

# What's happening to skill in Australian jobs?

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Paper presented at the NCVET No Frills  
conference  
Launceston, 10 July 2008

# What this research is about

- Focus on skill rather than training
- Primary interest is the amount and type of skill converted into productivity
- Focus on change over time
- Systems approach
  - dynamic interaction of multiple drivers and settings
  - inherent disequilibrium
  - Lags and feedback loops
- Looks at job skills from the employee's perspective

# Where it fits in

- Alternative perspective (or corrective) to the “stoking the boiler” model
- Clarifies and delimits the role/responsibility of institutional VET
- Sharper focus on the learning that takes place outside purposive training contexts
- Emphasises importance of the way skills are deployed In the workplace

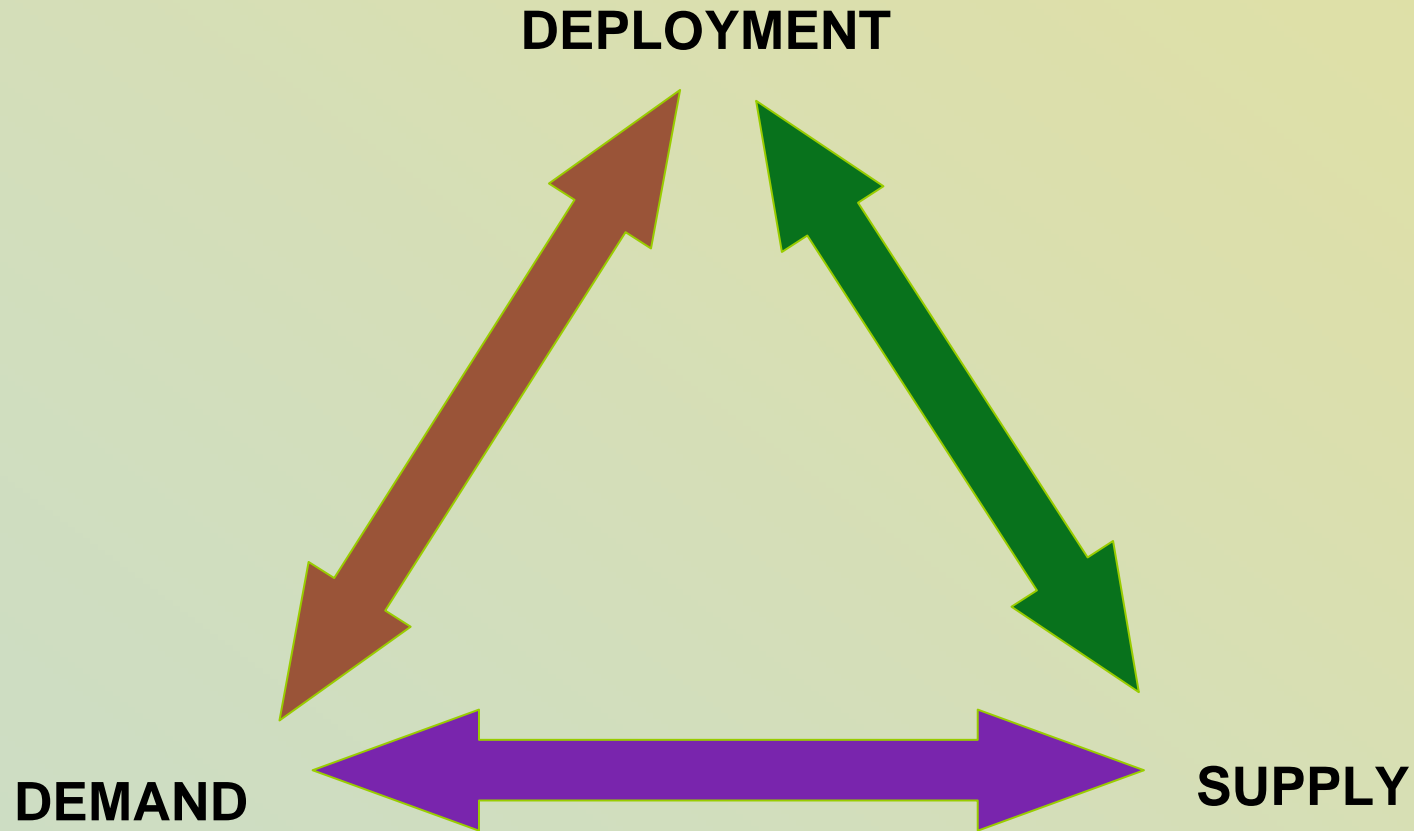
# Some political questions

- Are previously skilled occupations getting dumbed down by automation and managerialism?
  - *the deskilling hypothesis*
- Are all jobs in industrialised economies (even traditionally low-skilled ones) demanding more skill to survive in the face of globalisation?
  - *the skills upgrading hypothesis*
- Are entrenched interests, practices and economic institutions inhibiting the potential of the economy to make productive use of the higher skills it could generate?
  - *The low-skill equilibrium hypothesis*

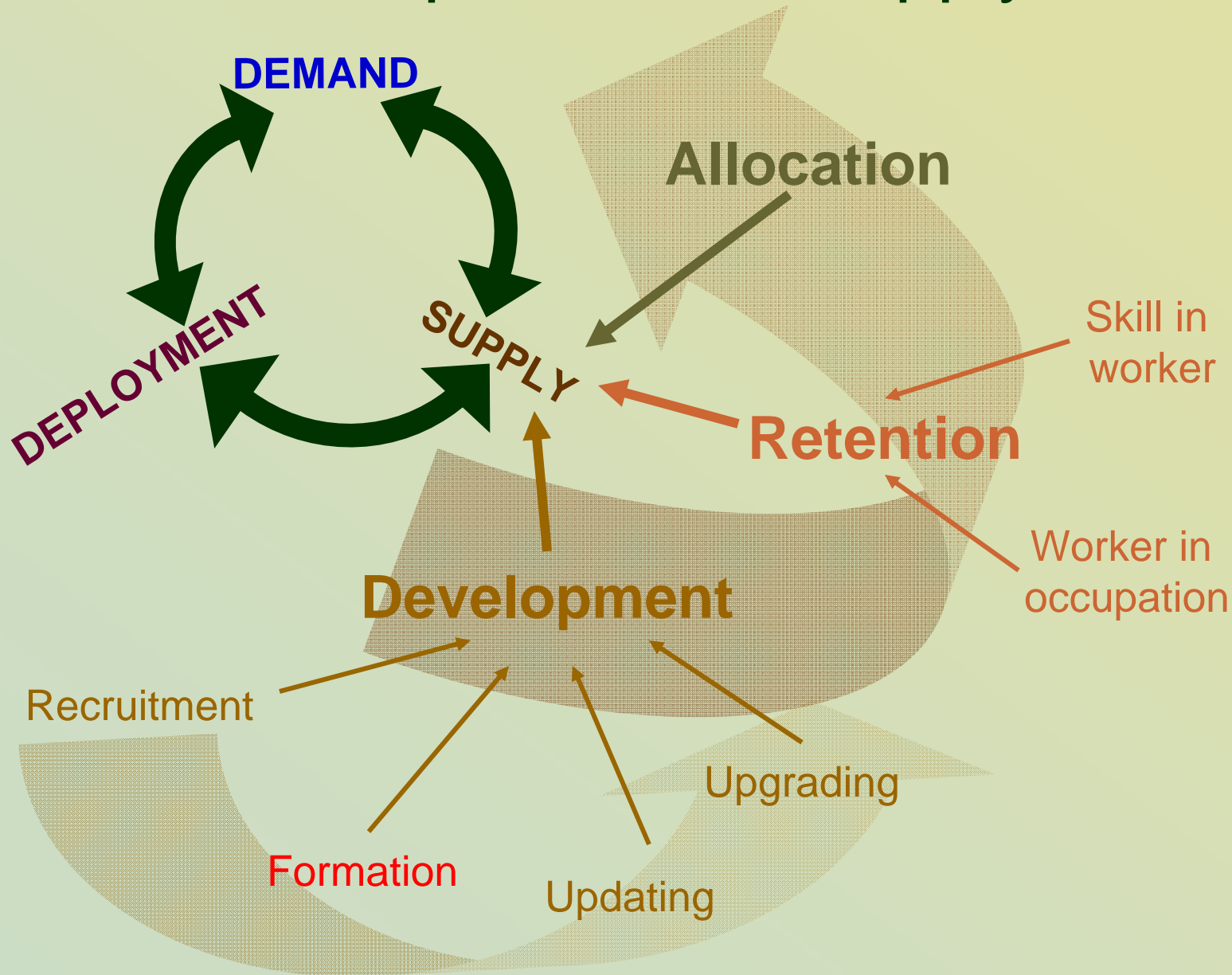
# Broad research questions

- Are the skill requirements of the Australian economy rising ?
- Has the rise (if there is one) been across the board, or confined to specific occupations or industries?
- How has skill utilisation been influenced by global competition, a tight labour market and critical skills shortages?
- Do workers with low formal qualifications nevertheless develop their skills over a working life?
- How are these developments affecting the ways in which the workforce develops skill?

