Discussion of Chiu, Meh and Wright

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Macro Perspectives on Labor Markets

Motivation

This paper develops a model in which financial frictions can retard growth.

The model has innovators, who have new ideas, and entrepreneurs,

who are more efficient at bringing those ideas to market.

But entrepreneurs need liquid assets to buy ideas from innovators.

If the economy is short on liquid assets,

—financing constraints can prevent new technologies from being implemented,

—there is a price (yield) spread between liquid and illiquid assets,

—long-run growth is slow.

Overview of this discussion

I. Recap the model and the Competitive Equilibrium with no trading frictions or credit constraints

2. Recap the CE with trading frictions, without and with credit constraints

3. Comments on the model and conclusions

The model

1. There are two technologies. One uses only land, the other only labor.

   There is no capital.

   Both produce the single homogeneous consumption good.

   Both enjoy technological change at a common rate.

2. The supply of land, a, is fixed and the land-using technology has CRS.

   Productivity is Z.

   A unit of land produces $Z\delta^a$ units of the consumption good.

3. There is a continuum $[0, 1]$ of firms in the labor-using sector.

   Each firm has DRS.

   Productivity of a firm is $z_0 = Z$ or $z_1 = (1 + \eta) Z$.

   Let λ denote the share of firms with $z = z_1$.

The model

4. The law of motion for Z is

$$\frac{Z'}{Z} = \rho \left[\lambda \left(1+\eta\right)^{\varepsilon} + (1-\lambda)\right]^{1/\varepsilon},$$

   where $\rho, \varepsilon > 0$. The growth rate g is exogenous, with

$$1 + g \equiv \frac{Z'}{Z}.$$

5. Firms in the labor-using sector hire labor after they observe their productivity level z.
6. Preferences are $U(c,h) = \ln c - \chi h$, with discount factor β.

Social Planner's problem

The Bellman equation for the social planner's problem is

$$V(Z) = \max_{h_1, h_2} \left\{ \ln(c) - \chi \left[\lambda h_1 + (1-\lambda) h_0 \right] + \beta V(Z') \right\}$$

$$\text{s.t.} \qquad c = \left[\delta^a A + (1-\lambda) f(h_0) + \lambda (1+\eta) f(h_1) \right] Z.$$

The log-linear preferences imply a constant labor allocation h_0, h_1,

and consumption c is proportional to Z.

The value function has the form

$$V(Z) = v_0 + v_1 \ln Z.$$

CE in a frictionless world

To support this allocation as a CE, suppose there are markets for labor, goods, and land.

There is also a mutual fund consisting of all firms, but shares in this fund are not traded.

A firm with productivity $z_0 = Z$ or $z_1 = (1+\eta)\,Z$ solves

$$\pi_j(Z) \equiv \max_h \left[z_j f(h) - w(Z)h \right], \qquad j = 0, 1.$$

In equil. $w(Z) = wZ$, so h_0 and h_1 are independent of Z, and average profits are

$$\begin{aligned}\overline{\pi}(Z) &= (1-\lambda)\,\pi_0(Z) + \lambda\pi_1(Z) \\ &= \overline{\pi}Z.\end{aligned}$$

CE in a frictionless world

The representative HH consumes, supplies labor, and trades land.

Its Bellman equation is

$$W(a, Z) = \max_{c,h,a'} \left\{ \ln(c) - \chi h + \beta W(a', Z') \right\}$$

$$\text{s.t.} \qquad c = w(Z)h + \overline{\pi} Z + \delta^a Za - \phi(Z)\left(a' - a\right).$$

The equil. land price, wage and consumption functions have the form

$$\phi(Z) = \phi^* Z, \qquad w(Z) = w^* Z, \qquad c(Z) = c^* Z,$$

and the asset price is the PDV of future dividends, with $r = \beta^{-1} - 1$,

$$\phi^* = \frac{\beta}{1-\beta}\delta^a.$$

The asset price does not depend on the supply of land.

CE with trading frictions

There are two distinct types of agents, innovators i and entrepreneurs e.

Their shares in the population are n_i and $n_e = 1 - n_i$.

Every agent operates a firm. Everyone can use the old technology, $z_0 = Z$.

Each innovator i gets a new idea every period.

Agents of each type are heterogeneous in terms of their probabilities of success in implementing new ideas.

An agent of type $j \in \{i, e\}$ gets a draw from a fixed distribution $F_j(\lambda_j)$.

In the DM, each entrepreneur e is, with probability α_e, randomly matched with an i. They bargain over the right to exploit i's idea.

If i is matched with an e, both parties observe their realized (λ_i, λ_e) .

CE with trading frictions

If $\lambda_e \leq \lambda_i$, the innovator implements the idea himself.

If $\lambda_e > \lambda_i$, the innovator sells the idea and the two parties split the expected gain $(\lambda_e - \lambda_i)(\pi_1 - \pi_0) Z$. The transfer price

$$p(\lambda_e, \lambda_i)Z = [\lambda_i + (1-\theta)(\lambda_e - \lambda_i)](\pi_1 - \pi_0) Z$$

depends on $1-\theta$, the bargaining power of i.

