



ECONOMICS AND FINANCE OF PENSIONS

Lecture 5

PENSIONS AND THE LABOUR MARKET

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Today's lecture

- The role of pensions in employment contracts
- Spot labour markets & perfect capital markets
 - Pensions “neutrality”
- The role that pensions play
 - Internal labour markets
 - Efficiency wages
 - Sorting
 - Transactions costs / incomplete markets
- Review



Brief history of occupational pensions

- Started at larger companies in the Victorian era
 - But did not reach wide prominence in the labour market until the mid 20th century
- First US pension scheme: American Express (then a courier company which started transporting money)
- Tax exemptions made setting up schemes very attractive for employers & employees
- Incomes policies (price and wage freezes in the US and UK in the early 1970's for example) led to growth of plans
- Believed to be significant advantages to employer management of investments and centralised administration



The role of pensions in labour markets

- A way of selecting desirable potential employees (RECRUIT)
- A way to retain employees (RETAIN)
- A method of incentivising employees (REWARD)
- A way of managing retirement behaviour of employees (RETIREMENT)
- A way to save transactions costs
- A way to offer employees insurance against risks they would not be able to purchase insurance against in private markets
- A way of making compensation tax efficient



The fundamental question is:

- Why are *pensions* the best way to achieve these objectives, and not some other method?
- For instance, it is much easier to use bonuses to incentivise employees than pensions
- Retirement behaviour could be managed by a set of ad-hoc pay adjustments or payments at retirement
- There are other ways of selecting employees from the workforce
- So let's look at the case of perfect (complete) capital markets and perfect (spot) labour markets



Spot labour markets

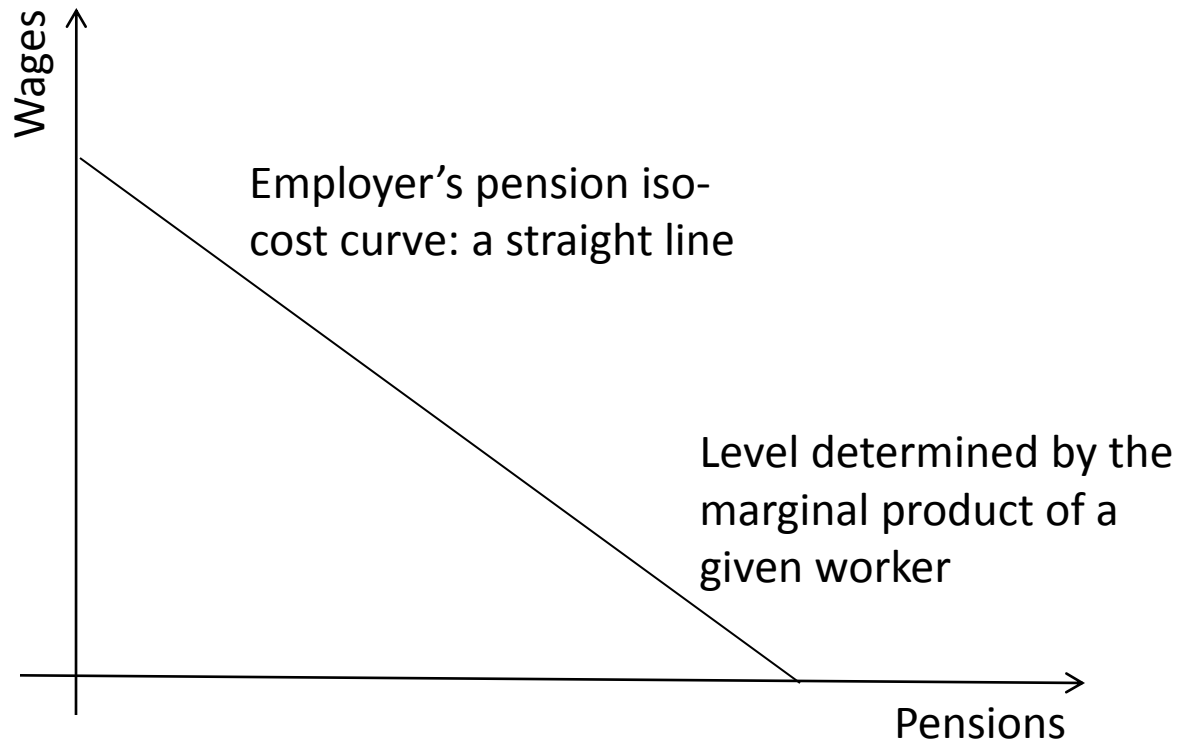
- Imagine that workers and firms agreed wages and terms of employment every period
 - No social relationships between firms and workers
 - No asymmetric information
 - No moral hazard
 - No transactions costs
 - No firm-specific human capital
- This is called a “spot” labour market
 - Wages would adjust to ensure that the labour market cleared every period and there would be no involuntary unemployment



