

# Accumulation of Human & Nonhuman Capital Revisited

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Harvard University, Cambridge, MA August 9, 2012



# 1948-1984 and 1998-2009 Data

- Jorgenson and Fraumeni, 1989

“The Accumulation of Human and Nonhuman Capital, 1948-1984,” in Lipsey & Tice, (eds.), The Measurement of Saving, Investment & Wealth

- Fraumeni, 2000

“The Jorgenson System of National Accounting,” in Lau, (ed.), Econometrics, Volume 2: Econometrics and the Cost of Capital

- Christian, July 2011

“Human Capital Accounting in the United States: Context, Measurement, & Application,”

BEA research paper

# Methodology

- **Human wealth is the present discounted value of an individual's expected lifetime income**
- **Even for an infant, this can be estimated...and represents an investment**
- **Investment in education is the difference between the expected lifetime income of someone who has just completed another year of school compared to someone of the same birth year, age and gender who has not**

## Share of Market Human Investment and Wealth in Total Human Investment and Wealth

(J-F from 1992, "Output of the Education Sector," Griliches, (ed.)  
Output Measurement in the Service Sectors)

	Investment	Wealth
<b>Fraumeni-Jorgenson</b>		
1947	.337	.295
1986	.412	.325
<b>Christian</b>		
1998	.409	.320
2009	.416	.306

# **Methodological Differences Jorgenson-Fraumeni and Christian**

- **Lifetime income until age 70 for J-F and 80 for Christian**
- **Investment in education is gross for J-F and net for Christian**
- **Overall comparisons across time are still valid as differences are somewhat offsetting and are small compared to the size of human investment and wealth**

# Christensen-Jorgenson (C-J) Product Accounts (1982; 2005) trillions

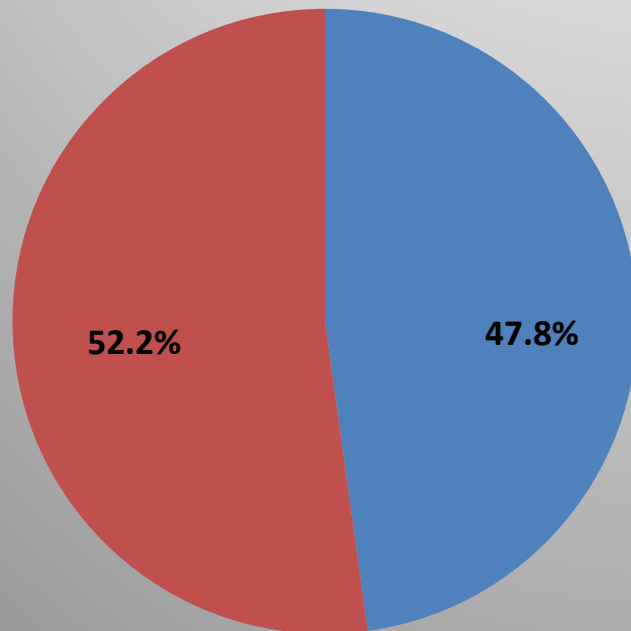
- **From NIPA Gross Private Domestic Product (3; 11)**
  - Exclude all government taxes and nontaxes on production and imports (.2; 1.0)
    - + Except for business property-type taxes (.1; .4)
  - + Add in C-J imputations for consumer durable services flows and HH and institutions service flows not in NIPA GDP (.3; .8)
  - + Plus subsidies, less current surplus, of government (.02; .06)
- **= C-J Gross Private Domestic Product (3; 11)**

