

2013

Paying to Play: Supply Management in Montana's Dairy Industry

Laura Ginsburg
The University of Montana

Let us know how access to this document benefits you.

Follow this and additional works at: <https://scholarworks.umt.edu/etd>

Recommended Citation

Ginsburg, Laura, "Paying to Play: Supply Management in Montana's Dairy Industry" (2013). *Graduate Student Theses, Dissertations, & Professional Papers*. 736.

<https://scholarworks.umt.edu/etd/736>

This Thesis is brought to you for free and open access by the Graduate School at ScholarWorks at University of Montana. It has been accepted for inclusion in Graduate Student Theses, Dissertations, & Professional Papers by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

**PAYING TO PLAY:
SUPPLY MANAGEMENT IN MONTANA'S DAIRY INDUSTRY**

By

LAURA MICHELLE GINSBURG

Bachelor of Arts, New College of Florida, Sarasota, Florida, 2005

Thesis

**Presented in partial fulfillment of the requirements
for the degree of**

**Master of Science
in Environmental Studies – Sustainable Food and Farming**

**The University of Montana
Missoula, MT**

May 2013

Approved by:

Sandy Ross, Dean of The Graduate School

Committee:

**Dr. Neva Hassanein, Chair
Environmental Studies**

**Dr. Len Broberg
Environmental Studies**

**Dr. Laurie Yung
College of Forestry and Conservation**

ACKNOWLEDGEMENTS

This research could not have happened without the guidance and support of the following people:

Neva Hassanein, for taking me on as a graduate student, teaching me to be a much better writer and researcher, and encouraging my ideas;

Len Broberg and Laurie Yung, for agreeing to be on my committee and taking on an unfamiliar topic;

Bonnie Buckingham, for being a major support and providing me an opportunity to work in the western Montana food system;

Connie Surber, for everything.

I am very thankful to the dairy farmers across the state who have contributed time, energy, and expertise to help me understand dairy policy.

I would also like to sincerely thank the following for their financial support:

B. & B. Dawson Memorial Fund

Pat Williams Scholarship Award*

Matthew Hansen Endowment

*The Pat Williams Scholarship Award is made possible by a congressionally appropriated grant administered by the U.S. Department of Education. The funding of this project does not imply endorsement of specific activities by the federal government.

ABSTRACT

Ginsburg, Laura, M.S., Spring 2013

Environmental Studies

Paying to Play: Supply Management in Montana's Dairy Industry

Chairperson: Dr. Neva Hassanein

Montana's dairy industry is unique among US states because of its supply management program, which allocates quota to limit how much fluid milk can be produced and sold within the state. The amount of quota is set and price varies with market conditions; therefore, quota adds to a farm's production costs. This paper presents findings from in-depth interviews with 17 dairy farmers to learn how quota has affected on-farm decision-making and how they perceive the impacts of quota on the statewide industry. Farmers tend to be split between those who think it affected their on-farm decisions and those who felt that other factors had greater impact. Farmers perceive effects such as supply stagnation, increased expenses, industry protection from other states, and possibly stabilizing the price of milk. The qualitative approach used here differs from past research in other nations, which typically focused on the financial implications of supply management.

TABLE OF CONTENTS

Introduction	1
The Road Ahead	10
Beyond the Milk Mustache: Dairy Policy, Quota, and Montana’s Dairy Industry	
Introduction	12
Development and Importance of Geographic Milksheds	12
Restructuring, Regionalizing, and Industrialization	15
Social and Environmental Effects of Restructuring	18
The Government in the Milking Parlor	19
Quota System Research	21
Bringing the Focus Back to Montana	26
Methodology	28
A Breed Apart: Dairy Farmers Discuss Quota	34
Meet the Farmers	35
Farm Level Effects of Quota	38
Effects at the State Level	49
Bringing it Together	58
Conclusion	60
Works Cited	69
Appendix 1	72

LIST OF FIGURES AND TABLES

Figure 1.	3
Changes in the Number of Dairy Farms and Milk Production in Montana: 1987 – 2010	
Table 1.	64
Changes in the Structure of Montana’s Dairy Industry by Farm Numbers and Herd Size: 1992-2007	
Table 2.	64
Changes in the Structure of the National Dairy Industry by Farm Numbers and Herd Size: 1992-2007	
Figure 2.	65
Percentage Change in the Number of Dairy Farms by Herd Size, Montana and U.S., 1992 - 2007	

INTRODUCTION

Montana dairy cows have some of the best views that can be found in the state, rivaling what many people see from their home or office windows. In western Montana, some cows overlook the Mission Mountain range and the National Bison Refuge, while others gaze upon the dramatic Bitterroot and Sapphire ranges. In the Bozeman area, cows often look out onto the Gallatin National Forest and the resort peaks of Big Sky. To the north, along the High Line and in the central part of the state, farms are situated in what truly is “Big Sky Country,” where it seems that the expanse of blue overhead is much more vast than the ground below. In some places, there is only open space as far as the eye can see, while in others development and houses crowd the surrounding land. And depending on what part of the state you are in, there might be another dairy just down the road, or it might be 200 miles or more before you come to the next dairy farm. Whether framed by wind-swept prairie, fields of golden wheat, or mountain peaks, the dairy cows of Montana live in a place that many people only dream about. It is not only the picturesque landscapes which set Montana dairying apart from others states, it also has a unique industry overall because it is one of only two states which utilize supply management. Dairy farmers across the state literally have to “pay to play” by purchasing quota, or production rights, in order to sell into the higher priced, fluid milk market.

With only 70 dairy farms¹ left across the state, the industry is just a shadow of what it used to be. Farmers and long-time residents tell stories of a time when there were dozens of dairies in areas where there may now be only one or two. One farmer recounted to me

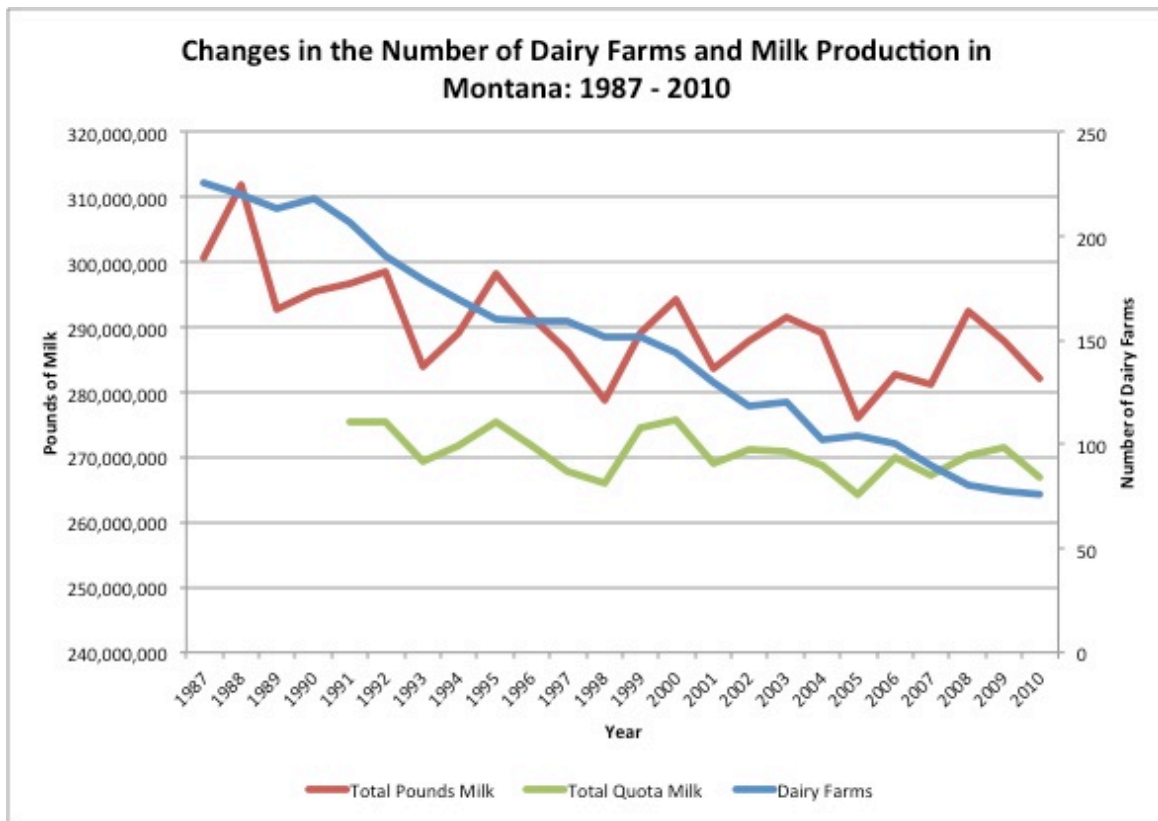
¹ When I refer to dairy farms in this thesis, I am talking only about those who ship their milk for processing and own quota. There are three dairies in Montana who process their own milk and are not included in state dairy statistics.

that when he was growing up on the farm he now operates, he could see nine other dairies from his driveway. Now, only his farm remains. This will come as no surprise to those familiar with the dairy industry; since the 1980's there has been a constant decline in the number of dairy farms across the United States, an approximate loss of 3% annually (*Progressive Dairyman* 2011). According to Montana's Milk Control Bureau, there were 218 dairy producers in 1990; by 2012, there were just 70, a 68% decline. Also, only three processing plants remain in the state: Darigold, a cooperative based out of Seattle, operates one in Bozeman, while MeadowGold, a subsidiary of Dean Foods, operates creameries in Great Falls and Billings. There are two independently operated creameries that are associated with a single farm, so while they are additional processors, they do not fall under the category as processors that purchase milk from multiple farmers. Figure 1 details dairy farm and production numbers between the years of 1990 and 2010, clearly showing the decline in farm numbers over the past 23 years, while production has remained level.

While Montana generally mirrors national trends in terms of consolidation of farms, it stands out for its use of a mandatory supply management policy intended to keep production steady. In 1990 Montana established a quota system, in which farmers own the rights to produce a certain amount of milk on a daily basis and receive the highest pay for that production. As illustrated in Figure 1, the quota system has kept milk production in the area of 275 million pounds annually. Despite changes in the industry and population growth in the state from just under 800,000 in 1990 to 989,000 in 2010, and thus increasing demand for dairy products, Montana's dairy production has been fairly

stable for nearly two and a half decades. Consistent with national trends of fewer and bigger farms, as the total number of dairies declined in Montana, the amount of milk produced has stayed level indicating that as farmers exit the business those that remain increase their own production. California is the only other state that utilizes supply management, yet the system has not been as restrictive as Montana's. Due to the infrequency of its use, little is known about the effects of supply management on U.S. dairy farmers. This thesis attempts to understand how a quota system affects on-farm decision-making and the larger statewide industry, which is critical when thinking about the future of dairy farm policy in Montana and on a national level.

Figure 1.



Montana dairy farmers and the Department of Livestock adopted the quota system and production pool (discussed below) in Montana in 1989 and enacted it in 1990, with the original intent to limit producer production (correspondence, Montana Department of Livestock- Milk Control Bureau). Dairy farmers had to vote to put the system in place and there was a failed attempt a few years earlier, but the 1989 vote was successful because it included the producer pool and modified levels of quota that were to be given to individual farmers. Before the institution of quota, farmers typically held a shipping contract with a specific creamery for a certain amount of milk. If the farmer wanted to significantly increase his or her herd, they would have to contract with the creamery to do so. Each creamery had its own utilization levels for various value-added products, which later factored in heavily into the formation of the quota system and created the need for a production pool.

All milk produced in the state that is shipped to a processor constitutes a “pool” available for processing. The pool and quota are inextricably linked, as one would not work without the other. The pool is significant because before its inception, producers were paid differently depending on which plant processed their milk. Historically, when there were more processing facilities across the state that made dairy products other than fluid milk, such as cottage cheese and ice cream, producers received different amounts for their milk. For instance, farmers in Western Montana may have been affiliated with Equity, which had 100% fluid utilization when it was still in business, meaning their producers received the Class I price for all of their milk. Down the road, another farmer may have been selling to Darigold, which produced mostly fluid milk and some cottage

cheese. This meant that the Darigold producers only received a fraction of their production at Class I price and the remainder at the Class II or Class III price. As creameries started to close, this created a challenging situation for farmers because they wanted their milk to go to the processor with the highest Class I utilization, but sometimes that option was not feasible because the distance between creameries was too far or creameries were not accepting new sources of milk. Once the pool was initiated, it no longer mattered which company the farmer was working with because all milk in the state was essentially combined and the total usage derived from that larger amount. Now usage and pay out is based on the Class I utilization of both MeadowGold and Darigold combined, so even though MeadowGold currently has higher amounts of Class I usage, all producers benefit. Price of milk is based on national milk pricing plus a location differential for the state because of the distance to markets (see footnote on page 6 for more explanation about pricing).

Upon implementation of the quota system, each producer was given a percentage of their existing production as quota pounds, which was “based upon each eligible producer’s highest total production for the one-year period immediately preceding the effective date of the quota plan” (Nick 2002: 1). Because quota only effects Class I, fluid milk production, the percentage was calculated based on the utilization of the plant they were currently shipping to, and how much of that milk was going to fluid uses. Producers for MeadowGold received 100% of their production, while Darigold producers received about 75%, which created an immediate demand for additional quota pounds. Quota pounds are for daily production, and are bought and sold by the pound.

