Representative firm assumption:

Productivity is output produced per unit of input.

One unit is aggregate productivity (Solow residual).

Establishment (Starbucks) or Firm (Starbucks company)

Productivity is anything that influences output other than measured inputs. Exogenous outside of model.

* Yit as value added (sales – materials) and not gross output (sales)

Stylized facts about productivity

* Enormous dispersion
* Productivity is persistent: below 1 provides churning
* Correlated with outcomes

Even with this aggregate level can have representative agent.

Heterogeneous firms:

* Decreasing returns of scale to get the decreasing curvature is one way to do it. If not curvature to restrict how much high productivity firms can increase scale, they can increase very much and eliminate small productivity firms. So add this curvature.
* Financial friction could mean different rt and the proof will not hold and representative agent assumption will not hold.

Measure dispersion of marginal products based on reduced form. This would mean that we are not accounting for the dispersion in rt or wt (foc for firms).

What are these frictions???

Hsieh and Klenow (2009 Model)

* Need some curvature. If linear than high producing firms will kick out low producing firm. Add curvature by downward slopping curvature (demand curve). Revenue will still be curved because demand has curvature.
* Assume firms produce somewhat differentiated goods. All aggregated as Yt wil such elasticity of substitution gamma.
* Key difference: instead of same marginal cost of labor based on markup or tax tau\_t (search friction, hiring cost, regulation), markup on renting capital (friction).
* Measure these distributions across firms.
* Not MPK but MRPK (marginal revenue of product capital). Don’t observe how much produce but revenue. So, need to know demand system (relationship between price and quantity).
* TFP = output divided by input.
* Use micro data to infer about stuff on left side of equations.
* Data and calibration: Observe measure of revenue (value added term), capital (book value, inventory), labor input (employee body) so can construct red. For rest, calibrate elasticity of substation, prices (rental rate, prices).
* Distribution of TFPQ (quantity productivity).
* Marginal products of capital and labor. TFPR is summary statistics of how MPRK and MRPL are distribution. Shows have lot of dispersion. Not as dispersed as Marginal productivity, but still dispersion.
* Conclusion, far away from representative firm because of lots of friction.

Census data: Confidential (Establishment level)

1. Within manufacturing (LRD: longitudinal database)
   1. CMF (census of manufactures): every 5 years manufacturing establishment survey. Less measurement error.
   2. ASM: every year, sample
2. Outside manufacturing: LBD
   1. Annual, all sectors
   2. BUT, employees, revenues (sometimes). No capital information.
3. BDS: Publicly available
4. LEHD (longitudinal employee household dataset): matched employer-employee dataset

Compustat: non-confidential (Accounting, book value)

* All sectors, input measures
* Publicly traded firm’s disclosure (Balance sheet information collected every 4 quarters)
* Consolidated global information

IRS data: confidential

* Zwick and Mahan (2017)
* Yagan (2017) – dividend tax paper
* Corporate firms