III. OUTSOURCING, SPINOUTS, AND DEVELOPMENT

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From offshoring back to outsourcing

- We began this course discussing outsourcing and offshoring together . This was because we were dealing with the boundary of the multinational firm.
- We then focused on offshoring, both vertical and horizontal, without being concerned about where the boundaries of the firms were located.
- We now conclude by returning to outsourcing, this time without offshoring. In fact, the outsourced product or service will be substituting for imports and thereby reducing trade.

“Spinouts” an entrepreneurial version of make or buy

- When discussing outsourcing and the product cycle, we saw that as an input became less R&D intensive the most efficient mode of sourcing could shift from internal (subsidiary) to external (independent supplier).
- Similarly, we could imagine that over time the same thing happens as the tasks associated with supply of an input become more routine, for example as a result of learning by doing. (Note that these are not the same thing, as we saw from the independent effects of R&D intensity and routineness on the share of U.S. imports that are internal to multinationals.)
- When the internal supplier *becomes* the external supplier, we call the new firm a “spinout.” The spinout could be initiated by a key employee, who becomes an entrepreneur, or by the “parent” firm.

New data, new thinking – about development

- Data recently collected by Hortaçsu and Syverson (2007) show that, within narrowly-defined manufacturing industries, vertically integrated firms are larger (and have larger plants) and have higher productivity. These data, collected for the United States for the period 1977-97, also show that vertically integrated firms account for about 70% of the value of manufacturing output.
- Comparably detailed studies are not available for less developed countries (LDCs), but we can expect the need for larger, more productive firms to produce their own inputs to be even stronger in these countries. Tybout (2000, p. 14) reports, "The menu of domestically produced intermediate inputs and capital equipment is also often limited in developing countries. Thus producers who might easily have acquired specialized inputs if they were operating in an OECD country must either make do with imperfect substitutes or import the needed inputs at extra expense."

It follows that the firms we care about are vertically integrated – so what?

- Exports of manufactures are strongly correlated with economic growth in LDCs. Many studies have found that only the largest LDC manufacturers export, in part because the larger manufacturers produce the higher quality products that consumers in more developed countries demand.
- I argue that employee-initiated spinouts create problems for vertically-integrated firms that can discourage their entry, especially in LDCs
- These problems can be mitigated if the employees in the position to initiate spinouts are "cronies" – members of one's ethnic minority, or relatives.

Take 1:
Deviant behavior by cronies is punished

- Poor incentives for an internal supplier are traded off against costs of setting up an independent business. Depending on which way the tradeoff breaks, the employee spins out or not.
- In return for continuing to supply at marginal cost , the independent supplier can extract a transfer from the (formerly) vertically integrated firm by threatening to withhold a specialized input. By hiring a crony, the firm can weaken this threat. E.g., employee is member of same ethnic minority, which has a tight-knit network that punishes deviant behavior.
- "Crony capitalism" then supports entry of high-end vertically integrated firms from which spinouts originate, generating a larger total number of high-end producers. Helps to explain business success of certain ethnic minority groups

Take 2: Spinout deprives vertically integrated firm of a major revenue stream

- The big surprise in Hortasçu and Syverson (2007) is that vertically integrated firms sell the bulk of their internally produced inputs externally.
- Former employers cannot force spinouts to compensate them for the profits lost from these external sales of inputs without effective non-compete enforcement and/or patent protection.
- In the LDC context the knowledge possessed by spinouts is probably not patentable, and enforcement of non-compete contracts is likely to be too slow, if it happens at all.
- To the extent that this discourages entry by vertically integrated firms, the problem is compounded by their dependence on each other for markets for their externally sold intermediates: a "multiplier effect" not present for DC firms that export the intermediates they produce

Some observable consequences

- I shall argue that, by discouraging entry of vertically integrated firms, the inability to capture spinout profits contributes to the "missing middle" in the size distribution of LDC firms (Tybout 2000): only the highest productivity, largest firms founded by the best entrepreneurs are profitable despite this problem, and less able entrepreneurs simply found small, non-integrated firms.
- Moreover, since vertically integrated firms sell most of their intermediate output externally, fewer of them (and their spinouts) means fewer locally supplied inputs, leading to a low local content of LDC exports and contributing to precisely the state of affairs regarding intermediates that Tybout described before.

Hiring family cronies

- Employers can mitigate the impact of the spinout problem by hiring children who keep profits “in the family” even if they spin out.

