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An Analysis of Benefit Flows in New Zealand using a Social Accounting Framework[1]

Omar Aziz, Nick Carroll and John Creedy[2]

Abstract

This paper presents a social accounting model to examine the entrants, exits and transitions of individuals among a wide range of benefit categories in New Zealand. Transition rates and flows are estimated separately for periods before the global financial crisis (GFC) and periods following the crisis. The data were obtained from the Benefit Dynamics Dataset maintained by the Ministry of Social Development. The model is used to examine, using simulations, the implications for the time profile of changes in the stock of benefit recipients under a range of counterfactual situations. It is suggested that the model can provide a useful tool for policy analysis.

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1 Introduction

The aim of this paper is to explore the use of a social accounting approach to examine the entrants, exits and transitions of individuals among a wide range of benefit categories in New Zealand, using data from the Benefit Dynamics Dataset maintained by the Ministry of Social Development. An understanding of the factors affecting the number of individuals in receipt of various benefits requires information about movement from one benefit category to another, in addition to flows on and off the benefit system as a whole.[3] The model is used to simulate the number of individuals in the various benefit categories, using assumptions about the variation over time in the inflows to the benefit system and transition rates among benefits.

The approach can be used to examine the time profile of the numbers receiving various benefits, resulting from an underlying set of inflow, transition and exit rates. A policy changes concerning a single benefit type, by influencing transitions, can affect the numbers in receipt of a range of benefits; these consequences can be examined in detail, along with the speed of adjustment. For example, an initiative designed to increase the flow of individuals off a particular benefit type, and which moves those individuals into other states where they are more likely to move into full time employment and off the benefit system entirely, has different implications from a policy which moves individuals away from what may be an expensive benefit but into other states where they are more likely to remain for longer periods.

Movements of individuals through the benefit system depend on the precise regulations, concerning for example eligibility. The analysis of specific policy changes would focus on particular flows that are likely to be affected. The dynamic properties also depend on a range of factors that are independent of the benefit system, such as structural or cyclical changes to probabilities of becoming

[3] An analysis of flows among seven benefit categories in Australia is by Harris and Kalb (2005, who compare annual and spell-based transition matrices. Hall (2008) looked at how transitions from unemployment to sickness postpones returns to work in Sweden. New Zealand benefit flows were examined using an ethnographic approach by Shirley et al. (2001), emphasising how decisions are made within households, the role of local networks and perceptions, and so on.

unemployed or gaining employment, which are likely to have significant impacts on flows and therefore costs.[4]

Although there have been some policy changes in recent years, particularly regarding the Invalid's Benefit, by far the most important changes have arisen as a result of the global financial crisis (GFC). This is convenient for present purposes as the large changes observed for many flows following the GFC provide useful illustrations of the advantages of the approach and the potential value of recognising explicitly that changes take place to a system that is not in equilibrium, so that the consequences of any change can be much wider than anticipated. The transition rates and flows, measured over discrete periods of three months, are therefore estimated separately for a number of periods before the global financial crisis (GFC). These periods reflect relatively stable patterns of entry and movement and a stable policy environment. The rates are also estimated for several periods following the crisis, which saw substantial changes in a number of inflow rates. Simulations are reported for several assumptions about economic conditions over the period February 2011 to November 2016.[5]

Section 2 presents the basic framework, outlines the relationships between stocks and flows and the way in which the model can be used to consider policy changes. The New Zealand flows data are described in Section 3. This section also defines the benefit categories and the construction of the transition matrices. Summary information regarding inflows and average durations, before and after the global financial crisis, are also briefly discussed. Section 4 reports simulations of benefit numbers up to November 2016 under several assumptions about the economic conditions over the period. Section 5 explores the potential implications of a reduction in inflows to Unemployment Benefits. Conclusions are in Section 6.

2 The Framework of Analysis

The flows of individuals among defined benefit categories or 'states' from one period to the next can be recorded in a social accounting matrix.[6] Suppose the accounting

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[4] Changes in the age composition of the population and fertility rates, for example, can affect aggregate flows.

[5] Official Treasury and MSD forecasts of the number of benefit recipients are provided in the *Budget Economic and Fiscal Update*, and are based on estimated relationships between GDP and the number of benefit recipients. The purpose of the simulations presented here is to illustrate the impact of different counter-factual scenarios and illustrate the sensitivity of numbers to the underlying flows.

[6] For an extensive discussion of social accounting models, see Stone (1973).

period is three months, so that information is available about the state occupied by each individual at the beginning of each quarter.[7] There are *m* states. Let $s_{i,j,t}$ (for $i, j = 1, ..., m$) denote the number of people who move from state *j* to state *i* from period *t* to period *t*+1 (at the beginning of quarter *t* they are in state *j* and at the beginning of quarter *t+1* they are in state *i*). These flows are placed in a matrix $S_t = \{s_{i,j,t}\}$. Let $b_t = \{b_{i,t}\}$ denote the vector whose *i*th element is the number of people who enter state *i* from outside the labour market during period *t* (for example, those leaving full time education and inward migrants): these are referred to as 'inflows'. Similarly $d_t = \{d_{j,t}\}$ is the vector of exits at the end of period *t* for various reasons, including migration and death: these are referred to collectively as 'outflows'. Finally, $n_t = \{n_{j,t}\}$ is the vector of stocks of individuals in each state, $j = 1, ..., m$, at the start of period *t*.

Figure 1 Relationship between Stocks and Flows

	State occupied in time period t	Inflows	total
state occupied in time period t+1	s	b	n_{+1}
Outflows	d'		
total	n'		

[7] The approach therefore ignores some very short spells of benefit receipt. A continuous time framework was examined in Creedy and Disney (1981a) who show the different implications for durations. The present model also does not allow for dependence on the past. An analysis of unemployment flows in New Zealand, distinguishing those with single and multiple spells, is by Stillman and Hyslop (2006). For an early treatment of population heterogeneity and multiple spells, and their effect on benefit eligibility, see Creedy and Disney (1981b).

The information about stocks and flows are displayed in Figure 1 where, for convenience, t subscripts are omitted. The flows take place from columns to rows. A prime attached to a variable indicates transposition, so that, for example, d_t' is the column vector of exits rewritten as a row. The inflows and outflows can be further divided where necessary. For example, some individuals may leave the benefit system by, for example, migrating, dying, or moving into employment with sufficiently large earnings.[8]

Each flow (number of individuals) can be converted into a transition rate, $c_{i,j,t}$, which denotes the proportion of individuals who started quarter t in state j and moved into state i by the beginning of quarter $t+1$. Hence:

$$c_{i,j,t} = \frac{s_{i,j,t}}{n_{j,t}} \tag{1}$$

or matrix terms, $C_t = S_t \hat{n}_t^{-1}$, where the 'hat' indicates that the column vector forms the leading diagonal of a square matrix with zeros in the off-diagonals.[9]

Letting i denote a vector of units, the sum of elements in the ith row of S is expressed as Si, and noting that $\hat{n}i = n$, the 'closing stocks' are related to the 'opening stocks' and the flows according to:

$$n_{t+1} = C_t n_t + b_t \tag{2}$$

Moving forward one period:

$$n_{t+2} = C_{t+1}\left(C_t n_t + b_t\right) + b_{t+1} \tag{3}$$

and:

$$n_{t+3} = C_{t+2}\left\{C_{t+1}\left(C_t n_t + b_t\right) + b_{t+1}\right\} + b_{t+2} \tag{4}$$

If transition rates and inflows remain constant over time, (4) becomes:

$$n_{t+3} = C^3 n_t + \left(I + C + C^2\right) b \tag{5}$$

Here I denotes a unit matrix (a square matrix with a leading diagonal of units, and zeros elsewhere). The column sums of C are less than one and all the elements are

[8] In the application below, exits are divided into five categories.
[9] The C matrix differs from a transition matrix familiar from Markov models, since the column sums do not add to 1 (the difference reflecting the outflows).

non-negative. Hence, if the process continues long enough, $\lim_{T\to\infty} C^T = 0$ and $I + C + C^2 +$ etc $= (I - C)^{-1}$. The vector of equilibrium stocks is therefore:

$$n = (I - C)^{-1} b \tag{6}$$

Furthermore, it can be shown that the average time in state *j* is $(1 - c_{j,j})^{-1}$ while the variance is $c_{j,j} / (1 - c_{j,j})^2$.

