

# Generational Wealth Accounts

**David McCarthy, James Sefton, Ron Lee & Joze Sambt**

University of Georgia & NIESR  
Imperial College Business School  
University of California, Berkeley  
University of Ljubljana

AGENTA Final Conference, Vienna  
21 November 2017

- Definition of Generational Wealth Accounts
- Connections to (and extensions of) Generational Accounting
- First set of GWA's (UK, 2012, with and without 'austerity')
- What to use the results for?
  - To calculate public and private generational accounts
  - To estimate the sustainability of consumption plans
  - To assess the intergenerational equity of transfer systems

# Generational Wealth Accounts

---

- Use same principles developed by Auerbach, Kotlikoff and Gokhale (1991) to look at transfers of all living and unborn age cohorts with the public sector over their remaining lifetime – Generational Accounting.
- But now wish to look at whole account –
  - Each generation's transfers with the public sector – public transfers
  - Each generation's transfers with each other – private transfers
  - Over time through the financial markets – ABR
- Similar to GA, use intertemporal budget equation to investigate both sustainability and transfers to unborns.

# Private Sector

- Built around inter-temporal budget constraint of each generation. Thus for generation born in year  $k$ , their account at  $t=0$

$$\begin{aligned}
 & \underbrace{\sum_{t=0}^{\omega+k} N_{k,t} y_{k,t}^l (1+r)^{-t}}_{\text{Human Capital}} + \underbrace{N_{k,t} w_{k,0}}_{\text{Net Wealth}} + \underbrace{\sum_{t=0}^{\omega+k} N_{k,t} \tau_{k,t}^+ (1+r)^{-t}}_{\text{P.V. of Transfers Received}} + \underbrace{\sum_{t=0}^{\omega+k} N_{k,t} b_{k,t}^+ (1+r)^{-t}}_{\text{P.V. of Bequests Received}} + \underbrace{FG_{k,0}}_{\text{Funding Gap}} \\
 & = \underbrace{\sum_{t=0}^{\omega+k} N_{k,t} c_{k,t} (1+r)^{-t}}_{\text{P.V. of Total Consumption}} + \underbrace{\sum_{t=0}^{\omega+k} N_{k,t} \tau_{k,t}^- (1+r)^{-t}}_{\text{P.V. of Transfers Paid}} + \underbrace{\sum_{t=0}^{\omega+k} N_{k,t} b_{k,t}^- (1+r)^{-t}}_{\text{P.V. of Bequests Paid}}
 \end{aligned}$$

# Public Sector (Generational Account)

---

- Built around inter-temporal budget constraint of the public sector.

Present value of net transfers plus debt equal zero.

$$\underbrace{D_0}_{\text{Public Sector Net Liability}} + \underbrace{\sum_{k=-\omega}^{\infty} \sum_{t=0}^{k+\omega} (1+r)^{-t} N_{k,t} \left( \tau_{k,t}^{g,+} - \tau_{k,t}^{g,-} \right)}_{\text{P.V of Net Public Transfers (Deficit)}} = FG_0^g$$

# But GA ...

---

- Focuses only on the public sector and
- We know that
  1. Theoretically (Samuelson 1958) private sector transfers can undo everything done in the public sector (under idealised conditions) – Ricardian equivalence argument.
  2. There is evidence – Chile, Ecuador (pensions), Taiwan (health) – that private sector does respond to changes in public sector programmes.
  3. Comprehensive analysis requires integrated whole economy approach.
- We need more robust analysis of what is actually happening, particularly given how politically contentious this issue has become

# However the GWA still misses

---

- We retain same scope as national accounts and so ignore
  1. Domestic Production, Informal Care
  2. Natural Resources
  3. Knowledge Creation and Transmission
- Based on the assumption that **‘people continue to replicate current behaviour (growth adjusted) into the future’** and so sustainability must be interpreted as ability to sustain current behaviour.
- Small open economy (interest rates stay constant)
- Measures are indicative and not welfare based
- Account treatment so no economic response, and no change in economic efficiency (unless otherwise specified)

