

Career Choice and Business Cycles*

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Bojos per l'Economia!



*Based on Baley, Figueiredo and Ulbricht (JPE, 2022): "Mismatch Cycles".

The role of the labor market

- **Labor Markets:**

- **Supply:** workers supply their **skills** to firms and receive a salary
- **Demand:** firms demand workers' **skills** and pay a salary

- In an ideal world, labor markets...

- assign the right person to the right job
- equalize supply and demand

- In the real world, labor markets do not work perfectly:

- workers' skills are not perfectly known \implies **Information frictions**
- finding a job / filling a vacancy is costly \implies **Search frictions**

- Frictions give rise to: **Skill mismatch**

Why should we care about skill mismatch?

- Consider a few examples:
 - Economics graduate from UPF flying planes
 - Pilot teaching classic literature
 - Writer doing research in economics



- Do you see any problems?
- **Today we will ask:**
 - How do people choose their careers?
 - How can we measure skill mismatch?
 - Do workers switch careers? When do they do it?
 - What are the implications for the macroeconomy?

Career choice

Two skills, Two careers

- **2 Skills:** verbal (v) and math (m)
- **2 Careers:** defined according to their relative use of skills
 - Legal career (Verbal 80%, Math 20%)
 - Banking career (Verbal 30%, Math 70%)
- **3 hierarchies:** Job ladder
 - Top > Middle > Bottom
- **Occupations:** classified in career and hierarchy
 - Legal: Judge > Lawyer > Secretary
 - Banking: ECB president > Bank manager > Accountant

How do we classify occupations?

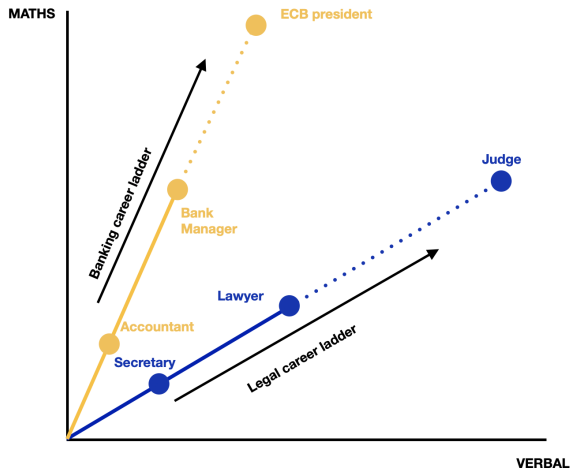
- **Occupation** is a vector of skill requirements $r = (r_v, r_m)$
- Requirements between 0 and 100

Skill requirements by occupation

	Verbal r_v	Math r_m
Legal career:	80%	20%
Judge	96	24
Lawyer	80	20
Secretary	40	10
Banking career:	30%	70%
ECB president	42	98
Bank manager	30	70
Accountant	15	35

Illustration of careers and occupations

Skills, Careers and Job Ladder



Worker abilities and mismatch

- **2 Skills:** verbal (v) and math (m)
- **Abilities:** $a = (a_v, a_m)$
 - Abilities are between 0 and 100
 - Q: How good are you in these abilities?
- **Mismatch:** abilities $a_k \neq$ requirements r_k , $k \in \{v, m\}$
 - Zero: abilities equal requirements ($a_k = r_k$)
 - Positive: over-qualification ($a_k > r_k$)
 - Negative: under-qualification ($a_k < r_k$)
- Mismatch by skill or overall mismatch?

How do we aggregate mismatch across various skills?

- **Mismatch Index:**

$$m(a, r) = \underbrace{|a_v - r_v|}_{\text{verbal mismatch}} + \underbrace{|a_m - r_m|}_{\text{math mismatch}}$$

- Compute your mismatch given your abilities $(a_v, a_m) = (\quad , \quad)$

	Verbal r_v	Math r_m	Mismatch $m(a, r)$
Legal career:	80%	20%	
Judge	96	24	
Lawyer	80	20	
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How do we aggregate mismatch across various skills?

