

Baines, Joseph

Doctoral Thesis

Price and Income Dynamics in the Agri-Food System: A Disaggregate Perspective

Provided in Cooperation with:

The Bichler & Nitzan Archives

Suggested Citation: Baines, Joseph (2015) : Price and Income Dynamics in the Agri-Food System: A Disaggregate Perspective, The Bichler and Nitzan Archives, Toronto, <http://bnarchives.yorku.ca/437/>

This Version is available at:

<https://hdl.handle.net/10419/157992>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by-nc-nd/4.0/>

**Price and Income Dynamics in the Agri-Food System:
A Disaggregate Perspective**

Joseph Stanislaw Baines

A DISSERTATION SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

GRADUATE PROGRAM IN POLITICAL SCIENCE YORK UNIVERSITY
TORONTO, ONTARIO

February 2015

Abstract

This dissertation seeks to illuminate contemporary processes of redistribution in the agri-food sector, with particular reference to the US. It addresses the following questions: How has the rapid rise in food price instability since the turn of the twenty-first century impacted income shifts within the agri-food system? Which groups within agriculture and agribusiness benefit from high and volatile food prices and which groups have suffered amid the tumult? Are all of these groups 'price-takers' that simply respond to price signals? Or are some of them 'price-shapers' that, with varying degrees of success, actively seek to restructure the agri-food system, and the regulatory architecture that governs it, in ways that make certain price developments more likely?

Hitherto, there has been little in the way of sustained analysis of the connections between prices, power and redistribution in the agri-food system. The dissertation addresses three approaches that offer some perspective on the redistributive-power dynamics of agricultural commodity price movements: global value chains analysis, the food regime approach and the emergent international political economy literature on post-crisis commodity derivatives regulations. As the thesis argues, although these approaches offer important *qualitative* insights, they have yet to offer *quantitative* means of gauging the power-shifts between different agricultural and agribusiness groups and their connection to price-shifts between different agri-food sub-sectors.

The thesis attempts to enfold the multiple insights of the existing literature into the capital as power approach. I submit that the process of enfoldment results in an analysis that offers a rich and highly differentiated understanding of the redistributive dynamics of high

and volatile agricultural commodity prices. The arguments are made in relation to the contestation within agriculture and agribusiness over perhaps the two most controversial developments within the US agri-food sector in the early twenty-first century: the diversion of grain into agrofuels production and the rise of 'excessive speculation' in agricultural derivatives markets.

The importance of these two developments is underlined by the fact that a number of scholars have attributed the sharp food price peaks in 2007-08 and 2010-11 to the influx of speculative investment in futures markets, and the general upward trend in food prices in the 2000s to the agrofuel boom. By analyzing the redistributive effects of high and volatile prices, and by examining the contestation over the course taken by agrofuels policy and commodity derivatives regulation, the dissertation outlines the winners and losers of high and volatile food prices within both agribusiness and agriculture.

Acknowledgments

This thesis would not have been possible if it were not for the support of many people. Eric George, Jeremy Green and Sandy Brian Hager have offered great friendship over the last six years. My horizons have been broadened considerably by their wit, verve and erudition. Julian Germann has also been tremendously kind, making me feel at home when I first moved to Canada. The second half of my doctoral studies was transformed by the friendship of Karl Dahlquist, Elif Genc, Arthur Imperial, James McMahon, Shourideh Molavi, David Ravensbergen, Joel Roberts, Alain Saleh, Sune Sandbeck and Donya Ziaee. They are among the finest people I know.

In the early period of my time in Toronto, I was uneasy with the academic path that I had chosen. This feeling of unease ebbed away once I took Jonathan Nitzan's course on the capitalist mode of power. With the research skills that I developed under his guidance, I found an independent voice as a scholar. I feel incredibly lucky to have had such a supportive supervisor who, along with Shimshon Bichler, has contributed so much to the field of political economy.

I have also benefitted tremendously from the encouragement and the constructive criticism offered by Mark Peacock. His integrity, intellect and professionalism are a constant reminder of why I was originally drawn to academia. Additionally, I feel very grateful to Rodney Loepky for making the Department of Political Science a warmer and more collegial space than it might be otherwise, and for being a key source of support at the latter stages of the doctorate.

Marlene Quesenberry and Judy Matadial have helped me clear administrative hurdles at York University. And Xumei Li always made me feel incredibly welcome in Bronfman Business Library, even though I was acquiring financial data for very different reasons to the business students working beside me. Moreover, in my four research trips to the National Agricultural Library in Maryland, Daniel Lech was extremely accommodating while I spent countless days hunched over his department's photocopying machine.

I would also like to express my gratitude to Jordan Brennan, D.T. Cochrane and Jongchul Kim. In their own very different ways, they have been role models for me. Furthermore, Lana Goldberg and Shaghayegh Tajvidi deserve special mention because they have reminded me, through their words and their actions, that research ought to be combined with political engagement.

I am grateful to the Ontario's Ministry of Training, Colleges and Universities for awarding me an Ontario Graduate Scholarship in support of my research. But most of all, I would like to thank Janina Juchnowicz. It is primarily because of her belief in the intrinsic value of education that I have reached this milestone. I dedicate the dissertation to her.

Table of Contents

Abstract	i
Acknowledgments	iii
List of Tables	vii
List of Figures	viii
1. Introduction	1
The Questions	1
The Approach	3
The Synopsis	9
2. Food Price Inflation as Redistribution: Towards a New Analysis of Corporate Power in the World Food System	13
Introduction	13
Questioning Supermarket Mastery	18
Mapping out Corporate Power in the World Food System:	23
The Emergence of the Agro-Trader Nexus	34
The Power Trajectory of the Trader-Core	34
The Agro-Core and the Contested Emergence of Agro-Biotechnology	40
The Formation of the Agro-Trader Nexus and the Agrofuel Boom	44
Conclusion	53
3. The Ethanol Boom and the Restructuring of the Food Regime	56
Introduction	56
The Food Regime Analysis of Agrofuels	62
Toward the Disaggregation of Agri-Food Capital	67
Archer Daniels Midland and the Political Institutionalization of the US Food/Fuel complex	73
The Agro-Trader Nexus and the Corn-Ethanol Coalition	79
The Agro-Trader Nexus versus the Animal Processor Nexus	83
Conclusion	106
4. Futures Tense: The Food Crisis and the Contested Regulation of Agricultural Derivatives	110
Introduction	110
The IPE of Agricultural Derivatives Regulation	116

Clapp and Helleiner	118
Pagliari and Young	120
A Power-Distributional Approach	123
The Distributional Dynamics of Grain Futures Price Instability	125
Farmers	126
The Trader-Core	137
Coalition Dynamics: Rule Ambiguity and Definitional Conflict	143
Change Agents: Narrow the Exemptions, Broaden the Target Group	147
Veto Players: Broaden the Exemptions, Narrow the Target Group	149
The Agricultural Derivatives Endgame	152
Conclusion	158

5. Conclusion

160

The Dynamics of Power, Prices and Redistribution: A Summary	160
Avenues for Future Research	167

References	171
------------	-----

List of Tables

2.1	Dominant Corporations in the World Food System	30
3.1	Animal Slaughter and Corporate Control	86
4.1	Multivariate Regression Analysis of Agricultural Income and Grain Futures Price Dynamics	129

List of Figures

2.1	Inflation-adjusted Food Prices	14
2.2	Profit Share Breakdown of the World Food System	22
2.3	Relative Food Price Movements and Retailer Profit Share	27
2.4	Differential Profit of Dominant Capital Groups in the World Food System	31
2.5	Four-Firm Concentration Ratio in Raw Agricultural Commodities Processing	36
2.6	Transformations in the American Diet	39
2.7	The Agro-Trader Nexus	45
2.8	The Agrofuel Boom as the Redistribution of Food	51
2.9	Global Hunger Levels and the Differential Profits of the Agro-Trader Nexus	52
3.1	Transformations in the Political Economy of Corn	75
3.2	Two Axes of Power in the Corporate Food Regime	84
3.3	Proportion of Domestically Produced Corn used by Feed Grain and Ethanol Sectors	89
3.4	The Differential Capitalization of the Agro-Trader Nexus and the Animal Processor Nexus	93
3.5	The Relative Income of Farmers in the Corn Belt and the Southern Seaboard Region	101
4.1	Relative Grain Futures Price Levels and Volatility	112
4.2	Pagliari and Young's Payoff Matrix	120
4.3	Farmer Relative Income and Grain Futures Price Instability	127

4.4	Midwestern Farmer Relative Income and Grain Futures Price Instability	131
4.5	Southern Seaboard Farmer Relative Income and Grain Futures Price Instability	132
4.6	Farmer Relative Income and Grain Futures Convergence	134
4.7	The Major Agricultural Commodity Traders' Differential Profit and Food Price Instability	139
4.8	Cargill's Differential Profit and Food Price Instability	140
4.9	The Relationship between Agricultural Income and Price Dynamics	143
4.10	The Lobbying Networks of Agricultural Interest Groups	145
4.11	The Differential Profitability of Traders and Farmers and the Incidence of Revolt	157

1. Introduction

The Questions

How has the rapid rise in food price instability since the turn of the twenty-first century impacted income shifts within the agri-food system? Which groups within agriculture and agribusiness benefit from high and volatile food prices and which groups have suffered amid the tumult? Are all of these groups 'price-takers' that simply respond to price signals? Or are some of them 'price-shapers' that, with varying degrees of success, actively seek to restructure the agri-food system, and the regulatory architecture that governs it, in ways that make certain price developments more likely? These are the questions that structure this thesis. They point to a broader quest for an understanding of the variegated roles of agribusiness corporations and farmers in the transformation of the contemporary agri-food system.

Agribusiness is defined in this study as the sum-total of off-farm operations in food supply chains that are under corporate control. These operations include the manufacture and distribution of farm supplies, and the storage, processing, distribution and retailing of farm commodities and associated products. Agriculture is defined here as the on-farm production operations overseen by farmers. Given the US's centrality in the world food system, the principal focus of the analysis is US-based agriculture and US-headquartered agribusiness. The country dominates the export of the three most widely traded agricultural commodities in the world - corn, soybeans and wheat - accounting for 42 percent, 38 percent and 22 percent of global export tonnage respectively (FAOSTAT, 2014a). Moreover, the US is home to the world's largest agricultural commodity exchanges by trading volume. Thus, the agricultural futures prices set at US exchanges, such as the Chicago Board of Trade, represent a key

benchmark for agricultural prices worldwide. These considerations underscore the potential importance of the US agrarian political economy for understanding the high and volatile agricultural commodity prices in the first decade of the twenty-first century.

Unfortunately, heretofore, there has been a paucity of sustained analysis of the linkages between prices, power and redistribution in the political economy of the agri-food system. The dissertation addresses three streams of thought that have gone furthest in shedding some light on the redistributive-power dynamics of agricultural commodity price movements: global value chains (GVC) analysis, the food regime approach and the emergent international political economy (IPE) literature on contemporary agricultural derivatives regulations. As I argue, while all three offer qualitative insights about the relationship between prices, power and redistribution in agriculture and agribusiness, each is limited by the fact that they have yet to offer quantitative means of measuring the power-shifts between different groups and their connections to price-shifts at different interstitial points of the agri-food system.

That being said, the thesis does not seek to abrogate GVC analysis, the food regime approach and the emergent IPE literature on derivatives reform. Instead, it attempts to incorporate their multiple insights into the disaggregate perspective advanced by the capital as power (CasP) approach. I submit that the process of incorporation results in an analysis that offers a more variegated understanding of the redistributive-power dynamics of high and volatile agricultural commodity prices. In the remainder of this introductory chapter, I outline key features of the CasP approach, and summarize the arguments put forward in the chapters that follow.

The Capital as Power Approach

The CasP approach has been developed over the last three decades by Jonathan Nitzan and Shimshon Bichler. The framework does not constitute a uniform school of thought, but rather a broadly conceived philosophy of research based on a quantitative-qualitative mode of analysis and a disaggregate method of accounting.

The research philosophy of the CasP framework is centered on theorizing and investigating capital accumulation as the core power process of the capitalist political economy. This approach has given rise to a burgeoning array of research projects that take the accumulation of capital and the accumulation of capitalist power to be figuratively identical. Nitzan and Bichler have developed this theorization of capital *as* power through researching diverse phenomena, such as inflation in the United States and Israel, conflicts in the Middle East, global merger waves, financial crises, inequality, unemployment and incarceration. Moreover, a new generation of political economists have drawn on aspects of the CasP framework to conduct their own research. This research has led to the emergence of novel contributions to a range of fields of investigation, from retail supply chain analysis (Baines, 2014), to trade and investment liberalization (Brennan, 2013), to animal rights and anti-apartheid campaigns (Cochrane and Monaghan, 2012, 2014), public debt (DiMuzio, 2007; Hager 2014), the role of fossil fuels in capitalist social reproduction (DiMuzio, 2012), investment bank power (Hager, 2012), and the capitalization of cinema (McMahon, 2013). The disparate undertakings of these researchers are brought together in one political economy network. The emergence of this network is most clearly manifest in the creation of the journal *The Review of Capital as Power* in 2012; the launching of *capitalaspower.com* in 2013; the publication of an edited volume entitled *The Capitalist Mode of Power: Critical Engagements*

with the Power Theory of Value (DiMuzio, 2014); and the organization of a research seminar and an annual conference series, by *The Forum on Capital as Power*, from 2010 to the present (Hager, 2013).

The intellectual roots of the CasP approach are almost as numerous as the research projects that stem from it. At this point, it suffices to outline just four key influences: Karl Marx, Cornelius Castoriadis, Thorstein Veblen and Michal Kalecki. From Marx, Nitzan and Bichler borrow the all-important insight that capital accumulation is an inherently antagonistic process that is generative of a universalizing social structure of power. Where they part ways with Marx, however, is in their conceptualization of capital accumulation. While Marx's broadly bottom-up perspective gives analytical primacy to labour's relationship to capital, Nitzan and Bichler suggest that labour should be one of many considerations in a top-down, disaggregate analysis of the whole gamut of social relationships that may bear on the earnings capacity of business (Marx, 1867; Nitzan and Bichler, 2009; Cochrane, 2011).

In making sense of the difference between Marxist political economy and the CasP framework, it is instructive to apprehend the influence of the philosopher Cornelius Castoriadis on the latter. In a powerful critique of Marx's labour theory of value, Castoriadis claims that throughout his writings, Marx's vacillates between different positions. On the one hand, Marx - as the avatar of a dialectical understanding of capitalist development - illuminates the historicity of social categories and the centrality of conflict to social change, like no other figure in economic thought. On the other hand, Marx - as someone that was deeply impressed with breakthroughs by his contemporaries in physics and chemistry - sought to find in capitalist processes underlying basic units, along with abiding 'laws of motion', that are amenable to scientific investigation (Castoriadis 1984; Nitzan and Bichler 2009). The basic, universal unit for Marx is abstract labour: '[the] productive activity of human brains,

nerves, and muscles... the expenditure of human labour in general... the labour-power which, on average, apart from any special development, exists in the organism of every individual' (Marx 1867: 134).

Nitzan and Bichler distance themselves from Marx's attempt to find material units of inquiry. However, they embrace his emphasis on the transformative dynamics of conflict. In so doing, they concur with Castoriadis in arguing that value is not an objective-material substance (what Aristotle calls the *physis*). Rather, it is social and thus derives from the norms, laws and institutions of society (the *nomos*). Moving from this line of argument, Nitzan and Bichler contend that the researcher ought to be open to the multiplicity of power relations that may impact the valuation of commodities. From this perspective, the changing ratios of prices and incomes within capitalism do not reflect any intrinsic property of the goods and services that are traded, whether it is understood in terms of 'utils', as postulated in neoclassical economics, or 'abstract labour', as argued by Marx.¹ Instead, these changing ratios are quantitative manifestations of the overall patterns of conflict that re-shape the *nomos* (Castoriadis 1984; Nitzan and Bichler 2009).

This shift by the CasP approach from the material to the social, and from the exploitation of labour to the totality of power, owes much to Veblen's conception of capital. Whereas Marx begins his theory of capital with a materialist analysis of production, Veblen's conceptualization begins with 'the state of the industrial arts': the immaterial assets inherited from previous generations necessary to produce socially useful goods and services. The historically contingent, and context-specific, development of the technology that makes up 'the state of the industrial arts' occurs through the integration of myriad streams of information and

¹ For a comprehensive critical analysis of the utility and labour theories of value, see Nitzan and Bichler (2009: 67-124).

the synchronization of numerous industrial sub-processes. Veblen contrasts the cooperation involved in the collective advancement of technology with the pecuniary impulses of business. Business, Veblen argues, strategically inserts itself at the interstices of the multiple sub-processes of industry, so as to exact tribute from the community in the form of profit, in return for granting the community access to privately-controlled, but collectively-created, productive capacity. According to Veblen, the level of tribute that is demanded by business is a reflection of the bargaining power of owners vis-à-vis the rest of the community. This bargaining power will in turn be determined by such factors as the importance of the asset, the means by which it is controlled, and the ease with which it can be substituted (Veblen, 1904; Nitzan and Bichler, 2009; Cochrane, 2011).

While Veblen alludes to the redistributive dynamics of relative price changes, Nitzan and Bichler rework Veblen's insights in advancing a systematic *power theory of value*, based on new categories and new research methods. In constructing methodological tools for the power theory of value, the analysis of the neo-Marxian economist Michal Kalecki has been particularly instructive as he is perhaps the first scholar to have tentatively sketched a distributional measurement of corporate control. This measure comes in the form of 'the degree of monopoly': the quantitative proxy for market power as registered in the profit ratio of sales. In advancing the concept of the degree of monopoly, Kalecki gestures towards the view that income redistribution is not merely the consequence of market power shifts, but rather its very definition. Notwithstanding its importance, Kalecki's measure clearly only pertains to the narrow economic issues of monopoly and competition. Accordingly, Nitzan and Bichler devise other measures that quantify the patterns of power that inhere in the capitalist restructuring of social reproduction as a whole (Kalecki, 1943; Nitzan and Bichler, 2009).

In developing these measures, Nitzan and Bichler render explicit what remains only partially revealed in the work of both Veblen and Kalecki. More specifically, Nitzan and Bichler argue that the quantitative changes in the architecture of prices and the qualitative changes in the institutions of society are part of the same power process. From this viewpoint, the price system is the numerical expression of power over social organization, and this power over social organization changes according to the transformations in cooperation and conflict between different groups. Thus, in place of dual quantity theories of prices that posit a direct connection between the nominal quanta of prices and earnings and underlying but unobservable quanta in the spheres of consumption and production, Nitzan and Bichler argue that the nominal sphere is the only quantitative sphere to which we have access. Accordingly, the CasP framework represents an alternative approach whereby the analysis of quantitative changes in prices and pecuniary earnings can be synthesized with an investigation of qualitative changes in the institutions of society, to create a 'scientific story' of capitalist power (Nitzan and Bichler, 2009: 313).

Analyzing the pecuniary quanta in terms of power has a number of important methodological implications. First and foremost, power is inherently relational. As such, both accumulation and prices can only be understood differentially. The differential drive of capital is manifest in the fact that large firms do not simply aim to accumulate in absolute terms. Instead, they strive to beat some average benchmark. Second, power is inherently dynamic. Thus, rather than conceptualizing the market in terms of static equilibria, as in neoclassical economics, the CasP framework encourages the researcher to analyze how one group's ongoing attempts to restructure social reproduction encounters ever-changing resistance from other social groups. Lastly, because power is inherently relational and dynamic, Nitzan and Bichler suggest that rather than engaging in case-studies of individual firms or aggregate

analysis of the corporate sector as a whole, we should delineate and disaggregate the performance of the contending coalitions within what they call 'dominant capital': the major corporations which operate in tandem with, and are often intertwined with, key government organs in restructuring social reproduction for differential pecuniary gain.

The thesis uses three such measures for charting differential pecuniary shifts for groups within US agribusiness and agriculture. The first and most widely used measure in this dissertation is *differential earnings*: the net income of any given group of firms or farmers relative to the net income of 'the average'. The second measure is *differential capitalization*: the market value of any given group of firms relative to the market value of 'the average'. The third and final measure is *differential markup*: the weighted net income to sales ratio of any given group of firms to the weighted net income to sales ratio of the 'the average'. When using these differential measures in the analysis of the power shifts between agribusiness firms and the largest US corporations outside of the agribusiness sector, 'the average' is taken to be dominant capital as represented by the top 500 US-listed firms, ranked by net income. When using these differential measures in the analysis of the pecuniary shifts within agriculture, 'the average' is taken to be the average net income of all farmers in the US. And when using these differential measures to chart the shifts in income between US farmers and the remainder of the US population, 'the average' is taken to be the average earnings of US nonfarm workers.

The differential earnings measure is the most widely used measure in this thesis because a number of the largest agribusiness firms are not publically traded, and as such, there are no market capitalization data available for these entities. Moreover, unlike the differential capitalization measure, the differential earnings measure is easily transposable to the analysis of income shifts between farmers, as almost all farming operations in the US are run by 'petty producers' rather than publically-traded entities. Following the research methods pioneered by

Nitzan and Bichler, this dissertation connects key quantitative shifts in differential earnings and relative prices on the one hand, to the qualitative shifts in the restructuring of social reproduction on the other, in order to create a quantitative-qualitative analysis of transformations in the agri-food system.

The Synopsis

What might seem like burdensome theoretical baggage during these preliminaries, will be properly unpacked in the chapters that follow. After all, it is only when a theory is put to work in the field of investigation that the meaning of its concepts, and the purchase of its methodological tools, can truly be determined (Green, 2014).

But this thesis is not simply an empirical exposition of the CasP approach. Rather it seeks to show how the CasP approach's concepts and tools may be adapted and refined by other researchers in the exploration of territory that has yet to be charted by disaggregate accounting. Moreover, it shows that through disaggregate methods of accounting, new concepts can be expounded. This process of *re*-search, in which theoretical concepts and empirical analysis are in continual dialogue, has been integral to the evolution of the CasP approach. This process not only entails the continual exercise of reflexivity, but also openness to the insights offered by complimentary approaches. Hopefully, such a research philosophy ensures that the CasP approach does not ossify into an established 'school of thought', wherein the defence of existing theoretical postulates is prioritized over the discovery of new patterns and the elaboration of new concepts. The thesis espouses this reflexive way of proceeding.

Specifically, the thesis examines the redistributive-power dynamics within US agribusiness and agriculture in two arenas: government agrofuels policy and regulation of

agricultural derivatives markets. These two arenas are of particular importance because, according to some of the literature on food price inflation, booming agrofuel production and investor speculation in agricultural derivatives markets have been the two main contributors to the surges in agricultural commodity prices in the early twenty-first century. In fact, one group of analysts go so far as to argue that:

[T]he dominant causes of price increases are investor speculation and ethanol conversion. Models that just treat supply and demand are not consistent with the actual price dynamics. The two sharp peaks in 2007/2008 and 2010/2011 are specifically due to investor speculation, while an underlying upward trend is due to increasing demand from ethanol conversion. (Lagi *et al.* 2011a: 1)

Other studies lend some support to these conclusions (see: Timmer 2008; Piesse and Thirtle 2009; Baffes and Hanjotis 2010; Ghosh 2010; Ghosh *et al.* 2012). As such, I principally focus on the coalitional and redistributive dynamics between agri-food corporations and farmers in regard to agrofuels and investor speculation. In so doing, I seek to outline how interests within agribusiness and large-scale agriculture may relate to the interests of those poor households across the world that are existentially vulnerable to food price shocks.

With these considerations in mind, the second chapter engages with existing analyses of corporate power in the world food system, and it lays out some aspects of the CasP approach in greater detail. Adopting a macroscopic focus on shifts of differential earnings between agri-food corporations, it points to the rapid ascendance of a new power configuration in the global political economy of food. I call this configuration 'the Agro-Trader nexus'. I argue that the agri-biotechnology and grain trader firms that belong to the Agro-Trader nexus have not been mere 'price takers', instead they have actively contributed to the inflationary restructuring of the world food system by championing and facilitating the rapid expansion of the first-

generation agrofuel sector.² As a key driver of agricultural commodity price rises, the agrofuel boom has raised the Agro-Trader nexus's differential profits and it has at the same time exacerbated food insecurity. These initial findings affirm a core theme of the thesis: that food price inflation is a mechanism of redistribution.

The third chapter builds directly on the second chapter in four main ways. First, it narrows the focus of analysis from the global agrofuel boom in general, to the US ethanol boom in particular. Second, it offers a more concerted examination of how the Agro-Trader nexus, and more specifically, Archer Daniels Midland, has championed increases in corn-ethanol production from the 1970s onwards. Third, it develops a richer understanding of how the corporate conflict that arises from soaring agrofuel production, as indicated by the second chapter, plays out in the US agri-food sector in relation to the increased antagonism between the Agro-Trader nexus and what I call 'the Animal Processor nexus'. Finally, it incorporates US farmers into the picture. As I argue, the ethanol boom has not only engendered a shift in pecuniary earnings from the Animal Processor nexus toward the Agro-Trader nexus; it has also led to a shift in income from farmers specializing in livestock production to farmers specializing in corn production.

The fourth chapter extends the analysis to contemporary debates concerning speculation in agricultural derivatives markets and attempts to regulate it. While the second and third chapters illuminate the redistributive dynamics brought about by soaring agrofuel production, the fourth chapter outlines the shifts in relative income engendered by grain futures price volatility. With quantitative methods, I show that while livestock interests have suffered hardship as a result of price volatility, crop grower and commodity trader groups have

² Following Philip McMichael and other analysts of the biofuel boom, I label biofuel 'agrofuel' to underscore the problematic diversion of agricultural products from food to fuel uses.

generally prospered amid the tumult. And with qualitative methods, I show that the former constellation of interest groups has pushed for far-reaching restrictions on speculation but the latter has opposed the emergence of a new speculative position limits regime. The chapter argues that the ongoing conflict within and beyond agriculture over the timing, scope and necessity of reform has contributed to the protracted manner in which the nascent speculative limits regime has been implemented.

The concluding chapter looks back at the territory covered in this thesis and it suggests possible directions for future research. I argue that the CasP approach, when combined with the insights of existing scholarly contributions, casts into sharp relief aspects of the agri-food system that have been heretofore unclear. Most importantly, the thesis offers a more qualified understanding of the power of major supermarkets in food supply chains; it delineates the major winners and losers within agriculture and agribusiness of the agrofuel boom; and finally, it outlines in hitherto unreached levels of detail the redistributive impacts of agricultural commodity price instability within the US. In offering these insights, the dissertation demonstrates how the CasP approach's concepts and tools may be further adapted and refined by other researchers. Through this process of adaptation and refinement, a new generation of scholars might clear the way to a more comprehensive panorama of the agri-food system and the myriad fields of business control to which the agri-food system is connected.

2. Food Price Inflation as Redistribution: Towards a New Analysis of Corporate Power in the World Food System

There isn't one grain of anything in the world that is sold in a free market. Not one! The only place you see a free market is in the speeches of politicians.

- Dwayne Andreas, CEO of Archer Daniels Midland from 1972–98³

Introduction

The turn of the millennium marked a sea change in the world food system. After a two decade decline, food prices trended upward. From 2006 to 2008 food price rises accelerated and the number of undernourished people in the world increased to over 1 billion. Food riots erupted in 30 countries. There was a temporary reprieve from price hikes in 2009, but in the following year much of humanity was drawn into another brutal round of food price inflation. By January 2011 the Food and Agricultural Organization's food price index had surpassed the levels scaled during the previous crisis and again widespread upheaval ensued. Unrest crested during the Arab Spring but social discontent is evident far beyond the Middle East and the Maghreb. Indeed, all over the world people have poured onto streets in protest against the rising cost of living.

This severe bout of food price inflation is not without precedent. Figure 2.1 traces the movements in the Economist's Food Price Index – the oldest index of its kind available. It shows how the inflation-adjusted price of a basket of foodstuffs has changed over the last 165 years. In the twentieth century one can identify at least three agricultural commodity price cycles. The first cycle occurred from the turn of the twentieth century to the mid-1930s. The

³ Cited in Carney (1995).

second cycle began in the mid-1930s and ended in the early 1970s. And the third cycle was experienced in the three decades leading up to the most recent escalation in the relative cost of food. From a quantitative standpoint each cycle appears to follow a consistent pattern: each lasts for 30 to 40 years; in each cycle there is a commodity price boom; and after each commodity price boom there is a period of ‘excess capacity’, usually lasting around two decades, that weighs down on food prices.

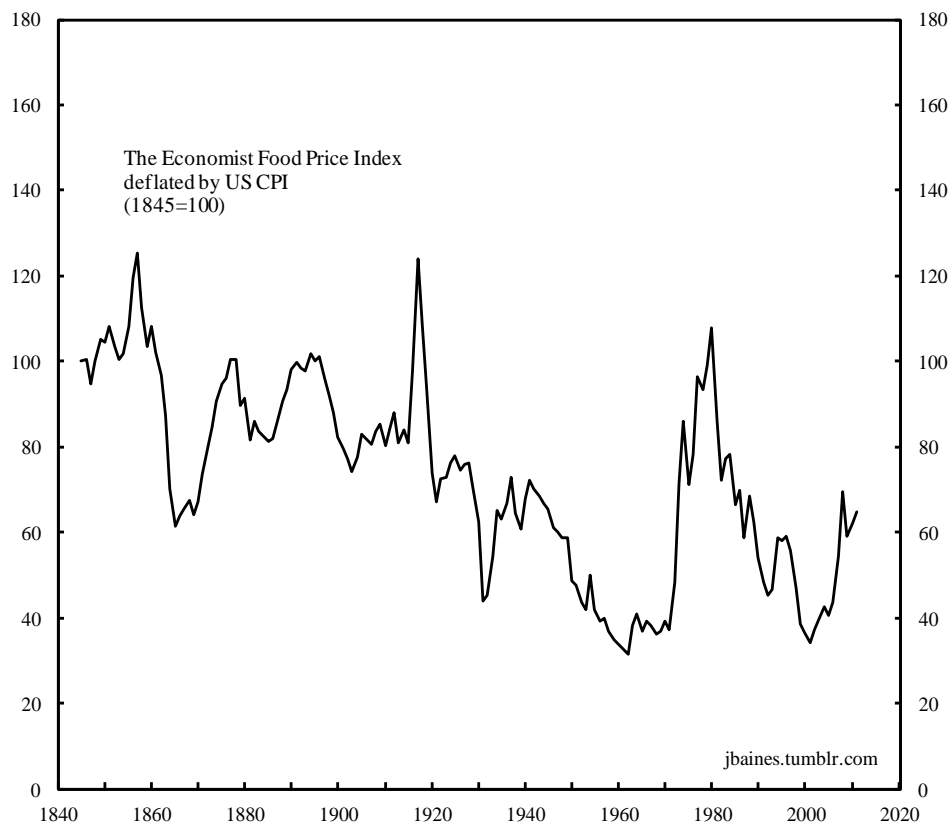


Figure 2.1 Inflation-adjusted Food Prices

Note: The Economist Food Price Index represents a basket of 14 food commodities that are weighted in terms of their relative values in world trade.

Source: Food price index from the Economist Newspaper Ltd. CPI taken from Lawrence H. Officer, the Annual Consumer Price Index for the United States, 1774–2010, from Measuring Worth, 2010; <http://www.measuringworth.com/usdpi/> [accessed 30 May 2012].

But despite their statistical regularity, these cyclical movements are not pre-determined by some automatic economic mechanism. Instead, their depth, rhythm and trajectory are shaped by the dynamics of social power. Indeed, each successive agricultural commodity price cycle is characterised by a specific set of massive and oftentimes violent transformations in the organisation of society and nature. The bloodshed and repression that has followed the recent wave of popular uprisings constitutes the latest and most blatant proof of this. And beyond these headline grabbing developments lie deep shifts in the configuration of corporate control over both the world food system and global capitalism as a whole. This chapter seeks to make sense of these shifts during the denouement of the third agricultural commodity cycle and the period of food price inflation that has come in its wake. Drawing on the CasP perspective propounded by Jonathan Nitzan and Shimshon Bichler, the chapter contends that the food price inflation of the last decade is a quantitative manifestation of an overall restructuring of corporate power within the political economy of food. This restructuring has been calamitous for much of humanity and very destabilising for many governments, but it has been extremely beneficial to some groups of firms.

A lot has already been written on corporate power in the global political economy of food. Three different forms of analysis are particularly prevalent: analysis that offers a broad historical overview of growing business control over the world food system (Goodman *et al.* 1987; Friedmann and McMichael 1989); analysis that proceeds through case-study examinations of individual firms (Morgan 1980; Whitmore 1999; Kneen 2002); and analysis that vacillates between these two perspectives (Shiva 2000; Patel 2007; Van der Ploeg 2010). Although the first two forms of analysis seem entirely different – with the former putting the contemporary political economy of food in historical context and the latter offering detailed insights into the intricacies of corporate control – what they have in common is that they both

tend to neglect the conflicts between different groups of corporations. And while the third form of analysis wavers between the world-historic and the case-specific, intra-capitalist struggles remain blurred. The few studies that do seek to grapple with business conflicts within food supply chains (*e.g.* Burch and Lawrence 2005, 2007; Falkner 2009) do not offer any quantitative means of gauging the shifts in corporate control. Moreover, these analyses do little to connect corporate conflicts to the overall formation of food prices. Therefore, they do not have much to say about the wrenching food price inflation of the last decade beyond what is stated by conventional accounts of the food price crisis.

The analysis advanced here offers an alternative. It is premised on four principles derived from the CasP approach. Firstly, the power of a group of firms is reflected in the relative level of its pecuniary earnings. Secondly, food price changes are the aggregate appearance of redistributive shifts between groups and organisations operating in the world food system. Thirdly, these redistributive changes can be discerned by comparing the relative changes in different groups of firms' pecuniary earnings to the relative changes in food prices. Fourthly, these quantitative phenomena are best understood with reference to a qualitative analysis of social struggles around the restructuring of society and nature. Through this qualitative-quantitative method one can illuminate the key power dynamics within the political economy of food.

With these principles in mind I progressively disaggregate the profits of corporations operating in the world food system. The first section offers a breakdown of corporate earnings by sector. It questions the widespread notion within agri-food studies that supermarkets have gained mastery over food supply chains by showing that the sectoral profit share of food retailers and wholesalers has actually declined since the turn of the millennium. The second section outlines key aspects of the CasP approach and shifts the reader's attention from food

sectors to clusters of dominant capital operating within food supply chains. I introduce new categories of analysis and I show that the pecuniary performance of both the major food retailers and major food manufacturers have virtually flat-lined since the mid-1990s. Such a finding raises further doubts about the supermarket mastery thesis.

Additionally, I show that the relative profits of the major grain traders and the major firms selling inputs to farmers have soared during the recent period of food price inflation. These findings make the dominant traders and agricultural input firms prime candidates for critical interrogation. Are they merely riding the wave of the latest food price cycle? Or have they been actively restructuring the world food system in ways that make food price shocks more probable? The third section investigates these questions. My main contention is that since the late 1990s the dominant grain traders have forged close linkages with major agrobiotechnology companies. These links have given rise to a power constellation that I call the Agro-Trader nexus. The nexus's main impact on the world food system since the early 2000s comes in the form of its facilitation and championing of the wasteful absorption of grain and oilseeds into the heavily subsidised first-generation agrofuel sector.⁴ The soaring production of agrofuel has contributed to a dramatic upswing in accumulation for the firms of the Agro-Trader nexus. However, the agrofuel boom has been less beneficial for other firms operating in food supply chains and it has pushed millions of people into conditions of acute undernourishment.

⁴ The commercial agrofuel sector is currently in large part restricted to first-generation agrofuels made from the starches, sugars or vegetable oils extracted from arable crops. Second-generation agrofuels made from non-edible plant biomass and third-generation agrofuels made from microalgae are still under commercial development and as a result only account for an estimated 0.042% of US agrofuel production. Author's calculations are from US Department of Agriculture data (USDA ERS 2014a).

Questioning Supermarket Mastery

The view that supermarkets have in recent decades rapidly increased their power so that they are now ‘masters’ of the world food system is shared by scholars from a whole range of theoretical positions within the IPE literature. The mastery thesis was first alluded to by Anthony Winson in 1993. And one year later it was given theoretical substantiation by the global value chains (GVC) approach (Gereffi and Korzeniewicz 1994). The GVC approach combines world systems theory’s concern with elucidating spatial inequalities within global capitalism with analysis, derived from the work of Joseph Schumpeter and Joe S. Bain, of how actors can extract economic rent from the construction of ‘barriers to entry’. The methodology of the GVC approach entails tracing the journey that commodities take as they are converted from raw material to finished consumer products. By mapping out commodity chains in this manner, GVC analysts hope to gauge different countries’ relative capacities to capture value. The underlying premise of GVC analysis, as it was originally formulated, is that the distribution of wealth within a chain is the outcome of the relative levels of the barriers to entry in each stage of production.

In order to discern differential national access to capturing value in each stage of production, GVC analysts seek to identify the key corporations operating supply chains. Gereffi’s work was integral in this regard as he endeavoured to grapple with how ‘lead firms’ establish the standards and procedures with which other actors in the chain have to comply. From this work he constructed two ideal types of governance within commodities chains: ‘producer-driven’ and ‘buyer-driven’. Producer-driven value chains are centred on those transnational corporations that control the key nodes of production. This kind of chain is characterised by a high level of vertical integration and its major barriers to entry lie in capital

requirements and proprietary know-how. Buyer-driven value chains are governed by retailers and marketers that have outsourced their production capabilities to a range of smaller independent suppliers connected by intermediary firms through complex logistics networks. Their major barriers to entry are constituted by advertising, product design and electronic supply management systems (Gibbon 2001: 347; Gereffi and Christian 2010: 92–3).

Gereffi contended that producer-driven commodity chains were becoming eclipsed by buyer-driven commodity chains in the global economy. This change was, according to Gereffi, principally brought about by the ‘retail revolution’. The retail revolution started out in the 1960s and 1970s when giant department stores such as Sears bought up independent retailers. And in the 1980s and 1990s the revolution unfolded in such a way that the department stores themselves were superseded by large-volume discount stores such as Wal-Mart and K-Mart (Gereffi 1994: 104–8). Despite the importance of these insights, in the early 2000s, the dual typology of buyer-driven and producer-driven value chains was slowly giving way to a finer-grained, more technical and less explicitly power-oriented analysis of intra-firm interaction that was anchored in transaction cost economics. This analysis paved the way for a switch in emphasis from ‘governance as driving’ to ‘governance as coordination’ (Gibbon, Bair and Ponte 2009).

Notwithstanding this switch, the idea that retailers were becoming the lead firms in the global economy was finding currency. David Burch and Geoffrey Lawrence were at the forefront of analysing the major supermarkets’ dramatic rise in prominence within the world food system. Their main contention is that ‘from the late 1960s control over the establishment and management of agri-food supply chains began to pass from the food manufacturers to the supermarkets’ (2009: 275). This shift was driven by a number of factors, five of which they take as being especially important. First, the development of supermarket ‘own brands’,

particularly within ‘fresh/healthy’ food niches, helped generate more revenue for the retailers and undermine the sales of the ‘national brands’ owned by the major food manufacturers. Second, as supermarkets become less reliant on the food manufacturers for the supply of established brands, they have become more able to enforce heavy slotting fees and other charges upon food manufacturers in return for the latter’s continued access to supermarket shelf space. Third, global consolidation in the retail sector and the development of complex logistics systems have increased the ability of supermarkets to demand lower prices from food manufacturers, as food manufacturers are faced with fewer buyers and as food retailers are able to source their products from a larger pool of suppliers. Fourth, food retailers’ diversification into new areas such as petrol distribution, telecommunications and consumer finance has enabled them to consolidate their market power and expand economies of scale. And last, the development of ‘strategic partnerships’ with food suppliers, in Burch and Lawrence’s view, probably signals a tightening of retailer control over food supply chains (Burch and Lawrence 2007: 100–2). This tightening of control, they argue, is manifest in the fact that food retailers are now increasingly setting the quality and environmental standards for food manufacturers and fresh food producers; and in so doing, major supermarkets are becoming ever more able to determine the general health risks that consumers are exposed to (Burch and Lawrence 2007: 9). Due to the apparent importance of these factors, Burch and Lawrence have endorsed the notion first promulgated by Winson that supermarkets are the ‘new masters of the food system’ (2009: 268).

The major praiseworthy aspect of the supermarket mastery thesis is that it does not treat agri-food corporations as either case-specific or homogenous. This aspect is important because, as argued above, in much contemporary scholarship, business interests are either viewed in aggregate terms or they are analysed at the micro-level; and from both theoretical

standpoints, meso-level conflicts between different corporate groups are obscured. By drawing a distinction between food manufacturers and food retailers and by focussing on power relations within commodity chains, supermarket mastery theorists make an important step in devising an analysis which promises to offer a nuanced conception of the corporate restructuring of the world food system. However, this promise is only partially fulfilled. The shortcoming is primarily born out of the fact that few if any studies of supermarket power within the IPE literature offer a quantitative method of actually gauging the power-shifts between different corporate groupings in the world food system. To illustrate the problems of neglecting this empirical dimension, Figure 2.2 plots the world profit shares of the three major business segments within the global political economy of food.

If the balance of power within food supply chains had indeed shifted decisively from manufacturers to retailers one would expect retailers to increase their share of overall corporate profits generated within the global food system. As the graph shows, the world's supermarkets' and food wholesalers' profit share trended upwards in the 1970s, 1980s and 1990s. So far so good: this trend coheres with the thesis. However, at the dawn of the new millennium the correspondence between the supermarket mastery narrative and the empirical reality of capitalist profits ends. Instead of superseding food processing and manufacturing companies, the food retailers' profit share hits its zenith in the year 2000 and then it declines. This decline is ironic as it is precisely during the downtrend that Burch and Lawrence profess their belief that 'the period when the manufacturing sector dominated the supply chain has passed, never to return' (2007: 119).

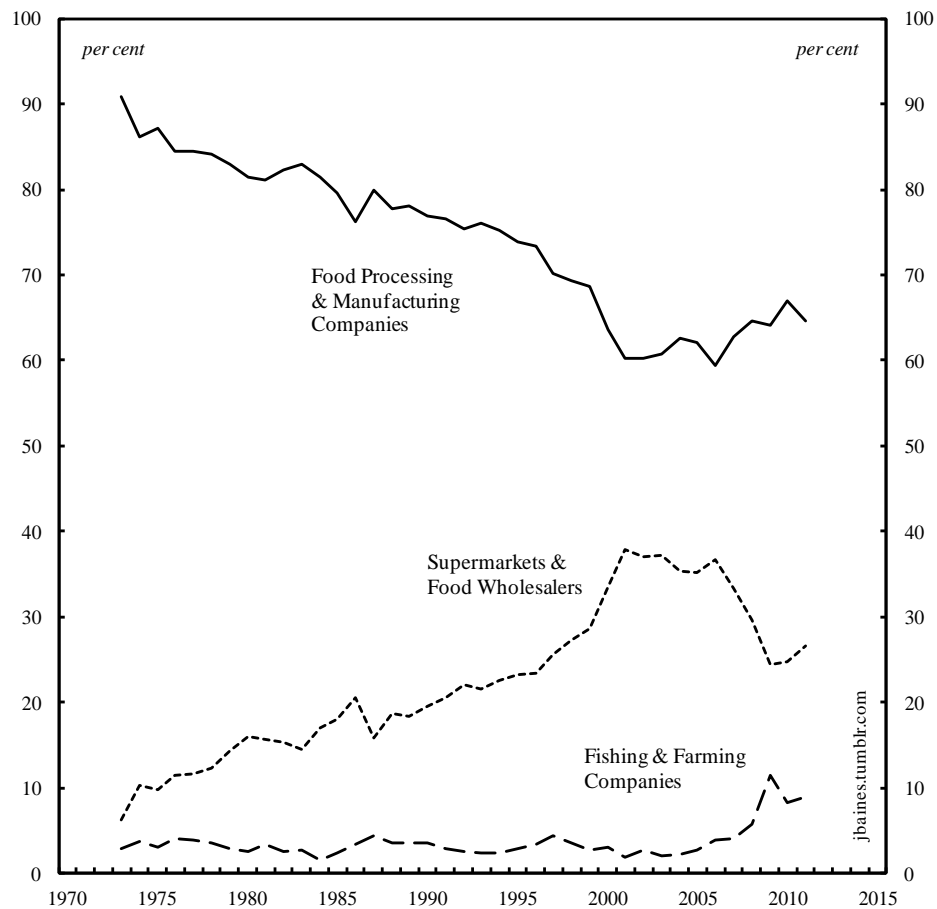


Figure 2.2 Profit Share Breakdown of the World Food System

Note: Profit data for each sub-sector calculated by dividing its total market value by its price-earnings ratio. Profit shares are computed as a percent of the aggregate profit of the three food sectors. The data cover listed companies only.

Source: Thomson Reuters Datastream. Series codes: food processing and manufacturing companies – FDPRDWD(MV), FDPRDWD(PE); supermarkets and food wholesalers – FDRETWD(MV), FDPRDWD(PE); fishing and farming companies – FMFSHWD(MV) and FMFSHWD(PE).

The profit-share data clearly cast the supermarket mastery thesis in a new light. More specifically, the data encourages an investigation into whether supermarkets’ development of their own product lines and their diversification into new areas of business, rather than indicating a shift in the overall balance of power away from food manufacturers, may be manifestations of intensified struggle over consumer loyalty in the retail sector itself. It may

also suggest that the computerised logistical systems that seemed to benefit retailers so much from the 1970s to the 1990s, were offering diminishing pecuniary returns by the beginning of the twenty-first century. Finally, the data may indicate that supermarket mastery theorists exaggerate the degree to which food retailers have become empowered through the regulatory competencies that they have acquired over suppliers' production standards and their customers' consumption habits. There is no room to explore such hypotheses here, but suffice to say at this point, Figure 2.2 demonstrates the need to adopt quantitative methods of gauging power shifts within the political economy of food. Without these methods, researchers will find it hard if not impossible to know how much weight they should give to various qualitative transformations in control over food supply chains. They are thus liable to arrive at wayward conclusions.

Mapping out Corporate Power in the World Food System

The capital as power framework propounded by Jonathan Nitzan and Shimshon Bichler represents an advance on GVC analysis for four main reasons. First, and most fundamentally, capital from the standpoint of GVC is an 'economic' entity that is distorted by power, whereas from the view of the CasP framework, capital *is* power. Second, and following from this first point, the CasP framework puts business conflict and cooperation front and centre in the analysis of the accumulation process. Third, the framework links these various forms of conflict and cooperation to the formation of prices. And last, it encourages the researcher to critically theorise the connection between the quantitative changes of capital accumulation and qualitative transformations within the world food system. This section elaborates on these key

aspects of the CasP framework and sketches out the framework's theoretical significance in relation to the global political economy of food.

Building in part on Thorstein Veblen's theory of business sabotage, Nitzan and Bichler argue that all profits stem from the institution of private ownership as it confers upon owners the power to exclude others from using their assets. Such a view gives the researcher a much more radical starting point than what is offered by GVC theory. Value chains analysis begins from the premise of perfect competition and then offers the concept of barriers to entry to account for those situations of 'market deviation' in which 'supernormal profits' are attained. But from a capital as power perspective, the idea that barriers to entry give rise to supernormal profits is unhelpful because it rests on the assumption that there exist 'normal profits' that can be secured without exclusion. For Nitzan and Bichler, all profits are exacted through exclusion because all profits depend on private ownership. Without private ownership there could be no restriction on the use of goods; and without restriction on the use of goods, goods could not be priced into commodities that yield pecuniary earnings. As such, it is private ownership in general that institutionalises exclusion, not 'barriers to entry'. The foundational exclusionism of private ownership is evidenced in the etymological roots of the word private: 'privatus' and 'privare' – Latin for 'restrict' and 'deprive' (Nitzan and Bichler, 2009: 228).

