Inefficiency and Misinformed Investment in Ethanol:

Arguing misunderstood scale efficiency and misallocated investment in domestic ethanol production including an NIE treatment of vertical integration.

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Abstract:

Production of corn-based ethanol in the United States has driven unprecedented investment in rural economies since the late 1990s. With the establishment of the "renewable fuels mandate" in the President's 2005 Energy Policy Act funding for domestic production and a national market demand have stabilized. Currently the industry is rolling-back investment plans and scaling down proposed developments and expansions of existing plants. This paper uses a New Institutional Economic analysis to explain how vertical integration benefits large production facilities. Further it reinforces current arguments on the relative local impacts of these large production sites should they come to dominate the industry. Proponents of corn ethanol argue that decentralized domestic energy production can offset our energy insecurity from imported fossil fuels while creating new demand for agricultural inputs improving local rural economies. The paper shows the fallacies of these assumptions, namely that industry dynamics tend towards large centralized production which minimizes relative local economic impact, depresses input prices, and exacerbates rural instability by undercutting less cost-effective but more socially beneficial producer-owned cooperatively organized ethanol production.

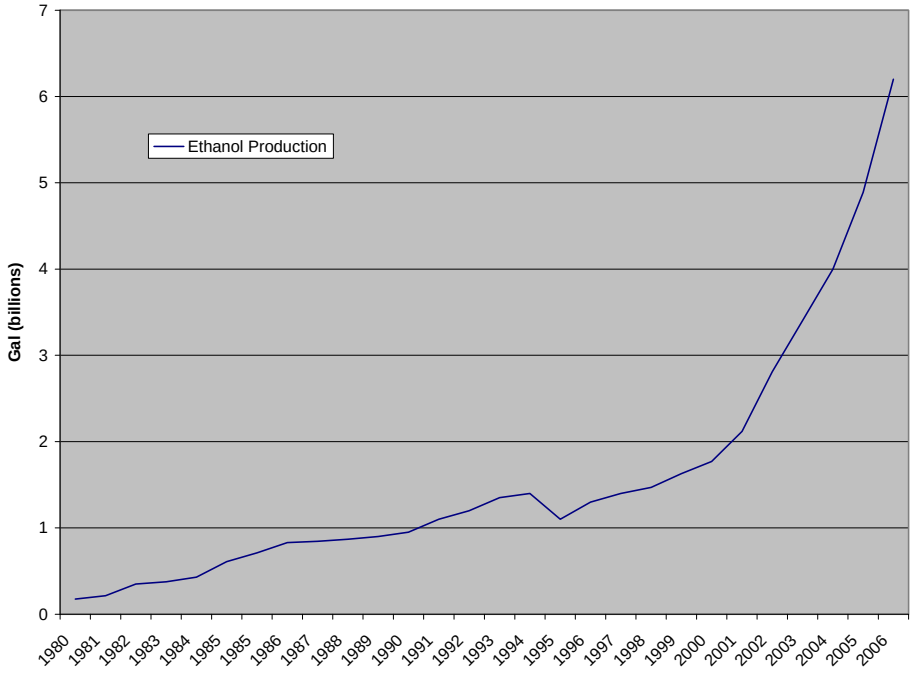
Introduction:

Ethanol has been heralded as the most significant development in rural America in the last quarter century (Urbanchuk, 2006). From under 175 million gallons in 1980, domestic production has sky-rocketed to over 4.6 billion gallons annually. The most recent Energy Policy Act of 2005 included the broadest incentives for biofuels yet, including a federal mandate to require 7.5 billion gallons of renewable fuels such as

ethanol in the nation's highway fuel supply by 2012 (Department of Energy, 2005). Possible economic impacts range from reinvigorating rural economies to shrinking the trade deficit. Agribusiness lobbyists highlighted, in 2005, the link between the 65% of crude oil supply that was imported and the growing U.S. trade deficit. Estimates suggest ethanol may offset 3.7 billion barrels of crude imports with domestic production by 2015.