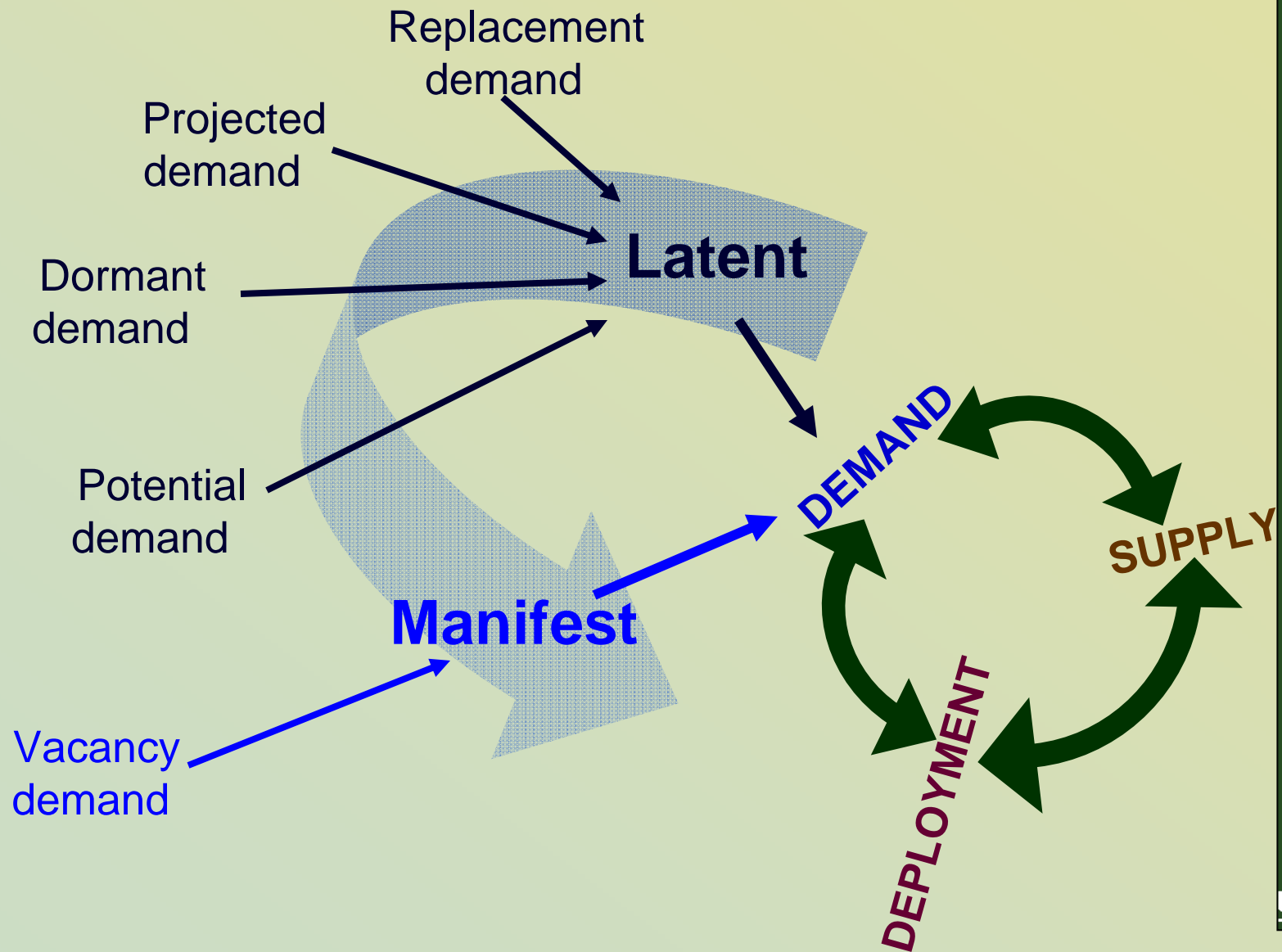
# The skill triangle



# Components of Supply

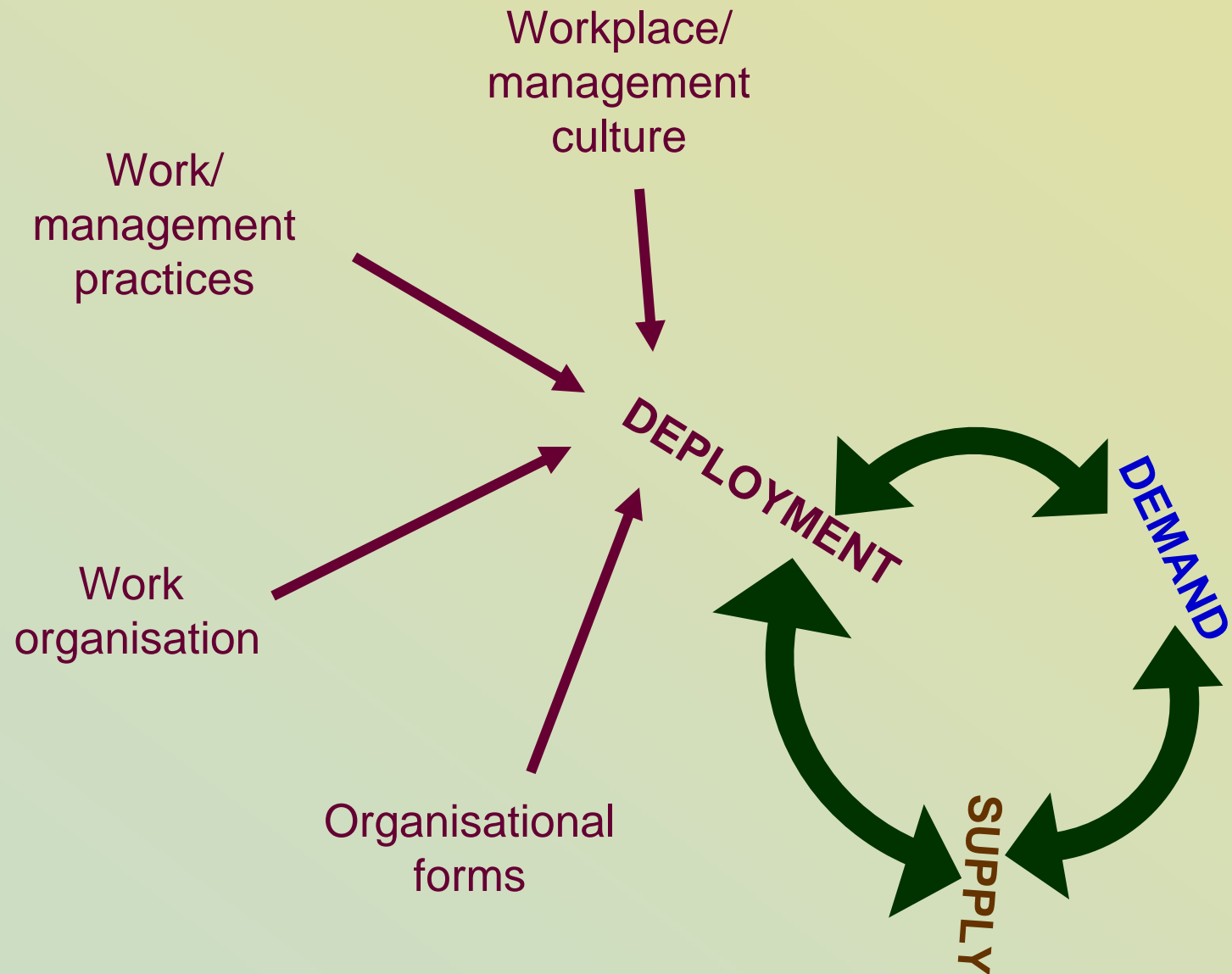


# Components of demand





# Components of deployment



# How can you specify a common measure of skill?

- No common metric for the content of different skills
- Skill doesn't stand still - it evolves, mutates and decays
- Difficult to compare the kinds of skill exercised at different levels in the workforce hierarchy
- Confounding influence of social construction
- The commonly used proxies (qualifications, occupational status) could represent independent variables in their own right

# Spenner's two dimensions (1990)

- Substantive complexity
  - The level, scope and integration of mental, manipulative and interpersonal tasks in a job
- Autonomy-control
  - The discretion or leeway available in a job to control the content, manner and speed with which tasks are done

# Skill-intensity

- The degree to which a job “stretches” the current capabilities of those who work in it
- Effectively captures the *match* between the employee’s self-perceived capabilities and the perceived demands of the job
- Does not imply any objective comparison of the *amounts* of skill actually exercised in different jobs
  - i.e. a skill-intensive job is not necessarily a high-skilled one
- Allows meaningful comparison and aggregation across skill types and levels in the work hierarchy
- Makes more sense for tracking change than for static comparisons.

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# The data

# HILDA

- Household, Income and Labour Dynamics in Australia
- Data owned by FAHCSIA (ex-DSS)
- Survey designed and managed by Melbourne University Institute of Economic and Social Research
- Household survey
- Interviewer-administered survey with supplementary self-completion questionnaire
- Panel sample – i.e. same respondents in each round
- Repeated annually since 2001
- Primary focus areas are
  - household income, wealth and expenditure
  - labour market experience
  - family formation and dynamics

# Strengths of HILDA

- Best source yet of quality microdata on Australian employees' individual experience of work
- Only large-scale Australian dataset to combine variables on skill-intensity and task discretion
- Large sample (20,00 in-scope households, 7-8,000 employed respondents per wave)
- Frequent refresh rate permits rapid identification of emerging trends
- Panel sample allows individuals or cohorts to be tracked across waves
- Scope of subject areas covered provides wide choice of analysis variables

# Limitations of data

- Survey not primarily designed to investigate workplace dynamics
  - Choice and structure of variables reflects priority of non-relevant demands
- Sampling method (geographic cluster) maximises demographic representativeness at the expense of representative coverage of employed workforce
- Relatively high attrition rate in early years
  - No mechanism to refresh sample to compensate for effects of attrition
- Limited scope for disaggregation despite large aggregate sample
- Some relevant variables are ambiguously worded
- No information on skill content



# Key dependent variables - skill-intensity (7-point Likert scale)

- **COMPLEX**  
(\_jomcd) - My job is complex and difficult (waves 1-6)
- **NUSKILLS**  
(\_jomns) - My job often requires me to learn new skills (1-6)
- **USESkill**  
(\_jomus) - I use many of my skills and abilities in my current job (1-6)

# Key dependent variables - task discretion (7-point Likert scale)

- OWNTASK (\_jomfd) - I have a lot of freedom to decide how I do my job
- HAVESAY (\_jomls) - I have a lot of say about what happens on my job
- WORKFLOW (\_jomfw) - I have a lot of freedom to decide when I do my work

# Additional job characteristic variables – Waves 5 and 6 only

- I have a lot of choice in deciding what to do at work
- My working times can be flexible
- I can decide when to take a break
- My job requires me to do the same things over and over again
- My job provides me with a variety of interesting things to do
- My job requires me to take initiative
- I have to work fast in my job
- I have to work very intensely in my job
- I don't have enough time to do everything in my job

# Two additive scales (all waves)

## Skill-intensity

- My job is complex and difficult
- My job often requires me to learn new skills
- I use many of my skills and abilities in my job

## Task discretion

- I have a lot of freedom to decide how I do my job
- I have a lot of say about what happens in my job
- I have a lot of freedom to decide when I do my work

# 2-factor solution – Wave 5 onwards

## Extended skill intensity

- My job is complex and difficult
- My job often requires me to learn new skills
- I use many of my skills and abilities in my job
- My job provides me with a variety of interesting things to do
- My job requires me to take initiative

