is around 70%. The 0.6% fall in employment hours represents a fall in productive capacity of about 0.42%. This is the difference between real GDP in simulations one and two.

The remainder of the reduction can be explained by the movement of resources away from heavily traded sectors of the economy and towards the health sectors. Chart 3 shows declining export volumes as resources move away from the traded goods sectors. The mining and agricultural sectors are amongst the biggest losing industries in both simulations. The fall in exports results in an improvement in the terms of trade (Chart 5), reflecting the downward sloping export demand curves in MONASH.

For both simulations, aggregate health as a proportion of GDP rises by about 2.8 percentage points. The change in health as a proportion of GDP is almost the same for both simulations. The proportion for simulation two is only 0.04 percentage points higher than for simulation one. This small difference is partly due to the way that the shocks are implemented. Health expenditures rise slightly less in simulation two than in simulation one (Chart 1) because both government and private expenditure are - despite the shocks to taste variables - partially dependent on GDP growth. The sharper fall in GDP in simulation two depresses growth in health spending and mitigates the growth in health as a proportion of GDP. The other important factor is the lack of much of a price increase for health services in simulation two, as discussed above.

Future Research

The current MONASH structure is inadequate to satisfactorily examine issues in the broad health sector such as costs associated with population ageing. Whilst the framework is ideal for studying the interplay between the pure and indirect cost effects of demographic change and the consequences for the broader economy, the

model needs further disaggregation. At present, the broad health sector consists in MONASH of health services, pharmaceuticals and a portion of the community services industry. Splitting the MONASH database to yield a number of health-related sectors will consist of the following stages:

- Disaggregation to the detailed commodity level of the ABS input-output data. This will distinguish between *hospital and nursing homes services* and *medical services*, as well as some smaller sub-sectors such as *ambulance services*.
- Further disaggregation. For the purposes of examining population ageing it would be useful to split nursing homes from *hospitals and nursing home services*, as well as residential aged care from *community services*.
- Labour force structure.

Detail at the sub-sectoral level is important because demand characteristics, supply characteristics and policy variables all operate well below the current level of aggregation in MONASH. In the case of population ageing, different sub-sectors of health are liable to be affected differently by demographic change. Whether or not the overall health sector faces inevitable expansionary pressure due to ageing, there is no question that the need for residential and nursing home beds will increase. To the extent that cost pressures due to an ageing population can be eased by policy change it is important to understand which medical services are good substitutes for each other. Finally, in examining the feedback between demographic change in the workforce and the health sector, it is important to know whether skill shortages that result in changing wage differentials will affect nursing homes differently to hospitals or other health services.

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Tables and Charts

Table 1 Allocated health expenditure per person by age and sex, Australia, 2000–01 (\$ million)

Per Person									
\$million	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+
Male	1,876	1,091	1,271	1,230	1,402	1,915	3,179	5,657	9,924
Female	1,564	1,240	1,732	2,126	1,936	2,343	3,305	5,371	10,877
Female (Excl Maternal)	1,556	1,240	1,497	1,591	1,786	2,342	3,305	5,371	10,877
<i>Source: AIHW 2005</i>									

Table 2: Selected historical simulation results for health-related variable (annual average percentage change, 1996/97 – 01/02)

Variable: Commodity	A			B		
	x3	p3	x5	a3	t3	fx5
1. Pharmaceuticals	19.8	4.5	0.2	16.3	17.0	-3.0
2. Health services	3.6	4.2	0.2	0.4	2.1	-3.0
Key: x3: real household consumption p3: consumer price x5: real public consumption a3: shift in consumer preference t3: cost wedge between basic price and producer price fx5: difference between growth in aggregate public consumption and growth in commodity-specific public consumption.						