The President's 2005 Energy Policy Act mandated support for national output of over 7.5billion gallons yearly. It is important to note that logistical limitations create questions about actual demand. For now demand is stable due to the federal renewable fuels mandate, beyond those 7.5 billion gallons projections for demand become less clear. Many questions important to the development of ethanol markets remain unanswered. Infrastructure constraints have the potential to limit development of this industry if not addressed congruently with the expansion of the industry. Similarly ignoring the potential for reaction by petroleum exporting countries and large transnational oil companies is illogical. Their actions within the market are quite relevant to the development of alternative fuels. As alternatives become cost effective competitive pressure on these firms will increase, possible spurring reactionary limit pricing. Figure 1 illustrates the rapid growth of ethanol production.

Fig. 1 U.S. Ethanol Production (CARD, 2007)



The potential for some economic impact from ethanol cannot be contested; however the scale of that impact has been over asserted (Hendersen and Akers 2007). The nature of ethanol production lends itself to certain production economies associated with centralized, concentrated production. While some of these efficiencies are well understood and reflected in investment and production development, continuing investment trends in the ethanol market lead towards inefficiency. The scale of investment in New Generation Cooperatives and small scale producers appears to

overlook inherent returns to scale associated with large capacity vertical integration and industry concentrated.[1] A New Institutional Economic approach to integration efficiencies and transactions costs helps elucidate the cost-benefits of large scale production.

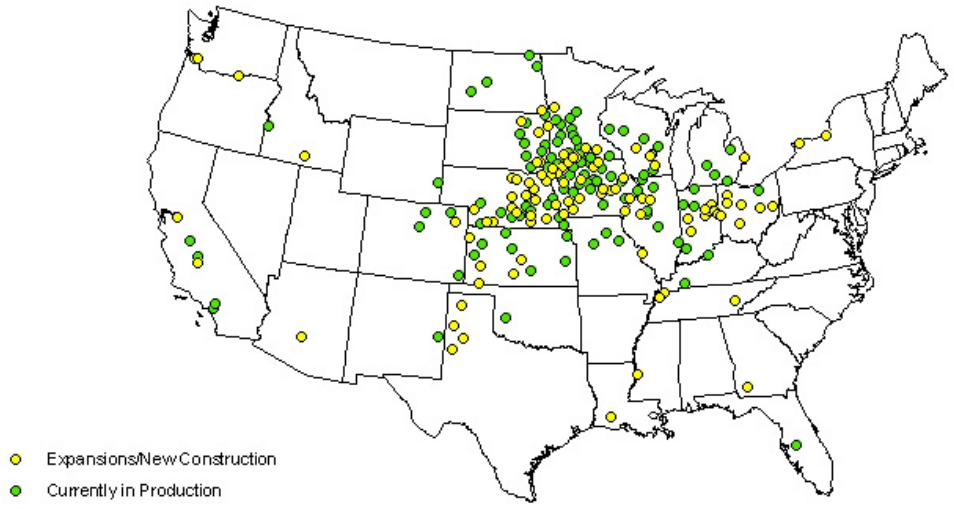
In the U.S. there are 129 operational dry-mill ethanol plants with more in development queuing (Urbanchuk, 2007). The ethanol industry in the U.S. is diversified into three types of production facilities: small, privately-held, producer-owned firms, cooperatives organized on a pay per bushel basis, and larger vertically integrated sites that produce 100million gallons per year (MGY from now on). A single large agribusiness firm operating vertically integrated plants, Archer Daniels Midland Company (ADM) accounts for more than 1 billion gallons of annual domestic production: four times any rival company (Swenson, 2006).

This paper argues that this diversity of production creates diverse benefits reflective of the differing production schemes. Local impact measures of ownership in ethanol production illustrate the economic effect of producer ownership, however public opinion and the growing demand for energy independence incentivize large scale centralized production. This paper explains the forces behind industry consolidation as well as elucidating the local economic drawbacks of said consolidation. The question in policy makers mind is not should we support domestic energy production, but rather does our support promote the most socially beneficial means of production, or simply the most cost-effective?

1.Production levels less than 30mgy million gallons per year roughly the average threshold for direct state subsidization in the upper plain states. A majority of current and planned development is in 75 mgy or the so called name-plate size for ethanol plants.

Figure 2 below illustrates the scope and diversity of the industry, while production currently ranges across many states this paper will focus on the industry trends of corn-belt states especially Iowa however the conclusions are broadly applicable.