Moreover, the exclusionary underpinning of private ownership not only enables business to limit the use of goods so as to generate pecuniary earnings; it also enables any one group of business to circumscribe the pecuniary earnings of other business groupings. Indeed, the pecuniary earnings claimed by one, are the pecuniary earnings that the others cannot have. Thus, by emphasising the centrality of exclusion within business, Nitzan and Bichler suggest that, at its core, the capitalist political economy is constituted by redistributive struggle. And by emphasising the integral role that restriction plays in generating pecuniary earnings, Nitzan

and Bichler argue that this redistributive struggle within business undermines efficient social reproduction of humanity for the benefit of humanity (Nitzan and Bichler 2009).

Following on from these observations, in the CasP framework the concept of the market is turned on its head. Rather than being a pristine space that is distorted by power, through for instance the erection of barriers to entry, the market is itself a mechanism of power. It is the means through which corporate control over the restructuring of social reproduction is expressed. This capacity to reorient human and non-human life for pecuniary gain is subject to constant resistance, transformation and negotiation and it is only because of the encompassing institution of the market that these socially heterogeneous dynamics can be articulated into universal quanta of dollars and cents. Indeed unlike pre-capitalist societies, in which exclusion is codified by custom and fealty in relatively stable structures of social control, exclusion within capitalism is continually being recreated through the buying and selling of ownership claims. To cite Nitzan and Bichler directly: ‘in capitalism change itself has become the key moment of order’ (2009: 153). Moreover, as capitalism is constituted by ongoing redistributive conflict within business, pecuniary magnitudes should be understood in relative rather than absolute terms. Thus, the continual process of recreating exclusion in the capitalist political economy is manifest in the qualitative realignments of corporate control, on the one hand; and it is given quantitative expression in changes in relative prices and relative profits, on the other (Nitzan and Bichler 2009).

In applying this method to the exploration of food retailer power, Figure 2.3 reproduces the time-series data of supermarkets’ and wholesalers’ changing profit share presented in Figure 2.2 and compares it with movements in the retail price of US consumer foods relative to the US price of foods at the intermediate stage of processing. The two time-series have a correlation coefficient of 0.89. This is remarkable when one considers that the price data are

US-based only, but the profit share data pertains to supermarkets and food wholesalers all around the world. Moreover, the strength of the relationship is impressive given the fact that non-food items (such as clothing, fuel and financial services) constitute a large proportion of supermarkets' revenues. Last but not least, given that both series shifted from an uptrend to a downtrend at the very same time (early 2000s), the correlation between them is unlikely to be a mere statistical fluke. The graph suggests that the ability of supermarkets to increase their profit share in the overall food sector depends to a large extent on the degree to which they can increase the price of foods faster, or reduce the price of foods more slowly, than firms exerting power further upstream in the supply chain.

Now, if we compare Figure 2.1 with Figure 2.3 a very interesting finding comes to the fore. Food retailers' profit share and the relative price of retail foods fall at the turn of the millennium – the very same point at which food price inflation returns to world food markets. This observation underscores another key insight of the capital as power approach that is worth emphasising here: that 'inflation is always and everywhere a redistributive phenomenon' (Nitzan and Bichler 2009: 369). Or to put it in the terms of this research: food price inflation is the aggregate appearance of redistributive conflicts between various groups and organisations within food supply chains. These conflicts involve, but are not necessarily limited to, farmers, biotech companies, international trading houses, food and beverage corporations, retail firms and consumers. From these data we can tentatively conclude that on a sectoral level, the food price inflation that has occurred in the last decade has benefited agricultural input firms, food processors and food manufacturers at the expense of food retailers. Of course, to substantiate this conclusion we need more empirical scrutiny and further breakdown of corporate profits which we cannot pursue here. But even without such an

inquiry, the distribution of profit and its relationship to relative prices presented in Figures 2.2 and 2.3 pose serious questions to those who ascribe ‘mastery’ to supermarkets.

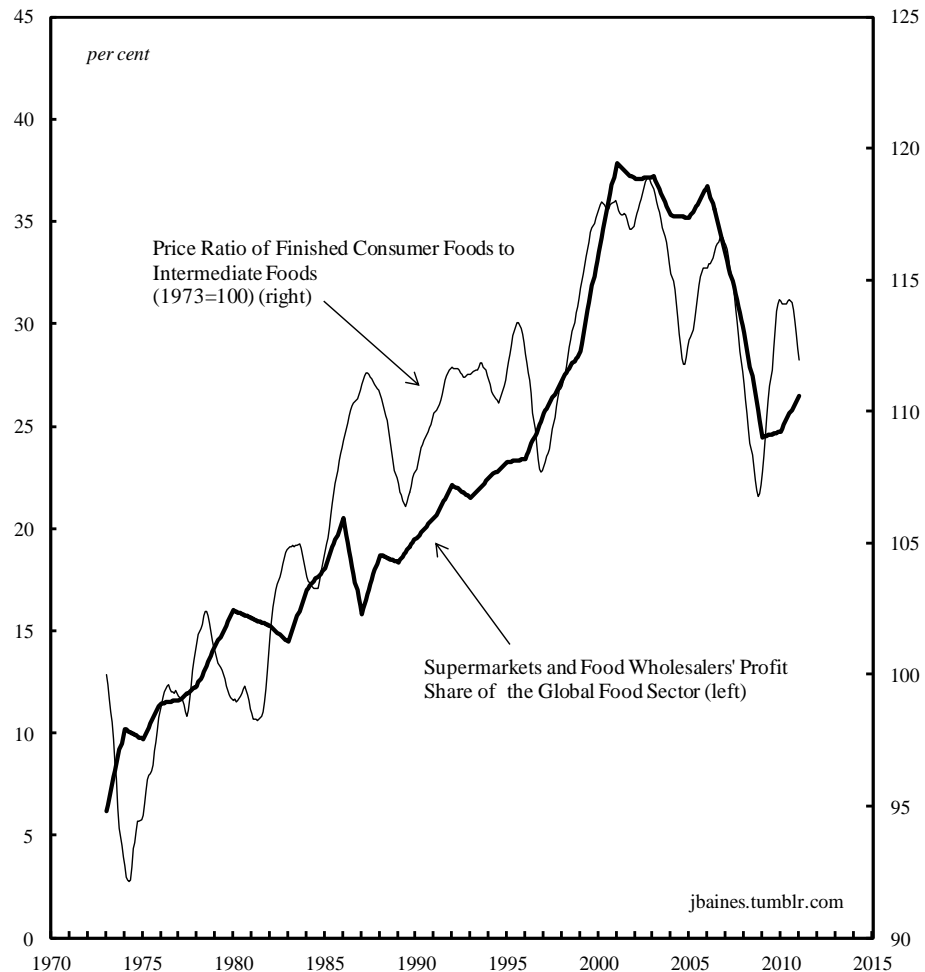


Figure 2.3 Relative Food Prices and Retailer Profit Share

Note: Price ratio data computed by dividing the monthly finished food price index by the intermediate food price index. The relative price data are presented as a one-year moving average. The Pearson Correlation Coefficient for the raw data for the two time-series is 0.89.

Source: Profit share data from Thomson Reuters Datastream (see Notes to Figure 2.2). Finished consumer food price data and intermediate food price data from Global Insight. Series codes: 110157513 (US Producer Price Index Finished Consumer Foods) and 110157453 (US Producer Price Index Intermediate Foods and Feeds).

So what do we disaggregate from here? The CasP approach encourages the researcher to study dominant capital with reference to differential profits. In the terms set out by Nitzan and Bichler, dominant capital is constituted by the leading firms and government organs that form the centre of the accumulation process. And differential profits are defined as the net earnings of a group of firms relative to some benchmarked average. The relativity of this measure stems from the fact that actual firms do not endeavour to maximise the absolute dollar level of their profits. In fact, the very notion of a profit maximum is conceptually indeterminate in any situation other than perfect monopoly or perfect competition. If we move into the real world of corporate finance, we find that firms continually measure their performance against an ever-shifting ‘average’. Political economy scholars should perhaps heed this ritual as it will give them a better understanding of the quantitative imaginary of business. Moreover, the benchmarking practice shows that different groups of corporations do not simply seek to retain their share of overall business profits; instead they continually strive to increase it. Therefore, through charting the differential profit trajectories of corporate groups one can illuminate the dynamic restructuring of dominant capital’s control over the organisation of human and non-human life (Nitzan and Bichler 2009).

With this approach in mind, I have constructed new proxies for what I delineate as the four major clusters of dominant capital that mediate the journey that food takes from ‘farm to fork’. I call these clusters the Agro-Core, the Trader-Core, the Food-Core and the Retail-Core. The Agro-Core consists of the 10 most profitable firms that control the production and marketing of inputs sold to farmers. The Food-Core is composed of the top 10 most profitable firms that manufacture agricultural products into food products packaged within their multiple brand lines. The Retail-Core is made up of the top 10 most profitable supermarkets that sell these foods to the consumer. And finally, the Trader-Core comprises the three most profitable

firms engaged in the processing and trade of raw agricultural commodities. The Trader-Core proxy is limited to three constituent firms because of the paucity of available data on the major grain traders. The historical changes in the net profits of these four proxies relative to the net income of the Compustat 500 – the 500 largest firms by net income listed in the United States – are presented in Figure 2.4. The data are plotted on a logarithmic scale to facilitate comparison and to highlight the rates of change in differential profits (indicated by the respective slopes of the different series). It is worth noting that although each proxy is an index in which the underlying constituent firms change with each quarter, there have been a number of companies that have consistently made it into the top 10 for the Agro-Core, Food-Core and Retail-Core categories. These firms are listed in Table 2.1, along with the three firms that currently dominate the global agricultural commodities trade.

By disaggregating the profit data for the four major clusters of firms operating within the world food system, one can build upon the insights first derived from the sector-based profit share data presented in Figure 2.2. As one can see, the Retail-Core underwent a decade-long differential accumulation boom that began in the early 1980s and ended in the mid-1990s. Since then there have been modest cyclical upswings and downswings around a very slight secular uptrend in the Retail-Core's differential profit. This indicates that the dominant supermarkets have experienced little more than pecuniary stagnation over the last two decades. Therefore, the chart raises further questions about the supermarket mastery thesis. While Figure 2.2 suggests that the food retailing sector reached its apogee within the world food system at the turn of the millennium, Figure 2.4 indicates that the retail revolution was already running out of steam by the mid-1990s.

Moreover, Figure 2.4 shows a very strong correlation between the differential profits of the Food-Core and the differential profits of the Retail-Core, especially from the early 1990s

onwards. This suggests that the arguments about there being a shift in the balance of power from food manufacturers towards supermarkets may be ill-conceived. The dominant food

	<i>Company</i>	<i>Market Value (May 12, 2012)</i>	<i>Comments</i>
<i>Agro-Core</i>	Monsanto	\$38.5bn	The world's largest biotech company. 90% of the U.S. soybean crop and 80% of the corn crop are grown with seeds containing genetic traits owned by the firm.
	Potash Corp.	\$35.5bn	Has the largest share of control over global fertilizer production. It is the world's largest producer of potash and the third largest producer of phosphate and nitrogen.
	Deere and Co.	\$31.9bn	The world's biggest manufacturer of farm machinery. Its main strengths lie in the large agricultural equipment associated with the soybean and corn sectors.
<i>Trader-Core</i>	Cargill	\$53.5bn*	The largest private company in the world. Cargill cemented its position as the world's most powerful grain trader when it bought the trading division of its rival Continental in 1998.
	ADM	\$21.4bn	Has the largest share of control over the world ethanol industry. Historically just an agricultural commodities processor, it moved into trading in the 1970s.
	Bunge	\$9.0bn	Has the largest share of control over the flour milling and fertilizer industry in South America. It also has the world's largest share of control over dry corn and soy processing.
<i>Food-Core</i>	Nestlé	\$196.4bn	The most powerful global food conglomerate. Moreover, in 2011 it was the world's most profitable company of any sector. Owns 29.5% stake in L'Oreal.
	Pepsi-Co	\$104.7bn	Famed for its eponymous soft drink, PepsiCo is much more than just a beverage corporation. It owns many food brands including Frito-Lay and Quaker.
	Kraft	\$69.4bn	Owner of numerous household names including Jacobs, Maxwell House and Philadelphia. In 2010 it acquired the Cadburys brand after a fractious takeover campaign.
<i>Retail-Core</i>	Wal-Mart	\$202.4bn	With 2.1 million workers it is as about as large as the People's Liberation Army of China in terms of employee numbers and it is the world's largest firm in terms of sales.
	Tesco	\$42.0bn	Dislodged Sainsbury's from the top spot in UK food retailing in the early 1990s. Tesco gets around 30 pence from every pound spent on groceries in Britain.
	Carrefour	\$12.5bn	Headquartered in France. It is the world's second largest retailer in terms of revenue and it has a strong presence in

Table 2.1: Dominant Corporations in the World Food System

* Implied market value, Financial Times estimate, January 2011.

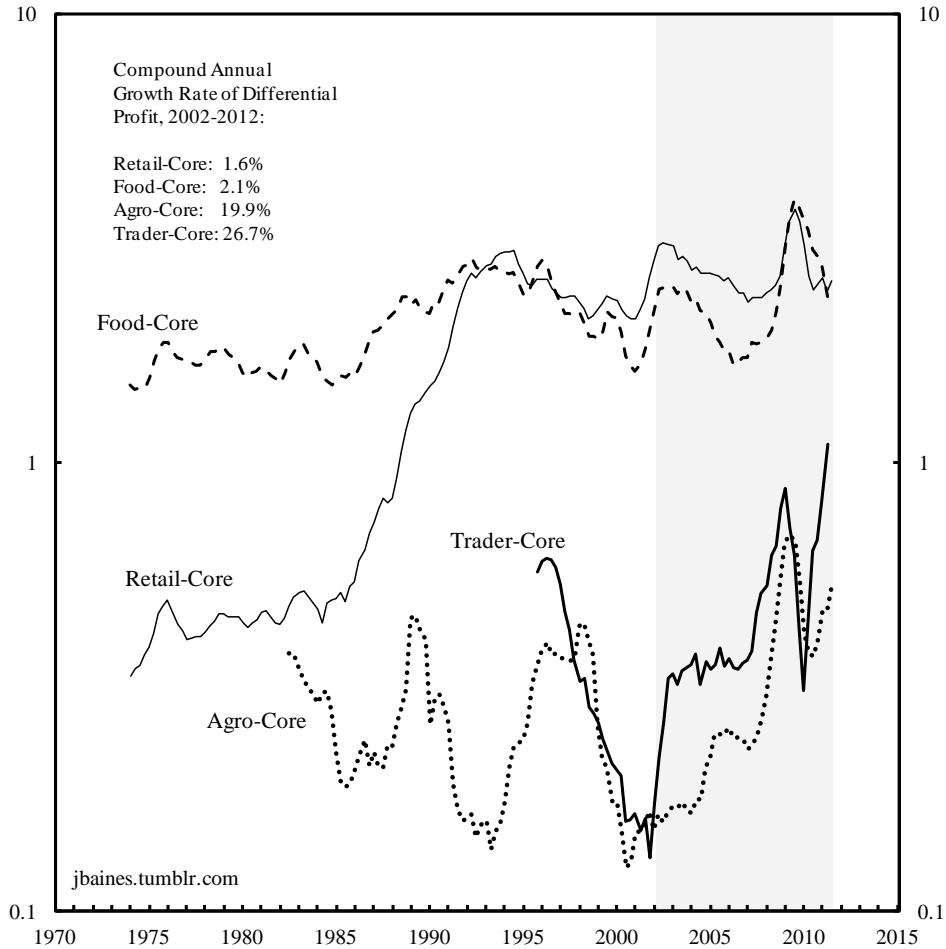


Figure 2.4. Differential Profit of Dominant Capital Groups in the World Food System

Note: For each quarter, the average net income per firm of the firms listed in the top 10 of each category (and of the top 3 for the Trader-Core) are divided by the average net income per firm of the Compustat 500 to yield differential profit data. Data are presented as one-year moving averages.

Source: Agro-Core proxies: 'Crop Production' (NAICS 111- 111422), less subcategory 'Fruit and Tree Nut Farming' (NAICS 113-11399); 'Farm Machinery and Equipment Manufacturing' (NAICS 333111); and 'Pesticide, Fertilizer and Other Agricultural Chemical Manufacturing' (NAICS 3253 – 325320). Food-Core proxy: 'Food Manufacturing' dataset (NAICS 311 – 311999). Retail-Core Proxy: 'Grocery Stores' dataset (NAICS 4451 – 445120). Net income data for each firm from Compustat through WRDS (series code: NIQ). Where net income data was missing from Compustat it was obtained from Thompson Reuters Datastream, Forbes Magazine, Wall Street Journal, Financial Times, Business Source Premier and the Fortune Magazine.

manufacturers' pecuniary dynamics appear to move in tandem with, rather than counter to, the pecuniary dynamics of the major supermarkets. The view that concordance outweighs conflict between major supermarkets and major food manufacturers is further supported by the findings of some specialist literature within consumer marketing research. This literature suggests that retailers' ability to use store brands to gain leverage over food manufacturers is circumscribed by the fact that it is the very same food manufacturers' 'national brands' that attract many consumers into their stores. The threat to demote the position of food manufacturers' branded products on store shelves or remove them altogether thus might ring hollow, as supermarkets are dependent on many of these brands for the sustenance of satisfactory levels of business traffic (Ailawadi 2001: 313). Moreover, slotting fees and the exacting quality standards imposed by supermarkets may actually be supported by large food conglomerates as they know that smaller suppliers cannot bear the weight of hefty expenses and stringent regulations (Hendrickson *et al.* 2001). Lastly, this exclusionary logic may also apply to the 'strategic partnerships' that have proliferated between food retailers and food manufacturers in recent years. Rather than increasing the power of supermarkets over food manufacturers in general, such alliances may be consonant with the pecuniary interests of dominant food manufacturers: ensuring both the exclusion of smaller suppliers and a concomitant increase in the predictability of earnings. Interestingly, just as the differential accumulation dynamics of major supermarkets and major food conglomerates generally move in sync, the Agro-Core's and Trader-Core's differential accumulation trajectories also follow a similar course. Moreover, in relative pecuniary terms the Agro-Core and Trader-Core tend to move to a completely different rhythm to the Food-Core and Retail-Core pairing. In the early 1980s the Agro-Core differentially decumulates when the Food-Core and Retail-Core differentially accumulate and for much of the 1990s the Agro-Core also moves in an opposite

direction to the Food-Core and Retail-Core. This negative correlation breaks down in the late 1990s when all four major clusters of dominant firms within the world food system experience a decline in earnings relative to dominant capital in general. However, the inverse relationship is restored from 2002 to 2006 when agricultural commodity price inflation sets in.

During the 2007–8 food-price hike the Agro-Core and Trader-Core experienced a differential accumulation boom. The upswing in the differential profits of the Food-Core and Retail-Core lags behind both in temporal terms and in terms of sheer magnitude. Moreover, while the revival in the Food-Core's differential profits is quite significant, the Retail-Core's rebound is rather modest. And in the most recent food price hike no pecuniary upturn for the Food-Core and Retail-Core seems evident. In fact, their differential earnings continue to decline. More generally, one can see that in the whole period of severe food price inflation (shaded in grey) the Agro-Core and Trader-Core differentially accumulate much more rapidly and for a much longer period of time. Indeed, as shown by the statistics presented in Figure 2.4, from 2002 to 2012 the major food retailers and manufacturers have only been increasing their differential profits relative to dominant capital by a paltry two per cent a year; while the Agro-Core and the Trader-Core have increased their differential profits annually by an astounding 20 per cent and 27 per cent, respectively. These observations suggest that in periods of rapid agricultural commodity price inflation, the firms that are in closer proximity to the end-consumers in food supply chains find it hardest to differentially accumulate.

Taken as a whole, Figure 2.4 indicates that those scholars who focus on the balance of power between food retailers and food manufacturers miss out on what perhaps is a much more important dynamic within the contemporary political economy of food: the accumulation boom of the Agro-Core and Trader-Core over the last decade. Although it is true that the dollar profit levels of the dominant food manufacturers and food retailers are far greater than those of

the dominant grain traders and the major firms selling agricultural inputs, the growth rate of the differential profits of the Food-Core and Retail-Core since the turn of the millennium has been comparatively modest. In short, the agricultural input firms and the grain traders are in the ascendant, not the food retailers. Thus, in order to more adequately comprehend the restructuring of corporate power over the world food system since the turn of the millennium, we must focus on the pecuniary strategies of the agricultural input firms and grain traders. Given this fact, the last section of this chapter turns the reader's attention from the major food retailers and food manufacturers to the Agro-Core and Trader-Core. It will be suggested that key firms within both clusters forged important cross-linkages with one another towards the end of the 1990s. These linkages gave rise to what I term an Agro-Trader power nexus. And perhaps most importantly: rather than passively cashing in on the upswing in agricultural commodity prices, the firms within this nexus have been actively working to restructure the world food system in their favour, and in ways that make violent inflationary shifts much more likely.

The Emergence of the Agro-Trader Nexus and the Restructuring of the World Food System

The Power Trajectory of the Trader-Core

In the nineteenth century the major grain traders were all shadowy organisations that were privately held by a small number of highly uncommunicative clans. Indeed, even as late as 1979, when Dan Morgan wrote his brilliant expose 'of the 'merchants of grain' the five companies that dominated the world's trade in grain (André, Bunge, Cargill, Continental and Louis Dreyfus) were owned by just seven families (1979: 19). They all sold exactly the same commodities and had no distinct business advantages such as the possession of patents or

proprietary technology (Lindell 1982: 240). Moreover, the grain trade was a relatively low overhead business in which large profits could be made from relatively small investments. As such, the major grain merchants' main assets were not their products or their holdings but their personal connections and their unsurpassed knowledge of changes in grain markets (Morgan 1979: 115). In this sense, the exclusionary capacity of the trading houses, and therefore their ability to profit, was not guaranteed by the law through formal claims of ownership; instead, their capacity to exclude was customary in nature; it was based on the cultivation of an intense culture of secrecy (etymology: *sēcrētus*, Latin for 'separated', 'hidden').

The grain merchants' stealthy expansion of control over food supply chains had taken them very far. At the beginning of the third agricultural commodity cycle in the early 1970s, the six largest trading houses collectively controlled between 85 per cent and 90 per cent of US grain exports (Committee on Foreign Relations 1977: 72). However, as Figure 2.5 shows, the grain merchants did not just consolidate their control over trading. They also extended their power over the processing of agricultural commodities. The chart, which depicts firm concentration ratios, focuses on the flour milling, soybean crushing and wet corn milling sectors because they represent the main foci points of the modern food system. Flour, as the main ingredient for bread, has become in many cultures synonymous with life sustenance itself, as diverse and nutritionally rich diets across the world have been homogenised along the lines of wheat-dependency. And soybeans and corn have become key commodities because they provide the raw material for many of the industrialised inputs which have become omnipresent in modern food supply chains such as high fructose corn syrup; xanthan gum; corn starch; soy lecithin; glycine; maltodextrin; citric acid; corn oil; diglycerides; dextrose and glucose, along with animal feeds such as corn meal and soybean oil cake. By replicating the natural properties of traditional ingredients, these 'fabricated foods' represent a source of

‘value-added’ for corporations involved in processing. They are more durable and transportable than traditional rural products and, as many of these inputs are interchangeable, they enhance processors’ power over mono-cropping farmers. The measure presented in the chart, commonly called the four-firm concentration ratio (or CR4 for short), is used by economists to assess the ability of the four largest firms in a given sector to exert oligopolistic control. The chart also shows the changing shares of control wielded by the three major Trader-Core firms: Archer Daniels Midland (ADM), Bunge and Cargill. As one can see, these three firms’ control over each sector has increased dramatically over the last three decades.

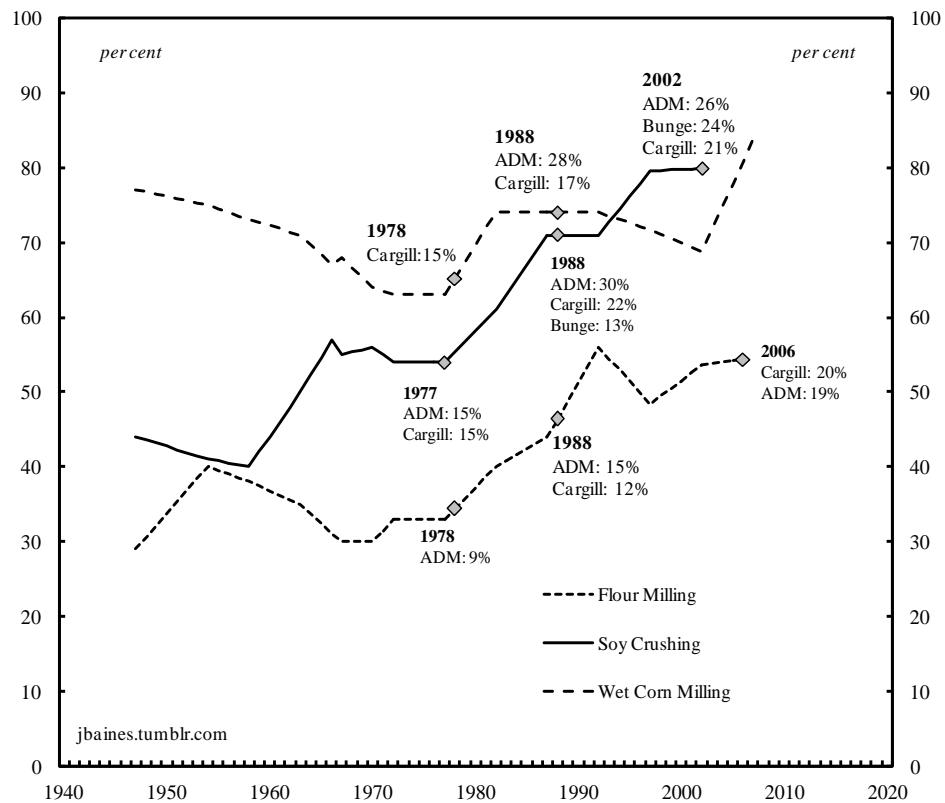


Figure 2.5 Four-firm Concentration Ratio in Raw Agricultural Commodities Processing

Note: The four-firm concentration ratio (CR4) is the percentage of the total value of shipments in a sector accounted for by the four largest companies.

Source: CR4 data from US Census Bureau (available from: <http://www.census.gov/econ/concentration.html> [accessed 30 May 2012]). Individual firm data for 1977, 1978 and 1988 from Marion and Kim (1991). Firm data for 2002 and 2006 from Hendrickson and Heffernan (2007).

The Trader-Core's strategy of extending their pecuniary ambit over domestic processing made a good deal of sense from a business standpoint. Amidst a slump in world grain exports after the boom of the 1970s, the devalued agricultural commodities that they were trying to sell internationally could be absorbed into their new processing divisions. But the traders' expansion into processing was also constitutive of dietary transformations in the period. Some of the main facets of this transformation are depicted in Figure 2.6. At the broadest level, the increased American consumption of grain-based foods, as depicted in Figure 2.6, was driven by the 'fast food revolution'. From being rather peripheral players in the food service industry in the 1960s, fast food restaurants have become ubiquitous. By the turn of the millennium, it was estimated that on any given day one in three American children and one in four American adults will visit a fast food outlet (Schlosser 2001: 3; Pollan 2006: 111). The development of the fast food supply chain has wrought violence upon communities across the world, precipitating deforestation and peasant displacement on one end and coronary heart failure and diabetes on the other. However, for the grain merchants the changes brought about by the fast food revolution were most welcome. More and more consumers munched through nuggets made from an amalgam of corn-fed chickens, modified corn starch and soy lecithin; more and more consumers chomped on burgers comprising wheat-based buns and beef patties originating from soy-fed cows reconstituted with yellow corn flour and partially hydrogenated soybean oil; and more and more consumers slurped on corn-sweetened beverages to wash this junk down. And as the fast food revolution rolled out to the rest of the world and as people increasingly turned towards meat-heavy diets, the major grain traders felt there was good

cause to be optimistic. The enthusiasm for the meat sector as an absorbent for grain ‘excess capacity’ was well articulated by the CEO of Archer Daniels Midland in the 1980s:

Think of chickens with their little mouths... Nothing affects them. They’re biting, biting, biting... Little pigs biting, biting. More every single day. It’s a dog-eat-dog competitive global market, but it isn’t true that exports aren’t going to come back. Chickens are growing damn near 10% each year (cited in Stavro 1985:40)

However, the Asian Financial Crisis of 1997–8 depressed global grain consumption. Up until that point East Asia represented a key regional market for the Trader-Core. But in the wake of the crisis, imports of foodstuffs processed and transported by the major grain merchants fell precipitously. To compound problems for the Trader-Core, there was a slowdown in the expansion of major fast food chains and low carbohydrate diets became increasingly popular. And in the beverage sector, corn-sweetened soft drinks were falling out of favour amidst the increased popularity of bottled water, activism against soft drink vending machines across schools and universities, the end of ‘supersizing’ by some fast food chains and well-publicised research that suggested corn syrup was a key cause of obesity (Meyer 2005: 48). The key dietary changes are depicted in Figure 2.6. The chart shows that by the early 2000s per capita flour and cereal consumption tapered off and high fructose corn syrup (HFCS) intake dipped. And a few years later even meat consumption was falling. The decline of the differential profits of the Trader-Core during the late 1990s was in large part brought about by this relative decrease in the consumption of grain-based products. As a result of these changes in international grain markets and American consumption trends, problems of ‘excess capacity’ within the storage and processing of corn and wheat had returned, and by the late 1990s the

relative cost of primary agricultural commodities had reached its lowest level for three decades (see Figure 2.1).

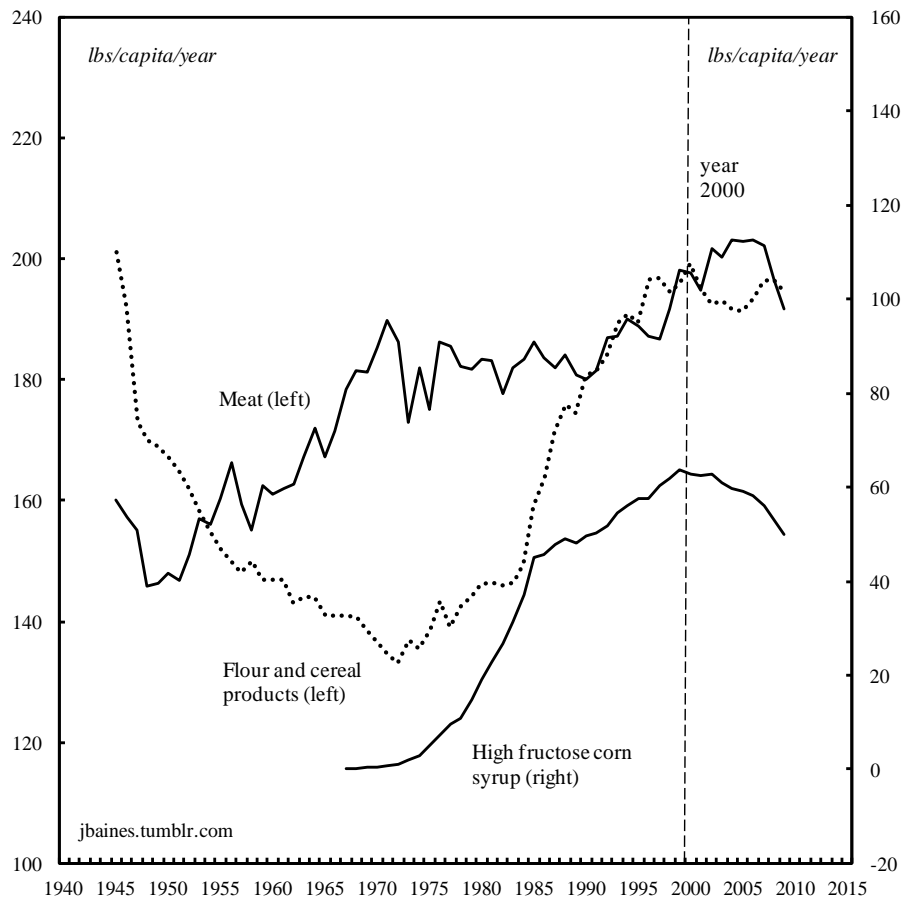


Figure 2.6. Transformations in the American Diet

Source: <http://ers.usda.gov/data/foodconsumption/FoodAvailspreadsheets.htm> [accessed 25 June 2012].

At the dawn of the third millennium, one market analyst remarked that ‘[a]nything to do with food – growing, processing, packaging, marketing, retailing – attracts all the investor interest of a dead skunk at a tea party’ (Meyer 2000: 20). But as one may recall from Figure 2.4, some clusters of firms within the world food system were doing worse than others. While

many investors turned their noses up at major supermarkets and food manufacturers, from a pecuniary standpoint it was the performance of the Trader-Core and Agro-Core firms that stank the most. The major causes for the pecuniary downturn of the Trader-Core have been detailed in this section and it is worth noting that these factors also negatively impacted the Agro-Core. The easing consumption of grain-based foods precipitated a slump in commercial farming in many parts of the world and this slump put downward pressure on the volume of the sales of the agricultural inputs that the Agro-Core controlled. However, the Agro-Core's pecuniary performance was not simply shaped by the balance of production and consumption. Instead, the rapid differential decumulation of the dominant agricultural input firms in the late 1990s has to be contextualised in relation to the 'troubled birth' of the biotechnology sector within agriculture (Falkner 2009). This troubled birth did not affect all Agro-Core firms. But agricultural input companies that were delving in the 'life sciences', such as Monsanto, had a strong interest in ensuring the successful delivery of biotechnology from its prolonged gestation in bioengineering laboratories to true genesis in world agriculture.

The Agro-Core and the Contested Emergence of Agro-Biotechnology

In principle, biotechnology held a lot of promise for corporations selling inputs to farmers: by patenting various bioengineered seeds, agribusiness could intensify the commodification of the agricultural process. Moreover, from the perspective of chemical companies, biotechnology held the key to increasing farmer dependency on the agrochemicals they sold as most of the early genetically modified crops were designed for herbicide tolerance. The engineering of this genetic trait was important for firms such as Monsanto because their patent on their Roundup product – a herbicide that kills plants indiscriminately and that contributed to around one-fifth

of the company's revenues – was going to expire in 2000 (Vellema 2004: 46). By inserting a gene into plants that made them tolerant to the blanket application of the herbicide, Monsanto could maintain its large market share in agrochemicals and sell their Roundup herbicide and Roundup Ready seed as part of a comprehensive package of inputs to farmers. But chemical firms such as Monsanto knew that in order to seize the opportunities that the biotechnology industry offered they had to influence government policy on genetically modified (GM) crops. They achieved this end through intense lobbying and also through the 'revolving door' that facilitated the two-way movement of staff between the upper echelons of agribusiness and the apex of the US government's regulatory apparatus. This regulatory incest between the 'regulators' and the 'regulated' made the US's policymaking environment very propitious for the rapid spread of transgenic crop production (Palaez and Schmidt 2004: 233–5).

However, the chemical companies perhaps underestimated the degree to which they needed to convince people beyond the halls of the US government about GM plants. Some agronomists found that the yields of transgenic crops were below that of non-engineered varieties. Such findings undermined the credibility of those agri-biotechnology firms that boldly proclaimed that genetic modification would increase agricultural productivity. The controversy of GM food was cast into sharper relief after Monsanto first touted its planned use of 'terminator technology' – a modification that was to take away plants' germinative capacity and thus guarantee the company's proprietary rights over living organisms. NGOs such as Greenpeace and farmers' organisations such as the one-and-a-half-million-strong Brazilian Landless Workers' Movement protested vociferously against genetic modification in the wake of such revelations. The terminator episode was a public relations disaster for Monsanto and in 1999 the company announced that it was discarding plans to render its seeds sterile (Vellema 2004: 50–2). There was also resistance to agro-bioengineering from consumers. People in

Europe were particularly uneasy about GM ‘Frankenstein’ foods as they had just gone through the jitters of the BSE crisis. To compound problems for the agrobiotech companies, major food manufacturers appeared to be exploiting widespread consumer scepticism about bioengineering so as to present themselves as the true guardians of human nourishment. Nestlé and Unilever insisted that they would not ‘take a bullet for GMOs’, to cite the words of one Nestlé representative, and they publicly declared they would refrain from using bioengineered foods in the products that they sold (Deutsche Bank 1999). Similarly, many food retailers were unsympathetic to agro-biotechnology. Indeed, major European supermarkets adopted a discouraging labelling policy for GM foods that went far beyond anything stipulated by EU legislation (Falkner 2009: 235–8).

As a result of these counter-currents, biotech and chemical firms had difficulty encouraging the spread of transgenic crop production beyond the United States and a small number of other countries such as Argentina and Canada. Moreover, many governing authorities within key import markets, such as the EU, Japan and Korea, followed the major food conglomerates and retailers in establishing strict import and labelling regulations. As the major biotech firms became increasingly aware of the rising public hostility towards transgenic crops, they sought to insulate their pharmaceutical divisions from the contestation over agricultural biotechnology. In 1999, Novartis and AstraZeneca, the third and fourth largest ‘life sciences’ firms at that time, decided to spin off their respective agribusiness divisions and merge them to form Syngenta. Similarly, in early 2000 Monsanto and Pharmacia and Upjohn completed a merger of their pharmaceutical operations and created a separate company focused on the application of biotechnology to agriculture, under the name of Monsanto. It was thus in this context of widespread public disquiet over agro-biotechnology that the Agro- Core crystallised into a distinct corporate cluster. However, the GM controversy

did not abate. A few years after the new Monsanto was formed, the company sought to introduce transgenic wheat to the US; but because of farmer resistance towards the idea, the plan was scrapped. Hence, even in the heartland of agrobiotechnology, there seemed to be severe limits placed on the Agro-Core firms' capacity to use the biotech industry for their own pecuniary ends (Falkner 2009).

At the turn of the millennium there were discernible similarities between the Agro-Core and the Trader-Core. As we can see in Figure 2.4, both clusters of firms were experiencing rapid differential decumulation amidst widespread scepticism about GM food, the declining popularity of grain-based products and a slump in global agricultural markets. And perhaps partly in response to those adverse developments, both clusters were undergoing rapid consolidation. The world's largest grain firm, Cargill, bought up the entire trading division of the world's second largest grain trader, Continental, in 1998. The major food processor-cum-trader Archer Daniels Midland bought up important assets of Louis Dreyfus, Glencore and also of André when it went bankrupt in 2000. And Bunge became the world's leading soybean trader after it purchased Europe's oilseed giant Cereol in 2002 (Milling and Baking News 2002). According to one estimate, by the early 2000s ADM, Bunge and Cargill, taken together, controlled between 75 per cent and 90 per cent of the entire world's trade in grain (Holt-Giménez and Patel 2009: 18). Consolidation was just as dramatic within the Agro-Core. After DuPont bought up Pioneer Hi-Bred in 1999 it gained the world's largest share of control over commercialised seed. The seed sector got even more consolidated in 2002 when DuPont and Monsanto signed a deal to swap their key patented technologies and drop all outstanding lawsuits they had levelled against one another (ETC 2003: 7). The US seed business has subsequently been dominated by a Monsanto-DuPont duopoly. It was in this context of pecuniary retrenchment and corporate consolidation that a new Agro-Trader nexus developed

between the Agro-Core and the Trader-Core. The remainder of this chapter outlines the institutional makeup of this power constellation and explores the social ramifications of its rise to prominence.

The Formation of the Agro-Trader Nexus and the Agrofuel Boom

The links between the Agro-Core and Trader-Core were primarily constructed through joint ventures – a means of corporate amalgamation which offered almost all of the advantages of mergers but without the impediments of antitrust law (ETC 2008: 13). Perhaps the most important joint venture that ADM embarked upon was with Countrymark – a major eastern Corn Belt cooperative. Countrymark was aligned to Novartis – the third largest seed company after Monsanto and DuPont in the late 1990s (Heffernan 1999: 8). However, the two other main grain traders were ensconcing themselves much more deeply than ADM within the Agro-Core. In 1998, Cargill hooked up with Monsanto and they embarked on a joint venture called ‘Renessen’ (Milling and Baking News 1998: 11). The venture indicated significant consolidation within the global food system as it brought together the world’s largest grain trader with what would soon become the world’s most powerful agro-biotech firm. Similarly, in 2003 Bunge married some of its operations with DuPont, giving birth to the ‘Solae’ project (Milling and Baking News 2003: 10). In this venture, Bunge agreed to sell DuPont’s seeds and agrochemicals to farmers who were contracted to produce soybeans for Bunge’s silos. Moreover, after a series of acquisitions in the 1990s, Bunge commanded the largest share of control over the fertiliser industry in South America (Howie 2000: 3). And in 2004 Cargill acquired a majority stake in Mosaic – the world’s second largest fertiliser company. Taken as a whole, these developments were premised on the establishment of proprietary claims over agrochemicals and plant life. Cargill’s CEO Gregory Page summarised his company’s re-

orientation in eerie terms: ‘[i]n the broadest sense, Cargill is engaged in the commercialisation of photosynthesis. That is at the root of what we do’ (Page 2012). By becoming more integrated into the Agro-Core, the Trader-Core was instituting new areas of exclusion and thus new sources of potential profits that supplemented the traditional norms of secrecy that had for a long time characterised their merchandising divisions. The Agro-Trader nexus emerged as a result of these developments. Figure 2.7 outlines the nexus’s key companies.

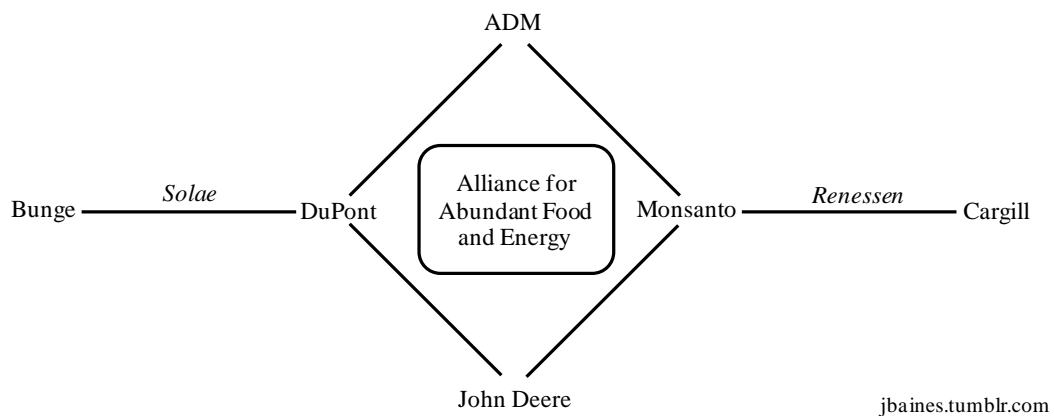


Figure 2.7 The Agro-Trader nexus

The formation of this power constellation put the Agro-Core and Trader-Core in a very strong position to benefit from the emergence of a new agricultural commodities cycle in the early 2000s. But, crucially, these firms were not simply benefiting from the upsurge in agricultural commodity prices, they were actually encouraging the upturn by expanding 'institutionalized waste', or what Baran and Sweezy (1966: 337) describe as the 'formula for maintaining scarcity in the midst of potential plenty'. The institutionalised wastage is partially achieved through the diversion of grain into meat production. But this is nothing new. In actual fact, world feed grain use has fallen from 41 per cent of total world grain consumption

in 1972 to 34 per cent of the total in 2010 (Earth Policy Institute 2012). It was primarily the rapid development of the first-generation agrofuel sector in the 2000s that catalysed the inflationary shifts that have recently reverberated throughout the world food system. The Agro-Trader nexus was at the forefront of this agrofuel boom. Indeed, the Renessen venture between Cargill and Monsanto sought to engineer and patent varieties of corn with high levels of starch, so that the crop can be more easily processed into ethanol (GRAIN 2007: 19) and Bunge's and DuPont's Solae venture has also come up with inbred and bioengineered varieties of corn and soybeans specially designed for the combustion engine rather than the human stomach (Milling and Baking News 2006: 20). Although ADM has not been involved in any comparable ventures with the agro-biotech giants, as the next chapter shows, it has worked unremittingly to create a policy environment within which the wasteful absorption of grain in the agrofuel sector can be achieved.

In the 2000s the American agrofuel sector experienced a dramatic growth spurt. The 'War on Terror' and the concomitant rapid rise in oil price inflation (see Nitzan and Bichler 2004), made the arguments concerning agrofuel-based energy security appear more credible. In 2005 the Energy Policy Act was passed. The bill mandated the blending of 7.5 billion gallons of ethanol into America's gasoline supply by 2012. In 2007 the agrofuel sector was further bolstered by the US Energy Independence and Security Act. This piece of legislation increased government subsidies for ethanol production and mandated that 36 billion gallons of agrofuel be added to gasoline by 2022. And in 2008, amidst increasing concern about the role of agrofuel in contributing to food price inflation, ADM formed the 'Alliance for Abundant Food and Energy' along with the major companies of the Agro-Core – Monsanto, DuPont and John Deere – to defend the existing government subsidies for the agrofuel sector (Cameron

2008). As indicated by Figure 2.7, these four firms represent the axial organisations of the Agro-Trader nexus.

The nexus has worked in unison with key government organs, such as the US Department of Energy and the US Department of Agriculture, to institutionalise an unprecedented increase in waste in the world food system. The conversion of corn – US's primary crop for agrofuel feedstocks – into ethanol represents the most egregious manifestation of this wastage. Despite being pitched as a 'green alternative', when all the energy required to produce corn and then process it into ethanol is considered (such as the diesel to power tractors, the natural gas to make nitrogen fertiliser and the coal to run ethanol production plants), the ostensible environmental benefits of ethanol production look very dubious indeed. According to the most optimistic studies, 1.3 units of energy are produced for each unit of energy used in corn-ethanol production in the US. More realistic calculations suggest that the average energy yield is a measly 1.01 per 1 unit of energy input. This ratio compares very poorly to gasoline production, which on average yields 5 units of energy from 1 unit of energy input (Albino *et al.* 2012: 3). In fact, even the most energy efficient agrofuel – ethanol derived from cane sugar – has less than half of the net energy yield of gasoline (Murphy 2010: 276). ADM's oft-repeated arguments about agrofuel increasing the US's energy independence are also specious. It was estimated in 2005 that if America's entire corn crop and soybean crop were used to produce agrofuel, it would only cover 12 per cent of the US's annual gasoline usage and six per cent of the US's diesel usage (Tokar 2010: 125).

Given the energy inefficiencies of many major agrofuels, it is unsurprising that biodiesel and ethanol processors are utterly dependent on government subsidies. By 2006 it was estimated that the US, Canada and EU were spending US\$11 billion per year in subsidies for the agrofuel sector. By 2015 this figure is expected to rise to US\$25 billion (OECD 2008). But

the agrofuel business is not just subsidised by the taxpayer via the government; it gets a direct hand-out from the customer at the gas station. To take the example of corn-ethanol again, one gallon of this fuel has only 67 per cent of the Btu (British thermal units) of energy contained in a gallon of gasoline. But sadly for the car driver, fuel is bought per gallon rather than per Btu, and the price of ethanol is almost invariably over 67 per cent of the price of gasoline. Thus, rather than reducing the price of fuel for the consumer, corn-ethanol may often be increasing it (Albino *et al.* 2012: 4).

