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Regional Minimums in the U.S. Beef Complex

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Declaration of Conflict of Interest

The authors declare that we have no relevant or material financial interests that relate to the research/results described in this paper

Data Disclosure

The data used in this research are non-proprietary. They were obtained from USDA-AMS' free portal that was created as a result of Mandatory Price Reporting

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Preface

The Center for Agriculture Profitability (CAP), located at the University of Nebraska – Lincoln, was asked by the staff of U.S. Senate Committee on Agriculture, Nutrition, and Forestry Ranking Member John Boozman (R-AR) to provide commentary related to current proposals surrounding mandating certain levels of negotiated cash trade in major cattle feeding regions. This report is a product of that invitation.

Table of Contents

Project Authors	2
Preface.....	3
Executive Summary	6
Defining Regional Minimums	10
Policy Factors in Each Bill	10
Date Introduced.....	10
Who Sets the Regional Minimums	10
Regions Required to Meet Minimums.....	11
Cattle Transactions Qualifying Towards Minimum	11
Mechanism of Required Minimum Trade.....	11
How Frequently Minimums Need to be Met	11
Who is Required to Make Minimum Purchases	12
Duration of Minimums	12
Initial Regional Minimum Requirement.....	12
Missing/Non-reporting weeks.....	13
Adjustments for Market Shocks.....	13
Cost-Benefit Analysis	14
Penalties	14
Categorization of Policy Parameters.....	15
Regional Minimum Assumptions	16
Mechanism of Required Minimum Trade.....	16
Data.....	16
Defining Negotiated Cash Sales	16
Frequency.....	17
Periods of Review	17
Marketing Regions.....	17
Adjustment for Market Shocks	17
Penalties for Non-compliance.....	17
30% regional minimum across all regions (H.R. 8489).....	17
Performance	17
50% regional minimum across all regions (H.R. 8489).....	17
Performance	17
Sensitivity Analysis	18
Minimum trade set by the lowest region 18 months rolling average and maximum trade set by no more than 300x minimum trade (S.B. 3229, H.R.5992).....	18
Performance	18
Sensitivity Analysis	18
The regional minimum is set by 75% of the robust level of trade and is required to be met in 75% of the weeks in a quarter (NCBA 75% Plan).....	18
Performance	18

Sensitivity Analysis	19
Getting to a Robust Trade Number	20
Within-year Variation of Weighted Average Price	21
Rolling Variation of Weighted Average Price.....	21
Share of Negotiated Trade Equal to the Percent of Total Trade.....	22
Regional Minimum Specification	22
Performance	22
Sensitivity Analysis	22
Flexible S.B. 3229, H.R.5992.....	23
Regional Minimum Specification.....	23
Performance	23
Sensitivity Analysis	23
Rolling Average of Robust Trade Levels	23
Regional Minimum Specification.....	23
Performance	24
Sensitivity Analysis	24
Robust Minimum Trade and Cattle Quality Minimum	24
Regional Minimum Specification.....	24
Conditional Regional Minimum Requirement.....	25
Regional Minimum Specification.....	25
Separate formula sales into formulas with and without quality premiums.....	26
Provide more information about the type of cattle reported under MPR	26
Report base price by region under new USDA-AMS reports.....	26
Percent of cattle sold under each contract in the cattle contract library	27
Conclusions.....	28
References.....	30
Supporting Tables	33
Supporting Figures.....	45

Executive Summary

There have been ongoing, yet mixed, concerns about the decline in negotiated purchases in the U.S. fed cattle industry and whether it has created a situation where the number of transactions has been insufficient to ensure efficient price discovery (Anderson et al. 2004). This problem, referred to as market thinness, creates industry concern because thin markets are more volatile (Hayenga 1979); are subject to price manipulation by large firms (Mueller et al. 1996; Xia and Sexton 2004; Zhang and Brorsen 2010); and exhibit observed prices that tend to deviate from the competitive price (Adjemian, Saitone, and Sexton 2016). Market thinness issues are further amplified when transparency regarding prices and how they are set are unavailable to market participants (Adjemian, Saitone, and Sexton 2016). This is referred to as price transparency. In situations where there are thin markets and low levels of price transparency, there are increased opportunities for firms to engage in strategic behavior. This occurs because contract negotiations are often private and public reporting of contract specifications and prices is not required thus limiting the amount of information to public participants. Most fed cattle market participants agree the level and percent of negotiated purchases have been thinning. However, they disagree on whether market thinness and its corresponding effects have created issues for the industry.

The discussion around market thinness and price transparency and its effects on the industry has been elevated by recent meat processing plant fires in Holcomb, Kansas, and Grand Island, Nebraska, and the slowdown and temporary closures of meat processing plants during the ongoing COVID-19 global pandemic. These events led to both federal and industry-proposed responses to solve some industry participants' concerns. Three responses have been proposed: 1) greater transparency through the creation of additional public reports from the United States Department of Agriculture (USDA) reporting the base price for all cattle transactions, 2) greater transparency through the development of a cattle contract library detailing the use of all contracts utilized by the industry, and 3) reduced market thinness through implementing a minimum level of fed cattle that would need to be purchased in the negotiated cash or negotiated grid market in each United States Department of Agriculture-Agricultural Marketing Service (USDA-AMS) cattle feeding region. The third proposal is commonly referred to as "regional minimums".

The first two proposals have been met with appreciation by most industry participants. The first response was implemented in August 2021 when USDA-AMS released three new reports publishing the base prices for all cattle purchases including formula and forward contracts. Before this, only net prices received were reported by USDA-AMS for cattle purchased on formula, negotiated grid, and forward contracts. These reports attempt to resolve concerns about the public reporting of private negotiations in marketing contracts. Additional improvements and reports by USDA-AMS under the Mandatory Price Reporting Act to expand on industry concerns about price transparency are expected in the coming years. Numerous congressional bills have been drafted to address the second proposal. In December 2021, the U.S. House of Representatives passed the Cattle Contract Library Act (H.R. 5609) creating a public library for all types, quantity of head, and specifications of each marketing contract by region. If passed in the U.S. Senate, it would further reduce concerns about a perceived lack of price transparency. The third proposal has generated a significant amount of debate over the last two years. In November 2021, the most recent version of regional minimums was introduced in both the U.S. Senate and the U.S. House of Representatives. These bills come after a failed attempt by the industry to increase the levels of negotiated purchases to levels sufficient to ensure adequate

price discovery. Some regions did increase the level of negotiated purchases during this time compared to historical levels and further policies could be developed or implemented. The belief is that requiring a certain level of minimum trade by region will decrease market thinness such that prices reported by USDA-AMS approximate the competitive price. Bills advocating for mandatory regional minimums have received mixed reactions from industry participants and observers.

Advocates for regional minimums claim markets are too thin, reliable price discovery is no longer possible, and given market fundamentals, the USDA-AMS reported prices are different than what prices should be. They further claim the reporting of prices is a public good and if the industry has been unable to self-regulate, then there is a need for the federal government to regulate business practices. They believe with regional minimums in place, price discovery will be sufficiently high across all regions such that the observed price will approximate the competitive price. This process will allow for correctly communicated market signals along the beef complex. They acknowledge the potential added costs with these policies but justify the added benefits of price discovery offset these costs.

Opponents of regional minimums claim the increased use of alternative marketing arrangements (AMAs), and thus the reduced use of negotiated purchases, allowed meat processors to better communicate the level and timing of cattle quality through premiums and discounts awarded by cattle carcass attributes. They argue this incentive mechanism improved the quality of beef entering the market and increased the price levels for all market participants, not just the users of AMAs. It has also created incentives to find and purchase feeder cattle capable of earning these premiums leading to a greater reliance on predicted genetic performance and value-added practices. Opponents further point out that while negotiated purchases have declined, this can partially be explained by aggregate market fundamentals (e.g., cyclical changes in the cattle cycle, reduced packing capacity, etc.). Finally, opponents claim that while current levels of negotiated purchases are low, they have not reached sufficiently low levels to hamper robust price discovery. Opponents justify this by suggesting the hog industry has sufficient price discovery with less than 5% of total purchases in the cash market. Their primary concern is that if regional minimums were implemented, the minimums would negatively impact the supply chain of quality cattle increasing industry costs. These increased costs would ultimately impact consumer demand and potentially reduce the total value for all industry participants.

Given these contrasting views about the implementation and effects of proposed regional minimums on the U.S. beef complex, the purpose of this report is seven-fold. First, we review and compare existing legislation requiring regional minimums in the fed cattle industry. Second, we categorize key policy parameters for regional minimums. Third, we evaluate how current proposals align with historical market behavior and provide a sensitivity analysis for key policy parameters. Fourth, we show how a level of robust trade could be estimated. Fifth, we provide a few alternative specifications to the regional minimums that, if implemented, could accomplish the objective of providing robust price discovery in the fed cattle industry while maintaining cattle quality considerations. Sixth, we discuss some policy alternatives to regional minimums. Seventh, we conclude the report and provide some broad conclusions and implications.

The main findings of this study include:

Policy Parameters

- The frequency of the data used to create regional minimums determines how responsive regional minimums should be towards short- and long-term trends.
- The method by which the levels of robust trade are derived is an important decision on whether negotiated trade will resolve perceived issues of price discovery.
- The length of time regional minimums are required to be met determines how reactive regional minimums can be to changing market conditions.

Historical Alignment of Policies

- Ad-hoc specifications perform the poorest of all current policies suggesting, even at extremely low levels of required negotiated trade (i.e., <10%), no region would pass 100% of the weeks. This is largely an effect of non-reporting weeks and these situations should be clarified in future policies.
- Regional minimums based on past market activity are set by negotiated purchases occurring in CO or TX-OK-NM. No other regions set minimums. Increasing the level of weeks in the rolling averages decreases the number of weeks not meeting regional minimums.
- Increasing the number of weeks that are required to meet a percentage of negotiated trade is less restrictive than requiring a larger percentage of negotiated trade to be met each week.

Robust Trade

- The previous analyses suggest there is some justification for making regional minimums different across regions and that these minimums should be flexible over time.
- The historical amount of trade within a region does not necessarily imply more trade will be required. Rather, it is the amount of variation in price that determines the amount of required trade.
- Estimating a robust level of trade requires the industry to consider the pricing accuracy (c ; \$/cwt.); probability of being accurate (P ; %); and how price variation is modeled. If a rolling variance is used, then using a shorter rolling average combined with a lower level of c and a higher level of P would be required.

Alternative Specifications of Regional Minimums

- *If* regional minimums continue to be a policy priority, there are several different ways they could be specified. The tradeoffs in these are between requiring sufficient trade so price discovery is adequate while still allowing producers to market cattle in a manner they believe is profit-maximizing. These alternatives incorporate what industry participants voiced over the last year about equitable price discovery across regions and concerns about regional minimums affecting cattle quality.

Policy Alternatives to Regional Minimums

- The primary question to be addressed is whether there is inadequate price discovery. In this situation, the solution increases the level of negotiated purchases either voluntarily or by mandate. Even with improved price discovery, consideration needs to be given to what is driving the variation in prices reported for negotiated purchases. Explored policy alternatives seek to improve price transparency through changes in USDA-AMS reporting which may resolve some industry participants' concerns.

The main purpose of this report is to show how current and potential alternative specifications of regional minimums would have historically aligned with observed market behavior. However, the fundamental question in the debate of the validity and effectiveness of regional minimums first rests on whether robust price discovery has historically occurred over time and within each USDA-AMS region. If there has been a lack of price discovery during certain times of the year or systematically within certain regions, then creating regional minimums is *one* alternative to increase negotiated trade to robust levels. Thus, if either of these two conditions are met, then one should not expect any formulation of regional minimums to match historical market behavior. This does not necessarily imply regional minimums are poorly constructed or would be ineffective at increasing price discovery. On the contrary, to create regional minimums so that they matched historical market behavior considering either of these two conditions would be counterproductive to the objective of increasing negotiated trade to a robust level. Rather than solving issues of price discovery, the enacted regional minimums would only continue permitting deficient levels of price discovery to persist under the guise of “improved price discovery”.

As with all policies, benefits and costs may not be equally shared along the supply chain. This analysis does not take an opinion on whether regional minimums are a net benefit or a net cost to the U.S. beef complex nor does it attempt to quantify these impacts, of which there are likely many. But rather, its primary purpose is to compare proposed solutions and show how current and potential alternative specifications of regional minimums would have aligned with historically observed market behavior.

