

Opposition to Contract Production: Self-selection, Status, and Stranded Assets

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Abstract: Production contract tournaments induce self-selection among producers. Self-selection for pork differs from broiler production resulting in a predictably different political response by incumbent producers to contract innovation. The higher capital and status of incumbent pork producers than poultry producers account for much of the difference.

JEL Classifications: J41 Contracts: Specific Human Capital
J43 Agricultural Labor Markets
L22 Firm Organization: Markets vs. Hierarchies

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Opposition to Contract Production: Self-selection, Status, and Stranded Assets¹

Political leaders will resist vertical integration in agriculture, in their oratory, in their congressional hearings, and in their legislation. The philosophy of the small, owner-operated, family farm is deeply ingrained in our sociological and political mores. - Earl Butz, *The Social and Political Implications of Integration*, (1958)

Introduction

Contract production revolutionized the broiler industry and is transforming pork and, to a lesser extent, beef production. The economic incentives driving the current spread of this organizational innovation are similar to those that led to its rapid diffusion for broilers in the 1950s and 1960s. The current political response however is rather different. Unlike 40 years ago, opposition to contract integration by independent pork producers has been successful in passing state legislation that effectively slows the rate of structural change. The diffusion of these technological and organizational innovations generate gains in allocative and productive efficiency. Early (and lucky) adopters gain an advantage over non-adopters, forcing many of the latter to exit production. The result is a redifferentiation of rural economy and society, a perennial theme in the social sciences, although the process is currently referred to as ‘industrialization’ or attributed to ‘globalization.’ This paper contributes to the analysis of this process by focusing on how production contracts induce self-selection among agricultural producers to generate patterns of differentiation (exit, entry and survival). In particular it examines how the self-selection process for pork differs from broilers and how this results in a predictably different pattern of differentiation and political response.

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1. Labor markets, not product markets

In the early 1960s Paarlberg and Breimeyer observed that vertical integration in broiler production required producers to cease being their own bosses and accept the status of an employee working under contract. Welsh (1997) makes the identical point referring to a shift in the “locus of control over agricultural production decisions” from the farm to non-farm corporations. The fact that broiler contracting transformed what was once a product market for live birds into a labor market for poultry caretakers is often not taken to its logical conclusion by researchers.

Contract growers may view themselves as independent operators because they are paid when they deliver finished product to the integrator, but they are being compensated for effort, not for the product. In fact, they are relative piece-rate workers. They do not own the product and therefore they do not bear any direct product market price risk. The only market contract growers expose themselves to is the labor market for contract growers. Consequently, contract growing should be analyzed as a labor market, not as a product market. The demand for labor is a derived demand driven by final demand for the finished product. So although the price of broiler parts is relevant to the demand for contract labor, it is not central to the analysis.

Because virtually all broilers are raised under contract, there has not been a product market for broilers in the United States for many years. The USDA derives a “live weight equivalent price” for this missing market from wholesale market prices for ready-to-cook broilers. [USDA/NASS (1998)] A similar phenomenon is emerging in the pork complex. Slightly less than one-fifth of all hogs slaughtered in the U.S. is finished under contract, and this proportion is rising. Indicative this structural change, the Chicago Mercantile Exchange [CME] terminated its Live Hog futures contract in December 1996. It was replaced by a Lean Hog contract: a lean hog is a 51-52% lean carcass, not a live hog as before. The CME explains that: “Seventy percent of

hogs are [now] bought on a lean value basis. The new contract opens the market to the complete pricing stream of the pork industry, including international interests, by substantially reducing basis risk.”² Clearly, the primary market for price discovery has shifted from the entrance of the slaughterhouse to its exit. The CME has also introduced more value-added contracts for the beef complex.

