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- This study considers the impact of minimum wage increases on New York dairy farm labor costs and net farm income, under two wage compression scenarios.
- Average net farm income could decrease by at least one-third and labor costs could increase by at least 34 percent under the new minimum wage law, compared to an expected 10 percent decline in net farm income and a 13 percent increase in labor costs based on historic wage increases. Average returns (profits) after farm family contributions are accounted for could disappear or become negative under some scenarios.
- The estimates presented support a strong management response to increasing wages. Under the current short term outlook for low milk prices, increasing wage pressure may accelerate the decades-long trends towards (1) larger and more productive dairy farms and (2) capital-intensive or labor-saving production methods.

### Introduction

Labor is substantial expense for New York dairy farms and maintaining a sufficient labor force is a major farm management challenge. The recent minimum wage law will lead to minimum wage increasing in annual \$0.70 increments in upstate New York to reach \$12.50 per hour by 2021, compared to \$15.00 minimum wage for New York City and surrounding counties. Average wages for hired workers on dairy farms in 2014 were well above the minimum wage of \$8 but below \$12.50. Increases in minimum wage typically raise overall wage levels due to what is referred to as wage compression. For example, with more or higher wage compression, the wages of workers paid more than minimum wage do not increase as much, or overall wage levels are more “compressed”. Likewise, with lower wage compression, workers paid more than minimum wage experience larger wage increases. We used data from the 2014 Cornell Dairy Farm Business Summary<sup>i</sup> (DFBS) to consider the potential impacts of the scheduled minimum wage increases on labor costs and profitability for New York dairy farms.

### Methodology

This analysis is designed to frame the challenges facing New York dairy farms due to recent minimum wage increases and to provide such information in a *timely* manner. As such we use a partial budget methodology that is static (as opposed to dynamic), that is, it assumes no change in profit margins due to management actions taken in response to the new minimum wage levels. This approach holds revenues and costs other than labor fixed at 2009-2014 levels, depending on the scenario being presented. In reality, farms can make management decisions to adapt to the new environment and hence actual impacts may be lower than indicated. To partially address this issue, we also present a “status quo” or “business as usual” scenario. This scenario assumes that future labor costs per cow will grow at the same rate as from 2009-2014, about 1.7 percent per year for farms participating in the DFBS. All potential outcomes presented should be considered relative to the status quo.

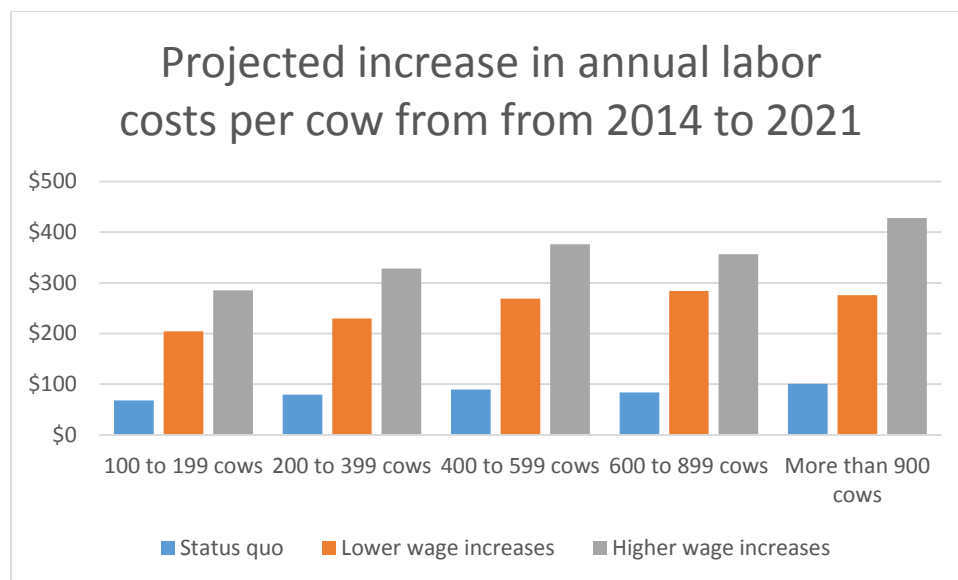
Given that hired labor requirements, costs, and farm structure vary considerably by herd size, we conduct our analysis for the following herd sizes: 100-199 cows (26), 200-399 cows (22), 400 to 599 cows (22), 600 to 899 cows (31), and 900 or more cows (57). The number of farms used to calculate averages for each category is indicated in parenthesis. Farms with less than 100 cows typically do not use full-time hired or nonfamily labor and are hence not included in this analysis. Minimum wage increases are scheduled as follows: \$9.00 by end 2015, \$9.70 by end 2016, \$10.40 by end 2017, \$11.10 by end 2018, \$11.80 by end 2019, and \$12.50 by end 2020.