Policy changes may be designed to affect a wide range of components of the social accounting framework. For example, changes to eligibility conditions for certain types of benefit may affect the number of people moving onto those benefits (both from outside the benefit system and transitions from other categories). Changes to the administration of benefits (including, for example, the monitoring of behaviour relating to moral hazard, the provision of information for potential benefit recipients regarding regulations, and so on) can affect flows of individuals in and out of a range of states. Changes to benefit levels and abatement rates, through their effects on individuals' budget constraints and thus financial incentives, can also influence transitions. It is therefore possible to use the framework to examine the implications for benefit flows of various policy reforms, given *a priori* information about the likely effects on relevant elements of the matrix.

The effects on equilibrium stocks of changes in the inflow vector are easily obtained from equation (6). Letting $M = (I - C)^{-1}$ denote the 'matrix multiplier', the changes in the stocks are a multiple of the change in the flows for any category. A change in one of the elements of the inflow vector has effects on many of the stocks, not simply the category whose inflow has changed. Thus, if the *j*th element of *b* changes, the equilibrium stock changes in all categories, *i*, for which the *i*th row element, m_{ij}, from the *j*th column of *M* is non zero.

In equilibrium the outflows from each category must match the inflows, so that an increase in the latter can only be matched by outflows after the stocks have built up sufficiently. The extra inflows in any category also lead to higher movements among benefit categories. In a large system, the consequences can easily be obtained from the matrix multiplier, *M*, but of course the elements of *M* are not transparent from the flow coefficients, given the matrix inversion involved. The speed of adjustment to the new equilibrium also depends on the speed of convergence of the powers of C towards zero, as is evident from equation (5). The effects of changes in the elements of C itself are also discussed in Appendix C.

3 New Zealand Flows Data

This section describes the data and construction of the matrices used below: further details are in Appendix A. Summary information is also reported on the average durations and entrants.

3.1 The Data and Construction of Matrices

The data used here were obtained from the Benefit Dynamics Dataset maintained by the Ministry of Social Development. This dataset includes information on all people who received any main working-age social welfare benefit in the period of study, from February 2005 to February 2011.[10] It provides information on their demographic characteristics, and traces their changing benefit status and other circumstances from the beginning of the study period (for benefits current at that date) or from the date they are first granted benefit in that period (for new grants).[11]

The first stage involved constructing the relevant flow matrices and vectors for each quarter over the period, resulting in 24 matrices. At this stage, benefit recipients were divided into 63 mutually exclusive categories. After examination of these matrices, the number of benefit categories was reduced to 47, largely by amalgamating different age groups within a category type: some age groups were found to contain few individuals.[12] Examination of the many matrices showed relative stability over 13 pre-global financial crisis quarters (pre-GFC) from February 2005 to April 2008. There are clearly fewer observations for the post-global financial crisis period (post-GFC), covering 11 quarters from May 2008 to February 2011, but again the flows showed little change. Hence, a dividing line was drawn between pre-GFC and post-GFC flows and the many matrices were reduced to only two sets of flow matrices and vectors, by computing average flows in the two periods.[13] A difficulty

[10] Starting from February 2005 gives a long period with no substantial benefit reforms, and February 2011 is the last period for which data are available. The post-GFC period thus excludes any effects of the Christchurch earthquakes.
[11] It also traces the benefit histories of partners and dependent children included in benefits.
[12] Clearly, there remains a small amount of heterogeneity within the groups.
[13] In view of this averaging process, no explicit allowance is made here for seasonality (particularly regarding unemployment benefit inflows).

arises in dealing with exits from benefits. Instead of having a single vector of 'outflows', *d*, many reasons are recorded. In addition, this part of the dataset has a significant number of missing entries. Appendix B describes the method used to divide the exits into meaningful categories.

Space limitations clearly prevent the full tables being reproduced here; they can be obtained from Aziz et al. (2013). However, a useful indication is provided by Tables 1 and 2, which show consolidated (average quarterly) flow matrices for the pre- and post- GFC periods respectively.[14] These matrices involve 10 broad benefit categories and four exit reasons (along with a 'missing data' exit category). The mutually exclusive categories are Domestic Purposes Benefit (DPB), Invalid's Benefit (IB), Sickness Benefit (SB) and Unemployment Benefit (UB). Domestic Purposes Benefit is available to sole parents and carers. Each of the benefits is subject to means testing, with two abatement rates and income thresholds. For a detailed description of the benefits, eligibility conditions and means testing, see Ministry of Social Development (2010). In each case the initials are followed by the relevant age group: for example DPB18-59 refers to individuals aged 18 to 59 who are in receipt of Domestic Purposes Benefit.

A feature of the flows in both matrices is that movement into work is not the dominant reason for leaving the benefit system. Even where this is the modal reason (as for DPB18-9 and UB18-59) the majority of the exits in a quarter are for other reasons.[15] In considering the off-diagonal elements of the flows matrix, there are substantial quarterly movements from Unemployment to Sickness Benefits, and in turn from Sickness to Invalid's Benefit. In the pre-GFC period, the latter flows actually exceeded the number of direct entries to Invalid's Benefit from outside the system. These movements were reduced somewhat in the post-GFC period, when also flows from Sickness to Unemployment were much higher than in the pre-GFC period. In the post-GFC period there were fewer moves directly into Invalid's Benefit from Unemployment. This is in fact the main area where reforms were directed over the relevant period, so that the changes in these flows can probably be attributed to policy rather than economic conditions.[16] Although the quarterly entries into Domestic Purposes Benefit are lower than the entries to Sickness or Unemployment Benefits,

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[14] The averages are taken over 13 pre-GFC quarters and 11 post-GFC quarters.
[15] The coding schedule actually allows for over 400 'other reasons'.
[16] For detailed discussion of factors affecting the number of recipients of Sickness and Invalid's Benefit, and trends over time, see Fletcher (2009).

the stock of individuals in receipt of DPB is substantially higher than for any other benefit type, because of its high average duration. A similar property applies to numbers receiving Invalid's Benefit, where stocks are exceeded only by DPBs.

Comparing the two tables shows by far the largest change is for entries to UB, particularly by those aged 18-59, although more older workers are observed to move into paid employment post-GFC. It is shown below that most of the higher entries to DPB are of carers with no children and no earnings. Presumably these are carers who were previously working, perhaps in casual jobs and, on becoming unemployed as a result of the GFC, they receive DPB rather than the lower UB. Importantly, the differences between the totals at the beginning and end of each quarter in each of the tables indicate that the systems are not in equilibrium.

Table 1 Pre-GFC Flows

	DPB 18-59	DPB 60-64	IB 18-59	IB 60-64	SB 18-59	SB 60-64	U<18	UB 18-59	UB 60-64	Misc	Entrants	Total
DPB18-59	91,769	0	14	0	959	0	166	366	0	93	5,615	98,982
DPB60-64	183	4,607	0	0	0	6	0	0	14	8	207	5,026
IB18-59	156	0	61,649	0	1,146	0	163	90	0	13	938	64,154
IB60-64	1	28	654	12,422	14	235	0	1	39	3	232	13,629
SB18-59	281	0	59	0	36,058	0	35	1,454	0	195	7,041	45,123
SB60-64	0	2	0	3	260	3,615	0	6	130	7	431	4,455
U<18	0	0	0	0	0	0	2,638	0	0	0	1,096	3,733
UB18-59	351	0	12	0	799	0	130	23,989	0	616	11,841	37,737
UB60-64	0	3	0	1	4	39	0	135	5,709	12	410	6,314
Misc	134	5	2	0	144	4	47	1,212	18	7,045	1,166	9,777
Death	24	7	423	143	60	15	4	29	6	0	0	690
Migration	462	12	97	10	180	18	8	700	82	8	0	1,577
Missing	0	0	0	0	0	0	155	0	0	1,303	0	1,458
Other	3,200	401	409	607	4,126	347	342	6,597	571	107	0	16,707
Work	3,511	29	382	24	1,384	74	106	7,190	161	47	0	12,908
Total	100,074	5,093	63,700	13,212	45,134	4,353	3,793	41,749	6,729	9,457	28,976	

