DISCUSSION OF “INNOVATION & TOP INCOME INEQUALITY” BY AGHION, AKCIGIT, BERGEOAUD, BLUNDELL & HEMOUS

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A TOUR DE FORCE!

• Tackles a major economic & policy question of our age: rise of “extreme inequality”

• Brings interesting framework of Schumpeterian growth theory to understand this phenomenon

• Rich data & econometrics (impressive # of robustness tests) to show that innovation seems to be an important causal reason for growth of top income inequality

• A really seminal contribution
BIG PICTURE

• Big increase in the share of the top 1% in total income in US and most other major economies
  – Raises issues of Equity, but also of Efficiency.

• “Rents” view of the top 1%
  – Corporate Governance failures (CEO); Financial Sector & “Too Big to Fail” problems; Lowering of top taxes; union decline; Changing norms; etc.

• Innovation view of the top 1%
  – Increase in innovation (especially by entrants) gives temporary rents to entrepreneurs & complementary occupations

• Policy implications different. Very high rates of tax on top 1% has trade-offs: could harm innovation & growth
KEY EMPIRICAL FINDING

• In US cross-state panel data

• States which increased innovation by most had largest increase in income share of the top 1%
  – Looks Causal: Two different Instrumental Variables based on (i) spillovers & (ii) politics
  – Innovation doesn’t change inequality below the top 1%
  – Is temporary (Schumpeterian rents?)
  – Impact of innovation on inequality is weaker when there is more lobbying
  – (In cross section) innovation is associated with more social mobility

• A few issues: (i) Story; (ii) Empirics; (iii) Theory
(i) BASIC QUESTION ON STORY

• Has there really been an explosion of innovation (as opposed to patents) since 1980?

• Patent explosion is likely to be (at least partially) due to laxer standards in USPTO and pro-patent court decisions

• If innovation explosion why don’t we see this in TFP growth etc.? TFP growth slower 1980-2010 than 1950-1980
(ii) EMPIRICS 1: TRANSPARENCY

- “Bad Control” issue? Many potentially endogenous variables on right hand side. These sometimes strangely signed & significance/signs varies across specifications
  - e.g. GDP/capita negatively correlated with top income share (opposite for output gap).
  - I’d like to see some analysis of innovation on GDP growth directly to see if lines up with theory

- Paper mentions that results robust to specification with just state & year dummies (p.22). Hence, should be able to see relationship in a simple scatterplot
  - e.g. nice to see results in a long difference graph,

- Would help to allay concerns that results depends on conditioning on specific covariates
EMPIRICS 2: INSTRUMENTS

- **Spillovers IV**
  - Use spillovers between states. Lagged innovation in other states weighted by “closeness” using lagged cross state citation frequency

- *Neat idea* – I’d like to see first stage & also impact on productivity a la Bloom, Schankerman & Van Reenen (2013, Econometrica)

- Why is IV excludable from 2nd stage? p.22 says spillovers have direct effect on inequality rather than simply via innovation in own state
  - Hence, reduced form of inequality on spillovers interesting, but not an IV in classical sense

- I liked the *appropriations committee* as an IV better, but not enough description
EMPIRICS 3: OUTLIERS

• More graphical analysis to help to allay concerns that some outliers driving results.

• Specification uses state fixed effects so variation is annual shocks

• Annual innovation rates (& inequality) can be volatile, especially as you’re using logs & have some small states

• Show long-differenced specifications; look at using initial size of state as weights; robustness to non-logged specifications; leverage statistics; some more graphical analysis, etc.
(iii) LINK WITH THEORY

• Theory relates to Schumpeterian growth model with incumbents & entrants in imperfectly competitive industries

• But data is cross state. Most high tech industries operate in international (or at least national markets). Examples: Pharma, computer hardware, medical instruments, software

• So unclear (to me) why innovation in a state should affect inequality in a state via state-specific market structure
  – E.g. lobbying by high tech not really about state specific barriers to entry, but more nationwide (tariffs, anti-dumping, etc.)
CONCLUSIONS

• A really fantastic paper – first real attempt to directly link innovation with extreme income inequality in a compelling way

• Required reading – will definitely be on my grad students reading list!
BACK UP: MORE MINOR ISSUES FOR AUTHORS ONLY
OTHER ISSUES

• *Dynamics.* You should include a distributed lag & look at impulse response (as in Van Reenen, 1996, QJE). The long-run effect of innovation on top wage should still be positive even though it fades away.