- Shieh (1992, p. 184) writes:

  it is the middle-level or above managerial staffs who are more likely to open their own workshops. Hence a gap in promotion channel prevents line workers from setting up their own businesses, yet guarantees more opportunities for the managerial staffs of the inner circle of the boss....Only the family members of the boss can be promoted to the key positions....the family-based enterprises, which are the majority of Taiwanese enterprises, reserve training opportunities for the family members of the boss, for they fear that non-family-member employees may quit someday and the investment in training would be in vain, not to mention the threat from the potential competitors cultivated by their own hands. Familism here is a condition for the relatives or in-circle members of the boss to spin-off, which may in turn reinforce familism.

Family business groups

- Family spinouts are a natural route to the establishment of family business groups, which dominate the manufacturing sectors of many developing countries
- Bertrand et al. (2008, Table 8) find that the number of sons of the founder of a family business group in Thailand does not affect the number of firms in the group until after the founder has died. This could be because sons exert higher effort than non-family managers when monitored by the parent-founder, making spinouts less advantageous until after his death.
- At the same time, founding entrepreneurs may be willing to hire children who are not the best available employees in order to keep profits from any subsequent spinouts in the family. These offsetting influences on family firm profitability are consistent with the contradictory results in the literature.

Policy implications

- The key market failure can be addressed directly by enforcing non-compete clauses in employment contracts and making loans to workers to buy out their contracts when spinouts are the efficient option.
- Second-best policies would encourage entry by high quality, vertically integrated producers. If these producers are exporters, export subsidies can be used. If lump-sum taxation is available, export subsidies to inframarginal entrants are socially harmless transfer payments. If lump-sum taxation is not available, however, subsidies need to be targeted as narrowly as possible.
- Family firms with competent children require the least subsidy. Crony capitalism in the more widely used, political economy sense of the term may partially reflect government attempts to direct subsidies to such firms, more likely in an effort to achieve a target level of entry at minimum cost than to achieve a well-defined welfare objective.

Relation to “coordination failure”

- Rodrik (1995) recognized the value of vertical business groups in overcoming the problem of “coordination failure” between buyers and suppliers that in his view prevented countries with potential comparative advantage from moving into production and export of higher quality, higher technology manufactured goods. He describes preferential treatment given to these groups by the governments of Korea and Taiwan. Our model helps to understand the market failures that motivated such policies, at least for the founding firms, and also the concentration on certain families.