The price exceeds what the innovator could get on his own,

$$p(\lambda_e, \lambda_i) > \lambda_i (\pi_1 - \pi_0).$$

CE with trading frictions

In the CM, labor is hired; goods are produced; wages, profits, and land rents are paid; consumption occurs, and land is traded.

The outcome is efficient, given the matching technology.

The (constant) growth rate is as before, with

$$\lambda = n_i \mathsf{E}\left[\lambda_i\right] + n_e \alpha_e \hat{\mathsf{E}}\left(\lambda_e - \lambda_i\right),$$

where the last term is the expected gain from the transfer of ideas to entrepreneurs.

It doesn't matter whether the period is divided into parts.

If it is, the transfer of ideas to entrepreneurs in the DM is on credit, with the debt repaid in the CM.

CE with trading frictions and credit constraints

Suppose that credit cannot be extended in the DM: entrepreneurs must purchase innovations by offering land in exchange.

Then the fact that land is in limited supply may impede trade.

(For example: no land, no trade.)

If e has land holdings a^e, then he can offer at most

$$x(a^e)Z \equiv (\delta^a + \phi^a)\, a^e Z,$$

the ex dividend value of his assets, where ϕ^a is the new asset price. If

$$\max p(\lambda_e, \lambda_i) \leq (\delta^a + \phi^*)\, a^e,$$

then the asset price is unchanged, $\phi^a = \phi^*$, and all trades occur as before.

CE with trading frictions and credit constraints

More generally, trade occurs if and only if

$$\lambda_e - \lambda_i > 0 \qquad \text{AND} \qquad x(a^e) \geq (\pi_1 - \pi_0)\,\lambda_i$$

trade is worthwhile AND e can make an attractive offer to i,

where $x(a^e)$ is e's net worth, at the new equil. asset price ϕ^a.

If in a particular pairwise match

$$x(a^e) \geq [\lambda_i + (1-\theta)(\lambda_e - \lambda_i)]\,(\pi_1 - \pi_0)$$

then the financing constraint is slack, and the price is $p(\lambda_e, \lambda_i)$.

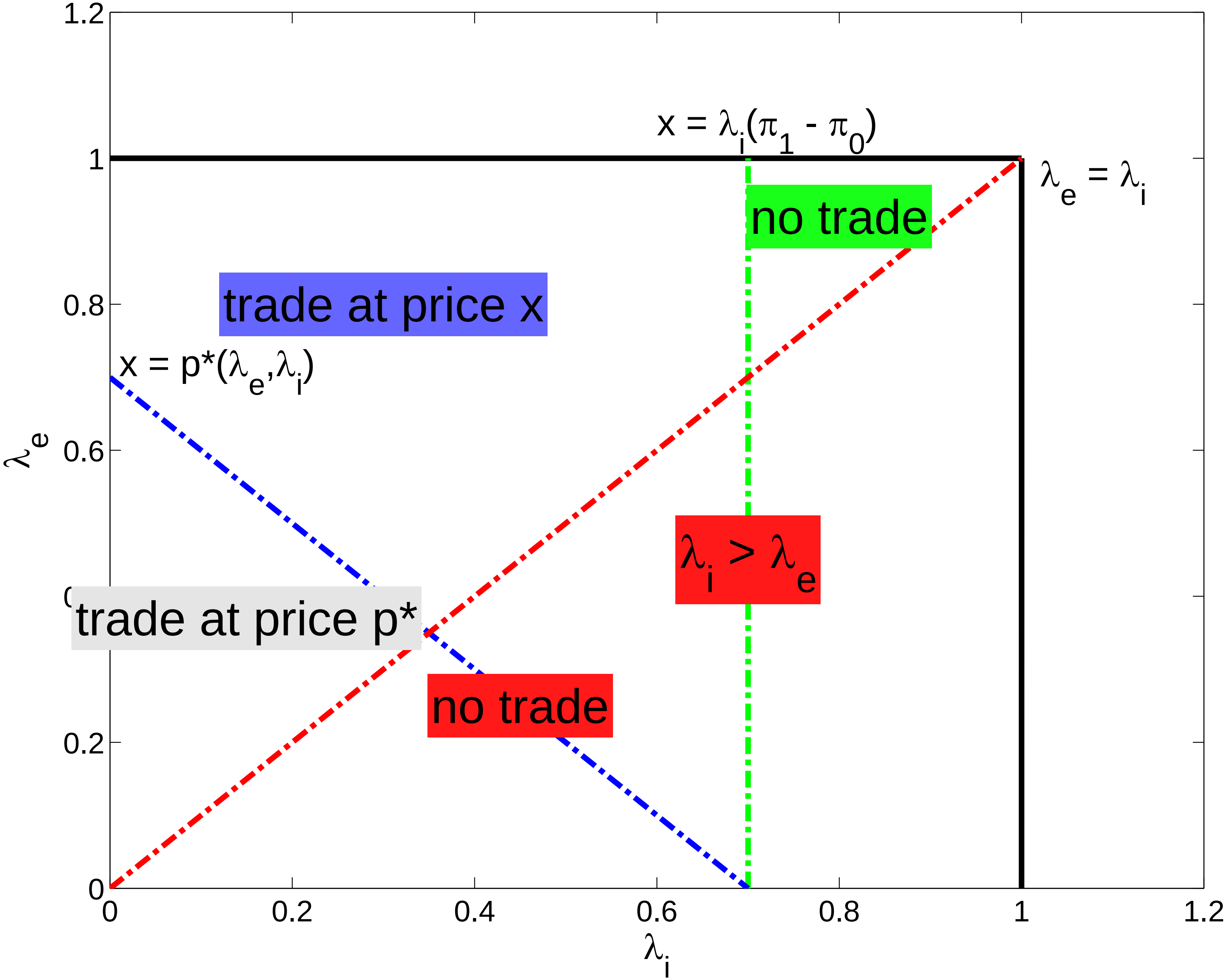
Otherwise the constraint binds, and the price is $x(a^e)$, all the seller has.