- **Mismatch Index:**

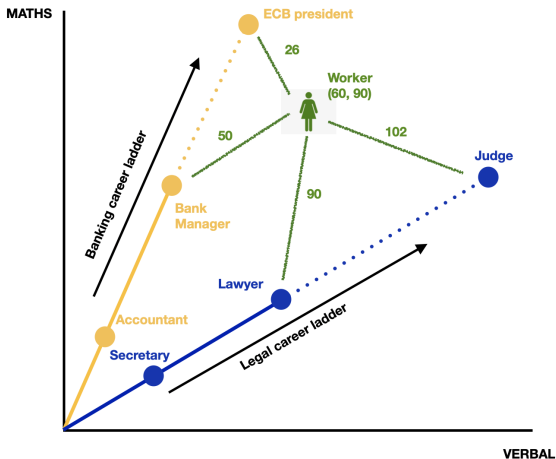
$$m(a, r) = \underbrace{|a_v - r_v|}_{\text{verbal mismatch}} + \underbrace{|a_m - r_m|}_{\text{math mismatch}}$$

- Example: mismatch for a worker with $(a_v, a_m) = (60, 90)$

	Verbal r_v	Math r_m	Mismatch $m(a, r)$
Legal career:	80%	20%	
Judge	96	24	$ 60 - 96 + 90 - 24 = 102$
Lawyer	80	20	90
Secretary	40	10	100
Banking career:	30%	70%	
ECB president	42	98	26
Bank manager	30	70	50
Accountant	15	35	100

Illustration of occupational mismatch

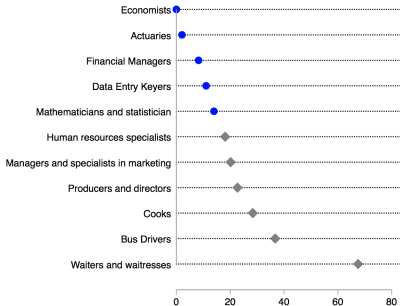
- What occupation will the worker $(a_v, a_m) = (60, 90)$ choose?



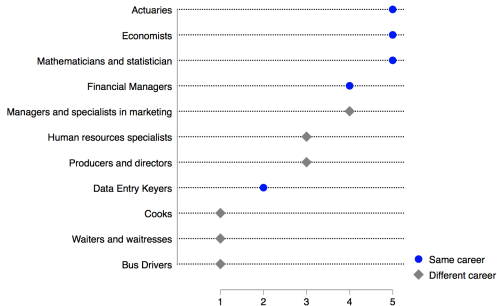
Careers and Job Ladders

- In reality, there are many careers, occupations and ladders...
- Examples:

A. Career



B. Ladder



Why is mismatch a bad thing?

- For simplicity, let us focus on 1 skill (math)
- **Output** produced by worker with ability a in occupation r

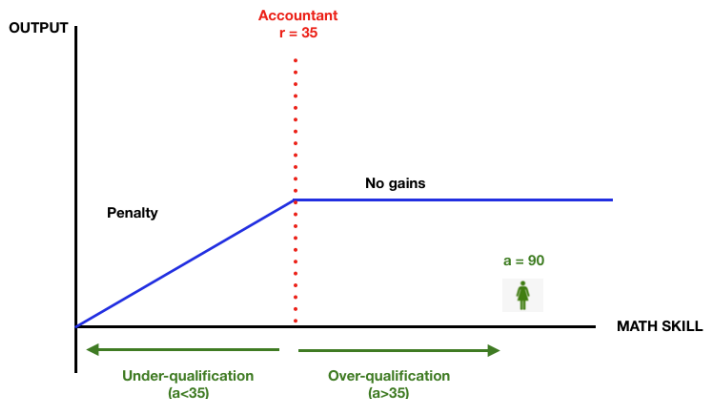
$$y(z, r, a) = \underbrace{z}_{\text{business cycle}} + \underbrace{\eta r}_{\text{job ladder}} - \underbrace{\max\{r - a, 0\}}_{\text{under-qualification penalty}}$$

- **business cycle:** $z \in \{z^{high}, z^{low}\}$
 - more output in expansions z^{high} than recessions z^{low}
- **job ladder:** ηr
 - higher hierarchy produce more (only if worker is qualified enough)
- **penalty:** $-\max\{r - a, 0\}$
 - Lower output if under-qualified
 - Q: What is the cost of being over-qualified?