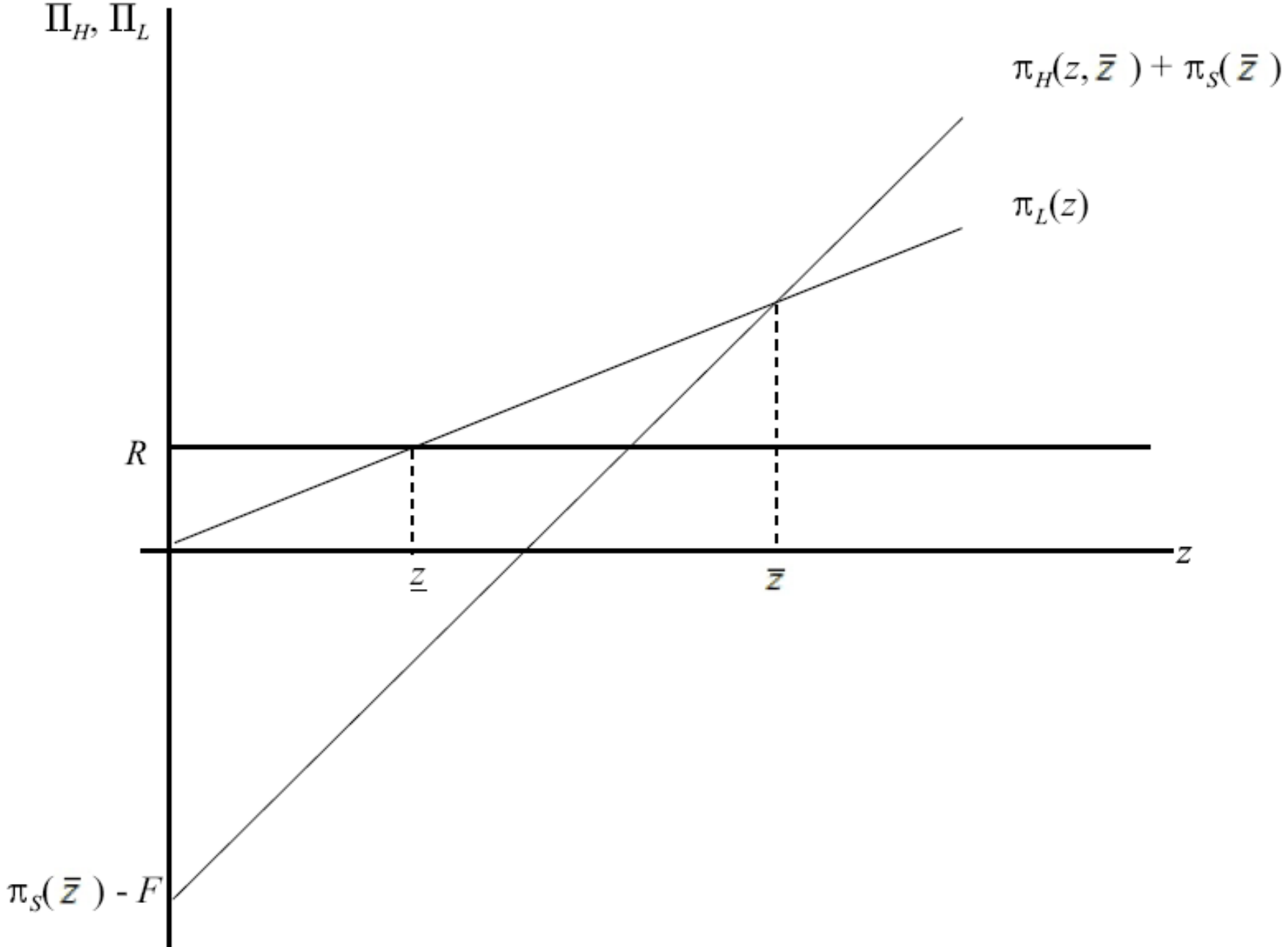
Needed: A Model of Vertical Integration that Fits the Facts

- I hypothesize that firms make their own inputs as an adjunct to development and possession of an in-house design capability. [Why in-house? Problem-solving intensity and firm boundaries.] This capability allows them to design and brand their own final goods or to customize their products in response to buyer demands, thereby enabling them to sell their output at higher prices.
- Higher prices imply a greater return to entrepreneurial ability that expands output. Lower prices for undifferentiated, low quality final goods yield a smaller return to entrepreneurial ability that expands output.
- Investment in the capacity to produce their own inputs constitutes an up-front fixed cost for firms, especially in training of highly skilled workers.

Selection of most able entrepreneurs into high quality, high productivity, vertically integrated production

- Figure 1 shows how this works. Entrepreneurial ability is measured by *z*.
- What about internal versus external sales of inputs? Once firms have the capacity to produce specialized inputs for their own needs, they have a valuable (and expensive) asset. By putting that asset to work producing generic versions of the inputs for other firms in the industry, they try to recoup as much of that expense as possible.
- The more subsidiary profits defray the fixed cost of establishing in-house design capability, the smaller is the "missing middle."

Determination of cutoff levels of entrepreneurial talent



Embed Our Model of Vertical Integration in a Developing Country Setting

- Developing countries tend to import their manufactured intermediates (Tybout 2000)

- It follows that the input subsidiaries of vertically integrated firms in developing countries are mainly competing with imports

- If these firms are the main source of manufactured exports, then more exporters also means greater local content of exports

Formalization shows conditions under which these results hold, and also yields additional results

- An industry in a developing country can produce both low and high quality final goods using imported intermediates and unskilled domestic labor. Low quality final goods are homogeneous and are sold domestically in competition with imports. High quality final goods are differentiated and are sold abroad.
- The economy of which this industry is part is populated by risk neutral old and young agents.
- A measure *N* of old agents is available to found and manage firms in this particular industry; each has the alternative to retire and enjoy leisure valued at *R.* We will follow Lucas (1978) and assume that a fixed distribution of managerial talent *G* with support [0,∞] exists in the population but is only relevant when actually managing firms that produce final goods, and hence is irrelevant for young agents.