The equilibrium is inefficient if there are too few liquid assets. If

$$x(a^e) < \pi_0 + (\pi_1 - \pi_0)\max \lambda_i.$$

then sometimes e cannot make an acceptable offer to i. (large λ_e, λ_i)

Figure 3: Trade with financial frictions



Rate of return dominance

Suppose there are also illiquid assets, that cannot be used in the DM.

For simplicity, consider two kinds of land, w/ the same dividend, $\delta^b = \delta^a$.

i's care only about return, while e's have a preference for liquid assets.

Two types of outcomes are possible:

a. both e's and i's hold both assets (but their portfolios may differ),

   both assets have the same price, $\phi^a = \phi^b = \phi^*$, and

   the liquidity constraint never binds.

b. e's hold both assets, and i's hold only the illiquid asset,

   the liquid asset has a higher price $\phi^a > \phi^b = \phi^*$, and

   the liquidity constraint sometimes binds.

Rate of return dominance

More specifically, the asset prices are

$$\phi^a = \frac{\beta}{1-\beta}\left(\delta^a + \ell\right), \qquad \phi^b = \frac{\beta}{1-\beta}\delta^b,$$

where ℓ is the expected value of the liquidity service provide to e.

Since i's never need that service, they will not pay for it.

Given supplies a, b, of the two assets, one can solve for the value ℓ of the liquidity service, the asset price ϕ^a, and portfolios of i's and e's.

The willingness of an e to hold a little more of the liquid asset depends on the probability that it will be needed in a match, and the returns from the additional trades that are consummated.

The equil. growth rate is increasing in a, up to a point, and then constant.

Comments

How do financing constraints affect innovation and growth?

The question is an important one, but the current model gives those constraints a limited role.

Agents make few choices:

—the number of innovators, and hence the supply of new ideas, is fixed.

—the number of entrepreneurs, and hence the probability of selling an idea for a profit, is also fixed.

—innovators and entrepreneurs are allowed to supply productive labor, so they do not have to ration their time between uses.

The model focuses on how rents are divided between i's and e's, but the agents make no choices that are altered by those rents.

Comments

If financing constraints are important, they

—make innovation less profitable

—alter the split of rents in favor of entrepreneurs.

The first effect should discourage agents from becoming innovators.

Fewer innovations should discourage agents from becoming entrepreneurs,

but the more favorable split of rents works in the opposite direction.

The matching technology might make it difficult to allow occupational choice.

Is the matching friction needed? The financial friction seems to be more important.

Comments

The model delivers a price differential, or rate of return dominance, between two assets with identical returns.

The asset that can be used to satisfy a liquidity constraint has a higher price and hence a lower rate of return.

Any model that has a role for money (CIA, cash-credit, MIU, etc.) has this feature if the nominal interest rate is positive.

The story here is the same.

The matching technology makes the RoR differential hard to calculate.

What does it deliver in return?

Comment on the empirical work

The empirical work uses data from firms in 33 countries (50 - 250 firms per country), who were asked to report the most important way that they acquired new technology in the last 36 months.

The authors look at the fraction who report arm's length technology transfers, licensing or turnkey operations.

The country means range from 0.005 to 0.128.

This is a very noisy measure of the importance of technology transfer.

Comments

Less developed economies have less well developed financial institutions.

Does this constrain growth? Or does it simply reflect weak demand for the services of financial institutions?

In the financial services sector, does demand elicit its own supply?

The model here seems unsuited for asking this question, since the importance of the financing constraint does not change as Z grows.

The history of financial institutions in the U.S. suggests that new (better) financial markets may be developed as needed.

Building the railroads required more capital than entrepreneurs had raised for earlier projects, and new institutions were created to finance them.