## Extended task discretion

- I have a lot of freedom to decide how to do my own work
- I have a lot of say about what happens on my job
- I have a lot of freedom to decide when to do my work
- I have a lot of choice in deciding what to do at work
- My working times can be flexible
- I can decide when to take a break

# 3-factor solution – Wave 5 onwards

## Skill intensity

- My job is complex and difficult
- My job often requires me to learn new skills
- I use many of my skills and abilities in my job

## Time control

- I have a lot of freedom to decide when to do my work
- My working times can be flexible
- I can decide when to take a break

## Job content discretion

- I have a lot of freedom to decide how to do my own work
- I have a lot of say about what happens on my job
- I have a lot of choice in deciding what to do at work
- My job provides me with a variety of interesting things to do
- My job requires me to take initiative

# 3

## The methodology

# 3 ways for an economy to get more skilful

1. Existing jobs become more skill-intensive, involve more learning or allow more discretion
2. Existing jobs in an industry or occupation are replaced by more skilful ones
3. Balance of economic activity shifts from low-skilled to high-skilled industries/ occupations



# Process 1: skill deepening

- Associated with incremental forms of innovation (Schumpeter 2, Japanese model)
- Core technical content of jobs may change little, *but*
- New soft skills may be required (VET implications), *or*
- Different forms of learning/knowing may be involved (VET implications)

# Process 2: sectoral skill change

- Associated with radical innovation or creative destruction (Schumpeter 1)
- Involves the development of new sector-specific skills or substantial upgrading of current ones (VET implications)
- Can have flow-on effect to other sectors in supply chain (VET implications)

# Process 3: shift in sectoral balance

- Creative destruction on a bigger scale
- Existing firms cannot be expected to anticipate adequately
- Need for ab-initio development of new kinds of skill or upgraded capacity to develop skills previously in limited demand (VET implications)
- Can lead to deskilling, skill polarisation, skilled unemployment

# What it could mean for VET

- Process 1:
  - Much of the new learning may be informal and self-initiated
  - Challenge for initial VET is to create a versatile, theoretically rich set of base skills to permit future work-based development
- Process 2:
  - Widespread requirement for formal upgrading of skills of existing sectoral workforce
  - Refocusing of entry-level training for individual occupations
- Process 3:
  - Shift of resources and effort from established to newer vocational specialisations
  - Challenge of finding ways to adapt and find productive outlets for skilled workers in declining industries

# Different processes, different research strategies

- Process 1:
  - Focus on longitudinal experience of those individuals who remain in the same jobs
  - Movement over time in cross-industry aggregates, adjusted to compensate for changes in industry/occupational profile of the sample
- Process 2:
  - Cross-sectional analyses in individual waves, focused on industries, not individuals
  - Not important that panel membership remain constant or representative of overall workforce composition, so long as it remains representative of sectors of interest
- Process 3:
  - Key evidence relates to changing industry/occupational balance of panel
  - Important that panel remain representative of distribution of work in the population
  - Continuity of panel membership and low attrition, non-response rates are critical to quality of findings

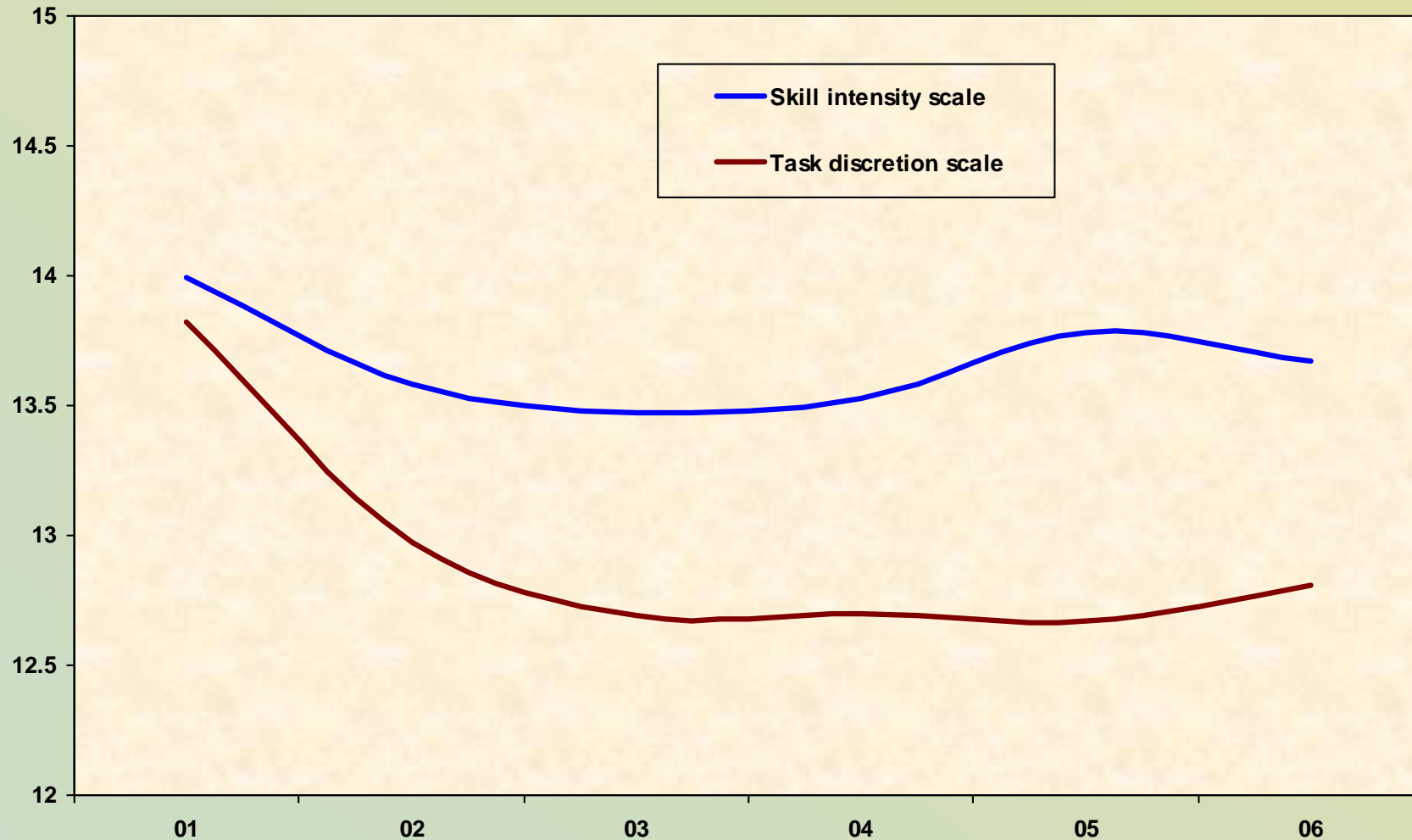
# 4

## The evidence

# Process 1

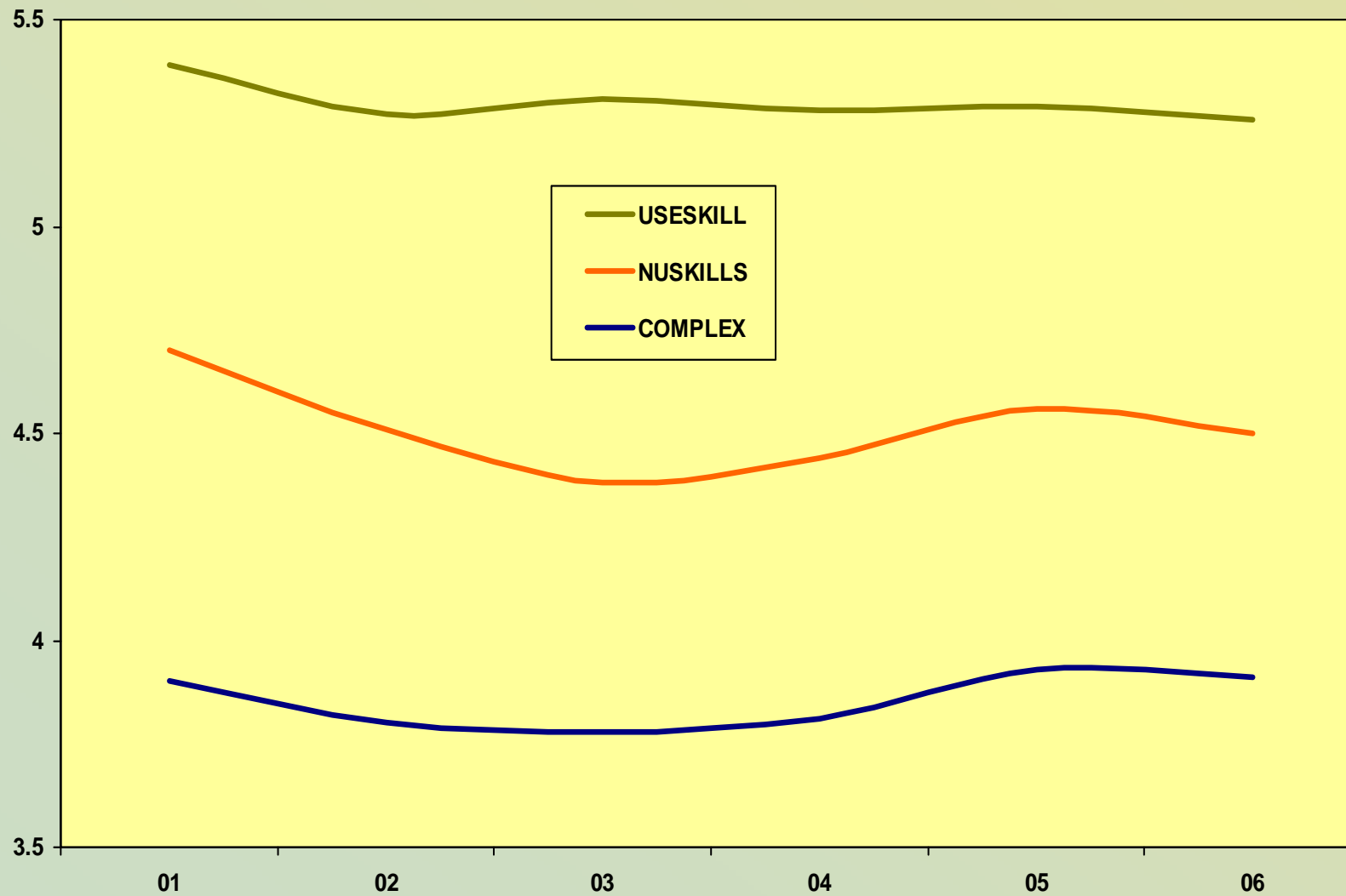
Are jobs generally becoming more  
skilful?