Table 2 Post-GFC Flows

	DPB 18-59	DPB 60-64	IB 18-59	IB 60-64	SB 18-59	SB 60-64	U<18	UB 18-59	UB 60-64	Misc	Entrants	Total
DPB18-59	93,831	0	28	0	1,102	0	186	398	0	130	6,594	102,268
DPB60-64	178	4,271	0	1	1	7	0	0	11	9	261	4,739
IB18-59	99	0	67,042	0	852	0	173	58	0	12	965	69,200
IB60-64	0	19	735	15,588	12	212	0	0	18	2	311	16,897
SB18-59	367	0	161	0	41,722	0	37	1,329	0	237	8,376	52,229
SB60-64	0	4	2	13	255	4,507	0	5	77	13	625	5,501
U<18	0	0	0	0	0	0	2,684	0	0	0	1,077	3,761
UB18-59	461	0	15	0	1,249	0	143	33,082	0	1,106	21,021	57,076
UB60-64	0	4	0	1	3	49	0	106	2,570	20	582	3,336
Misc	161	6	5	0	165	5	59	1,275	15	9,797	1,514	13,003
Death	21	4	408	177	61	13	2	12	4	1	0	703
Migration	375	10	92	19	173	25	10	741	37	12	0	1,495
Missing	0	0	0	0	0	0	122	0	0	1,443	0	1,565
Other	2,613	317	374	678	4,066	407	292	6,827	307	148	0	16,029
Work	2,839	41	370	50	1,364	93	68	7,118	199	56	0	12,200
Total	100,946	4,678	69,232	16,527	51,024	5,319	3,776	50,952	3,236	12,987	41,326	

3.2 The 47 Benefit Categories

In producing the simulations reported below, social accounting matrices with 47 benefit categories were used, although for succinctness the final numbers in each category are aggregated for presentation purposed. The mutually exclusive types are described in Table 3, using the following system is used. The notation Aa_B_C refers to benefit type A, for age category, a (a=18 refers to 18-29; a=30 refers to 30-59; a=60 refers to 60-64). B refers to the age of the youngest child (B=0 refers to 0-4; B=5 refers to 5-13; B=14 refers to 14 and older; B=nc indicates ‘no child’). The letter C indicates earnings (where C=e refers to earnings of $1-200 per week; C=f refers to >$200 per week; C=‘no’ indicates zero earnings; and C=‘wrk’ denotes positive earnings). This system reduces simply to Aa_C where the presence of children is not relevant: this applies to each of the IB, SB and UB categories.

The average number of entrants into each benefit category, before and after the GFC, are reported in Table 4. The largest increases in average entrants are for those with no earnings in all of the basic categories; these are Domestic Purposes Benefit (DPB), Invalid’s Benefit (IB), Sickness Benefit (SB) and Unemployment

Benefit (UB). Not surprisingly, the largest increases by far are for UBs, particularly in the age groups 18-29 and 30-59 with no earnings (18_no and 30_no respectively). However, increases in the corresponding SB categories are also substantial,

The average number of quarters spent in each benefit category, along with standard deviations, are also given in Table 4, using the expressions in subsection 2.1.[17] The largest increases are for the DPB categories with no dependent children and no earnings in age groups 18-29 and 30-59 (18_nc_no and 30_nc_no), which increase from 18.98 and 13.42 quarters respectively to 22.15 and 21.30 after the GFC. Large increases are also observed for those in receipt of IB with no earnings (categories 18_no and 30_no). Smaller increases are for UB recipients in the same age groups with no earnings (categories 18_no and 30_no). The average duration for those receiving UB in the group aged 60-64 with no earnings (category 60_no) fell from 6.07 before the GFC to 4.45 quarters after the GFC, reflecting a higher propensity to move into both the corresponding SB category and into work.[18]

The time units are quarters, so that the change from 19 to 22 for DPB recipients aged 18-29 with no children and zero earnings (DPB18_nc_no) translates to a change of 36 weeks. Furthermore the standard deviation for the DPB and IB categories mentioned above, for which the increases in (relatively high) average durations are largest, are much larger than for other benefit types at over 4 quarters.

[17] The standard deviations relate to the duration distributions; they are not standard errors of the estimated average durations.
[18] The proportion making this move increased from 0.019 to 0.024.

Table 3Benefit Categories

DPB18_0_e	DPB or WB, aged 18 - <29, youngest child aged 0 - <5, earning $1 - $200 pw
DPB18_0_f	DPB or WB, aged 18 - <29, youngest child aged 0 - <5,earning more than $200 pw
DPB18_0_no	DPB or WB, aged 18 - <29, youngest child aged 0 - <5,earning $0 pw or missing
DPB18_5+_no	DPB or WB, aged 18 - <29, youngest child aged 5+, earning $0 pw or missing
DPB18_5+_wrk	DPB or WB, aged 18 - <29, youngest child aged 5+, and earning > $0 pw
DPB18_nc_no	DPB or WB, aged 18 - <29, no dependent children, earning $0 or missing
DPB18_nc_wrk	DPB or WB, aged 18 - <29, no dependent children, earning > $0 pw
DPB30_0_e	DPB or WB, aged 30 - <60, youngest child 0 - <5, earning $1 - $200 pw
DPB30_0_f	DPB or WB, aged 30 - <60, youngest child aged 0 - <5, earning more than $200 pw
DPB30_0_no	DPB or WB, aged 30 - <60, youngest child aged 0 - <5, earning $0 pw or missing
DPB30_14_e	DPB or WB, aged 30 - <60, youngest child aged 14+, earning $1 - $200 pw
DPB30_14_f	DPB or WB, aged 30 - <60, youngest child aged 14+, earning more than $200 pw
DPB30_14_no	DPB or WB, aged 30 - <60, youngest child aged 14+, earning $0 pw or missing
DPB30_5_e	DPB or WB, aged 30 - <60, youngest child aged 5 - <14, earning $1 - $200 pw
DPB30_5_f	DPB or WB, aged 30 - <60, youngest child aged 5 - <14, earning more than $200 pw
DPB30_5_no	DPB or WB, aged 30 - <60, youngest child aged 5 - <14, earning $0 pw or missing
DPB30_nc_e	DPB or WB, aged 30 - <60, no dependent children, earning $1 - $200 pw
DPB30_nc_f	DPB or WB, aged 30 - <60, no dependent children, earning more than $200 pw
DPB30_nc_no	DPB or WB, aged 30 - <60, no dependent children, earning $0 pw or missing
DPB60_no	DPB or WB, aged 60 - <65, no dependent children, earning $0 pw or missing
DPB60_wrk	DPB or WB, aged 60 - <65, no dependent children, and earnings > $0 pw
IB18_e	IB, aged 18 - <30, earning $1 - $200 pw
IB18_f	IB, aged 18 - <30, earning more than $200 pw
IB18_no	IB, aged 18 - <30, earning $0 pw or missing
IB30_e	IB, aged 30 - <60, earning $1 - $200 pw
IB30_f	IB, aged 30 - <60, earning more than $200 pw
IB30_no	IB, aged 30 - <60, earning $0 pw or missing
IB60_no	IB, aged 60 - <65, earning $0 pw or missing
IB60_wrk	IB, aged 60 - <65, earning > $0 pw
SB18_e	SB, aged 18 - <30, earning $1 - $200 pw
SB18_f	SB, aged 18 - <30, earning more than $200 pw
SB18_no	SB, aged 18 - <30, earning $0 pw or missing
SB30_e	SB, aged 30 - <60, earning $1 - $200 pw
SB30_f	SB, aged 30 - <60, earning more than $200 pw
SB30_no	SB, aged 30 - <60, earning $0 pw or missing
SB60_no	SB, aged 60 - <65, earning $0 pw or missing
SB60_wrk	SB, aged 60 - <65, earning > $0 pw
u18	a benefit but aged under 18 years
UB18_e	UB, aged 18 - <30, earning $1 - $200 pw
UB18_f	UB, aged 18 - <30, earning more than $200 pw
UB18_no	UB, aged 18 - <30, earning $0 pw or missing
UB30_e	UB, aged 30 - <60, earning $1 - $200 pw
UB30_f	UB, aged 30 - <60, earning more than $200 pw
UB30_no	UB, aged 30 - <60, earning $0 pw or missing
UB60_no	UB, aged 60 - <65, earning $0 pw or missing
UB60_wrk	UB, aged 60 - <65, and earnings > $0 pw
Misc	other benefits, including CSI and training benefits