Figure 2. Ethanol Development and Planned Expansion (Henderson, Akers 2006)



Energy issues are highly politicized especially the significant cost of foreign oil. Public sensitivity to energy issues and resulting political culpability and public policy have created conditions that misallocate resources in ethanol investment opportunities by supporting temporary development of inefficient plants . Public support in the form of tax incentives, loan guarantees, and tariffs on foreign competition all auspiciously aim to promote small diversified production. Indeed literature indicates the largest relative local economic impact is derived from local ownership (Urbanchuk, 2007.) Local ownership of ethanol production creates a multiplier effect within regional economies (Urbanchuk, 2006). Local ownership is also a two-sided coin in that as the profitability of small ethanol ventures decline as is likely with profit seeking entrants to the industry, high

levels of local exposure can create lasting negative economic impacts in rural economies (Swenson, Eathingto 2006.)

Returns to scale and integration lead to a different outcome, namely absentee ownership and off-sight administration. Local administrative and clerical services are two areas where cooperative ownership increases local economic impact over absenteeism (Urbanchuk, 2007). In the case of New Generation Cooperatives, members control the prices they pay themselves per bushel of corn limiting the member-owners' exposure to volatile commodity price fluctuations. Cooperatives additionally benefit from the integration of supplying their own corn and chemical inputs like denaturants.

Increased external pressure on the logistics of the market from the high cost of stainless steel rail cars and premium rail fares from greater demand threaten to bolster entrenched operations while limiting new competition. Concentrated and integrated ethanol production is more able to weather corn price shocks, overcome logistical obstacles, benefit from internalizing transaction costs through integration, benefit from scale economies in labor and capitalization, and capitalize on captive research and development institutions such as Iowa's Center for Agricultural and Rural Development (CARD). These market conditions lend credence to the argument for concentration as an efficient market decision; however it may not have the desired regional and local economic payoff expected.

This paper argues that market forces dictate outcomes and efficiencies from larger firms less likely to be locally owned. Volatility from new market demand and historically unprecedented premium prices for inputs in ethanol production are creating an additional burden for small producer owned cooperative ventures that are not diversified to weather

market fluctuations. Investors in New Generation Cooperatives (NGC) and medium sized ventures ignore the competitiveness of strategic efficiencies from broad vertical integration.[2]

Review of Literature

Integration within firms is a result of "transactional failures" from market operations (Williamson, 1971). Market processes are internalized to substitute internal solutions to market outcomes. In volatile commodity markets where weather and other intangibles affect prices the advantages to internalizing input costs are evident. Vertically integrated firms are not subject to ephemeral speculation or confidence of their suppliers. Further, technological economies arise from the interdependency of successive production processes and the logistical costs of ethanol dispersal. The realities of internalizing transaction frictions promote largely concentrated production in contrast to trends of decentralized investment and the plethora of small producer-owned and cooperative ventures under construction (Swenson, 2006 p.19.)

Current government policy supporting ethanol must be rethought if the intent is to create sustained decentralized rural economic stimulation. At this time, tax credits to producers and tariffs on competition encourage a misallocation of investment funds to ventures soon to lose competitiveness and feasibility. State-sponsored tax incentives function ostensibly as incentives for entry by firms that are not viable as they would be unable to compete unsubsidized with larger firms. Strategic use of integration can achieve anticompetitive effects by substituting a firm's will for a decision that is otherwise subject to market coordination (Williamson, 1971.)

2. New Generational Cooperatives- agency premiums and dividends are paid on a per bushel of input basis in contrast to traditional one member one vote organization. Similarly cooperative ownership of corporate ventures is a growing trend (Urbanchuk, 2006)

The specifics of current tax incentive structures will be analyzed to disambiguate their effects on the current market structure, for now it is safe to assume that these price supports alter the investment market in ethanol towards inefficient over-investment.