Although the agrofuel boom defies common sense when judged on the grounds of efficiency and environmental sustainability, from an agribusiness perspective the benefits of first-generation agrofuel production are perfectly clear. Corn and soybeans are the primary crops for ethanol and biodiesel production respectively and Monsanto and DuPont have more proprietary claims over corn and soybeans than any other crop. By 2002, Monsanto controlled 38 per cent of the world's corn seed market (excluding China) and 20 per cent of the soybean seed market, while DuPont controlled 27 per cent of the corn seed market and 15 per cent of the soybean seed market (ETC 2003: 7). Moreover, because these crops are bioengineered to be tolerant towards the application of huge amounts of herbicide, seed sales are also tied in with agrochemicals sales for companies within the Agro-Core. Thus, joining the Trader-Core to facilitate and champion the development of the agrofuel sector was a no-brainer for firms such as Monsanto and DuPont. The appeal of agrofuel for the agro-biotech companies was further underscored by the fact that the agrofuel sector could be a Trojan horse for GM products in areas of the world which were more averse to agro-biotechnology than the US (Shattuck 2008). In particular, the regulatory barriers to transgenic crops within the EU could be circumvented and the overall scepticism felt by many consumers in regards to GM food could be offset. What is more, John Deere has supported the spike in agrofuel production

because it has increased the incomes of the company's main clients: the large, commercial farmers and it has also increased the global acreage of land used for agricultural production. And these two factors in turn have led to an overall increase in sales of its large specialist farm machinery (Blumenthal 2012).

The firms within the Trader-Core have also benefited greatly from the agrofuel boom. Due to the extensive control that they have over the processing of raw agricultural commodities, they benefit directly from supplying the processed crops used in ethanol and biodiesel feedstocks. Moreover, they are heavily involved in the actual production of agrofuel. Indeed, ADM has the largest share of control over world ethanol production, with seven per cent of global capacity; and Bunge has the seventh largest share (Chan and Reiner 2011: 11). And Cargill has been starting big operations with farmer cooperatives in Europe and North America in biodiesel production (Milling and Baking News 2005: 46). All three companies have also been spreading their pecuniary ambit over Indonesia's palm oil-biodiesel complex and Brazil's sugar ethanol industry. The Trader-Core's expansion into the Brazilian ethanol industry was perhaps typified by the joint venture that ADM embarked on in 2008 with a company controlled by Antonia Cabrera – one of the country's former agricultural ministers (Cameron 2008).

What is more, the Trader-Core has benefited indirectly from the agrofuel boom because, in the context of declining consumption of grain based products, the diversion of corn and soybeans into ethanol and biodiesel production has helped tame 'excess capacity'. In fact, the curtailment of 'excess capacity' has quickly given rise to fear of 'scarcity' and this shift has created conditions of widespread uncertainty within the world food system. With the new spectre of food shortages looming in the background, societies are increasingly dependent on the grain traders. The Trader-Core has research offices all over the globe and thus enjoys

unrivalled access to information about the production and distribution of raw agricultural commodities (Arsenault 2011). So up to a point, the greater the market volatility, the greater the value of the Trader-Core's extensive trading capabilities and the greater the value of the Trader-Core's exclusive knowledge of world food markets. Partly for that reason, the dominant grain merchants have sought to cultivate an environment of 'controlled instability' in the world food system (Krebs 1992: 305). In return for a hefty fee, they offer their customers expeditious 'solutions' for managing the price volatility and food shortage problems that they have played no small part in creating. We deal with the pecuniary dynamics of price instability in Chapter Four.

However, it is worth noting that not all food corporations operating within the world food system have backed the rapid expansion of the first-generation agrofuel sector. Dominant food conglomerates including Kraft, Pepsi-Co, ConAgra and General Mills have joined forces with the second largest US supermarket chain Kroger and the world's second largest meatpacker, Tyson, in a 'Food Before Fuel' lobbying campaign aimed at rolling back America's ethanol mandates (Circui 2008). The world's largest food manufacturer, Nestlé, has also released public statements decrying the effects of the agrofuel boom. These companies' ostensible complaint against the agrofuel sector is that it is overly reliant on government support and that this reliance distorts 'supply' and 'demand'. But their real grievance is that the increased diversion of food into fuel production increases the costs of inputs and inventory for their own businesses. With more crops diverted into the agrofuel sector, raw agricultural commodity prices rise, price volatility increases and the hedging practices and profit margins of firms in the Food-Core and Retail-Core come under pressure. Indeed, as one may recall from Figure 2.4, Food-Core and Retail-Core firms have achieved little beyond differential pecuniary stagnation during the agrofuel boom.

Having said all of this, one should remain cognisant of the fact that, in the end, the major victims of the increased costs of raw agricultural commodities are not the dominant food manufacturing and retail corporations, but rather the vast swathe of humanity suffering from food insecurity. Indeed for the world's poorest people who spend 60–80 percent of their

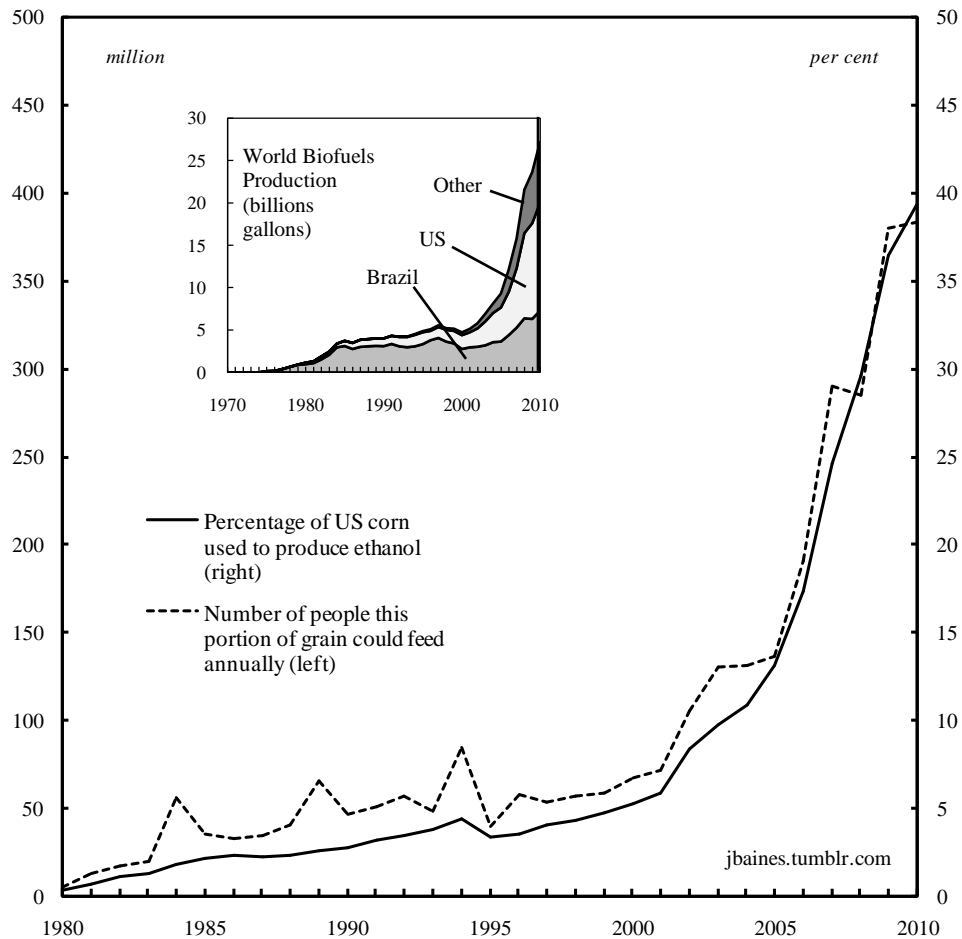


Figure 2.8 The Agrofuel Boom as the Redistribution of Food

Note: Estimate for the number of people the US corn used for feed stocks could feed annually based on annual estimated world grain consumption per capita.

Source: Average world grain consumption per capita from US Department of Agriculture, Production, Supply and Distribution, electronic database, at <http://www.fas.usda.gov/psdonline> [accessed 30 May 2012], and World Population Prospects: The 2010 Revision Population Database, at <http://www.esa.un.org/unpp> [accessed 30 May 2012]. US corn use data from <http://www.ers.usda.gov/data-products/feed-grains-database/> [accessed 27 June 2012].

income on food, sudden food price rises can be catastrophic. By way of closing the circle in

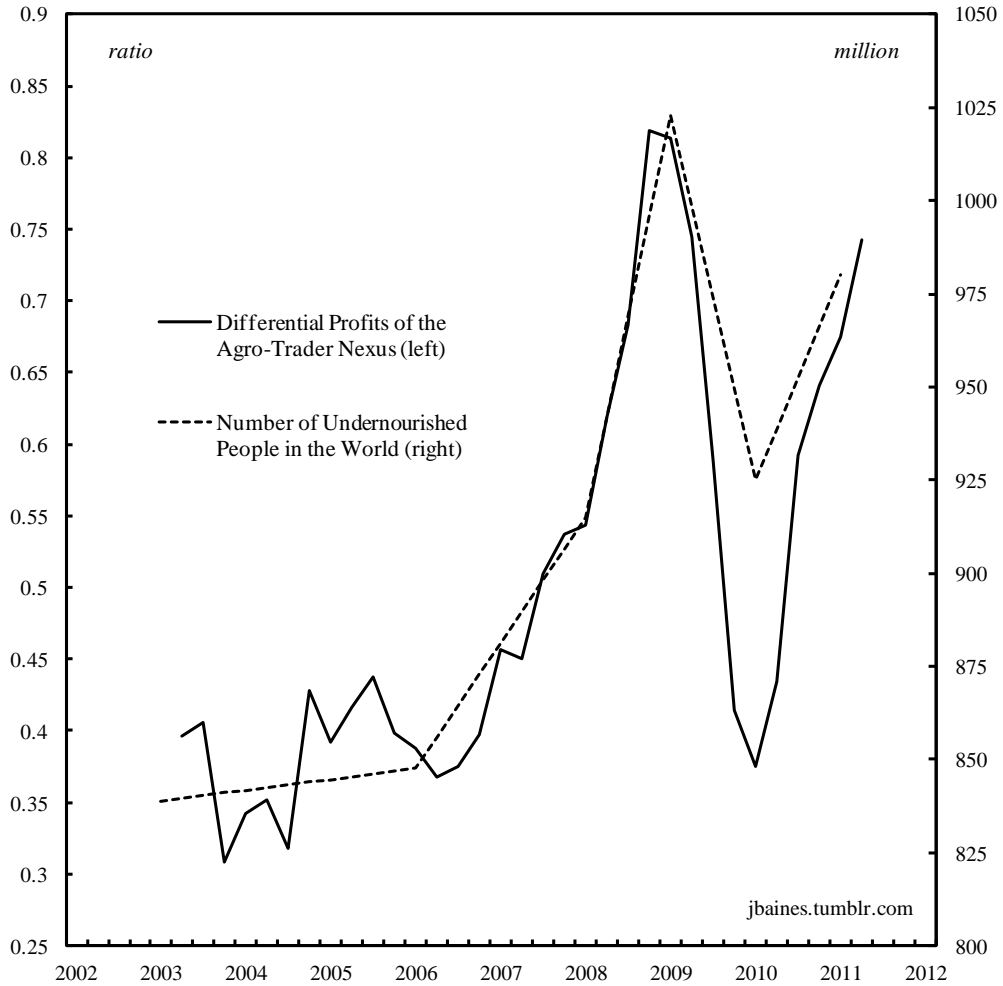


Figure 2.9 Global Hunger Levels and the Differential Profits of the Agro-Trader nexus

Note: Differential profits of the Agro-Trader nexus is the ratio between the average profits per firm of Archer Daniels Midland, Bunge, Cargill, Deere, DuPont and Monsanto and the average profits per firm of the Compustat 500. The data are presented as a one-year moving average. The Pearson correlation coefficient for the raw data of the two time-series is 0.76.

Source: Undernourishment figures for 2001–10 obtained from FAO (2010: 8, 9, 50). Last observation is provisional and is taken from World Bank (2011). Cargill data for 2000Q4–2004Q2 taken from the Wall Street Journal, Financial Times and Business Source Premier; data for 2004Q3–2010Q4 taken from company website: cargill.com/company/financial/index.jsp [accessed 30 May 2012]. All other data taken from Compustat through WRDS; series code: NIQ.

the analysis, Figure 2.9 presents data on global hunger levels alongside data on the profits of the Agro-Trader nexus relative to the firms listed in Compustat 500. The strikingly tight correlation suggests that the redistribution of business profits towards the Agro-Trader nexus was in part brought about by a redistribution of food away from the world's poor via food price inflation. As the figure clearly shows, since the turn of the millennium, the Agro-Trader nexus's share of dominant capitalist profits increases when global hunger levels rise and its share of dominant capitalist profits declines when global hunger levels fall. More analysis of the multifarious power processes behind food price inflation needs to be conducted; however it seems likely that the Agro-Trader nexus's facilitation and championing of the first-generation agrofuel boom was key. As Figure 2.8 indicates, in 2010 almost 40 per cent of America's corn crop was used to produce ethanol and this amount of corn could have fed around 350 million people given average world grain consumption levels. In short, the dramatic increase in agrofuel production, particularly as it pertains to the corn-ethanol business, is not only dubious from an environmental standpoint, it has also contributed to the emergence of structural scarcity within the world food system.

Conclusion

This chapter has demonstrated the analytical potential of using sectoral profit share and differential profit data to gauge the power shifts between groups of corporations in the world food system. Such an analysis requires capital to be disaggregated and accumulation to be understood not as an overarching structural phenomenon, but rather as an ongoing process of intra-capitalist conflict over the re-ordering of human and non-human life. This method of

progressive disaggregation illuminates crucial power processes within the world food system. Two interrelated insights are particularly important.

First and foremost, the research casts doubt on the prevalent view within IPE literature that there has been a shift in power away from food manufacturers, in favour of food retailers. On a sectoral level, the combined profit share of food retailers and wholesalers has declined significantly during the recent period of rapid food price inflation. And when one examines the differential profit data one can see that the dominant supermarkets have been experiencing little more than pecuniary stagnation since the mid-1990s. What is more, the earnings performance of the major supermarkets appears to move in sync with that of the dominant food conglomerates. This synchronicity suggests that the business interests of the dominant food retailers and food manufacturers are more closely aligned than the supermarket mastery thesis suggests. Overall these findings indicate that we should be circumspect about arguments that lay a great deal of emphasis on the increasing role that major retailers play in setting the terms of access to food supply chains and in shaping consumption patterns. Although these developments may have had a great impact on farmers, small food manufacturing firms and consumers, they do not seem to have given major retailers great pecuniary leverage over other major corporations operating in the twenty-first century world food system.

Secondly, my findings indicate that in recent years the real shift in power in the world food system has not been from the food manufacturers to the food retailers, but rather from the major food manufacturers and food retailers to what I term the Agro-Trader nexus. I argue that instead of being passive ‘price takers’, the firms belonging to the Agro-Trader nexus have actively sought to restructure the global political economy of food in a way that not only increases their own profit growth but also limits the potential growth of profits of other groups of firms within food supply chains. The primary vehicle of the Agro-Trader nexus’s

restructuring of the political economy of food has been the first-generation agrofuel boom. The boom has had profound implications, not only for corporate control and global undernourishment, but also for the categories that we use to understand such phenomena. Indeed, given the wholesale opening of agriculture to agrofuel production one may even ask whether the concept of the world food system as a distinct political economic arena still has analytical currency.

To sum up, the cost-benefit analysis of soaring agrofuel production could hardly be more stark. By redistributing energy away from the world's poor to the world's combustion engines, the agrofuel boom has contributed to the emaciation of bodies, on the one hand; while augmenting the Agro-Trader nexus's differential earnings, on the other. Needless to say, we should have no illusions about the pecuniary motivations of those corporations that have fought against the extensive government support for first-generation agrofuel production. But nonetheless, putting an end to the first-generation agrofuel debacle is a necessary step that must be taken if we are to work towards the construction of a world food order where no one goes hungry.

3 **The Ethanol Boom and the Restructuring of the Food Regime**

The trick is always to own the tollgate.

- Dwayne Andreas, CEO of Archer Daniels Midland from 1972–98, in response to an associate who asked him about the secret of his business success⁵

Introduction

The surge in the production of agrofuels in general, and US ethanol in particular, represents one of the most significant transformations in the world food system in recent decades. After a series of government initiatives to support the ethanol sector from the early 2000s onward, the diversion of corn into the US's agrofuel feedstocks increased dramatically. In 2001, US ethanol production accounted for 34% of global production of agrofuel. Ten years later this figure rose to 48%. The American ethanol sector is now so large that it consumes around two-fifths of the corn produced in the US. The re-channelling of grain from food production into fuel production has, according to many analyses, been a chief contributor to rising food prices since the beginning of the twenty-first century. A leaked World Bank internal report estimates that 70-75% of the food price rises between 2002 and 2008 were caused by the absorption of grain into burgeoning global agrofuel feedstocks; and a study by researchers at the New England Complex Systems Institute contends that the US ethanol sector alone was the preponderant long-term driver of food price inflation between 2004 and 2011 (Mitchell 2008, Lagi *et al.* 2011a). These food price hikes have had stark impacts. According to one estimate,

⁵ Quoted in Kahn (1991: 244).

the ‘real’ price paid by the world’s landless poor for the world’s major calorie staples has doubled since 2004 (Wright 2014).

The wrenching changes brought about by soaring ethanol and biodiesel production have prompted some scholars to ask whether the categories and methods of agrarian political economy are adequate to the task of analyzing the agrofuel boom. In an important overview of ‘agrofuels capitalism’, Ben White and Anirban Dasgupta address this issue directly. They suggest that the existing tools of analysis offered by agrarian political economy can be used to explain the agrofuel boom, just as these tools help to explain expansions in large-scale, monocrop agriculture in the past. A political economy approach, they argue, focuses our attention on ‘the social relations of production and reproduction and the structures of accumulation or (dis)accumulation’ generated by agrarian change, and the ‘accompanying processes of social differentiation and class formation’ (2010: 600). This focus, they contend, is encapsulated by Henry Bernstein’s catechism: ‘who owns what? who does what? who gets what? what do they do with it?’ In the case of agrofuel, White and Dasgupta suggest that Bernstein’s formulation can be distilled into the following three questions: Where does the land for the growing of agrofuel feedstocks come from? How is agrofuel production organized? And for whose benefit? In seeking to answer these questions, White and Dasgupta contend that we will establish ‘the actors involved and the added value in different points in the agrofuel commodity chain, the power positions and relations of the various actors, and the role of external agencies, including government’ (2010: 605).

A significant amount of agrarian political economy research has advanced the project of disaggregating the various actors and interests involved in the agrofuel boom (Borras *et al.* 2010). These contributions offer rich insights in regard to the conflictual and redistributive dynamics brought about by soaring ethanol and biodiesel production, at a variety of social

scales. The broadest and most wide-ranging appraisal of the agrofuel boom is perhaps offered by Philip McMichael. In his macroscopic analysis, McMichael (2009a, 2009b, 2010, 2012) combines a world-historical conception of capital accumulation with important observations garnered from case-study investigations of the agrofuel boom. From this vantage point, one can discern a food/fuel complex around which a socially and ecologically unsustainable food-for-fuel regime may be taking shape. Moreover, some scholars offer detailed examinations of how the broad processes of capital accumulation and peasant displacement, outlined so well by McMichael, play out in terms of regressive redistribution within regions (Dauvergne and Neville 2009, 2010; Richardson 2010, 2012), while others focus on the redistributive shifts, land-use changes and struggles around agrofuel development at the national level (Carolan 2009, 2010, Novo *et al.* 2010, Wilkinson and Herrera 2010, Holleman 2012, Mintz-Habib 2013). Crucially, there are also a number of fine-grained analyses of the differentiated ways in which agrofuels development impact, and are mediated by, local agrarian class structures and ethnic divisions (Gillon 2010, Vermeulen and Cotula 2010, Borras *et al.* 2011, McCarthy *et al.* 2011, Bain *et al.* 2012, Bain and Selfa 2013, Montefrio and Sonnefield 2013, Selfa *et al.* 2014). And finally, some scholars have extended agrarian political economy's focus on conflict and social differentiation to the domain of gender relations, by examining both the variegated effects that expanding agrofuel production have had on men and women and the uneven ways in which male and female labour is commodified and valued (Rometsch 2012, Julia and White 2013).

These contributions affirm the importance of the agrarian political economy framework to our understanding of the agrofuel boom. Not only does this body of literature successfully differentiate between the interests and roles of various rural social constituencies in regard to ethanol and biodiesel production; it also offers significant insights in regard to the way in

which corporations work with government to institutionalize agrofuels capitalism. However, hitherto, less attention has been given to differences within agri-food capital. As such, the analysis offered in this chapter seeks to contribute to existing research by extending the agrarian political economy project of social disaggregation more explicitly to the domain of agribusiness. More specifically, I suggest that through drawing on the method of disaggregating capital accumulation and labor income found in the capital as power approach, we can make better sense of the struggles between corporate-led coalitions over the future trajectory of agrofuels capitalism. I also suggest that, in so doing, we can discern sources of tension within the corporate food regime and the limits and contradictions of agrofuels capitalism as a whole.

The investigation focuses on the US ethanol sector as it is the global epicenter of the agrofuel boom. More specifically, I identify and analyze two rival constellations of corporate power within the US food system. The first is the Agro-Trader nexus. As outlined in the previous chapter, the core of this nexus comprises one of the world's largest grain processors along with a triumvirate of agricultural input firms. The second is the Animal Processor nexus. This constellation comprises the major firms that oversee the conversion of animal life into meat products. The feed grain sector lies at the interstices of the Agro-Trader nexus and the Animal Processor nexus and, as a result, it has become a site of redistributive conflict for the two business configurations. As I argue, the corn-ethanol boom has been a manifestation of this struggle. More specifically, soaring corn-ethanol production has shifted the balance of feed grain prices in a way that benefits the Agro-Trader nexus and Corn Belt farmers to the detriment of the Animal Processor nexus and livestock farmers outside of the Corn Belt. Concomitantly, while the Agro-Trader nexus and corn growers have championed government support for the corn-ethanol sector, the Animal Processor nexus and most livestock farmers

have opposed it. Thus, changes in the relative price of feed grain on the one hand, and changes in the relative power of the Agro-Trader nexus and the Animal Processor nexus on the other, are two sides of the same process of redistributive restructuring and social differentiation in US agribusiness and agriculture.

Why does this analysis matter? Most importantly, it offers a nuanced quantitative-qualitative understanding of the power dynamics that surround the corn-ethanol boom. As I argue, many analyses of agrofuels capitalism chiefly examine the power relations between agri-food capital and agricultural producers, arriving at the broadly true, but now oft-stated, conclusion that the former is increasingly dominating the latter. My method of tracing the uneven distributional consequences of the ethanol boom within agriculture and within agribusiness adds important details to the analysis of agrofuels development because it helps the researcher cut across the agribusiness/agriculture divide to show how one cluster of farmers and agri-food corporations appears to be benefiting at the expense of another. By specifying the winners and losers of the agrofuel boom in this manner, the chapter casts light on the uneven geography of agricultural development within the US and it also points to the social forces that stand to gain from the continuation of large-scale corn-ethanol production. As my findings indicate, putting an end to corn-ethanol production would not only involve challenging the accumulation strategies of some of the most powerful agri-food corporations in the world, it would also necessarily entail addressing the interests of a large constituency of monocropping farmers within the Corn Belt that benefit from the continued diversion of agricultural products into agrofuel feedstocks. More broadly, the chapter points to the potential of conducting research in other areas of agrarian political economy, on the ways in which redistributive struggles within agriculture become co-articulated with redistributive struggles within agribusiness. Such research may contribute to existing understandings of the

dynamics of inclusion and exclusion, and resistance and incorporation, in the relationships between farmers and agri-food capital.

The chapter comprises three sections. The first section takes Philip McMichael's account of agrofuel as its point of departure. As I have already suggested, the importance of McMichael's work lies in its situating of soaring ethanol and biodiesel production in relation to the world-historical dynamics of capital accumulation. In this respect, his analysis offers an important analytical map that helps orient those researchers conducting investigations on agrofuels at regional, national and local levels. However, by virtue of the wide-ranging scale at which he navigates the changing global food-fuel landscape and by virtue of his aggregative outlook on capital accumulation, McMichael tends to underspecify the redistributive conflicts between corporations over agrofuel production. This under-specification is typified by his assertion that agrofuels represent a 'portal' for the increased profitability of 'capital in general'. As I argue, although the concept of 'capital in general' is useful for elucidating the broad transformations in the food system, it tells us little about the contending alliances that incorporate both agri-food capitals and farmers. The second section outlines additional aspects of the CasP approach. Particular attention is given to the CasP methods and concepts that can be used to specify the processes of (dis)accumulation within agribusiness and social differentiation within agriculture. The third section draws on both the food regime approach and the CasP framework in putting the ethanol boom of the early twenty-first century into historical perspective. Moreover, it outlines how commodity-crop production and animal-meat production have become more or less distinct sectors of corporate control. And it then examines how the ethanol boom is constitutive of a conflict between these two sectors. As I show, while the US ethanol boom may have increased the profitability of capital in general, it has also been a vector of redistribution: increasing the earnings of the Agro-Trader nexus and

corn growers while reducing the earnings of the Animal Processor nexus and livestock farmers outside of the Midwest. In the conclusion of the chapter, I discuss the implications of these findings.

The Food Regime Analysis of Agrofuels

McMichael's analysis of the agrofuel boom is primarily anchored in the food regime framework. The framework was propounded by Harriet Friedmann (1987) and it received further substantiation two years later in a landmark article that she authored with McMichael. In this article, Friedmann and McMichael (1989) identify stabilized relations in the production, trade and consumption of food, from the period of high colonialism onwards. These stabilized relations emerge out of particular balances of social forces, within and between imperial metropolises, colonies and settler-states, and then later within and between advanced capitalist countries and the newly decolonized nations of the Third World. The approach combines a world-systems theory perspective on geographical specialization with a method of periodizing capitalism derived from the French Regulation School. Added to this theoretical synthesis is a focus on the evolution of various agri-food complexes that connect farmers to consumers through various webs of supply chains (Friedmann and McMichael 1989, Friedmann 2009, McMichael 2009a).

Friedmann and McMichael originally identified two food regimes. The first food regime was centered on British hegemony in the late nineteenth and early twentieth centuries. It combined the sequestering of exotic goods from tropical colonies with the importation of basic grains and livestock from the more temperate settler states, the most important one of which was the US. The cheap prices ensured by this imperial arrangement enabled rapid

industrialization in the metropolitan heartlands of capitalism. However, the first food regime ran into social and ecological limits. Highly fertile ecosystems became exhausted by soil-mining. Moreover, family farmers were, by the 1920s and 1930s, becoming increasingly exposed to the exigencies of a depressed world market. The deleterious effects of this food regime were perhaps most starkly exposed by the overlapping social and ecological catastrophes of the Great Depression and Dustbowl. Vast swathes of rural America were denuded by drought and hundreds of thousands of farmers stripped of all means of earning a decent income (Friedmann and McMichael 1989, Friedmann 2005). The second regime was centered on US hegemony and it emerged out of the social and environmental dislocation of the 1930s. In this context, family farmers within the US resolved to build a powerful constellation of lobbying organizations to represent their interests. The resulting ‘farm bloc’ became an important force in US agricultural policy for over three decades. Indeed, having rallied behind the Roosevelt administration’s New Deal in the 1930s, the farm bloc had won, and then defended, a suite of government measures – including price supports, production controls, tariffs and ‘food aid’ – that buffered agricultural producers from market instability. These government protections contributed to a provisional resolution of the social crisis that precipitated the first food regime’s collapse.

Drawing on the analysis of agro-industrial development offered by David Goodman *et al.* (1987), Friedmann and McMichael identify two long-running processes that would eventually undermine the second food regime. Firstly, agri-food capitals intensified their appropriation of aspects of the agricultural process through the transformation of farming into discrete elements of business control. For example, by the 1940s, the farm-reared horse was almost completely replaced by the industry-manufactured tractor for tilling; and the recycling of organic waste, such as manure, into farm soil was rendered obsolete by the wholesale

introduction of industry-produced fertilizers. Secondly, agri-food capitals intensified their substitution of traditional foods produced in the tropics, such as cane sugar and peanut oil, with derivatives of commodities that could be produced in more temperate climates, such as high fructose corn syrup and soybean oil. Friedmann and McMichael convincingly argue that these processes of appropriation and substitution enabled agri-food capitals to integrate the world food system by breaking agriculture into specialized sectors connected through supply chains that cut across national boundaries. This dynamic was evidenced in the emergence of the transnational 'durable food complex' and the 'livestock-feed complex'. With the emergence of these complexes, agricultural production moved away from closed-loop processes of energy nutrient recycling controlled by farmers, toward a linear process, comprising commodified inputs and outputs that were bought from, and sold to, increasingly powerful agribusiness firms (Friedmann and McMichael 1989, Weis 2007).

As agricultural production became more linear, farming became more specialized, more capital-intensive and thus less favorable to small family farm operations. These trends, in turn, contributed to a decline in the farmer population and the fragmentation of farmer interests along the lines of commodity specialization. Thus, the farm bloc was critically undermined, as broad-based agricultural lobbies that represented the interests of small farmers were superseded by commodity-specific interest groups that were principally driven by the interests of agri-food capital. As both Friedmann and McMichael argue, the decline of the US farm bloc, along with the intensification of international trade rivalries in the 1970s and 1980s, contributed significantly to the unravelling of the second food regime (Friedmann and McMichael 1989, Friedmann 1994, Friedmann 2005).

Given the food regime approach's proven capacity to clarify and orient analysis of the complexities of the political economy of food, it is no surprise that at the beginning of his most

extensive exploration of agrofuels, McMichael uses the original framework as his guide. Having outlined the colonial and the US-centered food regimes, McMichael discusses the ‘corporate food regime’. For McMichael, this corporate food regime has been constructed in the context of neoliberal hegemony. The key institution of this new food regime appears to be the World Trade Organization (WTO). As McMichael contends, the WTO has provided a ‘multilateral façade’ and it has at the same time, ‘presided over a deepening of agribusiness power’ (2010: 614). McMichael suggests that the agrofuel sector developed within the corporate food regime. However, its rapid growth may precipitate the corporate food regime’s own demise, for by contributing to sharp food price rises in the 2000s, the agrofuel boom has undermined the neoliberal claim that food security can be attained through continued market integration and agro-industrialization. A new set of agri-food relationships that approximate to a food-for-fuel regime may thus supersede the corporate food regime (McMichael 2010). This new regime is taking shape around the ‘food/fuel complex’: a network of recombinant corporate arrangements that combine the appropriation of agricultural processes by major seed companies, with the substitution of food for fuel, through alliances of grain, meat and energy companies (McMichael 2009b).

For McMichael, these recombinant corporate arrangements represent a profound epistemological assault whereby capitalist value relations are superimposed onto extant systems of provisioning. To cite him directly, ‘the agrofuels “gold rush” reveals the one-dimensionality of value relations as embodied in capitalism and its structures of thought’ (2010: 622). Given his focus on ‘structures of thought’, McMichael enjoins agrarian political economists to relay the ‘ecologically relevant discourses’ that counter the ‘value calculus through which capital rules the world’ (McMichael 2010: 622-6).

This project of emphasizing the endurance of suppressed knowledges within the world food system has a lot to recommend it. However, if we overlook the contestation between agri-food capitals, there is a danger that we may ascribe an unduly uniform metanarrative to capital accumulation itself. McMichael's tendency to underspecify the contrasting interests of agri-food capital may be adduced from his statement that the agrofuel boom:

follows a typical capital accumulation script – that is, attempting to overcome barriers to profitability by extending the realm of value creation, even as this intensifies capitalism's contradictions... The 'agrofuels project' is central to this attempt to maintain profit, and to legitimize the state/capital nexus. (2009: 825-6)

The assertion that the 'agrofuels project' legitimizes a 'state/capital nexus' as a whole is instructive at a macroscopic level of analysis. Nonetheless, we should also be attentive to the fact that different corporate groups seek to justify their competing attempts at re-organizing the contemporary food regime with recourse to different, and oftentimes rival, claims to legitimacy. The tendency to de-emphasize the role of intra-capitalist conflict over agrofuels is further evidenced in his assertion that 'biofuels constitute another portal through which capital in general can profit from agriculture' (2010: 613, my emphasis). The issue here is that although 'capital in general' is a potent category from a systemic perspective, it does not tell us much about - and in some sense dissuades us from inquiring into - the redistributive struggles that are occurring within agribusiness over agrofuel production. Thus, even when McMichael does refer to individual corporations in his analysis of agrofuels (see for example 2009b: 290-91), there is a danger that the reader may mistake these corporations as being mere standard-bearers of monolithic capitalist interests.

This chapter seeks to develop the food regime account of agrofuels through a more concerted examination of intra-capitalist dynamics. Moving from McMichael's panoramic

conception of ‘capital in general’ to a detailed investigation of different groups of agri-food capital, I seek to identify the main winners and losers of the ethanol boom, within both US agribusiness and agriculture. In so doing, I address a number of key questions that are opened by the food regime approach to agrofuels, and by agrarian political economy, more generally: How has the increased specialization of US agriculture played out in terms of the political-economic dynamics of the contemporary food regime? How has the decomposition of agricultural production into discrete phases appropriated by agribusiness impacted social differentiation within rural America? How has the rendering of agricultural products into substitutable commodities used in both food and energy sectors impacted processes of (dis)accumulation within agri-food capital at large? And finally, what tensions within the food/fuel complex do these processes of social differentiation and (dis)accumulation bring to bear? But before we delve into the empirical analysis of the US ethanol sector, we first have to establish additional methods and concepts that enable us to disaggregate capital.

Toward the Disaggregation of Agri-Food Capital

The CasP framework can contribute to the food regime approach in particular, and agrarian political economy more generally, because it furnishes the researcher with the means to chart the trajectories of different constellations of corporate power. As noted in the previous chapter, the framework’s disaggregative view of capital stems from the observation that the central institution of capitalism is private ownership and private ownership is predicated on exclusion. Without private ownership there can be no restriction on the use of goods; and without restriction on the use of goods, goods cannot be priced into commodities that yield pecuniary

earnings. From this view, ‘scarcity’ does not spring seamlessly from nature; instead, it emerges through the medium of control (Nitzan and Bichler 2009).

A particularly important aspect of this control lies in different business groups’ command over the interstices that link various parts of commodity chains. By means of discretionary management and, if necessary, disruption, the interstices can be levered by firms in such a way that changes the balance of prices to these firms’ advantage, and to the disadvantage of firms that operate other parts of commodity chains (Veblen 1904, Nitzan and Bichler 2009). This analytical starting point compliments key aspects of the food regime approach. As I have argued, Friedmann and McMichael convincingly show that the appropriation of discrete phases of the agricultural process, on the one hand, and the fractionation of agricultural goods into substitutable commodities, on the other, has enabled agribusiness to integrate agricultural and food manufacturing processes within overlapping agri-food complexes on a world-scale. The CasP framework adds to these insights by underscoring the fact that control over distinct parts of agri-food complexes enables agribusiness groups to potentially rechannel flows of agricultural goods in ways that give them leverage over other agribusiness groups. And due to the ever-expanding system of prices, this leverage manifests in quantitative shifts in accumulation from one constellation of agri-food capital to another.

Furthermore, while prices are the quantified appearances of exclusionary control over various parts of agri-food complexes, from the CasP perspective, the syntax that organizes prices into a totalizing system is capitalization: the risk-adjusted discounting of a future stream of earnings to its present value. A quick perusal of any corporate finance textbook confirms that the discounting formula of capitalization is elemental to the language of business. But one of the major innovations of the CasP approach lies in the fact that it rearticulates this

discounting formula from the power perspective of what Nitzan and Bichler call ‘dominant capital’: the firms and government entities at the center of accumulation. Capitalization is inherently encompassing. Any change in social organization that may bear on the expected future earnings of any given asset is factored into the capitalization formula. And since dominant capital strives to re-shape the interactions of human and non-human life in a manner that augments future income and reduces risk, market value is itself the master signifier of business power. This insight has far-reaching implications. Instead of being a mere tool that enables owners to passively measure the value of their ownership claims, capitalization is the inter-subjective process whereby investors collectively translate dominant capitals’ power to actively restructure social reproduction into the universal symbols of dollars and cents (Nitzan and Bichler 2009, DiMuzio 2012).

Nitzan and Bichler concur with the food regime approach in taking accumulation to be an inescapably antagonistic process through which capital subjects the biosphere to a universalizing value-metric. However, their identification of capitalization as this metric opens up new ways of interpreting and researching accumulation. Indeed, if capitalization is the metric of capitalist power, the social conflict inherent to accumulation exists on two levels. Firstly, it exists between different corporations as they attempt to re-organize social reproduction in their own specific ways; and the future stream of earnings that one firm can confidently claim is a future stream of earnings that all others cannot claim. Secondly, it exists between dominant capital and the biosphere, of which society is an integral part, as those subject to different corporate groups’ attempts at controlling agricultural supply chains persistently evade and oppose such control. Such evasion and opposition, if effective, undermine the confidence that capitalists have in restructuring supply chains for their own pecuniary gain. As such, capital accumulation is nothing other than the augmentation of

power. This power is articulated numerically in the form of the discounting formula of capitalization; and it asserts itself in qualitative terms through different corporations' attempts at controlling the continuum of ecological and social processes that supply chains punctuate, in ways that boost their expected future earnings over and above the expected future earnings of other corporations (Nitzan and Bichler 2009).

Moreover, since power is relative, accumulation is differential. Following on from this presupposition, the CasP framework suggests that corporations tend to coalesce into different 'distributional coalitions' in a bid to enforce the necessary changes in humanity and nature to attain differential gain. Mancur Olson devised the concept of 'distributional coalitions' in his theory of collective action to denote small and exclusive groups of actors that focus on redistributing existing social product in their favor as opposed to increasing the overall social product. Owing to the exclusivity of distributional coalitions, the costs of increasing 'the average' – whichever way that may be denominated - are very large; but the benefits to the coalition members themselves are very small. The concept of distributional coalitions is instructive for CasP analysis, not least because it sheds light on how capitalist exclusion is institutionalized within business alliances. However, the CasP approach departs from Olson's schema in a number of important ways. Most fundamentally, whereas for Olson, power is merely a means to a utilitarian end, for CasP it is a goal in itself. Moreover, unlike Olson, the CasP approach focuses on the social damage caused by corporate-led distributional coalitions, rather than distributional coalitions *tout court*. Finally, unlike Olson, the CasP framework offers a systematic method of quantitatively mapping out the trajectory of these capitalist alliances. The method involves comparing the changes in the capitalization of any one group of firms within dominant capital against the changes in the average capitalization of dominant capital at large or of the business universe as a whole (Olson 1965, Nitzan 1992).

To summarize this section, from a CasP perspective, the ‘value calculus through which capital rules the world’ (McMichael 2010, 622) is differential capitalization.⁶ By understanding this value calculus, we can analyze the agrofuel boom in ways that significantly extend existing agrarian political economy literature. My proposed method comprises three steps. First, the researcher outlines the different corporate constellations and alliances that operate at the key interstitial points of the agri-food complexes that they are analyzing. Second, the researcher charts the relative price changes of the commodities traded at these interstitial points, along with the corporate groupings’ respective capitalized profit shares. Third, the researcher links these quantitative changes in relative prices and capitalized profit shares, on the hand, to the evolution of corporate alliances, on the other, with an eye to formulating an integrative, quantitative-qualitative analysis of the transformations in control over human and non-human life. As I will show, we can apply this differential analysis to agricultural producers, by examining how the relative income of various commodity-crop farmers and livestock farmers shift in relation to the interstitial changes of the agri-food complexes in which they are ensconced. By examining both the shifts in differential capitalization of agribusiness groups and the shifts in differential income of agricultural producers, we can discern how power may be redistributed from one cluster of agri-food capitals and farmers at the expense of another cluster.

⁶ Interestingly, in a recently delivered conference paper, McMichael (2014: 2) breaks with his nominally materialist conceptualization of capitalism by stating that ‘capital is a mode of power (not just of production)’. In the same paper, he goes on to cite the arguments of both Nitzan and Bichler (2009) and DiMuzio (2012) to contend that the market episteme and the price form are defined by the universalizing metric of capitalization. Notwithstanding McMichael’s welcome acknowledgment of some core claims of the CasP framework, it may be asked whether his conceptualization of capital as both a mode of power *and* a mode of production is logically sustainable. Moreover, unlike his brief exegesis of the CasP approach, this chapter draws out some key methodological implications of analyzing capital as a mode of power, in terms of engaging in a new disaggregate approach to accounting.

This approach can contribute important details to the food regime analysis of agrofuels, in particular. Indeed, McMichael tends to examine the power dynamics between agri-food capital and agricultural producers in his analysis of agrofuels, arriving at the broadly true, but now oft-stated, conclusion that the former is increasingly dominating the latter. The concept of distributional coalitions, along with the method of tracing the trajectories of differential capitalization of agri-food capital and differential income of farmers, may both substantiate and refine McMichael's account because it helps the researcher cut across the agribusiness/agriculture divide. And in so doing, the researcher can discern power shifts between different agribusiness-agriculture coalitions. In what remains, I combine the food regime approach's analysis of evolving agri-food complexes with the CasP approach's focus on relative prices and relative pecuniary gain, in my analysis of the US corn-ethanol boom. More specifically, I explore the political institutionalization and oligopolistic dynamics of the modern food/fuel complex as it pertains to the US ethanol sector. I then identify two constellations of firms and farming groups that have vied over the course of the food/fuel complex during the 2000s. And finally, I show how this struggle has manifested itself in a structural shift in feed grain prices and a radical divergence in the pecuniary trajectories of the two corporate-led coalitions. Through shedding new light on the processes of social differentiation and (dis)accumulation engendered by the agrofuel boom, I seek to demonstrate how a synthesis of the food regime approach and the CasP approach may help advance the project of disaggregation within agrarian political economy.

Archer Daniels Midland and the Political Institutionalization of the US Food/Fuel Complex

The conversion of plant biomass into transportation fuel has a long history (see Carolan 2009). But the food/fuel complex that exists in the US today emerged in the 1970s, following three decades in which ethanol was completely marginalized as a source of energy. The renaissance of the ethanol sector was made possible by extensive government subsidies and the assiduous lobbying efforts of one firm: Archer Daniels Midland (ADM).

To cite one analyst, '[p]erhaps no commodity in American history has depended more on government support for its viability than ethanol. And perhaps no other company has done as much to orchestrate Washington's current support for the fuel than ADM' (Palmer 2006: 1). ADM's successful championing of the food/fuel complex took place against the backdrop of two key developments. Firstly, gasoline prices were soaring as a result of the transition of the global oil business from a 'free-flow' regime to a 'limited flow' regime (Nitzan and Bichler, 2002: 224). This transition was marked by the successful centralization of control over global oil production in the 1970s by the Organization of the Petroleum Exporting Countries (OPEC) cartel. The resulting upsurge in gasoline prices can be seen in the main chart of Figure 3.1, which compares the inflation-adjusted prices of gasoline and corn over the last four decades. Secondly, just as controls over Middle East oil production were being tightened, controls over US grain production were being loosened. This general loosening of government regulations over agricultural production was in large part a result of the fracturing of the farm bloc and the coeval rise in the power of agribusiness (Feedstuffs Magazine 1968, Friedmann and McMichael 1989, Friedmann 2005). The passing of the 1973 Farm Bill was a key turning point as it initiated the dismantling of the comprehensive system of agricultural price supports

that had existed since the New Deal era. Set-aside controls were suspended, public grain reserves were emptied, prices were allowed to fall below the cost of production, and farmers' incomes were now supported by direct payments from government (Winders 2009, Lehrer 2010). No matter how much market prices fell, farmers could keep on producing more, safe in the knowledge that they would receive direct payments that would make up the difference between the prices they got for their crop and the 'target prices' set by government. As the left insert of Figure 3.1 shows, the amount of US land devoted to corn production subsequently increased after a four decade decline. Wheat production also rebounded.

The soaring gasoline prices of the late 1970s conferred more credibility upon those who supported greater energy independence through the expanded use of US-produced alternatives to petroleum; and the general rise in corn production increased the feasibility of corn-ethanol being one of these alternatives. The grain processing giant, ADM, seized the opportunity and relentlessly championed ethanol as a petroleum substitute. ADM at this point was the pre-eminent force in the durable food complex. It had long been the front-runner in developing myriad soy derivatives (Southwestern Miller Magazine 1972). Moreover, it dominated High Fructose Corn Syrup (HFCS) production, with its corn wet mills churning out one-third of the national output of the sweetener (ERS 1993: 22). However, ADM's HFCS operations were buffeted by seasonal cycles in consumption patterns. During the summer soft drink sales soar. But in the winter such beverages are not so popular. ADM figured that if the right government

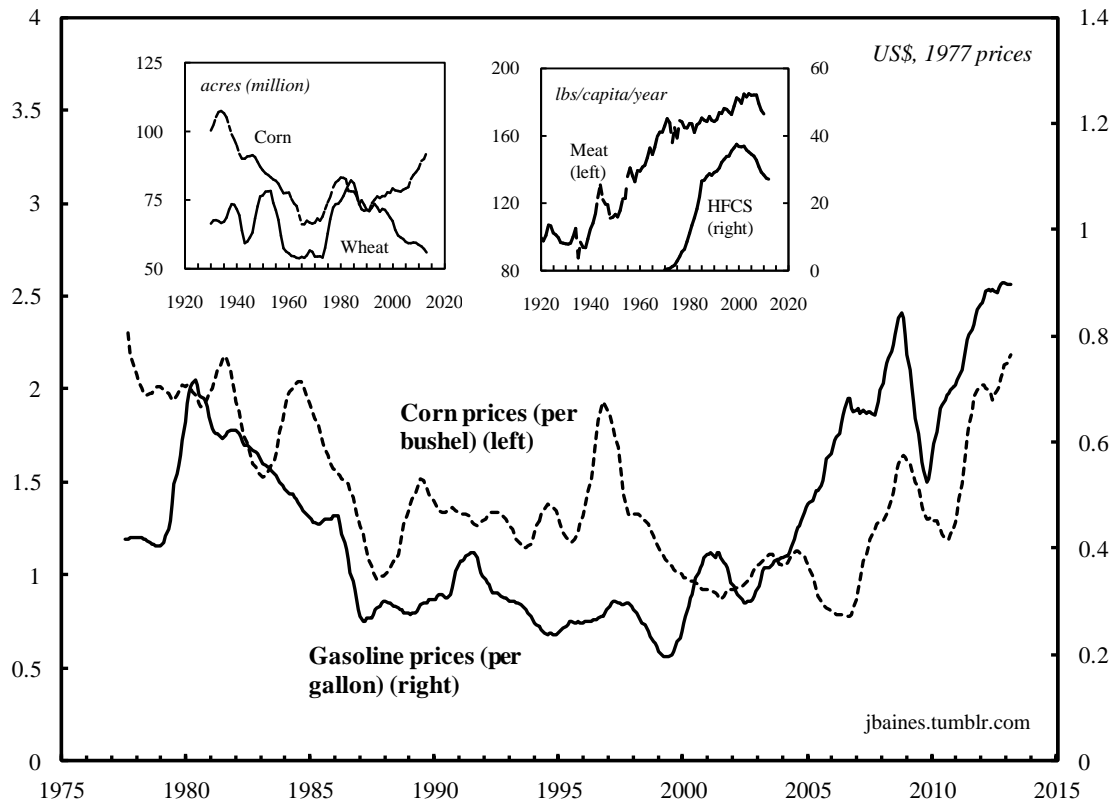


Figure 3.1 Transformations in the Political Economy of Corn and Gasoline

Note: Corn and gasoline prices are deflated by the US Producer Price index and presented as 1-year moving averages. Acreage data are presented as 5-year moving averages.