The government of Montana does not benefit financially from quota or quota transfers; rather, the State (through the Milk Control Board and Milk Control Bureau) acts as a rule-making body that decides in deciding how quota transfers occur. The Milk Control Bureau (MCB) is the state-run department for handling and overseeing Montana's dairy industry, and is under the Department of Livestock. The MCB collects fees from dairy farmers to pay for its own operation, the milk-testing lab, and for farm inspections. The Bureau is responsible for enforcing the laws and regulations regarding milk production in the state, including duties such as: licensing dairy farms, approving quota transfers, changing the total amount of quota available, calculating the current price for quota and excess milk², and ensuring that farmers are getting paid for their production.

The Milk Control Board works in tandem with the MCB, and is comprised of a group of agricultural producers nominated for the post, per Montana Code Annotated (MCA) 2-15-3105. No member of the Board may be connected with the dairy industry to ensure that policies are fair to all dairy farmers across the state. The Milk Control Board has decision-making power over the production, processing, storage, distribution, and sale of milk pursuant to MCA 81-23-103. Despite this authority, it is only the rare occasion that the Board will meet to discuss an issue. In the past, when there were more creameries

² Montana's milk price is set based on a Federal Milk Market Order price (often called the basic formula price), plus \$2.55 location differential, which changes according to the proximity of population centers. Each class of fluid milk is priced differently, based on its final use (drinking, cheese, powdered, and so forth), and in Montana, prices are set based on use for the first three classes of milk. Specifically, Class I milk receives the highest price, and is based on the basic formula price, plus the location differential. Also taken into consideration are the most recent Chicago Mercantile Exchange grade A butter price and the skim milk price for the central states, which factors in to how all classes of milk are priced. Utilizing these numbers and a complex formula, the Milk Control Bureau creates a base price for milk in the state. However, in theory Montana could create its own pricing mechanism because it is a State Order and does not have to follow the FMMO pricing schemes, but because of competition and that the milk processors are both based in other states, the price point must remain comparable to surrounding states.

and producer/processors across the state and before the institution of quota and the milk pool, the Board was charged with making sure that no one undercut the minimum sale price for fluid milk. Typically, this was handled through litigation that the Milk Control Board filed against the farmer or processor under investigation.

When quota was initiated, there was a penalty for transferring quota and not using it to discourage the collection of quota pounds and to keep price speculation to a minimum. The price per pound of quota is not set by the State either, and varies depending on supply and demand as producers exit the industry and others look to purchase more. Because quota has a monetary value, it can be used as equity when taking out a loan, but any liens against the quota must be paid before it can be sold. The total amount of quota that was set in 1989 and first implemented in 1990 was based on Class I utilization at that time, and has not changed. Thus, the amount of milk that is considered “quota milk” has remained nearly constant for the past 23 years.

The following hypothetical example illustrates how quota changes the way farmers are paid for their milk:

John currently owns 10,000 pounds of quota. His daily production is 10,500 pounds. Because the milk is pooled, John is hopeful that all of the other dairy farmers are producing at a level that is very close to their quota so that there will not be much surplus in the state. At the end of each month, the Milk Control Bureau calculates how much milk was produced and compares that with how much milk went in to each type of processed product. Currently, it is about a 70/30 ratio, with the majority going to Class I

fluid sales. Therefore, the highest price John will receive for his milk will be for the 10,000 quota pounds produced, which will receive the pooled price of 70% Class I and 30% Class II or III. The additional 500 pounds of milk he produced will get the lower over-quota price, which is always set at \$1.50 less than the highest pooled price.

Additionally, the price for all of his milk will shift up or down depending on how much butterfat it contains. If John wanted to purchase additional quota pounds to fill his production, he could do that if there was some quota available. As soon as he owns it, John will reap the higher pay afforded to the portion of what he produces under quota.

This scenario simply illustrates how quota effects pricing of milk, and does not take into account many of the other factors influencing a farmer's milk check. For instance, fees are deducted based on production to pay for milk testing and for the functioning of the Milk Control Bureau. The milk processing company also deducts freight calculated by hundredweight and can adjust pay based on milk quality. Each processing company across the U.S., whether is a cooperative or for-profit firm, has a unique method for calculating farmer bonuses based on milk quality and how much to charge for freight.

National supply management plans have been discussed many times over the years, with no clear answer on whether it would be a good match for the U.S. dairy industry. In the current debate over the 2013 Farm Bill, the National Milk Producers Federation (NMPF) put forth an optional market stabilization program as part of the Foundation for the Future plan. Unlike typical supply management systems, however, this program would change the way a farmer would be paid when milk prices fall below a certain threshold, based on

past production (NMPF 2013). This is one step in the direction towards stabilizing supply because the program acts to ensure that enrolled farmers are incentivized to keep production steady to increase pay out when milk prices drop. The market stabilization program was mandatory at first but not all farmers wanted to participate, which may affect the program's effectiveness at managing supply. Because production, processing, consumption, and farm practices vary tremendously by state, larger and smaller producers do not always agree on a program that will work best for their specific farm.

For example, Montana lies within a region characterized by a variety of dairy farm scales along with clusters of large processing facilities. This context influences the milk market and the ability of Montana dairy farms to persist into the future because a lot of milk and processed products are made just across state borders, which Montana cannot turn away due to the Interstate Commerce Clause of the U.S. Constitution. Illustrating the variety of farm scales in surrounding states, U.S. dairy statistics from the 2011 *Progressive Dairyman* shows that to the east, North Dakota has 145 dairies with an average herd size of 131 cows, while South Dakota has 350 dairies with an average herd size of 260 cows. The smallest regional representation comes from Wyoming, where there are 20 dairies with an average herd of 300 cows.

To the west, where environmental and policy conditions are advantageous for dairy farming, are two of the top ten dairy production states in the nation. Washington, with 460 dairies with an average herd of 565 cows, still retains some small farms and has numerous processing facilities, including a growing farmstead movement of artisan

cheese-makers. In Idaho, the third largest dairy producing state in the nation, the number of dairy farms fell from 1,990 to 575 between the years 1992 and 2011 (USDA-NASS 2007; *Progressive Dairyman* 2011). Yet, the number of cows rose from 181,785 to 582,000, with an average herd size of just over 1,000 cows (USDA-NASS 2007). This trend is consistent with changes in the structure of dairying nationally, though hyper-exaggerated given the incredible growth of cow numbers concurrent with farm loss. Idaho has numerous processing facilities, typically on an industrial scale, for a variety of dairy products including fluid milk, dry milk powder, whey powder, cheese, ice cream, cottage cheese, yogurt, sour cream, and a multitude of other dairy based products or ingredients.

The Road Ahead

In the following chapters, this thesis builds a foundation for understanding the dairy industry and situates Montana's industry into the larger national and international context. Chapter two explores location theory, restructuring and regionalization, and the resulting social and environmental effects. A discussion of government assistance and neoliberal policies frame the role of government in changing the way individual dairy farmers operate, with a brief discussion of tariffs, subsidies, and national-level milk price supports. Chapter two concludes with a discussion of other research from Canada and Europe where supply management systems are used and details the on-farm effects of a quota system in those contexts. Methodology for the data collection methods of qualitative interviews, document review, and statistical analysis and their strengths and limitations are discussed the third chapter, which also introduces the research

participants. The fourth chapter highlights the typology I created to group the farmers and analyzes the interview data with specific attention given to positive and negative aspects of quota at the on-farm and state industry levels. The types and their specific qualities enhance the understanding of how farmers view the supply management policy that they must operate under. Concluding remarks address how this thesis research applies to the broader state and national audience.

This study attempts to accomplish multiple goals to answer the question of how supply managed dairy systems affect farmer decision-making and the larger state dairy industry in the context of the much larger U.S. dairy industry. First, by adding to the body of knowledge about on-farm decision-making, this thesis highlights how farmers think the quota system has directly influenced their decisions for things like whether to expand, build a new facility, or even stay in the dairy business. The ways farmers discussed quota at this level divided them into two groups, those who think quota is a burden and have significantly expanded versus those who feel neutral or positive about quota and have maintained their smaller herd size. Second, this thesis discusses how farmers think the quota system has changed the overall state industry. When compared to national level data, specifically regarding the movement to fewer and larger farms, the thoughts of the dairy farmers are largely confirmed. Finally, this thesis explores if farmers think supply-managed systems are better when compared with other national and international dairy systems, particularly regarding the benefits of stabilizing supply.

BEYOND THE MILK MUSTACHE: DAIRY POLICY, QUOTA, AND MONTANA'S DAIRY INDUSTRY

Introduction

Over the years, location-based theory has come to be the guiding thought in developing dairy policy on state, regional, and national levels for a variety of reasons. As a result, the industry has been restructured, although on widely different paths particular to specific regions. The federal government's role in dairy policy is analyzed below, particularly governmental protections for dairy farmers and the regulation of price, which is especially based on location theory, or the valuation of commodities based on the production area. This chapter concludes with an overview of previous quota research from Canada and Europe that will form the basis for the analysis of farmer interviews, and highlights the necessity of this study regarding Montana's supply management policy.

Development and Importance of Geographic Milksheds

The development of milksheds -- geographic areas in which milk is produced for a particular region -- is based heavily on von Thünen's 1826 model of the Isolated State; that is, agricultural products with higher transportation costs and land use intensity would be produced closer to the final market. Block and DuPuis (2001) relate von Thünen's idea to current structures and models used within the dairy industry. Although the model is "a bit quaint" (Block and DuPuis 2001: 80), von Thünen predicted that most American cities would retain a semblance of a milkshed because of the perishable nature and high

cost of transporting fluid milk. Indeed, the existence of milksheds is true to this day, with most American consumers drinking milk produced in the region where they live. This does not hold true for most other dairy products and is in contrast with other major commodities, which are shipped around the globe.

In regards to agricultural economics, Congress utilized the model in the 1930's and 1940's when the federal milk market order system was formed. The von Thünen model provided a “theoretical backbone supporting the development of pricing systems used in federal milk marketing orders and a theory-based reasoning for their existence” (Block and DuPuis 2001: 88). Federal milk market orders created a national pay structure that paid producers more depending on their distance to urban centers. These market order zones were the “product of political struggles whose outcomes have varied according to region” (Block and DuPuis 2001: 93). DuPuis and Block (2008) note that the localization of the dairy industry was made possible by national government legislation that acted on the concerns of local-level players, which shows that “top-down policies and the grassroots policies are often coproduced,” even as the boundaries of production regions are continually influenced by politics (DuPuis and Block 2008: 2001). The market order system placed higher value on milk produced closer to processors and distributors, which led to zoning in the dairy industry (Block and DuPuis 2001: 86). The establishment of milk market-order boundaries thus had the effect of determining “not only which farmers gained access to the higher-priced city milk market, but also how a farmer used nature, capital, and labor resources to produce milk” (DuPuis and Block 2008: 1992). The federal milk market orders are still in existence today and form the

basis for a market structure that ensures consumers an adequate supply of milk while theoretically (if not in practice) preventing erratic price fluctuations (USDA-AMS 2010).

One of the most prominent effects of valuing commodities based on their production location has been the development of a classified pricing system for fluid milk sales. Fluid milk receives the highest classified price because it is the most perishable, cannot travel long distances, and must be sold in a short time frame. Other classes of milk are used for products with long shelf lives and can be transported to distant locations. Class I milk receives the highest price and the end use is for fluid consumption. Class II milk is used for cultured products or other freshly made products such as ice cream, yogurt, and cottage cheese. Class III and IV milk is utilized for butter, cheese, or other processed products like dry milk powder. Although most farmers produce milk that could be sold for Class I usage because it equates to higher returns, the price they receive is determined by the final use, which is at the discretion of the processor (Balagtas et al. 2007).

Market orders have been criticized because they have caused the production of Class I milk to exceed the demand, thus driving down the farm gate price of milk and raising the cost of processed products (Balagtas et al. 2007). Unless a farmer is in a direct relationship with a processor, they have little to no say in how their milk is used; that is, dairy farmers are price-takers. Manchester (1983: 269) notes, “The existence of classified pricing is an affront to economists, lawyers, and consumer advocates because, as everyone knows, classified pricing is equated with price discrimination.” Manchester goes on to explain that price discrimination is illegal in all other sectors, but has been

given special permission under the federal Agricultural Marketing Agreement Act. Pricing structures that determine the value of milk are based on “economic principles embodied in location theory” (Manchester 1983: 270), and that value comes from the transportation costs of moving products around in relation to the city center.

Restructuring, Regionalizing, and Industrialization

Restructuring of the dairy industry has had significant impacts on how and where milk is produced and processed, as well as how individual farms handle waste, use resources, and impact their surrounding communities. One of the major characteristics of the dairy industry is the growth of cooperatives and their exemption from antitrust laws through the Capper-Volstead Act of 1922 (Reich 2007). One of the two milk shipping and processing companies in Montana is the cooperative Darigold, based out of Seattle and representing the Northwest Dairy Association. The cooperative model was utilized beginning in the early 1900’s as a protection for farmers against the undercutting business practices of milk purchasing companies (Reich 2007). Since their formation, cooperatives have gone from being based in a relatively small geographic area to being larger entities representing hundreds or thousands of farmers across a region; for example, Darigold represents farmers in Montana, Washington, Idaho, Oregon, and Utah (Sumner and Ahn 2008).