Young agents

- Young agents can be divided into skilled and unskilled. Unskilled young agents supply labor to the industry at wage rate w_U.
- Among the skilled are a subset of measure greater than N who have achieved the highest measurable technical preparation for work in this industry; for example they have completed the requisite specialized education with the highest possible grades. These highly skilled young workers will be demanded by entrepreneur-managers who want to produce high quality final goods in this industry; the remaining skilled young workers will supply labor to the rest of the economy at wage rate w_S.
- However, we will later want to consider the possibility that entrepreneurs who produce high quality final goods hire their children even if they are less technically proficient.

Production of low quality final goods

- Before management is applied, the "raw" technologies for producing final goods display constant returns to scale in unskilled labor and a CES aggregate of intermediates. The technology for the low quality final good is associated with the following unit cost function:

$$c_L\left(\left(\int_0^{n_L}\left(p_L(i)\right)^{1-\sigma_L}di\right)^{\frac{1}{1-\sigma_L}}, w_U\right) \qquad (1)$$

- Here n_L is the measure of the fixed number of low quality intermediates, $p_L(i)$ is the price of the ith low quality intermediate, and σ_L is the elasticity of substitution for the CES aggregate of low quality intermediates.

Entrepreneurship in low quality final goods

- An entrepreneur with talent z who enters low quality final goods production uses this production technology with a diminishing returns managerial technology as in Lucas (1978), yielding a total cost function $(c_L/z)(q)^{\varphi}$, $\varphi > 1$, where q is output.
- The transportation- and tariff-inclusive price of the imported low quality final good is p_M.
- The entrepreneur therefore chooses q to maximize

  $p_M q - (c_L/z)(q)^{\varphi}$, yielding the profit function

  $$\pi_L(z) = A(p_M)^{\alpha+1}(c_L)^{-\alpha}z^{\alpha}, \qquad (2)$$

  where $\alpha = 1/(\varphi-1)$, $A = (\varphi^{-\alpha} - \varphi^{-\alpha-1})$, and c_L is defined by equation (1).

Entrepreneurship in high quality final goods

- An entrepreneur with talent *z* who enters high quality final goods production must develop an in-house design capability and specialize one of the imported high quality inputs in order to differentiate his product for foreign buyers and attract market share. This is an expensive process that requires hiring and training a technically prepared worker who will embody the in-house design capability and oversee production of the input.
- The entrepreneurs taking this route are matched randomly with the subset of skilled workers described before; unmatched workers earn w_S in the rest of the economy. In this basic model the matched workers also earn w_S; we will consider the determination of their earnings when we model spinouts.

The specialized input

- Unlike all other inputs, the specialized input enters the production function with a coefficient β > 1. The total cost function for differentiated product *j* is then:

$$\left(c_H\left(\left((\mu/\beta)^{1-\sigma_H} + \int_0^{n_H} \left(p_H(i)\right)^{1-\sigma_H} di \right)^{\frac{1}{1-\sigma_H}}, w_U \right) \Big/ z \right) q_j + F, \qquad (3)$$

- Here μ is the (constant) marginal cost to the firm of producing the specialized input, n_H is the measure of the fixed number of high quality intermediates, $p_H(i)$ is the price of the *i*th high quality intermediate, σ_H is the elasticity of substitution for the CES aggregate of high quality intermediates, q_j is output of the differentiated product, and *F* is the fixed cost of establishing production of the specialized input.

Selling high quality final goods

- The managerial technology for the high quality final good is not subject to diminishing returns, but this differentiated product faces a downward-sloping foreign demand curve $q_j = E^*(p_{Xj})^{-\varepsilon}/(P^*)^{1-\varepsilon}$, where E^* is foreign expenditure on high quality final goods in this industry, P^* is the foreign CES price index for this industry, and p_{xj} is the price foreigners pay for differentiated product j when it is exported to them.
- An entrepreneur with talent z who enters high quality final goods production will follow the standard markup pricing rule, yielding

  $p_X(z) = \tau c_H/z\eta$, where $\tau > 1$ is the number of units of any high quality final good that need to be shipped if one unit is to arrive, $\eta = (\varepsilon - 1)/\varepsilon$, and we have dropped the subscript j because the price of any differentiated product will be the same for a given level of entrepreneurial talent.
- Standard computations then yield the profit function

$$\pi_H(z) = (\eta P^* z/\tau c_H)^{\varepsilon-1}(E^*/\varepsilon) - F, \qquad (4)$$

  where c_H is defined by equation (3).