Source: 1977-2009 corn and gasoline prices from Commodity Research Bureau 2010 Yearbook. 2010-13 corn and gasoline prices from Index Mundi (2014). Corn and wheat planted acreage data from USDA ERS (2014a). US chain-type price index from Global Financial Data; series code: WPUSAM. HFCS consumption data from USDA ERS (2014b). Meat consumption data from USDA ERS (2014c).

supports were in place, the very same corn mills that turned out HFCS to sweeten the huge quantities of Coke and Pepsi gulped by thirsty American consumers in the summer months, could in the slow-selling winter months, produce ethanol to be guzzled by American automobiles. These seasonal switches of output in what ADM called its ‘sweetener/alcohol complex’ would ensure that the company’s corn milling plants ran close to capacity, thereby

boosting sales and minimizing average production costs (Milling and Baking News 1982: 32). It was within the womb of ADM's sweetener/alcohol complex that the broader food/fuel complex first developed.

ADM continuously flirted with scandal in its search for benefactors. According to a deposition given by a former presidential secretary, Dwayne Andreas – the then CEO of the company - personally delivered a package to President Nixon containing \$100,000 in \$100 bills in 1972. The cash was kept in a White House safe for around a year before being returned by Nixon when the Watergate scandal was beginning to engulf him (Carney 1995). In another apparent attempt at currying favor, ADM bought Jimmy Carter's peanut warehouse for \$1.2 million in 1981 (Weiss 1990). But ADM has not only bestowed its largesse upon the White House. It has also lavished Capitol Hill. Andreas's relationship to the self-described 'Senator of Ethanol' Robert Dole was particularly important. Dole frequently flew on ADM's private jets to speak at company engagements, and he received thousands of dollars in return. Additionally, Dole purchased Andreas's holiday home in Miami, below the market rate (Manning 2004). By cultivating close relationships with those in government, and by capitalizing on the broader shift in the climate of elite opinion that was brought about by soaring oil prices, ADM was able to reap bounteous rewards. Most notably, in the 1978 Energy Tax Act, a 40 cent tax exemption was granted to every gallon of ethanol mixed into gasoline and in the 1980 Omnibus Reconciliation Act, a 40 cent tariff was imposed on Brazilian ethanol.

ADM also lobbied via the ostensibly farmer-based commodity groups that had superseded the farm bloc. For example, at the beginning of Ronald Reagan's presidency, ADM joined with the American Sugar Alliance to campaign for increased government support for sugar farmers. The campaign was a success. In 1981 a new Sugar Bill was introduced that

extended import quotas on sugar and raised the price-floor of domestically produced sugar to about double the world market price. Soon after the bill was passed domestic sugar prices predictably increased and, in response, Coca Cola and Pepsi ratcheted up their orders of HFCS (Milling and Baking News 1984: 10). Partly as a result, American consumption of the sweetener surged (see right insert, Figure 3.1). The import quotas on sugar also bolstered the corn-ethanol sector, for sugar was widely used as an ethanol feedstock in Brazil, and sugarcane ethanol was proven to have a far superior energy conversion ratio to corn-ethanol. The US ethanol sector was thus now doubly protected: from ethanol imports and from the imports of a rival feedstock. As ADM's sweetener/alcohol complex accounted for 87% of ethanol production capacity in the US and 32% of the country's HFCS production capacity, it enjoyed the bulk of the benefits (Economic Research Service 1993, Henkoff 1990).

From a broad perspective then, the food regime approach is correct in arguing that the development of substitutable commodities, such as HFCS for cane sugar and ethanol-blended 'gasohol' for gasoline, can be considered as part of an overarching process through which capital overcomes barriers to accumulation in the agri-food system. But at the specific level of federal policy, the rise of the 'sweetener/alcohol complex' in the US can be seen as the result of an active erection of accumulation barriers, in the form of tariffs and import quotas. These barriers enabled ADM to increase its expected future earnings over and above other agri-food companies. The company not only jealously guarded itself from foreign competition through securing government tariffs and import quotas; it also barred potential rivals in the US from challenging its supremacy by pushing the ostensibly sector-wide lobby group - the Renewable Fuels Association (RFA) - to dissuade the US Department of Energy from disbursing loan guarantees to start-up ventures (Henkoff 1990). This strategy worked. By the late 1980s the company claimed a 75% share of ownership of total US ethanol processing capacity (Weiss

1990). Thus, the corn-ethanol sector remained little more than a government-backed monopoly. In maintaining its control over most of ethanol production and in maintaining its influence over the major lobbying organization for the ethanol sector, ADM was well positioned to engage in more policy breakthroughs in the 1990s. Once again bribes (viz. campaign contributions) appeared to be a key component of the company's success. In the 1992 US Presidential election race, ADM was the largest single source of funding for George Bush Senior's re-election bid and the third largest single source of campaign funding for Bill Clinton. In just one campaign fundraiser organized by Andreas, \$3.5 million was raised for Clinton. Soon after Clinton was elected into office, he stipulated that 30% of fuel in America's nine most polluted cities be cut with ethanol, despite mounting evidence presented by his own advisors that the resulting gasohol fuel would lead to new environmental problems (Manning 2004: 27).

However, not everything was going to ADM's liking. As Figure 3.1 shows, during the 1990s the inflation-adjusted price of gasoline continued on a downward slope from the heights it reached at the beginning of the previous decade. As ethanol prices were in effect tied to movements in gasoline prices, and because gasoline prices were low, the profit margins of the company's ethanol operations were very thin (ADM 1994: 5). Moreover, the Asian Financial Crisis of 1997–8 greatly undermined ADM's export business. Up until that point East Asia represented a growing regional market for the company. But in the wake of the crisis, East Asian imports of the foodstuffs processed and transported by ADM fell dramatically. Dietary trends in the US compounded ADM's problems. The slowdown in per capita corn sweetener intake, as depicted in the right insert of Figure 3.1, was particularly worrisome for ADM because in the mid-1990s an estimated 40% of the company's profits were generated by its HFCS division (Kilman, Ingerson and Abramson 1995).

In this context, ADM re-evaluated its priorities. Up until the turn of the twenty-first century, ADM's ethanol operations were, despite all the government support, little more than an adjunct to its massive HFCS division. But ethanol's auxiliary status changed once per capita intake of HFCS began to taper off in the US. With widespread health concerns relating to HFCS and with ever more people switching from soft drink to bottled water consumption, ADM was clearly facing an uphill battle in pushing more corn syrup into American digestive space (Meyer 2005). The company thus shifted its emphasis from increasing HFCS's 'stomach share' to increasing what I call ethanol's 'gas tank share'. Meanwhile, medium-sized alternative energy ventures were slowly making inroads into ADM's preponderance in the ethanol sector. This intrusion was evidenced by the fact that by the late 1990s, the company's share of control over national ethanol production capacity fell to 46% (Heffernan 1999). Moreover, by the turn of the millennium powerful agricultural input firms and an increasingly assertive cadre of American corn farmers also began to find reason to put their weight behind the pro-ethanol agenda. As such, the corn-ethanol industry grew from being the almost exclusive plaything of ADM, into a sector that was courted by a burgeoning array of interests within US agribusiness and agriculture. It is to these interests that we now turn.

The Agro-Trader Nexus and the Corn-Ethanol Coalition

Like ADM, many American corn farmers were weighed down by the price slump in global agricultural commodity markets in the late 1990s. In previous years, farmers could have relied on the US government to mitigate the price drops, through the combined use of land idling requirements and public grain reserves. However, the 1996 Farm Bill effectively discontinued all instruments of price stabilization. And in so doing, the bill completed the process of

disbanding production controls commenced by the 1973 Farm Bill. Farmers now received direct payments, not on the basis of the difference between ‘target prices’ and ‘market prices’, but rather on their past acreage use. With payments now completely decoupled from prices and production, farmers had a strong interest in reversing the price decline of their crops. This interest was particularly acute for corn growers who saw the price of corn fall by 48% in the three years that followed the 1996 bill’s implementation – the largest price drop of any of the major agricultural commodities (Winders 2009, Commodity Research Bureau 2010, Lehrer 2010). In this context, corn growers sought to find new ways of increasing the consumption of their output. Supporting ethanol production appeared to be an elegant solution. Millions of bushels of corn could be channelled into this growing sector and farmers could enjoy additional income through directly owning the plants that processed corn into ethanol. As such, in the late 1990s, a large number of farmer-owned ethanol cooperatives were formed. These cooperatives tenaciously lobbied state and federal governments to establish tax incentives and targets for the use of ethanol as a fuel additive (Ray 2009, 2010).

The emergence of ethanol cooperatives was both a boon and a bane for ADM. On the one hand, the farmers’ campaigns for more government support of ethanol production boosted ADM’s attempts to augment ethanol’s ‘gas tank share’. On the other hand, farmer cooperatives posed a serious challenge to ADM’s market share over the ethanol sector itself. The catalytic role of cooperatives in the ethanol boom is clearly indicated by the fact that by 2002 around 80% of the ethanol plants that were under construction were farmer-owned (Food and Water Watch 2011: 12). Moreover, by 2004 ADM’s share of total operating capacity in the US had declined to 31%; meanwhile, the combined share attained by farmer-owned cooperatives grew to 37% (Heffernan 1999, Hendrickson and Heffernan 2005). However, it was not just ADM and farmer-owned cooperatives that backed surging ethanol production. Three of the leading

agribusiness input firms – Deere and Co., DuPont and Monsanto - also put their weight behind the agrofuel sector. And it is around the linkages between these agribusinesses and ADM that the Agro-Trader nexus took shape.

The nexus emerged at a time when control over ethanol production was slowly becoming more decentralized, while control over the agricultural input industry was getting evermore concentrated. This rapid rise in concentration emerged against the backdrop of landmark legislation, such as the 1994 Plant Variety Protection Act, that strengthened corporations' capacity to assert exclusive ownership over the building blocks of plant reproduction (Mascarenhas and Busch 2006). The chemical giant, Monsanto was particularly active in staking its claims. In 1998, during a period of just eight weeks, it bought up four major agro-biotech firms, including two of the top ten largest seed marketing companies in the world (Shattuck 2009: 90). And in 1999, DuPont - another chemical giant - bought up the firm that dominated the corn seed market: Pioneer Hi-Bred. Since this point, DuPont and Monsanto have enjoyed unsurpassed control over the reproduction of corn plant-life in the US. In terms of gene technology, Monsanto is a clear leader: by 2009 over 80% of the planted acres of corn in the US contained genetic traits owned by the company (Langreth and Herper 2009). And in terms of control over the distribution of the seed itself, by 2010 Monsanto commanded a 36% share of the corn seed market in the US while DuPont had a 34% share (Kaskey 2010).

As with ADM, these agro-biotechnology giants have extensive reach into the halls of US government. Perhaps the most important aspect of this influence comes in the form of the 'revolving door', whereby corporate employees of the past become corporate regulators of the present, and vice versa. Many agri-food corporations employ this strategy of peddling policy. But no company has been better at keeping the door between government and business revolving than Monsanto. Examples of company personnel moving in and out of government

are legion. To take just a few cases: former Monsanto attorney, Clarence Thomas, is now a Supreme Court Judge; former Monsanto Vice-President for Public Policy, Michael R. Taylor, is currently Senior Advisor at the Food and Drug Administration; and former Monsanto and DuPont lobbyist, Islam A. Siddiqui, is the incumbent Chief Agricultural Negotiator for the US in international trade talks. And moving in the opposite direction: former Director of Agricultural Affairs at the Office of the US Trade Representative, Melissa Agustin, is now a lobbyist for Monsanto; and former Deputy Chief of Staff at the USDA, Jeremy Stump, is now Monsanto's Director of Government Relations (Boschma 2013, Center for Responsive Politics 2013). Keeping track of the many loyal purveyors of corporate power swinging in and out of public office may prove dizzying; but the point is that, through the revolving door, the seed giants are in effect regulating the very institutions that are meant to be regulating them. And as a consequence, their accumulation strategies are becoming progressively more synergized with the machinations of government (Baines 2014).

As was described in the previous chapter, Monsanto and DuPont have used their considerable influence to push for the expansion of the agrofuel sector. And the agricultural machinery firm, Deere and Co., has also actively promoted the development of the ethanol sector. This support is in part due to the fact that soaring corn-ethanol production bolsters corn prices, which in turn increases the cash flow of the company's main customers: commercial crop farmers. Indeed, Deere's machinery is expensive - average-sized combine harvesters sold by Deere cost around US\$400,000, while a John Deere row-planter is priced up to US\$300,000 - so farmers understandably prefer to have a strong income stream when they buy such items. Moreover, the absorption of masses of corn into the ethanol sector brings more land into agricultural production. Thus, Deere wagered that the ethanol boom would likely stimulate the increased purchase of specialized farm vehicles and equipment (Tepe *et al.*

2011). And as the company commands a 46% market share over the agricultural machinery sector in the US, it would be the major beneficiary (UOIG 2012: 7). Deere clearly expressed its support for ethanol in 2007, by backing the '25 by '25' resolution put forward by a group of Congressman to establish a national target of producing 25% of the US's energy from 'renewable sources' - such as solar, wind and agrofuel - by 2025. One year later, Deere further underlined its commitment to the agrofuel boom by joining ADM, DuPont, Monsanto and the RFA to create the 'Alliance for Abundant Food and Energy' – a lobbying group which we already mentioned and that champions continued government support for ethanol and biodiesel. With the formation of this alliance, the Agro-Trader nexus had crystallized into a distinct institutional form (Borgman 2007, Cameron 2008). As the left side of the network diagram in Figure 3.2 shows, the Agro-Trader nexus encompasses many organizations, from groups representing corn farmers (the National Corn Growers Association), to railroad interests (the Union Pacific Railroad), to oilseed processors (Bunge). However, the main axis of power within this constellation of social forces is constituted by the four founding firms of the 'Alliance for Abundant Food and Energy', shaded in grey: ADM, Deere and Co., DuPont and Monsanto. Interestingly, in 2009 these four firms also founded the 'Global Harvest Initiative' - an ostensibly anti-hunger campaign group that pushes for GM crop production and expanded agrofuel development throughout the world (Holt-Giménez and Shattuck 2011).

The Agro-Trader Nexus versus the Animal Processor Nexus

The corporate appropriation of various aspects of commodity crop production has been mirrored by the corporate appropriation of the phases through which animal life is converted into consumer meat products. The increased concentration of control over the livestock-feed

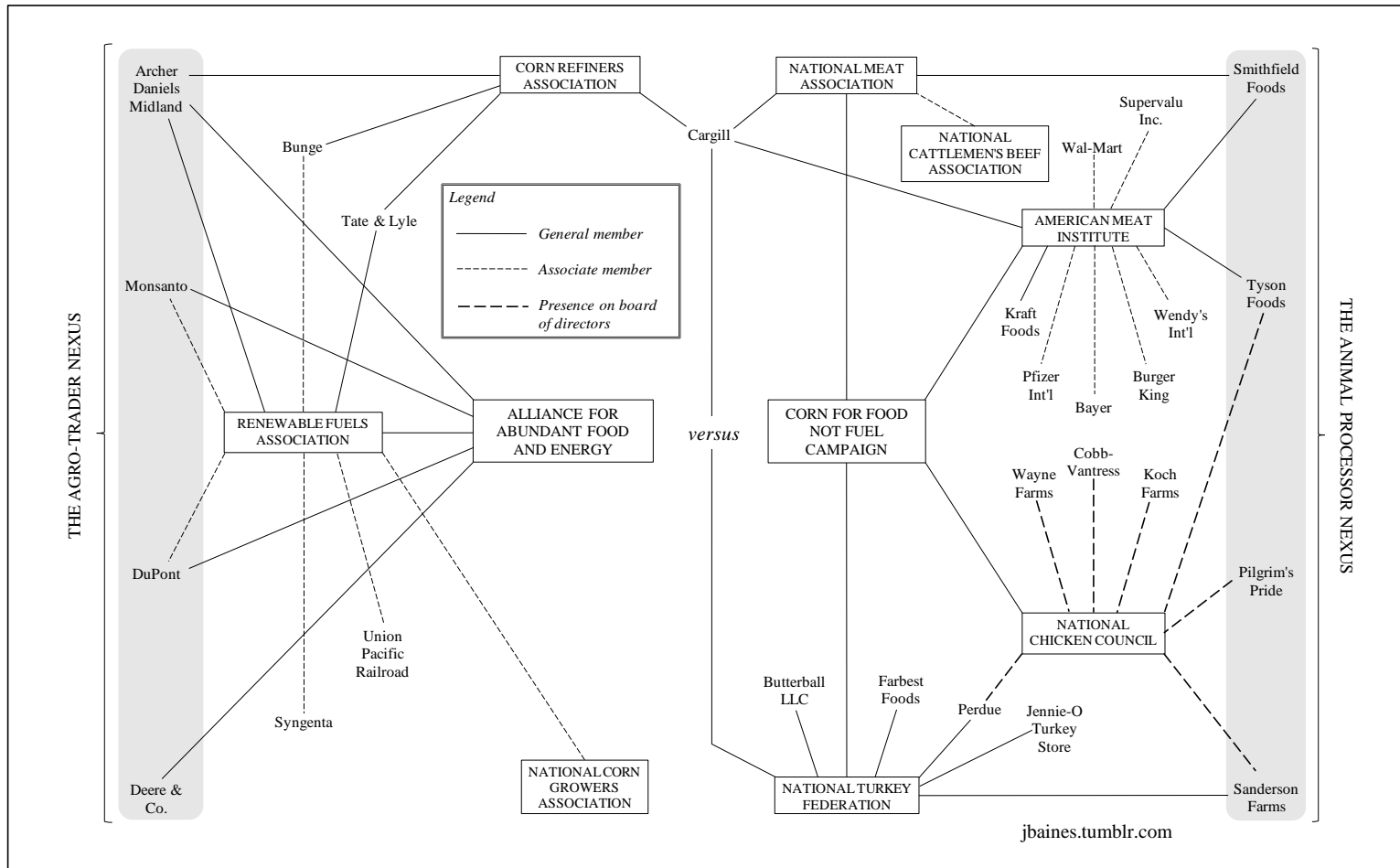


Figure 3.2 Two Axes of Power in the Corporate Food Regime

Note: National Chicken Council membership data appears to be unobtainable. As such, the figure presents data on the presence of corporate personnel on its board of directors instead.

Source: Membership data for the Alliance for Abundant Food and Energy; Renewable Fuels Association; Corn for Food not Fuel campaign; National Meat Association; American Meat Institute and the National Turkey Federation from: Cameron (2008); RFA (2014); CFNF (2014); NAMA (2014); AMI (2014) and NTF (2014). Directorship data for National Chicken Council from NCC (2010).

complex is partly indicated by the fact that the market share of the four largest firms in the US meat packing sector rose from a post-war low of 19% in 1977 to 59% just 25 years later (US Census Bureau 2013). Table 3.1 relays the latest obtainable data on meat company shares over animal kill in the US and it also puts the slaughtering of American domesticates within a global context. Although startling, the figures presented in the table do not tell us anything about the amount of control that major meat companies wield over animals prior to their death and dismemberment. In fact, some of the companies listed in the table have incorporated the very reproduction of animal life within the domain of their business. In a process that mimics the development of hybrid crops, these meat companies have engaged in the crossing of different pure-bred lines of animals so as to optimize certain genetic traits that conduce to greater and more predictable earnings. As the offspring of hybrids do not reproduce the same traits found in animals conceived from the initial crossing of ‘nucleus herds’, farmers return to the cross-breeders to replenish their stock of animals (Fuglie *et al.* 2011). Thus, cross-breeding extends companies’ exclusionary control over the meat production process and it simultaneously re-shapes animal life in ways that are propitious for future pecuniary gain.

The growing corporate control over the lives and deaths of American domesticates has been particularly pronounced in the poultry sector. The largest poultry firm, Tyson, now commands a 60% market share of the US chicken breeding stock (Food Safety Magazine 2007). In a system of vertically integrated operations that was first developed in the 1950s, contract farmers receive feed from Tyson along with one day old chicks delivered straight from Tyson’s own hatcheries. The chicks are housed in factory-like structures made according to Tyson’s specifications and after a period of 7-9 weeks they are taken to Tyson’s slaughterhouses (Boyd and Watts 1997). Smithfield spearheaded the adaptation of this model of vertical integration to the swine business in the 1990s. The company began to control every

stage of hog production: from the DNA lines, to the ‘farrowing’ of pigs, to the ‘finishing’, to their eventual slaughtering and processing into consumer products (CGGC 2009). Corporate power over cattle breeding is not so centralized, due in large part to uncontrolled mating in the rangeland and pasture conditions of the early stages of steer-raising (Fuglie *et al.* 2011). However, in the last stages of steer-raising, in which the cattle are confined to feedlots, ownership is highly concentrated. In fact, some feedlot operations are so vast that they can accommodate over 100,000 cattle at a time (Millet 2006: 223),

	Number Slaughtered in the world annually	Number Slaughtered in the US annually	4 Largest Firms in the US	Share of US Animal Slaughter (%)
Chickens	59.9 billion	8.7 billion	1. Tyson Foods 2. Pilgrim’s Pride 3. Sanderson Farms 4. Perdue Farms	21 18 7 7
Turkeys	649.5 million	250.1 million	1. Butterball 2. Jennie-O Turkey Store 3. Cargill VA Meats 4. Farbest Foods, Inc.	19 18 15 6
Pigs	1.4 billion	107.5 million	1. Smithfield Foods 2. Tyson Foods 3. JBS Swift 4. Cargill	26 17 11 9
Cattle	295.5 million	31.9 million	1. Tyson Foods 2. JBS USA 3. Cargill 4. National Beef Packing	23 21 20 11

Table 3.1: Animal Slaughter and Corporate Control

Note: Global and US slaughter figures as of 2012. Market share data for chicken slaughter as of 2014. Market share data for turkey, cattle and pig slaughter as of 2013.

Source: Global and US animal slaughter figures from FAOSTAT 2014b. Market share data for chickens, turkeys, pigs and cattle presented in Watt Poultry 2014, Pork Checkoff 2013 and Cattle Buyers Weekly 2013 respectively.

The functional division of animal husbandry from crop agriculture has coincided with the emergence of regions of specialized crop production and regions of specialized meat production. This spatial separation was also spurred by the low agricultural commodity and energy costs that prevailed for much of the 1980s and 1990s, as outputs from crop monocultures could be cheaply processed and transported into inputs for intensive animal-meat production. In this context, the American Midwest, within which the Corn Belt is situated, transformed from being the main integrated crop-and-livestock farming region in the US to the heartland of specialized corn and soybean production. Meanwhile, commercial beef production has slowly shifted westward and southward to the huge feeding operations in the Southern Plains. Contrariwise, the national center of hog production has gradually migrated east of the Corn Belt in large part because of the opening of enormous factory farms in North Carolina. Moreover, poultry production has transformed from being a dispersed, rural household activity to an industrialized process centered in the Southern states of Georgia, Arkansas and Alabama (Boyd and Watts 1997, Hart and Mayda 1998).

Hence, by the turn of the millennium, agribusiness control over agriculture was simultaneously highly consolidated and bifurcated. A small group of oligopolistic firms superintended the production and processing of commodity crops and a small group of oligopolistic firms commandeered the conversion of animals into meat products. As corn growers increasingly became reduced to being providers of feed inputs for the livestock-feed complex, fewer and fewer raised their own livestock. It was in the context of this diminution of integrated livestock-crop farming that corn farmers considered investment in ethanol cooperatives as their best alternative source of 'value-added' (Ray 2009). Moreover, by championing and facilitating the diversion of grain from the feed sector, the Agro-Trader nexus appeared to have wagered that it would be able to gain leverage over the major meat

companies. But while the earnings strategies of corn farmers and the Agro-Trader nexus played an instrumental role in the ethanol boom, the rapid development of the ethanol sector in the 2000s was also intertwined with wider transformations in global capitalism. In particular, the ‘War on Terror’ contributed to the reignition of instability in the Middle East and due to the ensuing panic in global energy markets, oil prices began to surge (Nitzan and Bichler 2006). Just like the oil price spike of the late 1970s, oil price rises in the early twenty-first century had a sharp knock-on effect on gasoline prices (see Figure 3.1). This knock-on effect imparted a veneer of credibility to the emergent Agro-Trader nexus’s claims that the ethanol sector could bolster US energy security. It was in this context that the 2005 Renewable Fuel Standard (RFS) was implemented. The RFS mandated the blending of 7.5 billion gallons of agrofuel into America’s gasoline supply by 2012. In 2007 the food/fuel complex was further bolstered by the US Energy Independence and Security Act. This piece of legislation increased the RFS to 15 billion gallons of corn-ethanol by 2015 and endorsed the ‘25 by ‘25’ vision backed by Deere (Shea 2007).

The enactment of the ethanol mandates caused massive interstitial restructuring between the overlapping food/fuel and livestock-feed complexes. As Figure 3.3 shows, the ethanol sector’s share of total corn produced in the US rose from just 6% in 2000 to over 40% in 2012. Meanwhile, the share of corn used by the livestock-feed complex plunged. The turning point appears to be 2005, when the ethanol mandate was first introduced. Until that year, increases in corn-ethanol production did not lead to a substantial decline in the share of corn consumed by the feed grain sector. However, at the height of the ethanol boom, from 2005 to 2012, the share of total corn produced in the US for feed fell from 58% to 36%. Given that 90% of feed grain used in the animal processing sector is corn-based; and given that feed comprises 60-70% of livestock production costs, the diversion of corn into ethanol distilleries had a huge

impact on the meat business (Becker 2008). The effect is confirmed by the insert of Figure 3.3. As the graph shows, the falling share of corn used for meat production from 2005 onwards has coincided with a structural shift in feed grain prices relative to meat prices. Moreover, the structural shift appears to be particularly stark in the hog and poultry sectors. From 1985 to 2005 a pound of pig meat cost around twenty times more than a pound of corn and a pound of

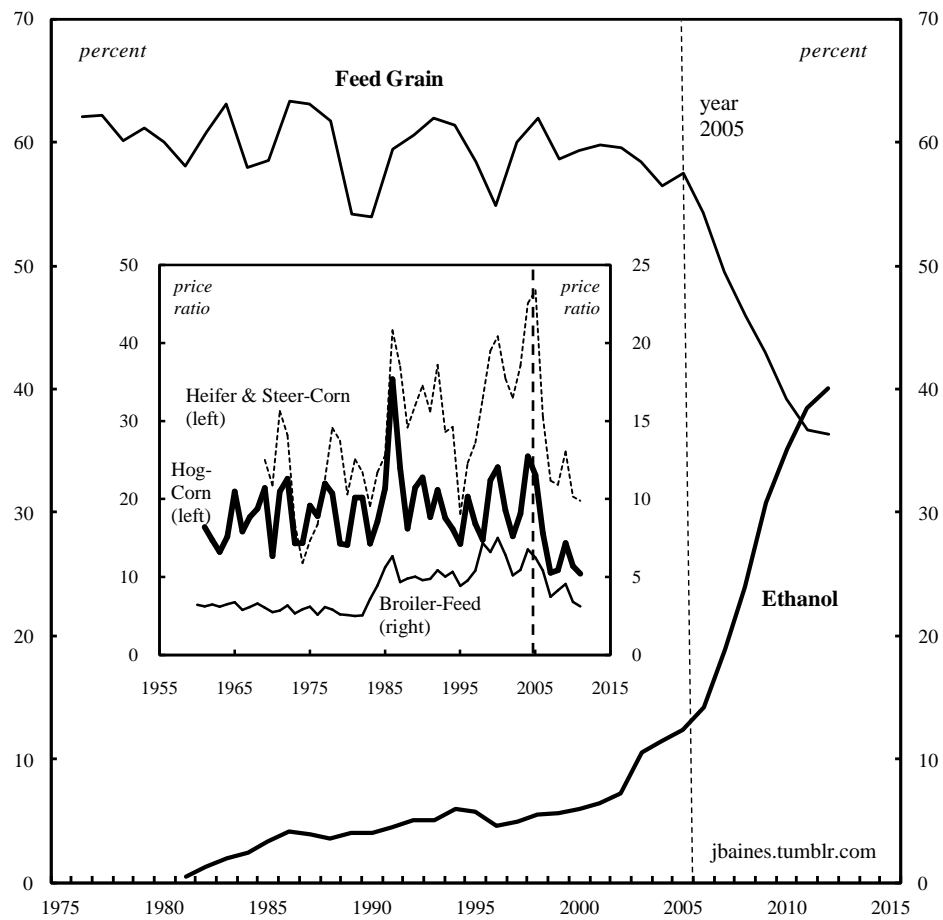


Figure 3.3 Proportion of Domestically Produced Corn used by Feed Grain and Ethanol Sectors

Note: The feed price – meat price ratios weigh the price of feed per pound against the per pound price of meat.

Source: Feed price – meat price ratios from USDA ERS (2014a). Corn use data from USDA ERS (2014d).

chicken meat cost around five times more than a pound of chicken feed. But by 2012, a pound of pig meat cost just ten times more than a pound of corn and a pound of chicken meat was just three times more expensive than a pound of chicken feed. Although feed-meat price ratios within the beef sector have historically been more cyclical than the poultry and hog sectors, a sharp fall in the steer and heifer to corn price ratio can also be seen from 2005 to 2012. The precipitous drops in the meat price-feed price ratios during these seven years were driven by soaring corn prices. Indeed, in this period, inflation-adjusted corn prices increased by 215%, while inflation-adjusted average meat prices increased by merely 7%.

The inflationary impact that the ethanol sector has had on feed prices underscores the severe tensions within the corporate food regime, between the food/fuel complex, on the one hand, and the livestock-feed complex, on the other. To be sure, when the ethanol sector was a peripheral feature of the agrarian political economy of the US, there was very little opposition within agriculture and agribusiness to the use of corn as a fuel feedstock. However, once ethanol production shifted from being an ancillary income support for a small set of farmers and corporations to an overt attempt at restructuring prices and redistributing income within agriculture and agribusiness as a whole, disunity broke out. Fault lines first became visible in the early 2000s when US ethanol production started to take-off. And these fissures enlarged into wholesale rupture by 2005 when the RFS was instituted. As Figure 3.3 shows, it was in that year that the relative price shifts began to have a jolting impact on animal agriculture in the US.

The dramatic price shifts coincided with sharply contrasting pronouncements made in regard to the effects of the ethanol sector on the meat business. In 2006, the then CEO of ADM, G. Allen Andreas, bluntly stated: '[t]here is no consumption versus combustion debate, except for those who really do not recognize the realities of the way this business functions'

(Milling and Baking News 2006: 11). The CEO of Tyson Foods, Dick Bond, did not recognize the ‘realities’ that his counterpart at ADM was referring to. In fact, Bond could hardly contain himself when remonstrating against the ethanol sector: ‘I can rant and rave about this for some time, but some of the things that our government in Washington has done in terms of mandating the use of corn-based ethanol... it's not right’ (Mosely 2008). Similarly, in an op-ed for the Wall Street Journal, Larry Pope - the CEO of Smithfield – argued that the US government’s mandate on ethanol blending had a more baleful effect in terms of increasing corn prices in 2012 than the deleterious drought of that year. ‘[I]f the ethanol mandate did not exist’, Pope moaned, ‘even this year's drought-depleted corn crop would have been more than enough to meet the requirements for livestock feed and food production at decent prices’ (2012). Such is their animus toward the RFS, interest groups within the US livestock sector have even set up a 'Corn for Food not Fuel' campaign group, to encourage concerned consumers to join them in their movement against corn-ethanol.

As Figure 3.3 indicates, the Corn for Food not Fuel campaign is headed by four major meat business lobbying groups: the American Meat Institute, the National Meat Association, the National Chicken Council and the National Turkey Federation. It is around this network of lobbying groups that a new corporate-led distributional coalition - the Animal Processor nexus - can be seen to take shape. Whereas the Agro-Trader nexus encompasses a fairly narrow set of groups that operate upstream in agricultural supply chains such as seed firms, crop growers and trading firms, the Animal Processor nexus is part of a broader and more diffuse constellation of interests that operate further downstream in supply chains. This constellation of interests begins with livestock farmers that use basic crop derivatives, such as corn meal as inputs to raise animals into edible commodities. And it ends with those multinational firms, such as Burger King and Wal-Mart, that sell processed and reconstituted forms of animal-

based, as well as plant-based, commodities to consumers. Pharmaceutical companies such as Pfizer and Bayer (see Figure 3.3) are also crucial in this supply chain as they furnish livestock growers with the antibiotics that increase animals' biophysical capacities to withstand extreme stress, crowding and confinement (Weis 2013). But the axial firms in the Animal Processor nexus are the major meat packing companies: Tyson Foods, Smithfield Foods, Pilgrim's Pride and Sanderson Farms. Their dominance in the livestock-feed complex is attested to by their shares in overall animal slaughter (see Table 3.1), and it is also affirmed by the fact that they are the four largest meat packers headquartered in the US by market capitalization.

The charges and counter-charges between key figures in the US agri-food sector clearly point to polarized opinions amongst the agribusiness elite. And the emergence of the Alliance for Abundant Food and Energy and the Corn for Food not Fuel campaign is also indicative of a deepening cleavage within US agri-food capital. But what connections, if any, can we draw between these recriminations and alliances, on the one hand, and the changing pecuniary quantities of prices and market capitalization, on the other? Figure 3.4 presents the contrasting power trajectories of the axial firms of the Agro-Trader nexus and the axial firms of the Animal Processor nexus. The average per firm market capitalization of each corporate grouping is divided by the average per firm market capitalization of dominant capital for every quarter to yield differential capitalization data. Dominant capital is represented in this analysis by the top 500 corporations listed in the US, ranked by market value for each quarter. The right insert presents the Agro-Trader nexus's and Animal Processor nexus's differential markup. This measure is calculated by dividing the net income to sales ratios of each corporate grouping by the weighted average of the net income to sales ratio of dominant capital. Thus, while the main chart in the figure depicts changes in investors' collective appraisal of the

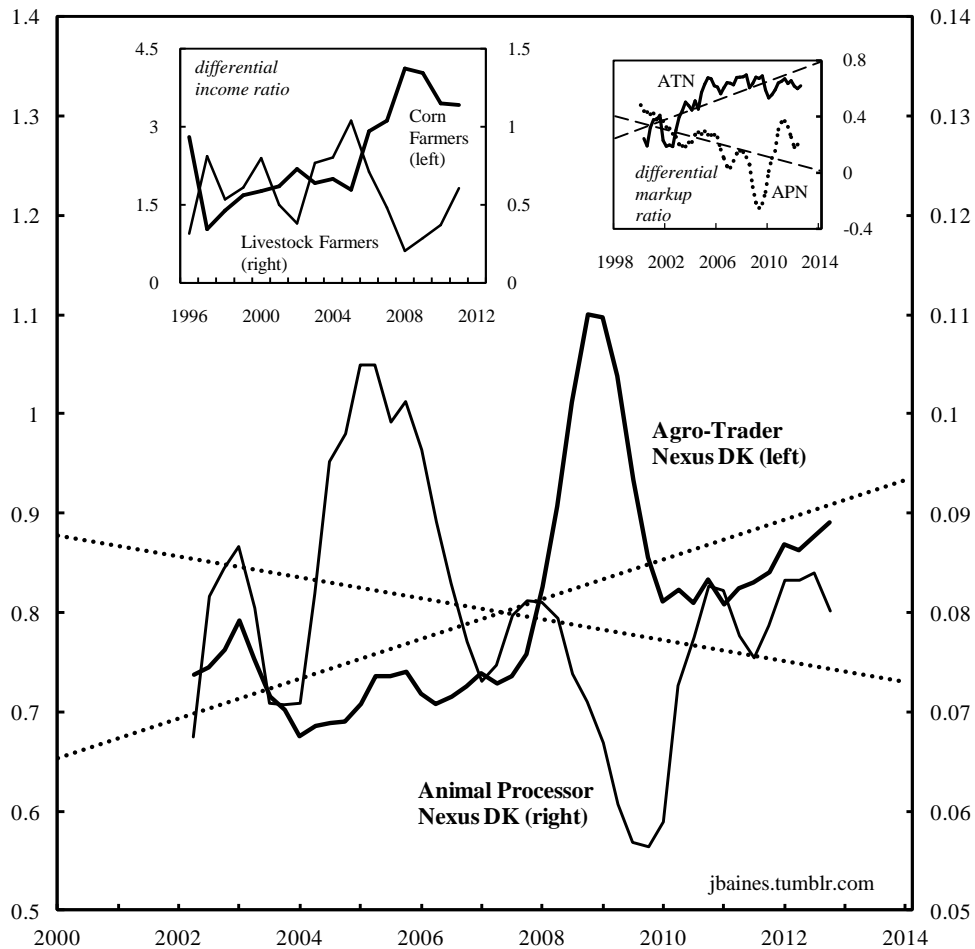


Figure 3.4 The Differential Capitalization of the Agro-Trader nexus and the Animal Processor nexus

Note: The differential capitalization (DK) and differential markup of the Agro-Trader nexus (ATN) and Animal Processor nexus (APN) show quarterly data presented as one-year moving averages. ‘Livestock farmers’ is a composite category comprising cattle, hog and poultry farmers, weighted by farm population size. Given DuPont’s wide ranging activities, only its agricultural division’s net income and revenue data were included in the calculation of the Agro-Trader nexus’s differential markup.

Source: Company market capitalization from Compustat through WRDS. Net income and revenue data for Archer Daniels Midland, Deere and Co. and Monsanto from Compustat through WRDS. Net income and revenue for DuPont’s agricultural division from 10-K SEC filings. Farmer net income data from the USDA NASS (2013).

power of the Agro-Trader nexus and Animal Processor nexus, the right insert depicts changes in the relative capacities of both corporate constellations to turn a profit. The left insert

switches the focus from the redistribution of power and profitability within agribusiness to the redistribution of income within agriculture. The differential income of corn growers and livestock farmers is calculated by dividing their respective average net incomes each year by the corresponding net income of all farmers in the US. The average net income data of livestock farmers is the weighted average of the net income of cattle farmers, hog farmers and poultry farmers.

Three major observations can be made from the figure. Firstly, the market capitalization of the Agro-Trader nexus is greater than that of the Animal Processor nexus by one order of magnitude. Secondly, as the trendlines suggest, while the Agro-Trader nexus has accumulated power ever since the onset of the ethanol boom, the Animal Processor nexus has experienced a general decline in power. Thirdly, in addition to these general trends, there are interesting oscillations in the differential capitalization of both the Agro-Trader nexus and the Animal Processor nexus. The Animal Processor nexus experienced a significant upsurge in its power in 2004 and 2005, when meat consumption and meat price-feed price ratios reached high-points (see Figure 3.3 and Figure 3.4). However, from 2006 to 2010 – when ethanol production soared and when meat price-feed price ratios plummeted - the Animal Processor nexus's differential capitalization dropped almost uninterruptedly. And when the Agro-Trader nexus reached the zenith of its power in 2009, the differential capitalization of the Animal Processor nexus was well on its way to reaching its nadir.

Similar patterns can be seen in the differential income data of corn growers and livestock farmers. In terms of magnitudes, from 1996 onwards corn farmers have enjoyed incomes that are on average almost six times larger than their counterparts in animal agriculture; and in terms of the changes in these magnitudes, the shifts in the differential incomes of corn farmers and livestock farmers are broadly synchronized with the power

trajectories of the Agro-Trader nexus and the Animal Processor nexus respectively. The differential incomes of livestock farmers reached a peak around 2005 just like the differential capitalization of the Animal Processor nexus; and like the capitalized profit shares of the Animal Processor nexus, the livestock farmers' income share bottomed out in 2008 only to increase again from 2009 onwards. Moreover, similar to the Animal Processor nexus, the livestock farmers experienced a general decline in relative pecuniary earnings in the period covered by the data. Contrariwise, the differential income of corn growers has trended upward since the beginning of the twenty-first century, just like the differential capitalization of the Agro-Trader nexus. Additionally, the corn growers' relative earnings reached an apogee in 2008-9 – the very same time that the power of the Agro-Trader nexus climaxed.

The general synchronicity between the relative pecuniary earnings of the Agro-Trader nexus and the corn growers on the one hand, and the Animal Processor nexus and the livestock farmers on the other, suggests that the redistribution of capitalized profit shares within agribusiness is tightly connected to the redistribution of income within agriculture. This insight is important because extant food regime accounts of agrofuels tend to examine the power dynamics between agri-food capital and agricultural producers. In contradistinction, the analysis offered here cuts across the agribusiness/agriculture divide to show how one cluster of farmers and agri-food corporations appears to be benefiting at the expense of another. Therefore, to use the words of White and Dasgupta cited in the introduction of this chapter, we can make more incisive claims about 'the structures of accumulation or (dis)accumulation' and the 'accompanying processes of social differentiation' in the agrarian political economy of the US. In terms of the structures of accumulation and (dis)accumulation, the Agro-Trader nexus has been accumulating rapidly for much of the early twenty-first century, while the Animal Processor nexus has been generally dis-accumulating. And in terms of social differentiation,

the divergent pecuniary trajectories outlined here point to the opening of a significant cleavage between corn growers, on the one side, and livestock farmers, on the other.

The divergence in power between the two corporate-led distributional coalitions was starkest in 2008 and 2009. During this period, ADM capitalized on, and contributed to, the interstitial shifts between the interconnecting food/fuel and livestock-fuel complexes. In the context of generous government support for agrofuels, it could direct vast quantities of corn into the burgeoning ethanol sector over which it had preponderance. In fact, ADM's ethanol division was the largest contributor to company earnings in 2007 - accounting for 19% of profits (Weber 2008). Additionally, ADM was able to benefit indirectly from the ethanol boom because of its control over the 'tollgate' that divided agricultural commodity processing from feed production. The company's heightened capacity to re-channel corn into the ethanol sector allowed it to exact more favorable prices for the feed inputs it renders to the Animal Processor nexus. The Agro-Trader nexus also benefited from its control of key tollgates further upstream in food supply chains. Indeed, Monsanto and DuPont have used their combined 70% market share over the corn seed market and their unsurpassed control over plant genetics to capitalize on the ethanol surge. More and more land that used to be committed to wheat production was converted for corn production (see right insert of Figure 3.1). And as GM corn acreage ate into non-GM wheat acreage, farmers increasingly drew upon the inputs, such as Roundup herbicide and RoundUp Ready corn, sold by the seed giants. Deere and Co. also appeared to benefit from the corn price boom. Farmers were newly flush with cash and were thus more willing to purchase Deere's highly expensive specialized machinery and equipment (Blumenthal 2012). The enhanced relative profitability of the Agro-Trader nexus's operations is registered in the steady rise in its differential markup during the agrofuel boom, as presented in the right insert of Figure 3.4.

However, there is perhaps a danger of overdrawing the differences in the experiences of the agrofuel boom for those farmers and agribusinesses involved in animal agriculture and crop agriculture. In fact, agrofuel apologists are keen to point out that the corn used by the ethanol sector is not entirely diverted from the livestock-feed complex as an animal feed called dried distillers' grains (DDGs) is an important bi-product of the ethanol production process. Nonetheless, a good deal of skepticism is felt in regard to its value as an input in animal agriculture. This skepticism is in part born out of the fact that the price of DDGs moves in tandem with the price of corn and when the inferior energy and nutritional content of distillers' grains are factored into calculations of its price, it does not appear to be much cheaper than corn feed itself (Welch 2011). Opposition to the use of the ethanol bi-product is most trenchant in the poultry sector. Indeed, chicken farmers usually limit DDGs to 5% of the overall feed ration because of the limited capacity of birds to digest the input. As the President of the poultry lobbying group, the National Chicken Council, demurred:

[T]his lesser feed is not coming at the discount that corn farmers and the ethanol industry would have you believe. Though DDGs provide a 25 percent "savings" compared to corn feed, that discount is nullified when considering the 275 percent spike in overall corn prices brought on by the RFS. Think of it as a grocery store raising prices by a couple of dollars then trying to win you over with a 50-cent coupon. (Brown 2013)

These arguments push us to supplement the contention put forward by Goodman *et al.* (1987), and later developed by Friedmann and McMichael (1989), that the substitution of perishable foods into durable and interchangeable commodities has increased the power of agri-food capital over the agricultural process. This claim is certainly true at a broad level of analysis. By breaking heterogeneous agricultural goods into their relatively generic constituent parts (e.g. starch, fibre, oil, protein), agri-food capitals can, in principal, switch their use of

agricultural commodities as market conditions dictate. However, not all feeds are valorized equally in the corporate food regime. Corn contains the most metabolizable and digestible energy of any of the cereal crops, and is thus most prized feed grain in US agriculture. As I have already indicated, corn's status as the premier source of energy in the livestock-feed complex is indicated by the fact that it accounts for 90% of the grains consumed by livestock and poultry in the US. Given that chickens, and even pigs, have a limited ability to feed on other commercial sources of energy such as DDGs, poultry and hog operations are left particularly exposed to upswings in corn prices. This exposure is evidenced by the fact that during the two years from 2006 to 2008 when the cost of feed increased by two-thirds, and corresponding live-production costs increased by 80%, the portion of corn in chickens' overall diets held constant (NCC 2013). The process of substitution is, in this sense, inherently differential. The dramatic increase in the substitution of corn-ethanol for petroleum in the fuel sector completely overwhelmed farmers' rather limited capacity to substitute corn for other sources of energy in the livestock-feed sector.

Notwithstanding this observation, in the cattle sector there is less criticism of DDGs. In fact, as ruminants are much more able to digest distillers' grain, it can comprise up to half of the formula for cattle feed. And overall the cattle sector is estimated to account for 75% of total domestic consumption of DDGs (Fatka 2011). Interestingly, however, the mitigating effects of DDGs on the inflationary impact that the ethanol boom has had on feed prices have been most pronounced for the livestock farmers that remain in the Corn Belt. Indeed, as approximately 85% of ethanol production capacity is concentrated in the Midwest, farmers in the Corn Belt can access DDGs at a lower cost than those farmers in other parts of the US. The differential expense advantage that they enjoy derives from the fact that, in this current period of relatively high energy prices (see Figure 3.1), it is costly to transport DDGs. Moreover, due

to the 15% moisture content of DDGs, there are concerns that the ethanol bi-product will spoil if it travels long-distances. These expiration issues are even more pronounced for the cheaper ethanol bi-product, feed substitute: wet distillers' grains. Thus, given the generally high transportation costs and given the spoilage concerns, most distillers' grains are used by farms that are situated within a 100km radius of the ethanol plant from which the bi-product has been churned out (Gottschalk 2007).

These insights regarding the uneven effects of distillers' grains suggest that the ethanol boom in the US has not only redistributed income from the livestock sector to the corn sector; in fact, it may have also redistributed income within the livestock sector, from farmers outside of the Corn Belt, to those inside it. But the regional shift is only in part born out of the differential cost advantage that distillers' grains afford Midwestern farmers. It is also due to increased regional price differentials in corn itself. Indeed, at the height of the spike in corn price inflation in late 2008, corn prices in the central Corn Belt state of Iowa were 7% lower than the corn prices in Texas – the US's number one beef producing state (Queck 2008: 28). The significant price differential largely derived from the general uptrend in energy costs in the 2000s (see Figure 3.1). As with DDGs, corn became more expensive to transport. Moreover, livestock farmers in the Corn Belt had one final advantage over livestock farmers elsewhere: land that they had previously rented out to specialized corn growers could be taken back into their own integrated crop-livestock production operations. As such, they could cover all of their feed grain input needs with corn raised on their own land. This 'internal hedge' has buffered these farmers from the high and volatile corn prices that have prevailed in recent years (Fatka 2011). Thus, just as low feed input prices and energy costs in much of the late twentieth century conduced to the increased functional division and regional separation of crop and animal agriculture, the more recent increases in feed input prices and energy costs may

have contributed to a modest re-integration of livestock and crop production in the Midwest at the beginning of the twenty-first century. As a consequence of this modest re-integration, livestock production in the Midwestern states appears to be resurging, at least in relative terms. To illustrate, from 2005 to 2012, cattle inventories in Texas, decreased by 13.7%; while cattle inventories in the central Corn Belt state of Iowa increased by 8.3%; similarly, in the same period, Iowa's pig population increased by 20.8% while the corresponding pig population in North Carolina – the heartland of factory farmed pig operations – has fallen by 11.3% (USDA NASS 2015).