As the industry has restructured over the past several decades, further regionalization has taken place. As Sumner and Ahn (2008) point out, the number one dairy state, California, had an average herd size of 700 cows in 2003, while Wisconsin, the number

two state, had an average herd size of 74 cows. The reasons for this difference include markets, environmental conditions, and the farming culture. For example, the California dairy industry, notable for its almost exclusive presence of so-called mega-dairies that feed their cows in confinement, can thank a combination of climate, geography, policies, urban expansion, and the influence of Dutch farmers who were well-versed in corral feeding (Cross 2006).

As the dairy industry has progressed along two fairly different yet related trajectories, there has also been a dramatic change in processing. Lyson and Gillespie (1995) note that economies of scale have led to the demise of many smaller processors. Large farms articulate with large processors, where both can capture “economies of scale and become the least-cost producers” (Lyson and Gillespie 1995: 494). This has allowed them to become the dominant form of production in the industry. Cross (2006) explains the growth of the dairy industry in Tulare County, California, as being directly related to the reliance on neighboring agroindustries that provide cheap feed and the construction of mega-processors that can handle large amounts of milk. Herbst, et al. (2006: 2) adds that, “Every area where growth has occurred has done so because of production and economic considerations. Low land costs, inexpensive feed, good weather (for cows and people), as well as attractive class I prices and fluid utilization have driven movement. The emergence of a national cheese market, as well as other national product markets, has enabled producers to move almost anywhere.” At the same time, Lyson and Gillespie (1995: 503) discuss how the presence of small processors allows the continuation of small dairies, and that “the persistence of family-size dairy farms may rest more on

developing and protecting markets for the milk they produce rather than tinkering with the production function.” Cross (2006) notes that this variation in farm and processing scales is symptomatic of the differentiating effects of regionalization. Such economic competitive advantage is indicative of a regionalized market acting in a global framework (Lyson and Green 1999).

Industrialization of the dairy industry has been the primary influence on the growth of mega-dairies and the associated effects. The movement towards industrialization of dairying has been more uneven than in other agricultural sectors, but it did intensify during the 1990’s (Jackson-Smith and Buttel 1998). Larger farms are able to capitalize on economies of scale and increased regional difference (Lyson and Green 1999). The growth of industrialized dairies is based on neoclassical economics that holds that larger production units are more efficient; technology and machinery are substituted for labor; and jobs are routinized so that workers become exchangeable (Lyson and Gillespie 1995). Increased use of technology has served as a downward pressure on price, which then forces dairy farmers to adopt the technology, particularly if they make their profit on the margins (Geisler and Lyson 1991). This is typically understood as the “treadmill theory” where early adopters of new technologies that lower cost and increase efficiency receive better prices. Once most farmers adopt the technology there is more over-production, which pushes down prices. Farmers are then encouraged to look for the next technological fix that will allow them to receive a better price. Returns from the industrialized system are “extremely low...[and] farmers are under constant pressure to

minimize costs, and to expand production to compensate for shrinking profit margins” (Lyson and Green 1999: 139).

Social & Environmental Effects of Restructuring

As restructuring continues to encourage the growth and spread of ever-larger dairies and as economic power is consolidated into fewer cooperatives and processors, social and environmental problems arise. Geisler and Lyson (1991: 562) argue that the loss of individual farms in a diverse system as a “security against economic breakdown” is rarely discussed, even though the social consequences of such a failure could be devastating. The erosion of social capital between farmers and the communities in which they are located is characteristic of an industrial food system, where relationships are impersonal and distant, and decisions are made primarily with economic self-interest in mind (Lyson and Green 1999). Social welfare has been found to be higher in communities with a base of family farms compared with communities that have farms owned by corporations or absentee owners (Lyson and Green 1999; Lyson and Welsh 2005). As communities lose small farms, they suffer from a loss of associated businesses, higher unemployment, and concentration of economic power (Geisler and Lyson 1991; Lyson and Green 1999; Lyson and Welsh 2005). In a state such as Montana that has traditionally relied on agriculture for a large number of jobs, the loss of a dairy farm can lower economic activity in the local area.

The Government in the Milking Parlor

The United States government is, and has historically been, heavily involved with regulating the dairy industry. One of the first instances of this was the development of Federal Milk Market Order (FMMO) boundaries, which set price differentials for producers in various parts of the country. This decision had the effect of making some producers' milk more valuable than others, creating market disparities that were primarily formed out of political struggles (DuPuis and Block 2008). Milk market orders, because they change the way dairies can be competitive with one another, particularly if they are from different price regions, run exactly counter to neoliberal ideas concerning competition. In a true neoliberal state, competition among different entities is understood to be the driver of the market and is seen as a "primary virtue" (Harvey 2005: 65). By changing the way a dairy farmer is paid based on location, the government may be inadvertently influencing the movement of farms (Herbst, et al. 2006). Market orders also have the effect of creating an over-supply fluid-grade milk, which is then used for processed dairy products even though a lower grade of cheaper milk could be used, thus altering the end price of dairy product (Balagtas et al. 2007). These effects depend on the location and market order, changing the way individual farmers are paid based on their geographic location.

In addition to controlling markets internally, the U.S. government has placed trade restrictions on the importation of dairy products. Currently two import tariffs aim to protect the dairy industry from the impacts of unrestrained trade. First is the "in-quota rate," which applies to imported products up to a certain, pre-determined amount, and are

subject to lower tariff rates. The second set of tariff regulations are on those items that are imported over the specified amounts, and incur much higher and potentially prohibitive rates (James 2006). By directly limiting imports of dairy products, the state is ensuring that there will be a market for those products produced within its borders. Harvey notes that, “The mobility of capital between sectors, regions, and countries is regarded as crucial. All barriers to that free movement (such as tariffs....) have to be removed, except in those areas crucial to ‘the national interest’” (Harvey 2005: 66). Additionally, under neoliberal ideology, states willingly surrender their power over commodity trade to the international market because it contributes to increased efficiency and productivity while lowering consumer price (Harvey 2005).

Herein lies a contradiction of the neoliberal framework, particularly in regards to commodity food production. The perishability of fluid milk and the fairly short shelf life of some processed dairy products make international trade, for all practical reasons, impossible to do for a competitive price with or without the import tariffs. The structure of trade restrictions clearly favors the production and use of American dairy products, even if it were more cost-effective to purchase them from another country. This nationalistic thought is a noted struggle over neoliberalism; the state provides the structure for markets to function, but is not supposed to intervene in market actions (Harvey 2005).

By supporting the domestic market through tariffs, the U.S. is limiting imports despite the ideological belief in unrestrained trade and pressure from other countries to allow greater

market competition. Also contrary to free-market thought is the use of supply management, which is a method that is used across the globe to level production, thus theoretically improving the relationship between supply and demand while potentially providing the producer with a better price.

Quota System Research

Supply management systems are most commonly found for dairy production in Canada and Europe, so the vast majority of previous research revolves around these areas.

Existing studies explore three major effects of supply management: cost of purchasing quota; effects on structural adjustment; and lowered competitive advantage compared to non-quota areas. These three themes are explored in greater depth in the following sections. The quota systems detailed below are found across whole countries; by contrast, Montana is one state in a dairy producing nation, which may alter how quota effects production and the larger market. While California also utilizes a quota system (Sumner & Wolf 1996), it operates differently than Montana's.

According to Cochrane (1959), four principles must be followed for agricultural supply control policies to be effective. First, a fair price must be set for the commodity so that the farmer receives a fair return on labor and capital invested. Cochrane acknowledged immediately that "fair" is a subjective term. It is a question that "only the government can solve since it represents the interests of both producers and consumers" (Dawson 1991). Second, quota levels are set for commodities in relation to consumption, or the amount that purchased at a "fair" price. Thus, quota levels should change in response to demand

over time. Third, at the time supply management systems are enacted, farmers should receive a share of quota based on previous production, and “once the program was in operation it would be illegal for a farmer to market any commodity having a national quota” over the amount he or she owns (Cochrane 1959). Lastly, quota certificates are tradable to retain the ability for producers to enter or leave the market, or for producers to expand or reduce production (Dawson 1991). Cochrane (1959: 702) believed that this could “achieve the impossible” by allowing production levels to be flexible at the local level within a larger controlled market.

The most common type of quota system is mandatory, requiring a farmer to obtain production rights, either by the state granting them based on previous production or through purchase of quota from another farmer. In Canada and Europe, quota allows a farmer to produce a certain amount of milk and receive the highest pay point for that production. In these cases, non-quota owners cannot produce milk for the larger market; effectively, this acts as a management tool for milk production for all processing needs. In other cases, such as Montana, quota acts to control production by offering a higher price for quota milk and a lower price for over-quota milk or milk produced without quota. That is, quota is mandatory to receive the highest price point, but is not required to produce milk to sell to the larger market.

Purchasing Quota

The price of quota is commonly seen as a drawback of supply management systems. In Montana, the cost of quota changes with the market for quota ownership. If a lot of

people want to expand, the price of quota goes up; if there is a flush of quota available, the price goes down. Oskam and Speijers (1992: 51) relate that the “main beneficiaries” are producers who were “given their quota rights for free.” In Canada, Richards and Jeffrey (1997: 555) note that the cost of quota is “often half the total cost of establishing a dairy farm.” The cost of quota can be a disincentive for new dairy farmers entering the market, and “strong pressure” to keep quota systems in operation can be expected from current quota owners who benefit from the closed system (Oskam and Speijers 1992: 51).

Future economic outlooks affect the cost-benefit analysis for farmers making a decision to purchase additional shares of quota. Oskam and Speijers (1992) note that short and medium term income gains disappear over the long run as capital costs increase. Stonehouse and MacGregor (1981) explain the decision-making process for purchasing additional quota, with future outlook for return on investment and how long the individual farmer is willing to wait for that return as two of the key factors. Richards and Jeffrey (1997: 555) note that supply management studies underestimate the actual cost because they “ignore the effects of regulation of multi-period decisions.”

Effects on Structural Adjustment

In the context of dairy farming, structural adjustment includes things like building a new parlor, increasing efficiency of everyday tasks such as feeding and cleaning by purchasing new equipment, and/or expanding farm operations though increasing herd size. Restructuring has been significant on dairies around the world, as farm numbers decrease and farm sizes increase, and the push for efficiency becomes ever more

important. Huettel and Jongeneel (2011) suggest that existing literature hints at the relationship between quota and slowed structural adjustment, although they note this varies depending on quota tradability. In a study of the Netherlands, Jongeneel and Tonini (2007: 3) write that, “since quotas are fixing output at farm level, they are generally assumed to ‘freeze’ the structural adjustment.” In Alberta, Canada, Richards and Jeffrey (1997: 557) postulate that because farm expenses are all related, the additional cost of quota would cause short-term adjustments to be constrained, making farms “slow to adjust.” In a study on dairy farmer decision-making in Ontario, Canada, Stonehouse and MacGregor (1981), discuss structural adjustment as one of the key factors of determining whether or not a farmer should invest in more quota. Upgrading to more advanced technology will decrease average cost of production, but this additional cost needs to be related to the expected future gains of producing more quota milk.

Despite the prevailing notion that quota may affect structural adjustment, the studies noted above do not provide evidence to support this idea. Richards and Jeffrey (1997: 562) write that “while far from conclusive” their comparison does not find a link between quota and lower capital investment in dairies in Alberta. Jongeneel and Tonini (2007) found that, because quota is mandatory for production in the Netherlands it increases the dependencies between farmers, meaning that a farmer can only expand if another farmer is decreasing in size or exiting the business. However, they did not find any indication that quota slowed the growth of larger farms. Across Germany and the Netherlands, Huettel and Jongeneel (2011: 520) found that quota does affect herd-size change but in a “more complex way than is usually thought.” They note that as compared to the pre-

quota period, overall herd size and expansion increased significantly after quota was enacted. The commonly-held belief that quota reduces structural adjustment was rejected for both countries in the study. However, Tiffin (1993) writes that quota does change structural adjustment across the dairy industry, in that producers who are cautious about adopting new technology have the ability to retain the methods currently used without taking a loss of income since quota levels payment across producers. Tiffin (1993) relates this to Cochrane's technological treadmill theory, which holds that farmers must adopt new technology so as not to fall behind early adopters who take advantage of increased production and lowered costs.

Lowered Competitive Advantage

Directly related to structural change and additional costs is a change in competitive advantage, commonly understood to be the most efficient use of land, labor, and capital to become the least-cost producer, which Lyson and Gillespie (1995) call the "key explanatory factor in the economic efficiency" of larger dairy farms. Additionally, larger farms enjoy economies of scale and production is highest on farms that utilize the most technology (Huettel and Jongeneel 2011; Tiffin 1993). Some studies (e.g., Richards 1996; Richards and Jeffery 1997) suggest that farmers tend to keep sub-par cows in the herd longer instead of improving the genetic quality of the animals, leading to lowered rates of productivity. Perhaps the most telling, Richards and Jeffery (1997: 564) note that "the most critical is the potential loss of competitiveness with dairy industries in countries that do not use supply control." Open markets guaranteed through the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and

Trade (GATT) combined with “Alberta’s lower rate of productivity may manifest itself in a sharp competitive disadvantage” when compared with producers in the United States (Richards and Jeffrey 1997: 564).