# **C-J & Fraumeni-Christian (F-C) Product Accounts (1982; 2005) trillions**

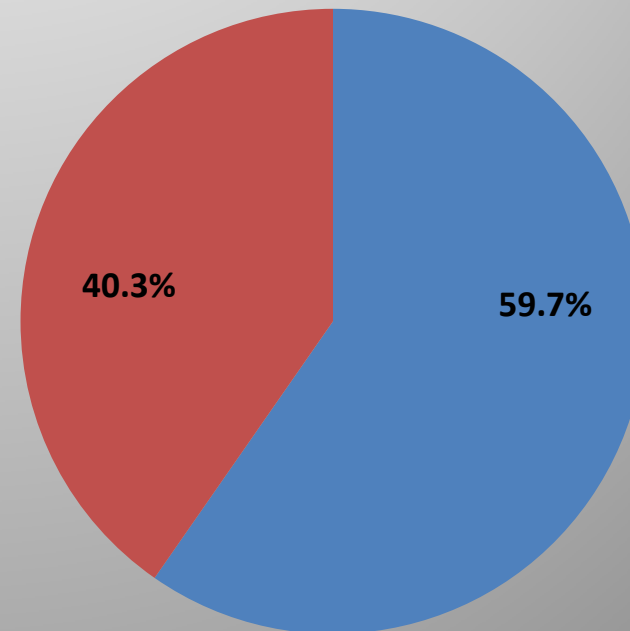
- **Add into C-J Gross Private Domestic Product (3; 11)**
  - + Time in HH production and leisure (consumption) (3; 11)
  - + Investment in human capital (9; 17)
- **= J-F/F-C Full Gross Private Domestic Product (14; 39)**

# Human Investment Shares Education vs. Infants

1982



2005





## Human Investment Shares Enrollment & Infant Growth Rates

Years	Share of Infant Investment in Human Investment	Years	Annual Growth in Enrollment Total	Annual Growth in Infants
'49-59	.553	'49-60	4.0%	2.3%
'60-72	.483	'60-73	2.2%	-1.7%
'73-84	.461	'73-84	-0.4%	0.6%
'98-2009	.592	'98-2009	1.0%	1.1%
'98-2007	.588	'98-2007	1.0%	1.5%

## Share of Infant Investment in Human Investment & Enrollment Growth Rates

Years	Share of Infant Investment in Human Investment		Annual Growth in Enrollment Total	Annual Growth in Enrollment (pre-)K-8	Annual Growth in Enrollment 9-12	Annual Growth in Enrollment College
'48-2009		'49-2009	1.6%	1.1%	1.5%	3.7%
'49-59	.553	'49-60	4.0%	3.7%	3.5%	4.4%
'60-72	.483	'60-73	2.2%	0.6%	3.6%	8.4%
'73-84	.461	'73-84	-0.4%	-1.1%	-1.0%	2.2%
'84-98		'84-98	1.1%	1.4%	0.4%	1.2%
'98-2009	.592	'98-2009	1.0%	0.1%	1.1%	3.1%
'98-2007	.588	'98-2007	1.0%	0.2%	1.5%	2.5%

# **U.S. Education Status**

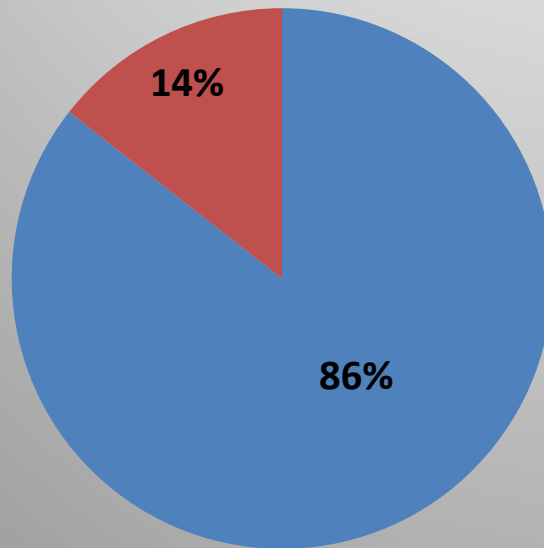
## **Compared to 33 Other OECD Countries**