Table 4 Average Entrants per Quarter and Durations

		Pre-GFC			Post-GFC	
States	Entrants	Average	SD	Entrants	Average	SD
DPB18_0_e	192	3.03	1.42	122	2.61	1.27
DPB18_0_f	4	1.14	0.38	4	1.16	0.4
DPB18_0_no	1,331	5.67	2.16	1,024	4.39	1.84
DPB18_5+_no	209	4.45	1.86	172	3.68	1.64
DPB18_5+_wrk	40	3.19	1.48	26	2.7	1.3
DPB18_nc_no	363	18.98	4.24	1,096	22.15	4.6
DPB18_nc_wrk	37	4.9	1.98	106	4.43	1.85
DPB30_0_e	127	3.12	1.46	83	2.67	1.29
DPB30_0_f	4	1.21	0.46	4	1.17	0.41
DPB30_0_no	789	4.8	1.95	596	3.77	1.66
DPB30_14_e	89	4.62	1.9	99	3.63	1.62
DPB30_14_f	4	1.33	0.57	7	1.28	0.53
DPB30_14_no	404	6.39	2.32	478	4.74	1.93
DPB30_5_e	282	3.93	1.71	189	3.15	1.47
DPB30_5_f	14	1.26	0.51	14	1.25	0.5
DPB30_5_no	1,106	5.07	2.02	925	3.91	1.71
DPB30_nc_e	111	6.81	2.41	246	6.27	2.3
DPB30_nc_f	5	1.31	0.55	11	1.43	0.65
DPB30_nc_no	504	13.42	3.52	1,393	21.3	4.51
DPB60_no	161	8.24	2.69	209	9.08	2.84
DPB60_wrk	46	6.54	2.35	52	6.12	2.26
IB18_e	15	5.53	2.13	11	5.22	2.05
IB18_f	1	1.2	0.45	0	1.21	0.46
IB18_no	163	13.85	3.58	162	17.19	4.02
IB30_e	44	7.21	2.49	35	6.48	2.34
IB30_f	2	1.23	0.48	2	1.25	0.5
IB30_no	714	21.6	4.54	755	24.59	4.86
IB60_no	218	14.72	3.7	297	16.26	3.91
IB60_wrk	14	7.19	2.49	14	6.27	2.29
SB18_e	107	2.1	1.05	111	2.08	1.04
SB18_f	6	1.14	0.38	8	1.14	0.38
SB18_no	2,824	3.04	1.43	3,438	3.47	1.57
SB30_e	198	3.45	1.57	189	3.31	1.52
SB30_f	19	1.25	0.5	21	1.24	0.49
SB30_no	3,887	5.44	2.11	4,608	6.24	2.29
SB60_no	401	5.38	2.09	589	6.03	2.24
SB60_wrk	30	4.25	1.8	36	3.93	1.71
u18	1,096	3.28	1.51	1,077	3.46	1.57
UB18_e	590	1.44	0.67	923	1.59	0.77
UB18_f	47	1.08	0.28	69	1.06	0.25
UB18_no	6,255	1.87	0.93	11,833	2.26	1.12
UB30_e	399	2.09	1.04	528	2.29	1.13
UB30_f	55	1.16	0.4	92	1.13	0.36
UB30_no	4,495	2.7	1.31	7,577	3.34	1.53
UB60_no	365	6.07	2.25	529	4.45	1.86
UB60_wrk	46	4.18	1.78	53	3.14	1.46
Misc	1,166	3.92	1.71	1,514	4.07	1.75

3.3 Decompositions

Having constructed two sets of average quarterly flow coefficients, relating to 13 pre-GFC and 11 post-GFC periods, along with two vectors of average entrants and numbers on each benefit, this subsection considers the effects on benefit numbers of alternative combinations. All the simulations are carried out using the matrices and vectors for 47 benefit types, as described above, and results are reported for various aggregates.

Importantly these are 'what if' scenarios, showing the potential impact that different transition probabilities could have on benefit numbers; they do not pretend to provide estimates of future stocks. In a practical reform analysis, the inflows would not be expected to remain constant and a particular time profile for changes in inflows would be modelled. This can easily be accommodated in the present framework. The present simulations illustrate the importance of allowing for the inter-benefit flows when changes take place to a system that is out of equilibrium. The separate effects of inflow and transition rates can be identified.

Figure 2 shows the effects on the time profile of total benefit recipients over the period from February 2011 to November 2016 of starting from average pre-GFC stocks, holding quarterly inflows constant at their average pre-GFC levels, and using the two different sets of forward flow coefficients. First, the simulated benefit numbers do not follow a simple monotonic adjustment towards a final equilibrium stock. Second, the total number of benefit recipients is consistently higher for the post-GFC transitions, reflecting the longer durations for the majority of benefit types. By 2016 the two simulations differ by about 25,000 individuals.

By contrast, the profiles in Figure 3 are constructed using the constant post-GFC average entrants and post-GFC initial stocks. The difference between the two totals by November 2016 is similar to that shown in Figure 2, although the time profiles are quite different. In Figure 3, the two simulations consistently increase over the period. As expected, the total number on the benefit system is much higher when the post-GFC entrants and initial stocks are used.

Figure 2 Effects of Different Transitions with Pre-GFC Stocks and Inflows: All Benefits Combined

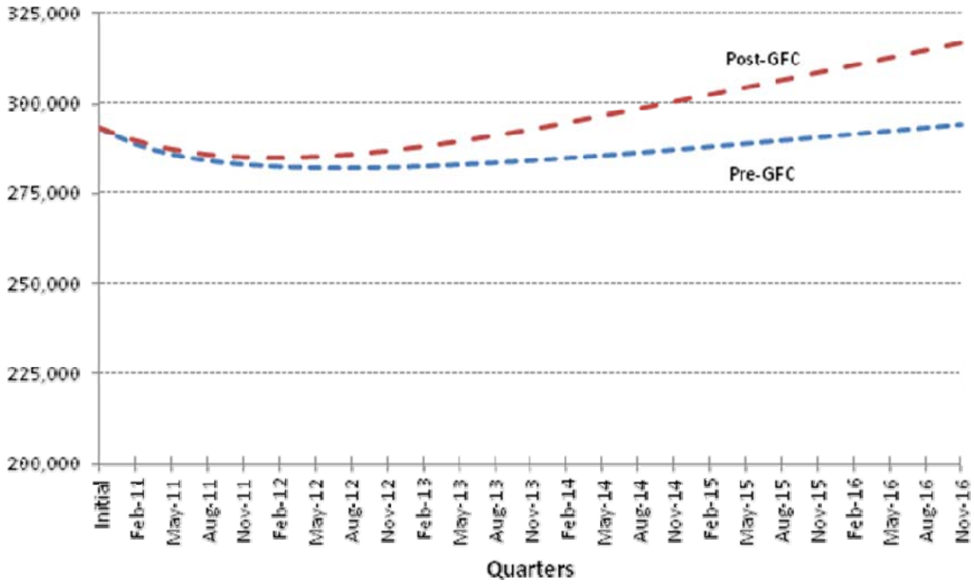
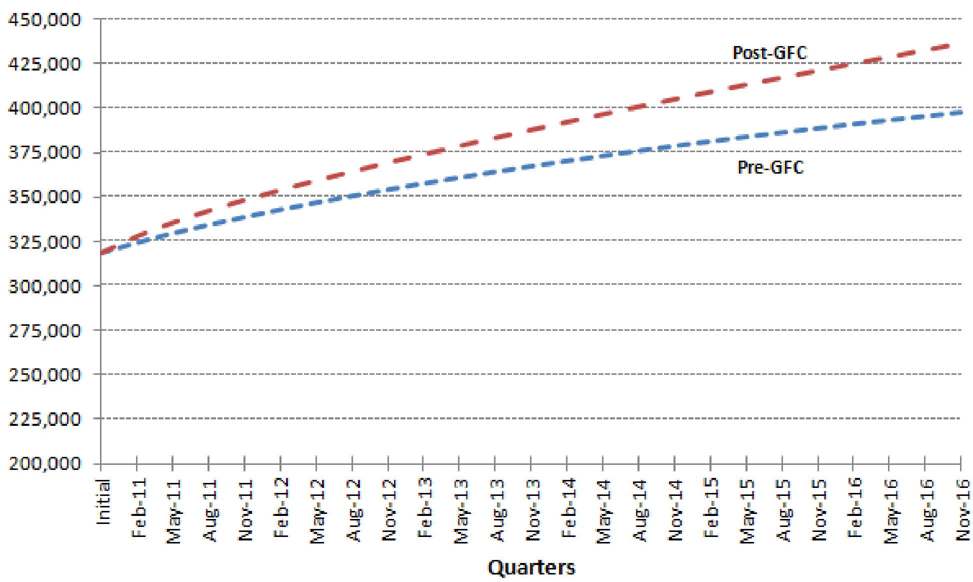


Figure 3 Effects of Different Transitions with Post-GFC Stocks and Inflows: All Benefits Combined



The profiles of different benefit types do not necessarily follow similar patterns to those in Figures 2 and 3. For example, simulations of DPB recipients are shown in Figures 4 and 5 using respectively the pre-GFC and post-GFC initial stocks and inflows. Figure 4 shows that the use of pre-GFC inflows and initial stocks generates non-monotonic profiles of DPB numbers over time for each set of transitions. In this case the post-GFC transition matrix produces lower stocks of DPB beneficiaries than the pre-GFC matrix in the early years of the projection period, only overtaking the pre-GFC transitions in mid-2014. In Figure 5, which uses the post-GFC birth vector each period, the DPB numbers increase continually over the period for both transition matrices, with the post-GFC transitions overtaking the numbers produced by pre-GFC transitions by early in 2013.