		RESOURCES							USES						
Year of birth	Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age (Year of Birth)		Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
90+ (Pre-1922)	0.51	0	116	45	3	0	0		165	27	25	10	5	99	165
80-89 (1923-1932)	2.46	3	642	372	30	0	0		1 047	210	216	87	42	492	1 047
70-79 (1933-1942)	4.52	14	1 492	959	108	0	0		2 572	497	663	279	136	996	2 572
60-69 (1943-1952)	6.97	256	2 788	1 755	348	0	0		5 146	859	1 559	737	344	1 648	5 146
50-59 (1953-1962)	7.92	1 460	2 831	2 002	483	0	0		6 777	1 008	2 313	1 370	538	1 547	6 777
40-49 (1963-1972)	9.25	3 444	1 884	2 365	595	0	0		8 288	1 186	3 156	2 298	1 079	569	8 288
30-39 (1973-1982)	8.28	4 197	680	2 215	558	258	0		7 908	1 044	3 105	2 386	1 372	0	7 908
20-29 (1983-1992)	8.65	4 996	156	2 385	600	645	0		8 782	1 121	3 540	2 616	1 504	0	8 782
10-19 (1993-2002)	7.5	3 915	2	2 171	883	638	0		7 609	1 194	3 217	2 084	1 114	0	7 609
0-9 (2003-2012)	7.64	2 889	0	1 968	1 278	463	0		6 598	1 244	2 882	1 652	820	0	6 598
Unborn		8 035	0	5 994	4 333	3 346	-2 061		19 648	3 980	8 664	4 738	2 265	0	19 648
Public sector net liability			-1 628					1 628	0						0
Net Public Transfers Deficit								3 973	3 973			3 973			3 973
<i>Of which: transfers between living and unborn</i>					2 068	3 346	-5 414	2 717	2 717			2 717			2 717
All		29 209	8 962	22 231	9 219	5 350	-2 061	5 601	78 513	12 370	29 341	22 231	9 219	5 350	78 513



		RESOURCES							USES						
Year of birth	Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age (Year of Birth)		Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
90+ (Pre-1922)	0.51	0	116	45	3	0	0		165	27	25	10	5	99	165
80-89 (1923-1932)	2.46	3	642	372	30	0	0		1 047	210	216	87	42	492	1 047

		RESOURCES (billions £)							USES (billions £)						
	Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Fundin g Gap	Public Fundin g Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age		Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
<b>90+</b>	<b>0.51</b>	<b>0</b>	<b>116</b>	<b>45</b>	<b>3</b>	<b>0</b>	<b>0</b>		<b>165</b>	<b>27</b>	<b>25</b>	<b>10</b>	<b>5</b>	<b>99</b>	<b>165</b>
Not used transfers									3 973			3 973			3 973
Deficit															
Of which: transfers between living and unborn						2 068	3 346	-5 414	2 717	2 717		2 717			2 717
All		29 209	8 962	22 231	9 219	5 350	-2 061	5 601	78 513	12 370	29 341	22 231	9 219	5 350	78 513

		RESOURCES							USES							
Year of birth		Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age (Year of Birth)			Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
90+	(Pre-1922)	0.51	0	116	45	3	0	0		165	27	25	10	5	99	165
80-89	(1923-1932)	2.46	3	642	372	30	0	0		1 047	210	216	87	42	492	1 047
70-79	(1933-1942)	4.52	14	1 492	959	108	0	0		2 572	497	663	279	136	996	2 572
60-69	(1943-1952)	6.97	256	2 788	1 755	348	0	0		5 146	859	1 559	737	344	1 648	5 146
50-59	(1953-1962)	7.92	1 460	2 831	2 002	483	0	0		6 777	1 008	2 313	1 370	538	1 547	6 777
40-49	(1963-1972)	9.25	3 444	1 884	2 365	595	0	0		8 288	1 186	3 156	2 298	1 079	569	8 288
30-39	(1973-1982)	8.28	4 197	680	2 215	558	258	0		7 908	1 044	3 105	2 386	1 372	0	7 908