### **2009 data from 2011 OECD Education at a Glance**

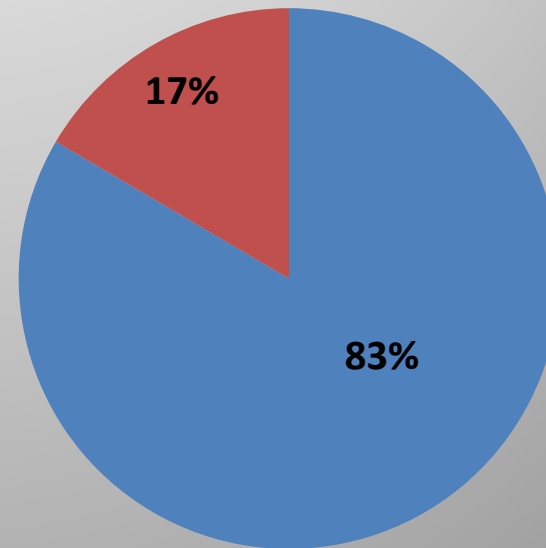
- **% achieving tertiary education among those 24-34 and 55-64**
  - Approximately 40% of Americans for both age categories
  - For all other OECD countries except for Germany the % is higher for the younger than the older group
  - OECD average for younger group is just below 40%, but < 25% for older group
- **U.S. tertiary education graduation rates below OECD and EU21 average**

## Full Investment Shares Nonhuman vs. Human Investment

1982



2005



## Share of Human Investment in Full Investment & Nominal Full Investment Annual Growth Rates

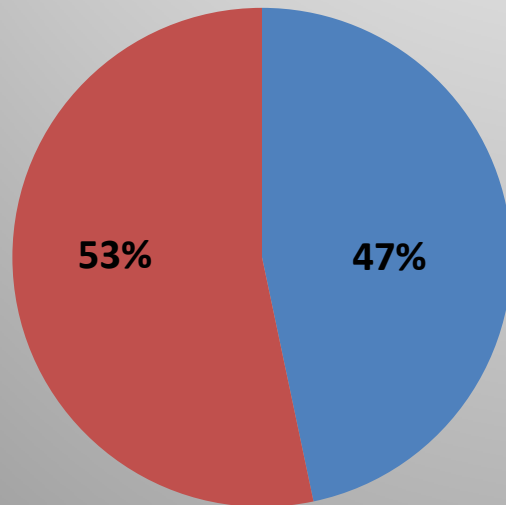
Years	Share of Human Investment in Full Investment	Full Investment	Human Investment	Nonhuman Investment
'49-60	.861	6.8%	6.9%	6.5%
'60-73	<b>.873</b>	7.0%	6.9%	<b>7.5%</b>
'73-84	<b>.848</b>	7.9%	7.8%	<b>8.6%</b>
'84-98				5.4%
'98-2009	<b>.850</b>	2.5%	2.7%	<b>1.1%</b>
'98-2007	<b>.847</b>	1.9%	1.4%	<b>4.7%</b>

## Real Investment Annual Growth Rates

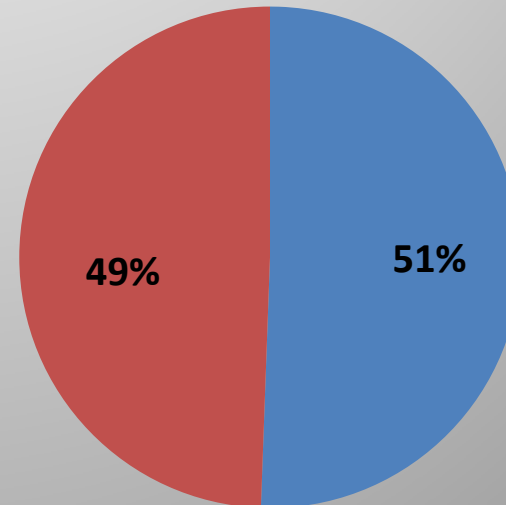
Years	Full Investment		Human Investment		Nonhuman Investment	
	Quantity	Price	Quantity	Price	Quantity	Price
'49-60	2.6%	4.2%	2.3%	4.5%	4.2%	2.3%
'60-73	2.1%	4.9%	1.6%	5.3%	4.7%	2.8%
'73-84	0.7%	7.2%	0.6%	7.2%	1.7%	6.9%
'84-98					4.4%	1.0%
'99(00)-2009	2000-9 0.6%	2000-9 1.5%	1999-2009 1.0%	1999-2009 1.5%	1999-2009 0.1%	1999-2009 0.4%
'99(00)-2007	2000-7 1.5%	2000-7 0.3%	1999-2007 1.3%	1999-2007 0.4%	1999-2007 3.4%	1999-2007 0.7%