Figure 4 Effects of Different Transitions with Pre-GFC Stocks and Inflows: DPB

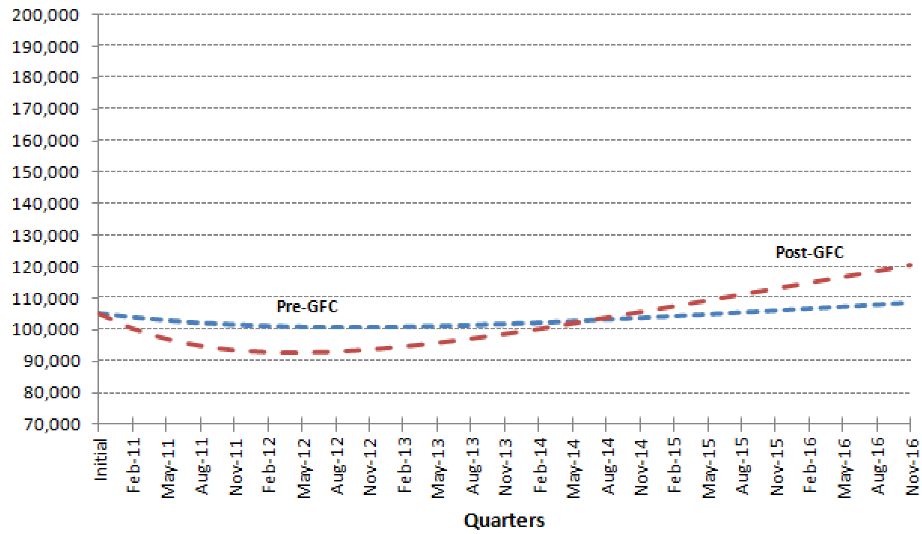
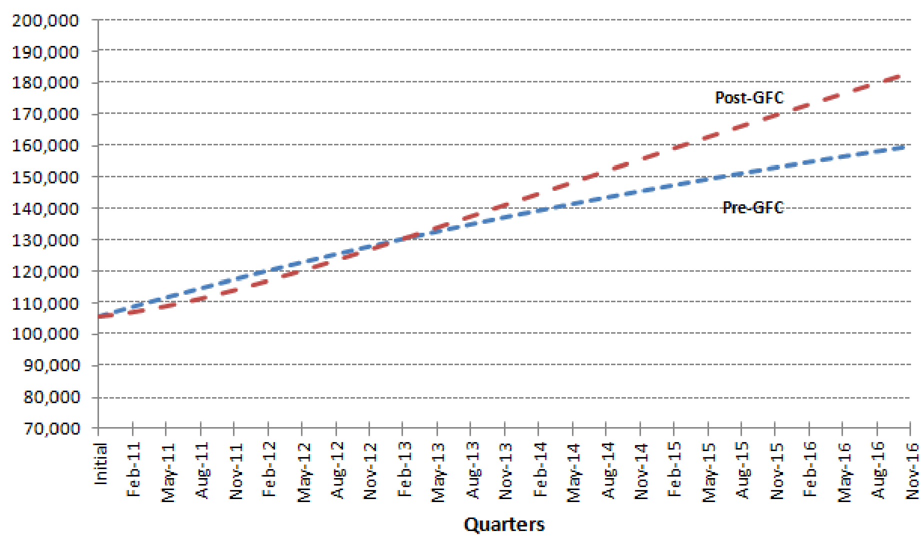


Figure 5 Effects of Different Transitions with Post-GFC Stocks and Inflows: DPB



4 Simulations of Benefit Numbers

This section reports a range of simulations, up to November 2016, which provide counterfactuals against which various policy reforms could be examined. The approach involves taking the actual stocks in each benefit category at November 2010, and then making assumptions about the quarterly entries and transitions over the subsequent quarters. As these simulations are alternative counterfactuals, the assumption that the inflows and transitions remain unchanged for a number of quarters at either their pre- or post-GFC values, or at transitional values, reflects an explicit assumption that there are no policy changes over the simulation period.

One simulation exercise produces the time profile of stocks on the assumption that pre-GFC (2005-08) inflow, outflow and inter-benefit transition rates apply from February 2011 and continue across the forecast period: this is the hypothetical situation of an immediate return to Pre-GFC flows. Other profiles involve different assumptions about the timing of the return to pre-GFC transitions. Thus, the profile labelled *Post-GFC+Recovery* assumes that post-GFC transitions prevail until February 2012 after which the pre-GFC transition rates and entries apply. The profile labelled *Post-GFC->Transition->Pre-GFC* assumes that post-GFC transitions prevail till November 2012 but there is a delay before Pre-GFC transitions apply. Finally, the *Post-GFC* profile assumes that post-GFC transitions prevail across the projection period.

All simulations thus begin from the same vector of stocks. These clearly do not reflect a long run equilibrium, especially since the actual November 2010 stocks arise from circumstances which have operated for a relatively short time. As explained in Section 2, the application of fixed inflows and transition rates ultimately produces an equilibrium in which the total outflows are matched by inflows, and the vector of stocks of individuals in each benefit category remain fixed. Three of the four counterfactuals ultimately move to, and then continue to apply, the pre-GFC inflows and transition rates. Hence it is clear that these cases will ultimately converge on the same vector of the distribution of individuals across benefit types. It can take many periods to approach the equilibrium, although the stocks for some benefit types may converge more quickly than others.

An important implication of starting from a disequilibrium stock of beneficiaries is that, when switching to a new set of inflows and transitions which imply lower equilibrium stocks in all benefit categories, the numbers in receipt of some of the benefits need not necessarily initially fall. The numbers in some benefit categories may increase for a period, particularly if the initial stocks involve large disequilibrium numbers of those benefit types from which there are significant flows into the category of interest.

The time paths of all benefits combined, for each of the counterfactual cases, are shown in Figure 6. There are substantial differences at the end of the projection period, even for the three counterfactuals having identical long run equilibrium numbers. Furthermore, the movement towards the equilibrium is not monotonic, even when the shift to pre-GFC rates implies an immediate fall in total numbers.