Foreign supply of intermediates

Producers of final goods generate constant elasticity demands for intermediates, to which foreign suppliers respond with constant markups over their marginal costs. The transportation-inclusive price of any imported intermediate is therefore

$$p_K(i) = p_K = \tau_K \mu_K^* / \rho_K, \; K = H, L,$$

where $\tau_K > 1$ is the number of units of quality K intermediate that need to be shipped if one unit is to arrive, μ_K^* is the foreign marginal cost of production for quality K intermediates, and $\rho_K = (\sigma_K - 1)/\sigma_K$. For simplicity I have treated all intermediates of a given quality symmetrically.

Domestic supply of intermediates

- Recall that each domestic producer of a high quality final good supplies itself with a version of an imported high quality input that is specialized to its own needs. It can also supply a generic version of the same input in competition with imports at marginal cost μ_H. I assume that

$$\mu_H^*/\tau_H < \mu_H < \tau_H \mu_H^* < \mu_H/\rho_H.$$

- The final goods producer then practices limit pricing, selling the input to other domestic final goods producers at the foreign (transportation inclusive) marginal cost.
- However, transportation costs allow the foreign producer to keep the domestic producer of the input out of its home market.

No independent startups for intermediates

- I assume that profits from domestic sales of a high quality input are not great enough to cover the fixed costs of entry into its production, which include the cost of imitating the foreign technology. It follows that independent domestic production of high quality inputs does not take place: all domestic producers of high quality inputs are owned by final goods producers (later to be joined by spinouts from final goods producers).
- The symmetry of all inputs in our model ensures that if independent entry were profitable for one, it would be profitable for all. If inputs were not all symmetrical we could allow for independent domestic production of a subset of high quality inputs without changing any of our results.

Profits of the input subsidiary

$$\pi_S(\bar{z}) = (\tau_H \mu_H^* - \mu_H) N \int_{\bar{z}}^{\infty} \left(-\partial \pi_H(z, \bar{z}) / \partial p_H\right) dG(z) \quad (5)$$

- Note that this does not depend on *z*, because of limit pricing and all firms hiring equally good workers (μ_H equal across firms).
- However, we now write profits from sales of high quality final goods as a function not only of the entrepreneur's managerial talent *z* but also of the cutoff level of managerial talent $\bar{z}$. This comes through the unit cost function c_H, and more specifically through its first argument, the CES price index for high quality inputs P_H faced by any domestic producer of high quality final goods:

$$P_H = \left((\mu/\beta)^{1-\sigma_H} + \left(1 - G(\bar{z})\right) N (\tau_H \mu_H^*)^{1-\sigma_H} + \left(n_H - \left(1 - G(\bar{z})\right) N\right) (\tau_H \mu_H^* / \rho_H)^{1-\sigma_H}\right)^{\frac{1}{1-\sigma_H}} \quad (6)$$

Firm size and internal sales ratio

$$ISR(z,\bar{z}) = \mu \partial \pi_H(z,\bar{z}) / \partial \mu \Big/ \left(\mu \partial \pi_H(z,\bar{z}) / \partial \mu + \tau \mu_H^* N \int_{\bar{z}}^{\infty} \left(\partial \pi_H(z,\bar{z}) / \partial p_H \right) dG(z) \right)$$

- This increases with *z* (firm size) because internal sales increase with *z* and external sales do not. I am waiting to hear from Hortaçsu and Syverson whether this is true in their data.
- *ISR* will be small unless the firm is very large or the measure of high quality final goods producers is very small ($\bar{z}$ is very high). This is consistent with the median value for Hortaçsu and Syverson (2007) of 2.6 percent.
- However, *ISR* cannot be zero, the modal value according to Hortaçsu and Syverson (2007). I conjecture that the zeros in their data occur because some firms produce the specialized version of the input they developed in the same plant in which they produce the final good that uses it, while dedicating their separate plant to the generic version of the input, so that no internal shipments of the input are recorded.

The multiplier effect

$$d\bar{z}/dF = 1/\left(\partial\pi_H(\bar{z},\bar{z})/\partial z - \partial\pi_L(\bar{z})/\partial z + \partial\pi_S(\bar{z})/\partial\bar{z} + \partial\pi_H(\bar{z},\bar{z})/\partial\bar{z}\right)$$

- We expect this expression to be positive: a fall in the fixed cost should lead to more entry into high quality final goods production. Without taking account of the impact of $\bar{z}$ on subsidiary or final goods profits, a sufficient condition is for profits from high quality production to be increasing faster with managerial talent than profits from low quality production (see Figure 1).
- More entry increases subsidiary profits (equation 5) and increases final goods profits (equation 6), creating a multiplier effect. I assume parameters such that this does not explode.
- The multiplier effect will amplify the impact on entry of changes in the ability of the entrepreneur to capture subsidiary profits, and hence the impact of spinouts.