Complete capital markets

- Anyone (employer or employee) can perfectly hedge their exposure to any real-world risk by holding a particular portfolio of traded assets

Pension-wage trade-off



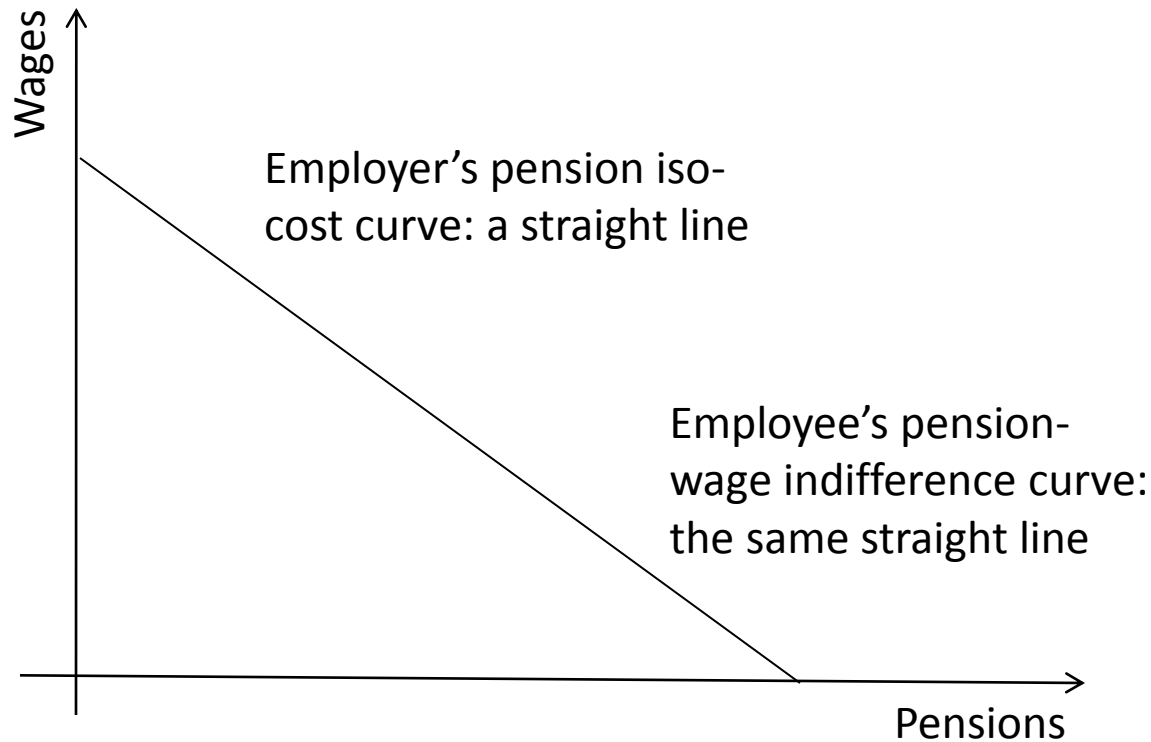
- Employers look at the cost of paying pensions and wages, and are indifferent between the two



Pension-wage trade-off

- What would the employees attitude to pension and wages be, *in a complete market*?
- Remember, in complete markets, employees can sell any claim they have (or buy more of it) at the ruling market price, and all claims they have, including pensions, will be tradable
- So what does the employee's indifference curve look like?
- Will it cross the employer's iso-cost curve
- KEY: Employers and employees function in the same capital market, and so pay the same prices for claims (including pensions)

Pensions neutrality result



- Conclusion: no optimal pension/wage split; this is called the “pensions neutrality result”



Pensions neutrality result

- Depends on assumption of perfect capital markets (how?)
- And on the assumption of “spot” labour markets (how?)

Table 1. Behavioral Motivation for Employer-Provided Pensions.

Worker-Side Motivations for Pensions

- Tax Qualified Retirement Savings
- Insurance Motivations
- Economies of Scale
- Union Preferences

Firm-Side Motivations for Pensions

- Regulating Work Effort
- Regulating Turnover Other Than Retirement
- Regulating Retirement
- Regulating Worker Quality

Outcomes Determined by Interaction of Supply and Demand

- Pension-Related Outcomes: Coverage, Plan Type, Plan Characteristics, Shape and Value of Accrual Pattern
 - Retirement
 - Other Employment-Related Outcomes: Worker Quantity, Including Transition Rates, Worker Quality, and Effort
 - Wage-Related Outcomes
-



Pensions neutrality result in practice

- One implication of the pension neutrality result is that we would expect workers without pensions to earn exactly the same as workers with pension, once the cost of pension benefits is properly accounted for
- We need to compare cash wages, plus the cost of pensions, of different workers in otherwise identical jobs
- Different employers will sit at different points along the threshold, and all these points are optimal
- The theory would predict no systematic differences in total compensation depending on the size of pensions
- What do you think we actually find?