Figure 6 All Benefits Combined

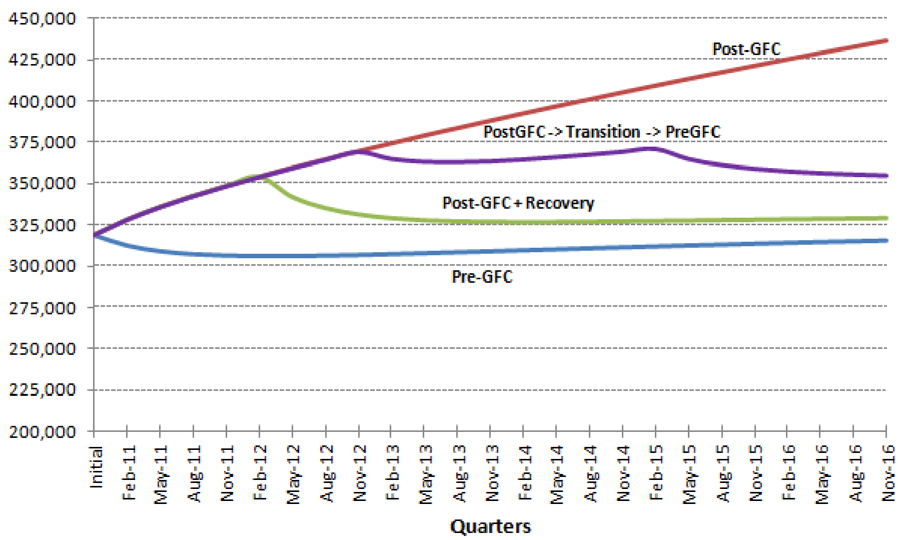
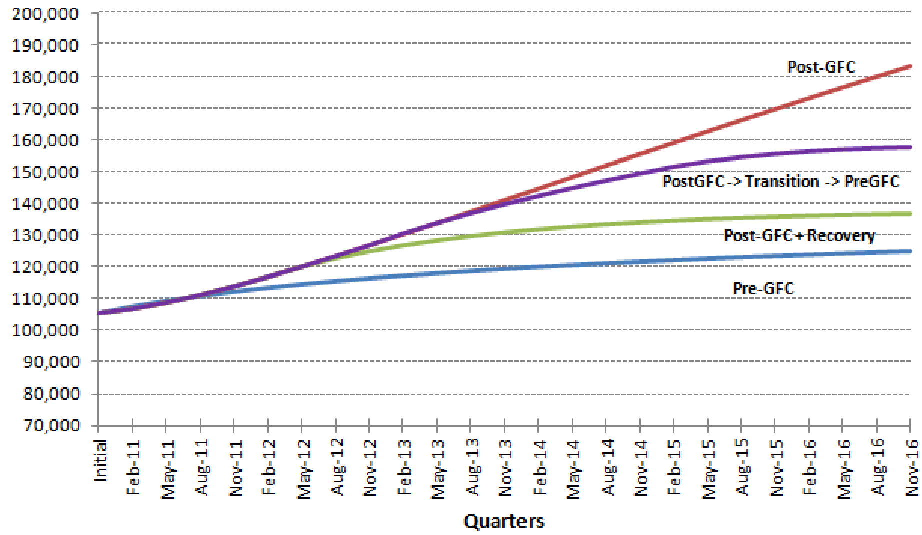


Figure 7 shows the implications for DPB recipients. In this case, the shift from post-GFC inflows and transition rates to pre-GFC rates does not imply a reduction in numbers, but simply a slowing down in their rate of increase, for each of the three less-pessimistic cases. At the end of the projection period, the three counterfactuals continue to produce quite different stocks.

Figure 7 Domestic Purposes Benefit



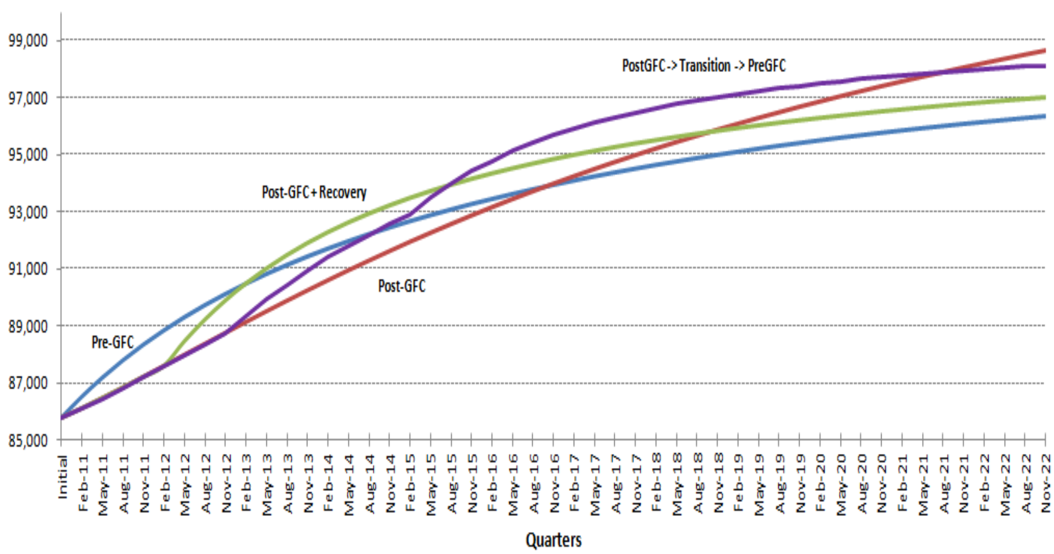
The importance of allowing for inter-benefit movements, and the effect of changing mobility patterns from a disequilibrium situation, is shown in Figure 8 for the case of Invalid's Benefit. A shift to pre-GFC inflows and transition rates initially leads to higher numbers in receipt of IB than under post-GFC conditions, for all the three relevant counterfactuals. This result is perhaps counter-intuitive, particularly as the flows onto IB from outside the benefit system are generally higher under post-GFC conditions and the average time spent in each of the IB categories is higher in the post-GFC transitions than for the pre-GFC transitions. However, the higher IB stock is only a temporary phenomenon. In Figure 8 the projection period is extended to November 2022 and for each of the three more optimistic counterfactuals the stock of IB recipients eventually falls below that arising from the continued post-GFC entrants and movements. For example, for a return to pre-GFC conditions in the initial simulation period, the stock intersects the profile of post-GFC numbers by November 2016.

It was shown in Table 2 that flows onto SB are relatively high and increase substantially as a result of the GFC. This is especially true of the younger SB categories. A characteristic of the inter-benefit transitions, shown for the broad categories in Tables 1 and 2, is that the movement from SB to IB is higher in the pre-GFC period than in post-GFC conditions. It was mentioned that this difference largely results from the policy changes relating to IB, which recognised that movement from

SB to IB was quite 'relaxed' and that IB stocks thus contained relatively more people with shorter durations.[19] Hence the return to pre-GFC mobility patterns, at the beginning of the projection period, returns to a situation where there are relatively more movements from SB to IB, from a position of very high SB numbers. These features combine to generate the temporary rise in IB numbers above the post-GFC counterfactual: the latter may have a lower probability of moving from SB to IB, but given the larger inflows the stocks eventually overtake the pre-GFC simulation.[20]

Figure 9 shows that the large differences in the inflows to SB categories produce quite rapid reductions in SB numbers following a shift from post-GFC to pre-GFC conditions. The two most optimistic counterfactual cases converge rapidly towards their equilibrium in view of the dominance of the inflows from outside the benefit system. Unemployment benefit numbers are shown in Figure 10. The differences between inflows to unemployment between the pre- and post-GFC conditions, combined with the small number of movements into UB categories from other benefit types, means that the three most optimistic counterfactuals shift quickly to the new equilibrium.

Figure 8 Numbers in Receipt of Invalid's Benefit



[19] The policy change re-categorised many people, who were shifted from IB to SB, as well as making transition into IB harder.
[20] In a more extensive exercise it would, for example, be useful to modify the relevant pre-GFC coefficients to reflect the policy change.

Figure 9 Numbers in Receipt of Sickness Benefit

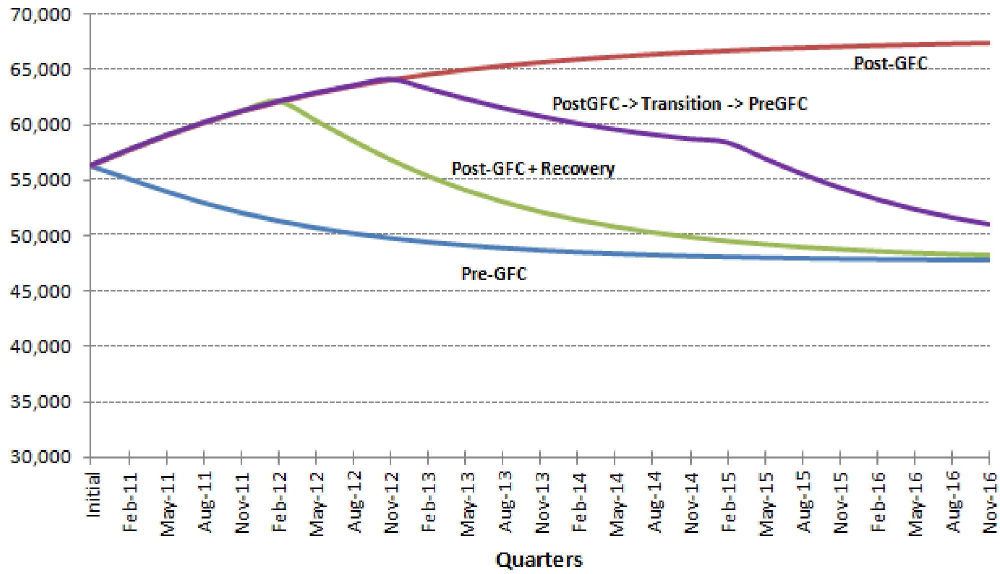
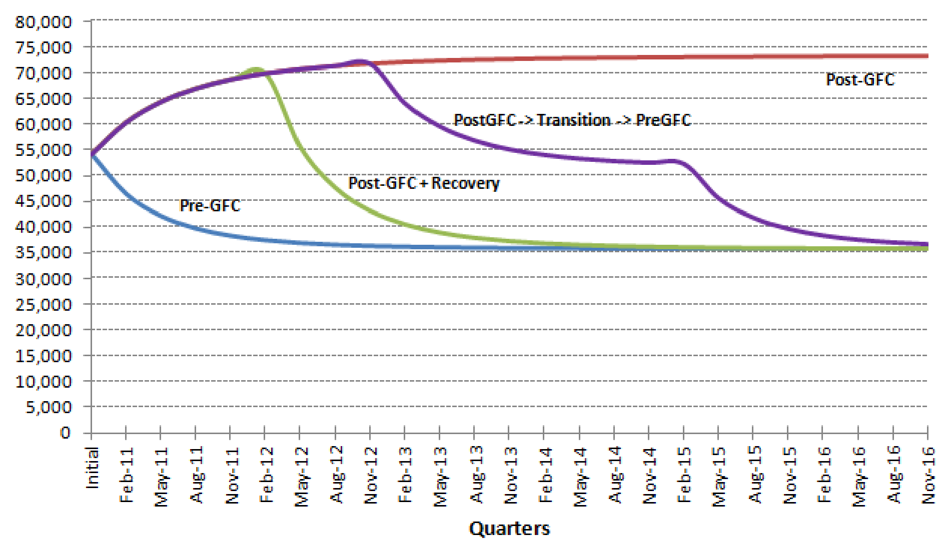