Production technology

$$y(z, r, a) = \underbrace{z}_{\text{business cycle}} + \underbrace{\eta r}_{\text{job ladder}} - \underbrace{\max\{r - a, 0\}}_{\text{penalty}}$$

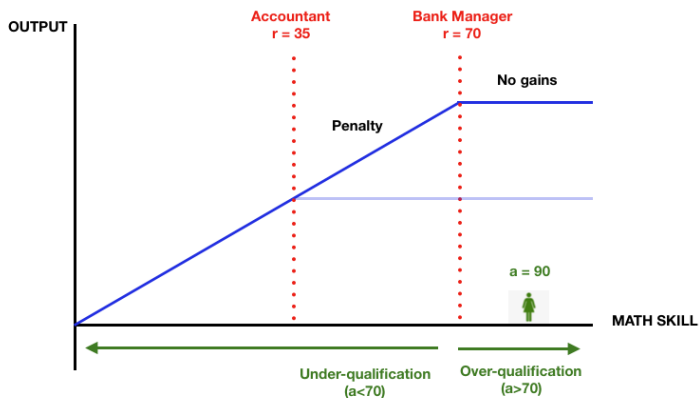
Output as a function of worker ability



Production technology

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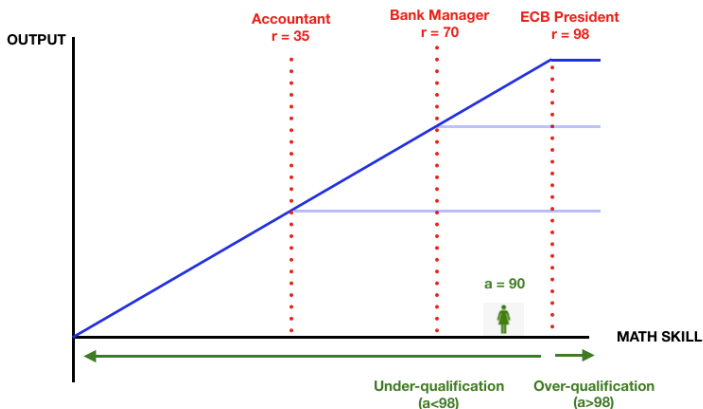
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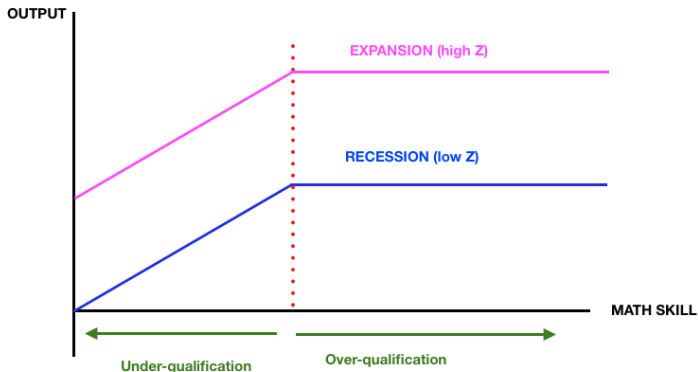
Output as a function of worker ability



Effect of aggregate productivity z on output

$$y(z, r, a) = \underbrace{z}_{\text{aggregate}} + \underbrace{\eta r}_{\text{hierarchy}} - \underbrace{\max\{r - a, 0\}}_{\text{penalty}}$$

Output as a function of worker abilities



Let us recap

- Mismatch between worker abilities and job requirements reduces output
- Then, why do mismatched relationships survive?
- Answer:

- They don't know they are mismatched
- They know they are mismatched, but it is better than breaking up

Q: What is the cost of breaking up?