Defining Regional Minimums

Several bills introduced in the U.S. House of Representatives and U.S. Senate address concerns from some producers about a perceived lack of price transparency and market thinness in the fed cattle market. In addition, the NCBA, a cattle producer organization, introduced a voluntary industry policy in 2021 to address similar issues. While these bills and industry proposals have several components, this section focuses on how they have defined the minimum levels of negotiated trade.

Since 2020, there have been three bills introduced in the U.S. Senate (S.B. 4647, S.B. 543, and S.B. 3229); three bills introduced in the U.S. House of Representatives (H.R. 8557, H.R. 3766, and H.R. 5992); and one industry proposal (NCBA 75% Plan). In addition, there was one bill introduced in the U.S. House of Representatives (H.R. 8489) proposing a feasibility study be conducted related to regional minimums in the fed cattle trade.

Table 1 compares the bills and policies introduced in the U.S. Congress and by industry. It compares the policies by:

1. Date introduced
2. The governing body setting the regional minimums
3. Regions required to meet minimums
4. What cattle transactions qualify towards a minimum (negotiated purchase only, negotiated grid purchase only, negotiated purchases, or negotiated grid)
5. The mechanism of required trade (i.e., the number of cattle, percentage of cattle, number of transactions, etc.)
6. The frequency minimums that need to be met (i.e., weekly, monthly, or yearly)
7. Who is required to meet minimum purchases (individual packer/company)
8. How long regional minimums will be in place
9. The initial requirement for regional minimums
10. Whether there are adjustments for market shocks

Policy Factors in Each Bill

The following section summarizes how the bills and industry proposal compare the policy mechanisms used to define regional minimums.

Date Introduced

All bills have been introduced since the spring of 2020 when the effects of COVID-19 started impacting the fed cattle and meat processing industry. The most recent bills were introduced in November 2021.

Who Sets the Regional Minimums

Who is empowered to set the regional minimums has changed over time. Earlier bills required only the Secretary of Agriculture to set regional minimums. However, more recent bills have focused on the Secretary of Agriculture in consultation with the Office of the Chief Economist (OCE). This is an important distinction as it creates new provisions for the OCE from its current role of providing unbiased data-driven analysis and information into more of a role in policy and regulation development. The industry proposal was set by a stakeholder committee supplemented with academic commentary.

Regions Required to Meet Minimums

All bills and industry proposals have focused on setting regional minimums for current USDA-AMS-defined reporting regions. These five regions include Colorado (CO), Iowa-Minnesota (IA-MN), Kansas(KS), Nebraska (NE), and Texas-Oklahoma-New Mexico(TX-OK-NM). These five regions account for the most fed cattle processed in the U.S. each year. If regions are defined as “USDA-AMS reporting regions” then the bills and proposals are flexible enough to account for potential changes to reporting regions such as those recently proposed (see Schroder, Tonsor, and Schulz 2019). However, all proposals waive the requirements for packing plants in non-USDA-AMS reporting regions. The industry proposal slightly deviates from USDA-AMS reporting regions by combining Nebraska and Colorado (NE-CO).

Cattle Transactions Qualifying Towards Minimum

All bills and industry proposals define that either negotiated purchases or negotiated grid purchases qualify toward regional minimums. In both cases, meat processing plants and feedlots negotiate a base price where cattle are sold before cattle are delivered and harvested. There is no distinction in the proposals about the selling basis (i.e., live vs. dressed) or who pays for transportation (i.e., delivered vs. freight on board (FOB)). Allowing the inclusion of both negotiated purchases and negotiated grid purchases allows for more cattle to qualify towards regional minimums but differs from the traditional definition of the “local cash price”. Regions with a larger share of cattle sold via negotiated purchases relative to negotiated grid purchases are less likely to be affected by what constitutes negotiated cash purchases.

Mechanism of Required Minimum Trade

The mechanism for regional minimums has changed considerably across bills and through time. Earlier bills defined it as the number of cattle and the percentage of cattle. Later bills required the number of cattle, the percentage of cattle, and the number of transactions. The most recently introduced version of the bills and the current industry format focus on the percentage of cattle required to be bought/sold as negotiated cash. Using the percentage of cattle allows for regional minimums to be flexible to industry trends and beef cow herd dynamics. Eliminating required transaction numbers allows packers flexibility to make large purchase orders from a small subset of producers rather than engaging with a larger number of producers.

How Frequently Minimums Need to be Met

All bills and industry proposals set regional minimums using weekly data. Setting regional minimums using weekly data allows for more variation in the data making regionals more reflective of market conditions. Using more aggregate data, such as yearly or multi-year data, removes short-term dynamics and focuses more on long-term trends. The bills specify regional minimums must be met each week while the industry proposal specifies minimums must be met in 75% of weeks within a quarter. Requiring regional minimums to be met weekly is perhaps the most restrictive version of the bills increasing the likelihood that meat processing plants will fail minimums. Providing flexibility to

meet monthly, quarterly, or yearly minimum requirements allow them to balance the flow and availability of cattle in addition to existing contractual arrangements.

Who is Required to Make Minimum Purchases

All proposed bills require the meat processing plant to meet the regional minimum purchases. The industry proposal requires both feedlots and processing plants work together to meet regional minimum purchases. The definition of which meat processing plants/packers are required to meet these minimums change between bills differing slightly from the definition of a packer required to report under Mandatory Price Reporting (MPR). Under MPR, a processing plant is defined as any entity buying cattle for the purpose of processing cattle into meat to be sold and harvesting an average of 125,000 head of cattle per year during the previous five years. Processing plants at these levels, through either new construction or an expansion of capacity, and are expected to remain at these levels for the next five years are also required, under MPR, to report purchases. The key difference is that proposed bills make exceptions for companies owning no more than one plant whereas including all packers covered by MPR requires all plants make negotiated cash purchases regardless of the number of plants owned.

Duration of Minimums

Earlier bills do not define how long regional minimums be in place before being adjusted. Later bills provided a consensus that regional minimums would be in place for no more than 24 months. None of the bills define a minimum number of months that regional minimums be in place. Given most current bills require a public comment period before adjustments can be made to regional minimums, it is unlikely these regional minimums would change frequently. As the length of time a regional minimum is in place increases, it could provide a long-term trend to which the industry would likely adjust. This could be both positive and negative depending on how well the levels are set to align with historical and future price variation. If regional minimums are set in periods of low (high) price variation, then the duration of these minimums should be smaller (larger) relative to periods of average price variation. If regional minimums are set in periods of low (high) price variation, then in the future, the number or percentage of cattle sold well under (over) represents the number of cattle required to ensure robust price discovery. Under average price variation, this over and under-representation averages out over time.

Initial Regional Minimum Requirement

Earlier bills proposed regional minimums be established but did not define how regional minimums be set. The most recent bills defined the minimum for all regions to be set at the lowest 18-month average of negotiated purchases that occurred across all regions. All regions would be required to meet this minimum for the defined duration. However, no region would be required to sell more than three times this amount. Thus, there are weeks a region could a) meet/set the minimum, b) be within the minimum and maximum, or c) be at or above the maximum requirement. This could have dual effects of increasing the amount of negotiated cash purchases in regions setting the minimums while creating disincentives for cattle to be sold as negotiated purchases in regions that are consistently above the regional minimum.

The industry proposed plan has a different approach requiring regions to meet 75% of a calculated robust minimum trade requirement in 75% of the weeks within a quarter. These calculated regionally robust trade requirements are defined using assumptions about the historical price variation, a proposed degree of certainty, and how close the industry wants to be to the hypothetical competitive price. For example, the industry may want to be 90% confident that the reported/observed price is within \$0.50 per cwt. of the competitive price. The observed price approaches the hypothetical competitive price as more cattle are sold in the negotiated cash market. If the industry wants to be either more confident of a given price range or wants to be within a smaller price range, then more cattle need to be sold in the negotiated cash market. Further, when there are periods of more price volatility in the local cash market then more cattle are required to be sold in the cash market. All these parameters are choices the industry or entity setting regional minimums must make to calculate a robust level of trade.

Missing/Non-reporting weeks

None of the bills define provisions on how regions would be evaluated for non-reporting weeks due to a lack of confidentiality. There is a significant difference between weeks where no cattle were transacted and thus not reported, versus weeks where cattle were transacted but could not be reported due to USDA-AMS confidentiality requirements. No cattle traded in a region would only occur under the rare circumstance where all plants within a region are shut down.

Defined USDA-AMS confidentiality guidelines do not allow data to be reported if there less than three companies reporting and each reporting company does not constitute more than 75% of the reported quantity. The confidentiality requirement instills confidence in producers/processors that the data reported, and thus business strategy/pricing, will be safeguarded. The default when calculating minimums assumes that if data is not reported by USDA-AMS, then no cattle were transacted. Whether no cattle were transacted or cattle were transacted but prices and quantities were withheld, there is an equivalent amount of price discovery provided to the market. Including non-reporting weeks as not satisfying regional minimum requirements will reduce compliance across all regions.

Adjustments for Market Shocks

One bill and the industry proposal provide regional minimums could be adjusted for market shocks (i.e., black swan events) but do not define what would be an acceptable market shock; how the adjustment would occur; or for how long the adjustment would remain in effect before reverting to original minimums.

Adjusting regional minimums to account for market shocks assumes that during periods of market disruptions, meat processing plants find it harder to procure cattle via negotiated purchases relative to cattle in formula or forward contracts. There is no published evidence suggesting this occurs. Rather, there is anecdotal evidence suggesting the opposite occurs – during market shocks, less cattle are sold via negotiated purchases relative to formula or forward contracts. This likely arises from the fact that operating contracts have “failure to comply” clauses in formula and forward contracts often with associated penalties. This creates financial incentives for processing plants to honor these

formula or forward contract agreements rather than purchase cattle in the negotiated cash market. Further, periods of market shocks are often accompanied by periods of large price variation/uncertainty as market participants recalibrate to perceived expectations of supply and demand. In these periods, the market generally requires more negotiated cash transactions to arrive at the new competitive price. Thus, by including policy adjustments reducing the number of negotiated cash transactions required during market shocks, it could exacerbate the price discovery challenge exactly during times when price discovery is most needed.

Cost-Benefit Analysis

There is significant uncertainty regarding the unintended costs and benefits regional minimums would impose along with the entire beef complex. Later bills recognize these limitations and create provisions to conduct a cost-benefit analysis no later than two years after establishing regional minimums. How frequently these studies would be conducted after the initial review has not been specified.

Penalties

Later bills specify that processing plants failing to meet regional minimums be subjected to a financial penalty. The maximum civil penalty is set at \$86,156, adjusted for inflation. There is no indication of how this level of civil penalty was derived. Similarly, plant size affects the penalty awarded. For example, a 490 head/day (125,000 head/year) plant harvesting cattle five days a week would equate to 2,450 head/week. Assuming average slaughter weights of 1,300 lbs., this penalty equates to \$35.17 per head ($86,156/2,450 = 35.17$) and \$2.71 per cwt. ($35.17/13 = 2.71$) penalty. For a larger plant harvesting 6,000 head/day (30,000 head/week and 1,530,000 head/year), this equates to \$2.87 per head and \$0.22 per cwt. Thus, unless the penalty is adjusted for plant size, smaller plants receive larger penalties than larger plants. The average plant harvest weights affect the penalty awarded. If plants harvest cattle at lower slaughter weights, then the penalty, on a per cwt. basis would increase. For example, taking the plant that harvests 490 head/day, the penalty would be \$2.71 per cwt. if the live weight plant average was 1300 lbs., \$2.93 per cwt. for 1200 lbs., and \$2.34 per cwt. for 1500 lbs. Thus, plants harvesting heavier carcass weights would be less affected by the civil penalty. The amount plants miss the regional minimum does not affect the penalty awarded. The most restrictive penalty would be a “pass/no-pass” system where, regardless of the amount the regional minimum was missed, the full penalty would be awarded. The most “packer friendly” penalty structure is one where penalties are small for small deviations from the minimum and exponentially increase as the deviations from the minimum become larger. Under the assumption that the objective of the policy is to ensure packers meet minimum negotiated cash purchases, the penalty should be structured so the marginal cost of procuring cattle via negotiated cash is less than the marginal cost of the penalty of missing the regional minimum.