Average wage costs are currently above minimum wage (\$10.00-\$12.40 versus \$8.00 per hour minimum wage in 2014). For the farm sector as a whole, the relationship between average wages and minimum wage has historically fluctuated between the absolute (at least \$3.25) and relative (at least 42%) differences. We hence consider two scenarios to characterize the difference between average dairy farm wages and minimum wage: (1) it continues at its 2014 absolute level (\$3.15-4.40, varies by herd size) or (2) at its 2014 relative level (25 to 55 percent, varies by herd size). The absolute level of scenario 1 implies relatively more wage compression (overall wages go up less, including for workers paid above the minimum wage), while the relative level of scenario 2 implies less wage compression (overall wages up more, including for workers paid above the minimum wage). These two scenarios use an approach similar to a recent Farm Credit East (2016) study.

We use gross wages and labor-months to calculate implied hourly wages, and then assume they increase based on minimum wage levels at the schedule above, under the two wage compression scenarios. Implied average gross wages reach \$14.54-16.90 per hour by 2021 under the high wage compression scenario and \$15.69-\$19.38 under the low compression scenario. While we assume FICA/Worker's Compensation increases proportionally with gross wages, we hold health insurance and other benefits constant. While health insurance costs have been increasing over time, we hold them constant to maintain our focus on the impact associated with minimum wage changes. In order to frame these labor cost increases relative to farm profitability, we estimate impacts on net farm income and economic value added (EVA) per cow, using average levels from 2009-2014. We also consider the impacts in a high income year (2014) and a low income year (2009).

## **Key Findings**

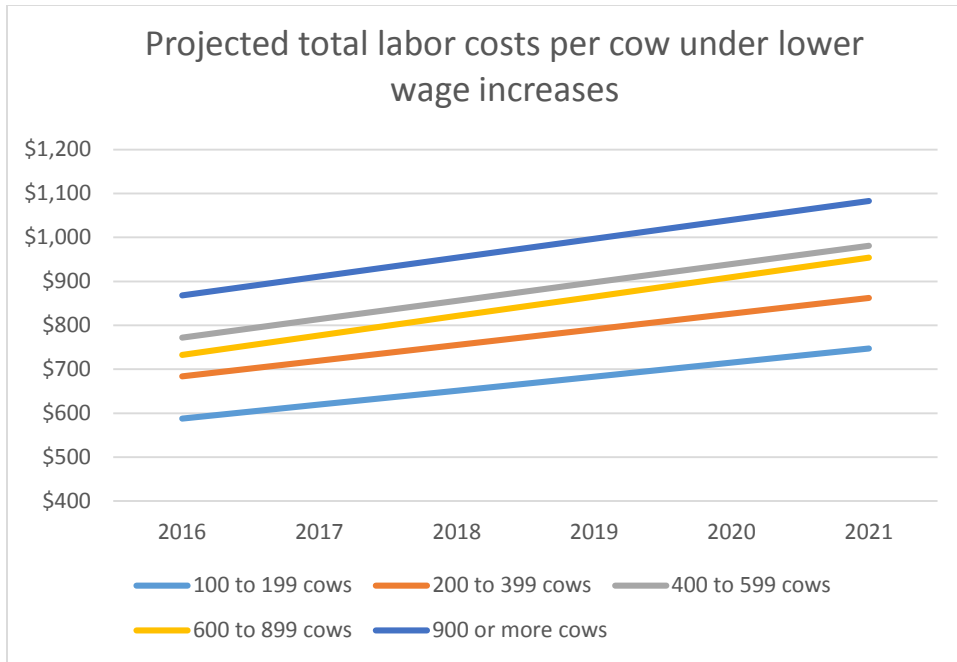
***Chart 1 – Minimum wage increases will put strong upward pressure on labor costs***



Note: Lower wage increases refer to scenario 1, or overall lower wage increases due to higher wage compression. Higher wage increases refer to scenario 2, or overall higher wage increases due to lower wage compression.

