Comments on "Wage Dynamics and Returns to Unobserved Skills"

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Introduction: Background

- Rising Residual Wage Inequality in the U.S.
- Current Theory:
  - Rising Price of Unobserved Skills
  - Evidence if Human Capital is fixed upon labor market entry, changes in wage dispersion needs to be related to prices of skills.
  - Argument is often SBTC is causing price of skills to rise.

This Paper: Innovation

- Recognizes that skills may evolve in labor market.
- Clouds interpretation of residual wage dispersion linked to rising price of skills.
- Rising wage dispersion is the product of changing skill prices and changing skill amounts.
- Importantly, growing unobserved skills would cause wage dispersion without changes in skill prices; even more interesting skill prices could fall and rising skills could cause rising wage dispersion
- A strong model is needed to separate the dynamics of skill acquisition from the dynamics of skill prices and they provide one.

This Paper: Model

- Identification of dynamics of skill prices - Two Key Assumptions:
  - Wages are levels of human capital times the price of human capital plus an Idiosyncratic component that dies out over time. Specifically:

$$w_{i,t}=\mu_t\theta_{i,t}+\varepsilon_{i,t}$$

  - Human Capital Accumulation process is additive and linear. Specifically (in the most stripped down form):

$$\theta_{i,t}=\theta_{i,t-1}+\delta$$

  - From this they show:

$$Cov(w_{i,,t},w_{i,t'})=\mu_t\mu_{t-1}Cov(\theta_{i,,t},\theta_{i,t'})=\mu_t\mu_{t-1}Var(\theta_{i,t'})$$

This Paper: Model

- Intuition of a central formula:

$$Cov(w_{i,t}, w_{i,t'}) = \mu_t \mu_{t-1} Cov(\theta_{i,t}, \theta_{i,t'}) = \mu_t \mu_{t'} Var(\theta_{i,t'})$$

- The last equality holds because:
  - t and t' are sufficiently far apart that $\varepsilon_{i,t}$ and $\varepsilon_{i,t-1}$ are uncorrelated.
  - $\theta_{i,t}$ is just $\theta_{i,t}{}'$ plus a scale factor making the covariance equal to the variance of $\theta_{i,t'}$.
- To see the last point considered the stripped down HC process. Then:

$$\theta_{i,t} = \theta_{i,t'} + \delta(t - t')$$

$$Cov(\theta_{i,t}, \theta_{i,t'}) = Cov(\theta_{i,t'} + \delta(t - t'), \theta_{i,t'}) = Var(\theta_{i,t'})$$