# Skill intensity and task discretion (full panel, all waves)



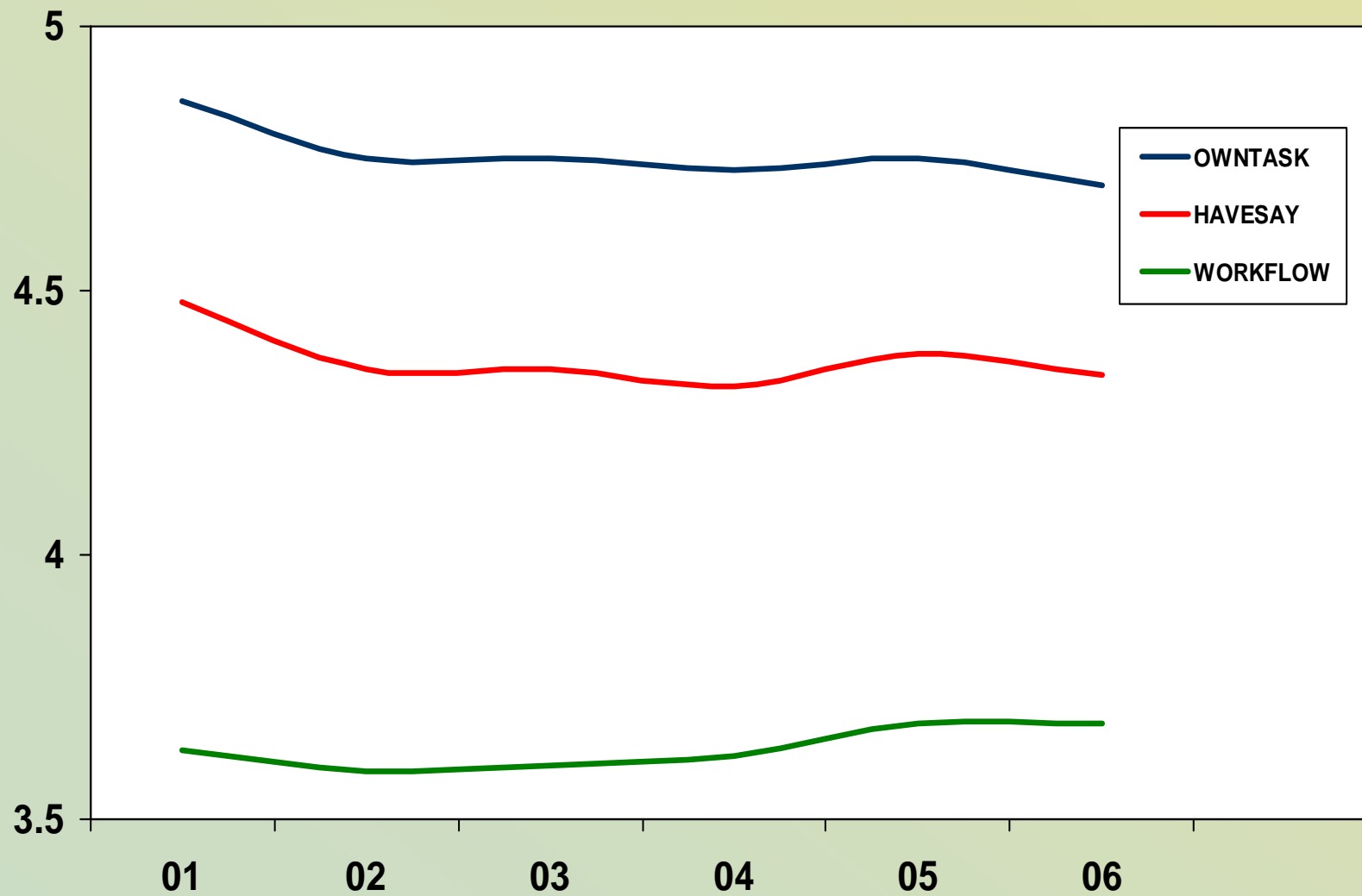


# Components of skill intensity (full panel, all waves)



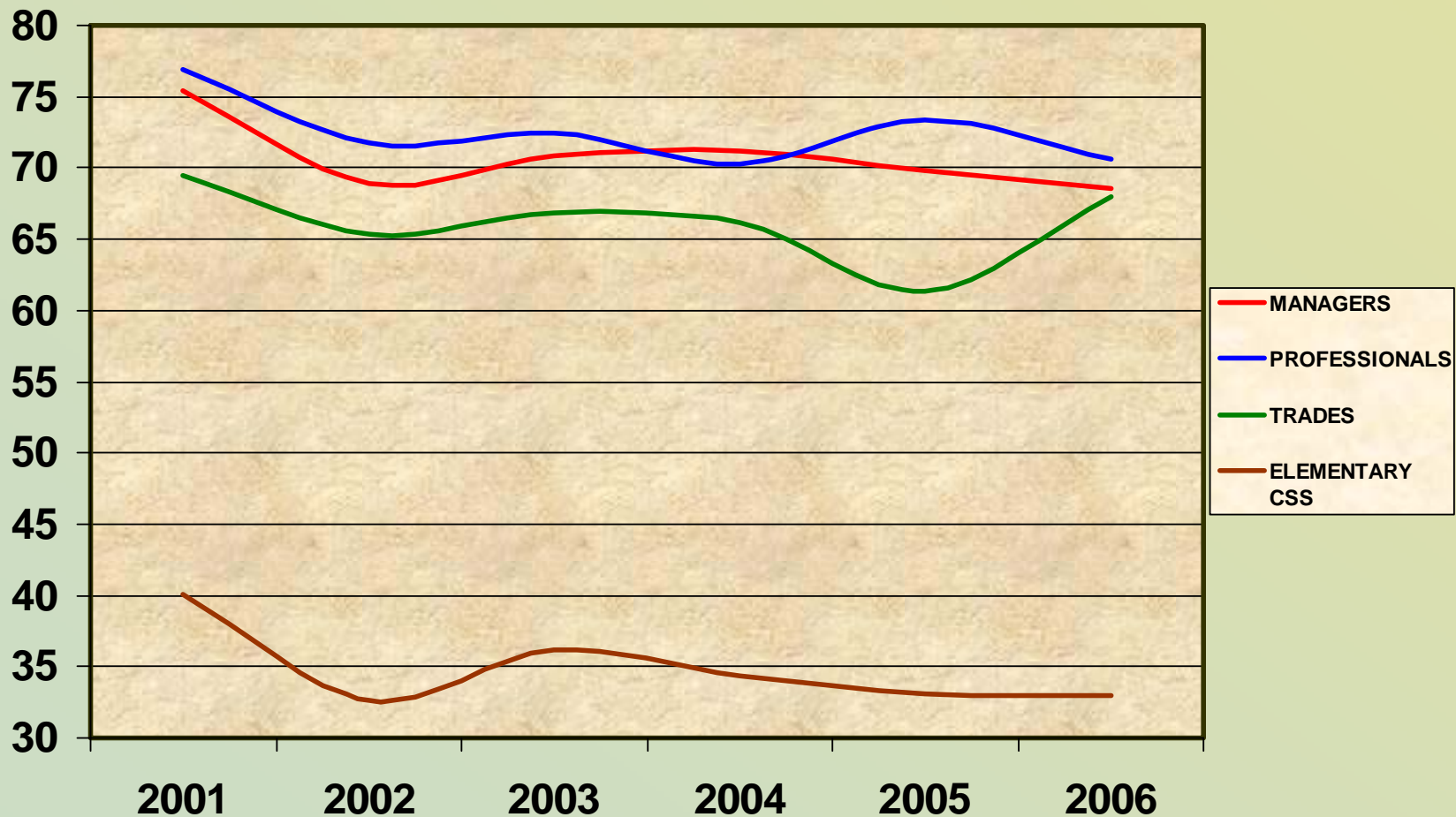
# Components of task discretion

(full panel, all waves)



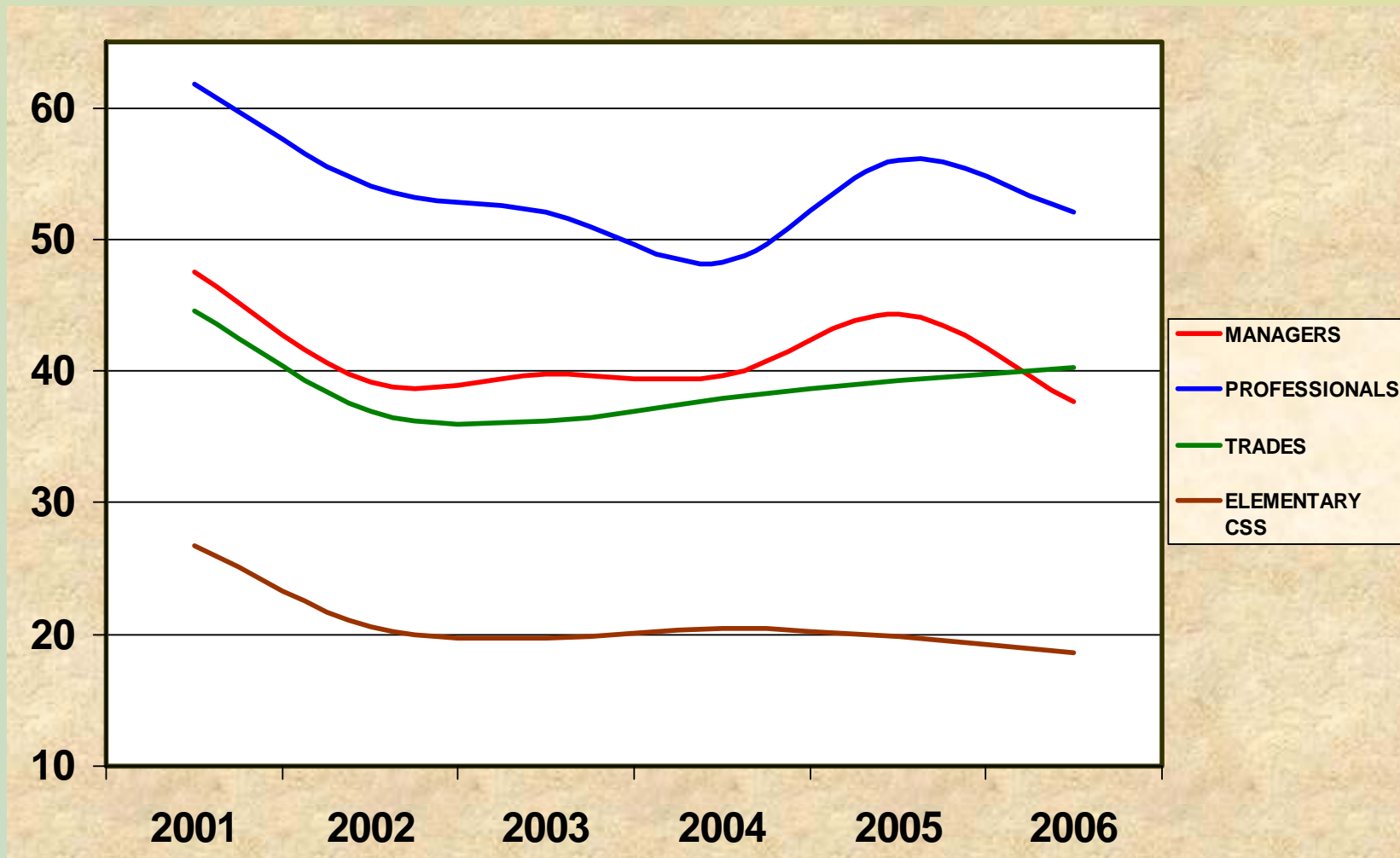
# Skill utilisation (*"I use many of my skills and abilities in my current job"*)