Source: Giesecke (2004)

Table 3: Exogenous / endogenous variables in historical simulation

A <i>Exogenous variables (endogenous in routine simulations, but exogenous in historical simulation)</i>	B <i>Corresponding endogenous variables (exogenous in routine simulations, but endogenous in historical simulation)</i>
1. consumption by commodity * 2. import volumes by commodity 3. investment by industry 4. export volumes by commodity 5. employment by industry 6. capital stock by industry 7. producer prices by industry 8. outputs of agricultural commodities 9. outputs of non-agricultural commodities 10. export prices, agricultural commodities 11. export prices, non-agric. commodities 12. consumer prices, by commodity	shifts in consumer preferences * import / domestic preference shifts investment / capital ratios by industry shifts in export demand schedules primary factor technical change by industry labour/capital bias in technical change shifts in rates of return, price of other costs supply (mark-up) shifts by industry cost-neutral input-using tech. change demand (stock and tech. change) shifts supply (mark-up) shifts by commodity supply (mark-up) shifts by commodity *
C <i>Other shocked exogenous variables (exogenous in both routine and historical sims)</i>	
13. consumer price index 14. number of households 15. tariff rates 16. government consumption by commodity * 17. foreign currency import prices	
C <i>Endogenous variables (endogenous in both routine and historical simulations)</i>	
18. demands for source-specific commodity inputs by industry, for current production 19. demands for source-specific commodity inputs by industry, for capital creation 20. prices of source-specific commodity inputs by industry, for current production 21. prices source-specific commodity inputs by industry, for capital creation 22. demand for margin m by agent k to facilitate purchase of commodity c from source s	

Adapted from Dixon, Menon and Rimmer (2000).

** see Table 2 for results for health services and pharmaceutical products*

Table 4		<i>Number of persons . . .</i>										
Male	\$ / person	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0-4	\$1,876	651,270	651,041	651,000	651,935	654,125	661,376	667,306	673,227	679,288	685,489	691,576
5-14	\$1,091	1,390,571	1,394,848	1,398,004	1,398,251	1,396,441	1,390,772	1,387,377	1,384,336	1,382,090	1,382,961	1,385,704
15-24	\$1,271	1,385,334	1,402,726	1,419,848	1,435,183	1,447,258	1,456,950	1,464,368	1,473,598	1,482,362	1,489,088	1,495,781
25-34	\$1,230	1,430,418	1,438,020	1,441,476	1,445,358	1,442,951	1,446,000	1,456,157	1,468,235	1,484,685	1,502,092	1,519,116
35-44	\$1,402	1,481,923	1,489,512	1,497,056	1,505,597	1,519,825	1,531,015	1,536,479	1,541,102	1,546,422	1,552,239	1,558,171
45-54	\$1,915	1,332,544	1,347,839	1,370,003	1,391,606	1,416,423	1,441,608	1,465,878	1,488,071	1,503,192	1,512,903	1,523,350
55-64	\$3,179	976,769	1,023,385	1,065,118	1,106,494	1,146,980	1,182,542	1,219,743	1,248,405	1,275,479	1,302,771	1,310,784
65-74	\$5,657	646,513	656,069	668,496	683,266	699,498	722,510	746,553	777,820	812,997	846,655	895,953
75+	\$9,924	458,476	477,475	496,270	513,920	531,959	547,130	561,085	575,817	590,422	609,643	630,642
Number of males		9,753,818	9,880,915	10,007,271	10,131,610	10,255,460	10,379,903	10,504,946	10,630,611	10,756,937	10,883,841	11,011,077
Total spending males (\$m.)		22,200	22,667	23,138	23,608	24,090	24,571	25,047	25,545	26,052	26,589	27,174
Female												
0-4	\$1,564	619,151	618,629	618,139	618,272	620,387	626,952	632,551	638,153	643,885	649,753	655,516
5-14	\$1,240	1,321,003	1,323,907	1,325,846	1,326,552	1,324,133	1,318,195	1,314,605	1,312,278	1,309,791	1,310,757	1,313,152
15-24	\$1,732	1,336,949	1,354,058	1,370,501	1,384,766	1,395,329	1,403,023	1,408,509	1,415,184	1,421,653	1,426,836	1,432,519
25-34	\$2,126	1,447,944	1,453,434	1,454,338	1,455,387	1,450,207	1,450,588	1,458,583	1,469,043	1,484,417	1,500,327	1,515,641
35-44	\$1,936	1,501,378	1,506,779	1,514,736	1,522,100	1,537,201	1,550,171	1,556,560	1,560,788	1,565,135	1,569,734	1,575,344
45-54	\$2,343	1,342,555	1,364,086	1,388,663	1,412,321	1,436,959	1,462,371	1,486,051	1,507,348	1,521,210	1,530,265	1,538,981
55-64	\$3,305	954,971	1,001,977	1,046,680	1,093,249	1,139,608	1,181,603	1,224,777	1,259,576	1,293,854	1,326,947	1,339,585
65-74	\$5,371	686,493	693,554	703,534	716,395	729,208	749,510	771,334	801,742	834,731	867,054	917,681
75+	\$10,877	698,519	718,163	736,974	753,500	772,251	786,138	799,403	812,692	827,186	845,836	865,235
Number of females		9,908,963	10,034,587	10,159,411	10,282,542	10,405,283	10,528,551	10,652,373	10,776,804	10,901,862	11,027,509	11,153,654
Total spending females (\$m.)		28,496	29,008	29,519	30,019	30,540	31,040	31,543	32,064	32,602	33,172	33,782
National population		19,662,781	19,915,502	20,166,682	20,414,152	20,660,743	20,908,454	21,157,319	21,407,415	21,658,799	21,911,350	22,164,731
			2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total spending (\$m)		50,696	51,674	52,657	53,627	54,629	55,611	56,590	57,609	58,654	59,760	60,956
% change, real health spending			1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.9	2.0
% change, population			1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Difference			0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.8