Pensions and wages

- Most studies in the US shows that workers with pensions earn *more* than workers without pensions

Study	Data set	Wage effect of pensions
Even and Macpherson (1990)	1983 CPS	+13% – +15%
Gustman and Steinmeier (1995)	Various	positive
Allen and Clark (1987)		+38%
Mitchell and Pozzebun (1987)	1983 CPS	positive
Dorsey (1989)	Various	+12% – +29%
Montgomery, Shaw and Benedict (1992)	1983 SCF	negative*

Note: CPS = Current Population Survey. SCF = Survey of Consumer Finances, both representative US data sources.

* often not significantly different from 0

Source: Adapted from Dorsey, Cornwell and MacPherson (1998).

- This sometimes even holds true *inside* companies



What could lie behind this result?

- Imperfections in capital markets?
 - Taxes
 - Transactions costs?
- Imperfections in labour markets?



Spot labour markets in practice

- One of the implications of spot labour markets is that wages will always adjust to ensure that there is no involuntary unemployment
- In practice, we observe involuntary unemployment, and in fact:
 - Wages are “rigid” over the economic cycle, but
 - Unemployment varies
- The unavoidable implication is that firms would rather lay off workers than reduce wages



Spot labour markets: a pensions test

- One piece of evidence against spot labour markets (if we needed any) is given by Kotlikoff and Wise (1987, 1989)
- They test to see if jumps in pension compensation are “offset” by falls in cash wages
- In a spot labour market, we would expect that total compensation is relatively stable across time
- Pension compensation (at least in the US) is very jumpy because of cliff vesting and ER eligibility conditions (as we have seen)
- Unsurprisingly, Kotlikoff and Wise find strong evidence against spot labour markets



Transactions costs in general

- Coase (1937) showed how transactions costs explain the emergence of firms
- You could imagine us permanently negotiating with everyone the minutest economic transactions (e.g. rental of our offices and furniture, use of secretarial time, our share of the institution's brand etc)
- It is economically optimal to surrender control over many decisions to central planners in exchange for relieving ourselves and everyone else of the burden of transactions costs
- Another Nobel prize!



Transactions costs in labour markets

- Transactions costs are large in labour markets
 - Firm-specific human capital
 - There are unique skills associated with working in a particular firm (examples might be the computer system they use, or the way decisions are made)
 - On-the-job-training
 - Firms invest a lot in workers to make them productive in a particular environment
 - Contracts are often incomplete by nature
 - e.g. Contracts usually specify rate of pay but not what you are actually required to do



Firm responses to transactions costs

- Job turnover has a cost
 - All firm-specific skills are lost to the firm when a worker leaves, and workers leaving imposes costs on other employees, who become less productive as a result
- Hence, employers have an incentive to try to reduce turnover, but to maintain efficiency at the same time
 - So they offer job security to workers
 - Hold out the possibility of promotions in exchange for good performance
 - In extreme cases they only employ outsiders for set roles and only promote internally