Categorization of Policy Parameters

Three key policy parameters for regional minimums are 1) the type of data used to create regional minimums (daily, weekly, monthly, yearly), 2) the length of time regional minimums are required to be met (weekly, monthly, quarterly, yearly, multi-year), and 3) how regional minimum levels are derived (calculated, historical, ad-hoc). These category levels create 60 ($4 \times 5 \times 3$) unique policy combinations. Current proposed federal and industry policies only consider using weekly data to create minimums. Fifteen policy alternatives are available if using weekly data to create regional minimums. Table 2 shows how current policies align with these potential policy combinations.

Certain policy parameters have a greater impact on a region's ability to pass the minimum levels of required negotiated purchase levels. The suggested impact from these policies is increasing the level of negotiated trade provides more robust price discovery. Only if specified minimums are properly calibrated can mandating regional minimums resolve some industry participants' concerns regarding inadequate price discovery (i.e., market thinness).

- 1) The frequency of the data used to create regional minimums determines how responsive regional minimums should be towards short- and long-term trends. Daily data focuses on short-term trends whereas yearly data focuses on long-term trends. There is more variability in daily data relative to yearly data. Thus, regional minimums using daily data are likely to experience increased variability = potentially leading to more regions failing minimum trade requirements.
- 2) The method by which the levels of robust trade are derived is an important decision on whether negotiated trade will resolve perceived issues of price discovery. Ad-hoc specifications of regional minimums are subjective and could be set either too high (i.e., more cattle traded than necessary to obtain robust price discovery) or too low (i.e., fewer cattle traded than necessary to obtain robust price discovery). Using historical negotiated purchases to determine future negotiated purchase requirements would resolve price discovery issues dependent on the historical timeframe used to set regional minimums. If historical data encompasses a time with robust price discovery, then the resulting regional minimums could provide robust price discovery. However, if the historical data encompasses a time with weak price discovery, then regional minimums would provide poor price discovery.
- 3) The length of time required regional minimums be met determines how reactive regional minimums can be to changing market conditions. The shorter the minimum length the more reactive they are. The longer the length, the less responsive the regional minimums can be to changing market conditions.

How Proposed Regional Minimums Policies Align with Historical Fed Cattle Marketing Practices

This section details how bills introduced in the U.S. Senate and the U.S. House of Representatives, as well as industry proposals, historically align with previous market conditions. In so doing, we *do not* make any normative assessment of whether this historical alignment with proposed policies created a net benefit or cost to a specific region. Rather, this section provides some indication of how much or little an existing USDA-AMS cattle feeding region would need to potentially change historical marketing practices to reach compliance with proposed regional minimum policies.

The initial minimum requirements examined are:

- 1) 30% regional minimum across all regions (H.R. 8489)
- 2) 50% regional minimum across all regions (H.R. 8489)
- 3) Minimum trade set by the lowest region 18 months rolling average and maximum trade set by no more than 300x minimum trade (S.B. 3229, H.R.5992)
- 4) A regional minimum set by 75% of an estimated level of the robust level of trade that is required to be met in 75% of the weeks in a quarter (NCBA 75% Plan)

Regional Minimum Assumptions

The following are assumptions made in analyzing the proposed policies:

Mechanism of Required Minimum Trade

Initial minimum requirements in plans (1)-(2) state purchases should be a percentage of total trade within a region remaining constant through time. Plan (3) also specifies a percentage of total trade by region but allows for regional minimums to be (re)set every 24 months. Plan (4) assumes a per head robust level of trade per region which remains constant through time. Other bills have proposed using the number of cattle and number of transactions. A percent of total trade is calculated as $[\text{negotiated} + \text{negotiated grid}] / [\text{negotiated} + \text{negotiated grid} + \text{formula} + \text{forward contract}] \times 100$.

Data

Weekly data is taken from USDA-AMS from 2013 to 2020. All plans require the use of weekly data rather than more flexible monthly or yearly minimums. Cattle are aggregated across cattle quality grades (i.e., Over 80% Choice, 65-80% Choice, 35-65% Choice, and 0-35% Choice), selling basis (Live and Dressed), and mode of transportation (FOB and Delivered). We restrict it to only include lots classified as “Steer only”, “Heifer only”, and “Mixed Steer/Heifer”. This represents most cattle harvested in the U.S. This excludes dairy bred steer/heifer lots and mixed steer/heifer/cow lots of cattle that tend to be priced and graded differently than fed cattle.

Defining Negotiated Cash Sales

We follow all policies stating cattle transactions that count towards regional minimum requirements can include cattle sold via negotiated purchase or negotiated grid purchase (i.e., negotiated cash = $[\text{negotiated purchase} + \text{negotiated grid}]$).

Frequency

Policies (1)-(3) assume regional minimums must be met weekly. Policy (4) uses weekly data but allows for minimums to be met 75% of weeks within a quarter.

Periods of Review

We analyze all proposed policies assuming they are under a “continuous review”. This is slightly different than what has been proposed in the third bill which states regional minimums are set and then in place for no more than 24 months. In this case, we provide results to both specifications.

Marketing Regions

All policies are analyzed using the five marketing regions as reported by the USDA-AMS: CO, IA-MN, (KS, NE, and TX-OK-NM. In addition to these five locations, we analyze a sixth region, Nebraska-Colorado (NE-CO), proposed under NCBA’s 75% rule.

Adjustment for Market Shocks

We do not make any attempt to show how regional minimum plans would perform given unforeseen market shocks (i.e., pandemic, animal disease outbreak, etc.).

Penalties for Non-compliance

Policy (3) is the only policy studied specifying a penalty associated with non-compliance. We do not specifically quantify how much each region would theoretically pay in penalties for several reasons. First, while an aggregate measure of non-compliance by region could be calculated (i.e., total penalty = [weeks non-complying × penalty]), these penalties are likely to be accrued back to meat processors. This would require an assumption on the share of production within a week for the top 50 meat processors by region and each company within that region was equally (non)compliant. Second, penalties incentivize compliant behavior making any estimate an “upper bound” on penalties accrued by region. Thus, this analysis is more about how often the proposed targets are or are not met and not a study of how markets or strategic buying behavior would change under penalty requirements.

The following is the performance of each proposed initial regional minimum.

30% regional minimum across all regions (H.R. 8489)

Performance

The following percentage of weeks would have met the minimum requirement in each region assuming a 30% regional minimum requirement across all regions that stays the same over time: 1% CO, 97% IA-MN, 5% KS, 92% NE, 0% TX-OK-NM, and 87% in NE-CO.

50% regional minimum across all regions (H.R. 8489)

Performance

The following percentage of weeks would have met the minimum requirement in each region assuming a 50% regional minimum requirement across all regions staying the

same over time: 0% CO, 83% IA-MN, 0.5% KS, 14% NE, 0% TX-OK-NM, and 28% in NE-CO. Figure 1 shows how the actual trade and regional minimum compares.

Sensitivity Analysis

Table 3 and Figure 2 show the percentage of weeks within each region meeting a given fixed percentage of trade required to be met across all regions. Combined, this suggests even at extremely low levels of required negotiated trade (i.e., <10%), no region would pass 100% of the weeks. This is from non-reporting weeks within regions not meeting the USDA-AMS confidentiality requirement.

Minimum trade set by the lowest region 18 months rolling average and maximum trade set by no more than 300x minimum trade (S.B. 3229, H.R.5992)

Performance

Table 4 shows the percentage of weeks each region would fail to meet the minimum under the current proposal. Approximately 32% of weeks would fail in CO, 0% in IA-MN, 4% in KS, 0% in NE, 32% in TX-OK-NM, and 0% in NE-CO. Averages across time can mask some of the dynamics occurring through time. Figure 3 shows the percentage of weeks violated by region assuming an 18-month rolling average is used to set regional minimum levels. There is significant variation through time, particularly in the TX-OK-NM region. Using different rolling averages yields similar results. Figure 4 shows that under any specification, regional minimums are set by negotiated purchases occurring in CO or TX-OK-NM.

Sensitivity Analysis

Table 4 also shows how the specification of the number of weeks to include in the historical average and the number of weeks the regional minimum is valid for impacts the percentage of weeks that violate by region. On average, holding the number of weeks constant for which the regional minimums are valid, increases the number of weeks included in the historical average decreases the number of violations. For example, in CO assuming regional minimums are valid for 26 weeks. Going from a 52-week historical average to a 156-week historical average decreases the number of violations from 36% to 31%. Similar results hold across other regions. Holding the number of weeks included in the historical average constant and adjusting the number of weeks for which regional minimums are valid creates more conflicting results. On average, increasing the number of weeks for which regional minimums are valid does decrease the number of violations at levels less than 24 months. At levels greater than 24 months, more violations begin occurring. Figure 4 shows this dynamic across a greater number of weeks for which regional minimums are valid. For most regions, there is a significant amount of movement in this policy parameter.

The regional minimum is set by 75% of the robust level of trade and is required to be met in 75% of the weeks in a quarter (NCBA 75% Plan)

Performance

Table 4 shows the percent of quarters containing 75% or more weeks passing 75% of the estimated robust level of trade for the region: 44% of quarters fail in CO, 0% in IA-MN, 19% in KS, 0% in NE, 39% in TX-OK-NM, and 0% in NE-CO. Figure 5 shows the

sequential percentage of violating quarters over the 2013-2021 period (i.e., 36 quarters). Tables 5 and 6 displays the results of the policy slightly differently. Rather than requiring a certain percent of weeks to pass within a quarter, this displays how many weeks, on average, passed percent levels of robust trade. No one region always meets estimated levels of robust trade. However, on average, not restricting a certain percentage of weeks to pass within each quarter increases the number of regions passing robust minimum levels.

Sensitivity Analysis

Table 7 shows the most flexible version of NCBA's policy. It shows different combinations of robust trade and the percent of weeks within a quarter by region required to pass estimated robust trade levels. Violations increase as the percent of weeks required to meet regional minimums within a quarter increases. Between these two policy parameters, the percent of robust trade required to be met each week is more important as it creates more violations with a 1% increase relative to a 1% increase in the percent of weeks.

Getting to a Robust Trade Number

The previous analyses suggest some justification for making regional minimums different across regions and that these minimums be flexible through time. The objective of requiring a minimum amount of negotiated purchases is to provide enough trade and eliminate concerns about price discovery (i.e., market thinness). If not previously aligned, this increased amount of trade could allow the competitive price and the observed price to align more closely.

The topic of creating sufficient trade to ensure adequate price discovery is not new. For the better part of four decades, numerous published studies attempt to clarify how one defines, studies, and quantifies thin markets. Several theoretical and empirical frameworks have been developed estimating how different solutions could remedy market thinness and ensuing negative impacts. One often-used technique is estimating the additional quantity needing to be priced to align with the competitive price and the with the observed price subject to several assumptions. These include how close the industry wants these two prices to be (i.e., within a \$/cwt. Range), and how accurate they want the estimates of this range to be (e.g., 90% confidence interval). This method, known as Chebyshev Inequality, has been used to estimate a robust level of trade in fed cattle and finished hogs markets (Tomek, 1980; Ward and Choi, 1998; Franken and Parcell 2012; Koontz 2015; Brookover, 2020).

Using the Chebyshev Inequality method to derive a “robust level of trade” can be done but relies on a key assumption about how one specifies historical price variation (i.e., volatility). More price variation requires more cattle to be traded. There are three primary ways historical price variation has been specified: 1) within-year variation of weighted average price, 2) first difference between regions, and 3) rolling variance. This section builds and partially replicates the work done in Koontz (2015) and Brookover (2020) on estimating a robust level of trade for major USDA-AMS reporting cattle feeding regions. For each USDA-AMS cattle feeding region r , we estimate the number of head n with a probability P that the observed price X_n does not deviate from the competitive price μ for a given level of accuracy $\pm c$. This can be written as:

$$P(-c \leq X_n - \mu \leq c) \geq 1 - \frac{\sigma^2}{n \times c^2}$$

where σ^2 is the assumed variance of weighted average prices. Thus, the total number of head required is calculated as:

$$n = \frac{\sigma^2}{(1 - P) \times c^2}$$

This has several important key insights. First, if the industry wants to have greater confidence (i.e., $\uparrow P$) or have the competitive and observed price be in better alignment (i.e., $\downarrow c$) or there is a significant amount of price variation (i.e., $\uparrow \sigma^2$), then the number of head required to be traded in each region r will increase. Using these observations, we report the historically estimated robust level of trade in each USDA-AMS cattle feeding region r .

