Firm-based Apprenticeship Training Schemes

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Material in this presentation is based on joint work with Uta Schoenberg, Jerome Adda, Costas Meghir and J.M. Robin

Structure of Talk

- Background and some facts
- Why do firms pay for general training?
- Why do workers enrol on apprenticeship schemes?
- What makes the system work: The role of Commitment
- Conclusions

Background: Post-secondary Education

- Large differences between post-secondary education systems across industrialised countries.

- Anglo-Saxon countries: post-secondary education usually state-provided, through universities, colleges and vocational schools.

- Germany and Austria: Largest fraction of each cohort undergoes training within apprenticeship schemes (Germany: more than 60 percent of each cohort)

Background: The apprenticeship system

- German Apprenticeship system combines school-based academic education with hands-on vocational and firm-based training

- Training duration 2-3.5 years; training in 370 occupations

- Attempts to implement App. Systems in other countries is less successful

- UK government intends to double the number of UK apprenticeships to 500,000 by 2020.

Some Facts: Apprenticeship Training: Demand and Supply

Deamand and Supply for Apprenticeships
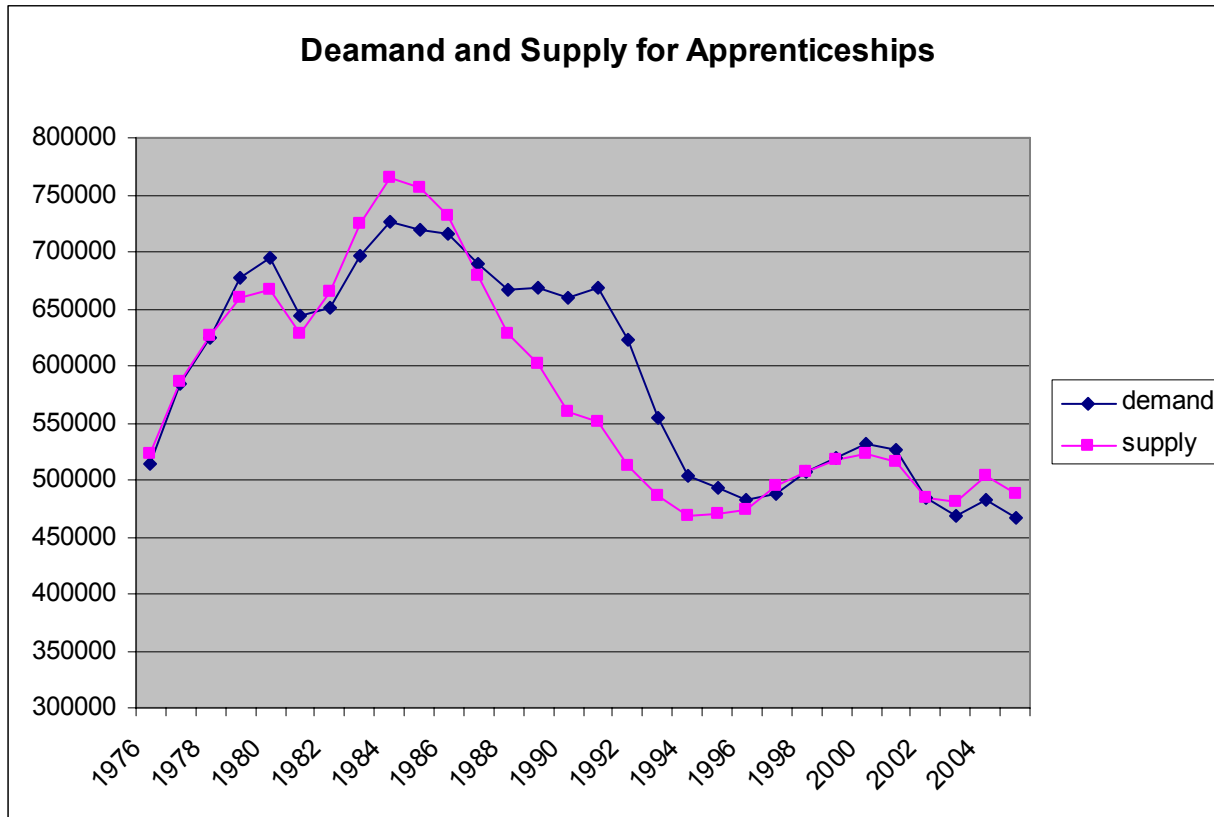
Some Facts: Who trains?