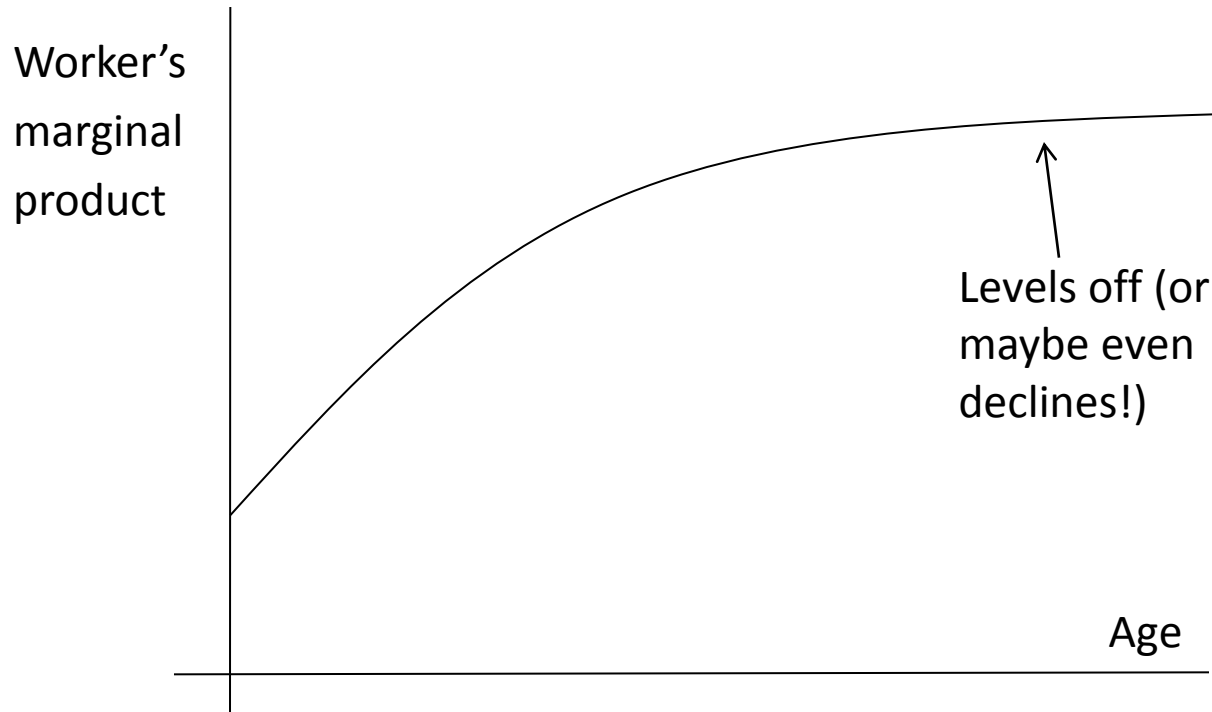
This leads to “internal labour markets”

- Employment security
- Career structure with pay grades
- External wage and employment competition limited to entry-level jobs
- On-the-job training (implicit and explicit)
- Internal competition for promotions
- Low quit rate / long employment duration

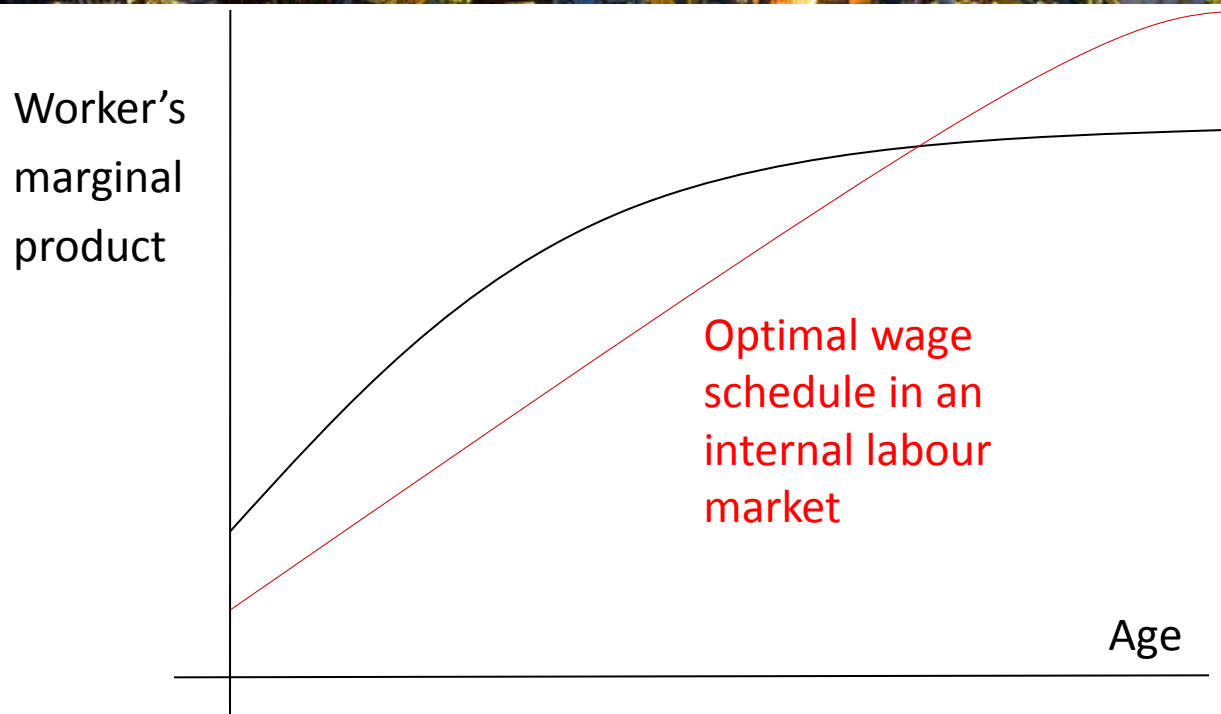
POSTER CHILD: Japan’s lifetime employment market