- Two frictions:
 - 1 Information frictions
 - 2 Search frictions

Q: Can you think of another market that has these frictions?

Break time!

See you in 30 mins

Information frictions

Learning about worker skills

- **In reality:** workers do not perfectly know their abilities
 - Q: How uncertain are you about your abilities a ?
 - Workers make mistakes: Wrong career / job ladder
 - Over time, you can find out by working on a career
- **Bayesian learning:** estimate is a weighted average of prior guess and a noisy data signal (reality)

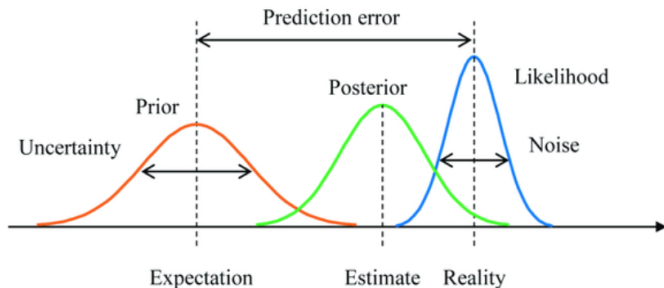
$$\underbrace{\hat{a}}_{\text{best estimate}} = \kappa \underbrace{\bar{a}}_{\text{prior guess}} + (1 - \kappa) \underbrace{s}_{\text{data signal}}$$

- weight $\kappa \in [0, 1]$: depends on relative uncertainty of guess and signal
- Q: Where could signals come from?
- **Example:** Is climate change real? Am I a good economist?

Illustration of Bayesian learning

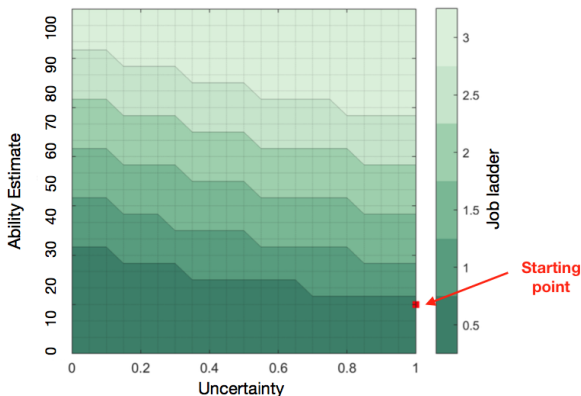
- Weighted average:
$$\underbrace{\hat{a}}_{\text{estimate}} = \kappa \underbrace{\bar{a}}_{\text{prior guess}} + (1 - \kappa) \underbrace{s}_{\text{signal}}$$

- Over time, as signals accumulate...
 - estimate \hat{a} gets closer to reality a (and further away from prior \bar{a})
 - estimate \hat{a} becomes very precise (uncertainty falls)



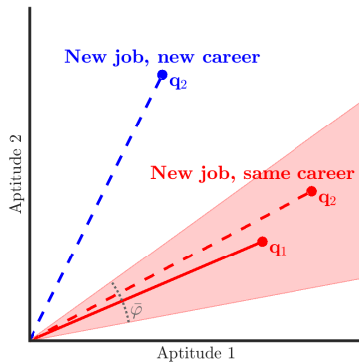
How does learning affect occupational choice?

- Movements **along job ladder** as true ability is learned
 - Ascend ladder (higher r) if belief \hat{a} is high
 - Descend ladder (lower r) if belief \hat{a} is low
- Q: What is the role of uncertainty?



How does learning affect career choices?