Iowa, the historical center of U.S. maize production, and now the epicenter of ethanol development and research, is soon to become a net importer of corn (Swenson and Eathington, 2006.) The paradox of how the nation's single most fertile producer of corn can come to import corn is linked to the story of ethanol and biofuel development. In 2006 the U.S. supplanted Brazil as the largest ethanol producer in the world, producing over 4.6 billion gallons. This juxtaposition is especially telling of the impact of recent policy promoting ethanol production in the US since Brazilian sugar-cane ethanol is cheaper and more efficient to produce in terms of externalities than corn-ethanol (Zhang, Vedenov, Wetzstein, 2007.)

There was enormous public anticipation for this tide of ethanol especially in the corn regions of the upper mid-west (Swenson, 2006). Proponents presuppose ethanol will invigorate rural economies in the Midwest, stabilize certain commodity prices, but most importantly it may provide a domestic salve to ease hypersensitivity to energy concerns. There is a groundswell of support for domestic production of fuels, especially those viewed as *green* (Urbanchuk, 2007.) Imported fuels have an implicit security cost stemming from the volatility inherent in maintaining their supplies which is not reflected in their market price; domestically supplied renewable fuels do not.

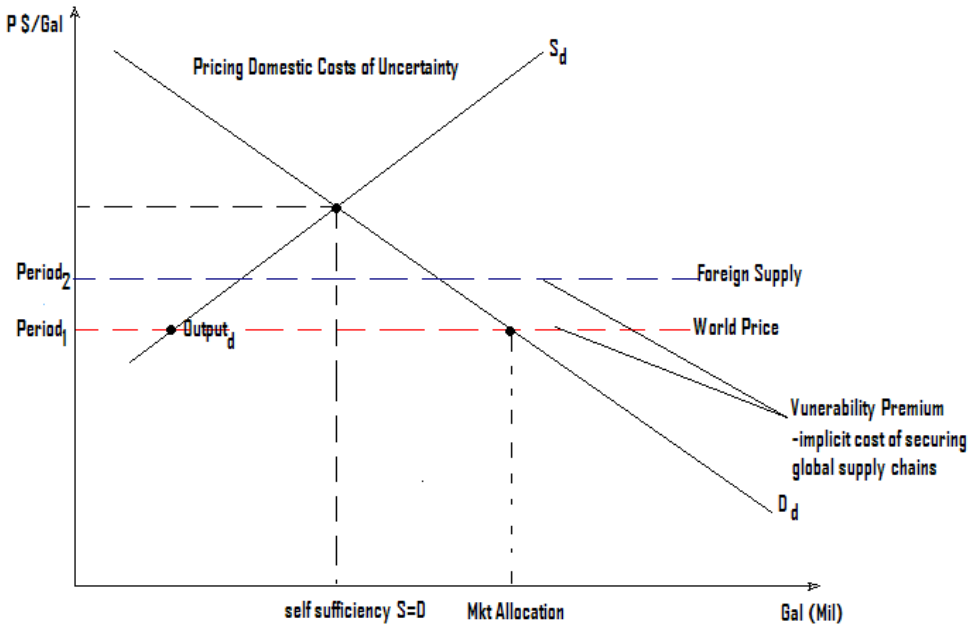
Why Now? Public Opinion's Push.

"The world will soon start to run out of conventionally produced, cheap oil," begins the first chapter of David Goodstein's Cassandran prediction in "Out of Gas" a

survival guide of the oil crisis. Books like *Out of Gas*, written in alarmist tones with hosts of dire predictions have become part of the mainstream of public discourse.

Critics of our economies dependence on foreign fossil fuels argue that oil has an ignored implicit security cost. The cost of ensuring global supply chains function smoothly is paid to petroleum exporting countries in the form of a vulnerability premium. A vulnerability premium is the cost from instability of supply that is inherent in the world price, or the cost of globally stable supply-chains. Its incidence is the cost incurred in military and economic intervention and aid predicated upon an importer-exporter relationship. Since this cost is ignored by pricing schemes crude and vicariously highway fuels, the world price and corresponding global quantity supplied exceeds the efficient market allocation. This argument for domestic supply certainty is modeled in Figure 3.