Pensions in internal labour markets

- Let's examine the lifetime progression of a worker in a company with internal labour markets



Employer's optimal response



- Employer's response is to pay a tilted wage schedule ("wage tilt" hypothesis)



Wage tilts & implicit contracts

- This “underpays” workers when they are younger, and overpays them when they are older
 - Firms have invested in training workers and want to recoup their losses by encouraging long tenure
 - This aligns the incentives of workers and firms
- Younger workers accede to this because they are offered job security and the opportunity to accrue firm-specific human capital (which increases their lifetime marginal product)
- This is called an “implicit contract” between firms and employees



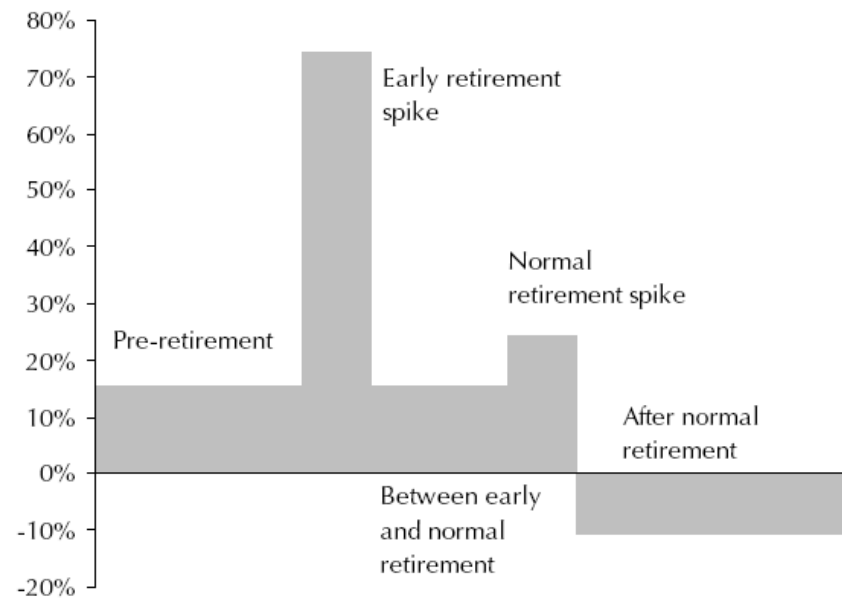
Pensions and internal labour markets

- But the contract gives older employees an incentive never to quit (because they are overpaid)
- So in response, firms need to give older workers an incentive to quit “on time”
- They also need to make their promises to younger workers credible
- DB pensions, in particular, are well suited to this role
 - They are back-loaded (i.e. the most valuable benefits accrue to those who are nearing retirement)
 - They give valuable incentives to workers to quit at set dates (more on this later)
 - They are tax protected

DB pensions and retirement

- DB pensions have a huge effect on retirement dates
 - They penalise early and late retirement

Percent of annual wages per annum



Source: Adapted from Gustman and Steinmeier (1989).



US federal workers

- Ippolito examine retirement behaviour of workers in the US Navy
- Found that workers over the age of 45 who are not yet eligible for full benefits (attained after 30 years work with the Federal government) have a 2% chance of quitting each year
- Once they have reached full benefit status, they have a 23% chance of quitting each year
 - DB pensions exert a strong influence on retirement behaviour

Determinants of job turnover

Independent variable: Job change (mean 0.35)	Probit regression co-efficient	Asymptotic standard error
Constant	1.569	0.406
Race	0.005	0.237
Education	0.028	0.023
Union	0.016	0.134
Experience	-0.014	0.007
Tenure	-0.027	0.010
Wage	-0.608	0.163
Pension	-0.700	0.155
-2 lnL	551.1	
N	512	

Note: Results shown for males. Job change = 1 if respondent changed jobs between 1973 and 1977. Race variable = 1 for non-whites. Education is years of full-time education. Union = 1 if respondent is a member of a union. Experience is number of years of work experience. Tenure is years in job left. Wage is in logs. Pension = 1 if employee has a pension. Pension plan reduces probability of job change by 20%.

Source: Mitchell (1982).