Quota System in California

California has a quota system but it is not mandatory to produce fluid milk that is shipped to a plant for processing; rather it changes the way a farmer gets paid for milk produced. Many farmers sell milk without quota and receive a lower price. Those with quota get a higher pooled price, determined by the amount of quota owned versus the amount of milk produced; thus, each farmer receives a different average price for production (Sumner & Wolf 1996). California’s quota system can be viewed as a modified pooling mechanism in which the quota is used to distribute pay at various price levels based on end use. With the use of price discrimination and pooling, California’s milk marketing order also raises the farm-level price and producer surplus for participating California dairy producers. (Balagtas & Kreutzer 2007)

Bringing the Focus Back to Montana

Montana is the only state in the U.S. that utilizes a quota system that creates price discrimination between quota and non-quota milk production and that is mandatory for payment of the highest pooled price for milk. Earlier studies have shown that quota systems are an additional cost, may alter structural adjustment, and can lower competitive advantage when compared to other dairy producing areas. Quota levels have remained steady since its inception in 1990 despite a growing dairy presence in neighboring states

and the growth of Montana's population, meaning that supply of milk is no longer meeting the demands of consumers is the state. Furthermore, the more remote location of the state and the distance to key population centers has affected the way that Montana dairy farmers interact with the larger market. The combination of location and restrained production may have an effect on processing and the number of dairy farms, even though the FMMO allows Montana farmers to receive a slightly higher location differential.

Understanding the role of quota in Montana's dairy industry is critical for three key reasons: First, no other academic studies of the effects of supply management on Montana dairy farmers have been located; Second, more inexpensively produced milk and dairy products have been brought into the state to fulfill the needs of Montana consumers; Third, as more farmers and the U.S. government consider implementing a nationwide supply management system, critical lessons can be learned from the Montana model. Because quota systems have been shown to affect farmer decision-making, the central question this thesis explores is how dairies are able to remain competitive within the larger and ever-changing market. Accordingly, this research seeks to understand the perspectives of Montana dairy farmers on the quota system, how those perspectives have influenced their business decisions, and their thoughts regarding impacts on the state industry.

METHODOLOGY

The life of a dairy farmer is one of routine. Wherever you go across the nation, a dairy farmer will tell you that the cows have to be milked every day no matter what else the day might bring; holidays, birthdays, weekends, cold weather or hot, during sickness or in health, dairy farmers may even beat the United States Post Office for their dedication to the job that needs to be done. While almost every dairy is the same in this regard, each farm is also unique. The hours a farmer decides to milk can seem completely arbitrary to an outsider but reveal a great deal about the farmer themselves. Do the cows get milked at 3am and 3pm, or thereabouts? The farmer most likely has children in school and wants to be available to participate in or watch their child in afterschool activities, or just have the ability to eat dinner as a family. Do the cows get milked at 4am, noon, and 8pm? This farmer is one who probably has a bigger herd and is trying to get maximum production out of his cows because the milk is going to the fluid market. Or do the cows head to the milking barn at 6am and 6pm? In this case, the farmer probably does most of the milking on their own and wants to keep normal hours to be able to enjoy a more typical life—going out to dinner, seeing a movie, or taking part in activities that do not revolve solely around the farm.

Keeping this in mind, along with a host of other factors like when a farmer might take a nap or be harvesting forage, the best time to contact a dairy farmer is between the hours of 11am and 2pm. If a message is left on the answering machine and one does not receive a call back the next day, it is best to give the farmer another call, changing the

time of day from the first call. Unlike other farmers who might have plans made in the long-term, it is best to ask a dairy farmer for an interview within the next week. If you ask for a date much farther into the future than that, something is likely to come up: a milker might quit, equipment might break, or there might be a forgotten appointment with the vet. But if you ask for an appointment within 72 hours, the farmer is likely to agree to meet, particularly if you plan on being there between the hours of 11am and 2pm. Another thing to remember about dairy farmers—as proud, hard-working folks who typically spend a lot of time alone or surrounded by brown-eyed bovines, once you start asking them about their operation, some farmers will talk at length about their farm, their cows, their kids, international dairy pricing, and so on. While the interview itself may only take a little while, you might be visiting with the farmer for much longer, and it is during these times that rapport is developed and interesting topics emerge. And in Montana, where not many people are interested in the dairy industry and even fewer talk to the farmers about their opinions, developing good relationships is critical to the success of qualitative research.

Because the purpose of this study is to understand how the quota system has affected on-farm decision-making, conducting interviews with farmers was critical to ascertain their opinions. Interview data was combined with document review and descriptive statistics for a mixed methods approach that generated a fairly comprehensive understanding of Montana's dairy industry by blending qualitative interviews with quantitative data (Hesse-Biber and Leavy 2011).

Quantitative data was sourced from Montana Milk Control Bureau historical records of milk production. Every year dairy farmers must apply for a license, so the number of farmers producing and selling milk is accurately recorded. These statistics also relate the amount of milk produced annually, the number of dairy cows across the state, and the number of quota transfers between farmers. Document review was utilized to understand the Montana dairy industry and the associated boards, bureaus, and laws that govern its activities. Historic documents speak to the foundation of the quota system and the ways it has changed since its inception in 1989. Additionally, I spoke and had e-mail correspondence with multiple staff members from the Milk Control Bureau and Department of Livestock who were able to answer specific questions about quota and dairy farm regulations.

With only 70 dairy farmers in the state, the pool of potential interviewees for qualitative data collection was known at the outset. Contact information was obtained either through a chain referral method (snowball sampling) or through the publicly available list of quota owners provided by the Milk Control Board. Farmers were invited to participate based on a convenience sample that took into account the expenses incurred in traveling to distant farms. Cold-calling farmers was successful some of the time, but if I could say that their name was given to me by another farmer whom they knew and trusted, I was much more likely to get a call back. Of 25 farmers that were contacted, 17 were interviewed, for a total response rate of 68%. One farmer declined an interview, and the remaining seven were called two or three times without hearing back. Of the 17 interviewed, 15 are currently in business and two retired after the institution of quota.

The 15 farmers that are now in business represent 21.4% of the state's dairy farmers. In total, 53% (n=9) of the sample comes from western Montana, 35% (n=6) from the Bozeman area, and the remaining 12% (n=2) from more northern parts of the state.

The size of the dairy herds of the interviewees reflected the range found in the state, from milking around 50 to more than 700 cows. All of the farmers are the primary owner/operators, with two farmers acting as the principal decision-makers in a family partnership. The average length of time they have been primary owner/operators is 30 years; all but one interviewee came into the dairy business because it was something their family was already involved in. Farms employ a diverse amount of hired help, from none at all to most of the work being done by hired hands (paid family members or otherwise). Farmers selling to Darigold constitute 70% of the sample (n=12), with MeadowGold producers representing 12% (n=2). The remaining 18% (n=3) is made up of retired farmers or farmers who process their own milk.

Interview questions were pre-determined and tested, and the interviews followed a semi-structured format to allow for more in-depth questioning beyond the interview guide and to set a more conversational tone. Questions covered personal industry involvement; family history in the business; personal experience with quota and on-farm influence on decision-making; perception of how the quota system has affected the statewide industry; and future outlook for Montana dairying, including recommendations for a more viable industry. The interview guide is located in Appendix 1. Fifteen interviews were conducted at the farm or house of the interviewee and two were conducted over the

phone. Interviews averaged 38 minutes in length. When interviews were done in person, my visit frequently ended with a tour of the farm facilities. Interviews and the qualitative data they provide allow for an in-depth understanding of the personal opinions of the participants. Interviewees are able to express their thoughts freely which, when combined across the sample, illustrate common ideas and themes. This approach lets the interview data speak back to and inform what is already known from the literature review. Additionally, learning about people's day-to-day experiences creates a deeper understanding of the issue that may not be apparent if data was only collected with closed-form questions, surveys, or statistical data.

Interviews were recorded on a digital audio recorder and then transcribed in their entirety, skipping conversational fillers such as “umm” or “ahh” which would detract from the readability of transcripts. Interviewees were informed about the confidentiality protocols of this study; at no time were real names or identifying farm descriptions used in the transcripts. Farmers were assigned a number based on the order in which they were interviewed, and this number is the only identifier in the transcripts and in quotes that are used during data analysis. Transcripts were then analyzed and open-coded using an array of concepts and themes. After coding, data across interviews was combined to identify areas with strong farmer sentiment, giving me the ability to analyze perceptions in relation to previous research. Quotes used in this paper are direct from transcripts, with clarifying terms in brackets if the quote would otherwise be unclear.

Methodologically, this approach provided a solid overview of the perceptions of impacts of the quota systems. A weak point is that a majority of farmers did not participate, thus leaving out voices in the discussion. Yet, theoretical saturation was reached with the given sample size, illustrating that many of the views expressed are shared. Also, it quickly became clear that a couple of the questions in my interview guide were not asking for the information I sought in a manner consistent with how the quota system worked. This primarily relates to the question about how the farmer first came to acquire the quota that they currently have. Because all of the farmers in the state were milking at the time quota was instituted, they all received some of their current production at that time. This question framing was easily overcome, however, as I could probe for depth regarding how many times quota had been purchased after the initial amount was given, and how much had been spent on buying quota. Additionally, only one person coded and analyzed the interview transcripts, which could potentially cause some statements to be misreported. Careful and conscientious coding using exhaustive concepts and themes strengthened the analysis of interview data.

The mixed-methods approach utilized in this study will illuminate the ways that Montana's quota system is reflected in supply management systems found in other countries. Interview data provides an in-depth look at farmer decision-making, while descriptive statistics illustrate the ways Montana's industry has changed since the institution of quota. The following chapter provides the analysis of interview findings and descriptive statistics, which are related to the literature review for a more complete understanding of Montana's dairy industry.

A BREED APART: DAIRY FARMERS DISCUSS QUOTA

To a person unfamiliar with a dairy farm, the way it looks and the kind of structures found there may appear random at first glance. But just like how milking times reveal much about the specific farmer and how they operate their farm, the physical structures found on the farm can also say a lot. What kind of barn do the cows live in? How are the calves raised? What kind and size of machinery is visible? Does the farm have a large bulk tank that can be seen outside the milking parlor? Do the cows spend their days outside or in a free-stall barn? Where does the farmer live? The answers to these questions can provide a glance into what the farmer's business strategy is and the types of decisions that he or she makes regarding their dairy farm.

Farm size, as revealed by the size and type of structures found, turned out to be a fairly strong indicator of the decision processes of the farmer. Farmers who had invested in updated equipment or facilities and had greatly increased their herd size, were more likely to think that the quota system had negatively affected them than those farmers who had maintained a smaller herd and often used older or fewer technologies. To make comparing the two groups more clear, I created a typology with two types, the first being expansionist and the second being sustainers, which are described in more detail below. The first part of the analysis explores on-farm decision-making, and is the area where the two types are the most contrasting. The second section explores statewide industry effects, and here farmers from both groups discussed similar topics.

Meet the Farmers

Expansionist:

Driving up to the farm of an expansionist, typically the first thing noticed is the number of cows, from young calves to older, pregnant cows. The animals live separated by age group, so the heifers – female cattle that have not yet borne a calf – are in the farthest fields from the main buildings. Then a little bit closer are the dry cows, those that have had a calf before and are in the period between milking and giving birth to their next calf. In fields or pens directly adjacent to the barn are the springers, cows and heifers that are just about to calve and re-enter the milking herd. Also close to the milking facility are the calves because they are still drinking milk and need close attention. The milking cows themselves might be the most difficult group to spot because each farmer houses his herd a little differently. Some live in open lots with a run-in shed, while others live in large free-stall barns, basically a big, covered shed with concrete floors that provide separate areas for the cows to lay down.

Of 17 dairy farmers I spoke with, I have categorized 11 into the expansionist type. Expansionist farmers share one important trait: they have all grown their herd size significantly since the start of the quota system in 1990. For this study, the herd size average of all interviewees was 268 cows; five expansionist farmers had fewer cows than the average, while the remaining six had larger than average herds. The overall average herd size for the expansionist type was 379 cows. Farmers in this group have also purchased most of the quota they now own. Some are still looking to buy more quota, and others have leveled out production to match their current quota level. Expansionist

farmers have also invested in updated facilities, including new barns or milking parlors, computerized feeding, milking, or monitoring equipment, and rely heavily on the use of machinery to complete daily tasks. Many of these farmers buy feed to supplement what they grow themselves, and some purchase the vast majority of their feed. Expansionist farms also have a large presence of hired help from outside of the family; some expansionists are not involved with daily milking and feeding chores at all, while others still handle some of the daily tasks.