Spinouts Without Cronies

We modify our model in the following three ways:

- The skilled worker can choose the effort he exerts in management of the production of the generic input. I assume that no effort choice is possible in production of the specialized input because it is too closely coordinated with production of the final good and therefore too closely supervised by the entrepreneur.

- This worker can, at some cost, establish his own firm to produce the specialized and generic versions of the input.

- This worker's pay is determined through bargaining with the entrepreneur; previously this worker's pay was simply absorbed into the fixed cost *F*.

Timing of interaction between entrepreneur and skilled worker

- The entrepreneur and the worker are matched randomly, and the entrepreneur hires and trains the worker. The worker is liquidity-constrained, and therefore cannot make a transfer to the entrepreneur to cover any future losses the latter might suffer if the worker spins out. Inability to borrow against one's human capital is realistic for young agents in the developing country context and can be thought of as part of the weak contracting environment.
- The worker discovers his fixed cost, measured in terms of his own time, to establish his own business. Specifically, the worker draws the cost x from a fixed distribution Y with support $[0, \overline{x}]$. The entrepreneur as well as the worker observes x.
- The entrepreneur and the worker decide whether to separate. If they stay together, the entrepreneur makes a transfer to the worker.

Staying together

- The worker produces the specialized input at marginal cost μ and the entrepreneur produces the final good, obtaining profit $\pi_H(z, \overline{z})$.
- The marginal cost μ_H for the generic input is now a function of worker effort e, $\mu_H(e)$. Neither the amount of effort supplied by the worker nor the marginal cost is verifiable outside the firm. Moreover, the marginal cost cannot be inferred from the price the firm charges for the generic input since this is still optimally chosen to equal $\tau_H \mu_H^*$. Finally, due to vertical integration the profit earned from selling the generic input is mixed together with the profit earned from selling the final good, so that no accountant can verify the profit earned from input production, therefore the marginal cost.
- In short, effort is non-verifiable, hence non-contractible. The best the entrepreneur and worker can do is work without a contract and, following the worker's effort decision, rely on their bargaining powers to obtain shares of the profit from generic input production. The worker and the entrepreneur have bargaining weights λ and 1-λ, respectively. The worker chooses his level of effort e (which is in monetary units) to maximize $\lambda\pi_S(\overline{z}) - e$.

Separating

- The entrepreneur and worker first negotiate over whether the worker will continue to produce and supply the specialized input. If they agree, the worker supplies the specialized input to the entrepreneur at marginal cost μ and receives a transfer, and the entrepreneur produces the final good, obtaining profit $\pi_H(z, \overline{z}) - t(z, \overline{z})$.
- The worker chooses effort to maximize $\pi_S(\overline{z}) - e$.
- Label the values of the variables associated with the separation or spinout branch and associated with the together or internal branch *OUT* and *IN,* respectively. It is easy to show that, as long as $\lambda < 1$,

$$e^{OUT} > e^{IN}, \quad \pi_S^{OUT}(\bar{z}) - e^{OUT} > \pi_S^{IN}(\bar{z}) - e^{IN}$$

Efficient bargaining

- With efficient bargaining, the entrepreneur and worker stay together if there is a surplus over separation from doing so.

- There is a break-even $\hat{x}$ for which they are just indifferent. For $x < \hat{x}$, they separate; for $x > \hat{x}$, the entrepreneur pays the worker to stay together.

- For *x* sufficiently large, however, the worker's bargaining position is so bad he must pay the entrepreneur to keep him. This violates his liquidity constraint, hence the assumed upper bound $\overline{x}$.