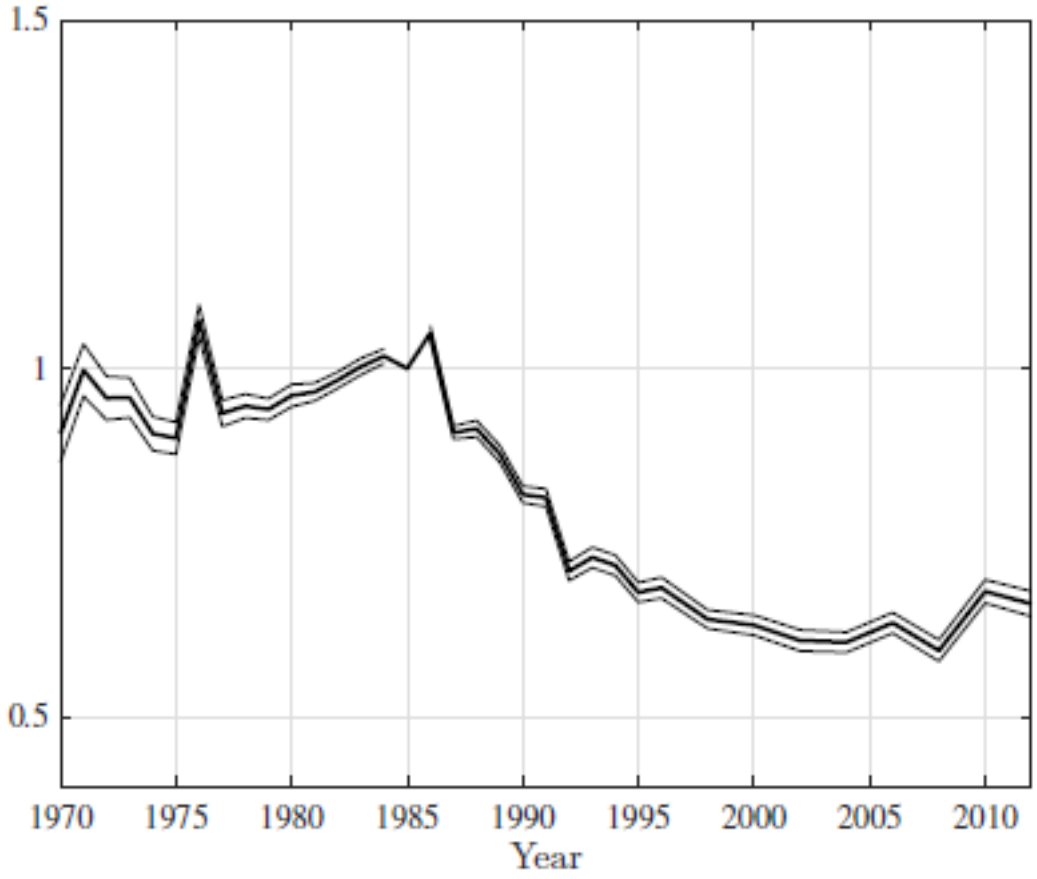
This Paper: Model

- Since:

$$\frac{Cov(w_{i,t}, w_{i,t'})}{Cov(w_{i,t-1}, w_{i,t'})} = \frac{\mu_t \mu_{t'} Var(\theta_{i,t'})}{\mu_{t-1} \mu_{t'} Var(\theta_{i,t'})} = \frac{\mu_t}{\mu_{t-1}}$$

- That is the ratio of the covariance of two sufficiently spaced wages will be a function only of relative prices!
- Once you can trace out the dynamic path of prices you can back out the dynamic path of human capital as well.
- Notice you can let δ have an "i" subscript δ_i, and as long as δ_i and $\theta_{i,t'}$ are uncorrelated everything goes through.
- Now human capital can fan out over time and wage dispersion can increase without changes in prices or even in the face of declining prices!

This Paper: Delivers Evolution of Human Capital Prices



Comments

- Strong assumptions are needed to separate the dynamics of prices and human capital.
- Benefits:
  - You can make progress and get answers.
  - You need very little data other than wage series of individuals.
  - This means the method can be applied to a wide variety of datasets including large administrative datasets.
- Costs:
  - Results could be sensitive to modeling assumptions.
  - Are results sensitive to the human capital process modeled?
  - Is the assumption of limited idiosyncratic wage shock persistence reasonable (especially for the historical time period of the data)?

Comments: Human Capital Process

- Some things you might try that require no more data then you are currently using.
  - Alternative modeling assumptions that helps establish robustness.
- Some things you might try that require more data then you are currently using.
  - Alternative data-driven modeling assumptions.
- Some things you might try that require less data then you are currently using.
  - Alternative modeling assumptions that could be applied to other less detailed datasets.

Comments

Some ideas that use the same amount of data

Comments: Human Capital Process

- Human Capital Production Process:
  - What if Human Capital Process is not linear and additive but is like Cunha, Heckman & Schennach (again in its simplest form):

$$\theta_{i,t}\text{-}\theta_{i,t-1}=\delta_i\theta_{i,t-1}$$

  - This implies that:

$$\frac{Cov(w_{i,t},w_{i,t\prime})}{Cov(w_{i,t-1},w_{i,t\prime})}=\frac{\mu_t\mu_{t\prime}Cov(\theta_{i,t},\theta_{i,t\prime})}{\mu_{t-1}\mu_{t\prime}Cov(\theta_{i,t-1},\theta_{i,t\prime})}=(1+\delta_i)\frac{\mu_t}{\mu_{t-1}}$$

  - Separating δ_i and $\frac{\mu_t}{\mu_{t-1}}$ is now not possible without additional assumptions.