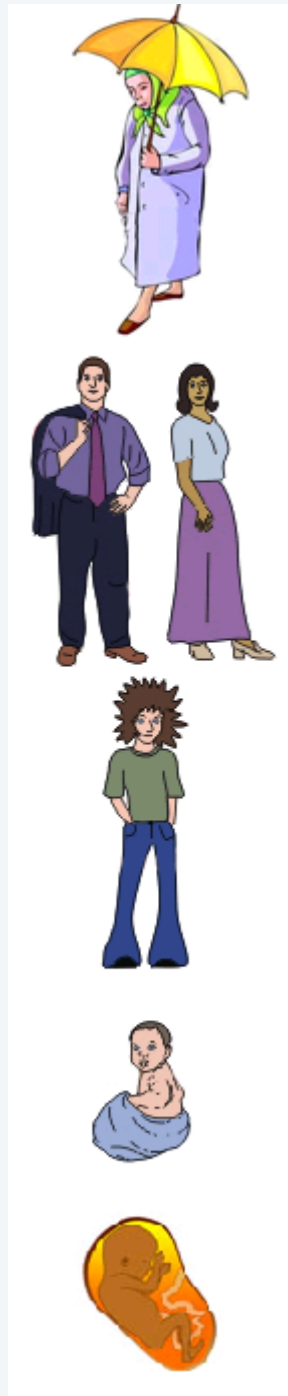
		RESOURCES (billions £)							USES (billions £)							
		Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Fundin g Gap	Public Fundin g Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age			Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
50-59		7.92	1460	2831	2002	483	0	0		6777	1008	2313	1370	538	1547	6777

		RESOURCES								USES						
		RESOURCES (billions £)								USES (billions £)						
		Private resources	Transfers received		Net beq. rec.	Private Fundin g Gap	Public Fundin g Gap	TOTAL	Consumption	Transfer made		Net beq. made	TOTAL			
Age	Pop (mn)	Human capital	Assets	Public	Prvte				Public	Prvte	Public	Prvte				
20-29	8.65	4996	156	2385	600	645	0		8782	1121	3540	2616	1504	0	8782	
40-49	(1963-1972)	9.25	3 444	1 884	2 365	595	0	0	8 288	1 186	3 156	2 298	1 079	569	8 288	
30-39	(1973-1982)	8.28	4 197	680	2 215	558	258	0	7 908	1 044	3 105	2 386	1 372	0	7 908	
20-29	(1983-1992)	8.65	4 996	156	2 385	600	645	0	8 782	1 121	3 540	2 616	1 504	0	8 782	
10-19	(1993-2002)	7.5	3 915	2	2 171	883	638	0	7 609	1 194	3 217	2 084	1 114	0	7 609	
0-9	(2003-2012)	7.64	2 889	0	1 968	1 278	463	0	6 598	1 244	2 882	1 652	820	0	6 598	
Unborn			8 035	0	5 994	4 333	3 346	-2 061	19 648	3 980	8 664	4 738	2 265	0	19 648	
Public sector net liability				-1 628					1 628	0					0	
Net Public Transfers Deficit									3 973	3 973		3 973			3 973	
<i>Of which: transfers between living and unborn</i>						2 068	3 346	-5 414	2 717	2 717		2 717			2 717	
All			29 209	8 962	22 231	9 219	5 350	-2 061	5 601	78 513	12 370	29 341	22 231	9 219	5 350	78 513

		Net beq. rec.	RESOURCES							Net beq. made		
	Age (Year of Birth)		Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Consumption			Net beq. made	TOTAL	
							Public	Prvte				
	90+ (Pre-1922)	0							99			
	80-89 (1923-1932)	0							492			
	70-79 (1933-1942)	0							996			
	60-69 (1943-1952)	0							1 648			
90+	50-59 (1953-1962)	0	3	0	0	165	27	25	1 547	5	99	165
80-	40-49 (1963-1972)	0	30	0	0	1 047	210	216	569	12	492	1 047
70-	30-39 (1973-1982)	258	08	0	0	2 572	497	663	0	36	996	2 572
60-	20-29 (1983-1992)	645	48	0	0	5 146	859	1 559	0	14	1 648	5 146
50-	10-19 (1993-2002)	638	83	0	0	6 777	1 008	2 313	0	38	1 547	6 777
40-	0-9 (2003-2012)	463	95	0	0	8 288	1 186	3 156	0	79	569	8 288
30-	Unborn	3 346	58	258	0	7 908	1 044	3 105	0	72	0	7 908
20-	Public sector net liability		00	645	0	8 782	1 121	3 540	0	04	0	8 782
10-	Net Public Transfers Deficit		83	638	0	7 609	1 194	3 217	0	4	0	7 609
0-9	Of which: transfers between living and unborn		78	463	0	6 598	1 244	2 882	0	20	0	6 598
Unb	All	5 350	33	3 346	-2 061	19 648	3 980	8 664	0	55	0	19 648
Pub							1 628	0				0
Net							3 973	3 973				3 973
Def												
Of			68	3 346	-5 414	2 717	2 717					2 717
bet			19	5 350	-2 061	5 601	78 513	12 370	29 341	9	5 350	78 513
unt												
All		5 350										