Sustainers:

The six farmers that fall into the sustainer type have the smallest herds in this sample, with an average of 88 cows. Herd size was the delineating characteristic between the two types for this study, with the largest sustainer herd having 102 cows. The farm scene of a typical sustainer is quite different from that of an expansionist. Sustainer farms primarily resemble the pastoral ideal of a dairy – old barns, the farmhouse situated close to the barn and milking parlor, and fewer cows than the average Montana dairy farmer. When you arrive at one of these farms, you may or may not see some young stock. Because the herds are smaller, there are not as many fields or pens with young cows waiting to enter the milking herd. Most of the cows on these farms live in smaller barns, rather than the open lots more typical of larger dairies.

All of the farmers in this type reported that they matched their herd to the amount of feed their land could produce, and did not want to rely on purchased feed as the primary source of nutrition for their cows. Five of the six reported buying quota at some point and

only to get their quota levels up to 100% of their production; the only farmer from the whole sample who has never purchased quota is the dissenting voice. Sustainers rarely, if ever, hire labor and do the majority of the farm work themselves, including milking, feeding, and harvesting feed crops from their land. Many of these farmers do not rely on computerized milking or cow monitoring technology, and most milk in older facilities and house their cows in older barns. The sustainers are more likely than the expansionists to know all of their cows by sight, and many of them name their cows instead of just using ear tag numbers for identification.

In the following sections, interview findings are discussed from the various viewpoints of each type and will be linked to previous research. Topics covered include perspectives on how quota has impacted their personal, on-farm decision-making and on how farmers think quota may have changed the statewide dairy industry. On some topics, the expansionists and sustainers agree, while on other issues their opinions contrast sharply. The areas of divergence may be the most indicative of how perspectives can vary based on the business strategies and decisions of individual farmers.

The questions I posed to the dairy farmers pointedly asked how, (a) they personally had acquired the quota they currently own (including if they have bought or sold any, and what the prices were at the time of purchase); (b) how they make the decision about whether to buy more quota; and (c) if the quota system itself had ever affected how they make decisions on the farm for things like expansion or adoption of new technology. I then asked how the farmers thought quota might have impacted the state industry and

included questions about historical effects, continued necessity of quota, and ways the industry might be different if quota has never been adopted.

Interestingly, when farmers talked about the beneficial effects of quota, they talked about on-farm and state-level effects as being very similar. In other words, when discussing quota positively, dairy farmers did not separate their operations from others across the state. However, when talking about the drawbacks of quota, farmers distinguished on-farm and state level effects, in many cases seeming to separate their farm from the remainder of the industry. To clarify the analysis of interview data and to report findings in a way similar to how the farmers actually talked about the effects of quota, some positive views are discussed at the farm and state levels simultaneously. Additionally, positive and negative effects will be discussed together for a more comprehensive and readable report, allowing the data to illustrate the complexity of policy and decision-making in the dairy industry. The first section focuses on the personal, on-farm effects of quota, while the second section discusses how farmers think quota has impacted the state level industry.

Farm Level Effects of Quota

The first section of analysis focuses on the farm level effects of quota as reported by dairy farmers. In the following examples, farmers are speaking directly about their experience with quota on their own farm decision-making and how the quota system has altered their decision-making process.

Quota & Money Spent: A Heated Topic

A hot-button topic when discussing the value of quota is how multiple farmers view it as an excessive or additional cost, and feel like they have lost money in the process of buying quota. As discussed in Oskam and Speijers (1992) and Richards and Jeffrey (1997), the actual cost of quota can be a substantial sum, and those who report the most benefit from the system are those who received the majority of their quota for free. The two farmers in this study who ship their milk to MeadowGold received 100% of their quota production in 1990; they have since expanded their operation and purchased additional quota. The only farmer who has never purchased quota is a sustainer; thus 16 of 17 farmers have purchased quota. Every expansionist farmer mentioned cost at least once, and some farmers mentioned it several times. In fact, these ideas were some of the most frequently mentioned by dairy farmers, with 14 of 17 farmers bringing up the high cost at least once. The three farmers who did not discuss quota in this way are all sustainers with some of the smallest herds in the state, who have remained at or near their initial quota levels.

One of the first things that Farmer #1 said to me, before we had even gotten to the third interview question, was, “we had thousands, hundreds of thousands of dollars tied up in quota and the bottom fell out of that market...It was an extra expense we didn’t need. In our case, we lost a lot of money through the quota system.” The cost of buying quota and seeing the value diminish was clearly a sore spot, which was echoed by several other farmers. Farmer #10 was one of the only farmers who could remember the exact amount of quota purchased, “This is how much daily quota we bought in the last twenty years—

10,750 [pounds]. So there is a lot of money involved.” During this time, many farmers report spending \$21 to \$26 per pound of quota purchased. To understand how this directly affects a farmer’s business, Farmer #5 explained, “if you have an 80-pound herd average, it costs you \$2,000 to buy the quota for one cow at \$25 [per pound]. At \$10, it would be \$800. So it still costs me \$800 every time I want to buy a cow, wherein a non-quota system that is not part of the equation.”

A recent adjustment to the quota system has changed the way that dairy farmers value and place value on quota pounds. Until the dairy crisis of 2009, when the value of Class III was higher than Class I milk, the differential price between quota and over-quota milk varied based on how the processing companies used the over-quota milk. This meant that sometimes the difference between the two could be four dollars or more, making quota milk much more valuable to a producer. When the differential between the two was high, the cost of quota was also high, and farmers could justify buying additional pounds because it would pay for itself within a short period of time. Now, with a set \$1.50 differential between quota and excess milk, the value of quota itself has decreased because the returns are not that much different between the two. Farmer #11 related, “[Quota] is around \$10 today, but what caused that was that there was never a set amount from quota to excess when this was initiated and you could have a spread of \$7 or \$8 from quota milk to excess milk. Later on, it was put into place that it is a dollar and a half, so that has really lowered the price of quota down quite a bit because when you had a \$7 or \$8 spread you could pay a lot of money for quota and make it pay.” While discussing how this reduction in price for quota has been detrimental, Farmer #7 said,

“well it kind of hurts, I guess, if you paid a higher price for it. It is like an asset that has diminished in value... The most I paid was \$22 per pound, what I sold this past winter was \$10 per pound, so the value has decreased, and it decreased mostly because they shrank the difference between quota and over-quota price.” Farmer #15 echoed this when he said that the set differential “made our quota [worth] considerably less, about half as much as when we purchased it.”

Feelings of Necessity

Nine farmers specifically brought up the issue that they feel like it is nearly impossible financially to produce milk in Montana without quota. Seven of those who brought up this topic are expansionists, which may highlight a tendency to talk about and seek profit on the margins as they increase their herd sizes. In other countries with quota systems, producing milk without quota is illegal, which was one of Cochrane’s (1959) four principles for developing an effective supply control program. Montana is one state out of a dairy producing nation, so they express a feeling of necessity to buy into the quota system to remain competitive and receive a fair price for their milk.

Over-quota milk is priced \$1.50 lower than the highest blend price in the state, and this price varies on market conditions. The differential between the two can be the difference between being profitable or losing money in milk production. When milk prices are high, the lower over-quota price is not so detrimental. But as Farmer #11 explained, “when you are down to \$15 [per hundredweight] and your excess is thirteen and a half, then your margins are tighter, so you would like to have that extra dollar and a half on your

excess. It probably becomes more important to us at that point to have our quota pounds and our production about the same.” Several farmers talked about how the quota system worked before the set differential and how high milk prices encouraged farmers to buy additional quota. For example, Farmer #10 said, “back then, when the differential was five or six dollars and quota was twenty dollars, if you could ship it you, you bought quota because you could pay for it in two years.”

The way farmers talk about milk production and the need for quota illustrates two key ideas: first, farmers feel like they have to buy quota to be profitable; and second, farmers must continually plan on keeping their quota amount and production even so as not to lose money when the market trends downward. On the first point, Farmer #4 noted, “if you want to produce milk in Montana you have got to...get some quota if you are going to be at all profitable.” Farmer #1 echoed this sentiment, saying, “anything over that production would be Class 3, which you can’t hardly afford to do because it just doesn’t pay...So you had to go with quota...if you were going to stay in the dairy business.”

Keeping production in line with how much quota they own and not shipping much excess milk is the goal of most dairy farmers in this study because it ensures that they get top-dollar for their production. Many farmers directly or indirectly stated that the amount of milk they are shipping is a concern that is, as Farmer #14 put it, “always in the back of my mind.” Farmer #2 explained in detail, “It becomes a financial thing. It always comes down to the finances when it comes to quota. What can I afford? How can I do it? You really can’t afford to produce the milk without the quota. You can a little bit, if you are a

little over your quota, you will survive. It won't kill you. It is when...you are shipping 40% over your quota it is going to kill your mailbox price of your milk. It is hard enough to make it work with your quota price, but without it a lot of excess milk is going to hurt." Farmer #12, a sustainer with a small herd, questioned the business sense of farmers who are shipping a lot of milk over their quota levels, "You get a dollar fifty less a hundred and that is huge. Huge. Especially now with feed costs and such, I don't know how these guys are doing it. I mean they are losing money doing it. But you can't find quota right now, there is very little around." However, given the set differential between quota and excess milk, Farmer #10, an expansionist, felt like this issue was less critical than it was when the differential could be much higher, "Now with the \$1.50, if they are over a couple thousand pounds, most people don't worry about it unless there is quota for sale, because there isn't that big of a loss in it now compared to six or seven years ago."

More Cows, More Quota

As Stonehouse and MacGregor (1981) explained, the decision-making process for purchasing additional quota has two key factors: future outlook for return on investment and how long the individual farmer is willing to wait for that return. Because farmers feel like they have to buy quota to stay in the dairy business, it follows that this additional expense would require more financial planning. Additionally, the feeling of having to purchase quota to stay afloat in an ever-changing market may have an effect on the competitive advantage Montana dairy farmers have when compared to other milk producing states, which Richards and Jeffery (1997: 564) note as "the most critical" issue facing quota-restricted production areas. Six of the seven farmers who mentioned the

increased short-term planning (2-5 years) necessary fall into the expansionist type.

Considerations generally include the differential (before it was set at \$1.50), the average price of milk in the recent past, and the changes the farmer is planning on making.

Because most of the on-farm decisions revolve around expansion, that will be discussed in greater depth in the following section although many of the concepts explored here are related directly to expansion. This section highlights how farmers talked about increasing their planning for all aspects of operation, which fall into two categories: first, the time frame considered when purchasing quota, and second, planning for actual structural or herd growth.

Buying additional quota allows the dairy farmer to earn more for his or her milk, but the cost of quota must be balanced against the price of milk and, in the past, the variable differential between quota and excess milk. When the difference between the two was high, farmers could rationalize paying more for quota because they would receive so much more back for their milk. For example, if quota milk was receiving \$20 per hundredweight and over-quota milk was receiving \$15 per hundredweight, and quota was selling for \$20 a pound, it would take the farmer's earnings from one hundred pounds of milk (or the daily production of one really good cow) to pay for every pound of quota. So if the farmer in this example bought 1,000 pounds of quota, assuming that the price of milk stayed at \$20 per hundredweight, they would have to dedicate the earnings from the sale of 100,000 pounds of milk to pay for it.

The set differential of \$1.50 between quota and excess has not only lowered the price of quota (and therefore its value to the producer), but it also changed how much money a farmer can make from the purchase of additional quota pounds. As Farmer #2 explained, “There were times it [the differential] was up to three bucks, so you could justify spending a lot more on your quota because you got paid so much more for your quota milk versus your excess milk...When we put that \$1.50 spread in, it definitely depleted the value of quota because it made it safer to buy...because you knew what that spread was. But at the same time you don’t have the same ability to make money as fast with a bigger spread. So it reduced the value of the quota.” Farmer #14 related that with the set differential, “it now takes three years to pay for purchased quota,” while Farmer #11 thought that, “with a buck and half, you can still make it pay but you don’t want to pay more than ten [dollars per pound], and that still is about a two-year pay back.”

When planning for structural or herd growth, farmers include quota as one of the unavoidable costs. Farmer #1 explained the process as it worked on his farm, “if you wanted to put up a new facility like we did, we knew we needed so many cows to pay for that facility. And that was kind of one of the goals that we set, knowing how much milk we needed to produce to pay for that. And therefore, you had to know how much you could pay for your quota. And that was a big factor.” In this case, the farmer was going to bring in more cows to pay for a facility upgrade, and was going to purchase the quota before the cows could produce on it to make sure that they were receiving the highest price when production began. Some farmers took a different approach, purchasing the quota at the same time as the cows to ensure that they received the best price for their

milk as soon as the new cows entered the herd. Farmer #5 described how quota has affected his planning, “In Montana, you buy the cow, you buy the quota or live with the lower price, and...we have more facilities here than in a warmer climate, so we build more housing. So yeah, definitely. It designed my growth patterns.”

While the ability to pay for quota and the increased planning that purchase necessitates can be discussed separately, farmers typically discussed the two hand-in-hand because the price of quota and how fast the investment can be paid back informs the decision of whether or not to make a planned adjustment to herd size or facilities. Farmer #15 tied the two ideas together, saying, “It [quota] always affected [decision-making]. It was part of the equation of what to do and how to do it...And you needed to look at producing on it just about all year...If you only produced on it four months out of the year, then you couldn’t afford it. But if you did twelve months out of the year, then it made it where you could pay for it fairly quickly. Definitely less than two years and sometimes under 18 months to pay for itself, and then you are making money, supposedly.”