# Gross Private Domestic Shares Full Consumption vs. Full Investment

1982



2005



## Full Investment and GPDI Shares

Years	Full Investment Share of Full Product		Gross Private Domestic Investment Share of Gross Private Domestic Product
'49-59	.480		.269
'60-72	.499		.268
'73-84	.480		.283
'98-2009	.511		.274
'98-2007	.517		.284

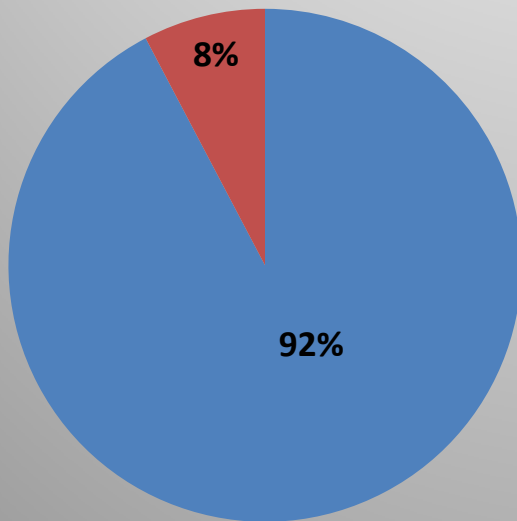


## **C-J & F-C Full Wealth Accounts (1982; 2005) trillions**

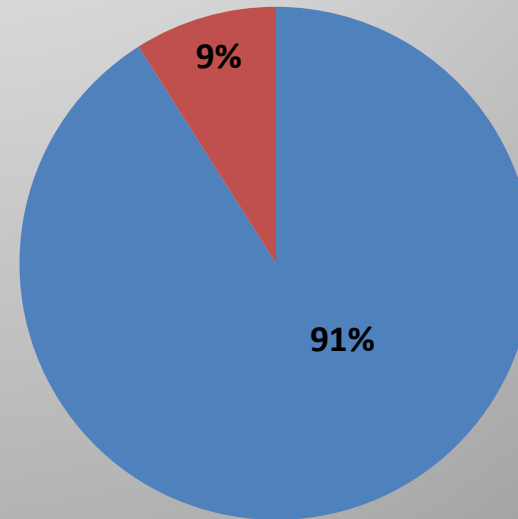
- **Private domestic fixed assets (12; 58)**
  - + Includes consumer durables
- + **Net claims on government and the rest-of-the world (1; 5)**
- = **Private national nonhuman wealth (13; 64)**
- + **Private national human wealth (167; 644)**
- = **Full private national wealth (181; 708)**