Chart 1
Value added, health services

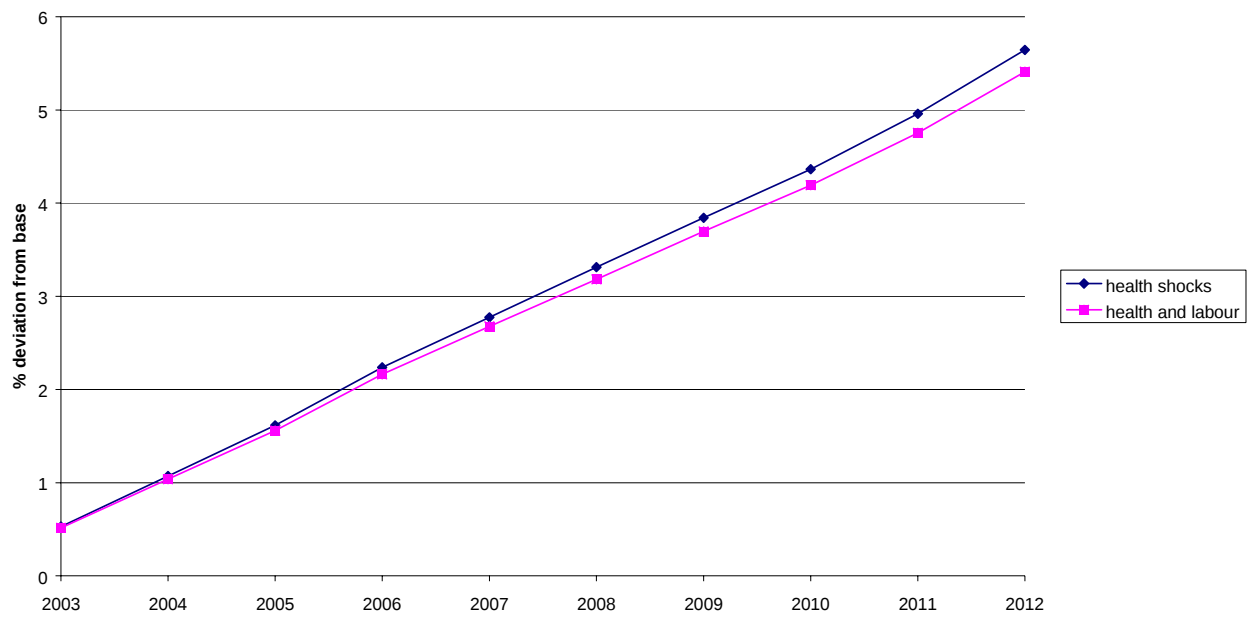


Chart 2
Real wage