Figure 10 Numbers in Receipt of Unemployment Benefit



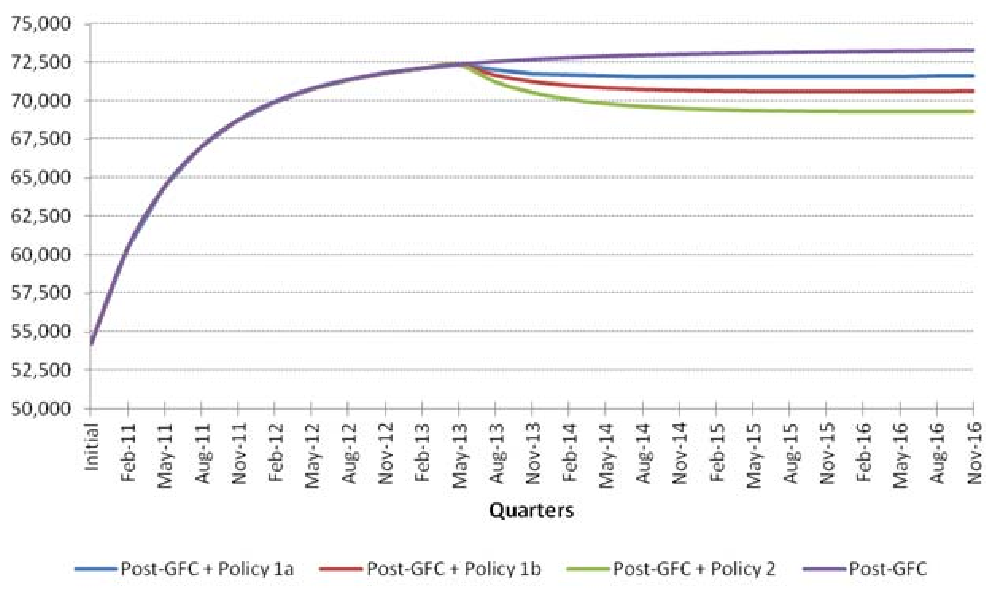
5 Effects of Changes in Unemployment Entry Rates

The previous section considered changes to inflows and transitions arising from changing economic conditions. The framework can also be used to consider a specified change to one or more features of the benefit system arising from a policy change. The potential impact on inflows to selected benefit categories and associated exit rates may be specified, drawing on a range of extraneous information.[21] An advantage is that implications can be examined for benefit types other than those for which reforms are being debated. Furthermore, as stressed earlier, the dynamics of a system, which is out of equilibrium when a change arises, can be investigated.

Suppose a change in circumstances is expected to arise in May 2013 which influences only the quarterly rate of entrants to the range of unemployment benefits, while all other flows and transition rates remain at the observed post-GFC levels. The details – whether of a change in market circumstances or a change in the eligibility conditions – need not be specified here. Figure 11 illustrates the subsequent time profile of the stock of unemployment benefit recipients over all UB categories, for a range of percentage reductions in the inflows: policies 1a, 1b and 1c respectively involve 2.5, 4 and 6 per cent reductions in entrants of all UB categories.

It has been seen earlier that unemployment stocks move relatively more quickly than other benefit types towards new steady-state values, and this is also observed for this simple change. Changes in other broadly defined benefit types are relatively small in this case.[22]

Figure 11 Projected Unemployment Benefit Stocks over Time



[21] Such information is needed because the various rates are not estimated as functions of a range of variables, but are simply computed from observed flows. In practice, many reforms to the welfare system involve innovations, so that econometric estimates of, say, hazard functions, cannot necessarily provide guidance.

[22] However, more substantial changes can be observed for particular types of UB claimant, where there are larger movements to other categories.

At the stage when the change is expected to take place, the stock of UB recipients is not in equilibrium even though the various rates were constant, because of the build-up in stocks resulting from the lower post-GFC exit rates (compared with those before the GFC). Furthermore, some movements into UB categories arise from other benefit types within the system, and the stocks in those 'source' categories are not in equilibrium. The diagram shows that the reduction in the stock over time (for each change in the inflow rate), when compared with the stock when the change arises, is smaller than the reduction when measured against the counterfactual of no change in inflows. The contrast between such comparisons would be much greater if the assumed change in the inflow rate were to occur while the counterfactual profile is rising much more steeply. A key point is that the effectiveness of a policy reform needs to be based on a sound counterfactual. In other words, simple *ex post* comparisons of changing stocks of benefit recipients may not provide an accurate measure of the effectiveness of a policy reform.

6 Conclusions

This paper has presented a social accounting framework designed to examine benefit flows in N ew Zealand. Quarterly entry, transition and exit rates for 47 benefit types were obtained using average values observed for a number of years before and after the global financial crisis. Simulations over time of the numbers of individuals in receipt of a range of benefits were obtained under alternative assumptions about inflow and transition rates.

One advantage of the approach presented here is that the dynamics and complexities of benefit flows can be investigated in detail. The approach recognises that a change is imposed on a dynamic system that is not in equilibrium. Existing stocks need to work their way through the revised structure, of which just a small number of transition rates are affected by any policy change. The final effect on the number of benefit recipients are not apparent immediately, but may take some time to settle down. In the medium term of three or four years, the stocks can be substantially affected by the economic conditions at the time of the change, and the assumed conditions over the projection period (even when the equilibrium stocks are expected to be the same – as with the three most optimistic counterfactual cases considered above).

The dynamics of adjustments to revised inflow and exit rates, consequent on policy changes, mean that the *ex post* evaluation of policy initiatives is far from straightforward. The speed and indeed the direction of adjustments to benefit numbers depend on a vast range of flows, not only those flows which are targeted by a policy change. Furthermore, it may in some cases appear that a reform has little or no effect, if the numbers in receipt of a benefit a year or so after the reform are only slightly below those when the reform was enacted. However, the need to consider the numbers in relation to a well-specified counterfactual, not the stock at the time of implementation, is paramount. If the counterfactual suggests that the numbers would increase substantially without a policy change, a policy change which involves only a slight increase, from the time of implementation, might wrongly be judged a failure. Alternatively, and perhaps even more worryingly, a policy change which results in beneficiary stocks that are only slightly below or similar to the counterfactual, which itself implies a large fall in the absence of any intervention, may wrongly be judged to have been successful.

It is suggested that the approach examined here can provide a useful tool for the analysis of alternative policies and exogenous changes in the economy which are expected (or designed) to lead to changes in the pattern of transitions into and among different benefit categories.

Appendix A. The Benefit Dynamics Dataset

The BDD dataset is derived from the SWIFTT benefit payments system. Data generated by taking snapshots of SWIFTT data at given points in time are held on the Information Analysis Platform (IAP). In raw form, the historical data do not readily permit analysis of benefit dynamics. The variables of interest are distributed across a number of different structures and matching routines are required to link them with spells on benefit. The BDD links information recorded in SWIFTT for the same individual over time and organises the data in a form amenable to longitudinal analysis. In the December 2003 update, the data set was enhanced to incorporate selected variables from the job seeker register system SOLO and the Unified Client View Phase Two (UCVII) system, other administrative data systems held by MSD. The BDD are stored in the secure environment of the IAP and access is restricted to a small number of authorised analysts. The dataset contains information that could be used to identify individual benefit recipients.