Trends in selected occupational groups  
(% of SCQ respondents rating item 6-7)



# Learning requirement (*“My job often requires me to learn new things”*)

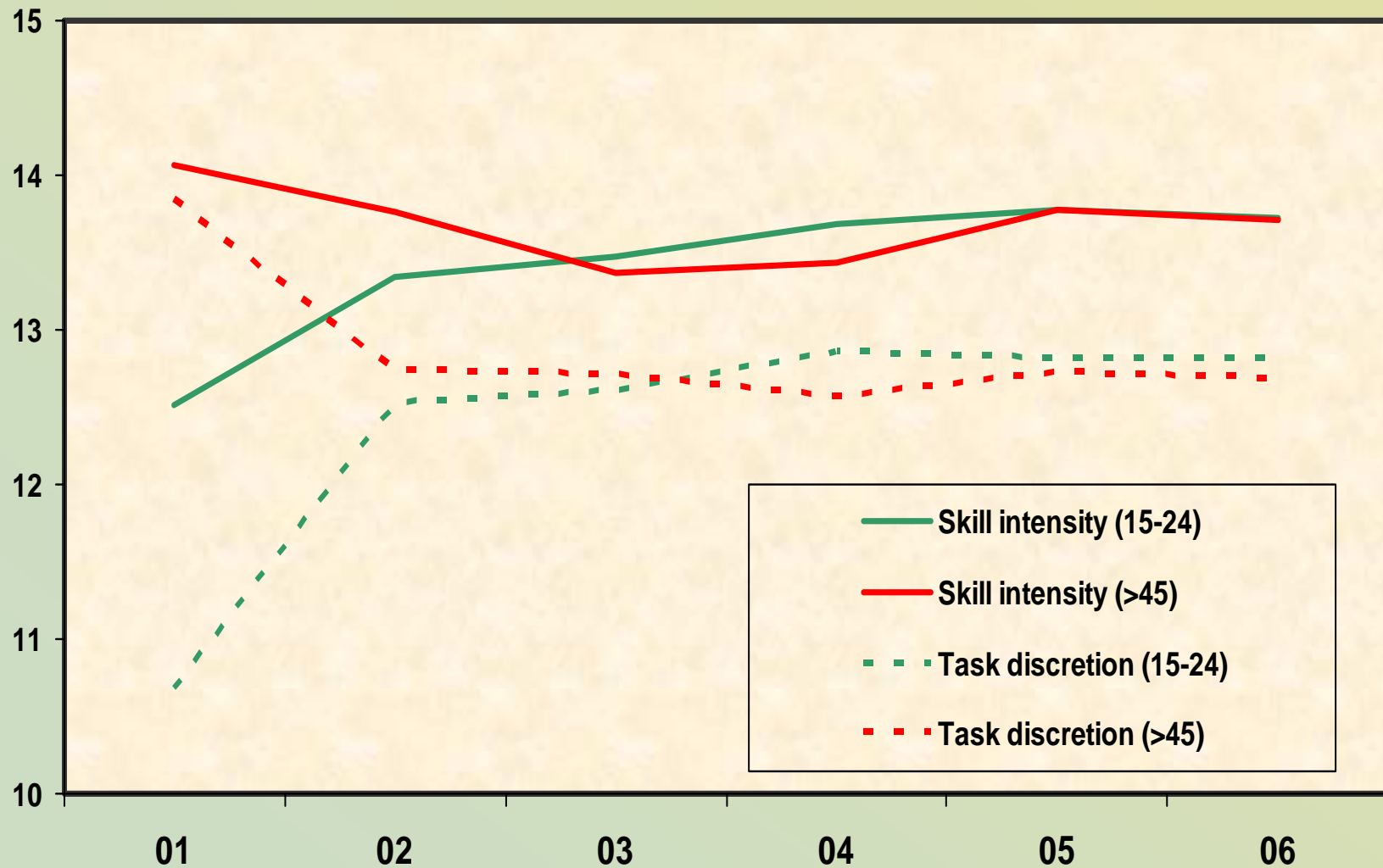
Trends in selected occupational groups  
(% of SCQ respondents rating item 6-7)



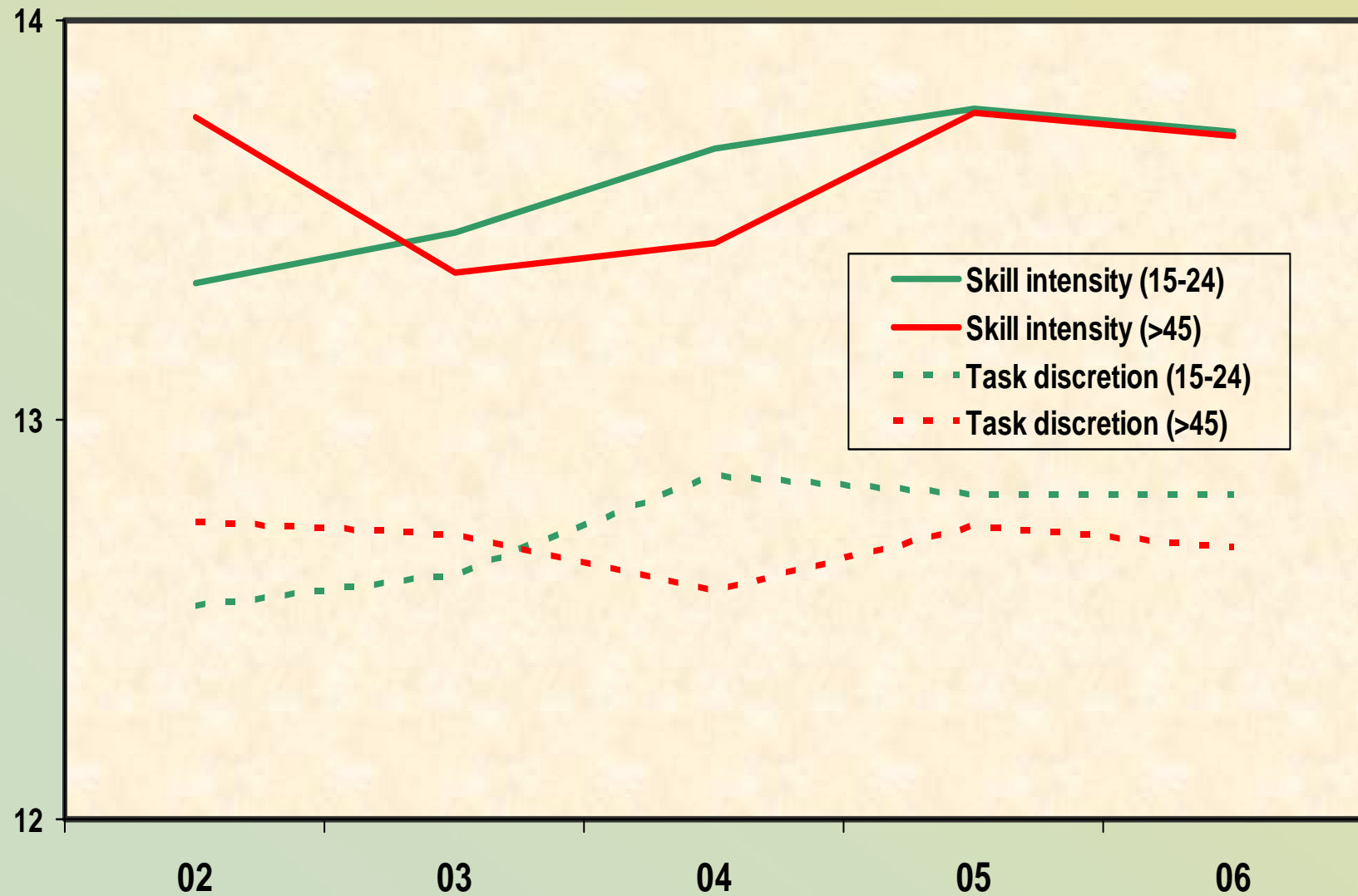
# Concerns about 01-02 data

- Significant attrition between waves
  - (13% of panel, 16% fall in response to relevant questions)
  - Many of the dropouts returned in later years
- Attrition non-randomly distributed
  - (proportionally greatest for young, low-skilled, mobile and casually employed)
- Significant changes in employment profile of younger respondents in 02
  - May reflect transition to primary labour market
- Possible impact of panel conditioning