It was not until the late 1970s when the formalization of the principal-agent problem and advances in the economics of information provided labor economics an analytical framework to model contract production. Product contracts, as administered by poultry and pork processors, are forms of tournaments.³ The integrator who initiates the tournament supplies all production inputs except the poultry building and the contractor’s management effort, these latter are supplied by the contracting grower. Because all variable inputs save the grower’s effort are monitored by the integrator and because the quality and quantity of the final product are easily observed, it is possible to measure the marginal physical product of the contract producer’s effort. Were it not for systematic risks such as weather and disease, the integrator could simply compensate the producer by his or her observed marginal value product. Tournaments allow the integrator to observe the productivity of a cohort of contract producers subject to the same systemic risks. Observing and rewarding individual performance relative to (mean) cohort performance neutralizes the cohort’s systemic risk. The least cost [most efficient] producer participating in the tournament receives the highest remuneration and so forth, declining to some pre-specified minimum compensation. Exceptionally high cost producers can be barred from further tournaments.⁴

² <http://www.cme.com/market/ag/leanfaq.html>

³ Lazear (1995) provides an excellent survey.

⁴ Knoeber and Thurman (1994) verify the tournament model with broiler contract data; Martin (1997) examines hog finishing contract data and discusses various forms of performance contracts.

2. *Self-selection, stratification, and survival*

As with innovations of any kind, changes in vertical coordination may have transitional effects that create difficult problems. Those farmers who for one reason or another are not able to participate in a new structural alignment will find themselves at a disadvantage, they may be forced to give up the production of a particular commodity or even to retire from farming. - Mighell & Jones (1963): 76

Contract production allows greater quality control and product homogeneity through the control of inputs, in particular, genetics and rations. It allows higher rates of processing capacity utilization through batch scheduling. Further, scale economies can be realized in input procurement and inventory management, and integrators can earn a premium by ensuring retail and food service chains a steady product flow of consistent quality. Combined, more efficient production, processing, coordination, and marketing result, through competition with other processors, in lower product prices and more consistent product quality. Because of scale advantages in procurement, management and marketing the long-run minimum average variable cost under contract production lies below the minimum average variable cost for most independent, non-contracting producers. As product market prices decline relative to input prices, independent grower margins are reduced. Moreover, as the share of independent production declines, the live product market thins yielding more live product price uncertainty.⁵ The return on independent assets has a lower mean and higher variance, thus reducing their capital value.

Tournaments induce a separating equilibrium among potential contract producers. The key question is what is the line of separation: what set of household characteristics determines

⁵ Nelson and Turner (1995) provide a useful survey in their attempt to test experimentally the proposition that thinner markets are more volatile.

whether one elects to contract? The problem is structured as follows. Before the advent of contracting households are either independent growers [I] or non-growers [N]. The introduction of contracting expands the choice set to include contract growers [C]. Contract growers are required to provide growing facilities that meet the integrator's specifications. This significant specialized fixed investment of capital, K_C , signals that the grower is unlikely to behave opportunistically toward the integrator.

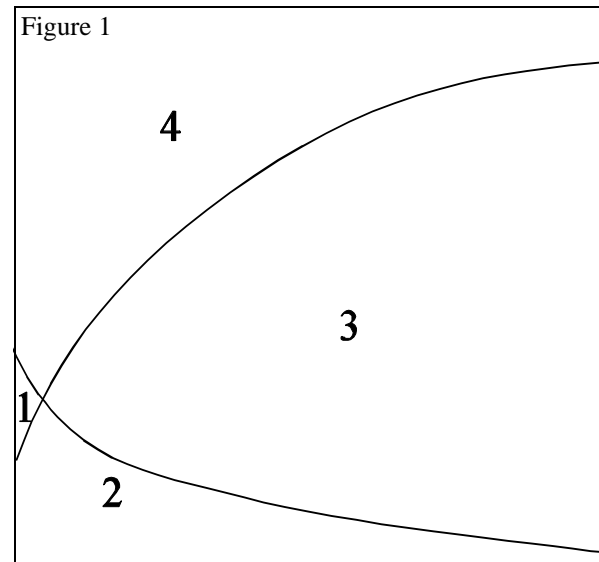
Each household has an endowment of specific growing skills, S_i , and general human capital, H_i . H_i and S_i are positively but not perfectly correlated. In addition, each household has an endowment of net worth-creditworthiness W_i , which can be drawn upon for various investments, K . W is increasing in H and S . There are two related decisions in determining who elects to contract. First, the returns from contracting must dominate independent production and non-growing. Second, if contracting does dominate, the household must then supply the specific investment, K_C . If the household has sufficient net worth or creditworthiness, the investment is no constraint on entry. If not, households need external finance for K_C . Generally they must satisfy an integrator that they are contract-worthy, and, with the integrator's statement in hand, attempt to negotiate a bank loan. Sometimes integrators provide direct building finance, but in either case a household must demonstrate some minimum combination of creditworthiness and growing skill. Whether the household will be financed is a decision *about* the household made by the integrator and the lender on the basis of observable characteristics. The decision to contract, given financing, is made *by* the household about its own prospects and capabilities.