- Movements **across careers** to learn if they are good at it
 - I learn a lot about my a_m if working in economics
 - I learn little about my a_m if working in legal
- Career switch likely entails learning from scratch (fresh start)

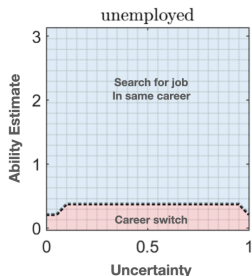


Search Frictions

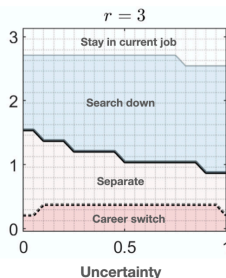
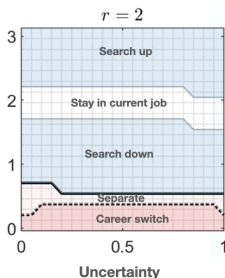
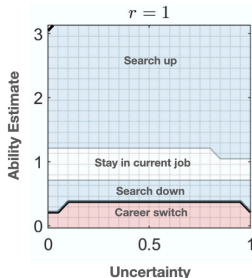
How do search frictions affect career choice?

- For workers and firms to meet...
 - Firms post a vacancy
 - Unemployed workers search
 - Employed workers might also search (on-the-job search)
- All these procedures are:
 - costly (money, time, opportunity cost...)
 - take time to happen
- Due to these search frictions:
 - There are unemployed workers and open vacancies
 - Some matches remain active even if highly mismatched!

Employment status, job mobility and career mobility



EMPLOYED WORKER AT DIFFERENT HIERARCHIES (JOB LADDER)



Business Cycles

Measuring economic activity

GDP = Gross Domestic Product

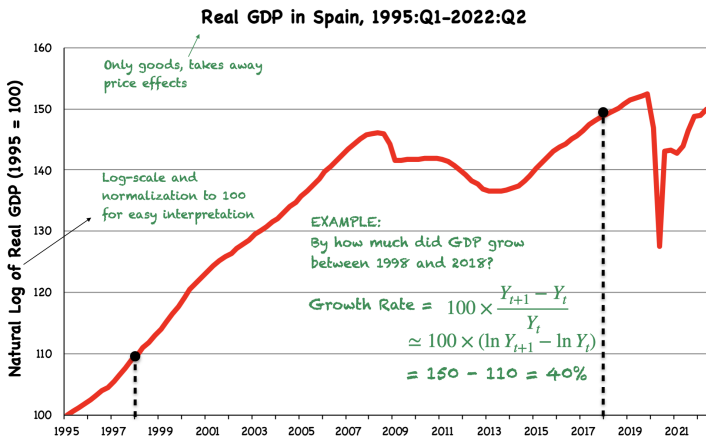
- Value of goods and services produced in an economy in one year



Long-run growth

Variations in GDP over the long term (say 20, 50 years)

- In Spain, 40% increase from 1998 to 2018



Business cycles

Fluctuations in GDP over the short- term (say 2-5 years)

- Recessions (2 quarters with negative growth)

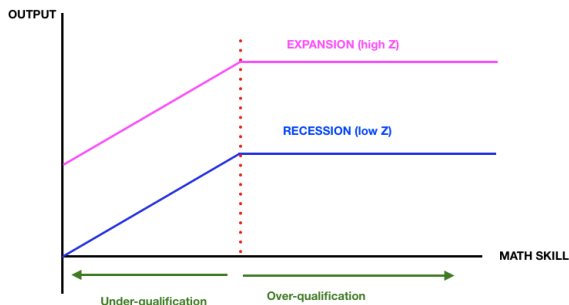


Effect of lower aggregate productivity (recession)

$$y(z, r, a) = \underbrace{z}_{\text{business cycle}} + \underbrace{\eta r}_{\text{job ladder}} - \underbrace{\max\{r - a, 0\}}_{\text{penalty}}$$

- Imagine that productivity changes from high (z^{high}) to low (z^{low})

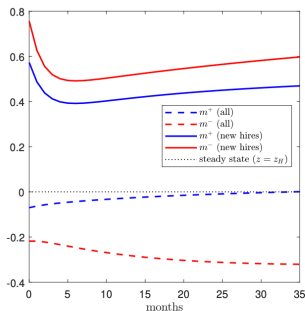
Output as a function of worker abilities