Given these considerations, it seems apparent that the corn-ethanol boom has not just engendered redistributive restructuring between different axes of corporate power, and between different sectors within US agriculture. In fact, the agrofuel boom has also driven redistributive shifts across different regions within rural America. The geographically uneven outcomes of soaring corn-ethanol production are vividly confirmed in Figure 3.5. This chart compares the relative incomes of farmers in the Corn Belt to the relative incomes of farmers in the Southern Seaboard. The Southern Seaboard is important to this analysis because it includes the number one beef producing state (Texas) and the three largest poultry producing states (Arkansas, Alabama and Georgia). As the chart shows, when the corn-ethanol boom started to take off in 2005, the average relative income of farmers in the Southern Seaboard slid precipitously. In contradistinction, the average relative income of farmers in the Corn Belt began to climb steeply after the 2002. And while the relative earnings of Southern Seaboard farmers has recovered since 2010, the relative earnings of Corn Belt farmers has continued to ascend to new peaks.

The great divergence within agriculture between farmers inside the Corn Belt and farmers outside the Corn Belt, and the coeval schism between the Agro-Trader nexus and the

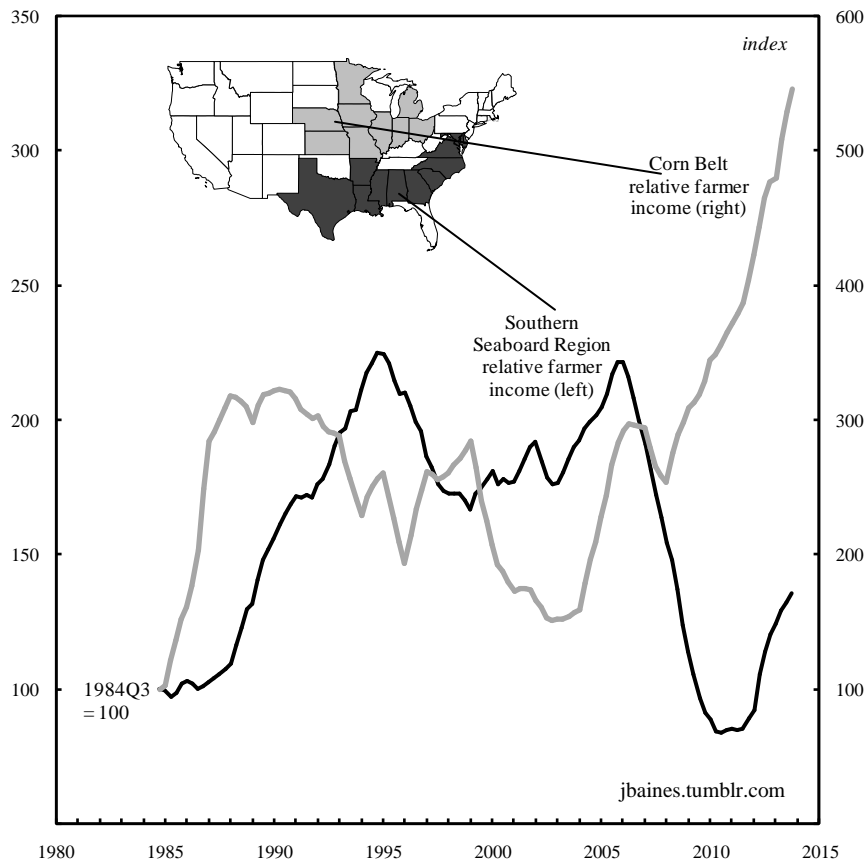


Figure 3.5 The Relative Income of Farmers in the Corn Belt and the Southern Seaboard Region

Note: The Corn Belt comprises Iowa, Illinois, Minnesota, Ohio, Kansas, North Dakota, Michigan, Kansas, Nebraska and Minnesota. The Southern Seaboard region is represented by Texas, North Carolina, South Carolina, Mississippi, Georgia, Virginia, Delaware, Maryland, Arkansas and Alabama. Farm income data consists of the net income of sole proprietorships and partnerships that operate farms. For more information regarding the computation of these data see www.bea.gov/regional/pdf/lapi2010.pdf. Farm income data collected for each state and then weighted according to the farm population of each state. Farmer relative income data calculated by dividing this weighted income data by the average U.S. hourly earnings of nonfarm production workers for each year. Data are smoothed to 3-year moving averages. Farmer relative income data re-based at 100 in 1983 Q3,

Source: Farmers proprietors' income data from the Bureau of Economic Analysis through Global Insight; series code: YENTAF. Average hourly earnings data of nonfarm workers from the Bureau of Labor Statistics through Global Insight. Series code: AHE@US.Q. State farm population data from USDA NASS (2012) Census on Agriculture: <http://www.agcensus.usda.gov/> and from the USDA NASS (2013b) Agricultural Resource Management Survey: <http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/>.

Animal Processor nexus, has been mirrored by a growing divide on Capitol Hill. In the mid-2000s when national gasoline consumption was still on the increase and when the US army was still deeply engaged in its Iraq adventure, politicians representing Corn Belt states enjoyed a broad-base of congressional support for their initiatives to bolster the ethanol sector. Considerations of 'energy security' reigned supreme. However, from 2007 onwards national gasoline consumption declined due to improved automobile efficiency and a decline in travelling by recession-hit drivers. Moreover, the widespread introduction of hydraulic fracturing ('fracking') has opened vast shale fields for oil extraction. As a result of these developments, ethanol increasingly appears to be the panacea of yesteryear. Members of Congress representing Corn Belt states still staunchly champion US government support for ethanol, as their interests are intertwined with the agribusiness-agricultural constituencies that they represent. Nonetheless, they have found themselves fending off an anti-corn-ethanol drive headed by political representatives of major meat producing states such as Arkansas, Alabama, Georgia and Texas (Gillon 2010, Winters 2012). This legislative backlash has had significant effects. In 2012, the US Congress voted to discontinue two bulwarks of the ethanol sector that had existed for over three decades: tariffs on imported ethanol and the tax credit for ethanol blenders.

Beyond lobbying for these measures, the firms of the Animal Processor nexus have been attempting to mitigate persistently high feed grain prices through rationalizing their operations. For example, Smithfield has downsized its hog production division in a bid to insulate itself from corn price inflation. In fact, in just a four-year span it has reduced its domestic exposure to corn markets by 40% through outsourcing more hog raising operations to nominally independent producers (Clyma 2011). More broadly, there has been a renewed focus on animal population control. From 2009 to 2011, the US chicken population flat-lined at 2.1 billion,

while the US cow population fell by 2% to 92.7 million and the pig population declined by 3% to 66.4 million (FAOSTAT 2014b). In the short term, the increased liquidation of existing animal stocks led to a large outflow of meat in the retail market, further pushing meat prices down relative to feed grain prices. However, in the longer term, the cutbacks have mitigated cash-flow problems caused by elevated feed grain prices and they have led to a recovery in the differential markup of the Animal Processor nexus, as shown in the right insert of Figure 3.4.

The Animal Processor nexus has also sought to offset adverse domestic meat consumption (see right insert of Figure 3.1) and relative feed price trends through capitalizing on the general 'meatification' of diets abroad (Weis 2010). International sales of Tyson Foods have increased from 11% of total revenue in 2005 to 17% in 2012 (Tyson Foods 2006: 2; 2012: 2). Similarly, Smithfield's corresponding international share of sales has risen from 15% to 24%, in the same period (Smithfield 2006: 23; 2012: 17). The rationalization of the Animal Processor nexus's domestic operations and the expansion of meat sales outside of the US have helped to reverse the decline in its differential capitalization, as depicted in Figure 3.4. Moreover, as the figure shows, these changes also seem to have contributed to a resurgence in the differential income of livestock farmers. Interestingly, the Agro-Trader nexus has perhaps contributed to the recovery of the Animal Processor nexus's earnings capacity, by supporting and facilitating the spread of meat-centered diets abroad. The support has been articulated in the discourse of the Global Harvest Initiative, for its policy statements continually equate social development with increased meat consumption (see for example Global Harvest 2013). And the Agro-Trader nexus has facilitated global meatification through encouraging the spread of agro-biotechnology and monocropping practices for feed grain production, and through setting up milling and distribution channels that process and deliver these feed grains to confined animal feed operations across the world. Thus, the tensions between the Agro-Trader

nexus and the Animal Processor nexus regarding the corn-ethanol boom have partially been defused through the international expansion of the livestock-feed complex (Gereffi and Christian 2010, Weis 2013, Schneider 2014).

The Animal Processor nexus has also benefited from the general slowdown of the corn-ethanol boom. By the beginning of the second decade of the twenty-first century, the ethanol sector was producing more fuel than could be absorbed by existing fuel consumption in the US. Almost all of the fuel in the US now contains about 10% ethanol, and surmounting this 'blend wall' will be difficult as higher percentages of ethanol used in fuel damages the engines of automobiles that are not built according to 'flex-fuel' specifications (Barnett 2013). The slowdown in the growth of ethanol production from a compound annual growth rate of 29% from 2005 to 2009 to a growth rate of just 5% per year for the four following years is reflective of a wider modulation in the power of the Agro-Trader nexus. As Figure 3.4 shows, between 2009 and 2010 the Agro-Trader nexus's differential capitalization fell dramatically. The slowing growth in the diversion of corn into the ethanol sector (Figure 3.3) contributed to a decline in corn prices in 2009 and 2010 and this in turn contributed to the emergence of a brief deflationary period within agriculture that the Agro-Trader nexus struggled to negotiate. In particular, there was a farmer backlash against Monsanto's genetically engineered Smartstax corn seed as the high price the company charged for it seemed to be completely unreasonable given its yield performance. Monsanto claims that it has now adjusted its pricing model. According to Monsanto's own figures, toward the end of the first decade of this century, the company sought to glean 50% of the extra profit that the introduction of its newly engineered seeds generated for farmers. Now, they have reverted to their strategy of claiming one-third of the extra profits (Pollack 2010). The moderation in Monsanto's pricing strategies, in the face of corn farmer discontent, perhaps contributed to the flat-lining in the differential

markup of the Agro-Trader nexus in recent years, as depicted in the right insert of Figure 3.4. ADM, for its part, found that the margins of its ethanol processing division were caught in a cost-price squeeze due to the diminution in the differential between gasoline prices and corn prices (Blas 2012). Finally, Deere and Co. experienced reduced sales of its specialized crop agriculture vehicles, as falling crop prices reduced corn growers' willingness to make costly machinery purchases.

Although the Agro-Trader nexus is operating in accordance with the Animal Processor nexus in the promotion of global meatification, it remains in a deadlock with the Animal Processor nexus over the US ethanol sector. The sharp rise in corn-ethanol production from 2005 to 2009 corresponded with a rapid redistribution of profitability-read-power from the Animal Processor nexus to the Agro-Trader nexus. And in the following years, corn-ethanol production kept climbing, albeit at a slower pace. According to the latest estimates, by 2013, a record-breaking 43% of corn produced in the US was channelled into the ethanol sector. This figure is predicted to fall to 40% in 2014 (AgMRC 2014). Despite the apparent downtrend in the proportion of corn channelled to ethanol feedstocks, it is unlikely that the corn-ethanol sector will be dramatically curtailed for a number of reasons. Firstly, as the chapter has argued, the companies of the Agro-Trader nexus enjoy a profound influence over the US government decision-making process and as a result, it is improbable that new policies and regulations will come to pass that substantially undercut their accumulation strategies. Secondly, the broader pro-ethanol coalition has significant electoral clout because two major 'swing states' – Iowa and Ohio - are in the Corn Belt. As such, US presidential candidates disregard the interests of corn farmers, and the nexus of agribusiness power in which these farmers are ensconced, at their peril. Thirdly, the possibility of non-edible biomass dislodging corn from its position as the US's premier ethanol feedstock looks extremely remote. In fact, the latest data show that

second-generation agrofuels account for only 0.04% of total agrofuel production in the US (USDA ERS 2014). Due to seemingly insurmountable problems regarding their commercial viability, it does not seem likely that second-generation agrofuels will be a significant factor in the US energy sector for the foreseeable future. Given these considerations, the food/fuel complex will probably remain an integral, but perhaps somewhat diminished, feature of the US agrarian political economy. The pecuniary effects of the interstitial adjustments that are under way are clearly depicted in Figure 3.4. The great divergence from 2008 to 2009 in capitalized profit shares within agribusiness, and in income shares within agriculture, has been followed by considerable re-convergence in both differential capitalization and differential income trends.

Conclusion

Building on previous scholarship in agrarian political economy (Goodman *et al.* 1987), the food regime approach underscores the importance of the corporate appropriation of discrete phases of agricultural production, on the one hand; and the reconstitution of perishable foods into substitutable commodities, on the other. As Friedmann and McMichael argue, these processes of appropriation and substitution have eroded the autonomy of farmers over the agricultural process and they have also undermined the capacity of different governments to direct agriculture for national ends (1989). In the account offered here, I have sought to emphasize another major consequence of the decomposition of the world food system into discrete sectors: this decomposition can give rise to rivalry between corporate constellations that superintend different agri-food complexes. Specifically, I have examined the rivalry between the Animal Processor nexus and the Ago-Trader nexus. While the former has

appropriated control over distinct parts of animal-meat production, the latter has extended its pecuniary ambit over distinct parts of corn and ethanol production. Additionally, by underscoring the seemingly indispensable role played by corn for both of these axes of power, my analysis shows how processes of substitution can drive conflict between different groups of agri-food corporations and between different groups of farmers. In the case of the US agrofuel boom, the dramatic increase in the substitution of ethanol for petroleum completely overwhelmed the Animal Processor nexus's rather limited capacity to substitute corn for cheaper commercial feed with comparable energy content.

As such, by shifting from an aggregate to a disaggregate perspective, I have moved the focus of analysis from the supersession of national government authority and farmer autonomy by capital in general, towards an examination of how both government organs and agricultural interests become enfolded into power struggles between different groups within agri-food capital. This disaggregating analysis offers novel answers to some foundational questions of agrarian political economy regarding (dis)accumulation and social differentiation. On a macroscopic level, the agrofuel boom may have increased the profitability of capital in general, as McMichael contends. But within the agrarian political economy of the US, the agrofuel boom can also be characterized as a vector of redistribution. The redistributive dynamics are multi-dimensional. By triggering the massive diversion of corn from the livestock-feed complex toward the food/fuel complex, the corn-ethanol boom shifted capitalized profit shares within agri-food capital, from the Animal Processor nexus to the Agro-Trader nexus. It also redistributed income within agriculture, from livestock farmers to corn growers. And the ethanol boom may have contributed to a shift in earnings within the livestock sector itself: from livestock farmers outside of the Corn Belt to livestock farmers inside the Corn Belt.

Furthermore, in specifying the winners and losers of the agrofuel boom, the chapter has pointed to the social forces that stand in the way of change within the corporate food regime. As my findings indicate, putting an end to corn-ethanol production would not only involve challenging the accumulation strategies of some of the most powerful agri-food corporations in the world; it would also entail confronting the interests of more than 400,000 corn farms in the US, many of which have a direct stake in the continued diversion of their output into agrofuel feedstocks (EPA 2013).

Finally, the chapter underlines the importance of supporting farmer-led movements that operate at the margins of the corporate food regime. As activists, food regime analysts and agrarian political economists have long argued, locally oriented polycultures, and peasant farming more generally, offer a vital alternative to the destructive directions in which agri-food corporations are taking the world food system. In defending and advancing these forms of agriculture, we may be able to move away from a food regime that commits inordinate amounts of energy and resources to fueling cars and feeding intensively reared animals, towards systems of provisioning that are fundamentally centered on nourishing humans.

In presenting these findings, the chapter points to the potential of conducting further research that inquires into the ways in which redistributive struggles between farmers become co-articulated with redistributive struggles between agri-food corporations, and it points to the importance of analyzing how these struggles impact nourishment outcomes.

Such research may deepen our analysis of uneven agrarian development and it may nuance existing understandings of the relations of inclusion and exclusion, and resistance and incorporation, between farmers in advanced capitalist countries, global agri-food corporations and the landless poor. The next chapter takes up this task, in relation to conflicts within US agribusiness and agriculture over the re-regulation of agricultural derivatives markets.

4. Futures Tense: The Food Crisis and the Contested Regulation of Agricultural Derivatives

It's important to allow markets to work and fluctuate properly and not squelch price volatility...

- Emery Koenig, Cargill chief risk officer⁷

Introduction

So far, this dissertation has only examined the redistributive-power dynamics in physical commodities markets. No attention has yet been paid to redistributive patterns of price changes within derivatives markets. These markets trade in financial instruments whose values derive from the underlying physical commodities. Commodity derivatives warrant attention because, according to a large portion of the literature on food price inflation, the price spikes in 2007-08 and 2010-11 were in part caused by the influx of investment in these financial instruments (see Timmer 2008; Piesse and Thirtle 2009; US Senate 2009; Baffes and Hanjotis 2010; Ghosh 2010; Lagi *et al.* 2011a; Ghosh *et al.* 2012). Thus, whereas the previous chapters examined the coalitional dynamics between agri-food corporations and farmers in regard to agrofuels policy, this chapter will examine the divisions within agriculture and agribusiness over the re-regulation of agricultural derivatives markets. Moreover, by exploring debates around the alleged role of 'excessive speculation' in destabilizing futures markets, the chapter

⁷ Cited in Meyer 2012.

investigates the effects of price volatility, rather than just price levels *per se*, on relative incomes for different groups within the agri-food sector.

Like the previous chapter, the argument in this chapter is focussed on patterns of power within the US. However, these patterns should be understood against the backdrop of the broader landscape of food insecurity. As has already been noted, expenditure on food accounts for 60-80 percent of income for poor households in some countries. When the price shocks that first register in US commodity exchanges reverberate into local markets across the world, these households have to make drastic adjustments in order to sustain themselves. The adjustments may entail cutting back on basic expenditures, by buying food of inferior nutritional value, or in smaller quantities; by extending work hours or engaging in casualized labor; and by pulling children out of school (Estruch and Grendelis, 2013). This collateral damage should be borne in mind when we assess the intricacies of the redistributive shifts within US agriculture and agribusiness, and when we weigh-up the various roles played by US farmers and US-headquartered agri-food corporations in lobbying over the re-regulation of agricultural derivatives markets. By doing so, we may arrive at a preliminary understanding of how interests within agribusiness and large-scale agriculture in the US may relate to the interests of those poor households across the world that are existentially vulnerable to food price shocks.

As Figure 4.1 shows, from 2007 to 2008, both price levels and price volatility in grain futures markets surged. During this period, there were mounting concerns among US policymakers that ‘excessive speculation’ was a key driver of the price instability. Moreover, other derivatives markets, with no linkage to physical commodities, also aroused acute anxiety. In particular, many believed that the over-the-counter (OTC) trade in credit default swaps amplified the wave of defaults in the US mortgage sector into the tsunami of financial

failure that engulfed the global economy in 2007 and 2008. It was during these deep throes of crisis that the Dodd-Frank reform agenda was conceived.

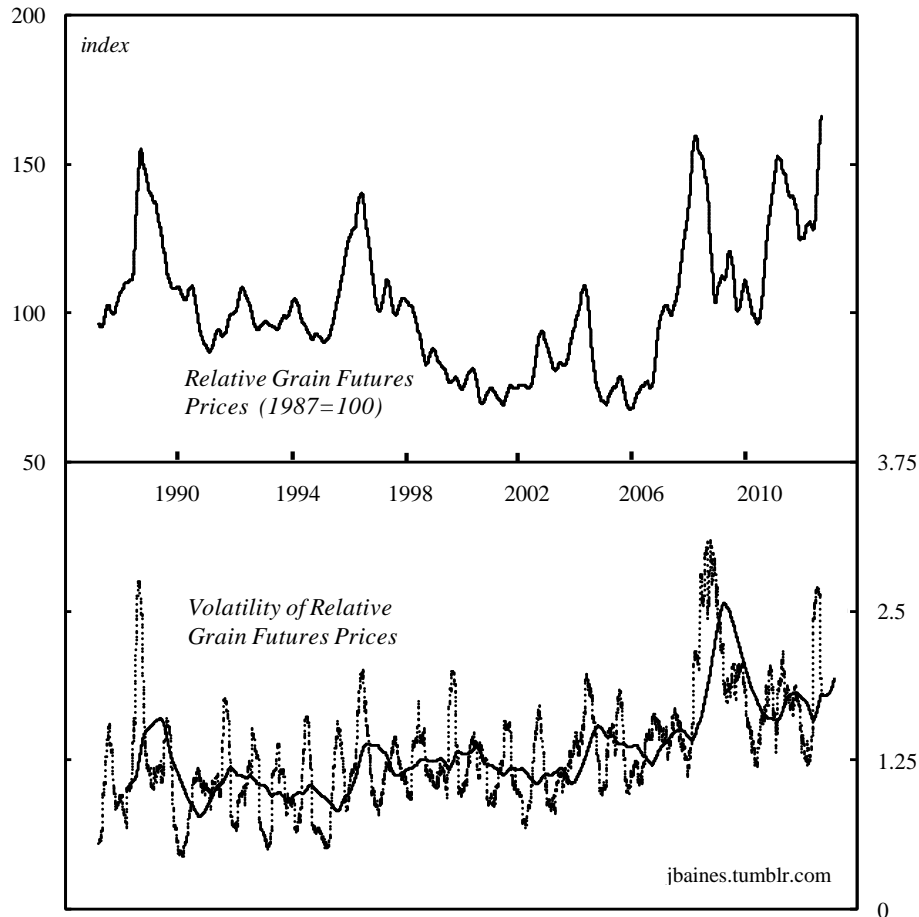


Figure 4.1. Relative Grain Futures Price Levels and Volatility

Note: Relative grain futures prices computed by deflating the daily Commodity Research Bureau Futures Grain Index by the linearly interpolated monthly Producer Price Index (all commodities - non-seasonally adjusted). The Futures Grain index tracks corn, wheat and soybean prices and gives equal weight to these components. Price level data presented as a 63-weekday (i.e. quarterly) moving average. Price volatility data computed as the standard deviation of the percent daily changes in relative grain futures prices in a trailing 63-weekday moving window. The solid black line in the lower chart represents the 63-weekday moving standard deviation, smoothed as a 252-weekday (i.e. annual) moving average.

Source: Grain futures price index data and Producer Price Index data from Global Insight, series codes: CRGRNSX.D7 and WPID01.M.

Supporters of the Dodd-Frank reform agenda hoped that it would, once implemented, reverse the rapid expansion of commodity index funds - traded OTC and hedged with actual purchases of futures contracts on commodity exchanges. Indeed, the Dodd-Frank Act was designed with the express intention of closing the 'regulatory black hole' within which commodity index funds, and other speculative vehicles, had flourished (Greenberger 2011). It stipulated that all OTC products be exchanged on centralized clearing houses, apart from those which were specifically designed for the 'bona fide hedging' practices of those 'commercial' firms purchasing physical commodities. In proposing such changes, the authors of the Dodd-Frank Act sought to establish more transparency for futures markets, and ensure that the purveyors of commodity index funds would be subject to position limits. These position limits had been circumnavigated by banks and other non-commercial entities largely as a result of a series of exemptions authorized by the Commodity Futures Trading Commission (CFTC) from the late 1980s onwards. By setting a ceiling on the number of agricultural futures contracts that non-commercial traders would be allowed, the wide-ranging enforcement of speculative position limits promised to mitigate the destabilizing impacts of 'excessive speculation'.

Yet in spite of the fanfare that surrounded the Act's promulgation, the implementation of position limits on commodity derivatives speculation has long passed the deadline of April 2011 set by Congress. The vexed birth of the new speculative limits regime contrasts sharply with the optimistic forecasts offered by existing international political economy (IPE) accounts of agricultural derivatives reform. The scholars that lead this emergent body of research suggest that financial firms' capacity to block commodity derivatives reform has been weakened, due in part to the advocacy efforts of agricultural interest groups. According to Clapp and Helleiner (2012), agricultural groups mobilized behind reform in response to the

apparently negative distributional effects that grain price instability was having on US agriculture, along with growing concerns about the role of speculation in contributing to this instability. And according to Pagliari and Young (2014), this mobilization of agricultural groups undermined the capacity of those financial firms targeted by derivatives regulation to ‘leverage’ the advocacy efforts of ‘non-targeted’ groups for their own interests. Using this literature as coordinates for inquiry, my argument is guided by the following questions: has futures price instability had a negative distributional impact on all agricultural interests, as has been suggested? Correlatively, have all agricultural groups been pushing for far-reaching commodity derivatives reform? And if not, what do agricultural interests' advocacy efforts in the field of commodity derivatives regulation tell us about the concepts that scholars use to understand the significance of actor plurality in the politics of financial regulatory policymaking? Finally, what might the answers to these questions imply for the political economy of food price instability and the agri-food system more generally?

In seeking to answer these questions, the chapter builds on extant investigations by offering a differentiated understanding of the distributional effects of grain futures price instability for US agricultural groups, and a variegated understanding of these groups' advocacy efforts. Combining quantitative analysis of the redistributive effects of volatility with qualitative analysis of the coalitional dynamics during the derivatives reform process, I show that cattle growers have been worst affected by price volatility and have thus generally acted as 'change agents' by calling for the swift enactment of new speculative limits and for the broadening of the group of firms targeted by regulation. But crop producers in general, and corn and soybean growers in particular, have been less negatively affected by price instability; and the commodity traders that dominate grain elevator and food processing operations in the US have actually benefited from the volatility created by price swings. Moreover, agricultural

commodity traders are particularly vulnerable to the attempts by the CFTC to broaden the coverage of speculative limits, as the CFTC has in recent years increasingly questioned whether these putatively 'commercial' entities are engaging and facilitating untrammelled speculation through proprietary trading and through their own financial services divisions. Accordingly, the commodity traders and allied crop producer organizations have acted as 'veto players' by pushing for delays in rule implementation and by lobbying government bodies to maintain broad exemptions for the speculative limits. The agricultural commodity traders' role as firms that operate in both the agricultural and financial sectors sheds light on the ambiguous and contested boundaries that divide speculators from hedgers, and concomitantly between those groups that are directly targeted by speculative limits and those that are not.

The revised account is by no means exclusive of other scholarly analyses of post-crisis financial reform. For a more comprehensive appraisal of the incremental ways in which new agricultural derivatives regulations have been designed and implemented, one would need to draw on the rich insights offered by those who have analyzed financial regulatory policymaking dynamics in interstate and transnational policy arenas (e.g. Moschella 2010; Mügge, 2011, 2014; Baker, 2013; Porter, 2014; Rixen, 2013; Tsingou, 2014). The chapter's engagement with the analyses of the domestic politics of derivatives reform offered by Clapp and Helleiner and Pagliari and Young thus constitutes a focussed contribution to a broad and flourishing field of research that these four scholars, among a number of others, have done much to cultivate (see Helleiner and Pagliari, 2011; Young, 2013; Clapp, 2014; Helleiner, 2014). Nonetheless, by attending to one specific area of Clapp and Helleiner's and Pagliari and Young's work, the investigation yields significant empirical insights. To the author's knowledge, it is the first IPE investigation to quantitatively map out the distributional consequences of futures market instability for different agricultural interest groups in the US.

Moreover, it is the first scholarly analysis to concertededly examine the coalitional dynamics of agricultural interest groups during the rulemaking stage of the Dodd-Frank reform process. And finally, it is the first investigation within IPE to connect the contested re-inscription of the hedger/speculator divide to the struggle over relative income within the agricultural sector.

The argument develops in three stages. The first section outlines the nascent literature on contemporary agricultural derivatives reform and it proposes an alternative power-distributional approach to analyzing the political economy of financial regulatory policymaking. The second section inquires whether Clapp and Helleiner's claims regarding the distributional consequences of agricultural futures markets are corroborated by relative price and relative income dynamics within agriculture. And the third section asks whether Pagliari and Young's claims about coalitional dynamics are borne out by the discursive content of agricultural groups' testimonies in Congressional hearings and submissions to the CFTC. I suggest that as an alternative to postulating the 'target groups' from 'non-target groups' of commodity derivatives reform *ex ante*, it may be fruitful to analyze the definitional conflict over the boundaries that separate target from non-target groups. In the conclusion, I point to other avenues of research in which one can further investigate the interconnection between definitional contestation and distributional struggle in the field of financial regulatory policymaking.

The IPE of Agricultural Derivatives Regulation

The Dodd-Frank Act comprises 848 pages of statute which contain many important new provisions. The Act bars deposit-taking banks from proprietary trading and investment in hedge funds and private equity (the 'Volcker Rule'). It sets in place arrangements for the

orderly unwinding of ‘too big to fail’ institutions that have sunk into insolvency (Hager, 2012). And most significantly for our analysis, it gives the CFTC expanded authority to set position limits on 28 futures contracts for core physical commodities, 19 of which derive their value from underlying agricultural commodities. Under the authority granted to it by the Dodd-Frank Act, the CFTC’s new position limits would extend well beyond the contracts traded on commodity exchanges to all ‘economically equivalent’ contracts, cleared on swap execution facilities or traded bilaterally OTC. The CFTC’s speculative limits were to be imposed on an aggregate basis. That is to say, the limits would apply to the sum of an entity’s contract positions across all trading venues, from domestic commodity exchanges, to swap exchange facilities, to foreign boards of trade (Sherman *et al.*, 2011).

The significant changes promised by the Dodd-Frank Act appeared to raise a serious challenge to the elite-centered accounts of financial reform that emphasize the narrow ‘transnational policy community’ of key financial actors that oftentimes control the financial policymaking agenda. According to this literature, the primacy of the transnational policy community in the formulation of financial regulation derives from the complexity of financial regulations, the ‘club-like’ institutional settings in which regulations are formulated and crucially, the unclear distributional consequences of these regulations (Tsingou, 2006, 2014; Moschella 2010). As the elite-centered accounts depict the construction of derivatives regulations as being relatively insulated from interest group pressures outside of the financial sector, it seems unable to account for the fact that, with the passing of the Dodd-Frank Act, the US government appeared to move decisively to intervene in the inner workings of derivatives markets in ways that impinged on the interests of the most powerful financial firms.

Clapp and Helleiner

The apparent failure of existing approaches to account for the dynamics of derivatives reform motivated the groundbreaking intervention of Clapp and Helleiner (2012). The pioneering nature of Clapp and Helleiner's work stems from the fact that, while the IPE literature on many aspects of financial regulatory policymaking is voluminous, 'the study of agricultural derivatives markets and their regulation has been almost completely neglected to date' (2012: 201). For these two scholars, the financial crisis of 2007-08 undermined the legitimacy of the elite-dominated 'Wall Street-Treasury complex' and opened the way for the politicization of commodity derivatives markets. The collapse of the subprime mortgage sector thrust the business operations of the major financial firms into the spotlight because these firms' trade of credit default swaps was widely considered to have spread the 'toxic waste' emanating from the subprime meltdown through the entire financial system. The popular backlash against this financial fallout was accompanied by significant changes in the regulatory policymaking environment. As the legitimacy of the Wall Street-Treasury complex waned, the focal point of regulatory agenda-setting shifted from technocratic policy networks towards branches of government, such as the US Congress, and standing committees, such as the House Committee on Agriculture, that were more receptive to interest group pressures from outside the financial sector.

In making these claims, Clapp and Helleiner seek to refute those elite-oriented approaches that suggest that unclear distributional consequences in financial regulation conduce towards elite-predominance in regulatory policymaking: 'agricultural interests were mobilized by some very clear and targeted distributional consequences of price volatility' (Clapp and Helleiner, 2012: 201, my emphasis). According to Clapp and Helleiner, the failure

of futures prices of wheat, and other grains, to converge with corresponding cash market prices at the point of contract expiration was a particularly acute problem for farmers as it raised doubts about the price discovery function of futures markets and, in so doing, made production decisions more difficult. Grain elevator and grain processing companies were also hit by volatility. These firms offset the risk of their grain purchasing commitments in cash markets with opposing commitments to sell grain contracts in futures markets. But because the volatility of grain futures prices rose, grain elevator and processor companies had to pay increasing amounts to keep their margin accounts open. Due to the fact that elevators found it increasingly expensive to offset their cash market commitments, many stopped engaging in long-term forward contracts with farmers; and as a result, farmers were deprived of their main marketing tool. The volatility set in motion an onslaught of denunciations of financial firms by agricultural interests, as many saw ‘excessive speculation’ as a chief contributor to the price spikes (Clapp and Helleiner, 2012: 196-7).

Clapp and Helleiner go on to argue that agricultural interests enhanced their influence over the regulatory policymaking process by forging alliances with domestic groups that were concerned about energy price instability. The key lobbying organization that emerged out of this marriage of domestic interests was the Commodity Markets Oversight Coalition (CMOC). The CMOC called for a whole range of regulatory changes at the beginning of 2010, including the imposition of aggregate position limits, the clearing of standardized derivatives and the application of these regulations to foreign jurisdictions. This mobilization of domestic groups, according to Clapp and Helleiner, spurred the passage of the Dodd-Frank Act. The Act met the CMOC’s calls for standardized commodity swaps to be cleared and exchange-traded, and it gave the CFTC enhanced authority to define key regulatory terms and to set speculative limits. Clapp and Helleiner express a degree of optimism in regard to the commodity derivatives

reforms that the Dodd-Frank Act appeared to usher in: the case of agricultural derivatives reform, they argue, ‘is one where the efforts of US agricultural groups to defend their interests may end up generating an outcome – less volatile agricultural prices – which strengthens the food security of the world’s poor’ (2012: 206).

Pagliari and Young

Since Clapp and Helleiner’s pioneering article, of all IPE scholars, Pagliari and Young (2013; 2014) have carried the study of the coalitional dynamics surrounding derivatives regulation furthest by offering systematic quantitative evidence of actor plurality within financial regulatory policymaking, and by constructing a preliminary framework with which to assess the significance of this plurality. They suggest that actor plurality is important because it bears on the capacity of financial firms targeted by regulation to influence the policymaking process. The lobbying clout of target groups can be curtailed when non-target groups actively engage in opposition to the advocacy efforts of the target group. Alternatively, the influence of a targeted financial sector group can be amplified or ‘leveraged’ by non-targeted groups whose regulatory preferences accord with its own (2014: 585-6). With these considerations in mind, Pagliari and Young argue that the degree to which a targeted financial firm can influence the regulatory policymaking process is conditional on two variables: the extent to which non-targeted groups are mobilized over the regulatory issues in question; and the extent to which the preferences of these non-targeted groups converge with those of the targeted financial firms. The interaction of these two factors yields what Pagliari and Young call a ‘payoff matrix’.

Pagliari and Young contend that there were low levels of mobilization against those ‘private financial industry groups’ (PFIGs) that championed the deregulation of commodity derivatives markets from the 1980s to the mid-2000s. This period was characterized by ‘quiet politics’ in which the interests of PFIGs took precedence. The interaction of target groups and non-target groups in this context is depicted in Quadrant A of Pagliari and Yong’s matrix, as reproduced in Figure 4.2. But, like Clapp and Helleiner, Pagliari and Young argue that after the commodity price spikes and financial crisis of 2007-08, the surge in advocacy activity of agricultural groups, working in consort with food and energy firms and NGOs, helped prevent the major banks from vetoing the inclusion of strict new curbs on commodity futures speculation within the Dodd-Frank Act (Quadrant B).

	Low mobilization of non-target groups	High mobilization of non-target groups
No convergence of interests between targeted PFIGs and other groups	(A) <i>Pre-crisis: banks dominate. Weak opposition from exchanges and agricultural groups.</i>	(B) <i>Post-crisis derivatives regulation: agricultural groups and NGOs push for commodity derivatives regulation.</i>
Convergence of interests between targeted PFIGs and other groups	(C)	(D) <i>Post-crisis derivatives regulation: Coalition of Derivatives End-Users push for exemptions.</i>

Figure 4.2 Pagliari and Young’s Matrix (2014: 598)

The two scholars compare these regulatory developments in commodity derivatives markets with contemporaneous regulatory developments in credit derivatives markets. The advocacy efforts of non-financial corporations that use derivatives for risk management purposes were particularly important in shaping the trajectory of regulatory policymaking. As the two scholars argue: 'unlike agricultural interests calling for more stringent regulation of commodity derivatives, these firms have mostly mobilized in opposition to a number of aspects of the existing legislative proposals' (2014: 595). The Coalition for Derivatives End-Users (CDEU) emerged as the major lobbying vehicle for these non-financial firms, just as the CMOE emerged as the major advocacy vehicle for agricultural interests. The CDEU was particularly concerned that those corporate actors that used derivatives to reduce their commercial risks would be subject to the same requirements designed for swap dealers. It contended that the mandatory clearing of OTC derivatives would drain significant amounts of working capital from non-financial corporations (Pagliari and Young, 2013: 138).

As such, Pagliari and Young suggest that while the mobilization of agricultural interests in the field of commodity derivatives regulation countervailed the power of financial firms; in the field of credit derivatives regulation, the regulatory preferences of corporate end-users and financial firms largely converged (Quadrant D). Financial firms were thus able to leverage the mobilization of corporate end-users in ways that enhanced their own influence over the policymaking process. The resulting 'Wall-Street-Main-Street nexus' successfully prevented the most far-reaching aspects of credit derivatives reform that were proposed in the lead-up to the promulgation of the Dodd-Frank Act (Pagliari and Young, 2013; 2014).

A Power-Distributional Approach

Clapp and Helleiner have broken new ground in the analysis of derivatives regulation by highlighting the role of agricultural groups in undermining the influence of financial firms over the commodity derivatives reform process. Pagliari and Young make further inroads into the unknown by offering exhaustive statistical confirmation of the diversity of actors mobilized around financial regulatory policymaking. However, there are some aspects of the emergent literature that should be addressed. Firstly, Clapp and Helleiner claim that the distributional dynamics of the food price crisis of 2007-08 are key in explaining the mobilization of agricultural groups around commodity derivatives reform, but they do not offer any quantitative evidence that shows that grain futures price instability actually had a negative effect on income streams within US agriculture. Secondly, Pagliari and Young claim that the passing of the Dodd-Frank Act represented a triumph of non-target groups against target groups in agricultural derivatives regulatory policymaking, but absent from their analysis is an acknowledgment of the fact that over four years after the passing of the Act, the target groups of speculative limits have yet to be clearly determined. As such, it becomes questionable whether we can delineate target groups from non-target groups in advance of an analysis of the struggles through which the boundaries between targets and non-targets are settled.

On a quantitative level, we can test Clapp and Helleiner's claims regarding distributional outcomes through quantitatively exploring the relationships between grain futures price volatility on the incomes of different agricultural groups. In so doing, the chapter draws on the method advanced by the CasP framework of charting relative price changes with changes in relative income for different agricultural groups. On a qualitative level, we can nuance the

framework offered by Pagliari and Young, by analyzing the open texture of the Dodd-Frank Act. In this regard, the historical institutionalist account of institutional change is particularly helpful. Consonant with the CasP framework, the historical institutionalist approach conceives rules as legacies of past struggles and instruments of ongoing redistribution (Mahoney and Thelen, 2010: 7-8). But one of the major innovations of the historical institutionalist perspective lies in its observation that rules change, not only because of the contested dynamics of regulatory policymaking, but also because there is a degree of openness in the interpretation and the implementation of legislative intent. The openness that exists between the creation of law and the administration of rules creates spaces for definitional conflict over how different groups are to be classified and regulated. This definitional conflict has significant distributional impacts because: 'struggles over the meaning, application, and enforcement of institutional rules are inextricably intertwined with the resource allocations they entail' (Mahoney and Thelen, 2010: 11). As such, Mahoney and Thelen (2010:11) argue that '[c]oalitions form not only as representatives of alternative institutions but also as movements seeking particular interpretations of the ambiguous or contested rules of a given institution'. In analyzing the different distributional coalitions vying over the interpretation of commodity derivatives reform, the chapter follows recent scholarship (notably Moschella and Tsingou, 2013) on financial regulation by drawing on the historical institutionalist concepts of change agents and veto players. Change agents, for the purposes of this chapter, are understood as those groups that advocate far-reaching interpretations of legislative intent in the hope of bringing about significant reform, while veto players are understood as those groups that advocate more limited interpretations of legislative intent, with a view to blocking change and preserving existing privileges.

The remainder of the chapter will examine the distributional impacts of grain futures price volatility, and link these distributional impacts to the definitional conflict over the regulatory boundaries that separate the targets of reform from the non-targets of reform. In the next section, I test Clapp and Helleiner's claims regarding the negative effects of market volatility for agriculture by mapping out the relationship between agricultural futures price instability and the income of different agricultural groups. And in the third section, I ask whether Pagliari and Young's arguments regarding target and non-target groups are affirmed by the content of agricultural groups' testimonies in Congressional hearings and their comments submitted to the CFTC. I argue that, rather than representing a definitive end-point in the derivatives reform debate, the Dodd-Frank Act granted significant latitude to the CFTC to develop rules for commodity derivatives markets in an ambiguous field of meaning. Moreover, I show that in this ambiguous field of meaning, some agricultural groups, chiefly comprising livestock interests, have acted as change agents by advocating an expansive interpretation of Congressional intent in a bid to widen the target group for speculative limits. But the most powerful groups within US agriculture have acted as veto players, as they have championed a much more limited interpretation of the Dodd-Frank Act in an attempt to push the CFTC to narrow the group targeted for regulatory restrictions.

The Distributional Dynamics of Grain Futures Price Instability

Grain futures price instability can be examined from three different perspectives: the levels of relative grain futures prices; the volatility of relative grain futures prices; and the decoupling of futures prices from cash market prices at the point of futures contract expiration. This section examines the effect of futures price levels and volatility on both farmers and

commodity traders. The first part of the section investigates the distributional outcomes of the levels and volatility of relative grain futures prices for the relative income of different groups of farmers; and it then ascertains how the decoupling of futures and cash markets impacts the relative incomes of those groups. The second part of this section examines the relationship between grain futures price instability and the relative income of the three largest agricultural commodity traders: Archer Daniels Midland (ADM), Bunge and Cargill. This group of firms is of direct relevance because, according to Clapp and Helleiner, the 'agricultural interests' that experienced 'hardship' and that mobilized behind the Dodd-Frank reform agenda comprise 'farmers, grain elevator operators, and food processor groups' (2012: 195). Although the major agricultural commodity traders have no farming operations in the US, they are the dominant firms in grain elevator operations; and they are also dominant in food processing. Indeed, ADM is the largest grain elevator operator with a market share of 20 percent of overall grain storage revenue in the US, Cargill is the second largest with a market share of 17 percent and Bunge the third, with a share of 10 percent (Kruchkin, 2013).

Farmers

The dependent variable for the scatter charts in Figure 4.3 is farmer relative income. This variable is calculated by dividing the average quarterly income of farmers in the US by the average quarterly income of nonfarm production workers in the US. The independent variable for the left chart is relative grain futures prices. It is calculated by deflating daily grain futures prices by the daily producer price index (interpolated linearly from monthly data) and then computing the average for this ratio. The independent variable for the right chart is the volatility of relative grain futures prices. It is computed by calculating the daily rate of change

in the deflated futures price data, and then calculating the quarterly standard deviation of this rate of change, such that each observation denotes the standard deviation of the daily rate of change in deflated grain futures prices for the quarter.

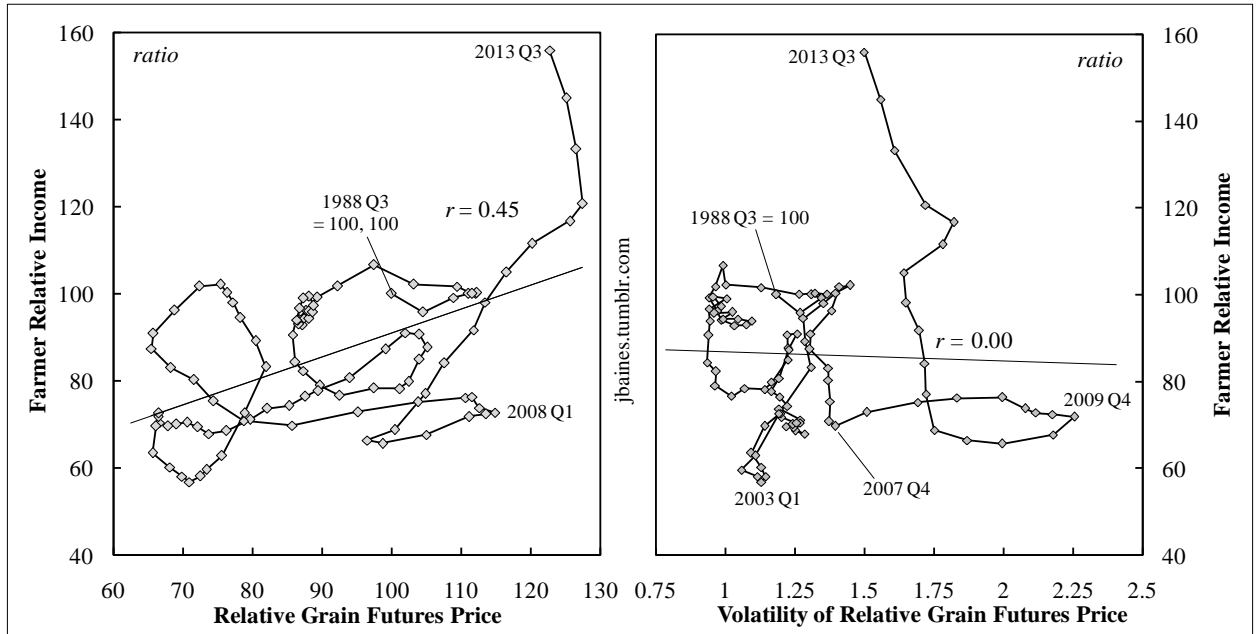


Figure 4.3 Farmer Relative Income and Grain Futures Price Instability

Note: Farm income data consists of the net income of sole proprietorships and partnerships that operate farms. For more information regarding the computation of these data see <http://www.bea.gov/regional/pdf/lapi2010.pdf>. Farmer relative income data calculated by dividing quarterly aggregate farmer income data by the interpolated farmer population for that quarter; and then by dividing these data by the earnings of nonfarm production workers for that quarter. For relative grain futures price levels and volatility computations see note to Figure 4.1. Data are smoothed to 2-year moving averages. Farmer relative income and relative grain futures price data re-based at 100 in 1998 Q3.

Source: Farmers proprietors' income data from the Bureau of Economic Analysis through Global Insight; series code: YENTAF. Earnings data of nonfarm workers from the Bureau of Labor Statistics through Global Insight. Series code: AHE@US.Q. Farm population data from 2012 Census on Agriculture: <http://www.agcensus.usda.gov/> and from the Agricultural Resource Management Survey: <http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices>. For relative grain futures price levels and volatility data see Figure 4.1.

There is a moderately positive correlation between relative grain futures price *levels* and relative farmer income in the US, as is confirmed by the Pearson correlation coefficient of 0.45 for the raw data. But there appears to be no correlation between the *volatility* of relative futures prices and relative farmer income. Furthermore, contrary to what the reader might expect from Clapp and Helleiner's account, when grain futures price volatility was climbing to new heights between 2007 and 2010, relative farmer income was not falling; instead it was staying relatively constant. These data appear to suggest that for farmers the distributional consequences of volatility are less clear than Clapp and Helleiner suggest.

However, the problem with these visual representations is that they do not isolate the effects of our two independent variables. Multivariate linear regression is helpful in this sense as it holds all independent variables constant when accounting for the predictive capacity of a given independent variable. The results of the multivariate regression of the same dataset are presented in the first row of Table 1. The most important observations to make from these statistical results concern the standardized beta coefficients. Assuming causality runs from right to left in this equation, the results suggest that one standard deviation change in relative grain prices changes relative grain farmer income by 0.55 standard deviations, holding the volatility of relative grain prices constant. Moreover, when the volatility of relative grain futures prices increases by one standard deviation, relative farmer income is expected to decrease by 0.23 standard deviations, holding the levels of relative grain prices constant. Thus, when levels of relative prices are controlled through multivariate linear regression, a statistically significant negative correlation between volatility and relative income can be discerned. Clapp and Helleiner's argument that volatility had a negative impact on relative income streams in agriculture thus appears to hold. However, we should treat the regression

results with some circumspection. Due to the relatively low number of observations, the results are exploratory in nature.