Socially inefficient results

- We can now compute the expected profits for an entrepreneur with talent *z* who decides to enter production of high quality final goods:

$$\Pi_H(z,\bar{z}) = \pi_H(z,\bar{z}) - t(z,\bar{z}) + \int_{\hat{x}}^{\bar{x}} ((1-\lambda)\pi_S^{IN}(\bar{z}) - t(x))dY(x)$$

  where $t(z, \bar{z})$ is his transfer to the worker to obtain the specialized input if he spins out and $t(x)$ is his transfer to the worker to keep him with his firm. Compare this to the social benefit:

$$\tilde{\Pi}_H(z,\bar{z}) = \pi_H(z,\bar{z}) + \int_0^{\hat{x}} (\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)dY(x) + \int_{\hat{x}}^{\bar{x}} (\pi_S^{IN}(\bar{z}) - e^{IN})dY(x)$$

- The second term is the social benefit from the spinout that is completely lost to the entrepreneur; $t(z, \bar{z})$ is also lost to the entrepreneur but not to society. The difference between the third term and the second term of expected profits reflects the need for the entrepreneur to motivate the worker to stay with his firm and exert effort. This is not a special vulnerability of vertically integrated firms.

Larger missing middle, smaller local content of exports

- All firms are vulnerable to spin*offs*. Vertically integrated firms are vulnerable to spinoffs *and* spinouts. Moreover, their suboptimal incentive to enter is amplified by the fact that they sell to each other (the multiplier effect)

- The negative welfare consequences of suboptimal entry are reflected in at least two observable phenomena: a larger "missing middle" in the size distribution of developing country firms, and a smaller local content of developing country manufactured exports

- Both of these phenomena result from a higher than socially optimal $\overline{z}$ (see Figure 1)

Policies: Export subsidies vs. import tariffs

- If lump-sum taxation is available, export subsidies can achieve the (constrained) first-best in this model. Two special features contribute to this result: (1) firms are exporters if and only if they are vertically integrated entrants; (2) subsidies received by inframarginal entrants are socially harmless transfer payments.
- Export subsidies also increase the local content of exports, by increasing the variety of domestically produced inputs. Analogy to the "home market effect" suggests a tariff on imports of input varieties. Far from being symmetric to export subsidies, however, this could backfire by raising the final goods costs of vertically integrated entrants more than it raises their input subsidiary profits. Backfiring is more likely the lower is equilibrium entry.

Spinouts with Cronies: Social Networks

- Social network punishes the deviant action taken by the worker, which is refusing to supply the entrepreneur with the specialized input after he has spun out. Denote the collective punishment imposed on the worker, measured in monetary units, by ζ. Transfer from entrepreneur to worker falls by $(1 - \lambda)\ \zeta$
- Results: When all entrepreneurs and workers are part of the same social network, then compared to its absence (i) entry into high quality final goods production is higher, and the difference is amplified by the multiplier effect; (ii) the local content of exports is higher; (iii) the "missing middle" in the distribution of firm sizes is smaller; and (iv) the (measure of the) number of entrepreneurs is higher.
- Note that the social network produces a higher volume of entrepreneurship not because of a higher propensity to spin out (that remains the same) but because there are more high quality firms from which to spin out

Spinouts with Cronies: Family Firms

- Assume one-sided altruism from parent-entrepreneur to child-worker:

$$U_E = I_E + \theta U_W \,,\; U_W = I_W$$

$$0 < \theta < 1-\lambda,\; U_W = U_{Wf}\,;\; \theta = 0 \text{ otherwise}$$

θ is like a self-enforcing equity contract

- Solve bargaining problem at end of together branch, where the threat points are zero:

$$\text{Max}\{I_E\,, I_{Wf}\}\;\; (I_E + \theta I_{Wf})^{1-\lambda}(I_{Wf})^{\lambda} \;\; \text{s.t. } I_E + I_{Wf} = \pi$$

$$\rightarrow I_{Wf} = [\lambda/(1-\theta)]\pi,\; I_E = [1 - \lambda/(1-\theta)]\pi$$

- Worker will supply more effort

Families stay together?

- The parent-entrepreneur and child-worker divide the profit from staying together by solving the same problem, except their threat points are now given by their utilities evaluated at the incomes earned when they separate.

- It can be shown that the solution for the together incomes is the same as for non-family firms, substituting $\lambda/(1-\theta)$ for λ. It follows that family firms stay together or separate based on the same comparison of total incomes that non-family firms make.

- However, total income along the together branch is greater because the child-worker supplies more effort and total income along the separation branch is the same, so the child-worker is less likely to spin out.