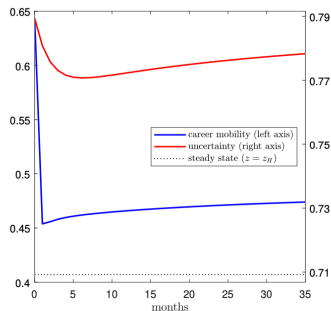
Recessions in the model

- 1 Underqualified workers separate \implies **Cleansing effect**
- 2 Career switching increases (they go for a fresh start)
- 3 New careers come with mismatch and uncertainty \implies **Sullyng effect**

Response of Mismatch, Career Mobility and Uncertainty



(a) Mismatch

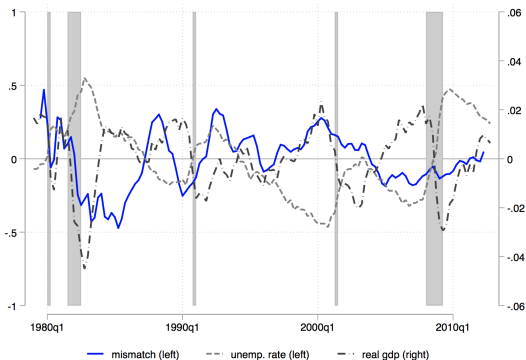


(b) Career mobility and uncertainty

Recessions in the data

- What happens to unemployment? Goes up
- What happens to total mismatch? Goes down
- Mismatch is **procyclical** (correlates positively with economic activity)

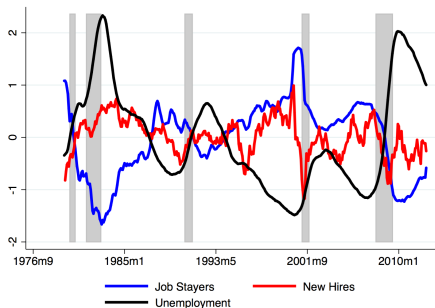
GDP growth, Unemployment, Mismatch in USA



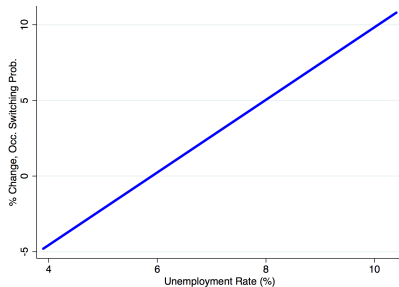
Cleansing, switching, and sullyng effects

- **Cleansing effect:** under-qualified workers are fired, stayers better matched
- **Switching effect:** fired workers switch careers to try other abilities
- **Sullyng effect:** new hires are both over and under-qualified

Mismatch: Job Stayers vs. New hires



Career switching



Real world

Switching Careers during COVID recession

Unemployed Americans are feeling the emotional strain of job loss; most have considered changing occupations

BY KIM PARKER, RUTH IGIELNIK AND RAKESH KOCHHAR



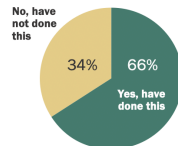
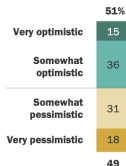
Jace Gentry was planning to move back from Carlsbad, New Mexico, to Louisiana in May 2020 after losing his job in the oil fields. (Paul Ratje/AFP via Getty Images)

Unemployed adults have mixed views about their future job prospects; most say they've thought seriously about changing their field or occupation

Among unemployed adults, % saying ...

Their current outlook on finding a job in the near future is ...

That, since they have been unemployed, they seriously considered changing their occupation or field of work



Note: Based on adults who are unemployed, furloughed or temporarily laid off and who are currently looking for work. Share of respondents who didn't offer an answer not shown. Source: Survey of U.S. adults conducted Jan. 19-24, 2021.

PEW RESEARCH CENTER

<https://www.pewresearch.org/fact-tank/2021/02/10/unemployed-americans-are-feeling-the-emotional-strain-of-job-loss-most-have-considered-changing-occupations/>

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