Figure 3
(Adapted from Tietenberg 2007)



This two period model illustrates the change in domestic output of petroleum as foreign costs change, or the implicit foreign price changes due to global insecurity. The shift from World Price up Foreign Supply is not reflected in the current global petroleum market. While no one country can set the world price, changing world security conditions should be illustrated by an increase in prices. $Output_d$ represents the level of domestic output in period one while the intersection of the blue foreign supply line with the domestic supply line represents the output level of petroleum with the new world price. The gap between quantity supplied and the demand curve is assumed to be the amount imported. This graph illustrates the implicit price of secure supply chains. The implicit cost of global security is implied but not reflected, the world price does not adequately respond to account for the true economic cost of security.

The public outcry against the war in Iraq only increases public energy awareness. "No blood for oil" and similar metaphors are popular rallying cries with anti-war activists while pundit luminaries such as Alan Greenspan motivate the war with oil.[2] Turbulence in proximity to some of the world's richest proven oil reserves and continued tension in the Middle-East create anticipation in and support for domestic energy independence regardless whether oil motivated intervention or was tertiary to political ends. Ethanol producers continue to benefit from what critics of intervention in Iraq have called the war for oil; as long as conflict continues producers will glean the benefits of direct and indirect subsidies of public support and domestic preferences.

[3]. Greenspan later retracted these statements citing deposing Saddam as having the largest impact on the global economy, due to its liberalization of petroleum reserves. "He Said What?" Maggs, J, *National Journal, 9/22/2007*

Figure 1 illustrated the dramatic increase in production since conflict began in 2003. The potential for production has only grown with increased investment in the field. Political support exists for further ethanol production in the name of energy independence; the issue reemerged in the most recent farm-bill.

The scarcity of oil and the instability in securing our supply globally both impact the price at which we consume oil. Ironically a byproduct of our consumption of the fossil fuels we struggle over is global warming (Arrow, et al 2004.) The rapid change in global climate norms caused by human actions especially burning of fossil fuels in first world nations threatens to drastically alter the geo-political and physical landscape. Global climate change is the third broadly applicable theme in public perception incentivizing ethanol production. As a biofuel, the public perception of ethanol is as an environmentally preferable alternative to gasoline with fewer negative environmental impacts. That argument itself is highly contentious however the ramifications of support from environmental advocates are tangible and apparent.

In 2004 and 2005 the domestic political atmosphere was ripe for an alternative to Mid-East oil. Enter domestic ethanol producers and the agribusiness lobby. Environmental critiques of ethanol note the scope of acreage necessary for ethanol to completely supplant fossil fuel usage in the US. They argue the strain on marginal land and even fertile land could have its own environmental cost as soil quality degrades (Secchi & Babcock 2007.)

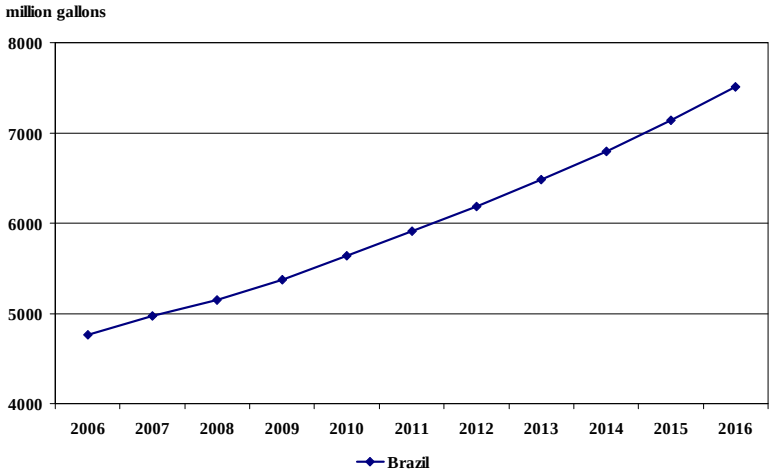
Political and Historical Context

Lobbying by agribusiness organizations such as the Clean Fuels Development Coalition and Renewable Fuel Association has dramatically altered the political

landscape for ethanol producers in the last three decades. Agribusinesses like Archer Daniels Midland (ADM) play a large role in the political development of ethanol production due to its lobbying efforts and powerful political allies that once included Senator Bob Dole and Former Vice President Hubert Humphrey (Runge and Senauer, 2007). Beginning with import restrictions in 1980 and culminating in the 2005 EPA federal renewable fuel mandate, the 51cent tax credit per gallon, and the host of state sponsored tax reductions all aim at spurring producer entry. Nationally the focus of domestic production has created market inefficiency by limiting international competition further encouraging early domestic entrants through inflated returns. The realities of direct federal subsidies are more likely to limit the growth of producer owned plants such as the New Generational Cooperative (NGC's) which account for a large portion of production in the upper plains states; instead promoting their cost-efficient competitors (Holland, 2004).