# Full Private National Wealth Shares Human Wealth vs. Nonhuman Wealth

1982



2005



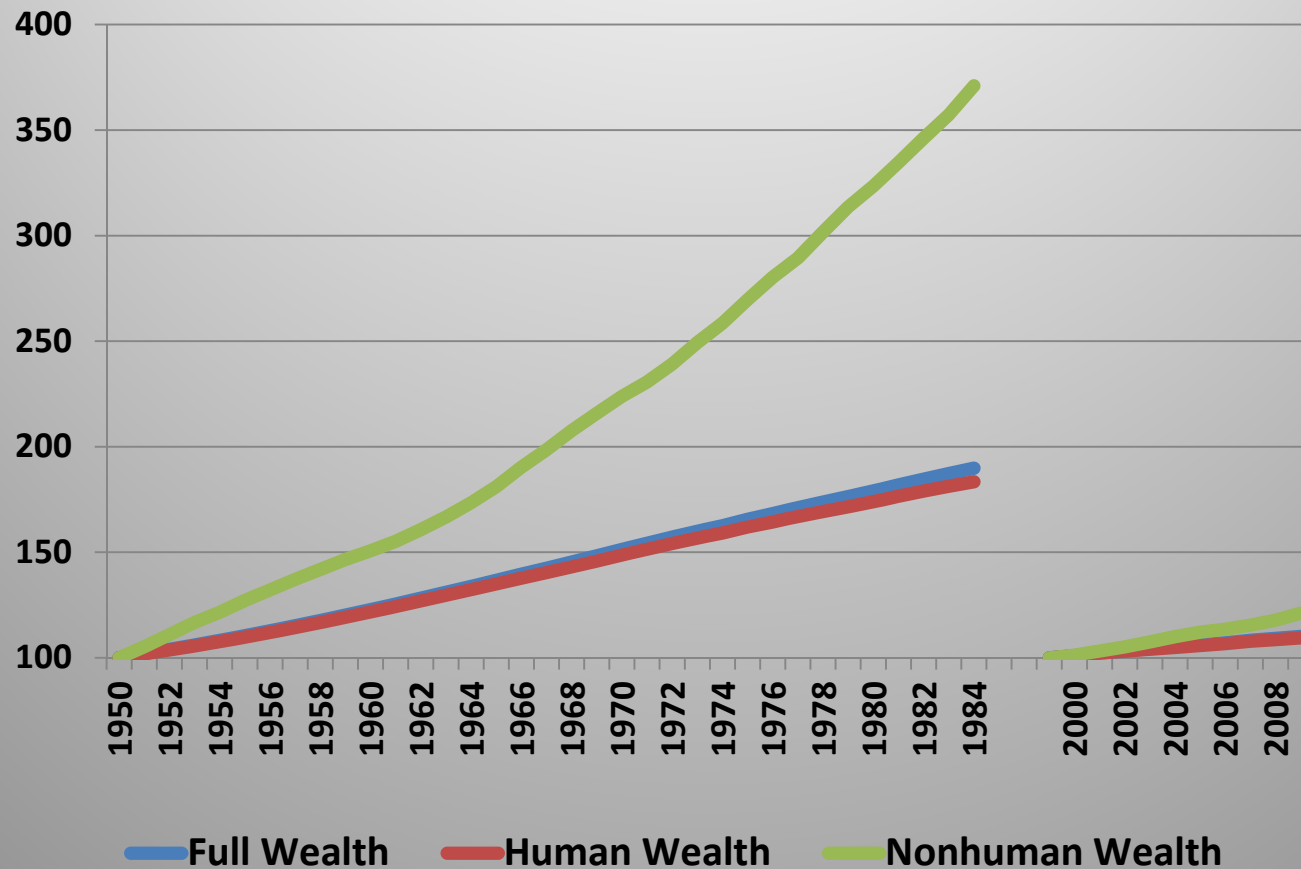
## Full Human and Nonhuman Wealth Shares

Years	Human Wealth Share of Full Wealth	General Trends
'49-59	0.930	Upwards from 1952-71
'60-72	0.938	
'73-84	0.930	Downwards from 1971-1981 Upwards from 1981-1984
		1984 = .925 1998 = .936
'98-2009	0.924	Downwards from 1998-2006 Upwards from 2006-2009
'98-2007	0.923	On net from 1949-2009, downwards

## Nominal Human Share of Full Wealth & Quantity of Full Wealth, Human, & Nonhuman Wealth Growth Rates

Years	Human Share	Years	Growth Rates		
			Full	Human	Nonhuman
'49-59	.930	'50-60	2.1%	2.0%	4.1%
'60-72	.938	'60-73	2.0%	1.9%	3.9%
'73-84	.930	'73-84	1.6%	1.4%	3.6%
'98-2009	.924	'99-2009	1.0%	0.9%	1.9%
'98-2007	.923	'99-2007	1.0%	0.9%	1.8%

# Trends in Normalized Quantity of Full, Human, & Nonhuman Wealth



# Conclusions

- **Humans are important elements of a country's assets**
- **Major demographic trends have impacted on human investment and wealth in the U.S.**
  - **Post WWII baby boom**
  - **Increasing, then flattening enrollments in college**
- **Nonhuman wealth has grown at a significantly higher rate than human wealth post WWII**