Under the new minimum wage law, average labor costs per cow could increase substantially relative to the status quo, or “business as usual” scenario. Labor costs per cow generally increase with herd size, and hence the minimum wage increases will have a larger absolute impact on farms with larger herd size. Smaller farms rely more on family labor, while larger herds may have nonfamily management as well as a higher overall level of nonfamily hired labor. Labor costs per cow varied from \$542 for herds with 100-199 cows in 2014 to \$807 per cow for herds with more than 900 cows. Even under lower overall wage increases (more wage compression), labor costs increases per cow would be approximately three times higher than the status quo for all herd sizes. For example, for farms with 100 to 199 cows, labor costs per cow could increase by \$205 instead of \$68, or \$276 instead of \$101 for more than 900 cows. With lower overall wage level increases, labor costs could still increase \$200-\$300 per cow or at least 34 percent. Under higher increases, labor costs could increase \$300-\$400 per cow. These compare to increases of \$68-101 under the status quo. While dairy farms have been facing increasing real wages for years, the new minimum wage levels will accelerate this process. Farm managers have had to make changes in the past to maintain profitability in the face of increasing wages. The magnitude of labor costs projected under the new minimum wage levels will make this even more of a challenge.

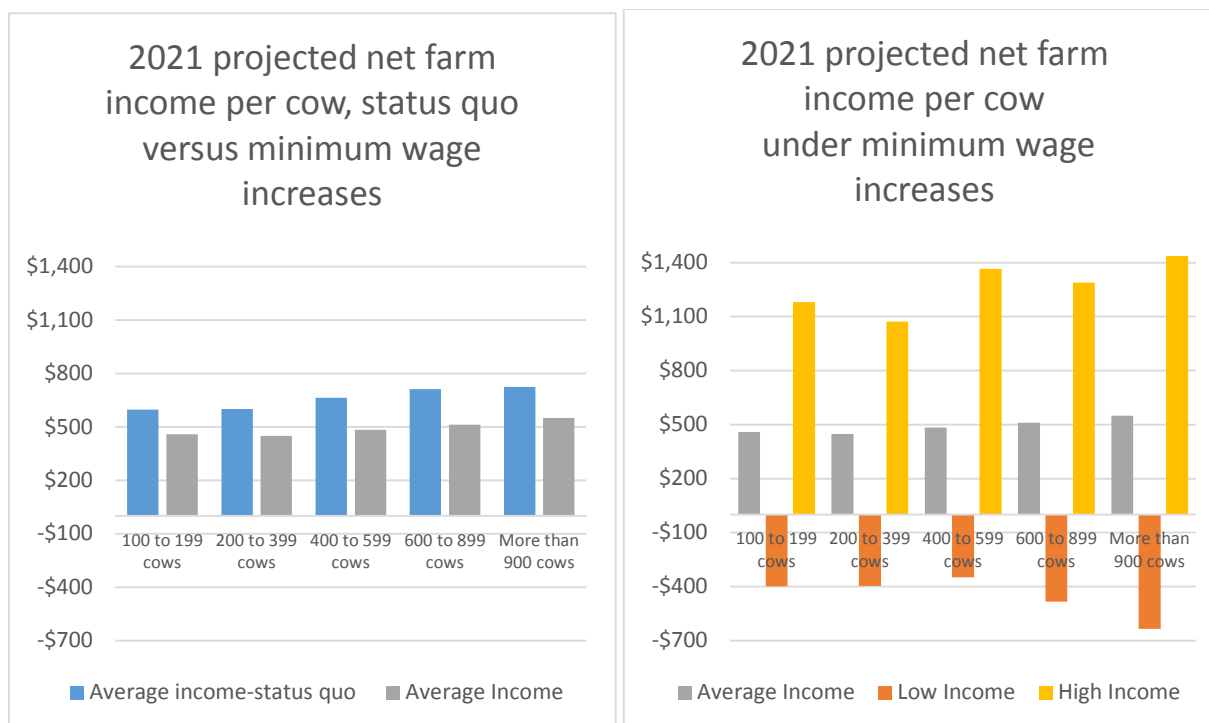
**Chart 2 – Total labor costs will gradually increase under increasing minimum wages**



Note: These estimates assume lower wage increases under scenario 1, or overall lower wage increases due to higher wage compression.

Minimum wage will increase \$0.70 annually to reach \$12.50 by the end of 2020, after which minimum wage will be tied to cost-of-living measures and allowed to rise to \$15 per hour, with some built-in flexibility for actual economic conditions. While the impact in 2016 will be small relative to the status quo, by 2021 the impact would be much larger. The annual wage increases add up over time to put substantial downward pressure on net farm income, as illustrated in Charts 2 and 3.

**Chart 3 – Increasing wage pressure may occur under volatile income levels**



Note: Other than the status quo, these estimates assume lower wage increases under scenario 1, or overall lower wage increases due to higher wage compression. Average expected decline in profits is indicated by the blue bar relative to gray bar on the left-hand side chart. Average levels are based on 2009-2014. Low income is based on 2009 and high income on 2014.