Comments: Human Capital Process

- Human Capital Production Process:
  - Human Capital Process that has a classic depreciation form:

$$\theta_{i,t}=\gamma\theta_{i,t-1}+\delta_i$$

  - Implies a similar condition:

$$\frac{Cov(w_{i,t},w_{i,t'})}{Cov(w_{i,t-1},w_{i,t'})}=\frac{\mu_t\mu_{t'}Var(\theta_{i,t'})}{\mu_{t-1}\mu_{t'}Var(\theta_{i,t'})}=(\gamma)\frac{\mu_t}{\mu_{t-1}}$$

  - Again not identified.

Comments: Human Capital Process

- Much progress is made by assuming growth rate in human capital is uncorrelated with initial human capital if growth rate is measured when workers are old enough. But:
  - This is not consistent with a linear additive model of Human Capital.
  - May not be consistent with a model of Human Capital that includes depreciation.
- Might be worth replacing this assumption with a different assumption such as explicit modeling the $Cov(\delta_i, \theta_{i,0})$.
- Might allow identifying more human capital models.
- Are the implied price paths the same with varying human capital models?

Comments

Some ideas that require more data:
Exploiting more data elements of the PSID

Comments: Do Idiosyncratic Wage Shocks Die out Quickly Enough

- Key assumption is $Cov(\varepsilon_{i,t}, \varepsilon_{i,t'}) = 0$ if $t - t' > k$.
  - Is this true for all regions in the U.S. during this historical time period?
  - Concentration of employment:
    - In Michigan 9 industries comprise 50% of employment; Three industries comprise 35% -
      - automobile manufacturing, construction and machinery manufacturing.
    - In Massachusetts 18 industries comprise 50% of employment; Nine industries comprise 35% of employment –
      - construction, electrical machinery manufacturing, other machinery manufacturing, justice/police/safety, elementary and secondary teaching, national security, grocery stores, metal products, eating and drinking establishments

Comments: Do Idiosyncratic Wage Shocks Die out Quickly Enough

- Key assumption is $Cov(\varepsilon_{i,t}, \varepsilon_{i,t'}) = 0$ if $t - t' > k$.
  - Both the historical diversity of the local economy and the concentration in especially declining industries is very different regionally.
  - Concern is a rapid decline in manufacturing in the 1980s in the Rust Belt and a rapid rise in technology industry in the 1990s on the Coasts.
  - k may be very large, even a full generation, in places like Michigan!
  - How sensitive is the model to allowing k to be a function of region (or the parameters of the ARMA process a function of region).
- Again are the implied price paths the same allowing the die out of wage shocks rate to vary by region?

Comments: More data-driven human capital processes

- Key assumption is Human Capital accumulation not a function of job tenure or industry tenure.
  - Typically one thinks that Human Capital accumulation might be more rapid when jobs are new and slow down with job tenure.
  - Might the Human Capital process be made a function of job tenure?
  - Typically one thinks that there is a loss of industry specific human capital when changing industries
  - Might the Human Capital process be made a function of industry tenure?
- Again are the implied price paths the same with this more data-driven human capital model?

Comments

Some ideas that use less data:
Would allow model to be applied more generally

Comments: Finding heterogeneity without data elements

- Paper usefully divides analysis by education group. Patterns are different in some time periods by education group.
- PSID has education but many datasets, especially administrative datasets do not.
- Might use PSID but not use education. Instead model the wage process as a mixture of two groups as in a latent class model.
- Does the model replicate the price paths found conditioning on education?
- Do posterior probabilities of group assignment accord with the actual education of respondents.

Other Comments

- Most people are concerned with growing wage inequality in repeated cross-sections
- PSID has the advantage of being a panel, but the disadvantage of not replicating the cross section.
- It would be good to establish that overall wage inequality in the PSID mimics repeated cross-sections.

Other Comments

- Very nice paper.
- Generalizes more restrictive models of wage dispersion.
- Needs to make strong assumptions, does so, and delivers results.
- Outstanding question is robustness of price dynamics to model specification.
- As a general strategy it might be good to use more data to reject model specifications and then see if statistical methods can mimic those specifications in the absence of such data.
- Of course application to new contexts may not extend but at least you have some faith in model from a known context.