- Pensions are associated with markedly lower job turnover



US Federal workers

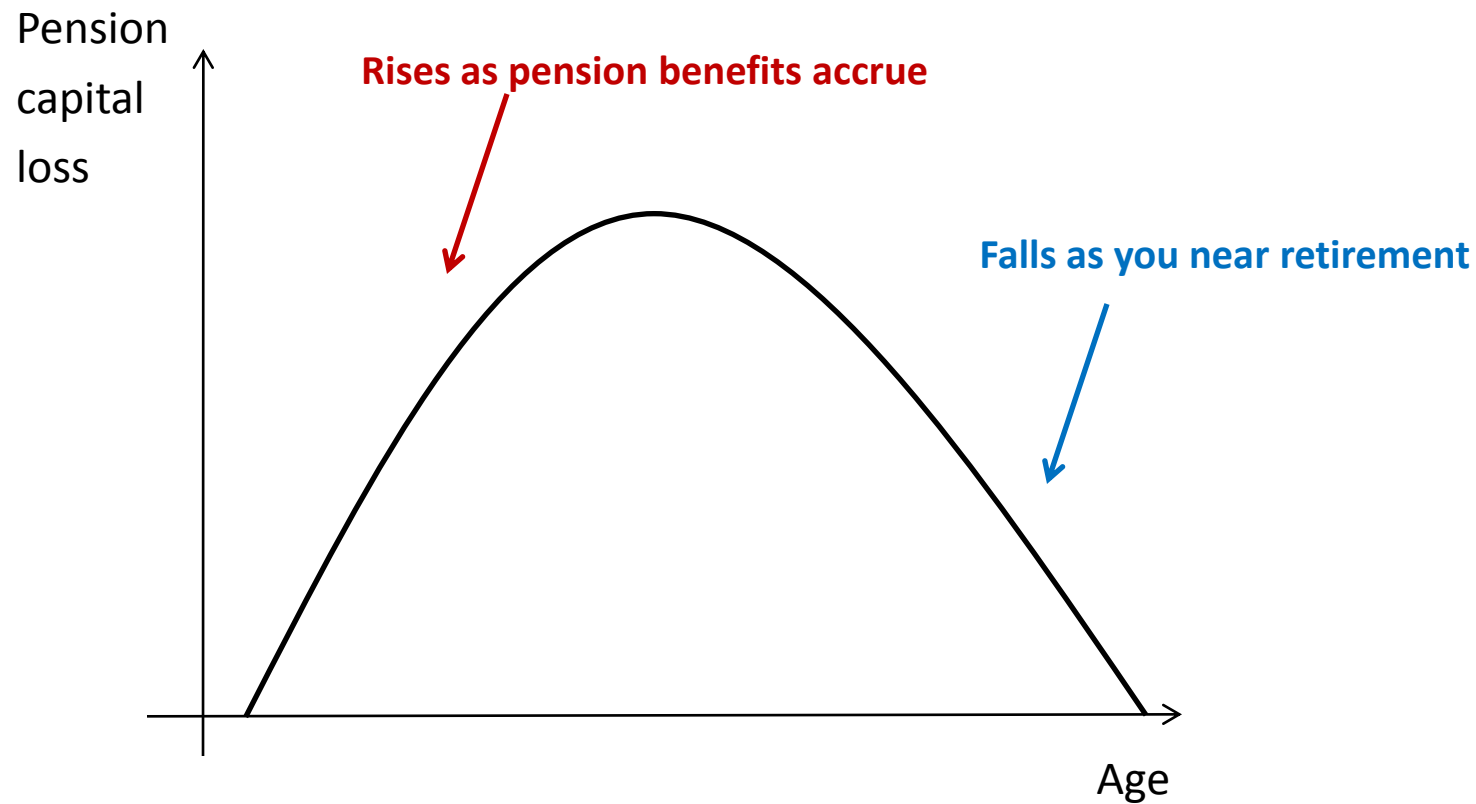
- The US Federal Government had a very generous DB pension (around twice as generous as the pension benefits of a typical large US private sector employer, even before indexation of federal pensions is taken into account)
- Ippolito (1997) shows that US federal workers have a quit rate that is significantly lower than the quit rate of workers in private firms who have pensions, and that this effect is very persistent over time
- But is this selection, or the result of the pension? (Endogeneity problems in regression)



Pension Capital Loss

- We can measure the pension loss suffered by employees when they leave their employers
 - Final salary DB pensions are linked to final wages
 - In deferment, pensions depend on wage when employee left service
 - The difference reflects the “Pension Capital Loss”
 - There is some PCL even if pensions in deferment are linked to prices (why?)
 - What about career average schemes?