One simplifying assumption is made. We combine dressed and live prices by converting dressed prices to live weight prices assuming a 63% dressing percentage. A weighted average price of live and dressed purchases is calculated using the number of head traded in each of these sub-segments each week. Thus, we create one reported price per region per week. While this may mask some of the differences between live and dressed purchases, and potentially between

delivered and FOB, it greatly simplifies the reporting of robust trade levels by region. This assumption has been used in other studies for similar reasons (see Coffey, Tonsor, and Schroeder (2018) using combined live and dressed prices for estimations of basis).

Within-year Variation of Weighted Average Price

Table 8 shows the number of transactions that need to occur by region to ensure robust price discovery given assumed levels of probability (P) and pricing accuracy (c). As the level of c becomes smaller, the greater the number of head required to be traded. Likewise, as P becomes larger, the greater the number of head required to be traded. Within cattle feeding regions, the number of cattle traded varies considerably. This variation is driven by the underlying volatility in the weighted average price. For example, 2015 had volatile prices relative to other years. Consequently, given the same levels of c and P , significantly more cattle were required to be traded to ensure adequate price discovery. The number of cattle traded by region also varies considerably. Counter to popular belief, the historical amount of trade within a region does not necessarily imply more trade will be required. Rather, it is the amount of variation in price that determines the amount of required trade. For example, in 2014 at $P = 75\%$ and $c = \$0.25$ cwt. CO traded 2,524 head and IA-MN traded 19,551 head on average each week. The required amount of trade to ensure adequate price discovery in each region was 5,437 in CO and 4,446 in IA-MN. Thus, while IA-MN traded nearly 10x the amount of CO, the required amount of trade was lower. This required amount of trade depends on price volatility driven primarily by local supply and demand dynamics and the underlying quality of cattle entering the negotiated cash and formula market.

Rolling Variation of Weighted Average Price

Like the within-year variation of weighted average price, levels of c and P need to be considered within each region. In addition, consideration needs to be given to the length of the rolling window. For simplicity in presentation, Figure 6 shows how the actual number of transactions and the estimated number of transactions compared by region and length of the rolling average given $P = 90\%$ and $c = \$1.50$ cwt. The longer the rolling average used, the more trade is required by region and that trade needs to be sustained for a longer period. Figure 7 verifies previous conclusions about the levels of c and P still hold using data from Nebraska and a 78-week rolling average. The benefit of the rolling average compared to the within-year variation estimation of required levels of trade is it provides a continuous weekly update on required levels of trade. If concerns are to provide each region enough trade during volatile pricing to ensure price signals are properly communicated along the supply chain, then using a shorter rolling average combined with a low level of c and a high level of P would be required.

Alternative Specifications of Regional Minimums

This section explores different ways regional minimums could be specified *if* regional minimums continue as a policy priority. By specifying alternatives, we make no claim about the cost and benefit of these alternative specifications but rather how they could *potentially* increase the number of weeks each region meets minimum trade requirements while simultaneously providing adequate and time appropriate price discovery. The tradeoff is between requiring sufficient trade so that price discovery is adequate while still allowing producers to market cattle in a manner they believe is profit maximizing. These alternatives try to incorporate what industry participants have voiced over the last year about equitable price discovery across regions and concerns about regional minimums affecting cattle quality. There are at least four alternatives in how regional minimums could be specified. All assume the same data used in previous sections.

Share of Negotiated Trade Equal to the Percent of Total Trade

Regional Minimum Specification

Central to some industry participants' concerns is that all regions should "bear their own share" of price discovery. Using this claim, an alternative way to specify regional minimums would be to require regional minimums to reflect each region's share of total trade in the market. This specification assumes price discovery in each region is proportional to the trade a region transacts in the market – something not empirically verified. Using this specification, each USDA-AMS region r would need to meet regional minimum trade calculated as:

$$Minimum_{rt} = \frac{Total\ Trade_r}{\sum_{l=1}^R Total\ Trade_r}$$

This specification implies the share of price discovery is directly proportional to the share of total trade in that region in each week t . It also assumes minimums must be met on a weekly basis. To allow for variation in negotiated purchases over time, an 18-month rolling window is used.

Performance

Table 9 shows the number of weeks each region passes the regional minimum requirements. Using this method, in CO 5% of all weeks would be above the regional minimum, 98% in IA-MN, 6% in KS, 99% in NE, 0% in TX-OK-NM, and 93% in NE-CO.

Sensitivity Analysis

Figure 8 and Table 10 shows how different specifications of the rolling average would impact the number of weeks above regional minimums. The number of months included in the rolling average has very little impact on the percentage of weeks above the minimum by region. Further, given the significant difference between historical trade and the estimated share of total trade by region, the length of time regional minimums would be in effect before they could be modified would have little impact on the number of weeks above the regional minimum by region.

Flexible S.B. 3229, H.R.5992

Regional Minimum Specification

A key assumption in S.B. 3229 and H.R.5992 is the length of time the regional minimums would be in effect. An alternative would be to remove this requirement and allow regional minimums to be met weekly. This specification would modify existing policies..

Performance

This regional minimum specification does not lend itself to quantifying (non)compliant weeks within regions. Rather, it provides a comparison for how often a region sets the minimum requirement (and thus sets the maximum trade requirement); is between the minimum and maximum; and is at or above the maximum requirement. The TX-OK-NM region sets the minimum trade requirements approximately 62% of the weeks and the CO region sets it 38% of the weeks. No other regions set minimum requirements. The number of weeks each region traded more cattle via negotiated trade than was required is 0% in CO, 100% in IA-MN, 22% in KS, 100% in NE, 1% in TX-OK-NM, and 99% in NE-CO. In all other weeks, negotiated trade by region was larger than the minimum and less than the maximum.

Sensitivity Analysis

Two factors are critical to this policy 1) the number of previous weeks to include in formulating minimum trade requirements and 2) the ceiling multiplier. Table 10 shows how compliance changes given different assumptions about the upper ceiling multiplier and the number of rolling weeks required to set the minimum. As the number of weeks included in the rolling average to set the minimum floor changes, the percent of time each region sets the floor changes. IA-MN, KS, and NE continue to have zero impact on the minimum. However, as the rolling average increases, the share of CO decreases and the share of TX-OK-NM increases. The ceiling multiplier does not affect the percent of time each region sets the minimum. Rather, it impacts the percent of weeks a region is above the maximum or in between the minimum and maximum. As the ceiling is increased, a larger number of weeks are above the minimum but below the maximum. Figure 9 shows the minimum, maximum, and range between these values by region and number of weeks included in the rolling average.

Rolling Average of Robust Trade Levels

Regional Minimum Specification

The objective of regional minimums is to allow for adequate price discovery to occur within each region. This implies, at certain times of the year, more cattle need to be traded to have sufficient price discovery. As described in a previous section, estimated robust levels of trade can be calculated given assumptions on the desired levels of accuracy in pricing. This third method is a combination of S.B. 3229, H.R.5992 and NCBA's 75% rule with the levels of negotiated trade set by a rolling variance of robust trade given $P = 90\%$, $c = \$1.00 \text{ cwt.}$, and a 78-week rolling average.

Performance

Using these levels of P , c , and rolling average the percent of weeks that would pass in each region is <1% in CO, 28% in IA-MN, 10% in KS, 43% in NE, and 0% in TX-OK-NM.

Sensitivity Analysis

Table 11 shows how the number of weeks above the regional minimum changes given different specifications of p , c , and rolling averages. As previously discussed in the Estimating a Robust Level of Trade section, as the level of P gets larger, the level of c gets smaller, the length of rolling average increases, and the estimated number of head required to be traded increases. This implies the number of weeks passing across different regions decreases. Figure 10 shows how the most flexible version of this regional minimum specification and the percent of weeks within each region would be above the minimum. It confirms that regardless of the specification P and c that CO and TX-OK-NM will never have 100% of the weeks be above the regional minimum. For other regions, at some level of P , c , and length of rolling average, all weeks within a region would be above the regional minimums.

Robust Minimum Trade and Cattle Quality Minimum

Regional Minimum Specification

A common concern among opponents of regional minimums is it hurts overall cattle quality going through the beef complex. This regional minimum would specify both a percent of total cattle and an (estimated) quality grade to trade. By requiring a certain percentage of cattle entering the cash market to be at an (estimated) level of quality grade, it *partially* resolves some industry participants' concerns.

Table 12 shows the percentage of cattle grading 80% Choice or higher of total cattle traded by selling basis, marketing method, and region. This leads to several observations. First, within a region and marketing method, there are very few differences between cattle sold as live vs. dressed. Second, within a region, but across marketing methods, there are some differences between cattle quality. For example, CO and IA-MN have higher cattle quality in negotiated purchases relative to the formula. In KS and TX-OK-NM, negotiated cash has lower cattle quality than formula. In NE, there is no difference the cattle quality between negotiated cash and formula. Third, within the marketing method but across regions there are significant differences in cattle quality. CO and IA-MN have the highest level of cattle quality in negotiated purchases and TX-OK-NM has the lowest. There is a similar cattle quality type for formula purchases across regions except for TK-OK-NM which has a lower percentage of cattle classified as 80% Choice or higher.

One concern is if regional minimums were implemented it would change the underlying composition of cattle quality entering through these different marketing channels. If cattle quality entering the negotiated cash market is lower than historically observed, it would reduce the negotiated cash price. Thus, this alternative ensure both the level of trade and cattle quality is robust.

Conditional Regional Minimum Requirement

Regional Minimum Specification

A concern with any government intervention is if markets truly operate competitively, it creates market inefficiencies. In the context of regional minimums, this could be seen by requiring too many cattle to be traded in the negotiated cash market when there is already adequate price discovery. When there is not adequate price discovery and adequate price discovery is causing market inefficiencies, there could be a role for the government to require more trade to enter the cash market to achieve robust price discovery and correct these inefficiencies. This process ensures minimal government intervention while providing adequate price discovery in all regions. Thus, this specification would require regional minimums, but would only be enforceable if price discovery levels fell below robust trade levels.

For this policy to effectively resolve price discovery issues, it needs to state an estimated robust level of price discovery which could be done using the rolling variance method demonstrated in the Estimating a Robust Level of Trade section. This would allow regional minimums to be switched on and off within a region while providing a minimal disruption in cattle trading. This specification of regional minimums is like the Chicago Mercantile Exchange (CME) trading limits. The CME has a normal allowable trading range to ensure the market does not move one direction too quickly. When the trading limit is hit, the market closes for the day. In periods of high price volatility (i.e., during the JBS Ransomware incident in 2021), expanded trading limits allow market participants to price in these market shocks. Once the incident is resolved, trading limits are generally re-set to their pre-shock levels.

Policy Alternatives to Regional Minimums

The following is a list of policy alternatives to regional minimums policymakers could pursue as a first step before pursuing regional minimums where effects have not been adequately quantified. However, these proposed policy alternatives have more to do with improving price transparency which we propose also have beneficial implications for price discovery.

Separate formula sales into formulas with and without quality premiums

Currently, formula transactions are classified by USDA as “the advance commitment of cattle for slaughter by any means other than through a negotiated purchase or a forward contract, using a method for calculating price in which the price is determined at a future date”. A recent USDA-AMS sub-report comprising data from 2021, showed approximately 70% of cattle sold on a formula contract had a premium-discount schedule based on cattle quality associated with them. Advocates of regional minimums point to the approximately 30% of cattle sold on formula without a premium-discount schedule as cattle that should be sold in the negotiated cash market but are instead sold in the formula market. If USDA were to separate cattle sold as formula, either as a separate category or as a subcategory of formula contracts, then additional price information could occur. This could be implemented at minimal cost to USDA-AMS since data is collected as part of MPR.

Provide more information about the type of cattle reported under MPR

In August 2021, USDA-AMS released three reports specifying base price and price distribution for formula contracts. Reviewing base prices and price distributions over the last five months reveals significant variation in the base price for formula contracts, more so than should be observed (e.g., in some cases it is well over \$50 per cwt). What this likely indicates is additional information not being reported causing prices to change (i.e., cattle credence attributes). Without additional information, reported base prices are less useful to producers. One way for reports to be more useful for producers and businesses would be to provide additional information about these characteristics. The difficulty in providing additional information improving decision-making needs to be balanced with providing too much information either compromising USDA confidentiality agreements or confusing industry participants. What information and how this should be presented should be studied before releasing additional information for existing reports.