Currently the federal government limits foreign competition in the ethanol market with a 54 cent tariff on imported ethanol (Runge & Senauer 2007.) However with Caribbean Basin Initiative, a trade agreement opening free-trade relations between the US and host of Caribbean countries, duty free trade zones will overlap allowing cheaper more efficient Brazilian ethanol duty free access to US markets. Figures 4 illustrates the potential of this foreign competition. Earlier the volatility of security from domestic fuel supply was modeled; this volatility premium serves as incentive for legislators to maintain that tariff. Indeed there is a movement within Congress in conjunction with increasing loan guarantees to ethanol to maintain the tariff (Runge, Senauer 2007.)

Figure 4 Brazilian Ethanol Production Projections (CARD 2007)



It is important to note that Brazilian ethanol has the inherent comparative advantage of being both cheaper to produce (directly from sugar rather than corn mash to sugars) and environmentally lower impact, or relatively regulated (Zhang et al, 2007.). Ethanol proponents are caught in a catch-22 dilemma wherein the most environmentally sound ethanol is not the most economically beneficial on a local scale. The current political atmosphere seems unwilling to recognize this trade-off.

The impetus exist for a transition to low-cost production, however the market has yet to adjust. This begs the question of why; where does this resistance to market outcomes come from? Opponents of ethanol cite three key forces, first is the political resistance to the change. As earlier noted the current state of the ethanol industry owes itself largely to the political power of its proponents in Congress. This political will stems from the diversity of the industry across rural America and is interrelated with a second factor resisting change, the agency of farm organizations. Farm lobbying groups

have a disproportionate voice in national politics relative to their portion of the population.

While only a small percentage of Americans still make their primary income in agriculture, America continues is long political history of protectionist policies which effect aggregate social wellbeing. This is evidenced in the 54cent tariff on cost-effective Brazilian ethanol and its ramifications for the domestic ethanol industry. The continuance of this tariff illustrates the third factor slowing transition to low-cost production, especially in Brazil, which is the disharmony and lack of political agency that competing producers display. The inability of Brazil's ethanol industry to present a unified political voice has limited its efficiency at combating protectionist policies in the US and EU. This has impacted both the price here in the US of ethanol and the future potential for development of the industry in Brazil (Zhang, et al 2007.) Supporters of corn-ethanol in the US argue that the current positive economic and environmental impacts outweigh the risk of a low-cost seeking market transition to imports of Brazilian sugar cane ethanol. Next the specifics of those impacts will be made clear in an effort to elucidate the impetus of resisting market reform.

Ethanol's Impact

Policy makers are reluctant to liberalize ethanol trade because the majority of economic literature focusing on the ethanol market highlights its impact on rural economies (Swensen, 2007 p. 19-20). Table 1 models two sizes of ethanol plants and their independent economic impacts. The impact of a plant in a rural economy goes beyond simply the inputs to include transportation, construction, clerical, administrative, and spill-over multiplier impacts (Swenson, 2006) Some of these multipliers include

dividends and premiums paid to local producers, spill over effects of infrastructure development and technical training.

While these impacts are difficult to quantify, Table 1 also fails to quantify negative externalities of production including higher feed costs, increases in staple grain prices, increased strain on marginal land and increased strain on local infrastructure. Urbanchuk also fails to address the risk associated with greater exposure of local economies as farmers increase personal private debt to invest in ethanol ventures.