Table 2: Training firms

Firm trains	29.63%
Proportion workers in firms that train	60.37%
Proportion trainees	5.37%
Proportion trainees in firms that train	18.13%
Firms Size	32.13
Firm Size in Firms that train	16.76

Source: IAB Firm-panel, 1999

Background

- Apprenticeship training financed mainly by firms and workers:

    - Forgone earnings for apprentices
    - Training costly for firms

Background: Cost of Training

Table 1: The cost of Apprenticeship training

1	2	3	4	5	6
Returns	Direct Cost	Apprenticeship Wage	Wage Unskilled Worker	Total Cost	Worker's share
7730	2663	7031	11973	6906	71.6%

Column 1: estimates for workers' (annual) productivity during apprenticeship training. Column 2: estimates for the direct cost of training, such as personnel costs for trainers, plant and material costs, as well as textbooks, teaching software, etc. (obtained from Beicht et al. 2004). Column 3, 4: average annual apprenticeship wage; average annual wage of untrained workers with zero labor market experience (calculated from the IAB-Beschaeftigtenstichprobe for the year 2000). Column 5: total cost of apprenticeship training as difference between wage of untrained workers and the productivity of apprentices plus the 'variable' cost of training, i.e. Column 4 - Column 1 +Column 2. Workers' share of training costs: ratio of the average wage of an untrained worker minus the average apprenticeship wage and the total training cost, i.e. (Column 4-Column 3)/Column 5.

Background: Cost of Training

Total Cost Apprenticeship training= wages unskilled

-productivity apprentices +direct cost of training=
€6906

Competitive apprenticeship wage= Productivity-direct
cost = **€5067 <** observed wage= **€7031**

Firm's share on total costs=30%

Apprentices share on costs= 70%

(wages unskilled - apprentice wage)/total training costs

Key questions

1. Why are firms willing to contribute part of the training costs, although human capital is largely general?

2. Why are workers willing to bear some of the training costs and what are the expected returns from apprenticeship training?

3. The role of commitment

Background: Papers

- We draw on detailed and in-depth analysis in three other papers:
  - Dustmann and Schoenberg (2008), "Training and Unions"
  - Dustmann and Schoenberg (2007), "Apprenticeship Training, Firm-Specific Human Capital, and Asymmetric Information"
  - Adda, Dustmann, Meghir and Robin (2006), "Career Progression and Formal vs on the job training"

1. Why are firms willing to contribute part of the training costs

- Simple models of human capital investment: firms have no incentive to invest in general skills.

- Wage Compression: firms are willing to sponsor training if wages are compressed, i.e. if training increases workers' productivity by more than workers' (outside) wages (Acemoglu and Pischke, various papers)

- At least three possible reasons for wage compression: (1) unions wages, (2) complementarities between firm-specific and general human capital, (3) asymmetric learning.

1. Why are firms willing to contribute part of the training costs? – Wage Compression
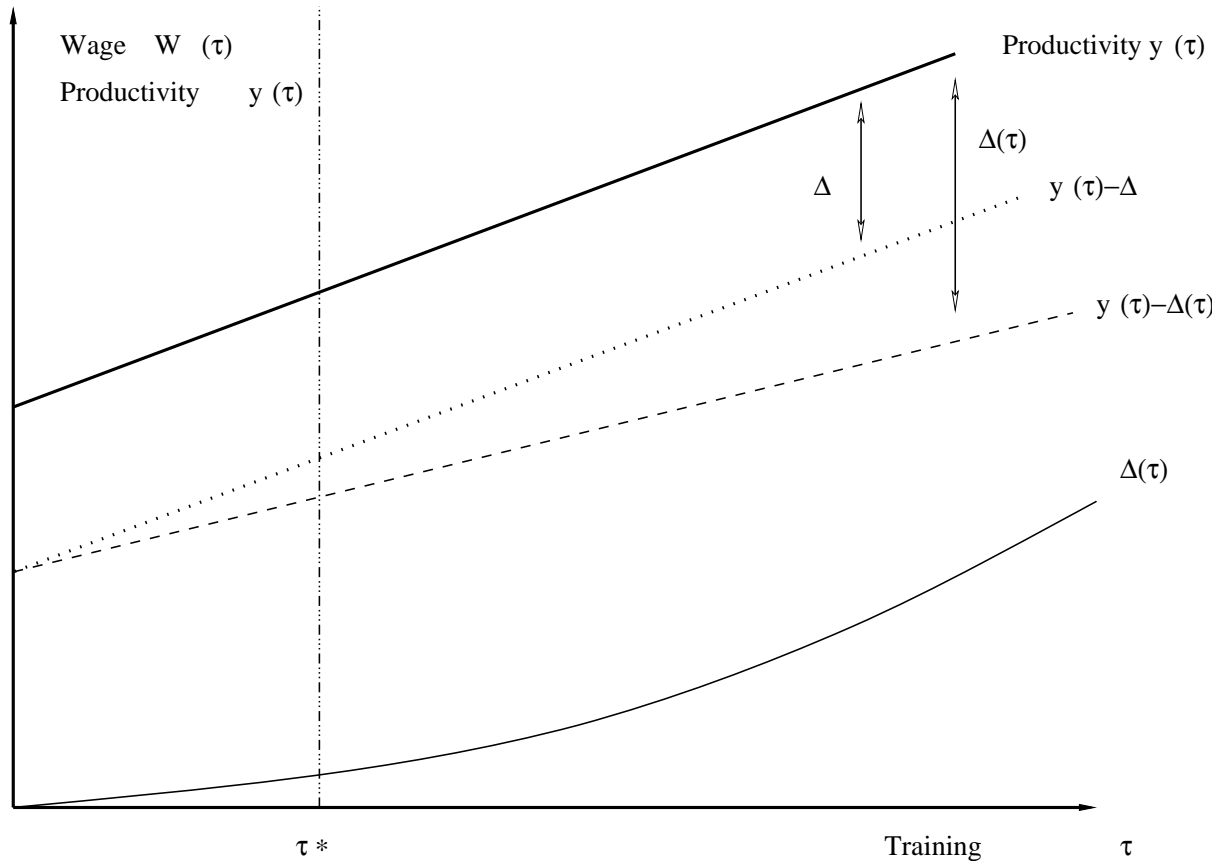
1. Why are firms willing to contribute part of the training costs? – Wage Compression