Report base price by region under new USDA-AMS reports

While the new reports released by USDA-AMS in August 2021 substantially improved cattle market transparency, reports can be improved by providing regional breakdowns in formula base prices. For advocates of regional minimums concerned with the appropriate use of base prices, these reports fell short of accomplishing complete formula pricing transparency as the real interest lies in whether base prices significantly differ across regions for formula contracts. Adding regional base prices would be a minimal additional cost to USDA AMS since the data is gathered and aggregated into a national report from regional numbers.

Percent of cattle sold under each contract in the cattle contract library

The cattle contract library, recently passed in the U.S. House of Representatives, appears to address many of the concerns posed in the industry regarding cattle transparency, namely the types of contracts being used and the specifications and head committed in those contracts. The cattle contract library should provide greater transparency in the market regarding how cattle are priced if the information is separated by region and the federal government provides funding for educational efforts allowing industry representatives to convey market information. However, the cattle contract library does not resolve concerns advocates for regional minimums have about thinning cash markets and their effects on accurate price discovery. We believe the cattle contract library is an appropriate first step forward.

Conclusions

Anytime the government intervenes in a competitive market there is potential for indirect costs to be incurred by market participants. Economists commonly refer to these as “deadweight loss” or “inefficiencies”. This of course rests on the assumption that the market is functioning competitively. Whether regional minimums would create this deadweight loss or would resolve a market failure of robust trade was not the objective of this report. This report showed how the proposed policies differ; showed how these policies aligned with historical market behavior; provided alternative specifications to regional minimums; and suggested policy alternatives to regional minimums.

The policy goal of increasing price discovery generally focuses on increasing the level of negotiated purchases in each region. If price discovery is an issue, then there are few ways to improve it other than increasing the number of animals traded. Assuming price discovery was sufficient, there still would remain concerns about what is influencing the variation in weighted average price. This is the role of improved price transparency. The objective of those policies should be to better inform market participants; reduce uncertainty and risk; and improve management decisions throughout the supply chain by addressing what price signals are and are not communicating. AMAs provide this information to market participants allowing for better coordinated marketing activities between cattle feeders and processors to reduce uncertainty and risk. This information is primarily in the form of premiums and discounts for cattle quality and other credence attributes. Tradeoffs of more robust market information *with* relevant price information vs. more efficient marketing arrangements imply benefits and costs from either approach. Any benefits or costs are allocated up and down the supply chain, affecting cattle market prices and quantities supplied, wholesale beef prices, retail meat prices and quantities demanded, price margins, international trade competitiveness, and demand for other proteins.

If more negotiated trade is required at the expense of fewer AMAs, there may be more cash market activity. This does not necessarily imply prices received by producers will be greater than what is currently observed. For this to occur there would need to be price downward skewness in the distribution of market prices which, with more trade, would approximate a normal distribution. Regardless of if prices are higher because of increased negotiated purchases, there may be more confidence the reported price reflects the hypothetical competitive price but not necessarily any expectation that market prices would be different from current levels.

Forcing more negotiated trade within 14 days of harvest and less forward contracting or AMAs would require both producers and processors to manage more price risk via futures and options, or federal livestock price insurance products like Livestock Risk Protection (LRP) administered by the USDA-Risk Management Agency (USDA-RMA). These all relate to managing the output price of cattle and do not affect feeding margins or input costs. The industry has made considerable progress in attempting to align beef production with consumer preferences for specific beef attributes, be they quality or credence attributes. If regional minimums were implemented, it would be important to preserve this progress which is partially implemented and coordinated through AMAs.

These considerations are mentioned to identify important conceptual issues and questions for further discussion. Other studies or commentaries have examined some of these issues and additional studies are likely to further expand and clarify previous and future concerns.

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Supporting Tables

Table 1. Regional Minimums Proposals in Introduced Legislation

Bill	S. 4647	H.R.8557	S.543	H.R.3766	S.3229	H.R.5992
<i>Date Introduced</i>	9/22/2020	10/9/2020	3/2/2021	6/8/2021	11/17/2021	11/17/2021
<i>Quantity of Cattle</i>	Yes	Yes	Yes	Yes	No	No
<i>Percentage of Cattle</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Number of Transactions</i>	No	No	Yes	Yes	No	No
<i>Frequency</i>	Week	Week	Week	Week	Week	Week
<i>A packer or company</i>	Packer	Packer	Packer	Packer	Packer	Packer
<i>Purchase Type Required</i>	negotiated OR negotiated grid purchases	negotiated OR negotiated grid purchases	negotiated OR negotiated grid purchases	negotiated OR negotiated grid purchases	negotiated OR negotiated grid purchases ¹	negotiated OR negotiated grid purchases ¹
<i>Adjustment for Market Shocks</i>	No	No	No	Yes	No	No
<i>Duration</i>	Not specified	Not specified	<= 24 months	<= 24 months	<= 24 months	<= 24 months
<i>Who Sets Minimums</i>	The Secretary	The Secretary	The Secretary, in consultation with the Chief Economist	The Secretary, in consultation with the Chief Economist	The Secretary, in consultation with the Chief Economist	The Secretary, in consultation with the Chief Economist
<i>Reporting Regions</i>	As designated by the USDA-Agricultural Marketing Service	As designated by the USDA-Agricultural Marketing Service	As designated by the USDA-Agricultural Marketing Service	As designated by the USDA-Agricultural Marketing Service	As designated by the USDA-Agricultural Marketing Service	As designated by the USDA-Agricultural Marketing Service
<i>Initial Requirement</i>	Not specified	Not specified	>= purchases in that region from the 3 previous calendar years.	Not specified	>= purchases in that region from the preceding 18 months AND no initial regional mandatory minimum established for a reporting region shall exceed 300 percent of the lowest initial regional mandatory minimum ²	>= purchases in that region from the preceding 18 months AND no initial regional mandatory minimum established for a reporting region shall exceed 300 percent of the lowest initial regional mandatory minimum ²

Note: ¹ This provides stricter language regarding where the purchases should take place. It states that the purchases for the mandatory minimum should occur in “the region in which the packer processing plant is located”. This would seem to imply that plants must purchase all the required negotiated cattle in the state in which they are located and by converse imply that a plant must be in the state where it purchases the cattle; ² This contains undefined qualifying information about what regions will be included in setting the minimum standard. It states that for a region to be included it must have “publicly reported a majority of weekly market information during the previous 18 months”. The phrase “majority of weeks” is not defined and whether this region would still be required to meet the minimums in future quarters.

Table 2. Categorization of Policy Alternatives Using Weekly Data to Create Regional Minimum Levels

Policy Alternative	Data Frequency Used to Create Minimums	How Robust Levels of Negotiated Purchases are Derived	Length Minimums in Effect	Current Policy Matching These Specifications
1	Weekly	Ad-hoc	Weekly	
2	Weekly	Ad-hoc	Monthly	
3	Weekly	Ad-hoc	Quarterly	
4	Weekly	Ad-hoc	Yearly	
5	Weekly	Ad-hoc	Multi-year	H.R. 8489 ^a
6	Weekly	Historical	Weekly	
7	Weekly	Historical	Monthly	
8	Weekly	Historical	Quarterly	
9	Weekly	Historical	Yearly	
10	Weekly	Historical	Multi-year	S.B. 3229, H.R.5992
11	Weekly	Calculated	Weekly	
12	Weekly	Calculated	Monthly	
13	Weekly	Calculated	Quarterly	NCBA 75% Plan
14	Weekly	Calculated	Yearly	
15	Weekly	Calculated	Multi-year	

Notes: ^a This bill does not specify how long the regional minimums are in effect before they can be changed. In absence of this, we assume that the regional minimums are put in place in perpetuity which we categorize as multi-year.

Table 3. Percent of Total Weeks Above Different Minimum Thresholds by Region, 2013-2021.

Minimum Negotiated Trade (Cash + Grid) in the Region	Percent of Weeks Meeting Minimum Negotiated Trade In:					
	CO	IA-MN	KS	NE	TX-OK-NM	NE-CO
0	97.22	99.36	99.36	99.36	99.36	99.36
10	48.39	99.36	87.37	99.36	48.61	99.36
20	7.71	98.50	42.18	98.93	1.93	98.29
30	1.07	97.22	5.14	92.08	0.00	87.15
40	0.00	95.50	0.86	57.60	0.00	62.74
50	0.00	83.30	0.43	14.13	0.00	28.48
60	0.00	50.54	0.43	0.64	0.00	9.42
70	0.00	13.49	0.21	0.00	0.00	2.36
80	0.00	0.21	0.00	0.00	0.00	0.21
90	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00

Data source: USDA-AMS (2021), authors calculations

Note: Graying is the minimum threshold under H.R. 8489.

Table 4. Percent of Weeks Within Region Failing to Meet Minimum by Number of Weeks Included in Historical Average and Number of Weeks Minimum is Valid for, 2013-2021

Weeks Included in Historical Average	Number of Weeks Regional Minimums Valid For:	Percent of Weeks Within Region Failing to Meet Minimum:					
		CO	IA-MN	KS	NE	TX-OK-NM	NE-CO
52	26	36.17	0.00	7.92	0.00	54.60	0.00
52	52	40.72	0.00	9.63	0.00	56.83	0.00
52	104	36.11	0.00	6.07	0.00	41.03	0.00
52	156	32.46	0.00	4.08	0.00	32.59	0.00
78	26	40.31	0.00	9.14	0.00	55.87	0.00
78	52	35.08	0.00	8.37	0.00	49.61	0.00
78	104	31.49	0.00	4.31	0.00	31.87	0.00
78	156	32.83	0.00	3.07	0.00	35.40	0.00
104	26	32.58	0.00	7.17	0.00	46.46	0.00
104	52	32.39	0.00	3.54	0.00	31.89	0.00
104	104	30.64	0.00	2.47	0.00	26.10	0.00
104	156	37.99	0.00	2.74	0.00	32.96	0.00
156	26	31.32	0.00	7.85	0.00	49.76	0.00
156	52	30.9	0.00	3.81	0.00	33.63	0.00
156	104	28.04	0.00	2.56	0.00	26.51	0.00
156	156	34.86	0.00	2.79	0.00	33.88	0.00

Note: Dark grayed area are the parameters specified in S.B. 3229, H.R.5992

Table 5. Percent of Quarters That Have 75% or More Weeks Passing Levels of Robust Trade, 2013-2021.

Percent of Estimated Robust Trade (%)	Percent of Quarters:					
	CO	IA-MN	KS	NE	TX-OK-NM	NE-CO
25	13.89	0.00	0.00	0.00	5.56	0.00
50	25.00	0.00	5.56	0.00	13.89	0.00
75	44.44	0.00	19.44	0.00	38.89	0.00
90	63.89	0.00	25.00	0.00	58.33	2.78
100	80.56	0.00	47.22	2.78	77.78	8.33
110	80.56	0.00	63.89	5.56	83.33	19.44
125	83.33	0.00	86.11	36.11	88.89	55.56
150	88.89	2.78	94.44	69.44	97.22	83.33

Note: The estimated number of head of robust trade at the 100% level is 5,000 for CO, 16,000 for IA-MN, 21,000 for KS, 31,000 for NE, 13,000 for TX-OK-NM, and 36,000 for NE-CO (Koontz, 2014). This assumes that the industry is confident that the observed prices will be within \$1 per cwt. of the true price 90% of the time; On average, weekly transactions in CO is 63% of the estimated robust levels, IA-MN is 170%, KS 78%, NE 118%, TX-OK-NM 69%, and NE-CO 110%; The estimated robust levels of trade by region at 100% would be equivalent to a minimum of level of negotiated trade as a percent of total trade of 17% in CO, 37% in IA-MN, 24% in KS, 36% in NE, 15% in TX-OK-NM, and 31% in NE-CO.

Table 6. Percent of Total Weeks Where Observed Trade Was Greater Than Estimated Robust Trade, 2013-2021.