The changes driven by increasing wages may seem relatively small compared to normal fluctuations in earnings, as illustrated by the low and high net farm income scenarios in Chart 3. Dairy farm earnings have fluctuated dramatically in recent years. Net farm income was negative in 2009 and higher than \$1,000 per cow in 2014, a rare year of very high income. As herd size increases, these year-to-year income fluctuations typically increase. If we just compare 2021 average net farm income under the status quo (blue bar) versus the new minimum wage increases scenario (gray bar) presented on the left of Chart 3, net farm income is \$200-300 or at least 34 percent lower under minimum wage insurances than the status quo. However, annual changes in net farm income due to milk price fluctuations in some years are larger than the projected year-to-year changes driven by minimum wage increases. The short term outlook based on current milk prices and domestic and global demand is for very tight or negative margins in the next few years. In what is currently a challenging milk price environment for dairy farms, which is driven both national and international factors, it will be important to maintain focus on responding to increasing wage pressure.

While minimum wage increases may substantially erode profit margins, it is important to also consider that net farm income does not include any returns to the family for their contributions to the business. Net farm income is the return to the family for investing, managing, and working in the dairy farm. Economic value added (EVA)<sup>ii</sup> is one measure that is used to take into account the labor, management and capital provided by the family owners. Like net farm income, EVA is the highest for the largest herd size category. Higher overall wage increases (low wage compression) imply a near-zero EVA of \$20 per cow by 2021 for herds with more than 900 cows. Projected EVA in this scenario for smaller herds is lower

than \$20 and in some cases negative. This assumes average income levels based on 2009-2014, which may be optimistic given current milk prices. Overall, this illustrates the need for a management focus on increasing wage levels. While this response will vary by farm, it could include some combination of aggressively pursuing new marketing opportunities, increasing labor efficiency, decreasing non-labor costs, and/or new capital investments. While farms have been continually adjusting to higher labor costs, our analysis indicates much more upward pressure on wages than the past. This type of pressure can drive investment in labor saving technologies, such as automatic milking systems (“robotics”) or rotary parlors. Historically, a combination of increasing costs and volatile milk prices has driven investments that substitute capital for labor. These investments have typically been debt-financed and have also driven a structural transformation of the dairy industry towards larger, more productive farms. More broadly, increasing labor costs raise the potential that relatively labor-intensive farming, such as dairy and specialty crop production, could shift to lower cost labor areas, such as the Midwest, Southeast or even overseas. Future research will consider strategies for dairy farms facing higher labor costs as well as the ability of farms to service debt under higher labor costs.

While this study focuses on farm businesses, there are important implications for farm workers as well. While labor cost data from the DFBS does not allow us to conduct detailed analysis of the impacts on farm workers, this is an important topic for future research. Many economists would agree that gradual or small increases in minimum wage levels historically haven’t led to substantial job losses, but there is little evidence on the impact of larger increases. Many farm workers will likely benefit from higher wages, under increasing overall wage levels driven by a higher minimum wage. The exact impact on take-home pay will depend on the actual level of wage compression and how farm managers respond to the additional expenses. Our analysis implies that some farms may face pressure to cut back on hours or employ fewer workers or relocate. *It is important to note that the most profitable farms in the Cornell Dairy Farm Business Summary tend to pay higher wages but also have higher productivity per worker. More generally, in addition to paying competitive wages, most successful farm business also invest in a safe and rewarding work environment for their employees.*

## **Summary**

New York dairy farms will face additional financial stress over the next five years from increasing wages. This analysis indicates that under new minimum wage levels average net farm income of New York dairy farms has the potential to decrease by at least one-third and labor costs increase by at least 34 percent. These estimates don’t take into account farm-level adjustments to wage pressure, but assume lower overall wage increases. This compares to an at least 10 percent decline in profitability and a 13 increase in labor costs under the “business as usual” alternative, as farms are *already* been experiencing increasing real wages for several years. For the average farm, these estimates indicate the possibility of near-zero returns to farming after accounting for family expenses and returns to equity. However, farms may take measures to dampen the magnitude of these estimated impacts. Increasing wage pressure may increase investment in labor-saving equipment and accelerate the decades-long trend towards and larger and more productive dairy farms. It could also support dairy production shifting to lower-labor cost regions in the long term. The new minimum wage law makes strong farm management and increasing labor productivity even more important to New York dairy farm survival.