The figures graph these decisions by plotting the limiting cases in household characteristics space ($S, W|H$): A measure of S is plotted on the horizontal axis and a measure of W and H is

plotted on the vertical axis. The finance decision made about the household is a negatively sloped line showing the tradeoff between creditworthiness and growing skill. Above the line credit is provided or investment is from net worth,

below the line credit is denied. The decision whether to contract is an upward sloping line.

The greater the growing skill the household perceives itself to have, the higher the expected return from contracting. However, the greater the general human capital endowment of the household, the greater the expected income from 'non-growing'



employment. Above this line not growing dominates, below it, growing dominates.⁶ The two intersecting lines create four subsets. Households in region:

- | | | | |
|---|----------|-----|------------------------|
| 1 | prefer N | and | would not be financed. |
| 2 | prefer C | but | are denied finance. |
| 3 | prefer C | and | gain financing. |
| 4 | prefer N | but | could gain financing. |

The position of these two lines and the boundaries and area of the subsets will depend on local credit and employment conditions as well as technological change.

3a Broilers.

Figure 1 illustrates the introduction of broiler contracting. Broiler contracting developed in areas

⁶ See Appendix for the optimization problem.

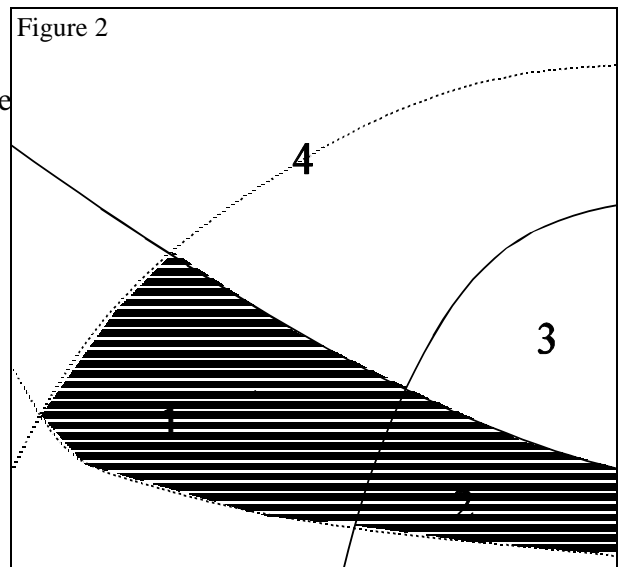
distinct from traditional poultry production regions. Prior to the development of broilers, poultry production was a by-product of egg production. It was geographically dispersed, small-scale, relatively unorganized and generally operated as a side activity, usually by farm women.⁷

Contracting developed in areas of rural underemployment and low land prices such as the Delmarva Peninsula, North Georgia and Arkansas. Second, at least at its inception, broiler contracting did not require much specialized skill and given the small scale of operations, the required capital investment was relatively small. Consequently, contracting was an attractive opportunity to many households [in 3] and only those with exceptionally bad credit would be denied financing [in 2]. In many cases becoming a contract grower meant not only higher income but higher status as well. Third, what little traditional poultry production there was in these states was poorly organized and usually at the social and political margins. Consequently, there was no effective opposition at the state level.

As the industry has matured and the scale, quality, and technology of production have advanced, the minimum investment requirement has increased, shifting the credit line upwards - In figure 2. Growers with old vintage houses had to consider upgrading or exiting. The use of tournaments has induced the entry of more skilled growers and the exit of less skilled growers. The average skill endowment in the contractor pool has increased and this has shifted the skill line rightward. The dotted lines mark the old borders. Region 3, the area of active contractors has diminished. Households in the new area of region 4 have left contracting for employment outside

⁷ For broiler history and spatial migration see Reimund, Martin and Moore. Umbach examines the 'masculinization' of broiler production.

of growing. Households in the new (shaded) area of region 2 are having to exit growing because they can no longer gain the necessary finance. Households in the new (shaded) area of region 1 have to exit growing because their skills are no longer competitive. The return from their growing skills has fallen relative to the return on their human capital in non-contracting. Further



inferences are impossible without knowing whether there was a decline in the former or a rise in the latter. Finally, households in region 1 cannot gain the finance to contract even if it were an attractive option.