Percent of Estimated Robust Trade (%)	Percent of Weeks:					
	CO	IA-MN	KS	NE	TX-OK-NM	NE-CO
25	75.69	98.51	95.74	99.36	99.36	88.49
50	54.37	97.23	83.80	98.72	98.29	71.43
75	33.90	95.52	61.19	93.18	88.27	41.58
90	23.03	94.03	45.84	80.81	74.41	25.59
100	17.91	90.62	31.77	71.00	62.47	18.34
110	15.35	87.63	22.39	56.93	49.47	11.94
125	11.30	79.96	10.66	39.02	29.64	6.18
150	6.18	65.03	4.26	15.99	9.17	1.71

Note: The estimated number of head of robust trade at the 100% level is 5,000 for CO, 16,000 for IA-MN, 21,000 for KS, 31,000 for NE, 13,000 for TX-OK-NM, and 36,000 for NE-CO (Koontz, 2014). This assumes that the industry is confident that the observed prices will be within \$1 per cwt. of the true price 90% of the time; On average, weekly transactions in CO is 63% of the estimated robust levels, IA-MN is 170%, KS 78%, NE 118%, TX-OK-NM 69%, and NE-CO 110%; The estimated robust levels of trade by region at 100% would be equivalent to a minimum of level of negotiated trade as a percent of total trade of 17% in CO, 37% in IA-MN, 24% in KS, 36% in NE, 15% in TX-OK-NM, and 31% in NE-CO.

Table 7. Percent of Quarters Passing Given Different Levels of Robust and Different Levels of Weeks Required to Meet Regional Minimums, 2013-2021

Percent of Robust Trade ^a	Percent of Weeks ^b	USDA-AMS Cattle Feeding Region					
		CO	IAMN	KS	NE	TXOKNM	NE-CO
25	5	69.44	13.89	36.11	2.78	36.11	2.78
25	25	33.33	-	2.78	-	13.89	-
25	50	16.67	-	-	-	8.33	-
25	75	13.89	-	-	-	5.56	-
25	95	2.78	-	-	-	-	-
25	100	2.78	-	-	-	-	-
50	5	97.22	27.78	66.67	5.56	72.22	11.11
50	25	63.89	-	19.44	-	41.67	-
50	50	38.89	-	13.89	-	19.44	-
50	75	25.00	-	5.56	-	13.89	-
50	95	11.11	-	-	-	8.33	-
50	100	11.11	-	-	-	8.33	-
75	5	97.22	44.44	91.67	61.11	94.44	61.11
75	25	88.89	-	52.78	2.78	83.33	13.89
75	50	75.00	-	30.56	-	61.11	2.78
75 ^c	75	44.44	-	19.44	-	38.89	-
75	95	16.67	-	5.56	-	16.67	-
75	100	16.67	-	5.56	-	16.67	-
90	5	97.22	52.78	97.22	86.11	97.22	91.67
90	25	91.67	-	83.33	27.78	88.89	38.89
90	50	83.33	-	44.44	2.78	83.33	13.89
90	75	63.89	-	25.00	-	58.33	2.78
90	95	33.33	-	11.11	-	33.33	-
90	100	33.33	-	11.11	-	33.33	-
100	5	100.00	66.67	100.00	97.22	100.00	94.44
100	25	97.22	5.56	94.44	52.78	91.67	61.11
100	50	88.89	-	75.00	11.11	86.11	30.56
100	75	80.56	-	47.22	2.78	77.78	8.33
100	95	36.11	-	19.44	-	41.67	-
100	100	36.11	-	19.44	-	41.67	-
110	5	100.00	77.78	100.00	100.00	100.00	100.00
110	25	97.22	13.89	97.22	72.22	97.22	80.56
110	50	88.89	-	91.67	41.67	91.67	52.78
110	75	80.56	-	63.89	5.56	83.33	19.44
110	95	44.44	-	22.22	2.78	47.22	2.78
110	100	44.44	-	22.22	2.78	47.22	2.78
125	5	100.00	94.44	100.00	100.00	100.00	100.00
125	25	97.22	30.56	100.00	88.89	100.00	97.22
125	50	94.44	-	97.22	66.67	97.22	77.78
125	75	83.33	-	86.11	36.11	88.89	55.56
125	95	55.56	-	47.22	2.78	75.00	2.78
125	100	55.56	-	47.22	2.78	75.00	2.78

Note: ^a Percent of the estimated robust trade by region required to be met each week; ^b Minimum percentage of weeks required to meet regional minimums. For example, 5% implies that more than 5% of all weeks within the quarter are required to meet regional robust trade.; ^c Dark gray shading represents NCBA's proposed 75% plan.

Table 8. Within-year Estimated Robust Levels of Negotiated Trade by C and P and Region Conditional on Historical Negotiated Trade and Price Variation, 2013-2021.

Year	Avg. Head	Avg. Transactions (40 hd. per transaction)	Historical Variance	P=75%				P=90%			
				\$0.25/cwt.	\$0.50/cwt.	\$0.75/cwt.	\$1.50/cwt.	\$0.25/cwt.	\$0.50/cwt.	\$0.75/cwt.	\$1.50/cwt.
<i>Panel (a): Colorado</i>											
2013	2824	71	17.63	1128	282	71	31	2820	705	176	78
2014	2524	63	84.97	5438	1359	340	151	13595	3399	850	378
2015	1679	42	232.55	14883	3721	930	413	37208	9302	2325	1034
2016	3549	89	144.71	9261	2315	579	257	23154	5788	1447	643
2017	4900	123	83.56	5348	1337	334	149	13370	3342	836	371
2018	2749	69	47.93	3068	767	192	85	7669	1917	479	213
2019	1122	28	133.41	8538	2134	534	237	21345	5336	1334	593
2020	5037	126	20.08	1285	321	80	36	3214	803	201	89
2021	2097	52	92.84	5942	1485	371	165	14854	3714	928	413
<i>Panel (b): Iowa-Minnesota</i>											
2013	16682	417	11.71	750	187	47	21	1874	469	117	52
2014	19551	489	69.48	4446	1112	278	124	11116	2779	695	309
2015	18821	471	261.18	16716	4179	1045	464	41789	10447	2612	1161
2016	16797	420	155.07	9924	2481	620	276	24811	6203	1551	689
2017	17673	442	88.96	5693	1423	356	158	14233	3558	890	395
2018	23094	577	49.70	3181	795	199	88	7952	1988	497	221
2019	22820	570	63.60	4070	1018	254	113	10175	2544	636	283
2020	23729	593	67.20	4301	1075	269	119	10751	2688	672	299
2021	26689	667	57.59	3686	921	230	102	9215	2304	576	256
<i>Panel (c): Kansas</i>											
2013	19754	494	16.90	1082	270	68	30	2704	676	169	75
2014	11779	294	90.34	5782	1445	361	161	14454	3613	903	402
2015	9617	240	218.23	13967	3492	873	388	34917	8729	2182	970
2016	20048	501	144.45	9245	2311	578	257	23112	5778	1444	642
2017	20523	513	81.66	5226	1307	327	145	13066	3266	817	363
2018	19105	478	42.82	2741	685	171	76	6852	1713	428	190
2019	15995	400	67.76	4337	1084	271	120	10842	2710	678	301
2020	20804	520	69.54	4451	1113	278	124	11127	2782	695	309
2021	22301	558	56.59	3622	906	226	101	9055	2264	566	252

Table 8. Continued

Year	Avg. Head	Avg. Transactions (40 hd. per transaction)	Historical Variance	P=75%				P=90%			
				\$0.25/cwt.	\$0.50/cwt.	\$0.75/cwt.	\$1.50/cwt.	\$0.25/cwt.	\$0.50/cwt.	\$0.75/cwt.	\$1.50/cwt.
<i>Panel (d): Nebraska</i>											
2013	37196	930	11.80	755	189	47	21	1889	472	118	52
2014	37428	936	69.04	4419	1105	276	123	11046	2762	690	307
2015	32852	821	250.33	16021	4005	1001	445	40053	10013	2503	1113
2016	39170	979	151.71	9709	2427	607	270	24273	6068	1517	674
2017	40993	1025	87.95	5629	1407	352	156	14071	3518	879	391
2018	42932	1073	46.36	2967	742	185	82	7418	1855	464	206
2019	31314	783	61.80	3955	989	247	110	9888	2472	618	275
2020	32376	809	66.71	4269	1067	267	119	10673	2668	667	296
2021	32618	815	58.26	3729	932	233	104	9322	2331	583	259
<i>Panel (e): Texas-Oklahoma-New Mexico</i>											
2013	12014	300	16.32	1044	261	65	29	2611	653	163	73
2014	6219	155	97.49	6239	1560	390	173	15599	3900	975	433
2015	3235	81	205.93	13180	3295	824	366	32950	8237	2059	915
2016	8917	223	144.58	9253	2313	578	257	23133	5783	1446	643
2017	10512	263	91.85	5878	1470	367	163	14696	3674	918	408
2018	8481	212	39.11	2503	626	156	70	6258	1565	391	174
2019	6415	160	70.86	4535	1134	283	126	11337	2834	709	315
2020	10008	250	68.21	4366	1091	273	121	10914	2729	682	303
2021	13351	334	55.87	3576	894	223	99	8940	2235	559	248

Table 9. Percent of Total Weeks Above Different Minimum Thresholds by Region Using Different Rolling Averages of Share of Total Trade as Minimum Threshold, 2013-2021.

The number of Previous Weeks Included in Rolling Mean of Total Cattle Trade:	Percent of Weeks Satisfying Minimum Negotiated Trade In:					
	CO	IA-MN	KS	NE	TX-OK-NM	NE-CO
26 (0.5 yr.)	3.62	97.74	5.43	99.32	0.00	93.21
52 (1 yr.)	4.33	98.56	4.81	99.76	0.00	93.99
78 (1.5 yrs.)	4.87	98.46	5.90	99.74	0.00	93.33
156 (3 yrs.)	5.77	98.08	8.01	99.68	0.00	91.03
260 (5 yrs.)	4.81	98.56	5.77	99.04	0.00	86.54

Note: This table represents the share of the current share of negotiated trade relative to a rolling mean of the region's previous share of total trade.

Table 10. The Percentage of Weeks at the Minimum Trade, Above the Maximum Trade, or Between the Minimum and Maximum Trade Levels by Region, Ceiling Requirement, and Rolling Weeks, 2013-2021

	The ceiling is $\leq 1.5x$ Min			The ceiling is $\leq 3x$ Min			The ceiling is $\leq 4.5x$ Min		
	52 wks.	78 wks.	156 wks.	52 wks.	78 wks.	156 wks.	52 wks.	78 wks.	156 wks.
<i>CO</i>									
Min	41.59	38.46	32.69	41.59	38.46	32.69	41.59	38.46	32.69
In	42.31	47.44	59.29	58.41	61.54	67.31	58.41	61.54	67.31
Max	16.11	14.10	8.01	0.00	0.00	0.00	0.00	0.00	0.00
<i>IA-MN</i>									
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
<i>KS</i>									
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In	7.93	1.03	0.00	72.12	77.69	94.87	87.98	90.26	100.00
Max	92.07	98.97	100.00	27.88	22.31	5.13	12.02	9.74	0.00
<i>NE</i>									
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In	0.00	0.00	0.00	0.00	0.00	0.00	39.18	31.54	18.59
Max	100.00	100.00	100.00	100.00	100.00	100.00	60.82	68.46	81.41
<i>TX-OK-NM</i>									
Min	58.41	61.54	67.31	58.41	61.54	67.31	58.41	61.54	67.31
In	20.91	17.95	22.12	37.50	37.44	32.69	41.59	38.46	32.69
Max	20.67	20.51	10.58	4.09	1.03	0.00	0.00	0.00	0.00
<i>NE-CO</i>									
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In	0.00	0.00	0.00	7.45	1.03	0.00	58.89	58.21	73.08
Max	100.00	100.00	100.00	92.55	98.97	100.00	41.11	41.79	26.92

Note: The grayed area is the performance under S.B.3229 and H.R. 5992; Rows sum within Ceiling, rolling average, and state. For example, for Colorado under the 1.5x ceiling and 52 weeks rolling average, 41.59% of weeks were at the minimum level, 42.31% of weeks were between the minimum and maximum level, and 16.11% of the weeks were higher than the maximum level (41.59 + 42.31 + 16.11 = 100).

Table 11. The Percentage of Weeks Above the Minimum Trade by Different Levels of P, c, and Rolling Window by Region, 2013-2021.