- Wage compression induced by union wages: One possible reason why firms train in Germany (-> Dustmann and Schoenberg 2008)

- But: Also non-unionised firms train.
  - Firm-specific human capital: contributes little
  - Asymmetric information: important additional reason for why firms train (Dustmann and Schoenberg 2008)

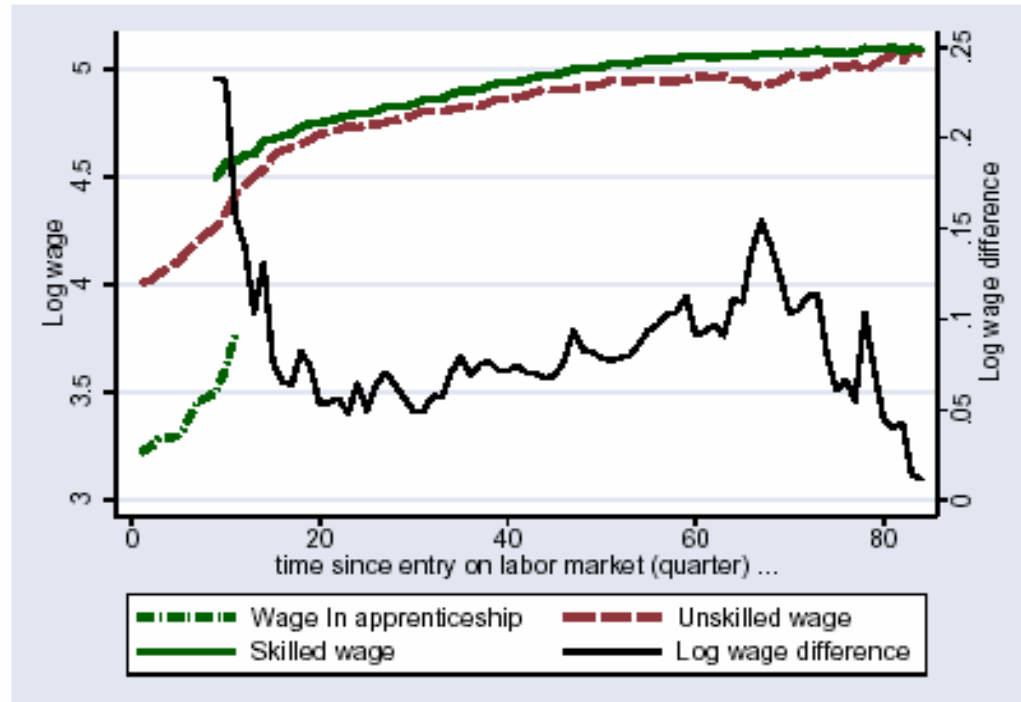# 2. Why do workers enrol into training? (Adda, Dustmann, Meghir, Robin 2006)