	<i>N</i>	<i>R</i> ² for model	<i>Relative Grain Futures Prices</i> <i>Standardized Beta Coefficient</i> (<i>p</i> -value, <i>t</i> -statistic)	<i>Volatility of Relative Grain Futures Prices</i> <i>Standardized Beta Coefficient</i> (<i>p</i> -value, <i>t</i> -statistic)
1. Farmer relative income (all states) 1987-2013	108	0.251	0.551*** (0.000, 5.927)	-0.229* (0.015, -2.465)
2. Farmer relative income (Midwest) 1987-2013	108	0.454	0.632** (0.001, 7.961)	0.089 (0.368, 1.124)
3. Farmer relative income (S. Seaboard) 1987-2013	108	0.286	-0.279** (0.003, -3.067)	-0.354*** (0.000, -3.901)
4. Cargill differential profit 1950-2013	64	0.522	-0.024 (0.845, -0.271)	0.719*** (0.000, 8.034)
5. Ag traders differential profit 2000-2013	56	0.219	0.138 (0.345, 0.952)	0.378* (0.012, 2.608)

Table 4.1: Multivariate OLS Regression of Agricultural Income and Grain Futures Price Dynamics

***, ** and * denote significance at the 99.9% ($p \geq .001$), 99% ($p \geq .01$), and 95% ($p > .05$) levels, respectively.

Note: Mean relative grain futures price for the period 1987-2013 is 68.4 where 1988Q3=100. Mean price volatility for the same period is 1.30. Mean relative grain futures price for the period 2000-2013 is 137.8 where 1999Q4=100. Mean price volatility for the same period is 1.49. Mean relative grain futures price for the period 1950-2013 is 60.7 where 1950=100. Mean price volatility for this period is 5.50. Multicollinearity checked and confirmed absent for regressions on farmer relative income (1) (2) (3), Cargill differential profit (4) ag traders' differential profit, (5) with variance inflation factors of 1.212; 1.432 and 1.020 respectively. Homoscedasticity checked with the Koenker test. The null hypothesis that the data are heteroscedastic is rejected for the all-states farmer relative income dataset (1) (p -value = 0.068); livestock states dataset (3) (p -value = 0.206); the Cargill differential profit dataset (4) (p -value = 0.67) and ag traders (5) (p -value = 0.162) at both 95% and 99% confidence intervals. The null hypothesis is accepted for grain states farmer income dataset (p -value = 0.0016). Adopting the estimator model of Hayes and Cai (2007), the p -values of the standard errors for the grain farmer income dataset (2) are adjusted for homoscedasticity to control for any statistically significant unevenness in the distribution of observations around the lines of best fit.

In advancing the overall analysis of the distributional dynamics of grain futures price instability, it makes sense to disaggregate farm groups by commodity specialization. Unfortunately, no long-term quarterly farm income data along lines of agricultural specialization appear to be available. However, state-based farmer income data are available. Moreover, there are regions of specialized crop production and regions of specialized meat production in the US. Indeed, all states within which grain production predominates are in the Midwest. And all states within which livestock production predominates are part of the Southern Seaboard – the wide regional arc that extends from the southern and south-eastern coastline of the US. By comparing farmer income trends within Midwestern states to farmer income trends within the states of the Southern Seaboard, we can make inferences about how income is being redistributed between commodity-crop and livestock-producer groups in the US.

The next two figures present the relationship between farmer income trends and grain futures price trends, using the same price data used in Figures 4.1 and 4.3. Figure 4.4 depicts the relationship between price dynamics and farm income dynamics in the Midwestern states, and Figure 4.5 depicts the relationship between price dynamics and farm income dynamics in the Southern Seaboard. The group of Midwestern states that are examined in this analysis contain the two top corn and soybean producing states (Iowa and Illinois) and the two top wheat producing states (Kansas and North Dakota). The sample of Southern Seaboard states in this analysis include the largest beef producing state (Texas), the three top chicken producing states (Georgia, Arkansas and Alabama) and the heartland for industrialized hog production (North Carolina).

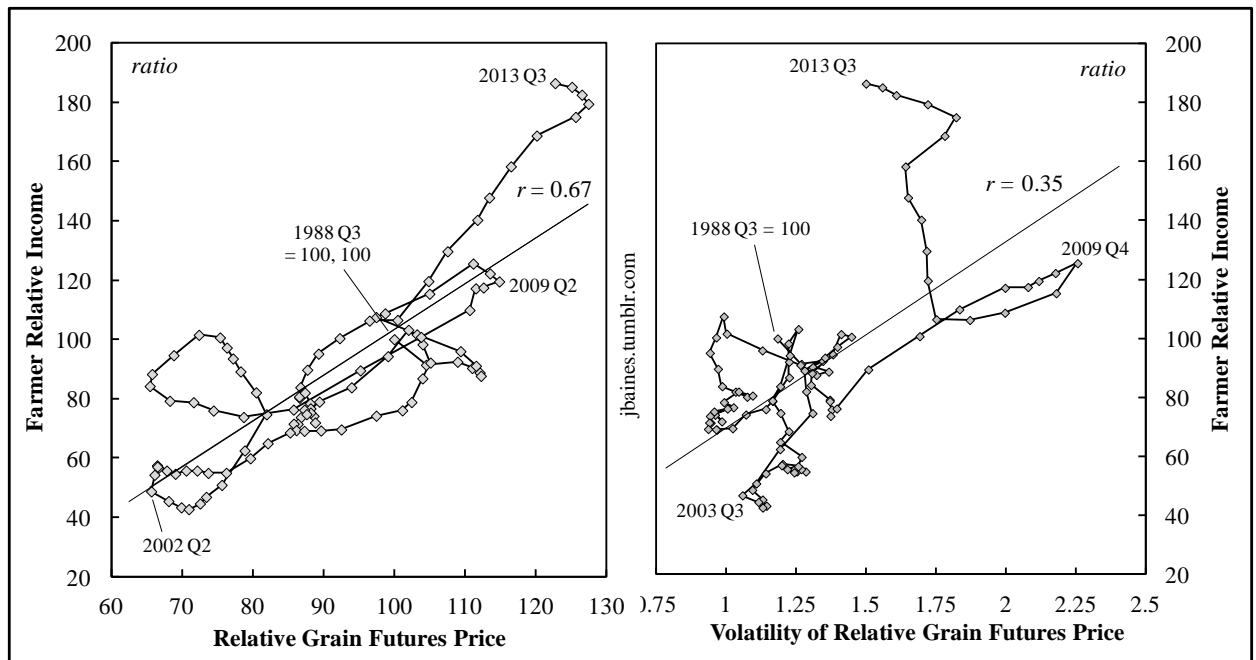


Figure 4.4 Midwestern Farmer Relative Income and Grain Futures Price Instability

Note: The sample of Midwestern states comprises Illinois, Iowa, Kansas, Minnesota and North Dakota. Farm income data consists of the net income of sole proprietorships and partnerships that operate farms. For more information regarding the computation of these data see <http://www.bea.gov/regional/pdf/lapi2010.pdf>. Farm income data collected for each state and then weighted according to the farm population of each state. Famer relative income data calculated by dividing this weighted income data by the earnings of nonfarm production workers for each quarter. For relative grain futures price levels and volatility computations see note to Figure 4.1. Data are smoothed as 2-year moving averages. Farmer relative income and relative grain futures price data re-based at 100 in 1998 Q3.

Source: See Figure 4.3

Figure 4.4 shows that, from 1998 to 2013 there is clearly a positive correlation between the relative income of Midwestern farmers and relative grain futures price levels, on the one hand, and relative grain futures prices volatility, on the other. However, the second row of Table 1 indicates that while price levels have a statistically significant effect on relative farmer income, price volatility is not a statistically significant variable. In contradistinction, the two

charts in Figure 4.5 show that from 1988 to 2013 there is a moderately strong negative correlation between the relative income of farmers in the Southern Seaboard and relative grain futures price levels, on the one hand, and relative grain futures prices volatility, on the other. Moreover, the third row of Table 1 confirms that both price levels and price volatility have statistically significant negative effects on relative farmer income in the Southern Seaboard. The interim results of this quantitative exploration seem clear: while Clapp and Helleiner’s arguments regarding the distributional consequences of grain price volatility apply to states where livestock-sector interests predominate and perhaps even to farmers in general, they do not appear to be applicable to states in which commodity-crop farmer interests are most pronounced.

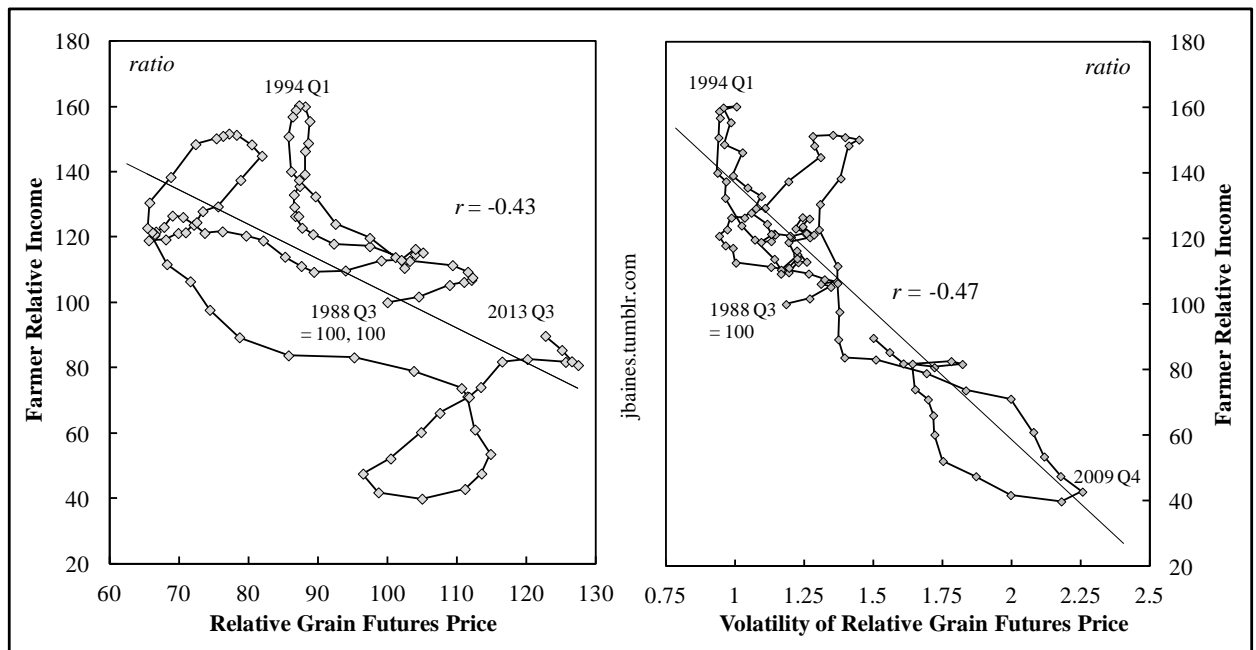


Figure 4.5 Southern Seaboard Farmer Relative Income and Grain Futures Price Instability

Note: The sample of Southern Seaboard states comprises Alabama, Arkansas, Georgia, North Carolina and Texas. Farm income data consists of the net income of sole proprietorships and partnerships that operate farms. For more information regarding the computation of these data see the note for Figure 4.4.

Source: See Figure 4.3.

So far this section has only considered two aspects of grain futures price instability: price levels and price volatility. However, as noted, there is another aspect of price instability discussed by Clapp and Helleiner that has yet to be explored in relation to relative farm incomes: the weakening link between futures prices and cash prices at the point of contract expiration. To recapitulate: Clapp and Helleiner argue that the problem of non-convergence between futures prices and cash prices undermines the price discovery function of futures markets and that this mismatch in turn complicates planning decisions for farmers. Figure 4.6 introduces into our analysis the issues of convergence and relative farmer income by commodity specialization. Although there does not appear to exist long-term quarterly data on farmer income by commodity specialization, there are annual data available for farmer income by commodity specialization that extend back to 1996. These data furnish us with important insights.

The top-left chart of Figure 4.6 shows the relative income of farmers by specialization from the 1996 onwards. It demonstrates that during the price tumult of 2007-2010, the earnings trends of crop farmers were markedly different from the earnings trends of livestock producers. The relative income of livestock farmers in general, and cattle growers in particular, plunged in 2008 when grain futures price instability reached a crescendo. Contrariwise, the commodity crop growers actually experienced an almost uninterrupted increase in relative income throughout the period.

The three other charts depicted in Figure 4.6 shift our attention from relative income changes within the commodity crop and livestock sectors, to the relationship between crop growers' relative income and the 'basis' of agricultural commodities during contract expiration. The basis is defined as the cash price minus the futures price for any given agricultural commodity at the point of contract expiration, and thus indicates the extent to which cash

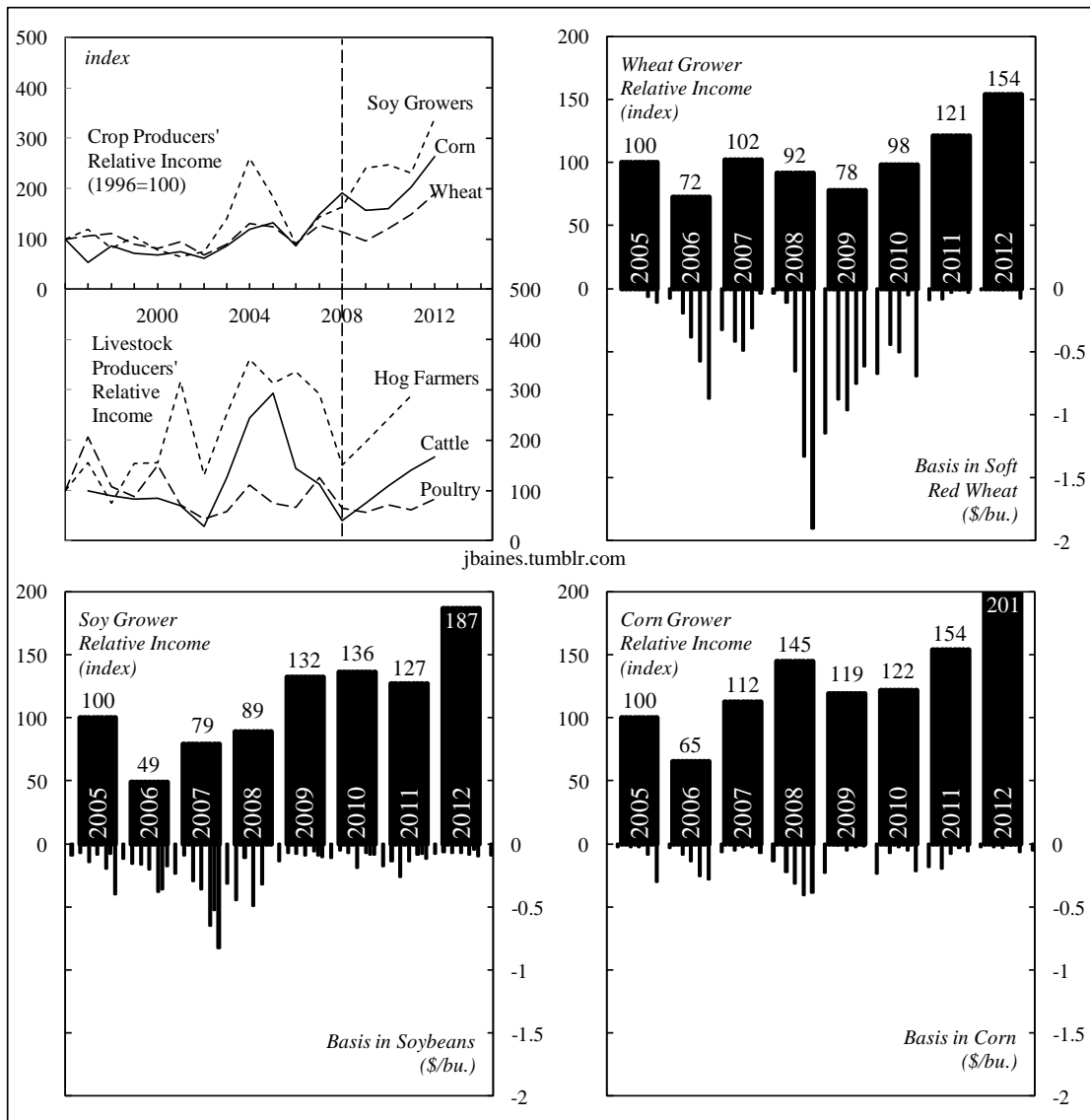


Figure 4.6 Farmer Relative Income and Grain Futures Convergence

Note: Farmer relative income calculated by dividing average net cash farm income by the average wages of nonfarm production workers. Relative income data re-based at 100 in 1996 for the top-left chart. Note that, the relative income observation for cattle farmers in 1996 is omitted because it was a negative value in that year. Therefore, this series has been re-based to 100 at 1997. Basis is the daily cash price less futures price during the delivery period for each contract expiration month (bu. = bushel). There are five contract delivery periods for the soft red wheat and corn contracts each year, and eight contract delivery periods for the soybean contracts.

Source: Farmer income data from the US Department of Agriculture’s Agricultural Resource Management Survey available at: http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/tailored-reports.aspx#.U24aB_m7ySq Basis data from Hoffman, L.A. and Aulerich, N. (2013) ‘Recent Convergence Performance of Futures and Cash Prices for Corn, Soybeans, and Wheat’, Report from the Economic Research Service, US Department of Agriculture, FDS-13L-01, pp.15-16. For average earnings data for nonfarm workers see source details for Figure 4.3

markets and futures markets are converging. The thick bars reproduce the relative income data for the crop producers presented in the top-left panel. The thin lines track the basis for the futures prices for the different commodity crops. The longer these lines are, the lower the futures prices are relative to the cash prices, and the greater the convergence problems are, for the respective crops. The charts suggest that convergence problems were most acute in wheat markets. When the basis was widest for the wheat farmers, in 2006, 2008 and 2009, their relative income was comparatively low. In contrast, corn and soy bases have been generally much narrower, and there does not seem to be any direct relationship between relative income and basis levels for these crop producers.

Why were wheat growers more negatively affected by futures price instability than other farmers in the commodity crop sector? Arguably, a key factor was the outsized presence of Commodity Index Funds (CIFs), such as the S&P Goldman Sachs Commodity Index (S&P GSCI), in the wheat futures market. At the height of the price crisis in 2008, index funds laid claim to the equivalent of 196 percent of the wheat crop, but just 22 percent of the soybean crop and 13 percent of the corn crop for that year (ABA, 2009). A representative of the National Farmers Union (NFU) - a general farm organization that according to Bill Winders (2009) has been historically aligned with wheat interests - was unequivocal in his appraisal of the situation: 'speculators have created a huge mess here for us... farmers are feeling this today' (cited by Reuters, 2009). While wheat farmers have lambasted the possibly destabilizing impact of the influx of CIFs in agricultural futures markets, representatives of other grain farmers have been ambivalent on the issue. The ambivalence partly stems from the fact that convergence problems have been much less acute for corn and soybean markets. It also stems from the fact that the CIFs have been widely considered to have had a 'price-supportive'

impact on the market, and thus allowed farmers to sell their crops at higher prices than the putative 'market fundamentals' would have allowed. The complexity of the situation was well articulated in a statement delivered to the CFTC in 2008 by the American Farm Bureau Federation (AFBF):

Trading activity by funds is certainly one of the contributing factors generating high futures prices for commodities. Ordinarily, this would appear to be positive for agriculture. But if the futures markets do not converge with cash markets, there is little information on what real price levels should be either for producers or consumers of the commodity in question. (Cited by US Senate, 2009: 141-2)

As the purported representative of farmers in general, AFBF's carefully calibrated statement in which it lauds the inflationary effects of the expansion of CIFs but bemoans its apparently destabilizing impact on grain futures markets, coheres with the quantitative findings of this section. For as the regression results suggest, on an aggregate level farmers benefit from higher grain prices but they appear to suffer from increased grain futures price instability.

So far we have just examined grain farmers, but what explains the negative effects of high and volatile futures prices on the US livestock sector in general, and cattle farming in particular? Feed comprises 60-70 percent of the livestock production costs in the US, and thus high grain futures prices are associated with crimped margins within animal agriculture (Becker, 2008). Additionally, the more volatile grain futures prices are, the harder and the more expensive it is for livestock interest groups to hedge input costs. These problems are particularly acute for cattle producers because of the unique structure of cow-beef production. Cattle have the longest biological cycle of all farmed animals in the US. The gestation period for calves is nine months, and then cows can live for up to one and a half years before they are killed. In contrast, it takes just 13 weeks to bring chickens from zygote-state to slaughter weight, and 45 weeks for hogs. Furthermore, cows typically produce only one calf a year,

while sows can produce a litter of eight to nine piglets every six months and breeder hens can lay over 12-dozen hatching eggs annually. As a result of the low fecundity and long biological cycle of cows, it takes a long time for cattle producers to adjust population levels to new feed grain price conditions, and they are thus particularly vulnerable to grain futures price volatility (McBride and Matthews, 2007). The vulnerability is compounded by the fact that unlike grain farmers, livestock farmers cannot withhold their product using on-farm storage facilities in the hope of more favorable price conditions in the future. The marketing window for live-animals is simply too short and the handling costs are too high. As the old agricultural saying goes, cattle farmers must 'sell it, or smell it' (Knorr, 2010: 12).

The Trading Houses

Let us shift our attention from the rather unglamorous undertaking of raising livestock to the more rarefied business of commodity trading. Unfortunately, long-term, granular data for the earnings of the agricultural commodity traders are difficult to obtain. The major trading houses that have historically dominated grain merchandising were privately owned, and as a result there is a lack of publically available financial data on these companies. Fortunately, however, fragments of Cargill's net income data have been published in various texts (Broehl, 1992; 1998 and 2008; Kneen, 1995). These fragments have been pieced together in this thesis to create a continuous dataset of the net income of Cargill from 1950 onwards. Shorter-term net income data for the major grain traders have been easier to obtain. From 1999 onwards Cargill began to release press statements on a quarterly basis that disclosed details of its financial performance. Moreover, by 1999 Bunge became a publically traded firm. And by the late 1990s, publically-traded ADM ascended from being a major grain processing firm within the

US to one of the world's most powerful trading companies. As a result, the quarterly net income data for the three largest trading companies in the last fifteen years are obtainable.

The two charts in Figure 4.7 plot the relative net income data of ADM, Bunge and Cargill (henceforward 'ABC') against the same grain futures price data presented in Figures 4.1, 4.3, 4.4 and 4.5. Following the CasP's method of empirically investigating distributional shifts within dominant capital, ABC's relative income is calculated by dividing the average net income of the ABC firms by the average net income of the top 500 US-listed firms, ranked by net income for each quarter (Nitzan and Bichler, 2009). The left chart suggests that there is a non-linear relationship between ABC's relative income and the levels of relative grain futures prices. And the right chart shows a clear positive correlation between the relative income of ABC and the volatility of relative grain futures prices.

The two charts in Figure 4.8 plot the annual relative net income data of Cargill against annual relative grain futures price levels and volatility. Cargill's relative earnings are computed in the same way, *mutatis mutandis*, as those of ABC. There are two ways of understanding the left panel. Firstly, one can see an unchanging structure that yields a negative but loose correlation for the entire period. Secondly, one can observe a series of sub-structures linked by structural changes, where the underlying substructures show tight positive correlations. From the second perspective, one can see key structural changes during the two commodity super-cycles of the 1970s and of the 2000s, when relative grain futures prices increased dramatically. In these two periods, indeterminate relations between relative grain prices and Cargill's differential profit gave way to steep positive correlations. Interpreting the right panel is much more straightforward: here one can see a clear and consistent long-term positive correlation between Cargill's differential profit and the volatility of relative grain prices. The fourth and fifth rows of Table 1 present the regression results for the raw data presented in

Figures 4.7 and 4.8. These two rows of statistical results should be treated with even more caution than the statistical results for the farmer grain income datasets, due to the lower number of observations upon which the regression analyses are based. But the results appear to confirm the positive relationship between grain traders' relative income and the volatility of relative grain futures prices.

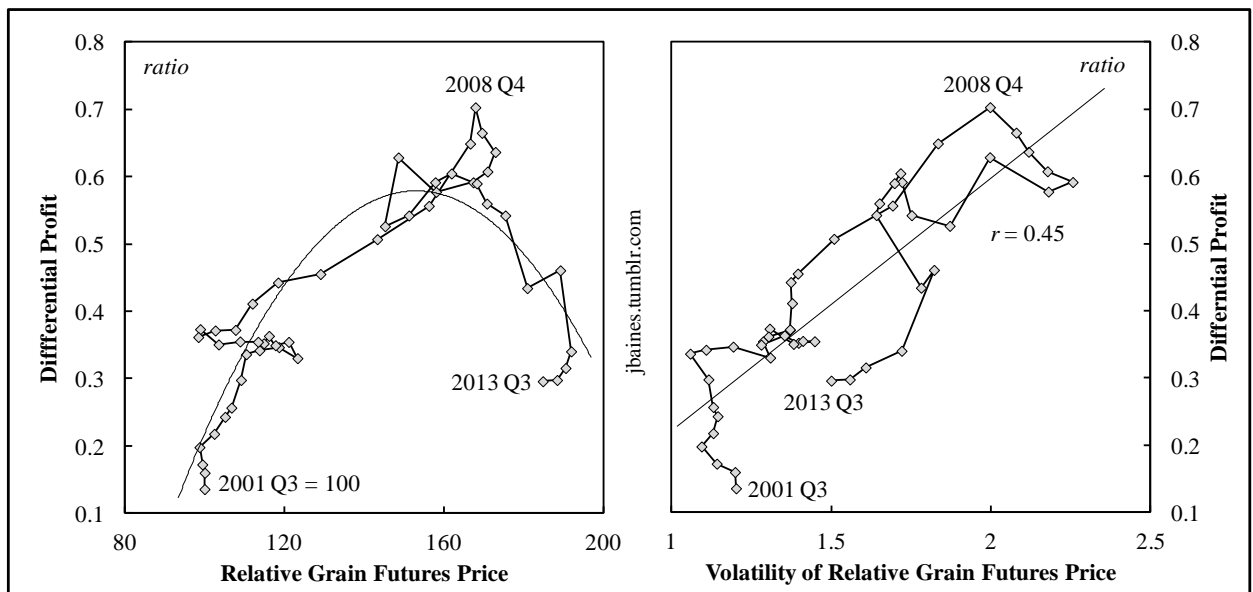


Figure 4.7 The Major Agricultural Commodity Traders' Differential Profit and Food Price Instability

Note: The major agricultural commodity traders' differential profit is computed by dividing the average net income of Archer Daniels Midland, Bunge and Cargill in each quarter by the corresponding average per firm net income of the Compustat 500. For relative grain futures price levels and volatility computations see note to Figure 4.1. Relative price and profit for the major agricultural commodity trader charts smoothed as 2-year moving averages

Source: Archer Daniels Midland, Bunge and Compustat 500 net income data from Compustat through WRDS. Cargill data from New York Times, Wall St, Journal and <http://www.cargill.com/company/financial/index.jsp> (accessed 2 May 2014). Grain futures price index data and Producer Price Index data from Global Insight, series codes: CRGRNSX.D7 and WPID01.M.

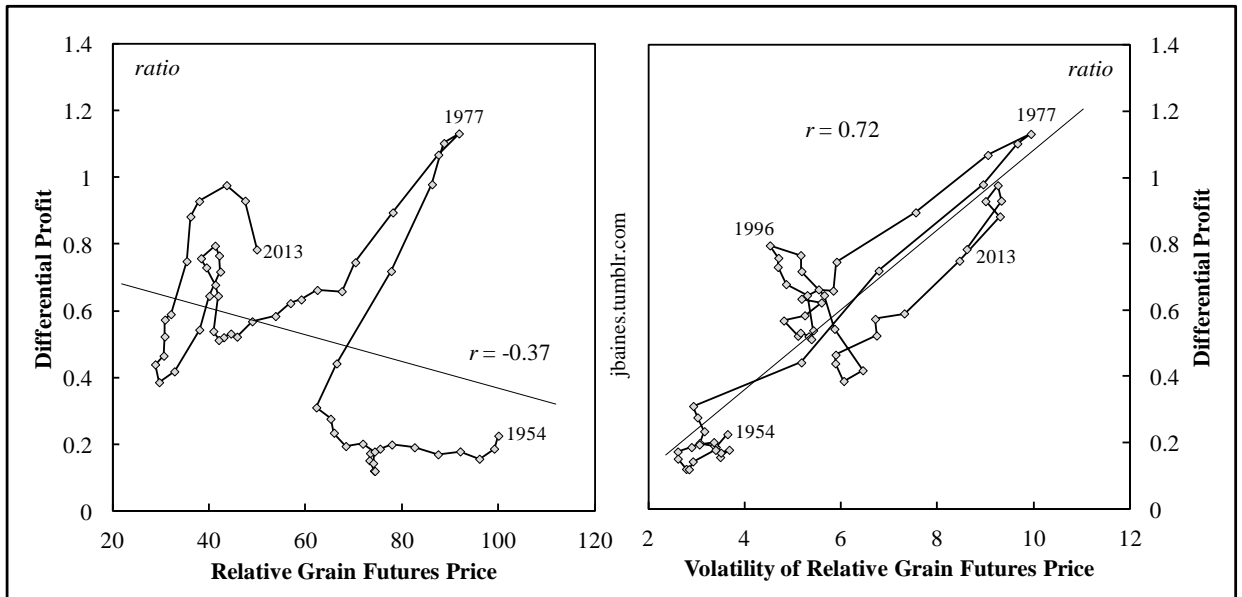


Figure 4.8 Cargill's Differential Profit and Food Price Instability

Note: Relative price volatility data computed as the standard deviation of the monthly changes in relative grain futures prices in a 1-year moving window. Grain futures price are measured using a reconstructed CRB Grain Futures Price Index. This reconstructed index comprises an unweighted average of monthly wheat, corn and soybean prices, like the original index for daily prices. Cargill's differential profit computed by dividing Cargill's net income each year by the corresponding average per firm net income of Compustat 500. Relative price and profit data for the Cargill charts are smoothed as 5-year moving averages. The Compustat 500 is the 500 largest firms ranked by net income. Relative grain futures price data re-based at 100 in 2001 Q3.

Source: Archer Daniels Midland, Bunge and Compustat 500 net income data from Compustat through WRDS. Cargill data from Broehl (1992; 1998 and 2008), Kneen (1995) and <<http://www.cargill.com/company/financial/index.jsp>> (accessed 2 May 2014). Monthly wheat, corn and soybean prices from Global Financial Data, series codes: W_USSD; C_US2D; and SYB_TD.

The positive correlations between grain futures price volatility and commodity traders' relative earnings complicate existing understandings of the distributional impacts of volatility for agricultural interest groups. The data indicate that volatility is not a bane for agricultural commodity traders. Rather, at least in a qualified sense, volatility is considered to be a boon. Indeed, due to the trading houses' unsurpassed reach into global trade flows and their often privileged access to policymakers and supply chain participants, they are privy to multifarious

streams of commercially-relevant information. They thus have a clear lead in the 'price discovery' process. And during periods of price turbulence, this lead tends to widen as the agricultural commodity traders can take advantage of the disorientation of other market participants, and harness their differential knowledge to navigate significant profit opportunities through arbitrage, informed speculation or the ramped up provision of risk-management services to farms, firms and sovereign states. With these considerations in mind, the agricultural commodity traders may be one of the main beneficiaries of the grain futures price volatility that possibly arises from the influx of CIFs and other investment vehicles in agricultural commodity derivatives markets. A statement made in Deutsche Bank's financial prospectus for Glencore - a conglomerate that accounts for nine percent of the global grain trade - affirms this view:

As commodities gain popularity as an asset class, the financial aspect of demand, which is arguably more susceptible to changes in sentiment will also continue to amplify volatility in our view. Commodity price volatility may not suit the pure producers... [But] Glencore's trading business actually benefits directly from the volatility. (Sporre, *et al.* 2011)

However, the agricultural commodity traders have not just been passively affected by increased investor interest in agricultural commodities as an asset class. In fact, they have actively facilitated the movement of institutional investors' capital in commodity derivatives. To illustrate, the world's largest agri-food trader, Cargill, expanded into financial services in 1972 by forming Cargill Investor Services - a division that offered a brokerage and advisory platform for investors seeking commodity exposure. And by 1994, the company founded Cargill Risk Management. This business unit designs customized OTC products to financial institutions seeking to diversify their portfolios (Broehl, 2008; Murphy *et al.* 2012). In the 2000s, Cargill Risk Management even set up its own passive long-only index that emulates the

S&P GSCI, and it also founded its own hedge fund - Black River Asset Management. Similarly, in 2006 Glencore embarked on a strategic alliance with Credit Suisse to design structured investment products based on Glencore's insider knowledge of global trade flows (Berne Declaration, 2011). And by 2013, ADM's investor services subsidiary (ADMIS) became the thirteenth largest futures brokerage firm in the world - handling US\$2.9 billion in customer equity (Szala and McFarlin, 2013).

The key findings that the chapter has reached so far are summarized in Figure 4.9. The figure shows that, in the aggregate, farmers' relative income is negatively correlated with futures price volatility and positively correlated with relative grain futures prices. Moreover, it shows that Southern Seaboard farmers' relative income is negatively correlated with both the level and volatility of grain futures. These findings lend some weight to Clapp and Helleiner's claims that grain futures price volatility has had a negative impact on distributional outcomes for agricultural interests. However, the other findings do not cohere with Clapp and Helleiner's arguments. As the matrix shows, Midwestern farmers' relative income is uncorrelated with grain futures price volatility and positively correlated with grain futures price levels; and the major agricultural commodity traders' relative income is positively correlated with futures price volatility and uncorrelated with grain futures price levels. Thus, when we disaggregate farmer income and extend the analysis to the pecuniary earnings of the grain traders, we can see that rather than being 'very clear and targeted' as Clapp and Helleiner suggest, the distributional impacts of price instability have been complex and variegated. In light of this finding, it may be the case that support for wide-ranging speculative limits is less uniform than is suggested by the extant literature. In what remains I investigate this hypothesis with particular regard to the definitional conflict over the delimitation of speculation and hedging,

and the correlative demarcation of target and non-target groups in the nascent speculative limits regime.

		<i>Price Volatility</i>		
		<i>Positive Correlation</i>	<i>No Correlation</i>	<i>Negative Correlation</i>
<i>Price Levels</i>	<i>Positive Correlation</i>		Midwestern Farmers	All Farmers
	<i>No Correlation</i>	Grain Traders		
	<i>Negative Correlation</i>			Southern Seaboard Farmers

Figure 4.9 The Relationship between Agricultural Income and Price Dynamics

Coalition Dynamics: Rule Ambiguity and Definitional Conflict

As the first section showed, Clapp and Helleiner take the CMOC to be the key vehicle for agricultural interests during the lead-up to the passing of the Dodd-Frank Act; and Pagliari and Young contend that this countervailing mobilization of agricultural interests stands in contrast to the advocacy efforts of commercial groups that formed the CDEU. According to Pagliari

and Young, the CDEU is the vehicle of those commercial interests outside of agriculture that have enhanced the vetoing power of banks in the regulatory reform of credit derivatives markets. But the coalitional dynamics behind agricultural derivatives regulations are less straightforward than the extant literature suggests, just as the distributional dynamics of price instability are less clear. Figure 4.10 maps out the nexus of agricultural interest groups that have lobbied over agricultural derivatives reform.

A number of observations are worth making. Firstly, one can see that the major commodity-specific interest groups in US crop agriculture (the National Corn Growers Association (NCGA), the American Soybean Association and the National Association of Wheat Growers (NAWG)), along with the largest general farm organization in the US - AFBF - are not members of the CMOC. Instead, they are members of the CDEU. In fact, no less than a quarter of the CDEU's member organizations represent agricultural interests. In contrast, under one-sixth of the CMOC's member organizations represent agricultural interests. And of those agriculture-based organizations within CMOC one-half lobby on behalf of cattle producers. The remaining agri-food member groups of the CMOC represent baking interests, feed interests, ethno-cultural farmer groups and farmers more generally. Of the three general farm organizations in CMOC, the National Farmers Union (NFU) is by far the largest. However, it has nowhere near the lobbying clout that the AFBF boasts. In fact, from 1992 to 2014, the AFBF spent almost ten times more on election contributions (Center for Responsive Politics, 2014a,b). Finally, one should note that the major agricultural commodity traders occupy a central position in the overall constellation of agriculture sector lobbying organizations. The trading houses have indirect ties to the CMOC, due to the presence of some of their executives in the American Feed Industry Association and the American Bakers Association. However, they have a much denser set of connections to the CDEU and to the

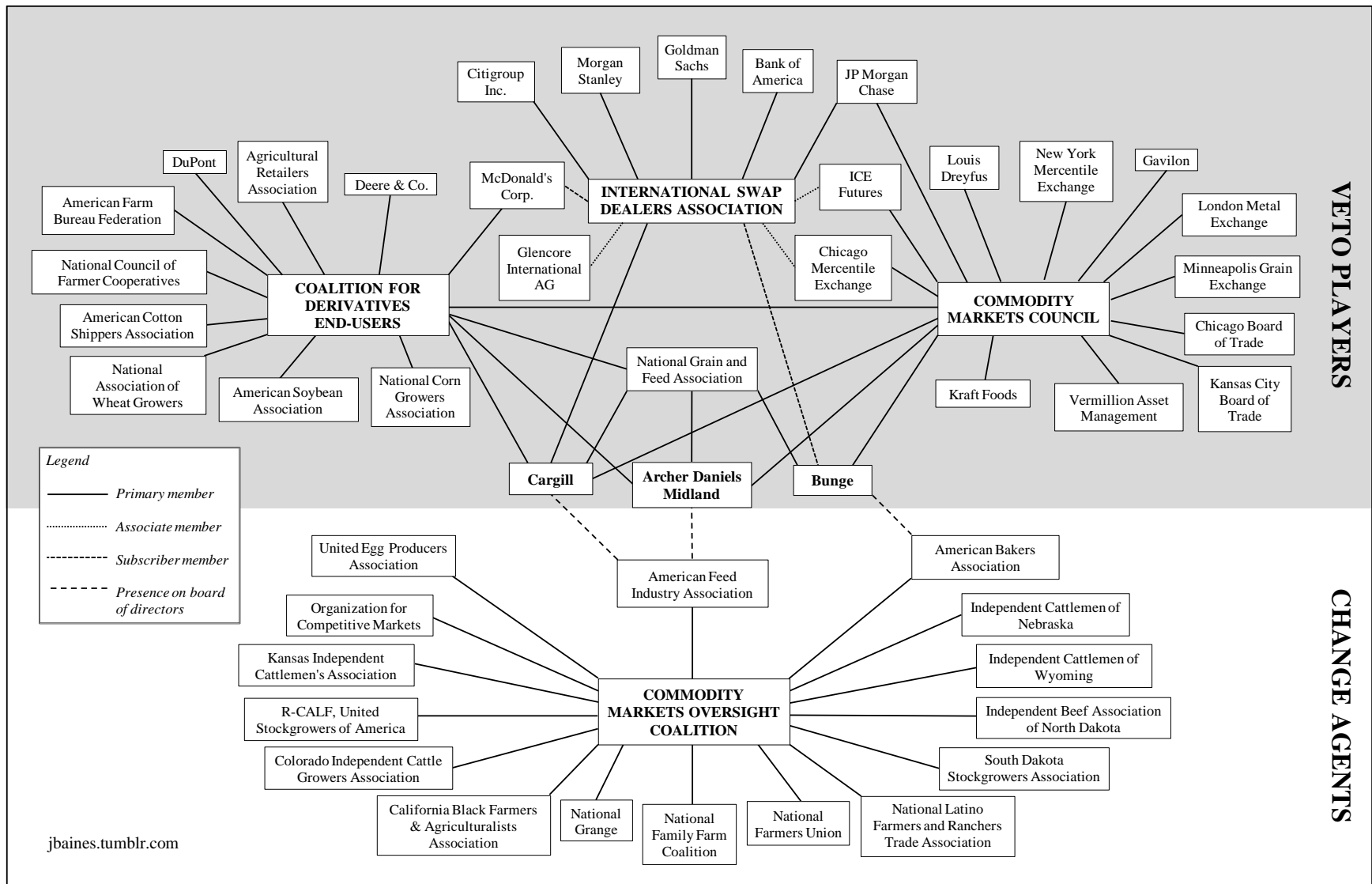


Figure 4.10 The Lobbying Networks of Agricultural Interest Groups

Commodity Markets Council (CMC). Moreover, Bunge and Cargill have links to the International Swap Dealers Association (ISDA) - a Wall Street bank lobbying group that represents 820 swap dealing firms, the five largest of which can be seen at the top of the network diagram.

The lobbying network diagram indicates that agricultural interests are bifurcated. On the one hand, there is a substratum of agricultural interests groups, primarily representing cattle grower interests, that form the CMOC. And on the other hand, is a multiplicity of crop grower, trader and swap dealer organizations that belong to three interlocking advocacy organizations: the CDEU, the CMC and the ISDA. This division in agricultural interest groups is mirrored by the divergent advocacy efforts of those market participants within and beyond the US agricultural sector in regard to the most heavily contested aspect of commodity derivatives reform: the definition of *bona fide* hedging. As has already been indicated, there is so much at stake in this definition because it effectively determines which market participants will be exempt from the new speculative limits, and which market participants will be subject to them. The actual levels of the limits have been subject to less controversy, as they largely follow the federal limits that have been in place in agricultural derivatives markets for decades. In what remains, I outline the advocacy efforts of those change agents within agriculture and government that have supported the narrowing of the *bona fide* hedging exemptions and the swift implementation of reform; then I outline those veto players within agriculture and government that have resisted the narrowing of the hedging exemption and who have sought to scupper the emergence of a new position limits regime. Although the existing literature highlights the former group within the US agricultural sector, no attention has yet been paid to the latter group.

Change Agents: Narrow the Exemptions, Broaden the Target Group

Some agricultural groups have endorsed a narrow end-user exemption that would just encompass those derivatives transactions that directly offset the physical exposures of commercial entities. This restriction of the end-user exemption would bring about the end of the practice of granting exemptions to those swap dealers that buy futures contracts to hedge the risks associated with selling commodity index swaps. As Clapp and Helleiner (2012) convincingly argue, the CMOG has been key in advancing the agenda of constricting exemptions.

But it is not just financial firms that have been targeted by change agents. Some agricultural groups have raised concerns that the largest commercial end-users may use hedging exemptions as a subterfuge for untrammelled speculative activity. These concerns were clearly articulated in comments submitted to the CFTC in March 2011 by the CMOG member, the Ranchers-Cattlemen Action Legal Fund (R-CALF). In its submission, R-CALF (2011) asserted that the four largest beef-packers, one of which is Cargill itself, commonly engage in 'speculative short-selling' in order to keep the price of cattle 'artificially low'. Accordingly, the organization beseeched the CFTC to 'draw a clearer line between physical hedgers and speculators to ensure that dominant physical hedgers do not unduly influence the market by assuming a dual role of both physical hedger and speculator'. The speculative short-selling alleged by R-CALF, along with the commodity traders' construction of investment vehicles to attract investor interest in agriculture detailed in the previous section, suggests that commodity traders' risk management practices are operating in ways that may be unbecoming of the commercial hedger designation historically assigned to them.

CFTC staffers have also suspected that the commodity traders may be engaging in speculative activity. Indeed, as has been confirmed by a legal report authored by a former General Counsel and a former Chief of Staff at the CFTC, staffers within the agency are 'skeptical of the price risk management utility of many common commercial risk management practices, particularly those used by commodity merchandisers [i.e. the commodity traders]' (Arbit *et al.*, 2013). Two longstanding risk management practices adopted by the commodity traders have been subject to particular scrutiny: cross-hedging and anticipatory hedging. The first entails offsetting the risk of a cash-market transaction in one commodity with a derivatives market transaction in another commodity. The second entails using a derivatives transaction to offset an anticipated, rather than an actualized, cash market transaction. Both risk management practices, from the viewpoint of those in the central organs of the CFTC, may be used to dissimulate speculative bets on the future course of prices. As a result, the CFTC has moved to narrow Congress's definition of *bona fide* hedging, by putting substantial restrictions on the eligibility of these risk management practices for the hedging exemption.

As Clapp and Helleiner indicate, the Chairman of the CFTC, Gary Gensler, has been instrumental in cultivating an environment in which new, more restrictive regulations on derivatives markets can be implemented. His status as a former partner at Goldman Sachs shows that not all individuals maintain the bearings of Wall Street when moving through the revolving door. To be sure, at the beginning of the rulemaking process, Gensler completely marginalized those senior staffers that did not accord with his mission to enforce new stringent regulations on derivatives markets (Brush and Schmidt, 2013). Moreover, Gensler's fellow Democratic Commissioner, Bart Chilton, a former Chief of Staff at the NFU, championed the Chairman's agenda. The third and final Democratic Commissioner, Michael Dunn, also fell into line, albeit less enthusiastically. All three voted in favour of the CFTC's new position

limits rule in 18 October 2011 that substantially narrowed the regulatory definition of *bona fide* hedging. In his speech on the day of the vote on the new rule, Chilton waxed Americana:

We're going to get rid of sort of the 'Wild Wild West' of exemptions... The Commission will approve exemptions, but only under very strict guidelines. There's an old Bruce Springsteen song, you've got to 'Prove It All Night'. So traders will have to prove that they are *bona fide* hedgers... they will have to prove it all night and all day. (Chilton, 2011)

Gensler (2011) concurred with Chilton, albeit in less vivid language, by stating that the final rule 'implements Congress's direction to narrow exemptions'. Commissioner Dunn was also in no doubt about the statutory basis of the CFTC's rules on position limits. As he stated: '[t]he law is clear, and I will follow the law'. However, he was at pains to outline the potentially negative ramifications of the ruling: '[for] farmers, producers and manufactures, position limits, and the rules that go along with them, may actually make it more difficult to hedge the risks they take on' (Dunn, 2011). The deep reservations that Dunn expressed point to the groundswell of opposition amongst some groups within the agricultural sector. It is to this groundswell that we now turn.

Veto Players: Broaden the Exemptions, Narrow the Target Group

As Clapp and Helleiner contend, the agricultural committees of Congress and the CFTC have been quite receptive to the advocacy efforts of pro-reform groups during the post-crisis financial regulatory policymaking process. With that being said, these government bodies have in no way been impervious to the influence of veto players. For example, the Republican Chair of the House Agriculture Committee, Frank Lukas, expressed resistance to swift reform from the outset of the CFTC's rulemaking process. In a statement delivered shortly after the CFTC's notice of proposed rulemaking in January 2011, Lukas (2011) bemoaned the fact that 'the

CFTC has proposed very broad and far-reaching definitions, but very narrow interpretations of the exemptions Congress authorized'. For Lukas (2011), the CFTC's proposed narrowing of exemptions contravened Congressional intent, for 'while Congress gave the CFTC broad discretion in defining key terms, it also directed the CFTC to provide exemptions where appropriate to avoid imposing unjustified and unnecessary costs on market participants'. Accordingly, Lukas sponsored a House Bill - HR 1573 - that would extend the CFTC's deadline for the implementation of new agricultural derivatives regulations by 18-months. He argued that such a measure would ensure that the CFTC's regulatory categories were adequately defined, so as not to undermine what he saw as legitimate hedging activity.