Pension Capital Loss





Pension Capital Loss

- The PCL acts as a deterrent on employees to leave their jobs
 - Of course, there may be wage tilt in addition to the PCL, which is much harder to measure (why?)
- In the UK, indexation requirements have significantly lowered the PCL of DB pensions, while in the US there are still large PCL's (there is no mandatory indexation of pensions in deferment in the US)



Pension Capital Loss

- Size of pension capital loss does affect the likelihood of turnover – at least if you believe Allen, Clarke and McDermed (1993)
 - They claim that PCL can explain 40% of the lower turnover of jobs with pensions
 - They have a complicated regression structure which includes allowances for self-selection into different jobs (and separate specifications for jobs with pensions and jobs without them)



Pension Capital Loss

- Gustman and Steinmeier (1995) re-examine PCLs by calculating the actual PCL's faced by real workers
- Conclude that PCL's look significant in dollar terms, but represent only a few percentage points of remaining lifetime wages for most workers, especially younger workers
 - So is likely to be compensated for by even a small increase in wages in the new job
 - So therefore it is surprising that PCL's have any effect on mobility



Gustman and Steinmeier (1995)

- They model the mobility rate as a function of worker, job and pension characteristics, and find, consistent with their analysis, that PCL's have little effect on turnover
- Consistent with this evidence they find that people with DC pensions also have low turnover, and that the turnover of people with DC pension is not statistically distinguishable from the turnover of people with DB pensions!

Gustman and Steinmeier (1995)

Dependent variable: job change (mean 0.11)	Model 1		Model 2	
	Probit regression marginal effect	Asymptotic <i>t</i> -statistic	Probit regression marginal effect	Asymptotic <i>t</i> -statistic
Pension coverage	-0.09	6.50		
DB Pension			-0.092	5.87
DC Pension			-0.087	4.93
Ln <i>L</i>	-748.38		-748.31	
<i>N</i>	2545		2545	

Note: SIPP data from 1984-85. SCF data from 1978-93. Dependent variable is 1 if individual separates from employer. Some control variables included.

Source: Gustman and Steinmeier (1995).

- Unavoidable conclusion in these data is the PCL is *not* associated very strongly with lower turnover (replicated in other data they analyse)



Gustman and Steinmeier (1995)

- So what explains the lower turnover of people with pensions in their analysis if not the PCL?
- Their answer is that it is the higher wages of people in jobs with pensions

Gustman and Steinmeier (1995)

	Original mobility rate (%)	Post-change mobility rate (%)	Number of observations
Effects of eliminating PCLs on			
All individuals with pensions	5.71	6.39	1678
46-50 year olds	4.35	5.35	359
Union members	5.70	6.49	590
Non-union members	5.72	6.34	1088
Effects of dropping pension compensation entirely			
All individuals with pensions	5.71	10.38	1678
Effects of eliminating pension job compensation premiums, as estimated by compensation equation			
All individuals with pensions	5.71	14.39	1678

Source: Gustman and Steinmeier (1995).



Explaining the pensions wage gap

- Pensions might be a form of “efficiency wage”
- This is the idea that firms might set wages *above* the market level in order to give workers something to lose if they are unemployed
 - The threat of dismissal means that firms spend less on monitoring workers
 - If all firms paid a market-clearing wage, workers would not mind being dismissed
- The implication is that *all* firms will optimally raise wages above the market clearing level, and there will be involuntary unemployment



Efficiency wages

- When firms face a down-turn, they do not reduce wages, because workers are of different qualities, and if they do reduce wages, the best workers will be the ones most likely to leave
- So firms choose instead to lay off the worst workers, and leave wages the same (or even increase them)
- Therefore, efficiency wages provide an explanation for sticky wages and involuntary unemployment



Pensions and productivity

- An alternative explanation is that pension have an incentive effect which makes workers more productive, allowing employers to pay them more
- Allen and Clarke (1987) tested at the aggregate level to see if workers in industries with greater pension coverage were more productive than workers in industries with low pensions coverage
- Found no evidence that this was the case
- No study (to my knowledge) has succeeded in demonstrating that workers with pensions are more productive than exactly equivalent workers without pensions



Endogeneity

- We always need to watch out for endogeneity in labour economics
- For instance, pensions might be used as a sorting mechanism to find productive workers in an asymmetric information context
- So let's look at these ideas for a while



Signalling theory

- The information content of a signal can be measured by the cost of generating the signal
- “Talk is cheap”
- Examples of signalling in economics:
 - Insurance salesmen and flashy cars
 - Risk-seeking behaviour
 - Private doctor’s waiting rooms



Asymmetric information

- Workers, it is assumed, know a great deal about their ability and willingness to work
- Employers, when they first employ workers, don't know much about workers and need to take a risk
- So firms need to find a way to “sort” workers into desirable and undesirable types