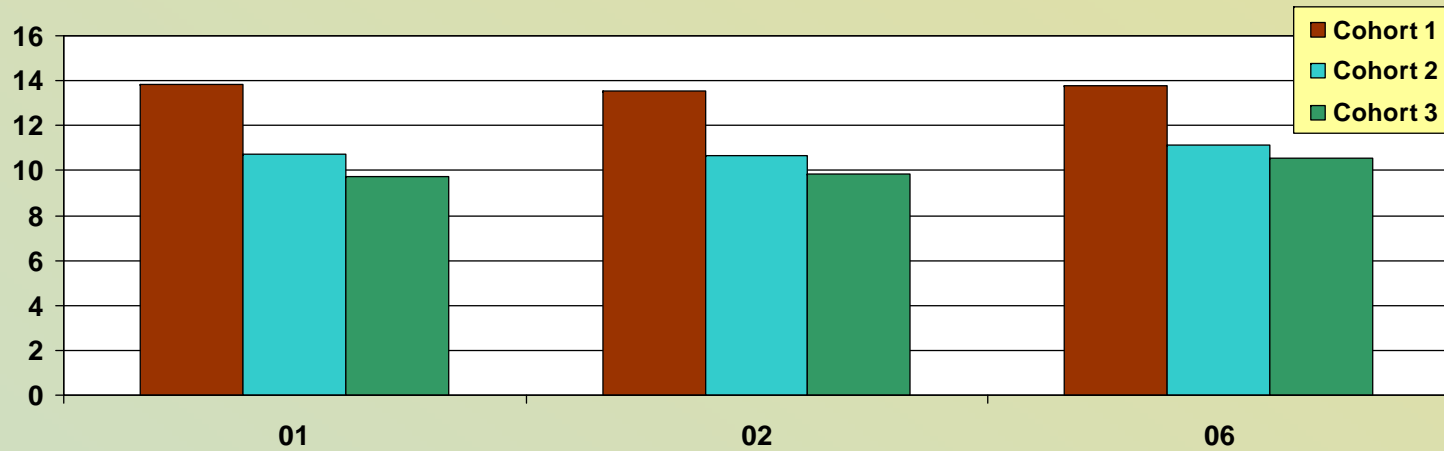
# True cohorts aged 15-24 and 45 or over in Wave 1 (answered all waves)



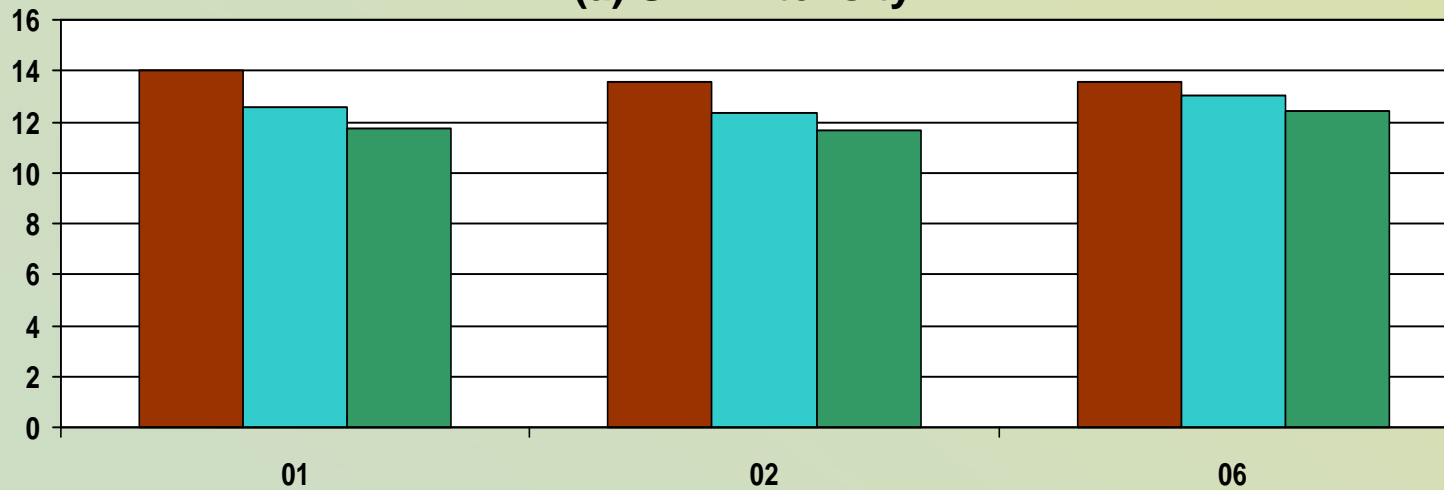
# True cohorts Waves 2-6



# Cumulative pseudo-cohorts aged 45 and over (1), under 25 (2) and under 20 (3) in Wave 1



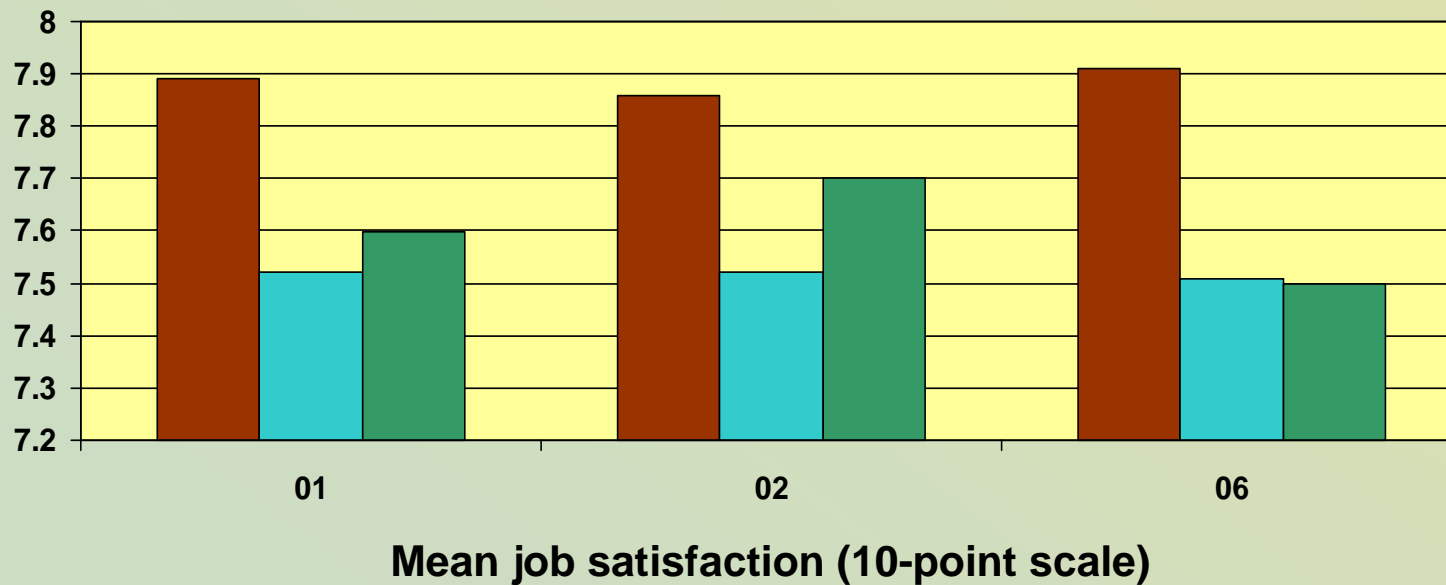
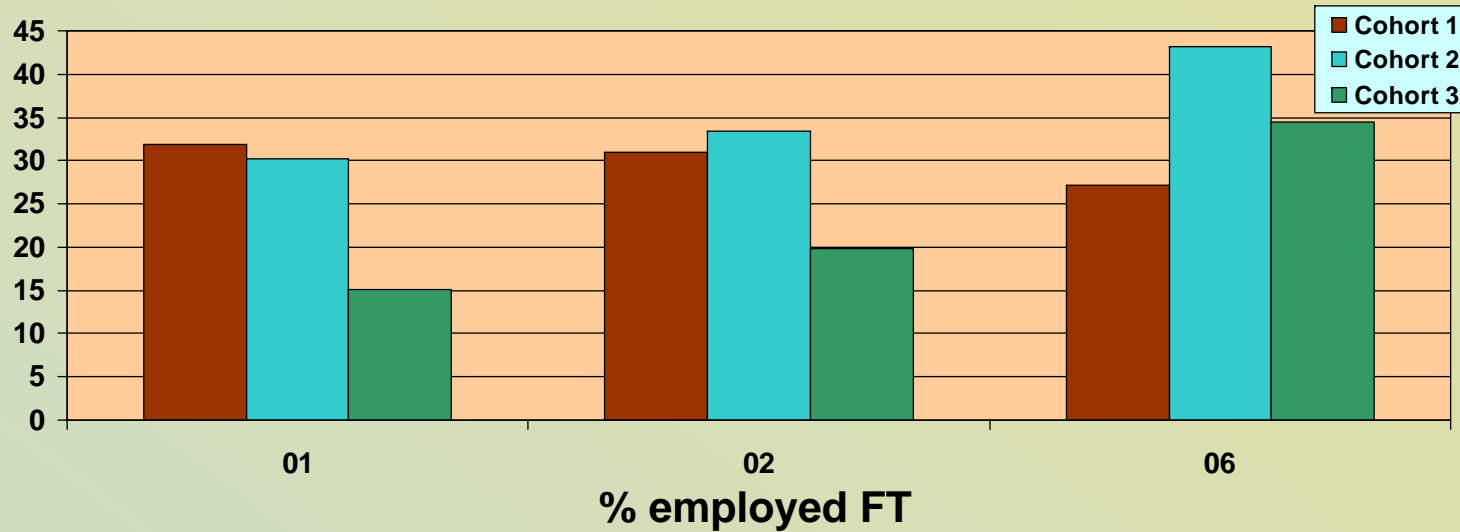
(a) Skill intensity