Expansion and Planning

The industrialization of the dairy sector intensified and became more widespread during the early 1990’s (Jackson-Smith and Buttel 1998), right around the same time that the quota system was put in place in Montana. Larger farms are better able to capitalize on the economies of scale, and farmers are under continual pressure to expand production and minimize costs to make up for smaller profit margins (Lyson and Green 1999).

Farmer #5, an expansionist, addressed this directly by saying, “you kind of have to grow

because of the economy of scale keeps pinching us.” Eight farmers specifically mentioned the effects of quota on expansion, and how it is not only an additional cost but also requires additional planning on sourcing and paying for quota. Three of the eight farmers who talked about quota and expansion are sustainers, and they all postulated about how they thought quota would effect those who wanted to expand and did not speak from direct experience like the other five. A couple farmers mentioned that as they grew their herd, they had to buy more quota to ensure they continued to receive the highest pay. Many of farmers who discussed quota in relation to expansion have purchased quota multiple times. Some of those I spoke with have only purchased it a few times during large expansion projects. The relationship between expansion, purchasing quota, and the timing of the purchase appears to signal one way that quota alters decision-making for individual farmers.

Some farmers talked about how they were given an amount of quota when the system started, and have been purchasing additional amounts consistently throughout the years as they have increased their herd sizes. Farmer #5 noted, “so of the roughly 22,000 pounds I have, I got about 5,000. And then the rest I have purchased monthly or every time I had a chance to buy more quota.” Farmer #11 related a similar experience, “we have been purchasing quota right along as we have been increasing our herd numbers to try and keep the pounds of quota close together so we don’t have an extreme amount of excess.”

On the other hand, some farmers have preferred to buy quota in large chunks, although that often means they are producing over-quota and receiving lower pay for a portion of

their milk production. Farmer #13 related, “we purchased quota three or four times...But even putting all that together is really not adequate. I am thinking we are going to get some more quota here soon. So we have been over-producing our quota for five years.” Despite this history of over-production, Farmer #13 felt strongly that this was the more appropriate approach when purchasing quota saying, “if you buy quota and it takes you five years to use it, you have kind of bought a dead horse. You are paying money for something you are not using.” In this case, the farmer felt as though he was better served to purchase large amounts of quota at a time once he knew he was producing the milk to fill his entire quota amount. This farmer thought that if you purchased quota and did not immediately have the milk production to match it, that you had wasted money because the differential between quota and over-quota milk is considerably lower than it was in the past.

In discussing the way quota affects expansion and the additional planning it requires, Farmer #2 said, “it adds a major expense to your cost of doing business. So if you are going to expand, especially in large chunks like if I wanted to go add 100 cows, I am going to want to make sure I am going to be able to find the quota for the milk I am planning on those cows producing to cover that.” Being able to find quota for purchase can be challenging at times, which means that farmers who want to expand have to make a decision: either expand and ship additional over-quota milk, or wait to expand until quota can be located and purchased. No farmer related that the availability of quota kept them from expanding; however, the lack of quota for sale may have influenced the time frame of expansion projects. Farmer #12 spoke about this idea, “Now if we were [going

to] milk 300 cows and buy quota and build a new parlor...I would really have to think about it. Where am I going to get the quota from? Because I wouldn't do it unless I had the quota, I would make sure I had the quota because it wouldn't work financially.”

Quota holdings are linked to economic returns and financial solvency; therefore, banks can require the farmer to prove they have the quota before they will provide the funds for expansion, which can be challenging during times when a limited amount of quota is available for sale. The farmer has to prove they own additional quota to receive the loan, but cannot yet produce the milk to pay for the quota until they are given the bank funding. Farmer #6, who found himself in this situation explains, “We had to work with the banking side and they said, ‘we will help you build your dairy, but you have to identify that you can buy the quota.’ So then it put us on hold because we found a willing lender but they would not lend until we could gather up quota, which put us in an awkward position because we had to buy quota and start paying for that quota before we could actually start producing it in a newer facility.”

Effects at the State Level

The following sections focus on how farmers think the quota system has affected the wider state-level industry. In this discussion, there was little distinguishable division of thought between expansionist and sustainer types, so the following responses are reported from the sample as a whole.

Quota as an Asset

Because quota can be bought and sold, it has a market value that varies depending on how much demand there is for it among other dairy farmers. Both expansionists and sustainers talked about quota as an asset, and because of the value associated with it, quota may have enticed some farmers to retire or exit the industry earlier than they may have otherwise. Conversely, it may discourage new farmers from entering the industry. Previous research does not discuss quota as an asset to the farmers, and how the price of quota may affect individual farmers' decisions on staying in the dairy business.

In discussing how farmers think of quota, Farmer #5 said, "it is registered with the Secretary of the State as an asset that we can borrow money against and [that we] paid good money for." Similarly, Farmer #8 noted, "Once it came in, then you had a vested interest in it because then you have capital in it...even at \$10 it [quota] is a nice asset to have on your balance sheet...I have \$525,000 worth of quota." Since 16 of the 17 dairy farmers in the sample purchased quota at least once, the feeling of being bought in was a common theme expressed by those I interviewed. Six farmers spoke directly about quota as part of their equity. I did not specifically ask if a farmer had borrowed against their quota due to the sensitive nature of personal finances, but a few farmers volunteered that they had done so for past or current purchases. The most commonly discussed topic, which 13 of 17 farmers brought up, is that some farmers may view quota as a kind of retirement package. As Farmer #7 said, "it is nice to have something of value, say if you went out of business, you have your quota and your cows that you can sell. You can liquidate and have some value if you have quota."

During the first decade or so after the institution of quota in 1990, the price per pound of quota remained high because there was demand from farmers who had been given less than 100% of their production (i.e., Darigold producers). To receive quota price for all of their milk, farmers had to buy additional quota, which meant that it was a seller's market in terms of naming a price. During much of that time, farmers report that the price of quota was \$20 a pound or higher, and Farmer #16 noted, "virtually everyone that was selling quota [at that time] was getting out." The fact that farmers would use quota as a retirement plan was called an "unintended consequence" by Farmer #4, who elaborated by saying, "for a while quota had a pretty good price, and so some people kind of took it as a retirement plan...They just had been handed...a hundreds or thousands of dollar, depending on how much quota they had, bonus that they could then sell. And some people did that." Similarly, Farmer #11 recounted, "One thing that the quota system has done for some farmers that have decided to exit the business is given them a pretty nice little bonus at the end of their career. They were given 75% of the quota that they needed when it started, so some of them decided to sell out when it was \$25 and it was a big bonus. It made an impact on the decisions... because when you can get that kind of money for your quota it makes a difference. You think, like if you had 5,000 pounds of quota, for \$25, and that isn't even that much quota... Yeah, I think it made a difference on some of the decisions that were made, especially early on when the quota system was initiated."

While quota may be a "bonus" to retiring farmers, Oskam and Speijers (1992: 51) observed that "quota values discriminate against new entrants." Indeed, some of the

farmers I spoke with felt that quota may have created a situation that discourages new producers from entering the sector. Seven farmers distinctly mentioned quota as a barrier for dairy farmers who may be looking to start an operation in Montana. Farmer #8 noted that “it is hard to start” a new dairy and that “a couple people have talked about coming up here [to Montana from other states] but they look at the quota system and it doesn’t make any sense [to start here].” Farmer #9 confirmed this by saying, “it is keeping young dairies from starting because it is expensive to get it.” Farmer #13, feeling that the cost of quota is cost prohibitive for those starting a dairy in Montana, said, “One thing about it for somebody that is trying to get started in the dairy business, is that unless you inherit it somehow, it is just about impossible because the quota is so expensive.”

Several famers shared anecdotes saying that they could not think of one new dairy farmer who had started an operation in the state since the beginning of quota. Some current farmers have siblings who have started their own farms, and so some of their initial quota was transferred from a family member. Farmers in the present study did not characterize the asset value of quota in either a positive or negative manner; rather, the farmers who brought up these topics discussed them in a matter-of-fact way, which is quite different than most other topics relating to quota, as becomes clear below.

Stability and Consistency

Despite all of the thoughts that quota has had some negative effects for Montana dairy farmers, nearly all farmers reported beneficial impacts as well. In these instances, the farmers talked about what is positive for the industry as also being good for their farm, so

there was little distinction made between on-farm and state-level effects. For all the drawbacks of quota, farmers mentioned three major positive effects: giving them a better price for their milk; industry protection from outside milk sources and large farms; and a stabilization of the in-state milk supply.

Eleven of seventeen farmers from both types directly mentioned that they felt like the price of their milk has been improved because of quota. The price of milk in Montana is set using a complex calculation that takes into account the Federal Milk Market Order (FMMO) price from a neighboring market order, plus a \$2.55 location differential. This pricing system is a direct descendent of policies based on location theory from the von Thünen model of production areas (Block and DuPuis 2001). Although Montana is technically in a state order, meaning that the state can set prices that are not based on federal pricing structures, Montana continues to set milk prices that are in-line with others in the region because the milk is purchased by processors who are headquartered out of state. Because Montana sets prices based on FMMO levels, it is unclear whether or not quota actually allows farmers to receive a “better” price for their milk, but this is how dairy farmers talked about this issue. Farmers frequently interchanged “my” and “our,” illustrative of how positive effects are viewed similarly at the on-farm and state levels.

The price of milk changes every month and is heavily dependent on national and international supply and demand relationships. The 2009 national dairy crisis, which saw the hundredweight price of milk fall below the cost of production, is still fresh on the

minds of Montana dairy farmers. Farmer #9, reflecting on the tough times the dairy industry has been through recently said, “if I didn’t have quota I would be getting paid even less money.” Farmer #2 felt like quota has “definitely help[ed] my price of my milk,” while Farmer #10, who was not so convinced, said, “Well they claim we get more money for our milk than Idaho.” Farmer #12, who thought quota and the higher price it pays out has allowed farmers to stay in operation longer, said, “it would have been tougher to stay in business because we wouldn’t have been getting what we are getting for our milk... [Quota] has to stay or we won’t be able to weather it because we cannot take a hit in our milk price.”

Regarding the relationship of quota and the Montana industry, 12 of 17 farmers felt that the quota system had acted as a protection from the pressure of outside forces. The farmers talked about this protection in two ways. First, it has kept “Montana milk Montana’s” (Farmer #3). Second, “it protects the smaller farmer from the large one” (Farmer #9). Just as in previous topics explored, these two ideas are linked but will be discussed separately to more fully illustrate the idea of quota as a protection for Montana dairy farms.

Montana neighbors Idaho, the third largest dairy producing state in the nation. Because Interstate Commerce supports free trade among the states, Montana’s dairy industry could very easily be washed out by the extraordinary production coming out of Idaho. The quota system in Montana, however, ensures that the processors in the state must first utilize Montana-produced milk to satisfy their Class I (fluid, drinking milk) sales before

they can bring in out-of-state milk. This does not mean that milk produced out-of-state is not sold in Montana; rather, it guarantees a market for Montana farmers and ensures the processors that a steady supply of milk will be available for their needs. Farmer #3 explained this well, saying, “[Quota] was a protection for the processors in that they could more or less be guaranteed that whatever they could sell, they would have milk for. In other words, there was encouragement to the dairyman to keep producing his quota and it was an encouragement to the processors because he knew he would have enough milk to do that.” Farmer #17 agreed, noting that, “the main object of quota is to keep Montana milk in Montana. Quota milk fulfills the needs of Montana first and then you can let the excess go.” Farmers #2 and #3 used a similar catastrophic analogy in discussing what would happen if the quota system were not here to protect Montana milk: Farmer #2 related, “The state of Montana is so close to Idaho where there is so much milk and so many big dairies that without the quota system...milk would just flood into Montana.” Similarly, Farmer #3 thought, “Washington [is] a huge dairy state with a lot of surplus milk. Idaho [is]...a huge dairy state. So we had all of this milk sitting out there and if we didn’t have some protections you could just imagine the floodgates opening and then where are Montana farmers going to be?”

The other thought regarding quota as protection for Montana’s dairy farmers involves actually keeping the farmers in business. Tiffin (1993) notes that a benefit of quota systems is that, since quota levels payment across producers, it allows smaller or more cautious farmers to stay in business and not fall behind those who adopt newer technologies more quickly. Farmer #17 touched on this idea, “quota has reduced

competition because all of the producers benefit the same.” While herd sizes have gotten larger and farm numbers have continued to decrease, 12 farmers directly stated that they felt like quota was a major reason that so many farms are still in operation today. Farmer #9 noted, “It protects me...as a small farmer.” Farmer #11 agreed saying, “I think it is good for our industry in Montana...mostly because of the protection from bigger farms...It has kept the big, big dairies out of the state, you know, like the 5,000 cow dairies.”