# Flows down the generations

## Bequests



- The old have more resources – assets + pensions – than they need to support consumption.
- Estimate that of the £10.5 tn held in assets, £5 tn to be bequeathed
- £2 tn of this will be needed to support current living generations.
- £3tn to be bequeathed to the unborn.

		Transfers Received	RESOURCES					Transfers Made	USES				
Age	(Year of Birth)	Private	Transfers rec.	Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Co	Private	Public	Private	Net beq. made	TOTAL
90+	(Pre-1922)	3					165			10	5	99	165
80-89	(1923-1932)	30					1 047			87	42	492	1 047
70-79	(1933-1942)	108					2 572			279	136	996	2 572
60-69	(1943-1952)	348					5 146			737	344	1 648	5 146
50-59	(1953-1962)	483					6 777	1 079		1 370	538	1 547	6 777
40-49	(1963-1972)	595					8 288	1 079		2 298	1 079	569	8 288
30-39	(1973-1982)	558		258	0		7 908	1 079		2 386	1 372	0	7 908
20-29	(1983-1992)	600		645	0		8 782	1 079		2 616	1 504	0	8 782
10-19	(1993-2002)	883		638	0		7 609	1 079		2 084	1 114	0	7 609
0-9	(2003-2012)	1 278		463	0		6 598	1 079		1 652	820	0	6 598
Unborn		4 333	4 333	3 346	-2 061		19 648	3 973		4 738	2 265	0	19 648
Public sector net liability						1 628	0						0
						3 973	3 973			3 973			3 973
Net Public Transfers Deficit			2 068	3 346	-5 414	2 717	2 717			2 717			2 717
<i>Of which: transfers between living and unborn</i>		2 068	9 219	5 350	-2 061	5 601	78 513	12 231		2 231	9 219	5 350	78 513
All		9 219											

# Flows down the generations

## Inter and intra private transfers



- Private transfers are also predominantly down the generations.
- The young are significant beneficiaries of these transfers down roughly £80k net per child
- Living are transferring £2tn to the unborn

		RESOURCES								USES					
Year of birth	Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age (Year of Birth)		Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
		<b>RESOURCES (billions £)</b>								<b>USES (billions £)</b>					
	Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Funding Gap	Public Funding Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age		Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
Unborn		8,035	0	5,994	4,333	3,346	-2061		19,648	3,80	8,664	4,738	2,265	0	19,648
0-9 (2003-2012)	7.64	2 889	0	1 968	1 278	463	0		6 598	1 244	2 882	1 652	820	0	6 598
Unborn		8 035	0	5 994	4 333	3 346	-2 061		19 648	3 980	8 664	4 738	2 265	0	19 648
Public sector net liability			-1 628					1 628	0						0
Net Public Transfers Deficit								3 973	3 973			3 973			3 973
<i>Of which: transfers between living and unborn</i>					2 068	3 346	-5 414	2 717	2 717			2 717			2 717
All		29 209	8 962	22 231	9 219	5 350	-2 061	5 601	78 513	12 370	29 341	22 231	9 219	5 350	78 513



# Private Sector is sustainable

---

- Assume the public sector is sustainable
  - Qatar is picking up the tab, thank you!
- Then the private sector sustainable
  - Unborn receive £3 tn in bequests, £2tn in private transfers of which they need £3 tn to support their consumption.
  - Hence private sector £2 tn in surplus.