Households in region 4 voluntarily exit contracting, those in regions 2 and 1 (assuming a declining relative wage for contracting) would prefer to remain, but cannot. It is in these two regions where opposition, political or otherwise, to changes in the labor market for contract growers will be the greatest. The standard response of workers to declining real wages and accelerating employment requirements is through collective bargaining to require employers to give just cause for dismissal and provide other forms of job security. Because (the author assumes) contract growers view themselves as independent businesses and not as wage workers, these demands find a slightly different manifestation than normal unionization.

On October 23, 1997, H.R.2738, The Family Farmer Cooperative Marketing Amendments Act of 1997 was introduced in the U.S. House of Representatives. The bill proposes to amend the Agricultural Fair Practices Act of 1967 to include contract producers.⁸ Currently, 7 USC

⁸ The 1967 Act is embodied in U.S. Code Title 7, Chapter 56: Unfair trade practices affecting producers of agricultural products.

2302 (b) reads: *The term "producer" means a person engaged in the production of agricultural products as a farmer, planter, rancher, dairyman, fruit, vegetable, or nut grower.* H.R. 2738 proposes to amend this definition: “(1) by inserting ‘poultryman,’ after ‘dairyman,’; and (2) by adding at the end the following: ‘*The term includes a person furnishing labor, production management, facilities, or other services for the production of an agricultural product.*’”⁹

The bill would expand the definition of agricultural producer to include agricultural laborers and production managers. Individuals in such positions are already explicitly covered under the Fair Labor Standards Act of 1938 [29 USC 203(f)]. But Fair Labor Standards fall under the purview of the Secretary of Labor and collective bargaining negotiations under the National Labor Relations Board [NLRB]. H.R.2738 would allow voluntary cooperative associations of agricultural producers to combine in collective bargaining units and establish the Secretary of Agriculture as the mediator and arbitrator of contract disputes. In sum, the bill proposes to allow contract growers to form labor unions without having to call them labor unions, and to engage in collective bargaining under USDA oversight rather than under the NLRB. The bill is strongly supported by the National Contract Poultry Growers Association [NCPGA], which has lobbied to enact similar laws in several state legislatures.¹⁰

3b Pork.

Contract growing is about converting feed into meat. Because hogs require relatively more feed than broilers, feed transport costs are higher per unit of pork than of chicken for any given location. Consequently the location of a feeder-pig operation is likely to be located closer to feed sources than a broiler operation. Pork production has shifted southward in the U.S. but not to the

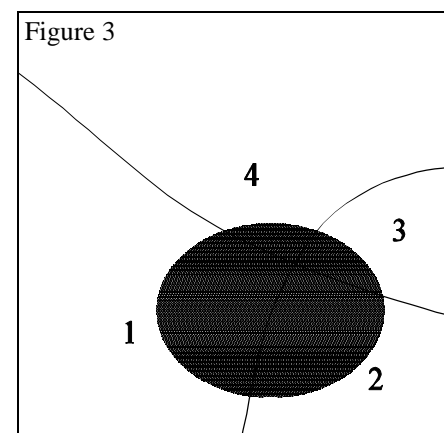
⁹ Search for H.R. 2738 text via Thomas (105th Congress): <http://thomas.loc.gov/home/c105query.html>

¹⁰ NCPGA’s web site: <http://www.web-span.com/pga/> documents legislative efforts and posts contract payment schedules for several major integrators.

same extent as poultry. In general, hogs are on feed today where they were on feed 20 years ago: in or on the periphery of the corn belt. Eastern North Carolina, which has aggressively followed the broiler model, is the clear anomaly. [See Hubbell]