Many farmers also said, however, that they thought the industry would be no different in size or scale if quota had never been established. From this perspective, quota actually had not kept more farmers in business but had helped keep smaller farmers from going under because it limited the growth of really large farms, particularly the threat of out-of-staters moving in to set up large dairies. Montana dairy farmers watched as this occurred in Idaho, and whether or not that same growth pattern would have happened in Montana is unclear, but many farmers think that quota has provided “control over growth” (Farmer #13). Farmer #12 related, “I think [quota] is fantastic. It keeps everything in check... We have big dairies around here now, but they were always here. These guys didn’t come from out of state. That is what we tried to stop years ago, to stop somebody coming up from Idaho or California with this grand plan that they are going to milk a couple thousand cows.” Farmer #8 summed up the idea of protection, noting, “What it does is stop a big dairy coming in, wiping us all out...and trying to sell to the plants cheaper. And really one big dairy could do all of Montana. You could have one 10,000 cow dairy, which isn’t rare, move in here and say ‘well, I am going to sell you guys my milk

cheaper' and then wipe us all out. I think it has helped save the smaller farms even though we are still losing the smaller farms." This trend is consistent with what is happening in Montana, and the farmers I spoke with indicated that they thought quota has most likely stopped the growth of very large farms.

The final benefit farmers talked about is how quota has stabilized the supply of milk in Montana, guaranteeing them a market for their production and encouraging farmers to produce at the level of their quota. Twelve farmers talked about how quota has "lent us stability" (Farmer #14) and "helped us be consistent" (Farmer #15), with stability and consistency being the two key words that nearly all farmers used. Stability and the national dairy industry do not always sit well together, because many farmers are quick to milk more cows when prices are high and cull cows when prices start to fall, creating cycles of over-supply and shortage. These fluctuations in production can make it difficult for processors to plan and facilities are built to handle a specific amount of milk, which means that processing plants are over-supplied and companies that buy the milk for processing will implement their own supply management programs. Farmer #7 discussed how Montana's planned quota system is better, "[Quota] gives us stability in our production in the state, and we are superior in that respect with regards to Idaho or Washington because Darigold had to implement supply management because of over-production and the plants were over-supplied." Farmer #14 concurred, saying, "Here [in Montana] over-production is not so high when milk prices get high because of quota." Farmer #8, who talked about the detrimental effects of price and production swings, feels like, "[quota] takes a lot of the angst out of the dairy business."

Quota also seems to encourage people to think about their own production and how it will affect other dairy farmers across the state. The statewide pool combines every producer's milk into one large supply of milk, from which the usage is calculated and farmers are then paid, because "in Montana, you get paid on usage" (Farmer #17). If a farmer is over-producing their quota, it also creates statewide over-production, which is one reason why the top price paid accounts for only about 70% of a farmer's milk check [the other reason is utilization for Class I sales]. Farmer #15 explained, "Part of the thing I liked about the quota system was the people didn't just gut the system by over producing and having our usage go down to nothing and then it really cuts the price we get paid."

Bringing it Together

As Montana dairy farmers talked about the quota system, most clearly felt like it has been simultaneously beneficial and possibly a hindrance to their farm and/or the state industry. Across the board, expansionist and sustainer farmers report being satisfied with the quota system. Quota has: helped them get a better price for their milk; provided protection; and stabilized supply. Expansionist farmers frequently brought up the negative impacts of the additional cost of buying quota, and discussed the challenges around timing the purchase cows and quota. Additionally, seven of the 11 expansionists felt their operation and decision-making had been impacted by the quota system. Sustainer farmers had a more positive view overall, and none reported negative impacts from the quota system. All sustainers discussed how they felt like quota had protected farmers like themselves –

those who did not wish to grow to stay in business. Sustainers less frequently discussed the financial impacts of quota or constraints they felt in their decision-making.

Many of the topics farmers discussed supported previous research, particularly the extra cost of purchasing quota, that quota can be cost-prohibitive to new entrants, and how some farmers feel like they have to grow to remain competitive. Farmers in this study brought up other topics that highlight the ways that Montana's quota system is unique. One of the primary examples is how many farmers felt that quota has protected Montana's dairy industry from being over-run by large farms or having the market flooded with out of state milk. Because other quota systems are nationwide, this belief may not rise to the surface as it did here. The final chapter will bring together the major themes and what can be learned from this study on the state and national levels.

CONCLUSION

Understanding the process a farmer goes through when making a decision related to their farm means uncovering the many variables that influence those decisions. In Montana's dairy industry, the quota system adds another layer of complexity on top of an already challenging national policy and pricing environment. In one of my readings I came upon a quip between one U.S. senator and another during a hearing on dairy pricing, where one of them joked that you knew you had been in Washington too long if you understood national dairy policy. By talking with farmers, learning from the Montana government agencies responsible for the dairy industry, and looking at historic trends, I have attempted in this thesis to provide an answer to an ever-present question for dairy farmers and policy makers across the country: is supply management an appropriate tool for the U.S. dairy industry? By looking deeper at how policy affects farmer decision making in the only state that has effectively managed supply, this thesis provides an opportunity to learn from the experience of Montana dairy farmers, and can potentially inform national level dairy policy.

Clearly, farmers with larger herds and a desire to expand feel some policy implications more acutely than those with smaller herds. The issue of cost, which previous studies (e.g., Oskam and Speijers 1992; Richards and Jeffrey 1997) noted as being one of the drawbacks of quota, was frequently mentioned by expansionist farmers. After receiving a portion of their quota pounds when the system was implemented in 1990, all but one farmer in this study has purchased additional quota. One farmer mentioned that he has more than half a million dollars invested in the quota system, an asset that has no market

value except to other Montana dairy farmers. Because dairy farming requires a lot of capital investment up front in the form of equipment, infrastructure, and cows, farmers who have increased their herd sizes frequently mentioned the excessive cost from purchasing additional quota.

The relationship between quota, cost, and allocation highlights a critical issue when considering supply management systems. In Montana, farmers were given a portion quota of their production based on the usage of the company who purchased their milk; thus, farmers had little control over the amount of quota they were going to receive. Immediately this had the effect of creating demand for quota pounds as farmers had to buy more to match their production. Because the price of quota varies with demand, price per pound skyrocketed, which meant that farmers who only received a portion of their production were immediately at an economic disadvantage. The limited supply of quota and the high price farmers were willing to pay for it may have then created a situation that encouraged some farmers to retire, causing unintentional consolidation at the farm in the years soon after the institution of the system. Although the price of quota has been lowered by the set differential, most farmers still have substantial amounts of money invested.

One issue of concern then becomes how to allocate quota so as not to put some farmers at an economic disadvantage (particularly if they have little or no choice in who they ship their milk to) or to inadvertently encourage farmers to leave the industry. The Canadian quota system covers milk for all uses and not just for fluid milk, meaning that company

affiliation had little effect on how quota was distributed. In Canada, quota received was based on past production, which more evenly distributed the economic benefits. For new entrants into the Montana or Canadian dairy industry, no quota is distributed without cost; thus, any new entrants bear the burden of purchasing the entire amount of quota they will need to cover production. If a national supply management system were created in the U.S., the benefits and drawbacks of each model would have to be considered as they each have impacts.

In a quota system, farmers may also feel more dependent on each other when making structural adjustments (e.g., Jongeneel and Tonini 2007). In any supply management system that limits overall production, in order for one farmer to be able to produce more another farmer will have to produce less. This is particularly true for Canada's system because it covers all classes of milk, but also holds true for Montana in that, if a farmer wants to cover more of their production at the highest price they have to be able to find more quota to purchase.

Supply management systems also have the effect of allowing farmers to keep older technologies instead of feeling like they need to upgrade to keep their competitive advantage (e.g., Tiffin 1993). Scholars and farmers commonly recognize competitive advantage as being critical to the success of individual farms that produce commodity goods (e.g., Lyson and Gillespie 1995; Huettel and Jongeneel 2001). Frequently, this means that some farmers are choosing to grow their herd sizes in areas that offer least-cost production. Supply management, however, offers small farmers or those slower to

adopt technology the ability to make the same amount of income compared to other farmers who more quickly adopt new technologies. It would be easy to assume that this would mean that in areas with supply management, there would be a greater number of small farms when compared to non-quota areas. Despite a supply management system that has been in place for 23 years, Montana has still witnessed a nearly 70% decline of dairy farms during that time frame (see Figure 1 in Chapter 1 for more details). In Montana quota has stopped the growth of so-called “mega-dairies,” operations that milk upwards of 1,000 cows (and often 5,000 or more), but has not slowed the loss of smaller farms. As Table 1 illustrates, Montana’s dairy farm numbers have declined in every herd size category except those who have 200 or more cows. Additionally, the USDA Census of Agriculture reports no farms in any of the categories above 1,000 cows. The herd size category of 1-9 cows, while seemingly robust, does not accurately reflect those farmers who participate in the quota system by shipping milk for processing; rather, the numbers in this chart are from the national census of agriculture, which asks people about the livestock they own, so those people who own a cow for personal use appear here. At some point in the past it may have been feasible to milk fewer than 10 cows in Montana, as it is in other parts of the country where dairy farming is much more vibrant, but at the time of this study the smallest farm that was shipping milk had 15 cows.

Table 1. Changes in the Structure of Montana's Dairy Industry by Farm Numbers and Herd Size : 1992-2007

Herd Size	1992	1997	2002	2007	Total % Change
1-9	854	552	489	282	-67
10-19	31	14	8	8	-74
20-49	35	20	8	12	-66
50-99	76	54	43	20	-74
100-199	85	67	55	37	-56
200-499	10	13	19	22	120
500-999	1	1	2	4	300
Total Farms	1,092	721	624	385	-65

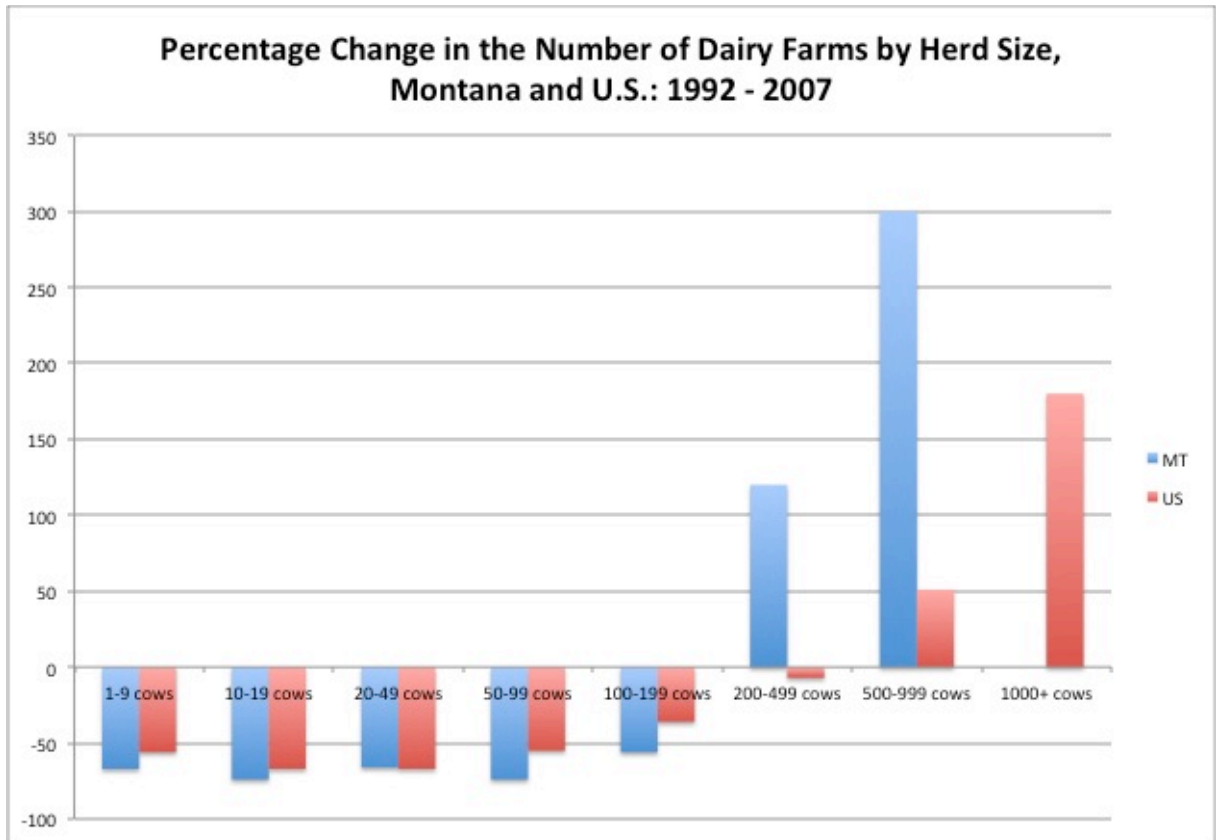
As Table 2 illustrates, on the national level the trend is the very similar to herd size changes in Montana. There are two major differences however: first, on the national level, mid-scale farms or those with herds of 200-499 cows, are on the decline while in Montana that category is experiencing steady growth. Second, the growth of farms with 1,000 or more cows shows the strongest increases nationally, while in Montana that herd size category does not exist.

Table 2. Changes in the Structure of the National Dairy Industry by Farm Numbers and Herd Size: 1992-2007

Herd Size	1992	1997	2002	2007	Total % Change
1-9	32,803	22,824	21,016	14,426	-56
10-19	10,897	7,696	5,270	3,568	-67
20-49	49,418	33,137	21,974	16,344	-67
50-99	41,813	33,477	25,465	18,986	-55
100-199	14,062	12,602	10,816	8,975	-36
200-499	4,652	4,881	4,546	4,307	-7
500-999	1,130	1,379	1,646	1,702	51
1000+	564	878	1,256	1582	180
Total Farms	155,339	116,874	91,989	69,890	-55

Source: USDA Census of Agriculture

Figure 2.