Lukas's Democratic counterpart in the House Agriculture Committee, Colin Peterson, expressed dismay at these attempts to slow the reform process and he charged that the supporters of the bill, 'including the financial community and even some in the end-user community... want to see nothing get done' (cited by Schuff, 2011: 4). The participation of non-financial groups in obstructing reform has been thoroughly examined by Pagliari and Young (2013, 2014) in the field of credit derivatives regulation. But what has been missed so far is that agricultural interests have been among those in what Peterson calls the 'the end-user community' that supported attempts to thwart swift regulatory changes in commodity derivatives reform. Indeed, in a letter addressed to the House Committee on Agriculture, the NCGA, argued that if implemented without modification, the new position limits regime 'would negate the economic and end user protections provided by the Dodd-Frank Act' and would come with 'a high price tag on the economy' (NCGA and NGSA, 2011). As such, the NCGA endorsed HR 1573. In a House Committee on Agriculture hearing, Todd Thul - a representative of Cargill's risk management division - chimed with the NCGA by opining that the CFTC should take more time to rework some of its key market definitions: 'in order to

have a firm ruling on what a position limit might be, we need to have definitions around *bona fide* hedge... and anticipatory hedging, and it feels too early'. If the proposed definitions became enshrined into rules, Thul warned, it 'will reduce the industry's ability to continue offering the same suite of marketing tools to farmers that they are accustomed to using' (Cargill, 2011).

Thul's wish for delays in the rulemaking did not initially appear to be granted. Although HR 1573 was approved by the House Financial Services Committee, measures to address 'excessive speculation' in derivatives markets were exempted from the regulatory moratorium. And shortly after Thul's testimony, the panel of commissioners at the CFTC voted on the new position limit rules. All three Democratic commissioners voted in favour of the ruling. But as with the House Committee on Agriculture, leading figures within the CFTC sought to stand in the way of the implementation of the new rules. In particular, the two Republic commissioners - Jill Sommers and Scott O'Malia - were incensed by the partial exclusion of anticipatory hedging from the *bona fide* hedging definition. Sommers - the former Head of Government Affairs at ISDA - stated that the limitation of anticipatory hedging to transactions no larger than current or anticipated storage capacity was 'needlessly at odds with the statute' set by the Dodd-Frank Act, and 'needlessly at odds... with the legitimate needs of hedgers' (2011). O'Malia, who, by July 2014, became the Chief Executive of the ISDA, echoed Sommers's sentiment and cited the testimony made by Cargill's Todd Thul when excoriating what he saw as the negative consequences of delimiting various risk management activities, such as anticipatory hedging, from exemption. And like Sommers, O'Malia claimed that the CFTC arrogated to itself regulatory authority to which it was not entitled and indicated that the nascent position limit regime was open to legal challenge.

The legal challenge that Sommers and O'Malia predicted, and indeed invited, was mounted two months after the passing of the final rule, by the ISDA and its sister organization - the Securities Industry and Financial Markets Association. The lawsuit was taken to the District Court for the District of Columbia. Although the Court was not entirely convinced by the plaintiffs' claims that the CFTC's ruling had stepped beyond the bounds of Congressional intent, it nonetheless vacated the CFTC's position limits regime and ruled that the CFTC had to resolve the existing ambiguities in legislative intent in regard to the establishment of new position limits (Arbit *et al.*, 2013) The Court's invalidation of the new position limit regime was met by silence from almost all agricultural interest groups. Only the CMOC inveighed against the ruling (see CMOC, 2013). The absence of wide-ranging complaints by other agricultural groups further corroborates the claim that, *pace* Clapp and Helleiner and *pace* Pagliari and Young, many farmers have had a limited appetite for the swift implementation of a new position limits regime.

The Agricultural Derivatives Endgame

The CFTC proceeded to advance a new position limits proposal while at the same time appealing the District Court's decision. Although O'Malia deemed this dual strategy 'unsavoury', he was the only commissioner that felt distaste for the CFTC's actions, and on 5 November 2013 the New Position Limits Proposal was approved in a 3-1, party-divided vote. The proposal contains a preamble that sought to resolve the statutory ambiguities identified in the District Court's ruling. In addition, the substance of the new proposed limits differed markedly to the aborted position limits regime that was approved on 18 October 2011. Most importantly, the CFTC had further narrowed the definition of *bona fide* hedging. The limited

anticipatory hedging exemption that was granted by the original position limits rule to commodity traders on the basis of current or unfilled storage capacity was removed. Moreover, the cross-hedging exemption was further restricted.

Once again, O'Malia expressed his dismay. The CFTC's stringent interpretation of *bona fide* hedging was at the top of his litany of discontents: '[t]his position limits proposal is just the latest in this disturbing trend of narrowly interpreting the statute to foreclose viable risk management functions that did not contribute to the financial crisis (O'Malia 2013). The changes also bewildered some of the major agricultural traders. In a letter to the CFTC, the Executive Chairman of Cargill, Gregory Page, argued that '[t]he net effect of the proposed rule could force commercial firms like Cargill to use speculative positions to hedge what has traditionally been legitimate *bona fide* hedging commercial activity' (Cargill, 2014). Confronted with the possibility of losing some of their end-user exemptions, the agricultural commodity traders and the organizations representing them have begun to contest the legitimacy of reform of any kind. As the CMC (2014) contended, '[t]he necessity for the imposition of new federal imposed position limits has not been clearly demonstrated as statutorily required'. Concurrently, ADM (2014) argued that '[t]he CFTC should also avoid any major redesign of the current system, but rather simply build upon the existing successful one'.

While the traders have pushed the CFTC to return to its pre-existing exemption rules, the CMOC (2014) has continued to implore the CFTC to 'reject calls to create an explicit enumerated hedge exemption or any other type of regulatory exemption for the benefit of commodity index funds'. However, just as in the rulemaking period before the District Court's remanding of the position limits regime, not all farm groups have followed the CMOC's lead in calling for strict regulations. In fact, like the trading houses, the US's largest general farm organization, the AFBF, and the largest commodity-crop farm groups - the ASA, the NAWG

and the NCGA - have been completely silent about the issue of index funds ever since the CFTC rulemaking process began. Moreover, they have followed the agricultural traders in expressing dismay at the constriction of the hedging exemption. The AFBF, for example, has argued that the CFTC's proposed definition of *bona fide* hedging 'is unnecessarily rigid and narrowly drawn' (AFBF, 2014). Thus, the CMOC now increasingly appears to be a renegade force in US agricultural advocacy efforts, as many farmer interest groups have begun to articulate their regulatory preferences in ways that are congruent with the agendas of the commodity traders.

What explains the presence of farmer interest groups in the agricultural veto-bloc led by the commodity trading houses? As has already been indicated, it is partly because farmers believe that, if the new position limits regime is implemented, they will not be able to receive the same range of marketing tools from commodity traders that they currently enjoy. But more importantly, it is because they fear that expanded coverage of speculative limits might undermine the capacity of the traders to effectively manage price risks and that these risks may, in turn, be offloaded onto farmers in the form of lower prices for the products that they sell (Peterson, 2014). Due to the fact that the crop farmers represented by organizations within the CDEU are generally less vulnerable to the grain futures price volatility than those cattle producer groups represented by the CMOC, these concerns regarding the generalized costs of a broad position limit regime likely outweigh fears regarding the destabilizing effects that CIFs may have on prices. Agricultural interests have thus diverged. On one side, is a substratum of agricultural groups, in which livestock interests predominate, that remain haunted by the spectre of volatility and that continue to champion a new and far-reaching position limits regime. And on the other side is a multiplicity of crop grower, trader and swap dealer

organizations that want to see no drastic departure from existing commodity derivatives regulations.

These findings complicate the extant understandings of the role of agricultural interests in commodity derivatives reforms. In particular, the fracturing of agricultural groups' regulatory preferences and the indeterminacy over who, in fact, are the target groups of reform, casts doubt on whether agricultural interests can remain neatly confined to one quadrant of Pagliari and Young's payoff matrix. Although there was a chorus of concern regarding the decoupling of futures prices and cash prices in some grain markets from 2007-08, this has given way to more discordant advocacy efforts, as convergence problems have subsided and as exemptions historically granted to commercial end-users increasingly appear to be under threat. Moreover, the lobbying activities of those agricultural groups belonging to the CDEU, the CMC and the ISDA force us to revisit Clapp and Helleiner's argument that the advocacy efforts of US agricultural groups in the field of derivatives reform 'may end up generating an outcome - less volatile agricultural prices - which strengthens the food security of the world's poor' (2012: 206). The qualitative evidence marshalled in this section suggests that agricultural commodity traders and a plurality of commodity-crop farmers appear to be at best, agnostic, and at worst, obstructionist, in the face of regulatory measures designed to mitigate volatile prices. And the quantitative evidence presented in the previous section also points to a possible misalignment in the interests of commodity traders and US commodity-crop farmers, on the one hand, and the global poor, on the other.

Indeed, as this chapter has shown, high grain prices have been beneficial for commodity crop farmers and high levels of price volatility have been a boon for the commodity traders. Conversely, it has been well-documented that high and volatile prices have grave impacts on those food insecure populations around the world that, after decades of

growing import dependency, are exposed to the exigencies of world markets. Food price spikes undercut the purchasing power of the urban poor and they also increase government import bills, with the result that governments have less 'fiscal space' to pursue long-term poverty-reduction programmes. The resulting increase in hardship, in turn, fosters conditions for social upheaval (World Bank, 2011; Hossain *et al.*, 2013). By way of closing the circle of the analysis, Figure 4.11 presents the nexus between differential pecuniary earnings within US agriculture and instability elsewhere. This chart takes its cue from the analysis of Lagi *et al.* (2011b). In their analysis, Lagi *et al.* connect the outbreak of social unrest to changing food prices. In a similar vein, this chart connects the outbreak of social unrest to differential income and profitability. More specifically, the solid line tracks the average net income to sales ratio of the agricultural commodity traders relative to the average net income to sales ratio of the top 500 largest corporations listed in the US, ranked by net income; the duplex line traces the relative income of Midwestern farmers; and finally, the dotted lines rising from the chart's abscissa indicate the beginning dates of the major 'food riots' and revolts of the early twenty-first century. The chart clearly shows that the relative income of Midwestern farmers and the relative profitability of the trading houses have been coeval with bouts of social upheaval abroad.

These data encourage us to be circumspect in regard to the contention that US agricultural interests may accord with the interests of the world's poor. Any claims about the agricultural interest groups playing a positive role in food security by pushing for less volatile agricultural prices must be qualified with the observation that two key groups within US agriculture - the commodity traders and commodity-crop farmers - have thrived amid price instability.

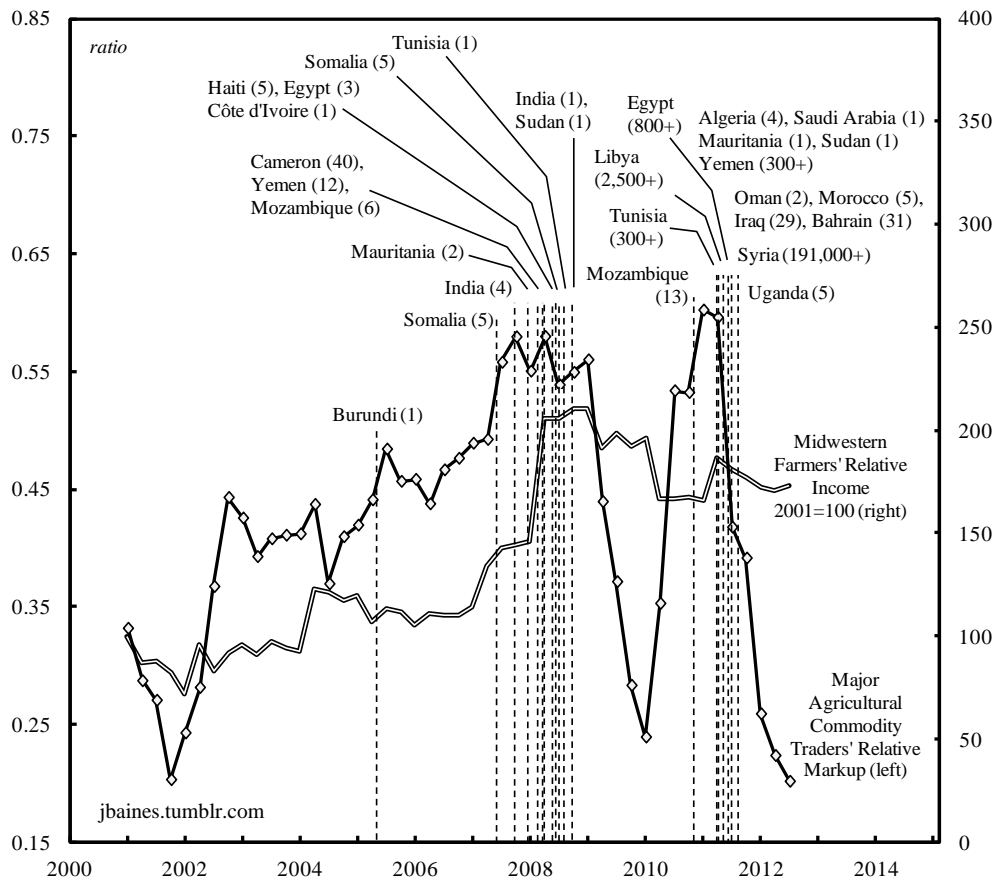


Figure 4.11 The Differential Profitability of Traders and Farmers and the Incidence of Revolt

Note: The major agricultural commodity traders comprise: Archer Daniels Midland, Bunge and Cargill. Differential markup is calculated by dividing the weighted average profit ratio of sales of these three companies by the weighted average profit ratio of sales of the Compustat 500. The Compustat 500 is the 500 largest firms by net income ranked for each quarter. Differential markup data presented as a one-year moving average. The dashed vertical lines correspond to the beginning dates of riots and protests associated with the ‘Arab Spring’. Death tolls reported in parentheses.

Source: Net income and revenue data for Archer Daniels Midland, Bunge and the Compustat 500 from Compustat through WRDS (series codes: NIQ and REVTQ). Net income and revenue data for Cargill from Financial Times, Wall St. Journal, Business Source Premier and <http://www.cargill.com/company/financial/index.jsp> (accessed 27th January 2014). Revolt data from Lagi, M., Bertrand, K.Z. and Bar-Yam, Y., 2011b, The Food Crises and Political Instability in North Africa and the Middle East, New England Complex Systems Institute. For Midwestern farmers’ relative income data see source details for Figures 4.3 and 4.4.

Conclusion

At the end of their exposition on the leveraging of interests in financial reform, Pagliari and Young (2014: 600) propose that future scholarship needs to have 'greater sensitivity to the often plural politics of global finance to allow for a more contingent and nuanced understanding of financial industry influence'. In line with this proposal, I have sought to offer an analysis that is both sensitive to actor plurality and attentive to the complex dynamics of regulatory policymaking in the field of commodity derivatives reform. Most importantly, the chapter has shown that there are fewer agricultural groups negatively impacted by price volatility, and fewer agricultural groups in favour of extensive derivatives reform, than is suggested by the existing literature. True, the CMOC persists in pushing for the swift implementation of a position limit regime with wide-ranging coverage, in large part because of the deleterious impacts of volatility on the relative income streams of the primarily livestock-based agricultural organizations that the CMOC represents. However, the commodity-crop producers and trading houses that are represented by the CDEU, the CMC and the ISDA have generally prospered amid the tumult. These groups' main concern is that their interests might be undermined by the implementation of a speculative limits regime with a target group that is so broad that it encompasses the trading houses themselves.

Due to their dual status as commercial end-users of derivatives products, on the one hand, and traffickers of agriculture as an asset class, on the other, the agricultural commodity traders bring to light the inherent ambiguity of financial regulatory policymaking and the inherent ambiguity of the categories that we use to understand it. The traders are neither pure speculators nor pure hedgers, neither simply financial nor simply commercial, and neither definitive targets of regulation nor definitive non-targets. Moreover, it is these hybrid entities,

rather than just the putatively speculative, financial and targeted firms on Wall Street, that are seeking to leverage the advocacy efforts of non-targeted groups in the debates on the coverage of speculative limits. So far the trading houses have had mixed success in this endeavour. They have garnered the support of many farmer organizations, but not all; and they have delayed the emergence of a new speculative limits regime, but they have not blocked it completely. The eventual outcome of the derivatives rulemaking process is of considerable interest because it may have a direct impact on the welfare and social stability of urban populations worldwide.

5. Conclusion

This thesis has drawn on the method of disaggregate accounting found in the CasP approach to discover and illuminate key conflictual dynamics within the contemporary agri-food system. In so doing, it provides a nuanced account of the distributional patterns, within agriculture and agribusiness, engendered by high and volatile food prices. More specifically, by examining the struggles of different agribusiness-agriculture coalitions over US agrofuel policy and the re-regulation of agricultural derivatives markets, the thesis offers a corrective to the tendency within some segments of the existing literature to advance a rather undifferentiated analysis of the interests of farmers, on the one hand, and agri-food corporations, on the other. In this first half of the concluding chapter, I summarize my major findings in further detail. In the second half, I point to possible avenues for future research.

The Dynamics of Power, Prices and Redistribution: A Summary

I argued in Chapter Two that the existing analyses of corporate power in the world food system tend to fall within three categories. Firstly, there are analyses that are directed at the macroscopic level and that offer a broad historical overview of growing corporate power in the global political economy of food. Secondly, there are analyses that are much narrower in focus: offering case-studies of individual corporations. Thirdly, there are analyses that attempt to synthesize these two perspectives. Although the first two forms of analysis seem very different, what they have in common is that they both tend to neglect the conflicts between different groups of corporations. And while the third form of analysis seeks to combine

analysis of world-historical trends with case-specific investigations, intra-capitalist conflicts remain obscured. Unfortunately, the few studies that do seek to address power shifts within food supply chains do not offer any quantitative means of charting changes in corporate control. As a result, these analyses of transformations of agribusiness power are liable, on occasion, to arrive at somewhat wayward conclusions.

I substantiated these arguments by examining the existing literature on 'supermarket mastery'. This literature holds that there has been a general shift in control away from food manufactures toward food retailers since the demise of the post-war food order. The analyses that fall within this stream of thought have gained a great deal of currency within both agri-food studies and global value chains analysis in the last two decades, in part because they offer a coherent and compelling account of contemporary supply chain restructuring. Notwithstanding the multiple contributions of this literature, I argued that it is potentially marred by the fact that the claims that supermarkets are the 'new masters' of the world food system have not been verified with careful examination of the relative profitability of retailers versus non-retail corporations.

My empirical engagement with the supermarket mastery thesis represents the first foray of CasP analysis into agri-food studies. The exploration was guided by the overarching principle that the shifts in agribusiness power are expressed quantitatively in the relative earnings and the relative commodity prices procured by groups at various points within agri-food supply chains. With this quantitative compass, I found that the sectoral profit share of food retailers and wholesalers has actually declined since the turn of the millennium. Moreover, I found that the shifting sectoral profit share of food retailers and wholesalers exhibits an extraordinarily tight correlation with the changing price ratio of 'finished foods', sold by supermarkets, to 'intermediate foods', sold by food manufacturers upstream in supply

chains. I then turned my attention from sectoral profit shares of food retail and wholesale corporations to the differential earnings of the main clusters of dominant agribusiness capital. By computing the ratio of the average earnings of different clusters of dominant agribusiness capital to the average earnings of the 500 most profitable corporations listed in the US, I found that the differential earnings of the major supermarkets has virtually flat-lined over the last two decades. Thus, whereas the food retailing sector as a whole reached the zenith of its power at the turn of the millennium, the relative pecuniary advancement of the major supermarkets was already running out of steam by the mid-1990s. On its own, this empirical reconnaissance does not necessarily debunk the supermarket mastery thesis, but it does encourage us to be more cautious in regard to claims made about the dominance of retailers in agri-food supply chains.

Chapter Two then moved from a broad analysis of the shifting contours of supermarket power to a detailed examination of the changing topography of agribusiness power further upstream in agri-food supply chains. I found that the dominant trading houses and the major agricultural input firms have enjoyed a dramatic increase in their differential earnings during the upsurge in the relative prices of raw agricultural commodities since the beginning of the twenty-first century. Marshalling qualitative analysis on corporate realignments, I argue that these trading houses and agricultural input firms have coalesced to form a distributional coalition that I call the Agro-Trader nexus. Instead of being passive ‘price takers’, the firms belonging to the Agro-Trader nexus have actively sought to restructure agri-food supply chains in ways that not only increase their own profit growth but also limit the growth of profits of other groups of firms within the political economy of food.

Chapter Three uses the coordinates laid out by the previous chapter and continues the process of progressive disaggregation of the agri-food system. It does so with particular reference to arguments made in the food regime account of the agrofuel boom. To recapitulate:

the food regime account, as advanced by McMichael, postulates that the agrofuel boom has increased the profitability of 'capital in general' and that it represents a new phase in which nature is further enfolded into the 'value calculus through which capital rules the world' (McMichael 2010, 622). The chapter followed McMichael in taking accumulation to be a universalizing process through which capital subjects the biosphere to a value-metric. However, it argued that the identification of differential capitalization as this metric enables the researcher to interpret accumulation in a manner that moves beyond the aggregate category of 'capital in general'.

Specifically, by viewing accumulation through the lens of differential capitalization, the chapter drew into the foreground the conflicting attempts by different groups of corporations to re-organize social reproduction in ways that increase their expected earnings and reduce their risk relative to 'the average'. Following from the mapping of the Agro-Trader nexus in the previous chapter, I delineate what I call the Animal Processor nexus: a network of corporations that superintend the conversion of animals into meat products. Combining differential capitalization and relative price measures, I show that soaring corn-ethanol production has shifted the balance of feed grain prices, and that this shift coincides with the empowerment of the Agro-Trader nexus over the Animal Processor nexus. Accordingly, just as the Agro-Trader nexus has championed government support for the corn-ethanol sector, the Animal Process nexus has opposed it. Thus, changes in the relative price of feed grain on the one hand, and changes in the relative power of the Agro-Trader nexus and the Animal Processor nexus on the other, are two sides of the same process of redistributive restructuring in US agribusiness.

Additionally, Chapter Three incorporated US farmers into the analysis of this redistributive restructuring. This analytical incorporation represents one of the few existing attempts to apply the CasP method of disaggregate accounting to redistributive dynamics

between non-corporate groups.⁸ As I argued, the ethanol boom has not only engendered a shift in pecuniary earnings from the Animal Processor nexus toward the Agro-Trader nexus; it has also led to a shift in income from farmers specializing in livestock production to farmers specializing in corn and soybean production. I argued that these findings contribute important details to extant food regime analysis of agrofuels. Indeed, McMichael tends to examine the power dynamics *between* agri-food capital and agricultural producers in his analysis of agrofuels, arriving at the broadly true, but now oft-stated, conclusion that the former is increasingly dominating the latter. The delineation of the Agro-Trader nexus and the Animal Processor nexus, along with the method of tracing the trajectory of differential capitalization of agri-food capital and differential income of farmers, adds nuance to McMichael's analysis because it helps us to cut *across* the agribusiness/agriculture divide. And in so doing, we can compare the pecuniary trajectory of one agribusiness-agriculture coalition against another agribusiness-agriculture coalition.

But the chapter did not just conceive new categories. It re-conceptualized existing ones. Most importantly, my analysis offered an alternative view of two paradigmatic concepts in agri-food studies, elaborated by the food regime approach: appropriation and substitution. In his account of agrofuels, McMichael convincingly shows that the appropriation of discrete phases of the agricultural process, on the one hand, and the rendering of perishable foods into substitutable commodities, on the other, has made it possible for agribusiness to integrate agricultural and food manufacturing processes within overlapping agri-food complexes on a world-scale. My analysis casts new meaning on these concepts by underscoring the fact that

⁸ The study by Hager (2014) is a forerunner as it disaggregates the bottom 99 income percentiles in the US to compare the flow of government transfer payments received by the lowest 40 percent with the flow of transfer payments received by those households falling within the 60th to 99th income percentiles.

control over distinct sub-processes within agri-food complexes, via appropriation, enables agribusiness groups to potentially re-channel flows of agricultural goods, via substitution, in ways that give them leverage over other agribusiness groups. Indeed, in the case of the US agrofuel boom, the dramatic increase in the substitution of ethanol for petroleum as championed and facilitated by the Agro-Trader nexus completely overwhelmed the Animal Processor nexus's and livestock farmers' rather limited capacity to replace corn with cheaper commercial feed with a comparable energy content. From this viewpoint, the processes of appropriation and substitution are not just momenta for the increased corporate control over the political economy of food. They are, in fact, key modalities of redistributive struggle.

The massive influx of 'speculative' investment vehicles in agricultural derivatives markets is perhaps the only development in the twenty-first century agri-food system that has aroused as much controversy as the agrofuel boom. Chapter Four explored how the debate over 'excessive speculation', and its regulation, has redounded within US agribusiness and agriculture. Like Chapter Three, Chapter Four identified in the existing literature on derivatives reform a tendency to offer a rather undifferentiated understanding of agricultural interests. However, it parted ways with the previous chapters by examining the effects of *instability*, rather than price levels *per se*, on relative incomes within US agriculture and agribusiness.

The quantitative analysis of the redistributive consequences of grain futures price instability yielded novel insights. I showed that the impacts of this instability on agricultural and agribusiness groups have been more variegated than is commonly suggested by leading contemporary contributors to the IPE of commodity derivatives reform. More specifically, I demonstrated that on an aggregate level, farmers' relative income is negatively correlated with futures price volatility as is suggested by the extant literature. However, when one

disaggregates the relative income dynamics within US agriculture, matters become much more complicated. Farmers in regions where livestock production predominates have clearly suffered from grain price instability, but the relative income of those farmers in regions where commodity crop production is most prevalent exhibits no clear relationship with the volatility of grain prices. And crucially, I showed that the major agricultural commodity traders' relative income is actually *positively* correlated with grain price volatility.

The chapter also offered insights that nuance existing claims about the mobilization of agricultural interest groups around commodity derivatives reform. Most importantly, I showed that there are fewer agricultural groups in favour of extensive derivatives reform than has been suggested. True, advocacy organizations in which livestock farmer interest groups are prominent persist in pushing for the swift implementation of a new speculative limit regime, in large part because of the deleterious impacts of volatility on the relative income streams of livestock farmers. But the advocacy organizations in which the interests of commodity-crop producers and agribusiness firms are most clearly represented have pushed for the circumscription of the most far-reaching aspects of derivatives reform and have sought to delay the implementation of a new speculative limits regime. The main concern of these groups is that the target group for new speculative position limits might be so expansive that it incorporates the trading houses themselves. Such an expansive speculative limits regime, these groups argue, would make it harder for the trading houses to hedge their risks, and this in turn would lead to farmers being paid less for the crops that they produce.

The trading houses are at the heart of this regulatory conflict over the delineation of target groups from non-target groups. Their significance derives partly from the fact that these firms occupy a central position in the overall constellation of agriculture sector lobbying organizations engaged in commodity derivatives reform debates. But more importantly, the

significance of the trading houses arises from the fact that they are located at the penumbra of regulatory classifications. To be sure, they are neither pure speculators nor pure hedgers, neither simply financial nor simply commercial, and they are thereby neither definitive targets of regulation nor definitive non-targets. Even when definitional boundaries do seem settled, whole armies of lawyers, regulatory compliance officers and accountants work to ensure that the firms that employ them are only adhering to the regulatory edifice where necessary, and are continually exploiting its symbolic disjunctions where possible. The ongoing breach of the extant regulatory edifice is indicative of the failure of the language of financial regulation to ever achieve symbolic closure over the corporations that it classifies. As such, in some regulatory conflicts it is dubious to impute a clear-cut distinction between 'target groups' and 'non-target groups' prior to an analysis of the struggles over how these distinctions are both settled and breached.

Avenues for Future Research

In this thesis I have worked through dense thickets of data and I have offered numerous insights into the changing agri-food landscape. In so doing, this work has made possible an initial cartography of the shifting contours of power within agribusiness and agriculture. However, as with any exploratory project, the work is partial and incomplete. In order to draw up a more comprehensive map of the political economy of food a number of research avenues could be pursued. In what remains of this concluding chapter, I propose four directions for future inquiry.

Firstly, my findings regarding the flat-lining in the differential accumulation of the dominant supermarkets over the last two decades and the fall in food retailers' and wholesalers'

sectoral profit share since the turn of the twenty-first century demand detailed explanation. In Chapter Two, I indicated that the decline in food retailers' profit share is intimately connected to rising relative prices in agricultural commodities. However, such an argument should be substantiated with further quantitative and qualitative investigation. Elsewhere, I have examined the marked slowdown of Wal-Mart's pecuniary growth in relation to the struggles of its own employees and the struggles of workers employed by its suppliers (Baines, 2014). This analysis has involved the elaboration of new differential measures that help the researcher gauge the extent to which these struggles may be hampering the corporation's cost-cutting strategy. Such an analysis of differential costs could be deepened and also extended to other food retailers.

Secondly, Chapter Two and Chapter Three addressed the corporate struggles over 'stomach share' particularly in relation to per capita consumption of grains, sweeteners and meat in the US. The analysis of corporate conflicts over consumer digestive space could be broadened to the investigation of the consumption of fresh foods and also to the attempts by different groups of agri-food corporations to influence nutrition research and government dietary guidelines in order to boost the consumer intake of their products. By widening the vista in this manner, researchers may be able to find compelling connections between the dynamics of differential accumulation and trends in undernourishment, both in terms of obesity and hunger. Although numerous authors have made claims about these connections (e.g. Patel, 2007; Nestle, 2008; Albritton 2009), to my knowledge, few if any have made convincing links between the quanta of agribusiness earnings and qualitative changes in diets. It remains to be seen whether compelling quantitative-qualitative linkages can be made.

Thirdly, Chapters Two and Three addressed the 'institutionalization of waste' in the world food system, in the form of the diversion of vast quantities of grain to both fuel and

animal-meat production. Future investigations could move beyond agrofuel and livestock production and illuminate the redistributive effects of other forms of institutionalised waste. One form that deserves particular attention relates to the ‘buy now, throw away later’ habits of overconsumption engendered by the sales strategies of supermarkets and food manufacturers. Again, connections between wastage and agribusiness profitability have been made (e.g. Hall *et al.* 2009; Stuart, 2009), but to my knowledge there has been no concerted theoretical and empirical exploration of this relationship. Research that makes both quantitative and qualitative links between diet-related health problems and food waste, on the one hand, with corporate profitability, on the other, could help raise further questions regarding the purported efficiencies of large-scale agriculture and oligopolistic agribusiness.

Finally, the dissertation demonstrated that the agri-food sector is not a discrete analytical space. Rather it is intermeshed with numerous other business sectors. The thesis addressed points of overlap that the agri-food sector has with the industrial chemicals sector, the biotechnology sector, the pharmaceutical sector and the retail sector. But the thesis gave most attention to the agri-food sector's interconnections with the energy and the financial services sectors. In regard to the energy sector, much analysis needs to be done on the dynamics of cooperation and conflict between the pro-agrofuel agribusiness-agriculture coalition and energy firms that operate outside of the agrofuel sector. More specifically, there is ample scope to examine qualitative changes in US energy policy with quantitative changes in the US energy supply mix, on the one hand, and the differential accumulation of energy groups, including agrofuel firms, on the other. In regard to the financial services sector, the analysis of the ambiguous borders that demarcate targets from non-targets in commodity derivatives reform opens up multiple avenues for inquiry. For example, parallel research could be conducted on how the agricultural commodity traders have been drawn into conflicts over

the CFTC's definition of 'swap dealer' in the regulation of swap markets and over the Financial Stability Board's definition of 'systemically important financial institutions' in global macroprudential regulation. In addition, investigations could be conducted on how the expansion of banks and hedge funds into physical commodities trading in recent years has also unsettled existing regulatory divisions.

In sum, the analysis provided in this thesis represents just a starting point for a critical theoretical venture that has multiple possibilities. I have demonstrated the analytical potential of using disaggregate accounting methods to gauge the pecuniary shifts between groups of corporations on the one hand, and the income shifts between non-corporate entities on the other, and to examine both as manifestations of changing power relations. Such an analysis requires accumulation to be understood not as an overarching structural phenomenon, but rather as an ongoing process of pecuniary struggle over the re-ordering of human and non-human life. This project promises to make us more wary of analyses that implicitly ascribe uniformity to the interests of various corporate and non-corporate groups and it may also make us more reflexive in using categories that might sometimes be taken as pre-given in the analysis of regulation, such as 'speculation' and 'hedging', regulatory 'targets' and 'non-targets', and perhaps most fundamentally, 'finance' and 'commerce'.

References

- Abrams, J. 2012. Ranchers seek Pause in Ethanol Production. *Associated Press*, 10 Aug. Available from: <http://durangoherald.com/article/20120812/NEWS04/708129977/-1/s> [Accessed 31 August 2013].
- ADM, 1994. *1994 Annual Report*. Retrieved from ProQuest Annual Reports [Accessed 31 August 2013].
- AgMRC 2014. Ethanol Usage Projections and Corn Balance Sheet. Agricultural Marketing Resource Center, 19 Feb. Available from: <https://www.extension.iastate.edu/agdm/crops/outlook/cornbalancesheet.pdf> [Accessed 21 March 2014].
- Ailawadi, K.L. 2001. The Retail Power-Performance Conundrum: What Have we Learned? *Journal of Retailing*, 77 (3), pp. 299–318.
- Albino, D.K., Bertrand, K.Z. and Bar-Yam, Y. 2012. Food for Fuel: The Price of Ethanol, New England Complex Systems Institute, 4 October 2012. Available from: <http://necsi.edu/research/social/foodprices/foodforfuel/> [Accessed 14 December 2012].
- Albritton, R. 2009. *Let them Eat Junk: How Capitalism Creates Hunger and Obesity*. London: Pluto Press.
- American Bakers Association (ABA) 2009. Testimony of Hayden Wands, Director of Procurement, Sara Lee, and Chairman, Commodity and Agricultural Policy, American Bakers Association before the Permanent Subcommittee on Investigations, Hearing on Excessive Speculation in the Wheat Market, 10 August. Available from: <http://www.gpo.gov/fdsys/pkg/CHRG-111shrg53114/html/CHRG-111shrg53114.htm> [Accessed 10 August 2014].
- American Farm Bureau Federation (AFBF) 2014. Letter to CFTC Re: Position Limits for Derivatives, 10 February 2014. Available from: <http://comments.cftc.gov/Handlers/PdfHandler.ashx?id=25428> [Accessed 31 August 2014].
- Arbit, T., Banaei, Salman, L., Loesch, M. and Sherman, J.A. 2013. CFTC Approves New Speculation Position Limits and Aggregation Proposals, Norton Rose Fulbright, 8 November 2013. Available from: <http://www.nortonrosefulbright.com/knowledge/publications/108040/cftc-approves-new-speculative-position-limits-aggregation-proposals> [Accessed 18 August 2014].

- Archer Daniels Midland (ADM) 2014. Letter to the CFTC Re: Notice of Proposed Rulemaking, "Position Limits for Derivatives". Available from: <http://comments.cftc.gov/Handlers/PdfHandler.ashx?id=25346> [Accessed 18 September 2014].
- Ariza-Montobbio, P., Lele, S, Kallis, G. and Martinez-Alier, J. 2010. The Political Ecology of Jatropha Plantations for Biodiesel in Tamil Nadu, India. *The Journal of Peasant Studies*, 37(4), 875–897.
- Arsenault, C. 2011. Glencore: Profiteering from Hunger and Chaos, *Al Jazeera*, 9 May. Available from: <http://www.aljazeera.com/indepth/features/2011/05/20115723149852120.html> [Accessed 30 May 2012].
- Associated Press. 2004. ADM Settles Antitrust Lawsuit Concerning High Fructose Corn Syrup Prices. *Herald Review*. Available from: http://herald-review.com/news/local/adm-settles-antitrust-lawsuit-concerning-high-fructose-corn-syrup-prices/article_d7f08ae3-08eb-53ca-8dd7-56cd3a311e5c.html [Accessed 12 July 2013].
- Baffes, J. and Haniotis, T. 2010. Placing the 2006/2008 Commodity Price Boom into Perspective, World Bank Development Prospects Group. Policy Research Working Paper 5371 (2010). Available from: <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-5371> [Accessed 12 July 2013].
- Bain, C. and Selfa, T. 2013. Framing and Reframing the Environmental Risks and Economic Benefits of Ethanol Production in Iowa. *Agriculture and Human Values*, (30), 351-364.
- Bain, C., Prokos, A. and Liu, H. 2012. Community Support of Ethanol Plants: Does Local Ownership Matter? *Rural Sociology*, 77(2), 143-170.
- Baines, J. 2014. Wal-Mart's Power Trajectory: A Contribution to the Political Economy of the Firm. *Review of Capital as Power*. 1(1): 79-109.
- Baker, A. 2013. The Gradual Transformation? The Incremental Dynamics of Macroprudential Regulation'. *Regulation and Governance*, 7(4): 417–434.
- Baran, P.A. and Sweezy, P.M. 1966. *Monopoly Capital: An Essay on the American Economic and Social Order*. New York: Monthly Review Press.
- Barnett, R. 2013. Hitting Biofuels' Blend Wall. *Bloomberg Government Analysis*. Available from: <http://www.ifdaonline.org/IFDA/media/IFDA/GR/Biofuels-Blend-Wall.pdf> [Accessed 21 March 2014].
- Becker, G.S. 2008. Livestock Feed Costs: Concerns and Options. *CRS Report for Congress*, 17 Sept. Available from:

<http://congressionalresearch.com/RS22908/document.php?study=Livestock+Feed+Costs+Concerns+and+Options> [Accessed 21 March 2014].

Bichler, S., Nitzan, J, and DiMuzio. T. (2012), 'The 1%, Exploitation and Wealth: Tim Di Muzio interviews Shimshon Bichler and Jonathan Nitzan', *Review of Capital as Power*, Vol. 1, No. 1, pp. 1-22.

Blas, J. 2011. Cargill is Clue to Value of Glencore', *Financial Times*. 12 January. Available from: <http://www.ft.com/intl/cms/s/0/13a05178-24c2-11e0-a919-00144feab49a.html#axzz2RL06KPJ4> [Accessed 30 May 2012].

Blas, J. 2012. Ethanol Margins Squeeze ADM's Profits. *Financial Times*, 1 May. Available from: <http://www.ft.com/cms/s/0/ea0e3542-938c-11e1-8c6f-00144feab49a.html#axzz2woT6pkj> [Accessed 21 March 2014].

Bloomberg 2010. GM Wheat Rejected by 233 Consumer, Farmer Groups in 26 Countries. *Bloomberg*. 9 Feb. Available from: <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=ay.qWiSi0.5o> [Accessed 18 June 2014].

Blumenthal, R. 2012. Big Green Finds Fertile Fields Abroad. *Barron's*, 24 Mar. Available from: <http://online.barrons.com/article/SB5000142405311190464670457729378236862246.html> [Accessed 31 August 2013].

Borgman, D. 2007. Agriculture, Biofuels and Striving for Greater Energy Independence. *John Deere White Paper*. 4 Jan. Available from: http://biofleet.net/documents/biofuelswp_12206.pdf [Accessed 31 August 2013].

Borras Jr. S.M, McMichael, P. and Scoones, I. 2010. The Politics of Biofuels, Land and Agrarian Change: Editors' Introduction. *The Journal of Peasant Studies*, 37:4, 575-592.

Borras Jr. S.M., Fig, D. and Suárez, S.N. 2011. The Politics of Agrofuels and Mega-land and Water Deals: Insights from the ProCana Case, Mozambique. *Review of African Political Economy*. 38(128), 215-234.

Boschma, J. 2013. Monsanto: Big Guy on the Block when it comes to Friends in Washington. *Open Secrets Blog*. Available from: <http://www.opensecrets.org/news/2013/02/monsanto.html> [Accessed 21 March 2014].

Bovard, J. 1995. Archer Daniels Midland: a Case Study in Corporate Welfare. *CATO Policy Analysis*, 26 Sept., no. 241. Available from: <http://www.cato.org/pubs/pas/pa-241.html> [Accessed 30 May 2012].

- Boyd, W. and Watts, M.J. 1997. Agro-Industrial Just-in-Time: the Chicken Industry and Postwar American Capitalism. In Goodman, D. and Watts, M.J, (eds.) *Globalising Food: Agrarian Questions and Global Restructuring*. London: Routledge, pp.192-225.
- Brennan, J. 2013. The Power Underpinnings, and Some Distributional Consequences, of Trade and Investment Liberalisation in Canada, *New Political Economy*. 18(5): 715-747.
- Broehl, W.G. 1992. *Cargill: Trading the World's Grain*. Hanover NH: University Press of New England.
- Broehl, W.G. 1998. *Cargill: Going Global*. Hanover, NH: University Press of New England.
- Broehl, W.G. 2008. *Cargill: From Commodities to Customers*. Hanover, NH: University Press of New England.
- Brown, M. 2013. No Doubt About it: Ethanol Mandates Hit Food Producers Hard. *The Hill*. 25 Jul. Available from: <http://thehill.com/blogs/congress-blog/energy-a-environment/313241-no-doubt-about-it-ethanol-mandates-hit-food-producers-hard> [Accessed 21 March 2014].
- Brush, S. and Schmidt, R. 2013. How the Bank Lobby Loosened U.S. Reins on Derivatives. *Bloomberg*. 3 Sept. 2013. <http://www.bloomberg.com/news/articles/2013-09-04/how-the-bank-lobby-loosened-u-s-reins-on-derivatives> [Accessed 2 January 2015].
- Burch, D. and Lawrence, G. 2005. Supermarket Own Brands, Supply Chains and the Transformation of the Agri-Food System. *International Journal of Sociology of Agriculture and Food*. 13 (1): 1–16.
- Burch, D. and Lawrence, G. (eds.) 2007. *Supermarkets and Agri-food Supply Chains: Transformations in the Production and Consumption of Foods*. Cheltenham: Edward Elgar.
- Burch, D. and Lawrence, G. 2009. Towards a Third Food Regime: Behind the Transformation. *Agriculture and Human Values*. 26(2): 267–279.
- Butzen, S. and Haefele, D. 2008. Dry-Grind Ethanol Production from Corn. Available from: <https://www.pioneer.com/home/site/ca/template.CONTENT/products/end-use/hf/guid.B6C03E1D-1585-429E-ABA8-104FB904EB63> [Accessed 21 March 2014].
- Caldwell, M. 2013. Maine is Second State to Pass GMO Labelling Law. *Mother Jones*. 14 Jun. Available from: <http://www.motherjones.com/blue-marble/2013/06/maine-gmo-labeling> [Accessed 21 March 2014].
- Cameron, D. 2008. Agribusiness Group Forms to Protect Ethanol Subsidies. *Wall Street Journal*. 25 July. Available from: <http://online.wsj.com/article/SB121694492314783063.html> [Accessed 30 May 2012].

Cargill. 2011. Testimony of Todd Thul Risk Manager, Cargill AgHorizons to the House Committee on Agriculture. 12 October 2011. Available from: <https://agriculture.house.gov/sites/republicans.agriculture.house.gov/files/pdf/hearings/Thul111012.pdf> [Accessed 31 August 2013].

Cargill. 2011. Annual Report 2011. Available from: <http://www.cargill.com/wcm/groups/public/@ccom/documents/document/2011-annual-report.pdf> [Accessed 30 May 2012].

Cargill 2014a. Letter to CFTC Re: Position Limits for Derivatives. 10 February 2014. Available from: <http://www.comments.cftc.gov/Handlers/PdfHandler.ashx?id=25345> [Accessed 26 August 2014].

Cargill 2014b. Financial Information. Available from: <http://www.cargill.com/company/financial/index.jsp> [Accessed 26 August 2014].

Carney, D. 1995. Dwayne's World, *Mother Jones*. July/August. Available from: <http://www.motherjones.com/politics/1995/07/dwaynes-world> [Accessed 10 July 2013].

Carolan, M.S. 2009. A Sociological Look at Biofuels: Ethanol in the Early Decades of the Twentieth Century and Lessons for Today. *Rural Sociology*. 74(1): 86-112.

Carolan, M.S. 2010. Ethanol's Most Recent Breakthrough in the United States: A Case of Socio-technical Transition. *Technology in Society*. (32): 65-71.

Castoriadis, C. 1984. *Crossroads in the Labyrinth*, translated from the French by K. Soper and M.H. Ryle, Cambridge MA: MIT Press.

Center for Responsive Politics, 2013. Revolving door – Monsanto. *Open Secrets*. Available from: <http://www.opensecrets.org/revolving/index.php> [Accessed 17 July 2013].

Center for Responsive Politics. 2014a. American Farm Bureau: Summary. *Open Secrets*. Available from: <https://www.opensecrets.org/lobby/clientsum.php?id=D000021832> [Accessed 19 September 2014].

Center for Responsive Politics. 2014b. National Farmers Union: Summary. *Open Secrets*. Available from: <https://www.opensecrets.org/pacs/lookup2.php?strID=C00151019> [Accessed 19 September 2014].

CGGC 2009. The Hog Farming Value Chain. *Center for Globalization, Governance and Competitiveness*. Case Study. Available from: http://www.soc.duke.edu/NC_GlobalEconomy/hog/value.shtml [Accessed 31 August 2013].

Chan, J.H. and Reiner, D. 2011. Dynamics of Evolution in the Global Fuel-Ethanol Industry. *Cambridge Working Paper in Economics*, CWPE 1129. Available from: <http://www.econ.cam.ac.uk/dae/repec/cam/pdf/cwpe1129.pdf> [Accessed 30 May 2012].

Chilton, B. 2011. 'Huggy Bear and Position Limits' Statement of Commissioner Bart Chilton Before the CFTC Public Meeting October 18, 2011. Available from: <http://www.cftc.gov/PressRoom/SpeechesTestimony/chiltonstatement101811> [Accessed 30 May 2012].

Circui, A. 2008. Crops for Biofuel and Biodiesel, Agribusiness Urges. *Economy Watch*. 25 July. Available from: <http://www.economywatch.com/renewable-energy/news/crops-for-biofuel-industry.html> [Accessed 30 May 2012].

Clapp, J. 2014. Financialization, Distance and Global Food Politics. *The Journal of Peasant Studies*, 41(5): 797-814.

Clapp, J. and Helleiner, E. 2012. Troubled Futures? The Global Food Crisis and the Politics of Agricultural Derivatives Regulation. *Review of International Political Economy*. 19(2): 181–207.

Clyma, K. 2011. On the Verge: Smithfield is in the Midst of Changes that could Result in Record Profits Following Years of Record Losses. *Meat and Poultry*. 1 June. Available from: http://www.meatpoultry.com/articles/news_home/Business/2011/06/On_the_verge.aspx?ID=%7BC3BD844A-AF9F-4462-8540-34D5257BD78E%7D&p=1 [Accessed 21 March 2014].

Cochrane, D.T. 2011. Castoriadis, Veblen, and the 'Power Theory of Capital. In Straume, I. S. and Humphreys, J. F. (eds.) *Depoliticization: The Political Imaginary of Global Capitalism*. Copenhagen: Aarhus University Press. pp. 89-123.

Cochrane, D.T. and Monaghan, J. 2012. Fight to Win! Empiricizing Political-Economic Disruption Campaigns. in Nocella, Anthony J. II, Deric Shannon, and John Asimakopoulos (eds.) *The Accumulation of Freedom: Writings on Anarchist Economics*. Oakland, California: AK Press.

Cochrane, D.T. and Monaghan, J. 2014. 'A Degree of Control': Corporations and the Struggle Against South African Apartheid. In DiMuzio, T. (ed.). *The Capitalist Mode of Power: Critical Engagements with the Power Theory of Value*. New York: Routledge.

Committee on Foreign Relations. 1977. Multinational Corporations and United States Foreign Policy, *Hearings before the Subcommittee on Multinational Corporations, Ninety-Fourth Congress, Second Session on International Grain Companies*, 18, 23 and 24 June, 1976, Part 16. Washington, DC: US Government Printing Office.