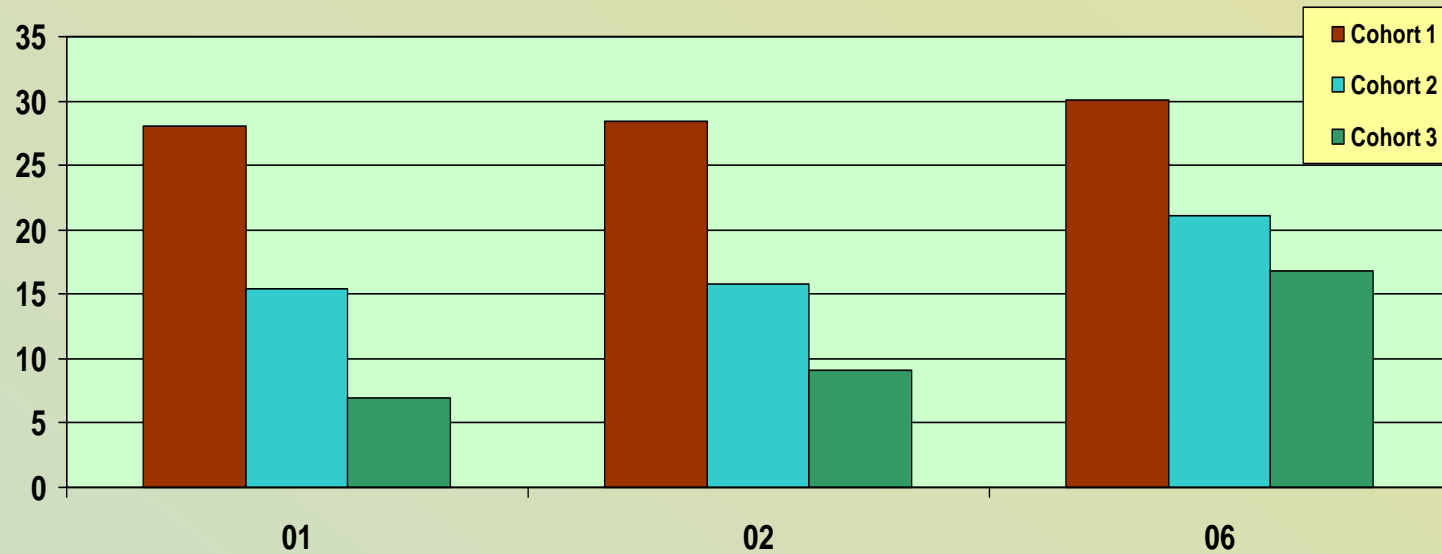
(b) Task discretion



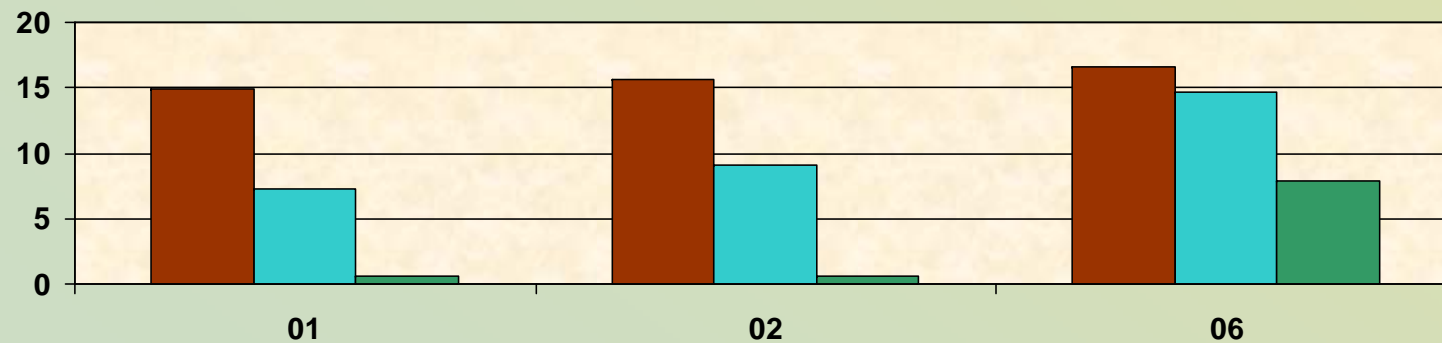
# Cumulative pseudo-cohorts – employment status and satisfaction



# Cumulative pseudo-cohorts – percentage with post-school qualifications



VET



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# Conclusions

- Small but clear declining aggregate trend in both skill intensity and task discretion
  - Appears to be robust to obvious sources of error (which should lead to overestimation of skill content)
  - Change between Waves 1 and 6 is statistically significant at the 1% level on most of the constituent variables for respondents in both waves
  - Virtually the only significant year-on-year change occurs between Waves 1 and 2
- Wave 1 data should be approached cautiously and might eventually need to be excluded
- Hard to explain trend without historical data to provide a context
  - May be linked to trends in skill demand
- Slight evidence of countervailing trend among younger workforce entrants

## Process 2

Are individual industries and occupations becoming more skilful?

# Biggest gains and losses 01-06 (skill index points – 2001 = 100)

- Non-metallic mineral m/f (+5.01)
- Air transport (+4.78)
- TCF (+4.64)
- Electricity & gas supply (+3.45)
- Machinery & equipment m/f (+1.84)
- Sport & recreation (+1.65)
- Rail transport (+1.07)
- Food retailing (-6.54)
- Road transport (-7.58)
- Agriculture (-7.58)
- Property services (-7.82)
- Food, beverage & tobacco m/f (-7.92)
- Printing, publishing, recorded media (-8.39)
- Basic material wholesaling (-9.06)
- Wood & paper product m/f (-10.46)
- Storage (-15.66)

# Criteria for selecting highest- and lowest-skilled 2-digit industries

- Percentage of graduates
- Percentage of employees with incomplete secondary education and no post-school qualifications
- Percentage of managers, professionals and associate professionals
- Percentage of labourers and elementary CSS
- Mean skill intensity score
- Mean score on extended skill intensity scale (Wave 6)
- Percent of employees who received training in last 12 months (Wave 6)

### Top 6 2001

- Education (5/5)
- Health services (4/5)
- Defence (4/5)
- Services to finance and insurance (4/5)
- Government administration (4/5)
- Libraries, museums and the arts (4/5)

### Bottom 5 2001

- Accommodation, cafes & restaurants (3/5)
- Personal services (3/5)
- TCF and leather M/F (4/5)
- Road transport (4/5)
- Food retailing (5/5)

### Top 6 2006

- Education (7/7)
- Insurance (6/7)
- Other services (6/7)
- Health services (6/7)
- Government administration (5/7)
- Finance (5/7)

### Bottom 5 2006

- Personal and household goods retailing (5/7)
- Personal services (6/7)
- Accommodation, cafes & restaurants (6/7)
- Road transport (4/5)
- Food retailing (7/7)

# Top industries 06 – ranking on task discretion scales (out of 44)

	<b>Extended task discretion</b>	<b>Job content discretion</b>	<b>Time control</b>
Education	38	11	43
Insurance	25	28	23
Other services	21	17	24
Health services	35	33	32
Government admin	12	16	17
Finance	22	32	21



# Bottom industries 06 – ranking on task discretion scales (out of 44)

	<b>Extended task discretion</b>	<b>Job content discretion</b>	<b>Time control</b>
Personal & household goods retailing	31	37	38
Accommodation, cafes & restaurants	39	41	38
Personal services	8	10	10
Road transport	23	36	26
Food retailing	42	43	33

# Highest skilled occupations

(>0.5 SD above all occupations mean on skill intensity)

<b>01</b>	<b>Task discretion</b>	<b>06</b>	<b>Extended task discretion</b>	<b>Job content discretion</b>	<b>Time control</b>
<b>Education professionals</b>	<b>17</b>	<b>Education professionals</b>	<b>27</b>	<b>11</b>	<b>35</b>
<b>Specialist managers</b>	<b>3</b>	<b>Science, building &amp; engineering professionals</b>	<b>3</b>	<b>4</b>	<b>3</b>
<b>Social, arts &amp; misc professionals</b>	<b>5</b>	<b>Specialist managers</b>	<b>4</b>	<b>3</b>	<b>7</b>
		<b>Social, arts &amp; misc professionals</b>	<b>7</b>	<b>5</b>	<b>8</b>
		<b>Health &amp; welfare assoc professionals</b>	<b>20</b>	<b>18</b>	<b>21</b>
		<b>Automotive tradespersons</b>	<b>21</b>	<b>14</b>	<b>26</b>

# Lowest skilled occupations

(>0.5 SD below all occupations mean on skill intensity)

<b>01</b>	<b>Task discretion</b>	<b>06</b>	<b>Ext task discretion</b>	<b>Job content discretion</b>	<b>Time control</b>
<b>Factory labourers</b>	<b>34</b>	<b>Factory labourers</b>	<b>34</b>	<b>34</b>	<b>34</b>
<b>Road &amp; rail transport drivers</b>	<b>31</b>	<b>Road &amp; rail transport drivers</b>	<b>28</b>	<b>31</b>	<b>29</b>
<b>Elementary sales workers</b>	<b>33</b>	<b>Elementary sales workers</b>	<b>25</b>	<b>32</b>	<b>27</b>
<b>Elementary service workers</b>	<b>26</b>	<b>Elementary service workers</b>	<b>30</b>	<b>28</b>	<b>19</b>
<b>Cleaners</b>	<b>20</b>	<b>Elementary clerks</b>	<b>32</b>	<b>33</b>	<b>22</b>
		<b>Cleaners</b>	<b>18</b>	<b>29</b>	<b>16</b>