The shorter transport radius means that the diffusion of pork contracting is occurring in areas already populated by independent growers. Consequently diffusion depends more on converting incumbent hog producers to contracting than did poultry. Whatever status quo resistance to contracting exists is compounded by the higher initial investment required for hogs as well as the higher relative skill level needed. So the positions of the capital and skill boundaries for the early stages of hog contracting more closely resemble those of the mature poultry industry than the early poultry industry. This is plotted in figure 3: the shaded oval represents the location of incumbent growers. Unconstrained by regulations, incumbents in region 3 are the most likely to convert to contracting. As the proportion of output contracted expands, finished hog market prices are likely to become more volatile and the margin over feed costs will decline. The return to incumbents in regions 1 and 2 declines as does the value of specific hog growing assets.

In response there is political action at the state legislative level to regulate and prevent the development of larger scale hog operations. Unlike opposition to broiler integration in the 1950s, pork producers in the 1990s have been successful in securing favorable legislation in several states. Several reasons account for this difference. First, as noted above, there are generally more incumbent independent producers. Second, independent hog producers are more significant economic operations than were traditional poultry producers. Rather than existing at the margins of rural society, they are



likely to be major actors in the local rural economy and political structure. Third, hogs also tend to be central to the farm organization rather than a side operation. So not only is the absolute amount of capital specific to hogs greater than traditional poultry, its proportion of household net worth is significantly greater. Fourth, in contrast to most converts to broiler contracting, contracting for most pork producers does not represent an increase in status; rather it is more likely a step down and viewed as a loss of autonomy. In sum, contract expansion represents a significant threat to incumbents' household wealth and status. These households tend to be integrated in the local power structure and the probability that their concerns will be manifest in legislative action is relatively high. Finally, although not central to the present analysis, the environmental externalities of large-scale animal production provide a powerful means for building support with urban and suburban representatives; this was not a viable political issue in the 1950s.

A second response is that incumbent growers are developing production and marketing networks to gain bargaining power in product sales and input procurement. If producer networks survive, it will merely result in a slightly different division of labor from the integrator-contractor model. The producer network would internalize the upstream activities of the integrator (breeding, procurement) and offer a standardized high volume product flow to a processor. The problems of how to monitor and reward grower effort and how to allocate and schedule production would shift to the network.¹¹

4 Conclusion.

This analysis argues that rural households' endowment of skills and capacity to finance production

¹¹ Welsh sees producer networks as a evidence of a movement of social resistance to retain the locus of production control with producers. This neglects that problems of network governance can be as contentious as negotiations with integrators.

investment are the primary determinants of whether a household will choose to engage in contract production, remain (or become) an independent producer, or exit production. I use this framework to discuss the differences between the political responses to the structural changes induced by contract production by poultry and pork producers. This is an initial effort to express this conceptual framework to the profession and elicit critical comment. If the propositions outlined in this paper are determined to be viable hypotheses, then the next step is empirical testing.

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Appendix: Each household i has an initial endowment of S , H , K and $W(S, H, K, z)$. W is increasing in all arguments; z represents household goodwill (credit record). Households have a fixed amount of labor time, L , which can be allocated between growing and non-growing: α is the proportion of L allocated to growing.

Similarly, initial K and W can be allocated among investments in I , C , or N . The household's problem is to maximize the expected discounted stream of utility $[V]$ given its resource constraints and the reward schedules offered by employment in I , C , and N : $\{Y_C, Y_I, Y_N\}$. Factor prices are denoted w , which include contract payments. Output is denoted q , product price p . The household's subjective discount rate is θ , r represents the finance rate on production capital, r_n the rate of return on financial investment and δ the rate of asset depreciation. δ_C depends on the rate of technical change in contract production (obsolescence of vintage capital). In addition, δ_I also depends on the expected mean and variance of p .

$$\max_{\alpha, K} E \int_0^{\infty} V_i[(Y_{\{C,I,N\}}(\alpha, K; H_i, S_i, K_N), W_i)] e^{-\theta t} dt$$

$$Y_C = w(S_i, \alpha L) q - (r + \delta_C) K_C + w(H_i) L (1 - \alpha)$$

$$Y_I = p q(S_i) - (r + \delta_I) K_I - w x(q) + w(H_i) L (1 - \alpha)$$

$$Y_N = w(H_i) L + r_n K_N$$

□