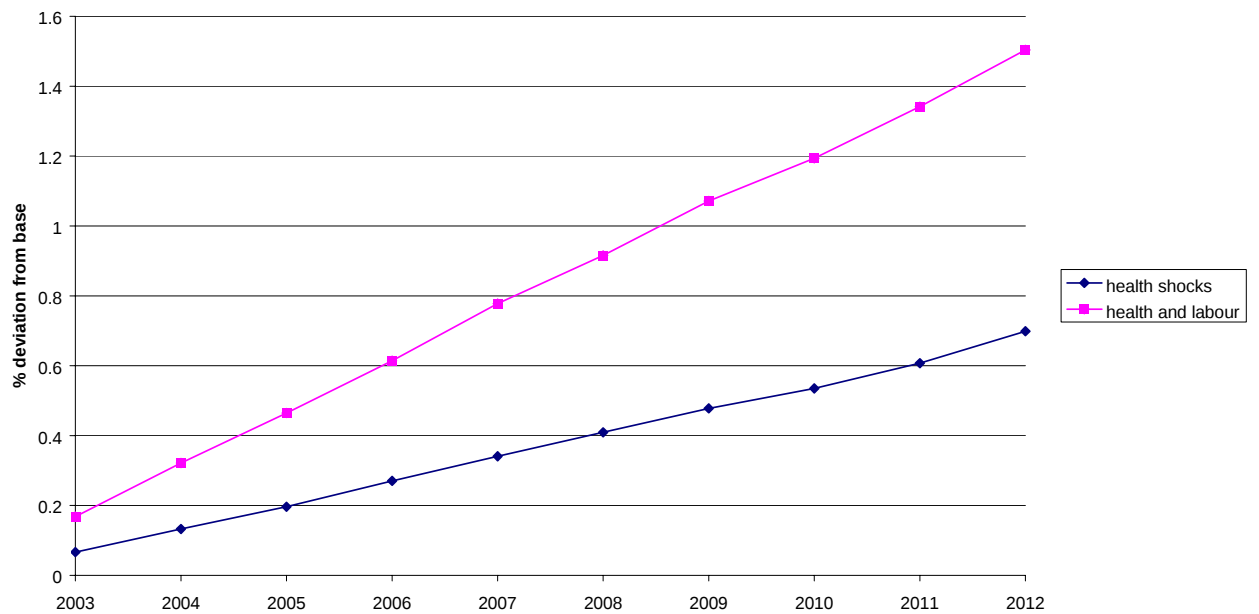


Chart 3 Real GDP

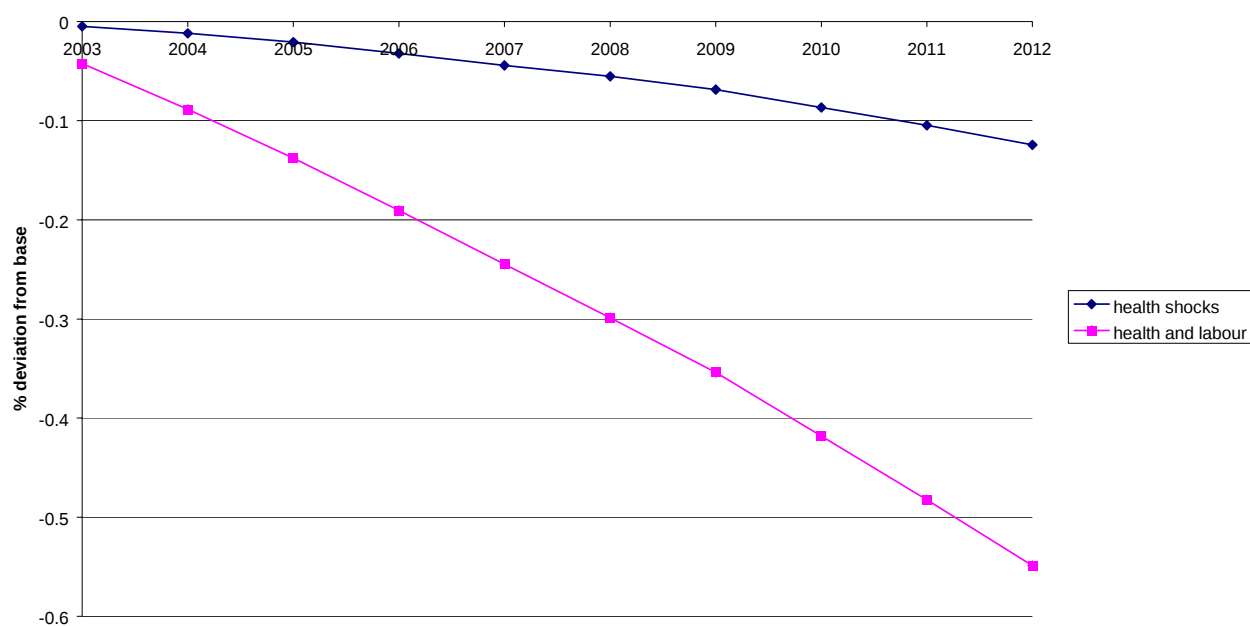