Family firms generate more entry …

- The total expected utility of an entrepreneur with talent *z* who hires a child of ability equal to that of the best available workers can be shown to be

$$\Pi_{Hf}(z,\bar{z}) = \pi_H(z,\bar{z}) - t(z,\bar{z}) + (1-\lambda)\zeta + \int_0^{\hat{x}_f} \theta(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)dY(x)$$

$$+ \int_{\hat{x}_f}^{\bar{x}} (\theta(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x) + (1-\lambda)(\pi_{Sf}^{IN}(\bar{z}) - e_f^{IN} - (\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)))dY(x)$$

- The difference between this expected utility and the expected utility (profit) of an entrepreneur who hires a non-family worker within his social network can be shown to be

$$\Pi_{Hf}(z,\bar{z}) - \Pi_H(z,\bar{z}) = \int_0^{\bar{x}} \theta(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)dY(x)$$

$$+ \int_{\hat{x}_f}^{\hat{x}} (1-\lambda)(\pi_{Sf}^{IN}(\bar{z}) - e_f^{IN} - (\pi_S^{OUT}(\bar{z}) - e^{OUT} - x))dY(x) + \int_{\hat{x}}^{\bar{x}} (1-\lambda)(\pi_{Sf}^{IN}(\bar{z}) - e_f^{IN} - (\pi_S^{IN}(\bar{z}) - e^{IN}))dY(x)$$

… but not enough

- The total expected (observed) profit generated by an entrepreneur with talent *z* who hires a child of ability equal to that of the best available workers is

$$\tilde{\Pi}_{Hf}(z,\bar{z}) = \pi_H(z,\bar{z}) + \int_0^{\hat{x}_f} (\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)dY(x) + \int_{\hat{x}_f}^{\bar{x}} (\pi_{Sf}^{IN}(\bar{z}) - e_f^{IN})dY(x)$$

- The difference between this expected profit and the expected utility obtained by this entrepreneur equals

$$\tilde{\Pi}_{Hf}(z,\bar{z}) - \Pi_{Hf}(z,\bar{z}) = t(z,\bar{z}) - (1-\lambda)\zeta + \int_0^{\hat{x}_f} (1-\theta)(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)dY(x)$$

$$+ \int_{\hat{x}_f}^{\bar{x}} (\lambda(\pi_{Sf}^{IN}(\bar{z}) - e_f^{IN}) + (1-\lambda-\theta)(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x))dY(x)$$

The impact of family firms on profitability is ambiguous

- If the entrepreneur hires a child of ability equal to that of the best available workers, the total expected (observed) profit is greater than if he hires a non-family worker
- However, even if the family worker has lower ability and raises marginal costs to the point where observed profit is reduced, the entrepreneur can still have an incentive to hire him because his utility is increased by the extra term

$$\int_0^{\bar{x}} \theta(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x) dY(x)$$

- Total profit may not be what the econometrician sees, if spinouts are not eventually incorporated into family business groups, for example. Nevertheless, the argument still goes through if spinout profits are unobserved, because the entrepreneur still incorporates the extra term into his hiring decision

Family firms will be more common in industries where subsidiaries are very profitable (import competition is weak)

This is easy to show. The extra term in the entrepreneur's utility when he hires his child

$$\int_0^{\bar{x}} \theta(\pi_S^{OUT}(\bar{z}) - e^{OUT} - x)dY(x)$$

is increasing in subsidiary profitability. Therefore, when subsidiary profitability rises, the entrepreneur's utility when he hires within the family increases more than his utility when he hires outside the family

Conclusions

- All firms are vulnerable to spin*offs*. Vertically integrated firms are vulnerable to spinoffs *and* spinouts. Moreover, their suboptimal incentive to enter is amplified by the fact that they sell to each other (the multiplier effect)

- The negative welfare consequences of suboptimal entry are reflected in at least two observable phenomena: a larger "missing middle" in the size distribution of developing country firms, and a smaller local content of developing country manufactured exports

- Government attempts to reach a target level of entry will cost less if directed at (competent) family firms

Future Research

I have at several points implied that spinouts lead to the formation of business groups, particularly family business groups. However, a key feature of business groups is internal capital markets and especially equity holdings of the lead firm in the subordinate firms (Khanna and Yafeh 2007). Given the intimate knowledge the parent firm has of the spinout in our model, it would be natural for the spinout to turn to the parent rather than an external bank to meet its financing needs. From there it seems a small step to equity holdings by the parent in the spinout, which in family business groups could replace the ties of affect that vanish with the death of the founder.