The dataset covers the period from 1 January 1993 to the date of the most recent update. From October 2010, the data are updated at the end of each month (previously updates were quarterly). These updates are each created with a lag of at least two to three months to allow retrospective action to 'bed down' records for the end of the period.

Because of retrospective action, successive versions of the BDD will give a different benefit history for small numbers of individuals, and analyses repeated on a later version of the data set may produce slightly different results. In order to minimise interruption to projects using a given version of the data set, the most recent update and the one that preceded it are both available through the IAP. The year and month of the update is indicated by the four digits at the end of the name of each file – 1006 indicates the update to 30 June 2010 for example.

Appendix B. Adjustment of Exit Frequencies

In examining the reasons for leaving each benefit type, the data relating to reasons for leaving benefits contain many cases where no code is given. This appendix explains how extraneous information about the distribution of reasons for exit in aggregate, for each group of benefits, can be used to adjust the data.

Let a_j^0 denote the number of individuals in benefit category *j* who exit the benefit system at the end of the quarter, for whom no reason is given. As above, let $d_{i,j}$ denote the number moving from benefit type *j* for reason *i*. The number for whom a reason is known is thus:

$$g_j = \sum_i d_{i,j} \tag{7}$$

The aggregate proportion leaving for reason *i*, for those for whom a reason is known, is given by:

$$r_i = \frac{\sum_j d_{i,j}}{\sum_j g_j} \tag{8}$$

In addition, information about these proportions is available from another data source. Denote the extraneous values by r_i^*. It is desired to adjust the $d_{i,j}$ by allocating the unknown values in such a way that the new aggregate proportions approximately match the values from the additional data source.

First, adjust all $d_{i,j}$ using:

$$d'_{i,j} = d_{i,j}\left(1 + \frac{a_j^0}{g_j}\right) \tag{9}$$

And then obtain:

$$g'_j = \sum_i d'_{i,j} \tag{10}$$

Along with new values of *r* using:

$$r'_i = \frac{\sum_j d'_{i,j}}{\sum_j g'_j} \tag{11}$$

Finally, adjust the $d'_{i,j}$ using:

$$d^*_{i,j} = d'_{i,j}\left(\frac{r_i^*}{r'_i}\right) \tag{12}$$

This procedure was used to benchmark the exit rates in the social accounting framework. As mentioned earlier, there are many reasons for a person on benefit to leave the benefit system. The four main reasons are: finding work; death; migration and; a change in circumstances such as re-partnering.

The data for exits in the Benefit Dynamics Dataset were accurate in aggregate; they correctly captured the total number of people leaving the benefit system in a particular quarter. However, they did not provide much detail on why they were leaving. Therefore exit rates were derived from the 2008 'Linked Employer-Employee Data' feasibility study.[23] This study documented the reasons why people left the benefit system in great detail. For example the study found that of the people who moved off the Unemployment Benefit between July 1999 and June 2005, 48 per cent left because they had obtained work, 0.1 per cent died, 5.1 per cent left New Zealand and the rest left for a variety of other reasons. Similar statistics were available for other benefit types.

It was assumed that the exit statistics detailed in the study applied to the corresponding aggregates of all the benefits in the model. However, since the model further divides these benefits into sub-categories (for example, UB is divided into 8 sub-categories), the above procedure was used to derive exit rates for each of the sub-categories without altering the overall exit rate for a particular benefit. This accounts for the fact that exit rates are not uniform across the sub-categories, for example older beneficiaries in receipt of a particular benefit are more likely to exit due to 'death' than beneficiaries in lower age-groups. Similarly, lower-age groups are more likely to exit due to migration or finding work. The procedure described above was used to account for this unevenness in the reasons for people leaving the benefit system.

Appendix C. The Matrix Multiplier

Consider the simple case of a two-state social accounting model, where the equilibrium stock, $n = \left(I - C\right)^{-1} b$, is given by:

$$\begin{bmatrix} n_1 \\ n_2 \end{bmatrix} = \begin{bmatrix} 1-c_{11} & -c_{12} \\ -c_{21} & 1-c_{22} \end{bmatrix}^{-1} \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \tag{13}$$

[23] http://m.stats.govt.nz/~/media/Statistics/browse-categories/income-work/employment-unemployment/leed/research-reports/leed-msd-feasibility-report-final-2.pdf

and:

$$\begin{bmatrix} n_1 \\ n_2 \end{bmatrix} = \frac{1}{(1-c_{11})(1-c_{22})+c_{12}c_{21}} \begin{bmatrix} 1-c_{22} & c_{12} \\ c_{21} & 1-c_{11} \end{bmatrix} \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \qquad (14)$$

The effect of a change in the vector of 'inflows' is thus straightforward, and is measured by the appropriate elements of the matrix $M = (I-C)^{-1}$: in matrix terms $\frac{dn}{db} = M$. Consider the effect on, for example, n_1, of a change in the forward coefficient, c_{11}, where:

$$n_1 = \frac{b_1(1-c_{22})+b_2c_{12}}{(1-c_{11})(1-c_{22})+c_{12}c_{21}} \qquad (15)$$

Differentiation gives:

$$\frac{\partial n_1}{\partial c_{11}} = \frac{n_1(1-c_{22})}{(1-c_{11})(1-c_{22})+c_{12}c_{21}} \qquad (16)$$

And using:

$$dn_1 = \frac{\partial n_1}{\partial c_{11}} dc_{11} \qquad (17)$$

$$\frac{dn_1}{n_1} = \frac{(1-c_{22})}{(1-c_{11})(1-c_{22})+c_{12}c_{21}} dc_{11} \qquad (18)$$

Given the definition, $M = (I-C)^{-1}$, the proportional change in the equilibrium stock of individuals in state 1 arising from the combination of a change in inflows and a change in the proportion remaining in the state from one period to the next is given by:

$$\frac{dn_1}{n_1} = m_{11}\left(dc_{11} + \frac{db_1}{n_1} \right) \qquad (19)$$

References

Aziz, O., Carroll, N. And Creedy, J. (2013) An analysis of benefit flows in New Zealand using a social accounting framework. *New Zealand Treasury Working Paper*, 13/01.

Creedy, J. and Disney, R. (1981a) Changes in labour market states in Great Britain. *Scottish Journal of Political Economy*, 28, pp. 76-85.

Creedy, J. and Disney, R. (1981b) Eligibility for unemployment benefits in Great Britain. *Oxford Economic Papers*, 33, pp. 256-273.

Fletcher, M. (2009) Addressing the growth in Sickness and Invalid's Benefit receipt. *Paper for Welfare Working Group*. http://igps.victoria.ac.nz/WelfareWorkingGroup/Downloads/Working%20papers/Michael-Fletcher-Addressing-the-growth-in-Sickness-and-Invalids-Benefit-receipt.pdf

Hall, C. (2008) Do interactions between unemployment insurance and sickness insurance affect transitions to employment? *IFAU – Institute for Labour Market Policy Evaluation Working Paper*, no. 2008:18.

Harris, M.N. and Kalb, G. (2005) Movement between benefit types. *Melbourne Institute of Applied Economic and Social Research Report, no. 5.*

Ministry of Social Development (2010) Description of social assistance benefits in New Zealand. *Background Paper for Welfare Working Group*. http://igps.victoria.ac.nz/WelfareWorkingGroup/Downloads/Working%20papers/MSD-Description-of-social-assistance-benefits.pdf

OECD (2002) The ins and outs of long-term unemployment. In *Employment Outlook*, chapter 4, pp. 188-243.

Shirley, I., Firkin, P., Cremer, R., Dewe, P., Eichbaum, C., de Bruin, A., Dupuis, A. and Spoonley, P. (2001) Transitions in the Waitakere labour market: an ethnographic study. *Massey University Labour Market Dynamics Research Programme Research Report*.

Stillman, S. And Hyslop, D. (2006) Examining benefit-to-work transitions using Statistics New Zealand's linked employer-employee data. (Unpublished paper, Statistics New Zealand).

Stone, J.R.N. (1973) Transition and admission models in social demography. *Social Science Research*, 2, pp. 185-230.

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