Figure 1: Log Wage by skill and the wage gain for qualified apprentices

2. Why do workers enrol in training? Returns to Apprenticeship Training

	Average	Type 1	Type 2	Type 3	Type 4
		Low Wage		High Wage	
		Low Cost	High Cost	Low Cost	High Cost
Return to Apprenticeship at age 15					
Average Treatment Effect (ATE)	-1.7 %	5.9 %	2.2 %	-1.2 %	-5.5%
Average Treatment on the Treated (ATTE)	8.4 %	6.7 %	5.4 %	8.8 %	7.1%
ATE, net of utility of education	2.8 %	9.5 %	8.8 %	2.3%	2.3 %
ATE, net of opportunity cost of education	8.8 %	13.1 %	9.4%	9.6 %	5.3 %
Decomposing the Average return to Apprenticeship (ATE) at age 18					
Baseline	14.0 %	12.4 %		14.1 %	
Returns at age 18 when apprentices have some non-apprenticeship characteristics					
Equal distribution of firm-worker match (σ_0)	21.4 %	18.6 %		21.6 %	
Same Business Cycle effects on wages	13.8 %	12.1 %		13.9 %	
Same Job to Job offer rate	13.7 %	12.0 %		13.8 %	
Same Job Offers	13.1 %	11.4 %		13.2 %	
Same Job Destruction	13.9 %	10.8 %		14.2 %	
Same Job destruction and job offers	13.1 %	10.0 %		13.4 %	

Table 4: The Life-cycle Returns to Apprenticeship

3. The role of Firm Commitment (Dustmann and Schoenberg 2007)

- We argue that Firm Based (as opposed to school based) type apprenticeship systems depend on the possibility of firms to commit to training
  - Requires regulatory framework
  - We simulate that training in Germany would be substantially lower under no commitment

3. The role of Firm Commitment

- Model:
  - Two periods, first is training period
  - Two types of workers: high-low ability
  - Two reasons for wage compression: asymmetric information, firm specificity
  - Two scenarios: no commitment (training is not verifiable); commitment.
  - Training observable by outside firms
  - No long-term wage contracts; zero profit condition

3. The role of Firm Commitment: Analysis

Training

- No Commitment: training only with wage compression; apprenticeship wage higher than productivity

- Commitment: workers are willing to bear part of the training cost; firms only if wage compression

3. The role of Firm Commitment: Analysis

Why is training lower under no commitment?

- Commitment: optimal training level equates MC with the sum of worker's MU and Firm's MP of training

- No Commitment: Firms ignore workers' MU

- For reasonable levels of Wage Compression: MU raises much more in training than MP of firms

3. The role of Firm Commitment: Analysis

- Evidence for Asymmetric Information and HC Specificity

- Evidence for Firm Commitment

- Question: How much lower is training without commitment?