Comparing the herd size and farm number trends of Montana and the U.S. between the years of 1992 – 2007 highlights the similarities and differences at each scale. Figure 2 clearly shows that smaller farms are declining statewide and nationally. Montana dairy farmers that I interviewed thought that the quota system was helping keep more small farms in business when compared to the U.S. industry, but Montana is actually losing these farms at a rate slightly faster than the national average. The Montana dairy industry is showing growth in the mid-scale category of 200-499 cows, where on the national level this farm scale is also on the decline. Because there have not been any new farms started since the institution of quota, what is likely happening is that as farmers retire those who are still in business buy the quota and increase their herd sizes, which would

explain the growth of the mid-scale farms concurrent with the loss of smaller herd sizes. While the category of 500-999 cows shows explosive growth in Montana, this is slightly misleading because it is only a change from 1 to 4 farms. Despite this, Figure 2 shows that quota may actually be helping slow the growth of large farms in the state when compared to the nation, although there has been a shift towards fewer, larger farms. While there are no dairies in the state that have herds of 1,000 or more cows, it may only be a matter of time as more farmers continue to retire and the remaining dairies increase their herd sizes.

Additionally, one might assume that in supply managed areas there would be greater interest from younger generations in starting a dairy farm because of the guaranteed market and higher price received for milk production. Montana, however, has not seen a new farm venture since the institution of quota, and in many cases, when the farmer retires his or her farm shuts down. While supply management and the additional costs associated are not the only reasons that keep young farmers out, the quota system certainly has not encouraged new entrants. More likely, the cost of purchasing quota, the out lay of capital required to start a dairy, the uncertainty of the industry, and the necessity of finding a processor to purchase the milk have worked in unison to discourage new dairy farmers in the state.

So the question remains: Are supply managed dairy industries more stable and better off than free-market dairy industries? In Montana's case, this question is difficult to answer because it is one state in a dairy producing nation, and is the only U.S. example of a supply managed system that has served to limit production. Because Montana operates

with the Federal Milk Market Order (FMMO) pricing as a guide, it is not entirely separated from national and international supply and demand signals and quota on its own does not necessarily affect the farm gate price of milk. Also, Montana cannot turn away dairy products from other states, so the market sells both Montana-made and imported dairy products.

Farmers did report benefits from the quota system, including protection and stabilization for Montana's dairy industry. Because the quota system in the state requires processors to first utilize Montana milk for Class I fluid use, it provides a guaranteed market for dairy farmers. Without this, many farmers I spoke with felt like Montana would be flooded with out of state milk particularly given the proximity of Idaho and Washington. Smaller farmers felt like quota has protected them from the bigger dairies because everybody's milk is worth the same amount. Farmers also noted the stability quota has provided, which is practically unheard of in the U.S. dairy industry. Not only has it ensured a market, the quota system has encouraged farmers to produce at a level matching their quota which makes it easier for processors to plan and should help control price swings.

Despite this, Montana's dairy industry is not thriving. A continued loss of farms, processing only for fluid milk, and uncertainty about the future still haunt the state's dairy farmers. When asked about the future of Montana's dairy industry, farmers answered one of two ways: three farmers said it is going to stay exactly the same as it is now, while 14 thought there will be fewer and bigger farms. As it stands currently, quota may be helping Montana dairy farms stay viable in the near future, but questions about

long-term survival remain particularly if more farmers retire or another processor leaves the state.

On a national level, supply management of the dairy industry may make sense but there are a lot of variables to consider. The U.S. generally prides itself on a free-market economy, and supply management is the antithesis of that ideology. Some farmers feel as though supply managed systems cause consumer prices to rise, which is the case in Canada, and that in itself would make a national quota system unlikely to pass. The other issue with a national quota policy is whether it would control all milk, like Canada's system, or only fluid milk, like Montana's system. If controlling price swings on the farmer's end were the goal, then a system like Canada's would be a better fit. If the U.S. wanted to limit Class I production and keep it more in line with demand, then perhaps a system like Montana's would work better. On the other end of the spectrum, the U.S. could remove subsidies, tariffs, and FMMO's, and let the dairy industry operate under a free market policy. New Zealand did this in the 1980s and since then farmers have learned to respond to international market signals and adjust their production accordingly.

The effects of supply management vary by farm size and intent of the farm operator, and change the ways that some farmers make decisions on their farm. Understanding the ways that quota effects individual farmers may help lead to better, more responsive dairy policy in Montana and on the national level. But for now and into the foreseeable future, Montana dairy farmers will operate under their supply management system. While Montana's dairy cows might be black and white, the issue of supply management is not so clear.

WORKS CITED

Balagtas, J., A. Smith, and D. Sumner. 2007. Effects of Milk Marketing Order Regulation on the Share of Fluid-Grade Milk in the United States. *American Journal of Agricultural Economics* 89(4): 839-851.

Balagtas, J. and K. Kreutzer. 2007. Commodity Policies and Product Differentiation: the California Milk Marketing Order and the Organic Dairy Sector. Selected Paper for Presentation at the American Agricultural Economics Association Annual Meeting: Portland, Oregon.

Block, D. and M. DuPuis. 2001. Making the Country Work for the City: von Thünen's Ideas in Geography, Agricultural Economics and the Sociology of Agriculture. *American Journal of Economics and Sociology* 60(1): 79-98.

Cochrane, W. 1959. Some Further Reflections on Supply Control. *Journal of Farm Economics* 41(4): 697-717.

Cross, J. 2006. Restructuring America's Dairy Farms. *Geographical Review* 96(1): 1-23.

Dawson, P. J. 1991. The Simple Analytics of Agricultural Production Quotas. *Farm Economist* 19(2): 127-141.

DuPuis, M. and D. Block. 2008. Sustainability and Scale: US Milk-Market Orders as Relocalization Policy. *Environment and Planning A* 40: 1987-2005.

Geisler, C. and T. Lyson. 1991. The Cumulative Impact of Dairy Industry Restructuring. *BioScience* 41(8): 560-567.

Harvey, D. 2005. *A Brief History of Neoliberalism*. Oxford University Press Inc.: New York.

Hesse-Biber, S.N. and P. Leavy. 2011. *The Practice of Qualitative Research: Second Edition*. Sage Publications, Los Angeles.

Herbst, B., J. Outlaw, D. Anderson, and H. Bryant. 2006. Considerations in the Dairy Relocation Decision. Selected Paper for Presentation at the Southern Agricultural Economics Association Annual Meetings: Orlando, Florida.

Huettel, S. and R. Jongeneel. 2011. How Has the EU Milk Quota Affected Patterns of Herd-Size Change? *European Review of Agricultural Economics* 38(4): 497-527.

Jackson-Smith, D. and F. Buttel. 1998. Explaining the Uneven Penetration of Industrialization in the U.S. Dairy Sector. *International Journal of Sociology of Agriculture and Food* 7:113-150.

James, Sallie. 2006. *Milking the Customers: The High Cost of U.S. Dairy Policy*. Cato Institute Center for Trade Policy Studies: Briefing Number 24.

Jongeneel, R. and A. Tonini. 2007. *Dairy Quota and Farm Structural Change: A Case Study on the Netherlands*. Paper Prepared for Presentation at the 107th EAAE Seminar, Sevilla, Spain: January 29 – February 1, 2008.

Lyson, T. and G. Gillespie. 1995. Producing More Milk on Fewer Farms: Neoclassical and Neosstructural Explanations of Changes in Dairy Farming. *Rural Sociology* **60**(3): 493-504.

Lyson, T. and J. Green. 1999. The Agricultural Marketscape: A Framework for Sustaining Agriculture and Communities in the Northeast. *Journal of Sustainable Agriculture* **15**(2-3): 133-150.

Lyson, T. and R. Welsh. 2005. Agricultural Industrialization, Anticorporate Farming Laws, and Rural Community Welfare. *Environment and Planning A* **37**: 1479-1491.

Manchester, A. 1983. *The Public Role in the Dairy Economy: Why and How Governments Intervene in the Milk Business*. Westview Special Studies in Agriculture Science and Policy. Westview Press: Boulder, Colorado.

National Milk Producers Federation. 2013. *Foundation for the Future: Program Details*. Accessed on 4/11/13 at:
<http://www.futurefordairy.com/program-details>

Nick, Monte. 2002. "Quota History and Procedures". Montana Department of Livestock: Milk Control Bureau.

Oskam, A.J. and D. P. Speijers. 1992. Quota Mobility and Quota Values. *Food Policy* February 1992: 41-52.

Platt, E. K. 1967. *An Appraisal of Some Economic Effects of Montana's Milk Control Laws on the State's Dairy Industry*. Master's Thesis, School of Business Administration, University of Montana – Missoula.

Progressive Dairyman. "2011 U.S. Dairy Statistics". March 21, 2012.

Reich, A. 2007. The Agricultural Exemption in Antitrust Law: A Comparative Look at the Political Economy of Market Regulation. *Texas International Law Journal* **42**(843): 843-874.

Richards, T. 1996. The Effect of Supply Management on Dairy Productivity. *The Canadian Journal of Economics* **29**: S458-462.

Richards, T. and S. Jeffrey. 1997. The Effect of Supply Management on Herd Size in Alberta Dairy. *American Journal of Agricultural Economics* 79(2): 555-565.

Stonehouse, D.P. and M. MacGregor. 1981. Decision-making Criteria for Purchasing Milk Quota at the Individual Farm Level. *Canadian Journal of Agricultural Economics* 29(2): 203-216.

State of Montana – Milk Control Bureau. Multiple Years (1987-2011). Annual Recap of Milk Receipts and Usage. Department of Livestock, Centralized Services Division. Helena, Montana.

Sumner, D. and Ahn, B. 2008. Market Power and Policy in the U.S. Dairy Industry. *Journal of Agriculture and Life Science* 42(2): 73-86.

Sumner, D. and C. Wolf. 1996. Quotas Without Supply Control: Effects of Dairy Quota Policy in California. *American Journal of Agricultural Economics* 78: 354-366.

Tiffin, R. 1993. The Welfare Effects of Technological Change Under Quotas. *Oxford Agrarian Studies* 21(1): 3-12.

United States Department of Agriculture: Agricultural Marketing Service. 2010. Dairy Federal Milk Marketing Orders: Program Overview. Accessed on 4/30/2012 at: <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateO&navID=IndustryMarketingandPromotion&leftNav=IndustryMarketingandPromotion&page=FMMOProgramObjectives>

United States Department of Agriculture: National Agriculture Statistics Service. 2010-2003. Farms, Land in Farms, and Livestock Operations. Accessed on 4/14/2013 at: <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1259>

United States Department of Agriculture: National Agriculture Statistics Service. 2007. Table 1. Historical Highlights: 2007 and Earlier Census Years. Pp. 7-8. Accessed on 5/3/2012 at: http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_1_State_Level/Idaho/st16_1_001_001.pdf

APPENDIX 1

Interview Guide

Introduction:

Thank you for agreeing to participate in this interview. I am a graduate student at the University of Montana. My focus is on farm policy and I am particularly interested in the dairy industry, how it has changed over the past several decades, and the future outlook.

I will be focusing on the Montana quota system and dairy farmers' perceptions of it. I am interested in your experience as a Montana dairyman and how you think the quota system has affected your operation.

So you know, your identity will remain confidential throughout the entire study. I will not be using your name or any description of your farm that could identify you to others, so please feel free to say whatever comes to mind.

Before we begin, is it okay if I record this interview? Taping ensures that I can focus on what you are saying and that your statements are accurately recorded.

Background:

1. To start off, I thought you could tell me about your history in dairying. How did you first get started in the business?

Follow-up: How many years have you been dairying?

Industry Participation:

Now I would like to ask you some questions regarding your participation in the dairy industry:

2. How many cows do you (did you) milk?

3. Who do you (did you) ship your milk to?

4. In thinking back about your decision regarding which milk shipping company to work with, what considerations did you make?

Quota System:

I would like to switch gears now and start talking about the quota system. These next questions are about your personal experience with quota.

5. So initially, how did you first come to acquire quota?

Follow-up: Have you since changed the amount you have?

6. Over the years, has the quota system affected how you make decisions on the farm for things like whether to expand or adopt new technology?

Probe: Are there any other ways quota has affected your on-farm decisions?

Now I would like to talk with you about your perceptions about how the quota system has influenced the industry across the state, not only your farm.

7. In the past, I understand there have been discussions about getting rid of the quota system in Montana. What is your opinion of this?

Probe: How has it historically affected the industry in Montana?

Probe: When you think about Montana's dairy industry, do you think the quota system is still necessary?

Follow-up: In what ways do you think the industry in Montana might be different without the quota system?

Wrapping Up:

The final questions I have for you are about your thoughts regarding the future of dairy in Montana:

8. What do you foresee for the future of the Montana dairy industry?

Follow-up: What recommendations do you have as far as improving the viability of dairying in Montana?

9. Is there anything else you think is important for me to know about the Montana dairy industry or the quota system?