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## Appendix

**Table 1. Labor Cost per Cow under Different Wage Compression Scenarios**

Herd Size	Scenario	2016	2017	2018	2019	2020	2021	% increase, 2014-2021
100 to 199 cows	Status quo	561	570	580	590	600	610	13%
	More Compression	588	620	651	683	715	747	38%
	Less Compression	606	650	694	739	783	827	53%
200 to 399 cows	Status quo	654	665	677	688	700	712	13%
	More Compression	684	719	755	791	827	862	36%
	Less Compression	706	757	808	859	910	961	52%
400 to 599 cows	Status quo	737	749	762	775	788	802	13%
	More Compression	772	814	856	898	939	981	38%
	Less Compression	796	855	913	972	1,030	1,089	53%
600 to 899 cows	Status quo	693	705	717	729	741	754	13%
	More Compression	733	777	821	865	910	954	42%
	Less Compression	749	804	860	915	971	1,026	53%
More than 900 cows	Status quo	834	848	863	878	892	908	13%
	More Compression	868	911	954	997	1,040	1,083	34%
	Less Compression	902	968	1,035	1,101	1,168	1,234	53%

**Table 2. Net Farm Income per Cow under Different Wage Compression Scenarios**

Herd Size	Scenario	2016	2017	2018	2019	2020	2021	% increase, 2014-2021
100 to 199 cows	Status quo	645	636	626	616	606	596	10%
	More Compression	618	586	555	523	491	459	31%
	Less Compression	600	556	512	467	423	379	43%
200 to 399 cows	Status quo	657	646	635	623	612	600	12%
	More Compression	628	592	556	521	485	449	34%
	Less Compression	606	555	504	453	402	351	48%
400 to 599 cows	Status quo	729	716	703	690	677	664	12%
	More Compression	693	651	610	568	526	484	36%
	Less Compression	669	611	552	494	435	377	50%
600 to 899 cows	Status quo	772	760	748	736	724	711	11%
	More Compression	732	688	644	600	555	511	36%
	Less Compression	716	660	605	550	494	439	45%
More than 900 cows	Status quo	798	783	769	754	739	724	12%
	More Compression	764	721	678	635	592	549	33%
	Less Compression	730	664	597	531	464	398	52%

i Dairy farm business summary (DFBS) projects are an integral part of Cornell Cooperative Extension's agricultural educational program in New York State. The Charles H. Dyson School of Applied Economics and Management of the College of Agriculture and Life Sciences at Cornell University, PRO-DAIRY, and County and Regional Extension staff, cooperate in sponsoring DFBS projects. In 2014, over 200 dairy farms participated, including dairy owners, renters, full-time, part-time, organic and out-of-state farms. Business records submitted by dairy farmers from 35 New York counties provide the basis for continuing Extension programs, data for applied studies, and for use in the classroom. The DFBS program helps farmers improve accounting and financial analysis techniques, develop managerial skills, solve business and financial management problems and plan the future of their business. For more information, please visit <http://dfbs.dyson.cornell.edu>.

ii EVA is calculated as net farm income less opportunity charges for unpaid family labor, owner labor, and management and a 5% charge on equity capital. It allows for estimation of returns to farming after accounting for the opportunity cost of choosing farming versus other investments.

## OTHER A.E.M. EXTENSION BULLETINS

EB No	Title	Fee (if applicable)	Author(s)
2016-01	Cost of Establishment and Production of Cold Hardy Grapes in the Chautauqua Region of New York - 2015		Oh, D., Kananizadeh, S., Gómez, M., Martin, K.
2015-13	Workforce Issues: Profiles of Specialty Crop Farms in New York State		Maloney, T., Smith, M., Saputo, R. and B. Rickard
2015-12	Cost of Establishment and Production of Cold Hardy Grapes in the Thousand Islands Region of New York - 2015		Oh, D., Kananizadeh, S., Gómez, M. and T. Martinson
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2015-10	Produce Procurement Study		McLaughlin, E., Park, K. and G. Hawkes
2015-09	Dairy Farm Business Summary, New York Small Herd Farms, 140 Cows or Fewer, 2014	(\$20.00)	Knoblauch, W.A., Dymond, C., Karszes, J. and R. Kimmich
2015-08	Dairy Farm Business Summary, Northern New York Region, 2014	(\$16.00)	Knoblauch, W.A., Dymond, C., Karszes, J., Howland, E., Murray, P., Buxton, S. and R. Kimmich
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2015-05	Dairy Farm Business Summary, New York Large Herd Farms, 300 Cows or Larger, 2014	(\$20.00)	Karszes, J., Knoblauch, W.A. and C. Dymond
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