Probability (%)	Pricing Accuracy (\$/cwt.)	Rolling Window Used to Calculate Variance	USDA-AMS Region				
			CO	IA-MN	KS	NE	TX-OK-NM
70	0.5	78	0.00	15.09	1.87	23.28	0.00
70	0.5	156	0.00	0.48	0.62	7.07	0.00
70	1	78	8.27	65.97	55.30	78.59	29.11
70	1	156	0.18	40.13	36.38	51.35	16.22
70	1.5	78	23.56	82.66	75.88	83.99	52.81
70	1.5	156	2.88	59.55	55.72	67.78	34.30
70	3	78	61.15	87.64	83.16	83.99	76.09
70	3	156	32.73	74.96	67.57	67.78	64.03
75	0.5	78	0.00	11.56	0.62	11.64	0.00
75	0.5	156	0.00	0.00	0.42	2.08	0.00
75	1	78	6.29	61.32	48.02	74.64	19.96
75	1	156	0.00	36.12	32.64	46.78	11.85
75	1.5	78	18.88	79.13	72.56	83.99	49.69
75	1.5	156	1.80	53.13	49.48	66.74	32.22
75	3	78	56.83	87.64	82.95	83.99	75.26
75	3	156	27.34	74.64	67.57	67.78	61.75
80	0.5	78	0.00	8.35	0.42	4.37	0.00
80	0.5	156	0.00	0.00	0.42	0.62	0.00
80	1	78	3.96	54.57	40.75	67.36	10.81
80	1	156	0.00	31.30	26.40	40.33	7.69
80	1.5	78	13.85	76.40	65.49	83.58	42.62
80	1.5	156	0.72	47.67	42.62	63.41	26.40
80	3	78	50.90	87.48	82.54	83.99	73.60
80	3	156	22.48	74.32	67.36	67.78	59.25
85	0.5	78	0.00	4.82	0.00	0.42	0.00
85	0.5	156	0.00	0.00	0.00	0.00	0.00
85	1	78	1.98	43.18	27.65	59.46	1.04
85	1	156	0.00	22.47	18.92	37.01	1.46
85	1.5	78	8.99	69.50	58.42	80.87	32.22
85	1.5	156	0.36	42.86	36.80	54.89	18.50
85	3	78	44.06	87.32	81.08	83.99	70.06
85	3	156	14.75	73.19	66.53	67.78	52.18
90	0.5	78	0.00	1.61	0.00	0.00	0.00
90	0.5	156	0.00	0.00	0.00	0.00	0.00
90	1	78	0.18	27.77	9.56	42.62	0.00
90	1	156	0.00	8.03	5.82	25.16	0.00
90	1.5	78	4.50	58.43	44.49	71.10	16.63
90	1.5	156	0.00	33.71	29.11	42.83	10.60
90	3	78	30.40	86.04	78.38	83.99	61.12
90	3	156	5.94	66.93	62.99	67.78	40.75
95	0.5	78	0.00	0.00	0.00	0.00	0.00
95	0.5	156	0.00	0.00	0.00	0.00	0.00
95	1	78	0.00	8.35	0.42	4.37	0.00
95	1	156	0.00	0.00	0.42	0.62	0.00
95	1.5	78	0.36	33.39	15.38	50.10	0.21
95	1.5	156	0.00	11.24	8.11	29.94	0.00
95	3	78	13.85	76.40	65.49	83.58	42.62
95	3	156	0.72	47.67	42.62	63.41	26.40

Table 12. Estimated Weekly Percent of Total Transactions Grading Over 80% Choice to the Total Cattle Graded by Region, Marketing Method, and Delivery Method, 2014-2021

Marketing Method and Selling Basis	USDA-AMS Region:				
	CO	IA-MN	KS	NE	TX-OK-NM
Negotiated Cash					
Dressed	67.4	94.2	42.4	60.5	26.80
Live	73.4	98.5	28.3	62.2	8.36
Negotiated Grid					
Dressed	98.8	94.5	38.2	69.2	12.60
Live	48.2	97.3	40.6	81.2	15.50
Negotiated All (Cash + Grid)					
Dressed	89.6	94.1	40.3	62.3	12.90
Live	70.1	98.5	28.3	62.2	10.20
Formula					
Dressed	53.9	69.4	57.3	63.3	24.80
Live	44.1	85.6	48.7	58.5	21.30
Forward Contract					
Dressed	54.3	72.4	59.1	61.1	25.30
Live	49.8	73.8	48.9	70.4	11.90

Note: All estimates are significant at the 1% confidence level; Negotiated cash live and dressed include a combination of delivered and FOB transportation methods.

Supporting Figures

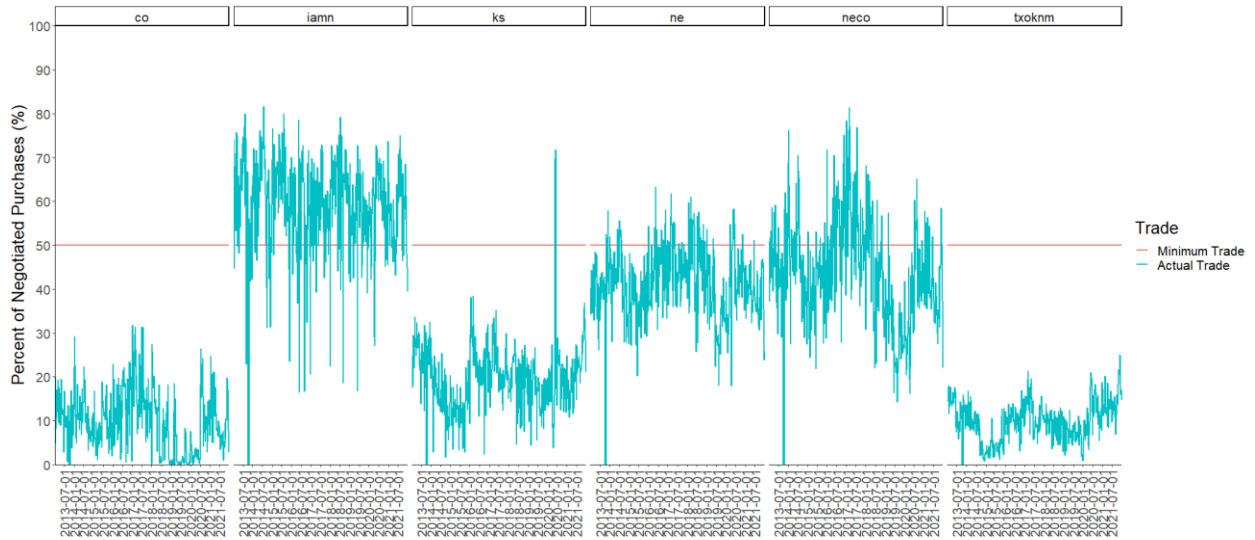


Figure 1. 50% Negotiated Trade Regional Minimum and Historical Trad by Region, 2013-2021.

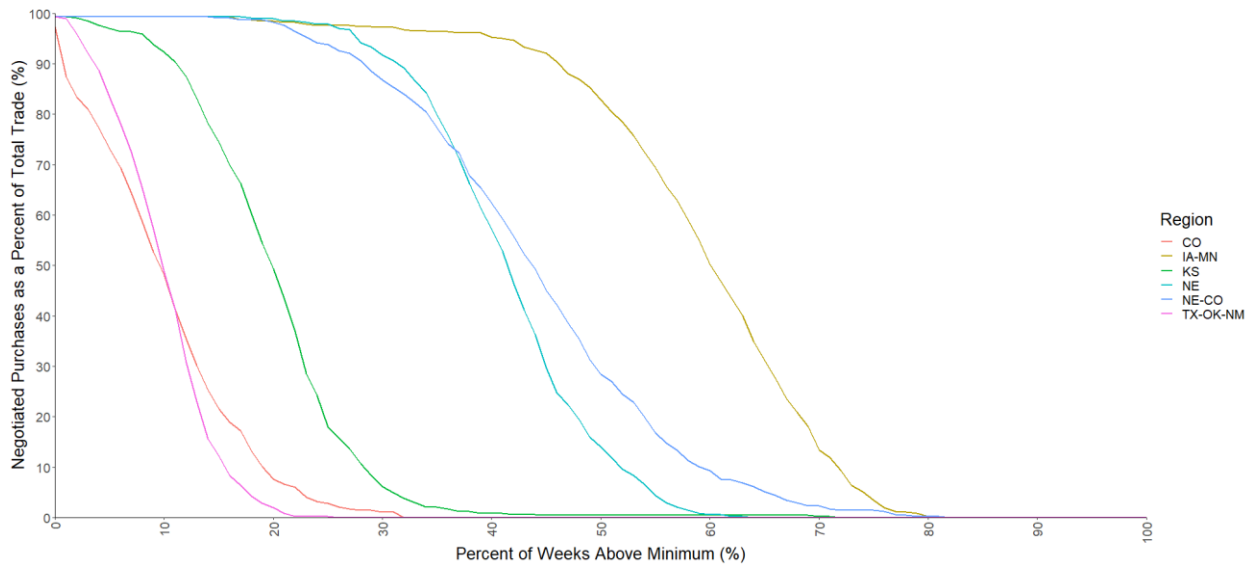


Figure 2. Percent of Weeks Passing Negotiated Trade Minimum Requirements by Region, 2013-2021.

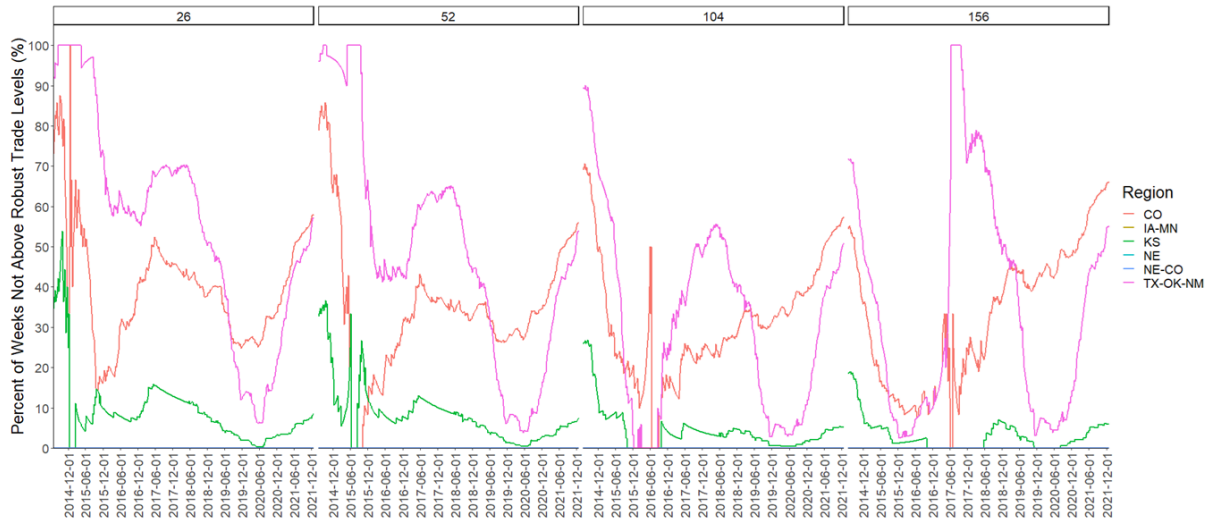


Figure 3. Historical Percent of Weeks Not Above Robust Trade Levels by Region and Number of Weeks Regional Minimums are Valid for Assuming Regional Minimums Were Set with a 78-week Historical Average, 2013-2021.