Commodity Markets Council (CMC) 2014. Letter to the CFTC, Re: Position Limits for Derivatives; Aggregation of Positions. 10 February 2014. Available from: <http://www.commoditymks.org/wp-content/uploads/2014/05/CMC-Position-Limits-Comment-Letter-2-10-2014.pdf> [Accessed 21 August 2014].

Commodity Markets Oversight Coalition (CMOC) 2010. Letter to the CFTC Re: General Comments on Implementation of Title VII the Dodd-Frank Act, 1 November 2010. Available from: http://www.nefiactioncenter.com/PDF/cmoc_doddfrank_gencomments_2010nov01.pdf [Accessed 19 August 2014].

Commodity Markets Oversight Coalition (CMOC) 2013. Brief of Amicus Curiae in Support of Appellant Commodity Futures Trading Commission in Favor of Reversal, United States Court of Appeals for the District of Columbia Circuit, No. 12-5362. Available from: http://www.cadwalader.com/thecabinet/get_doc.php?id=31887 [Accessed 27 August 2014].

Commodity Markets Oversight Coalition (CMOC) 2014. Letter to CFTC Re: Notice of Proposed Rulemaking, “Position Limits for Derivatives”. 10 February 2014. Available from: http://www.ieca-us.com/wp-content/uploads/02.10.14_CMOC_PosLimitsLtr.pdf [Accessed 31 August 2014].

Commodity Research Bureau 2010. *CRB Commodity Year Book 2010*. New Jersey: John Wiley and Sons, Inc.

Connor, J.M. 1997. The Global Lysine Price-Fixing Conspiracy of 1992–1995. *Applied Economic Perspectives and Policy*. 19(2): 412-427.

Dauvergne, P. and Neville, K.J. 2009. The Changing North–South and South–South Political Economy of Biofuels. *Third World Quarterly*. 30(6): 1087-1102.

Dauvergne, P. and Neville, K.J. 2010. Forests, Food, and Fuel in the Tropics: The Uneven Social and Ecological Consequences of the Emerging Political Economy of Biofuels. *The Journal of Peasant Studies*, 37(4): 631–660.

Davis, J. 2009. Tax Credit Loss Idles Conoco/Tyson Biodiesel Plant. *Domestic Fuel Magazine*. 14 May. Available from: <http://domesticfuel.com/2009/05/14/tax-credit-loss-idles-conocotyson-biodiesel-plant/#comments> [Accessed 30 May 2012].

Deutsche Bank. 1999. GMOs are Dead. Report. Available from: <http://www.cqs.com/gmosdead.htm> [Accessed 30 May 2012].

DiMuzio, T. 2007. The 'Art' of Colonisation: Capitalising Sovereign Power and the Ongoing Nature of Primitive Accumulation. *New Political Economy*, 12(4): 517–539.

- DiMuzio, T. 2012. Capitalizing a Future Unsustainable: Finance, Energy and the Fate of Market Civilization. *Review of International Political Economy*. 19(3): 363–388.
- DiMuzio, T. (ed.) 2014. *The Capitalist Mode of Power: Critical Engagements with the Power Theory of Value*. New York: Routledge.
- Donmoyer, R.J. 2007. Democrats Target Tax Break for ConocoPhillips, Tyson Update2. Bloomberg, 20 April. Available from: <http://www.bloomberg.com/apps/news?pid=newsarchive> [Accessed 30 May 2012].
- Dunn, M. 2011. 'Opening Statement, Public Meeting on Final Rules Under the Dodd-Frank Act'. October 18, 2011. Available from: <http://www.cftc.gov/PressRoom/SpeechesTestimony/dunnstatement101811> [Accessed 30 May 2013].
- Earth Policy Institute. 2012. Data Centre: Food and Agriculture. Available from: http://www.earth-policy.org/?/data_center/C24/ [Accessed 30 May 2012].
- Economic Research Service. 1993. US Corn Sweetener Statistical Compendium, US Department of Agriculture. Stock #94002.
- Estruch, E. and Grandelis, I. 2013. Promoting Economic Diversification and Decent Rural Employment towards Greater Resilience to Food Price Volatility. Gender Equity and Rural Employment Division Discussion Paper, Food and Agriculture Organization. Available from: http://www.fao.org/fileadmin/user_upload/fao_ilo/pdf/Papers/DRE_Food_Price_Volatility.pdf [Accessed 30 May 2014].
- Environmental Protection Agency. (EPA) 2013. AG 101: Major Crops Grown in the United States. Available from: <http://www.epa.gov/oecaagct/ag101/cropmajor.html> [Accessed 20 June 2014].
- Erosion, Technology and Control (ETC) 2003. Oligopoly Inc. – Concentration in Corporate Power: 2003. Communique No. 82, November/December. Available from: <http://www.etcgroup.org/node/136> [Accessed 30 May 2012].
- Erosion, Technology and Control (ETC) 2008. Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life. Communique No. 100, October. Available from: <http://www.etcgroup.org/content/who-owns-nature> [Accessed 30 May 2012].
- Erosion, Technology and Control (ETC) 2011. Who will Control the Green Economy? Communique No. 107, November. Available from: <http://www.etcgroup.org/content/who-will-control-green-economy-0> [Accessed 30 May 2012].

Falkner, R. 2009. The Troubled Birth of the 'Biotech Century': Global Corporate Power and Its Limits, in J. Clapp and D. Fuchs (eds), *Corporate Power in Global Agrifood Governance*. Cambridge, MA: Massachusetts Institute of Technology, pp. 225–252.

Food and Agricultural Organization (FAO) 2010. *The State of Food Insecurity in the World*. Rome: Food and Agriculture Organization of the United Nations.

Food and Agricultural Organization Statistical Division (FAOSTAT) 2014a. Trade Data. FAO Statistics Division. Available from:
<http://faostat.fao.org/site/535/DesktopDefault.aspx?PageID=535#ancor> [Accessed 21 March 2014].

Food and Agricultural Organization Statistical Division (FAOSTAT) 2014b. Live Animal Data. FAO Statistics Division. Available from:
<http://faostat.fao.org/site/573/default.aspx#ancor> [Accessed 21 March 2014].

Fatka, J. 2011. DDGs: A Feed Market Force. *Farm Futures*, March. Available from:
<http://magissues.farmprogress.com/FFU/FF03Mar11/ffu68.pdf> [Accessed 21 March 2014].

Feedstuffs Magazine. 1968. Agricultural Political Power Changing. *Feedstuffs*, 10 August, 20.

Fernandes, B.M., Welch, C.A. and Gonçalves, E.C. 2010. Agrofuel Policies in Brazil: Paradigmatic and Territorial Disputes. *The Journal of Peasant Studies*. 37(4): 793–819.

Food Safety Magazine, 2007. Poultry Breeder Improves Environmental Monitoring with Innovative Dry-Bags, Food Safety Magazine, Sep./Aug. Available from:
<http://www.foodsafetymagazine.com/magazine-archive1/augustseptember-2007/food-safety-insider-solutions-in-rapid-microbiology/poultry-breeder-improves-environmental-monitoring-with-innovative-dry-bags/> [Accessed 31 August 2013].

Franco, J., Levidow, L. Fig, D., Goldfarb, D., Hönicke, M. and Mendonca, M.L. 2010. Assumptions in the European Union biofuels policy: frictions with experiences in Germany, Brazil and Mozambique. *The Journal of Peasant Studies*. 37(4): 661–698.

Friedmann, H. 1994. Distance and Durability: Shaky Foundations of the World Food Economy. In McMichael, P. (ed). *The Global Restructuring of Agro-Food Systems*. Ithaca: Cornell University Press.

Friedmann, H. 2005. From Colonialism to Green Capitalism: Social Movements and Emergence of Food Regimes. In Buttel, F.H, and McMichael, P. (eds.) *New Directions in the Sociology of Global Development: Research in Rural Sociology and Development* New York: Elsevier.

Friedmann, H. 2009. Discussion: Moving Food Regimes Forward: Reflections on Symposium Essays. *Agriculture and Human Values*. (26): 335-344.

Friedmann, H. and McMichael, P. 1989. Agriculture and the State System: The Rise and Decline of National Agricultures, 1870 to the Present. *Sociologia Ruralis*. 19(2): 93–117.

Fuglie, K.O., Heisey, P.W., King, J.L., Pray, C.E., Day-Rubinstein, K., Schimmelpfennig, D., Wang, S.L. and Karmarkar-Deshmukh, R. 2011. Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide. US Department of Agriculture, Economic Research Service, Report No. 130, December. Available from: <http://www.ers.usda.gov/publications/err-economic-research-report/err130.aspx#.UiOGLzYqiSo> [Accessed 31 August 2013].

General Accounting Office (GAO). 1993. Sugar Program: Changing Domestic and International Conditions Require Program Changes, Report to Charles E. Shumer, House of Representatives. Washington DC: General Accounting Office.

Gensler, G. 2011. Statement of Support by Chairman Gary Gensler. Available from: <http://www.cftc.gov/PressRoom/SpeechesTestimony/genslerstatement101811b>. [Accessed 20 September 2014].

Gereffi, G. and Christian, M. 2010. Trade, Transnational Corporations and Food Consumption: a Global Value Chain Approach, In: Hawkes, C., Blouin, C., Henson, S., Drager, N. and Dubé, L. eds. *Trade, Food, Diet and Health: Perspectives and Policy Options*. Oxford: Blackwell.

Gereffi, G. 1994. The Organization of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks. In Gereffi, G. and Korzeniewicz, M. (eds), *Commodity Chains and Global Capitalism*. Westport, CT: Greenwood Publishing Group, pp. 95–122.

Gereffi, G. and Christian, M. 2010. Trade, Transnational Corporations and Food Consumption: A Global Value Chain Approach. In: C. Hawkes *et al.* (eds), *Trade, Food, Diet and Health: Perspectives and Policy Options*. Oxford: Blackwell, pp. 91–110.

Gereffi, G. and Korzeniewicz, M. (eds). 1994. *Commodity Chains and Global Capitalism*. Westport, CT: Greenwood Publishing Group.

Ghosh, J., Heintz, J. and Pollin, R. 2012. Speculation on Commodities Futures Markets and Destabilization of Global Food Prices: Exploring the Connections. *International Journal of Health Services*. 42(3): 465-83.

Gibbon, P. 2001. Upgrading Primary Production: A Global Commodity Chain Approach. *World Development*. 29 (2): 345–363.

- Gibbon, P., Bair, J. and Ponte, S. 2008. Governing Global Value Chains: An Introduction. *Economy and Society*. 37 (3): 315–338.
- Gillon, S. 2010. Fields of Dreams: Negotiating an Ethanol Agenda in the Midwest United States. *The Journal of Peasant Studies*. 37(4), 723-748.
- Global Harvest. 2014. International trade and agriculture: supporting value chains to deliver development and food security. Available from: http://www.globalharvestinitiative.org/Policy/GHI_Trade_Paper_2013.pdf [Accessed 20 June 2014].
- Goodman, D., Sorj, B. and Wilkinson, J. 1987. *From Farming to Biotechnology: a Theory of Agro-Industrial Development*. New York: Basil Blackwell.
- Gottschalk, A. 2007. The Impacts of the U.S. Corn/Ethanol Policy on the US Cattle Industry. Proceedings: The Range Beef Cow Symposium XX, 11-13 Dec., Fort Collins, Colorado. Available from: <https://beef.unl.edu/beefreports/symp-2007-01-xx.shtml> [Accessed 21 March 2014].
- GRAIN 2007. Agrofuels Special Issue. *Seedling*. July. Available from: http://www.odg.cat/documents/enprofunditat/Deute_ecologic/seed-07-07-en.pdf [Accessed 30 May 2012].
- Green, J. 2014. Beyond Coxian Historicism: 19th Century World Order and the Promise of Uneven and Combined Development. *Millennium: Journal of International Studies*. 42(2): 286-308.
- Hager, S.B. 2012. Investment Bank Power and Neoliberal Regulation: From the Volcker Shock to the Volcker Rule. In Overbeek, H. and Van Apeldoorn, B. (eds.), *Neoliberalism in Crisis*. Basingstoke, UK. Palgrave Macmillan, pp.124-161.
- Hager, S.B. 2013. Public Debt, Ownership and Power: The Political Economy of Distribution and Redistribution. Unpublished PhD Dissertation. Political Science. York University.
- Hager, S.B. 2014. What Happened to the Bondholding Class? Public Debt, Power and the Top One Per Cent. *New Political Economy*. 19(2): 155-182.
- Hall, K.D., *et al.* 2009. The Progressive Increase of Food Waste in America and its Environmental Impact. PLoS ONE, 4 (11): e7940. doi:10.1371/journal.pone.0007940. Available from: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0007940> [Accessed 20 December 2012].
- Hallman, W.K., Hebden, W.C., Cuite, C.L., Aquino, J.L. and Lang, J.T. 2004. Americans and GM Food: Knowledge, Opinion and Interest in 2004. (Publication number RR-1104-007),

- Rutgers: The State University of New Jersey. Available from: <http://foodpolicyinstitute.rutgers.edu/pubs.asp?id=59>. [Accessed 31 August 2013].
- Hart, J.F. and Mayda, C. 1998. The Industrialization of Livestock Production in the United States. *Southeastern Geographer*, 38(1): 58-78.
- Hayes, A. and Cai, L. 2007. Using Heteroskedasticity-consistent Standard Error Estimators in OLS Regression: an Introduction and Software Implementation. *Behavioural Research Methods*. 39(4):709-722.
- Headey, D. and Fan, S. 2011. Reflections on the Global Food Crisis: How Did It Happen? How Has It Hurt? And How Can We Prevent the Next One? *International Food Policy Research Institute*, Research Monograph, no.165 (Washington DC: IFPRI).
- Heffernan, W. 1999. Consolidation in the Food and Agriculture System, Report to the National Farmers Union. 5 February. Available from: <http://www.foodcircles.missouri.edu/whstudy.pdf> [Accessed 30 May 2012].
- Heffernan, W. 1999. Consolidation in the food and agriculture system, report to the National Farmers Union. 5 February. Available from: <http://www.foodcircles.missouri.edu/whstudy.pdf> [Accessed 30 May 2012].
- Helleiner, E. 2014. Out from the Shadows: Governing Over-the-counter Derivatives after the 2007-08 Financial Crisis. In: Best, J. and Gheciu, A. (eds). *The Return of the Public in Global Governance*. Cambridge: Cambridge University Press, pp.70-94
- Helleiner, E. and Pagliari, S. 2011. The End of an Era in International Financial Regulation? A Postcrisis Research Agenda. *International Organization*. 65(1): 169–200.
- Helleiner, E., Pagliari, S. and Zimmermann, H. 2009. *Global Finance in Crisis: The Politics of International Regulatory Change*. London: Taylor and Francis.
- Hendrickson, M. and Heffernan, W. 2007. Concentration of Agricultural Markets, 2002 and 2007. Available from: [foodcircles.missouri.edu/consol.htm](http://www.foodcircles.missouri.edu/consol.htm) [Accessed 30 May 2012].
- Hendrickson, M. and Heffernan, W. 2005. Concentration of Agricultural Markets, 2005. Available from: <http://www.foodcircles.missouri.edu/CRJanuary05.pdf> [Accessed 21 March 2014].
- Hendrickson, M. *et al.* 2001. Consolidation in Food Retailing and Dairy. *British Food Journal*. 103(10): 715–728.
- Henkoff, R. 1990. Oh, how the Money Grows at ADM. *Fortune*. 8 October. Available from: http://money.cnn.com/magazines/fortune/fortune_archive/1990/10/08/74164/ [Accessed 21 March 2014].

- Herndon, A. 2012. DuPont Betting on Cellulosic Biofuel after BP, Coskata Setbacks. *Bloomberg*. 30 November. Available from: <http://www.bloomberg.com/news/2012-11-30/dupont-betting-on-cellulosic-biofuelafter-bp-coskata-setbacks.html> [Accessed 20 December 2012].
- Hoffman, L. and Aulerich, N. 2013. Recent Convergence Performance of Futures and Cash Prices for Corn, Soybeans, and Wheat. A Report from the Economic Research Service, FDS-13L-01, December 2013.
- Hollander, G. 2010. Power is Sweet: Sugarcane in the Global Ethanol Assemblage. *The Journal of Peasant Studies*. 37(4): 699–721.
- Holleman, H. 2012. Energy Policy and Environmental Possibilities: Biofuels and Key Protagonists of Ecological Change. *Rural Sociology*. 77(2): 280-307.
- Holt, Giménez E. and A. Shattuck. 2011. Food Crises, Food Regimes and Food Movements: Rumbblings of Reform or Tides of Transformation? *The Journal of Peasant Studies*. 38(1): 109–144.
- Hunsberger, C. 2010. The Politics of Jatropha-based Biofuels in Kenya: Convergence and Divergence among NGOs, Donors, Government Officials and Farmers. *The Journal of Peasant Studies*. 37(4): 939–962.
- Holt-Giménez, E. and Patel, R. 2009. *Food Rebellions! Crisis and the Hunger for Justice*. Cape Town: Pambazuka Press.
- Hossain, Naomi, King, Richard and Kelbert, Alexandra (2013) 'Squeezed: Life in a Time of Food Price Volatility, Year 1 results', Joint Agency Report - Institute of Development Studies and Oxfam. Available on the Oxfam Website: <http://www.oxfam.de/publikationen/squeezed>. Last accessed on 19 September 2014. Kneen, Brewster (2002) *Invisible Giant: Cargill and its Transnational Strategies*, London, Sterling, VA: Pluto Press.
- Howie, M. 2000. Bunge Expands Latin American Fertilizer Business. *Feedstuffs*. 72 (16): 3.
- Hunsberger, C. 2014. Jatropha as a Biofuel Crop and the Economy of Appearances: Experiences from Kenya. *Review of African Political Economy*, 41(140): 216-231.
- Julia and White, B. 2012. Gendered Experiences of Dispossession: Oil Palm Expansion in a Dayak Hibun Community in West Kalimantan. *The Journal of Peasant Studies*. 39:3-4: 995-1016.
- Kahn, E.J. 1991. *Supermarketer to the World: The Story of Dwayne Andreas, CEO of Archer Daniels Midland*. New York: Warner Books.

- Kalecki, M. 1943. [1971]. *Costs and Prices*. In *Selected Essays on the Dynamics of the Capitalist Economy, 1933–1970*. Cambridge: Cambridge University Press, pp. 43–61.
- Kaskey, J. 2010. DuPont gains on Monsanto as farmers question high-tech seeds. *Bloomberg*. 24 August. Available from: <http://www.bloomberg.com/news/2010-08-24/dupont-gains-on-too-big-for-britches-monsanto-as-farmers-switch-seeds.html> [Accessed 1 September 2013].
- Kilman, S., Ingersoll, B. and Abramson, J. 1995. Risk Averse: How Dwayne Andreas rules Archer-Daniels by Hedging his Bets, CEO works with Rivals, Gives to Both Parties and Invests in the Media. *Wall Street Journal* 27 October. Available from: <http://www.apnewsarchive.com/1995/Risk-Averse-How-Dwayne-Andreas-Rules-Archer-Daniels-By-Hedging-His-Bets/id-e1466a4923bf11ccd4e5040c98e187a0> [Accessed 28 October 2014].
- Kneen, B. 2002. *Invisible Giant: Cargill and its Transnational Strategies*. London: Pluto Press.
- Knorr, B. 2007. Hate Speculators? *Farm Futures*. March 2007, 20.
- Knorr, B. 2010. Think like a Speculator. *Farm Futures*. March 2010, 12.
- Krebs, A.V. 1992. *Corporate Reapers: The Book of Agribusiness*. Washington, DC: Essential Books.
- Kruchkin, A. 2013. Farm Product Storage and Warehousing in the US. *IBISWorld Industry Report*. July 2013.
- Lagi, M., Bar-Yam, Y., Bertrand, K.Z., Bar-Yam, K.Z. and Bar-Yam, Y. 2011a. The Food Crises: A Quantitative Model of Food Prices including Speculators and Ethanol Conversion. New England Complex Systems Institute, Research Paper, 21 September. Available from: <http://necsi.edu/research/social/foodprices.html> [Accessed 20 December 2012].
- Lagi, M., Bertrand, K.Z. and Bar-Yam, Y. 2011b. The Food Crises and Political Instability in North Africa and the Middle East. New England Complex Systems Institute, 11 August. Available from: <http://arxiv.org/pdf/1108.2455.pdf> [Accessed 28 September 2014].
- Langreth R. and M. Herper, 2009. The Planet versus Monsanto. *Forbes Magazine*. Available from: <http://www.forbes.com/forbes/2010/0118/americas-best-company-10-gmos-dupont-planet-versus-monsanto.html> [Accessed 17 July 2012].
- Lehrer, N. 2010. *US Farm Bills and Policy Reform: Ideological Conflict over World Trade*. Amherst: Cambria Press.
- Lieber, J.B. 2000. *Rats in the Grain: the Dirty Tricks and Trials of Archer Daniels Midland*. New York: Four Walls Eight Windows.

- Lindell, E. 1982. US-Soviet Grain Embargoes: Regulating the MNCs. *Food Policy*. 7(3): 240–246.
- Lowe, M. and Gereffi, G. 2009. A Value Chain Analysis of the U.S. Beef and Dairy Industries. Report Prepared for Environmental Defense Fund. Available from: http://www.cggc.duke.edu/environment/valuechainanalysis/CGGC_BeefDairyReport_2-16-09.pdf [Accessed 21 March 2014].
- Mahoney, J. and Thelen, K. 2010. A Theory of Gradual Institutional Change. In Mahoney, J. and Thelen, K. (eds.) *Explaining Institutional Change Ambiguity, Agency, and Power*. Cambridge: Cambridge University Press, pp.1-37.
- Manning, R. 2004. Against the Grain: a Portrait of Industrial Agriculture as a Malign Force. *The American Scholar*. 73(1): 13-35.
- Marion, B. and Kim, D. 1991. Concentration Change in Selected Food Manufacturing Industries: The Influence of Mergers vs. Internal Growth. *Agribusiness*. 7 (5): 415–431.
- Marx, K. 1867. [1990]. *Capital: A Critique of Political Economy, Volume I*, translated by Ben Fowkes, London: Penguin Classics.
- Mascarenhas, M. and Busch, L. 2006. Seeds of Change: Intellectual Property Rights, Genetically Modified Soybeans and Seed Saving in the United States. *Sociologia Ruralis*. 46(2): 122-138.
- McBride, W.D. and Matthews Jr., K. 2011. The Diverse Structure and Organization of U.S. Beef Cow-Calf Farms, Economic Research Service Economic Information System. March 2011. (73): 1-42. Available from: http://www.ers.usda.gov/media/335292/dateliners_april2011_1_.pdf. [Accessed 10 August 2014].
- McCarthy, J.F., Gillespie, P. and Zen, Z. 2012. Swimming Upstream: Local Indonesian Production Networks in 'Globalized' Palm Oil Production. *World Development*. 40(3): 555-569.
- McMahon, J. 2013. The Rise of a Confident Hollywood: Risk and the Capitalization of Cinema, *Review of Capital as Power*, 1(1): 23-40.
- McMichael, P. 2005. Global development and the Corporate Food Regime. In Buttel, F.H. and McMichael, P. (eds.) *New Directions in the Sociology of Global Development*, Oxford: Elsevier, pp. 265-300.
- McMichael, P. 2009a. A Food Regime Genealogy. *The Journal of Peasant Studies*. 36(1): 139-169.

- McMichael, P. 2009b. A Food Regime Analysis of the 'World Food Crisis'. *Agriculture and Human Values*, (26), 281-295.
- McMichael, P. 2010. Agrofuels in the Food Regime. *The Journal of Peasant Studies*. 37(4): 609-629.
- McMichael, P. 2012. The Land Grab and Corporate Food Regime Restructuring. *The Journal of Peasant Studies*. 39(4): 681-701.
- McMichael, P. 2014. Land Grab Governance and the Crisis of Market Rule. Conference paper presented in the Property Rights from Below Symposium. MIT Property Symposium: Global Commodification & Land Grabs Panel. Feb 2014.
- Meyer, G. 2014. Bumper Profits Threaten US Ethanol Support. *Financial Times*. 16 February. Available from: <http://www.ft.com/intl/cms/s/0/48e2be34-95cb-11e3-8371-00144feab7de.html#axzz2wdPVyL6V> [Accessed 21 March 2014].
- Meyer, P. 2000. Food Companies Competing with 'Dot-coms' B-B Conglomerators. *Milling and Baking News*. 21 March, p. 18.
- Meyer, P. 2005. Producers 'Up to their Eyeballs' in High Fructose Corn Syrup. *Milling and Baking News*. 31 May, p. 48.
- Millet, G.T. 2006. *Environmental Science: Working with the Earth*. California: Thomson Books.
- Milling and Baking News. 1982. EC Subsidies Impact ADM earnings. *Milling and Baking News*. 12 October, p.32.
- Milling and Baking News. 1984. Coca-Cola, PepsiCo authorize 100% HFCS in soft drinks. *Milling and Baking News*, 13 November, p.11.
- Milling and Baking News. 1998. Cargill and Monsanto Alliance Creates Possibilities for Food. *Milling and Baking News*. 26 May, p.11.
- Milling and Baking News. 2002. Bunge's Intense Focus on Oilseeds Highlighted by Cereol Acquisition. *Milling and Baking News*, 29 October, pp. 1, 24-26.
- Milling and Baking News. 2003. Specialty Ingredients Effort Part of New Bunge, DuPont Venture. *Milling and Baking News*. 14 January, p.10.
- Milling and Baking News. 2005. Cargill to Invest in New Biodiesel Facility in Germany. *Milling and Baking News*, 6 September, p.46.

- Milling and Baking News. 2006. Bunge and DuPont Broaden Soy Venture, Launch TREUS Brand. *Milling and Baking News*. 12 September, p.20.
- Milling and Baking News. 2006. Controversy Erupts Between ADM and Cargill Leaders over Ethanol, *Milling and Baking News*. 9 May, p.11.
- Mintz-Habib, N. 2013. Malaysian Biofuels Industry Experience: a Socio-Political Analysis of the Commercial Environment. *Energy Policy*. (56): 88-100.
- Mitchell, D., 2008. A Note on Rising Food Prices. World Bank Report. Available from: <http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2008/07/28/00002043002/Rendered/PDF/WP4682.pdf> [Accessed 6 July 2013].
- Monsanto. 2003. Monsanto teams up with Industry Leaders to Provide a Major Boost to Ethanol and Corn Growers. Available from: <http://news.monsanto.com/press-release/monsanto-teams-industry-leaders-provide-major-boost-ethanol-and-corn-growers> [Accessed 6 July 2013].
- Montefrio , M.J.F. and Sonnenfeld, D.A. 2013. Global–local Tensions in Contract Farming of Biofuel Crops Involving Indigenous Communities in the Philippines. *Society and Natural Resources: An International Journal*. 26(3): 239-253.
- Morgan, D. 1980. *Merchants of Grain: The Power and Profits of the Five Giant Companies at the Center of the World's Food Supply*. New York: Viking.
- Moschella, M. 2010. Back to the Drawing Board: The International Financial Architecture Exercise. *Review of International Political Economy*. 17(1): 155–171.
- Moschella, M. and Tsingou, E. 2013. Introduction: The Financial Crisis and the Politics of Reform: Explaining Incremental Change. In Moschella, M. and Tsingou, E. (eds). *Great Expectations, Slow Transformations: Incremental Change in Post-Crisis Regulation*. Colchester, UK: ECPR Press, pp.1-34.
- Mosley, B. 2008. Tyson CEO says Ethanol will Lead to Higher Food Costs. *Shelbyville Times-Gazette*, 27 March. Available from: <http://www.t-g.com/story/1321018.html> [Accessed 31 August 2013].
- Mügge, D. 2011. The European Presence in Global Financial Governance: A Principal–Agent Perspective. *Journal of European Public Policy*. 18(3): 383–402.
- Mügge, D. 2014. Europe's Regulatory Role in Post-Crisis Global Finance. *Journal of European Public Policy*. 21(3): 316–326.

- Murphy, S. 2010. Biofuels: Finding a Sustainable Balance for Food and Energy. In Lawrence, G., Lyons, K. and Wallington, T. (eds) *Food Security, Nutrition and Sustainability*. Abingdon: Earthscan, pp. 223–237.
- Murphy, S., Burch, D. and Clapp, J. 2012. Cereal Secrets: The World’s Largest Grain Traders and Global Agriculture. *Oxfam Research Reports*. Available from: www.oxfam.org/sites/www.oxfam.org/files/rr-cereal-secrets-grain-traders-agriculture-30082012-en.pdf [Accessed 20 December 2012].
- National Chicken Council (NCC). 2013. National Chicken Council’s Comments on the Renewable Fuel Assessment White Paper. 29 April. Available from: <http://docs.house.gov/meetings/IF/IF03/20130723/101184/HHRG-113-IF03-20130723-SD017.pdf> [Accessed 31 August 2013].
- National Corn Growers Association (NCGA) and the National Gas Suppliers Association (NGSA). 2011. Letter to House Committee on Agriculture, Re: NCGA and NGSA Support Passage of H.R. 1573 to Facilitate Implementation of Title VII of Dodd-Frank Wall Street Reform and Consumer Protection Act. 3 May 2011. Available from: http://www.ncga.com/upload/files/documents/pdf/dodd.frank.ncga_-_ngsa_letter_supporting_hr1573_final_05032011.pdf [Accessed 18 August 2014].
- Nestle, M. 2002. *Food Politics: How the Food Industry Influences Nutrition and Health*. Los Angeles: University of California Press.
- Nitzan, J. 1992. From Olson to Veblen: the Stagflationary Rise of Distributional Coalitions, Montreal: Paper Presented at the Annual Meeting of The History of Economics Society Fairfax, Virginia. Available from: http://bnarchives.yorku.ca/176/01/920601N_From_Olson_to_Veblen.pdf [Accessed 31 August 2013].
- Nitzan, J. and Bichler, S. 2002. *The Global Political Economy of Israel*. London: Pluto Press.
- Nitzan, J. and Bichler, S. 2004. Dominant Capital and the New Wars. *Journal of World-Systems Research*. 10(2): 254–327.
- Nitzan, H. and Bichler, S. 2006. New Imperialism or New Capitalism? *Review*. 29(1): 1-86.
- Nitzan, J. and Bichler, S. 2009. *Capital as Power: A Study of Order and Creorder*. Abingdon: Routledge.
- Novo, A., Jansen, K. Slingerland, M. and Giller, K. 2010. Biofuel, Dairy Production and Beef in Brazil: Competing Claims on Land Use in São Paulo State. *The Journal of Peasant Studies*. 37(4): 769–792.

OECD 2008. Biofuel Support Policies: An Economic Assessment. Available from: <http://www.oecd.org/tad/agriculturaltrade/biofuelsupportpoliciesaneconomicassessment.htm> [Accessed 30 May 2012].

Olson, M. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, Mass.: Harvard University Press.

Östensson, O. 2012. The 2008 Commodity Boom: Did Speculation Play a Role? *Mineral Economics*. 25(1): 17–28.

Page, G. 2012. Speech: Trusting Photosynthesis: Thoughts on the Future of Global Food Production. Available from: <http://www.cargill.com/news/speeches-presentations/trusting-photosynthesis/index.jsp> [accessed 30 May 2012].

Pagliari, S. and Young, K.L. 2013. The Wall-Street-Main-Street Nexus in Financial Regulation: Business Coalitions Inside and Outside the Financial Sector in the Regulation of OTC Derivatives. In Moschella, M. and Tsingou, E. (eds.) *Great Expectations, Slow Transformations: Incremental Change in Post-Crisis Regulation*. ECPR Press, pp. 125–148.

Pagliari, S. and Young, K.L. 2014. Leveraged Interests: Financial Industry Power and the Role of Private Sector Coalitions. *Review of International Political Economy*. 21(3): 575–610.

Palaez, V. and Schmidt, W. 2004. Social Struggles and the Regulation of Transgenic Crops in Brazil. In Jansen, K. and Vellema, S. (eds) *Agribusiness and Society: Corporate Responses to Environmentalism, Market Opportunities and Public Regulation*. London: Zed Books, pp. 232–260.

Palmer, A. 2006. Harvest Time for Ethanol. DC WATCH - Corporate Counsel, 6(6): 1–2.

Patel, R. 2007. *Stuffed and Starved: Markets, Power and Hidden Battle for the World Food System*. Toronto: HarperCollins Publishers.

Pechlaner, G. and Otero, G. 2010. The Neoliberal Food Regime: Neoregulation and the New Division of Labor in North America. *Rural Sociology*. 75(2): 179-208.

Peterson, P.E. 2014. Position Limits, Hedging, and Excessive Speculation. *Farmdoc Daily*. 31 July 2014. Available from: <http://farmdocdaily.illinois.edu/2014/07/position-limits-hedging-and-excessive-speculation.html> [Accessed 27 August 2014].

Piesse, J. and Thirtle, C. Three bubbles and a panic: An explanatory review of recent food commodity price event. *Food Policy*. 34(2): 119-29.

Pleven, L. 2012. Behind Corn's Squeeze Play: Farmers. *Wall Street Journal*. 25 November 2012. Available from:

<http://online.wsj.com/news/articles/SB10001424052970204778604577243491711608130>. [Accessed 12 September 2014].

Pollack, A. 2011. USDA Approves Corn Modified for Ethanol. *New York Times*. Available from: http://www.nytimes.com/2011/02/12/business/12corn.html?_r=0 [Accessed 18 July 2013].

Pollan, M. 2006. *The Omnivore's Dilemma: A Natural History of Four Meals*. New York: The Penguin Press.

Pope, L. 2012. The Ethanol Mandate is Worse than the Drought. *The Wall Street Journal*. 27 July. Available from: <http://online.wsj.com/article/SB10000872396390443343704577550831467098866.html> [Accessed 31 August 2013].

Pork Checkoff, 2013. Quick Facts: the Pork Industry at a Glance, Iowa: National Pork Board. Available from: <http://viewer.zmags.com/publication/5bb6aa6d#/5bb6aa6d/1> [Accessed 31 August 2013].

Powell, J. 2003. ADM Acquisition Raises Antitrust, Ethanol Subsidy Questions. *Star Tribune*. 26 Jan. Available from: <http://www.startribune.com/business/11211801.html> [Accessed 16 July 2013].

Pritchard, B. 2009. The Long Hangover from the Second Food Regime: a World-Historical Interpretation of the Collapse of the WTO Doha Round. *Agriculture and Human Values*. (26) 297-307.

Purdue Extension. 2013. Purdue Crop Cost and Return Guide. Available from: http://www.agecon.purdue.edu/extension/pubs/id166_2013%20_novembe.pdf [Accessed 31 August 2013].

Pye, O. 2010. The Biofuel Connection – Transnational Activism and the Palm Oil Boom. *The Journal of Peasant Studies*. 37(4): 851–874.

Queck, P. 2009. Living with Higher Priced Feed. *Farm Futures*, October, 28-9. Available from: <http://magissues.farmprogress.com/FFU/FF10Oct08/ffu28.pdf> [Accessed 21 March 2014].

Ranchers-Cattlemen Action Legal Fund, United Stockgrowers of America (R-CALF) 2011. Letter to the CFTC Re: Comments Concerning Position Limits for Derivatives: Notice of Proposed Rulemaking, 28 March 2011. Available on R-CALF Website: <http://www.r-calfusa.com/Trade/110328-CommentsCFTCProposedRuleonPositionLimits.pdf>. [Accessed 19 August 2014].

- Ray, D.E. 2009. Driven by Ethanol at Break-Neck Speed. *Policy Pennings – Agricultural Policy Analysis Center*. 12 June. Available from: <http://www.agpolicy.org/weekcol/463.html> [Accessed 16 July 2013].
- Ray, D.E. 2010. Farmers had a Major Role in Jump-Starting Ethanol-Based Increases in Corn Demand. *Policy Pennings – Agricultural Policy Analysis Center*. 12 June. Available from: <http://www.agpolicy.org/weekcol/542.html> [Accessed 31 August 2013].
- Richardson, B. 2010. Big Sugar in Southern Africa: Rural Development and the Perverted Potential of Sugar/Ethanol exports. *The Journal of Peasant Studies*. 37(4): 917–938.
- Richardson, B. 2012. From a Fossil-Fuel to a Biobased Economy: The Politics of Industrial Biotechnology. *Environment and Planning C*, 30(2): 282-296.
- Rixen, T. 2013. Why Reregulation after the Crisis is Feeble: Shadow Banking, Offshore Financial Centers, and Jurisdictional Competition. *Regulation and Governance*. 7(4): 435–459.
- Rometsch, J. 2012. India’s Agrofuel Policies from a Feminist-Environmentalist Perspective. In: Potthast, T. and Meisch, S. (eds.) *Climate Change and Sustainable Development*. The Netherlands: Wageningen Academic Publishers, pp. 233-238.
- Rosiak, L. 2008. Power Struggle: Division with Biofuels Community Complicates the Energy Equation. 24 July. Available from: <http://www.opensecrets.org/news/2008/07/power-struggle-division-within.html> [accessed 30 May 2012].
- Sanders, D.R. and Irwin, S.H. 2011. New Evidence on the Impact of Index Funds in US Grain Futures Markets. *Canadian Journal of Agricultural Economics*. 59 (4): 519–532.
- Schlosser, E. 2001. *Fast Food Nation: The Dark Side of the All-American Meal*. Boston: Mariner Books/Houghton Mifflin Harcourt.
- Schneider, M. 2014. Developing the Meat Grab. *The Journal of Peasant Studies*. 41(4): 613-633.
- Selfa, T., Bain, C. and Moreno, R. 2014. Depoliticizing Land and Water ‘Grabs’ in Colombia: the Limits of Bonsucro Certification for Enhancing Sustainable Biofuel Practices. *Agriculture and Human Values*. 31(3): 455-468.
- Shattuck, A. 2008. The Agrofuels Trojan Horse: Biotechnology and the Corporate Domination of Agriculture. In Jonasse, R. (ed.) *Agrofuels in the Americas. A Food First Book*. Oakland: Institute for Food and Development Policy, pp. 89–101. Available from: http://www.foodfirst.org/files/pdf/Agrofuels_in_the_Americas.pdf [Accessed 30 May 2012].
- Shea, E. 2007. President Bush Signs Energy Bill; Sets 25x'25 as America's Energy Goal. 25x'25 Press Release. Available from:

http://www.25x25.org/index.php?option=com_contentandtask=viewandid=362andItemid=56
[Accessed 30 May 2012].

Sherman, J.A., Heeg, P. and Loesch, M. 2011. CFTC Publishes Final Rules on Position Limits. Available from:
<http://www.nortonrosefulbright.com/knowledge/publications/93407/cftc-publishes-final-rules-on-position-limits-limited-comment-period-closes-on-january-17-2012>. [Accessed 5 June 2014].

Shiva, V. 2000. *Stolen Harvest: The Hijacking of the Global Food Supply*. London: Zed Books.

Smithfield. 2005, 2005 annual report. Available
from:<http://www.sec.gov/Archives/edgar/data/91388/000009138813000040/fy201310k.htm>
[Accessed 31 August 2013].

Smithfield. 2012, 2012 annual report. Available
from:<http://www.sec.gov/Archives/edgar/data/91388/000119312505140386/d10k.htm>
[Accessed 31 August 2013].

Southwestern Miller Magazine. 1972. ADM moves to broaden earnings base, The Southwestern Miller. 5 Sept. 17.

Sporre, G., Clifford, R. and De Buyer, G. 2011. The Value in Volatility: Initiating with a Buy. *Deutsche Bank Global Market Research*. pp.1-130.

Stavro, B. 1985. Quit? Hell No! *Forbes*. 26 August, p. 35.

Stuart, T. 2009. *Waste: Uncovering the Global Food Scandal*. London: Penguin.

Szala, G. and McFarlin, M. 2013. Top 50 Brokers of 2013. *Futures Magazine*. 24 November. Available from: <http://www.futuresmag.com/2013/11/25/top-50-brokers-of-2013-bruised-and-battered-but-co?t=financialsandpage=7>. [Accessed 13 September 2014].

Tepe, F.S., Xiaodong, D. and Hennessy, D.A. 2011. The Impact of Biofuels Policy on Agribusiness Stock Prices. *Agribusiness*. 27(2): 179-192.

Timmer, C.P. 2008. Causes of high food prices. Asian Development Bank. ADB Working Paper Series no. 128. Available from:
<http://www.adb.org/sites/default/files/publication/28375/economics-wp128.pdf>. [Accessed 13 September 2014].

Tokar, B. 2010. Biofuels and the Global Food Crisis. In Magdoff, F. and Tokar, B. (eds) *Agriculture and Food in Crisis: Conflict, Resistance and Renewal*. New York: Monthly Review Press.

Tsingou, E. 2013. Transnational Veto Players and the Practice of Financial Reform. *The British Journal of Politics and International Relations*, n/a–n/a. doi:10.1111/1467-856X.12031

Tyson Foods. 2006. Investor Fact Book 2005-6. Available from: http://www.corporate-ir.net/media_files/irol/65/65476/reports/04_05_factbook.pdf [Accessed 31 August 2013].

Tyson Foods. 2013. Fiscal Fact Book 2012. Available from: <http://edg1.precisionir.com/companyspotlight/NA018523/TYSON-2012-Fact-Book.pdf> [Accessed 31 August 2013].

UOIG. 2012. Deere and Co. University of Oregon Investment Group. 30 May, Available from: <http://uoinvestmentgroup.org/wp-content/uploads/2012/05/DEUpdate-Grace-Gong.pdf> [Accessed 21 March 2014].

US Census Bureau. 2013. Concentration Ratios. Available from: <http://www.census.gov/econ/concentration.html> [Accessed 6 July 2013].

US Department of Agriculture. Economic Research Service (USDA ERS). 2014a. US Bioenergy Statistics. Available from: <http://www.ers.usda.gov/data-products/us-bioenergy-statistics.aspx#.UiJgwjYqiSo> [Accessed 20 June 2014].

US Department of Agriculture, Economic Research Service (USDA ERS). 2014b. Corn Supply, Disappearance and Share of Total Use. Available from: http://www.ers.usda.gov/datafiles/US_Bioenergy/Feedstocks/table05.xls [Accessed 20 June 2014].

US Department of Agriculture, National Agricultural Statistics Service (USDA NASS). 2013. Agricultural prices. Available from: <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1002> [Accessed 6 July 2013].

US Department of Agriculture, National Agricultural Statistics Service (USDA NASS). 2014. Available from: <http://usda.mannlib.cornell.edu/MannUsda/homepage.do> [Accessed 23 March 2014].

US Department of Agriculture, National Agricultural Statistics Service (USDA NASS). 2014. Available from: http://nass.usda.gov/Charts_and_Maps/ [Accessed 2 January 2015].

US Energy Information Administration, 2013. *International Energy Statistics*. Available from: <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=79andpid=79andaid=1> [Accessed 6 July 2013].

US Senate. 2009. Excessive Speculation in the Wheat Market. *Majority and Minority Staff Report, Permanent Subcommittee on Investigations*. Washington, DC: US Senate, 24 June.

- Van der Ploeg, J. 2010. The Food Crisis, Industrialized Farming and the Imperial Regime. *Journal of Agrarian Change*. 10 (1): 98–106.
- Veblen, T. 1904. [1975]. *The Theory of Business Enterprise*. Clifton, NJ: Augustus M. Kelley, Reprints of Economics Classics.
- Vellema, S. 2004. Monsanto Facing Uncertain Futures: Immobile Artefacts, Financial Constraints and Public Acceptance of Technological Change. In: Jansen, K. and Vellema, S. (eds.) *Agribusiness and Society: Corporate Responses to Environmentalism, Market Opportunities and Public Regulation*. London: Zed Books, pp. 232–260.
- Vermeulen, S. and Cotula, L. 2010. Over the Heads of Local People: Consultation, Consent, and Recompense in Large-Scale Land Deals for Biofuels Projects in Africa. *The Journal of Peasant Studies*. 37(4): 899–916.
- Weber, J. 2008. The Downside of ADM's Focus on Biofuels. *Businessweek*. 30 December. Available from: <http://www.businessweek.com/stories/2008-12-30/the-downside-of-adms-focus-on-biofuels> [Accessed 21 March 2014].
- Weis, T. 2007. *The Global Food Economy: the Battle for the Future of Farming*. New York: Zed Books.
- Weis, T. 2010. The Accelerating Biophysical Contradictions of Industrial Capitalist Agriculture. *Journal of Agrarian Change*, 10(3): 315–341.
- Weis, T. 2013. The Meat of the Global Food Crisis. *The Journal of Peasant Studies*. 40(1): 65–85.
- Weiss, M.J. 1990. The High-Octane Ethanol Lobby. *New York Times*. 1 April. Available from: <http://www.nytimes.com/1990/04/01/magazine/the-high-octane-ethanol-lobby.html> [Accessed 20 May 2012].
- Weiss, M.J. 1990. The High-Octane Ethanol Lobby. *New York Times*, 1 April. Available from: <http://www.nytimes.com/1990/04/01/magazine/the-high-octane-ethanol-lobby.html> [Accessed 11 July 2013].
- Welch, M. 2011. Feed Availability: Effect on the Livestock and Poultry Industries Hearing of the Livestock, Dairy, and Poultry Subcommittee House Committee on Agriculture, 14 September. Available from: <http://www.nationalchickencouncil.org/wp-content/uploads/2011/12/Testimony-Feed-Availability-Effect-on-the-Livestock-and-Poultry-Industries.pdf> [Accessed 21 March 2014].
- White, B. and Dasgupta, A. 2010. Agrofuels Capitalism: a View from Political Economy. *The Journal of Peasant Studies*. 37(4): 593–607.

- Whitmore, A. 1999. 'Monsanto: Corporate Food Gamble?' in Madley J. (ed.), *Hungry for Power: The Impact of Transnational Corporations on Food Security*. London: UK Food Group.
- Wilkinson, J. and S. Herrera. 2010. Biofuels in Brazil: Debates and Impacts. *The Journal of Peasant Studies*. 37(4): 749–768.
- Winders, B. 2009. *The Politics of Food Supply: US Agricultural Policy in the World Economy*. Connecticut: Yale University Press.
- Winson, A. 1993. *The Intimate Commodity: Food and the Development of the Canadian Agro-Industrial Complex*. Toronto: Garamond Press.
- Winters, P. 2012. Food Before Fuel is a Fight Between the States. *Biotechnology Now*. 25 September. Available from: <http://www.biotech-now.org/environmental-industrial/2012/09/food-before-fuel-is-a-fight-between-the-states#> [Accessed 31 August 2013].
- Wisner, R.N. 2004. Round-Up Ready Spring Wheat: Its Potential Short- Term Impacts on U.S. Wheat Export Markets and Prices. *Economic Staff Report*. 1 July. Ames: Department of Economics, Iowa State University.
- World Bank. 2011. Responding to Global Food Price Volatility and its Impact on Food Security. *World Bank Development Committee Report DC2011-0002*. 4 April. Available from: [http://siteresources.worldbank.org/DEVCOMMINT/Documentation/22887406/DC2011-0002\(E\)FoodSecurity.pdf](http://siteresources.worldbank.org/DEVCOMMINT/Documentation/22887406/DC2011-0002(E)FoodSecurity.pdf). [Accessed 21 September 2014].
- World Bank. 2011. Food Price Hike Drives 44 Million People into Poverty. Press Release No. 2011/333/PREM. Available from: <http://reliefweb.int/report/bangladesh/food-price-hike-drives-44-million-people-poverty> [Accessed 30 May 2012].
- Wright, B. 2014. Global Biofuels: Key to the Puzzle of Grain Market Behavior. *Journal of Economic Perspectives*. 28(1), 73-98.
- Young, K.L. 2013. Financial Industry Groups' Adaptation to the Post-Crisis Regulatory Environment: Changing Approaches to the Policy Cycle. *Regulation and Governance*. 7(4): 460–480.