Chart 4 Export volumes

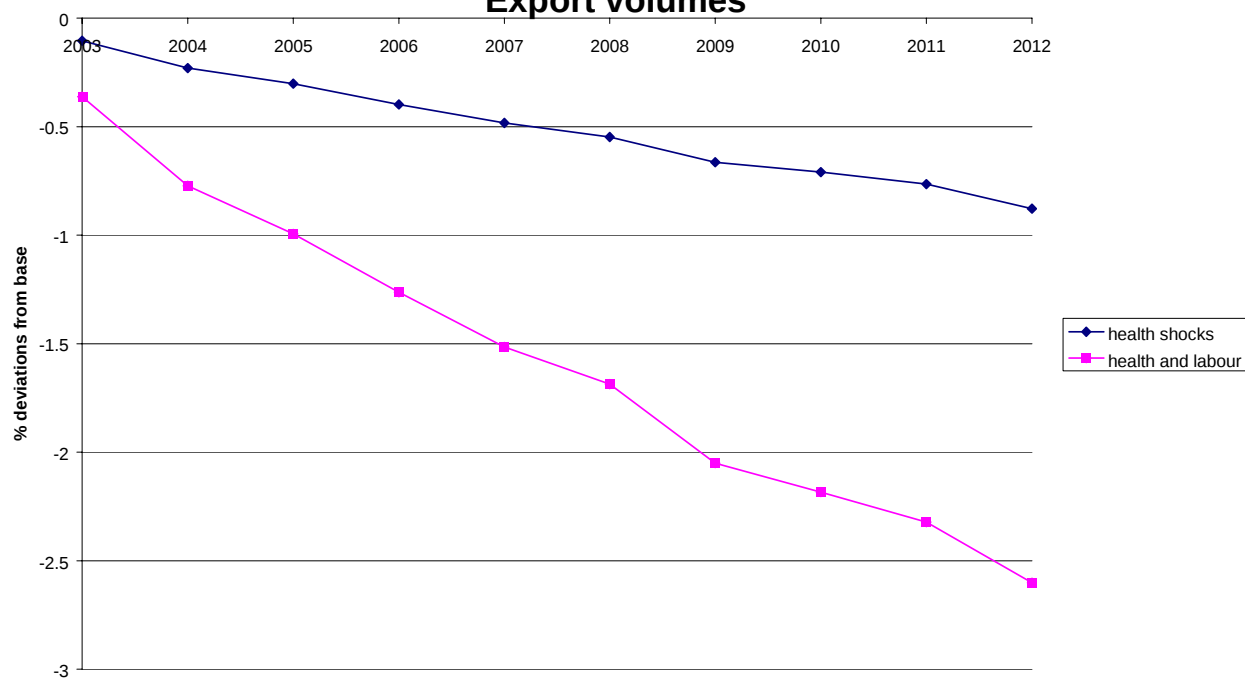


Chart 5
Terms of Trade