Signalling and employment markets

- Employers can alter their compensation contracts to be attractive to workers with desirable characteristics
- Variable pay versus fixed pay
 - How many real estate agents are paid exclusively with fixed pay?
 - There is an incentive issue, but also a sorting issue
 - People who have private information that they will be bad salesmen (e.g. me) don't go into selling real estate



Pensions and signalling

- Firms can use pensions to give workers an incentive to “reveal their types”
- By backloading compensation, firms can attract workers who intend to stay at the firm for a long time
 - Reduces transactions costs as discussed
- Furthermore, “low discounters” may have other desirable characteristics
 - May invest more in firm-specific learning
 - May be more reliable employees



DC pensions

- Are a sorting mechanism
 - Defer pay into the future
 - Therefore attract workers with lower subjective discount rates to work at the firm
 - Allow the firm to reward workers who save more than workers who do not save through matching contributions
 - In the US, give workers with very high discount rates a large incentive to quit (because then they can access the lump sum)



DB pensions

- Are a sorting mechanism
 - Make working at a particular firm attractive to workers who intend to work there for a long time, who hope that their salaries will rise strongly
 - Not attractive to workers who intend to leave very soon after joining
 - Attractive to workers with low discount rates



Low discount rates

- Ippolito has examined the association between measures of low discount rates, measures of employee performance, and measures of pensions saving
- Finds that low discounters tend to do worse in jobs, are less reliable employees, and save less
- The implication is that by offering a part of employee compensation in the form of pensions, employers will make their firm more attractive to workers with low discount rates and therefore “sort” job applicants

Low discount rates and workers

Independent variable	Log annual wage	Log hourly wage	Log hourly wage	Supervisor (1=yes)
Sick leave balance, cumulative %	0.146 (16.29)			
Non-smoker at age 50		0.038 (2.32)	0.024 (1.41)	-0.007 (0.67)
Log of planning horizon			0.018 (2.27)	0.052 (3.33)
Other variables	X	X	X	X
Observations	13,560	4,868	4,523	4,566
Mean dependent variable	10.30	2.52	2.52	0.17
R ²	0.49	0.47	0.43	

- Worker who use all their sick leave have lower wages
- Workers who smoke have lower wages
- Workers who have long planning horizons have higher wages and are more likely to be supervisors

Low discount rate and savings

Independent variable	Mean	Pension (yes = 1)	IRA contribution (yes = 1)	IRA balance (positive = 1)	401(k) contribution (% of wage)
Non-smoker at 50	0.67	0.046 (3.22)	0.015 (1.61)	0.035 (2.52)	–
Log of planning horizon	1.12	0.062 (3.11)	0.035 (2.59)	0.082 (4.72)	–
Sick leave balance (%)	0.40	–	–	–	0.013 (12.23)
Wage rate	12.76	0.31 (19.78)	0.01 (2.17)	0.06 (7.72)	0.028 (16.78)
Other variables		X	X	X	X
Observations		4,544	4,544	4,544	13,315
Mean dependent variable		0.67	0.12	0.26	0.04

- Low discounters save less than high discounters



Pensions and transactions costs

- If access to capital markets is expensive, pension plans may offer employees cheap access to capital markets by pooling their funds
- As capital markets become more efficient, and workers become more educated, we would expect to see employer-sponsored pensions decline



Pensions and incomplete markets

- Employees may find individual purchase of securities expensive because of adverse selection problems
 - Classic example is individual health insurance and individual life insurance
 - By pooling employees together, firms can get much better rates because they eliminate the adverse selection problem
 - This only works if most employees would actually want to purchase the security



Pensions and incomplete markets

- Employers may also have a comparative advantage in *creating* financial securities to offer workers
 - E.g. employers know a great deal about their workers and so might be willing to provide longevity or wage insurance at prices that third parties might not be willing to match
- This argument doesn't really hold water for DB pension plans, because the only securities being created are, arguably, securities younger workers don't want and securities that place the employer in a compromising position for older workers (agency costs)



The role of pensions in labour markets

- A way to retain employees
 - Possibly, but it seems as though most of the action is in the form of the higher wages of employees with pensions
 - Why not just pay higher wages?
- A method of incentivising employees
 - Not really much evidence that workers with pensions are more productive
- A way of selecting desirable potential employees
 - Possibly true; are there other ways of changing the compensation contract to select more desirable workers?



Pensions in labour markets

- A way of managing retirement behaviour of employees
 - DB plans certainly do this; we might expect them to be more used in the presence of age discrimination legislation
- A way to save transactions costs
 - As transactions costs in capital markets decline, we might expect to see less of these
- A way to offer employees insurance against risks they would not be able to purchase insurance against in private markets
 - Possibly, but not really applicable to core aspects of pensions
- A way of making compensation tax efficient
 - Definitely very important