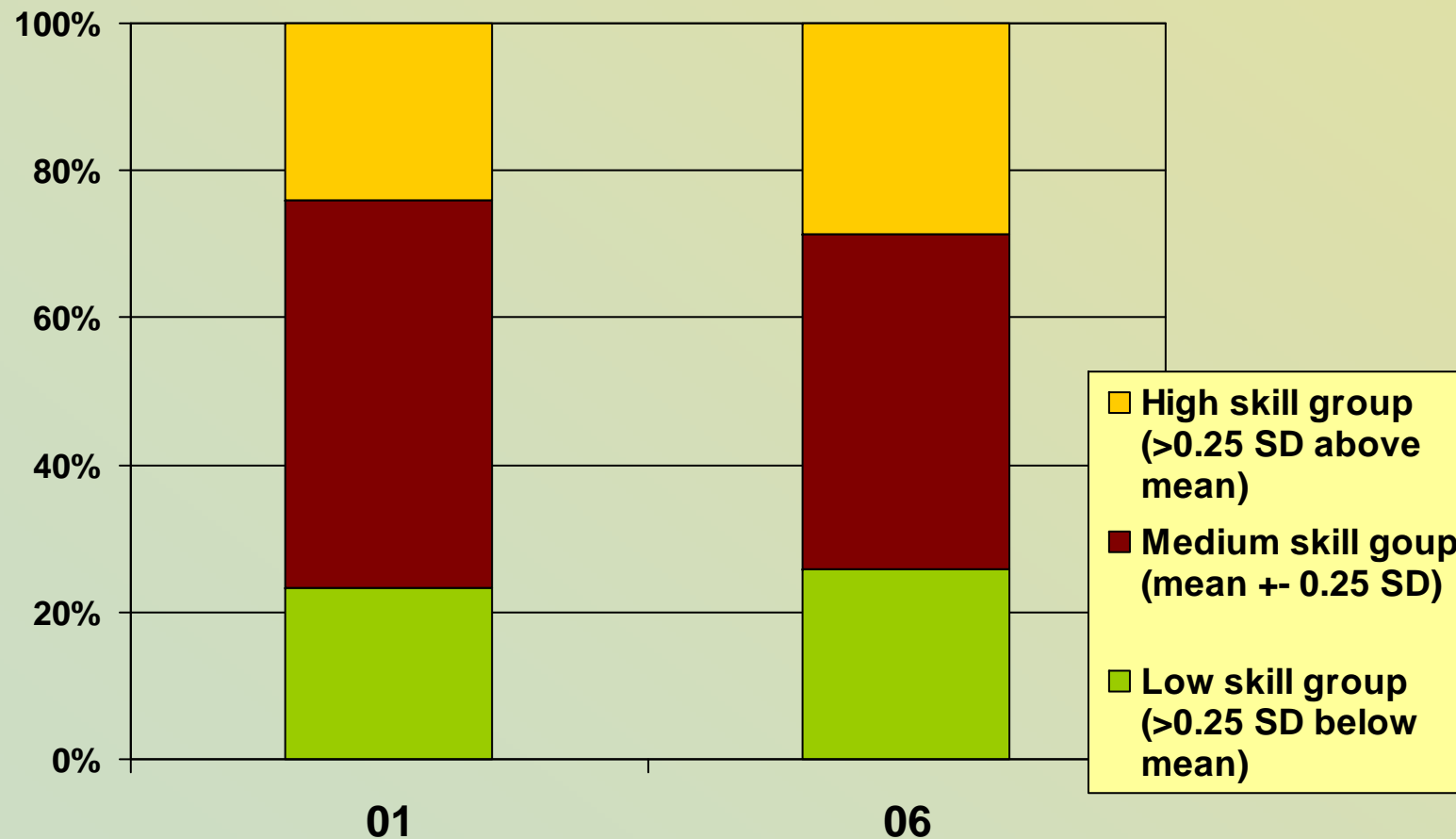
# Conclusions

- Declining trend in skill-intensity is spread across most industries
  - Those few that showed an increase mostly have small Ns and/or started from a very low base
  - No spectacular growth evident anywhere
  - 2-digit may be too coarse to pinpoint where the interesting change is occurring
- Most very high-skilled industries are in the non-market sector
  - A few market-sector industries are starting to catch up
  - but they represent a very small proportion of employment
- Spenner's hypothesis is not borne out by these data
  - Mismatch between skill-intensity and task discretion is most apparent in the non-market sector (health, education)
  - Correlation is better in the lower-skilled occupations
  - Time control is a confounding factor not addressed by previous research
  - Merits further investigation as a possible source of productivity problems

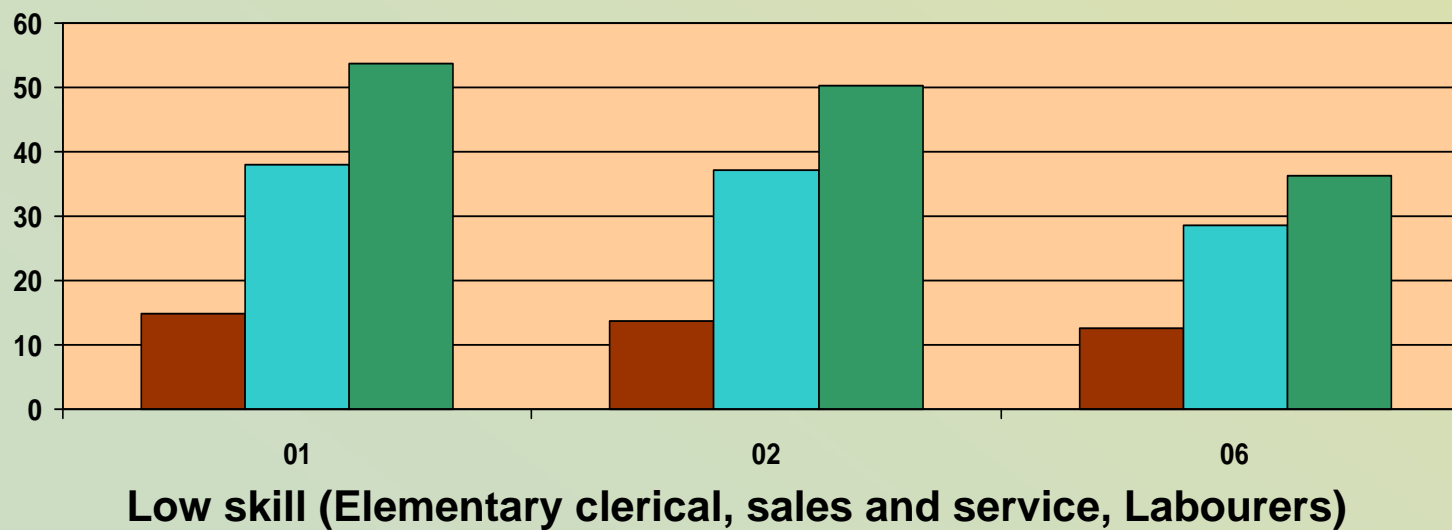
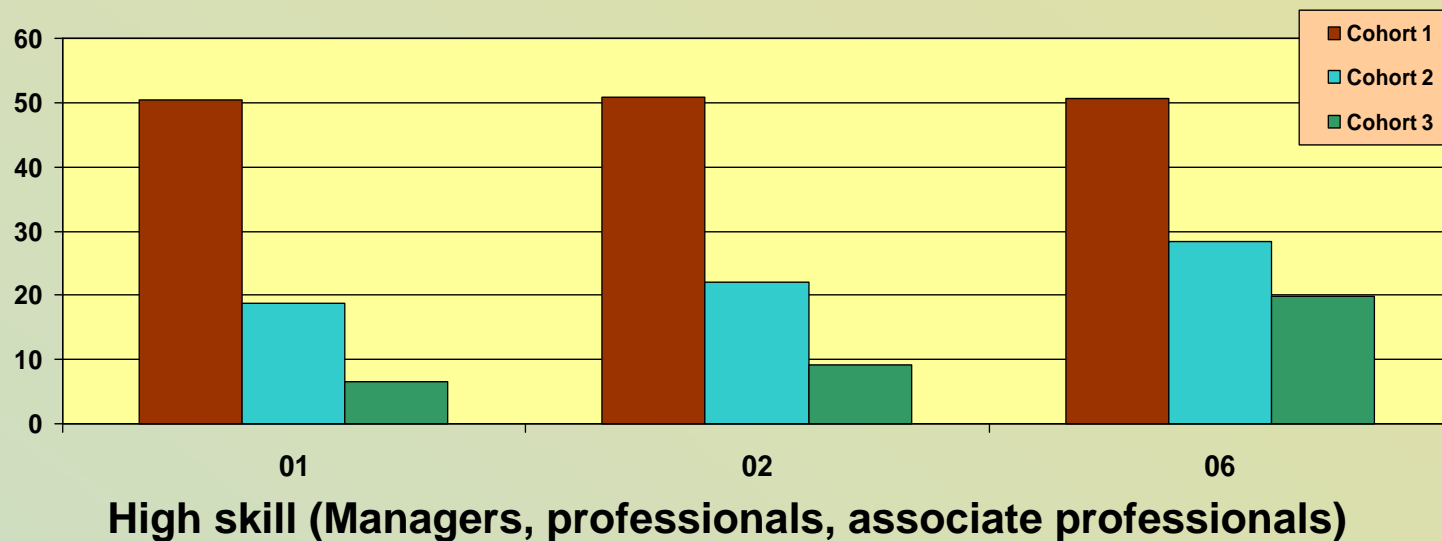
## Process 3

Is employment shifting from lower-  
to higher-skilled industries?

# Contribution of high, medium and low skill industries to employment in sample



# Cumulative pseudo-cohorts - % employed in highest- and lowest-skilled major occupational categories



# Conclusions

- Some evidence of skill polarisation
- Increasing proportion of employment in higher-skill industries is largely due to growth in non-market sector
- Key industries for low-skill employment have maintained and even slightly improved their position
  - Possible impact of boom conditions
- Cohort effect is partly due to
  - younger members of sample making the transition to the primary labour market
  - higher retirement rates among lower-skilled older workers
- 2-digit data may be giving us an inaccurate picture



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What does it all mean?

# Overall conclusions

- No sign that any of the known economic drivers are leading to any general increase in the skill-intensity of Australian jobs
- The picture would look much worse but for the public sector
- In many key high-skilled industries, employee autonomy and participation are badly out of kilter with the amount of skill being exercised

# Possible implications

- Long-term productivity problem in much of the Australian economy due to suboptimal deployment of the available skills
  - Those sectors which are being proactive make a very small contribution to overall employment
  - Contribution of employee task discretion needs further investigation
- Strategic restructuring in the direction of a higher-skilled economy may be getting hindered rather than encouraged by current economic drivers
- Questions remain over the wisdom of a purely employer-led VET strategy so long as these demand and deployment problems persist

# Some unanswered questions

- What lies behind the apparent failure to move to a more skill-based economy?
- What impact, if any, has supply-side reform (especially in VET) had on the trends?
- Is the disconnect between skill-intensity and task discretion peculiar to Australia in the current decade, or does it reflect inadequacies in the earlier research?
- Are 6 years really enough to give us a picture of the real change trends?
  - Not enough is known about the length of the adjustment lags
  - Much of the important change may have happened in earlier decades
- Are the data we have good enough to tell us what is really happening?

# Acknowledgement

The research on which this presentation is based uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) dataset. HILDA is managed by the Melbourne University Institute for Applied Economic and Social Research on behalf of the Commonwealth Department of Families, Housing, Community Services and Indigenous Affairs (FAHCSIA), which holds intellectual property in the data. However, neither FAHCSIA nor the Melbourne Institute should be seen as endorsing any of the analyses, conclusions or observations made in this presentation, which remain the sole responsibility of the author.