- Simulation: Compute training Level arising if firms could not commit

- Estimate parameters (degree of hc transferability, productivity of high ability workers, distribution parameter of non-pecuniary job characteristics) using various data sets
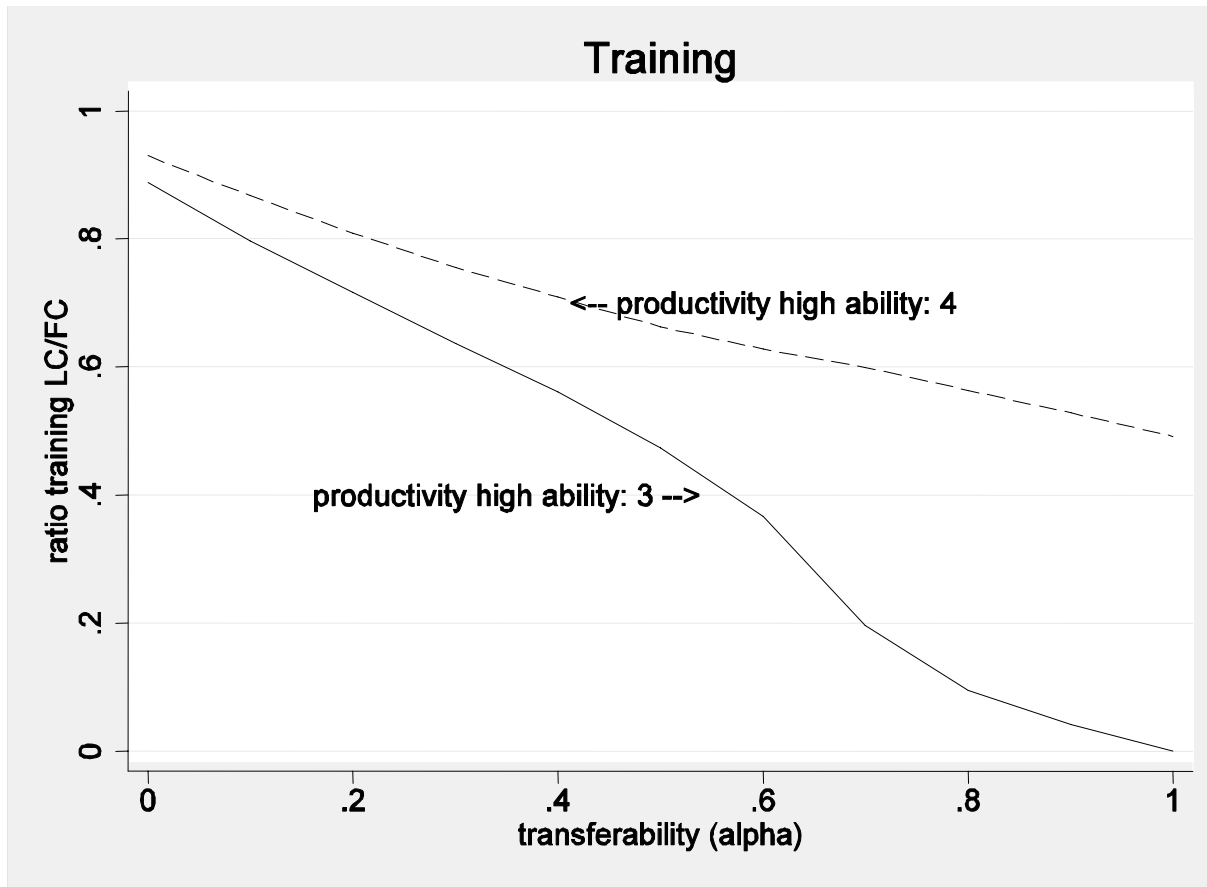
3. The role of Firm Commitment: Analysis

- For reasonable levels of wage compression, training and welfare are substantially lower under no commitment (at most 8%)

- Welfare to be at least 50% to that under no commitment: requires degree of firm-specificity and asymmetric information not supported by the data

Table 7: Full versus Limited Commitment: Simulation Results

Firm	1	2	3	4	5	6	7
Specificity	**parameters**		**training**		**welfare**		
Training	**b**	**Productivity η_H**	**FC**	**NC**	**FC**	**NC**	**optimum**
Panel A: Baseline Results (Mover-Stayer Wage Differential after Apprenticeship Completion							
α=0.95	0.44	3.22	2.02	**0.055**	2.51	0.64	2.75 (91.3%)
α=0.81	0.48	2.86	1.8	**0.137**	2.10	0.76	2.39 (87.8%)
Panel B: Robustness Check 1 (Mover-Stayer Wage Differential 10 years after training)							
α=0.95	0.44	3.15	1.98	**0.050**	2.45	0.62	2.68 (91.4%)
α=0.81	0.48	2.82	1.78	**0.131**	2.06	0.75	2.35 (87.7%)
Panel C: Robustness Check 2 (Job-to-Job Mover-Stayer Wage Differential 10 years after Training)							
α=0.95	0.42	2.79	1.79	**0.034**	2.14	0.59	2.32 (92.2%)
α=0.81	0.46	2.54	1.63	**0.104**	1.84	0.69	2.09 (88.0%)

Note: Column 1 and 2 report parameter values for the scale parameter of the logistic distribution, b, and the productivity of high-ability workers, ηH. They are chosen to replicate the separation rate and the mover-stayer wage differential in our data. Columns 3 and 4 compare the training level under full (FC) and limited (LC) commitment. Columns 5 to 7 report welfare under full and limited commitment as well as under the social optimum (i.e. when firms are able to training to commit to training provision, information is symmmetric, and training is fully general). We report our results for two estimates for the degree of specificity, and three alternative targets for the mover-stayer wage differential.

Limited versus Full Commitment: The Role of Wage Compression

3. The role of Firm Commitment: Why are firms able to commit?

- Vocational Training Act 1969: states rights and obligations

- Workplace training regulated, nation-wide standards, strict monitoring

- Centralised exams

3. The role of Firm Commitment: Other countries

- ## UK
  - No external, statutory regulation
  - No nation-wide training standard
  - Training and Enterprise councils: voluntary, at local level, purely advisory, and no statutory power
  - Examination: Firm-Internal assessment