Table 1. (Urbanchuk, 2006)

	50MGY (2005$)	100MGY (2005$)
Annual Expenditures	$46.7	$88.2
Gross Output	$209.2	$406.2
Gross State Output	$115	$223.4
Household Income	$29.7	$51.2
Newly Created Jobs	836 (real#)	1573 (real#)

If the previously mentioned positive externalities associated with ethanol production indeed exist, they are offset or lost in cases of absentee ownership. It illustrates an intuitive convention that more money realized and re-spent locally is locally beneficial (Swenson, Eathington 2006.) Unfortunately for local investment groups such as New Generation Cooperatives, concentration trends and scale economies in the industry threaten to undermine local ownership unless policy-makers take action to artificially support the market. While existing subsidies maintain local ownership of small scale production facilities Brazilian entry or a decline in the price of oil could unbalance the market. Table 2 compares local ownership to absentee ownership as typical in a public concern or traded company.

Table 2. Comparing Local and Absentee Ownership Impact Differentials (Urbanchuk 2006)

Expenditures (millions $2006)	Absentee Ownership	Farmer or Local Ownership (NGC)	Difference in 2006$
Feedstocks	$40.18	$40.18	
Chemicals, Enzymes	$0.00	$0.66	$.66
Natural Gas	$15.23	$15.23	
Electricity	$2.31	$2.31	
Denaturants	$3.00	$3.00	
Water	$.37	$.37	
Direct Labor	$1.60	$1.60	
Maintenance	$1.30	$1.30	
Gross State Product	$1.50	$3.00	$1.50
Interest on Debt	$0.00	$2.43	$2.43
Total Expenditure	65.49	70.09	$4.59million

The difference in expenditures between ownership patterns equate to millions of dollars of difference per plant in an industry with over 120 plants, the resulting localized impacts potentially lost from further centralization are in the $1.3-2 billion range annually. Analysis of local ownership results in greater economic impact due to the multiplier effect of locally held debt and expenditures on local inputs including chemical and feedstock inputs (Swenson, Eathington 2006.) Table 2 leads to the conclusion that the ideal industry is locally owned while table 1 illustrates relative decrease in jobs created and GSP as plants centralize and expand beyond 50mgy in output.

NIE Approach to Vertical Integration

New institutional economists concern themselves with the conditions of market failure where outcomes are not the most socially beneficial, and the resulting social institutions which remedy that market failure. A NIE analysis of the efficiencies of vertical integration in ethanol production will help evidence the potential for concentration and consolidation in the ethanol industry. Ethanol is a declining cost industry primarily because the three largest costs associated with it electricity, natural gas, and corn all decline (Swenson, 2006.) The marginal outcomes of larger plants have

smaller impacts on local economies, further they have smaller multiplier effects because the money paid for their product does not recycle locally. Additionally NGC and other locally owned ventures often pay premium rates for inputs or value added prices for their corn because they buy it from themselves, and secondly pay profits derived from ethanol out in dividends and shared equity (Swenson, Eathington 2006.) Modeling the stream of value added benefits is difficult but it can be asserted that these local economies incidence is roughly equal to the savings in transportation and transaction costs of the producers selling in a distant market (Swenson, 2006.)

Firms can achieve anti-competitive results by imposing their will through integration rather than accepting market outcomes (Williamson, 1971.) In the ethanol market efficiencies exist such as minimizing transaction and transport cost by purchasing inputs from yourself or a subsidiary. The level of integration achievable in ethanol production is especially interesting when the diversity of some companies in question is considered. ADM for example sells its genetically proprietary seeds, purchases the products of those seed sales from contracted producers around the country, processes the corn in wholly owned production facilities and uses its extensive international transportation network to market its ethanol.

Throughout its supply chain ADM and similarly scaled firms are able to take advantage of scale economies. In purchasing corn from producers ADM is able to draw on larger regional markets than local cooperatives and producer owned ventures. This has two efficiencies. First ADM supersedes regional price variations from adverse weather or other shocks. Second it is able to purchase at discounted rates because it makes purchases on a much larger contractual basis (Swenson, 2006.) Locally and

producer owned firms have a slight efficiency in their guarantee of delivery and lack of frictions in transport providing them a small efficiency from certainty of delivery and intimate knowledge of their supply stocks. Knowledge and control of supply stocks and their necessary levels internalizes market outcomes for inputs and creates cost-savings from avoiding larger than needed overhead (Williamson, 1971.)