• Figure 1. Show citations per capita as this is what you do in Fig 2 & where you get your econometric results from

• Fig 2 – States with biggest increases in inequality & innovation look odd: Idaho, Washington, Oregon, Utah, Wyoming? Makes me think that the log differences may be funny because of low values. What about levels not logs?
OTHER ISSUES

• Bakija (2012) not in references
• You should be clear that you’re arguing that increase in patents/citations in Fig 1 is a real exogenous acceleration in technology post 1980. But:
  – Some of patent explosion is purely institutional (Jaffe-Lerner book on how USPTO allowing rubbish patents; change in Appeal Court as mentioned in Lerner & Kortum that you cite)
  – If there has been an explosion in innovation why is productivity growth slower 1980-2010 than 1960-80?
• Top of p.3. It’s not obvious to me that the hedge fund managers, lawyers, & retail CEOs are complements to the innovation we’re talking about here
• Slides 5-6. Since this is just showing that all the variables are trending up since 1980, not very informative.
OTHER ISSUES

• P. 16 how is “entrepreneurial income” defined? Looks high to me if this is just self-employed profits. And what else is in the residual after wages and this item?
• P.16 the fact that inequality very high in Connecticut illustrates the problem I mentioned over “link with theory”. This is because rich people working in NY live in low income tax Connecticut & nothing to do with innovation in Connecticut
• Para above 3.3: give correlation numbers
• Since there are so many ways to calculate output gap why not simpler measure of unemployment or employment rate to capture local business cycle?
• Footnote 21. I recall in our EJ & ReStud paper we simply used count data models which avoided having to do this as we could treat the zeros as zeros
OTHER ISSUES

• **Standard Errors.** I would have expected some longer memory autocorrelation in this data so I’m surprised newey(2) is sufficient. I think you should present a test and show robustness to longer memory serial correlation.

• You also have some complex issues with spatial correlation, especially when you start using the cross state lvs. Conley standard errors, etc.?

• At various points you mention the significance of other variables (like students per capita on p.22; natural resources in col (5) p. 58). If these matter why aren’t they in baseline specification. You include many other insignificant variables after all.

• At many points I was itching to see the reduced for inequality on the IVs. These are of interest even if one doesn’t believe the exclusion restriction.

• What about using the two IVs together & doing an over-identification test?
OTHER ISSUES

• P.29 Does South Dakota really have a big financial sector?
• P.31 I find it surprising that neither California or Massachusetts have fast growth of innovation or inequality. It makes me wonder about whether the functional form is getting you some counter-intuitive results.
• P. 35 For entrant innovation, is it really the individual level that you want for this? I would have thought you would want to look at firms. Group by assignees & see if innovation is coming from firms who haven’t patented before.
• Lobbying. I wonder if this simply reflects that there are some states which have declining industries (who intensively lobby for protection from China, etc.) who have slow growth in innovation and top 1%.
• P. 38 you mention some cross country work but don’t reference. I’d expand, reference or drop.
OTHER ISSUES

• Table 2
  – Interesting that raw patents are insignificant
  – Seems like only significant variables are GDP per capita and output gap
  – By population growth do you mean level of population or its change?

• Table 3
  – Odd that share of finance was insignificant in Table 2 then comes to life in this table (funny it wasn’t before). Presumably this is because of changing sample. Suggests some heterogeneity of coefficient by sample period.
  – You should report “spatial correlation” coefficient & SE (its also confusing because I thought you were using Conley SEs or something)
OTHER ISSUES

• Table 4
  – Weird that government size is positive and significant in col (5), negative and significant in col (6)-(7) and insignificant in other columns?