# Public sector Sustainability



- Public sector is not sustainable
- Present value of net transfers to living from living is -£2.7tn, left to unborn
- Debt (in 2012) including unfunded govt occupational pensions was £1.6tn
- Present value of net transfers to unborn from unborn is -£1.3tn, left to ?
- Total deficit is £5.6tn

		RESOURCES								USES					
		RESOURCES (billions £)								USES (billions £)					
	Pop (mn)	Private resources		Transfers received		Net beq. rec.	Private Fundin g Gap	Public Funding Gap	TOTAL	Consumption		Transfer made		Net beq. made	TOTAL
Age		Human capital	Assets	Public	Prvte					Public	Prvte	Public	Prvte		
Public sector net liability			-1,628					1,628	0						0
Net Public Transfers Deficit								3,973	3,973			3,973			3,973
<i>Of which: transfers between living and unborn</i>					2,068	3,346	-5,414	2,717	2,717			2,717			2,717
All		29,209	8,962	22,231	9,219	5,350	-2,061	5,601	78,513	12,370	29,341	22,231	9,219	5,350	78,513
Public sector net liability			-1 628					1 628	0						0
Net Public Transfers Deficit								3 973	3 973			3 973			3 973
<i>Of which: transfers between living and unborn</i>					2 068	3 346	-5 414	2 717	2 717			2 717			2 717
All		29 209	8 962	22 231	9 219	5 350	-2 061	5 601	78 513	12 370	29 341	22 231	9 219	5 350	78 513

# Private and Public Sector is unsustainable

---

- Private sector is £2tn in surplus
- Public sector is £5.6tn in deficit
- Together there is a shortfall in £3.6tn => current consumption plans are not sustainable.
- All generations must reduce total consumption by 8.5%
- Or if the unborn bear it all then they must reduce total consumption by 28.5%.

# OBR Projections 2012 ('Austerity')

---

- Public sector matched to OBR (2013) forecasts (Table 3.6, 3.8) which together reduce deficit by 6.5% of GDP
  - Reduced welfare spend, rise in pension age to 68, increase in labour participation of 65+ (will make cake bigger).
- Need to make an assumption about the **incidence** of these government policy changes.
  - As with GA – assume the incidence is borne *by the generation that receives the change*. This is made explicit in the GWA (much less so in GA).
- OBR-modelled changes reduce public deficit to ~£2 tn approximately equal to private sector surplus (but so far, implementation delayed)

# Required change in consumption

Required change in consumption to ensure sustainability in:

- a) private
- b) public and
- c) entire economy

Public sector explicit and implicit debt and private inter vivos transfers and bequests passed to unborn						
	Sustainability measure S1 (shortfall measured across all generations, living and unborn)			Sustainability measure S2 (shortfall measured only across unborn generations)		
	Public shortfall	Private shortfall	Overall	Public shortfall	Private shortfall	Overall
Base case	45.3%	(7.0%)	8.5%	140.7%	(23.8%)	28.0%
OBR	14.8%	(7.4%)	(0.6%)	46.6%	(23.7%)	(1.9%)

# Intergenerational equity

- Our measure of **sustainability** is *also* a measure of intergenerational equity (if you assume that the unborn pick up any imbalance – this is the basis of the **AGK** measure used in GA)
- An alternative measure of intergenerational equity is based on the concept of **generational solidarity (GS)**, viewed from the perspective of the unborn
  - A thought experiment: would the young be better off if ALL transfers between the living and the unborn were turned off, or would they be better accepting the transfers (positive and negative) from the living and picking up the tab?
  - We find: **NO** (adjustment cost of the unborn higher despite transfers of debt from the living)



# Conclusions

- Private sector is in surplus, public sector in deficit, aggregate UK consumption plans are unsustainable
- ‘Austerity’ would have reduced the public sector deficit (& the private sector surplus), bringing aggregate consumption plans into (rough) balance
  - But imbalance between private & public sector remains (as shown by our public & private sector GA’s)
- Under AGK measure, unborn are being treated inequitably, BUT
- Under GS measure, unborn are still better off accepting transfers from living than they would be if they rejected these & needed to bring their own consumption paths into long-run balance
  - (But if the living pass all adjustment costs onto the unborn, it’s a close call!)