Large firms have the added asset of in-house administrative, clerical and human resource operations which benefit from experience and integration (Urbanchuk, 2006.) These jobs are one of the impact multipliers of local ownership; however local services are often less efficient and more costly. Further, large firms control search costs for new employees by handling promotions internally, in cases of expansion this can be a significant administrative cost (Urbanchuk, 2006.) In contrast a new locally owned firm will have to look outside its pool of producer owners to find a professional administrator. Additionally the opportunity cost of a professional to seek employment at a NGC or producer owned venture is great because the opportunity for promotion within the company or cooperative is minimal or non-existent. Large firms are able to offer promotional incentives beyond the local posting.

The final but arguably greatest scale economy for large firms is their control of distribution and transportation infrastructure. The global demand for stainless steel, a key component in the corrosion resistant tanker cars necessary to transport ethanol has been increasing steadily driving up the global price (Liebman, 2006.) The demand for these tankers has outstripped supply and the rapid depreciation of the cars is threatening to increase that demand additionally. Large firms are able to independently negotiate orders

and purchases from the manufacturers ensuring a steady supply and an uninterrupted delivery.

Conclusions

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The growth of the domestic ethanol industry over the last three decades has significantly altered the face of the rural economy in the U.S. The potential exists for this industry to further develop as public demand for domestically produced sustainable fuels grows. Public support for green fuels and local economies has created a glut of investment in ethanol production that ignores the fundamental nature of the industry. Recent investment trends ignore returns to scale from size and vertical integration. A NIE approach to vertical integration illustrates how transaction costs and search costs are reduced from scale efficiencies in the ethanol market. These scale efficiencies are absent in the most economically beneficial scale of production, the locally or cooperatively owned plant.

The results of the ethanol investment glut have only begun to be realized. While locally higher corn prices may result in a booming rural economy, there are global implications for basic food prices which condemn ADM's self-styled "supermarket to the world," analogy (Runge and Senauer, 2007). The environmental impacts to the quality of top-soil and watersheds from growing the 40 million tons of corn for ethanol have yet to be gauged. That damage is further likely to be expounded should President Bush's urgings for 35 billion gallons of production by 2017 be met. Additionally ethanol demand is seen as a grave threat to the Conservation Reserve Program a land trust for sensitive soils retired from agriculture, with increasing premiums the opportunity costs of keeping low yield acreage out of production grows.

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Scarce public funds should not be spent on an untried industry whose investment ideology is based on inflated expectations for growth and demand growth. Exaggerated returns and benefits coupled with a decided lack of risk mediation and increasing external capital investment are clouding the investment environment. While investment continues to be led by producer owned cooperatives and vertically integrated medium sized commodity producers, the fundamental underpinnings of the market broadly favor large end-point producers who are able to overcome logistical obstacles and premium corn prices through scale. By tracing the stream of economic benefits and following consolidation trends it seems evident that current ethanol policy benefits the same massive conglomerate agribusinesses that led the get big or get out movement in American agriculture. It is tragically ironic that policies which benefit these companies are encouraging small farmers and cooperatives to risk greater market exposure and encure greater personal debt.

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Misinformation and ignorance of market forces have created an atmosphere of investment that is overly optimistic. Large producers benefit from control of infrastructure, minimal transaction costs from internalizing market outcomes, and limited search costs from returns to scale in administrative and clerical services as well as input procurement contracts. However, public policy vocally aims to promote small-local investment rather than the low-cost producer due to the specific economic impact of small ventures. This industry pluralism exacerbate rural instability rather than guaranteeing it. By draining investment capital out of tenuous rural economies into joint ventures that in all likelihood will become non-competitive due to economies of scale

induced consolidation or foreign competition driving down profits current ethanol policy's means undercut its ends.

Today's ethanol industry cannot continue to invest and expand at its current rate. The growth of the industry is already constrained by infrastructure and input price limitations. The most socially beneficial producers face the greatest risk of consolidation while the least socially beneficial stand to benefit from misguided but well-intentioned policy and potential changes in that policy which further their market position. Continuing public support of ethanol should be tempered by the realistic impact of that support, if in fact more cost effective ethanol is the desired result, then current trends of consolidation are correctly pursued. If a locally produced sustainable alternative to oil is the desired outcome then policy changes must be made to reflect the value of a secure diversified industry and locally owned production.

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