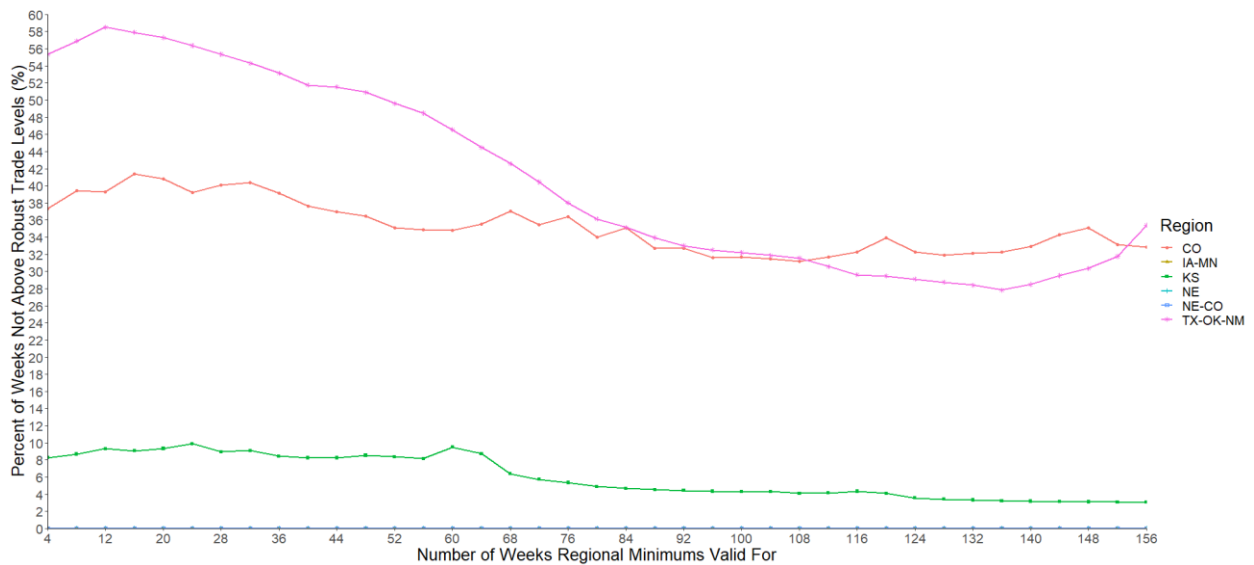


Figure 4. Percent of Weeks Not Above Robust Trade Levels by Region and Varying the Number of Weeks Regional Minimums are Valid for Assuming Regional Minimums Were Set with a 78-week Historical Average, 2013-2021.

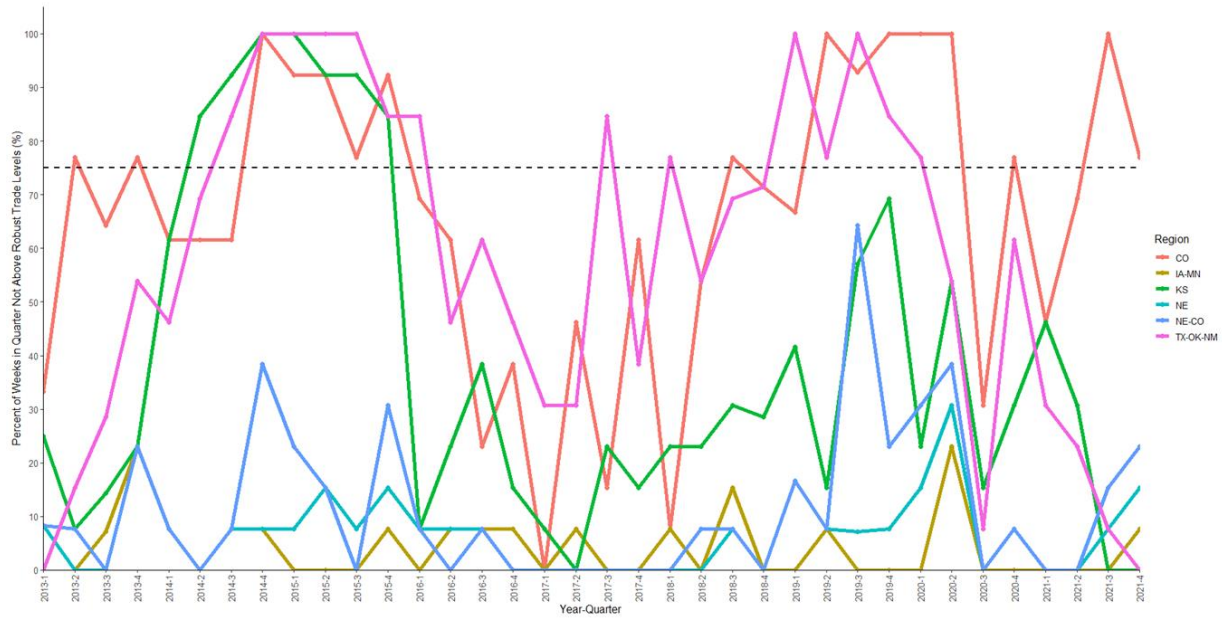


Figure 5. Negotiated Trade Minimum Requirements as Determined by Robust Trade by Region Compared Actual Negotiated Transactions, 2013-2021.

Note: NCBA 75% Policy Proposal

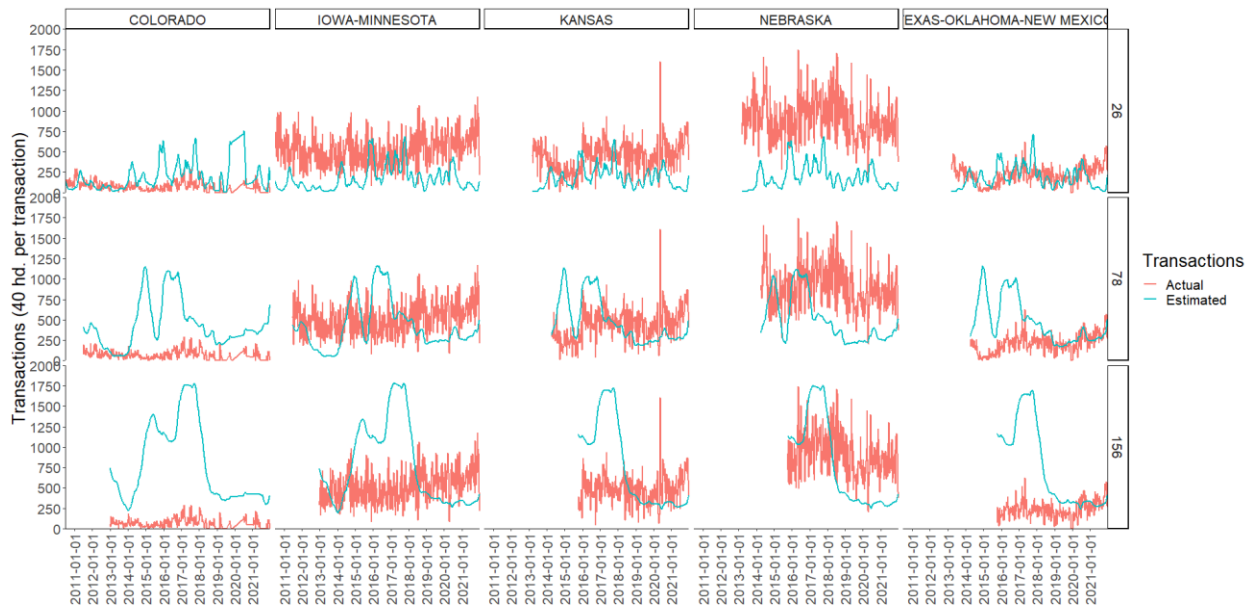


Figure 6. Estimated Levels of Robust Trade by Region and Rolling Variance of Weighted Average Price Assuming $P=90\%$ and $c=\$1.50/cwt.$, 2013-2021.

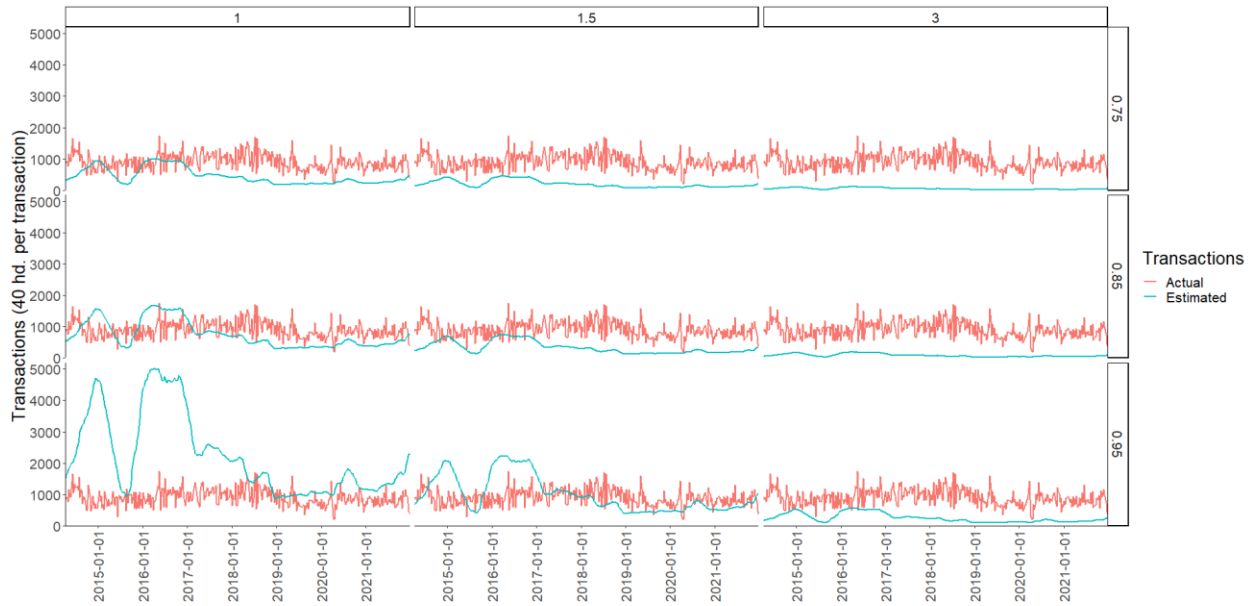


Figure 7. Estimated Levels of Robust Trade in Nebraska by Different Levels of Probability (P) and Pricing Accuracy (c) Assuming a 78-week Rolling Variance of Weighted Average Price, 2013-2021.

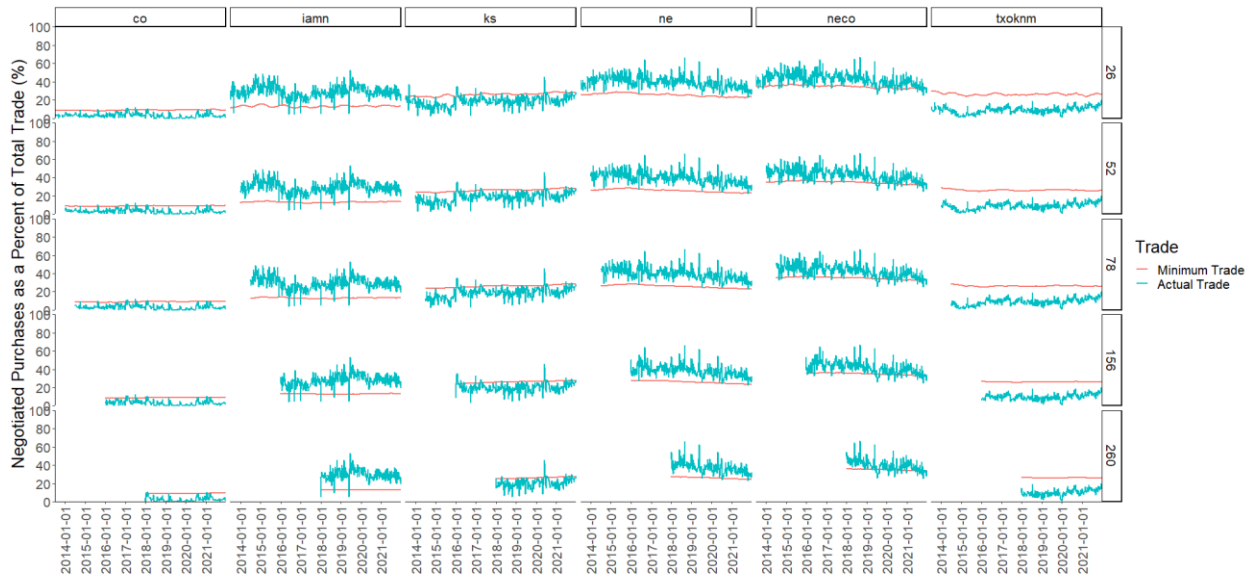


Figure 8. Weeks Passing Negotiated Trade Minimum Requirements as Determined by a Different Weekly Rolling Average of U.S. Trade by Region Compared to that Regions Current Share of All Negotiated Transactions, 2013-2021.

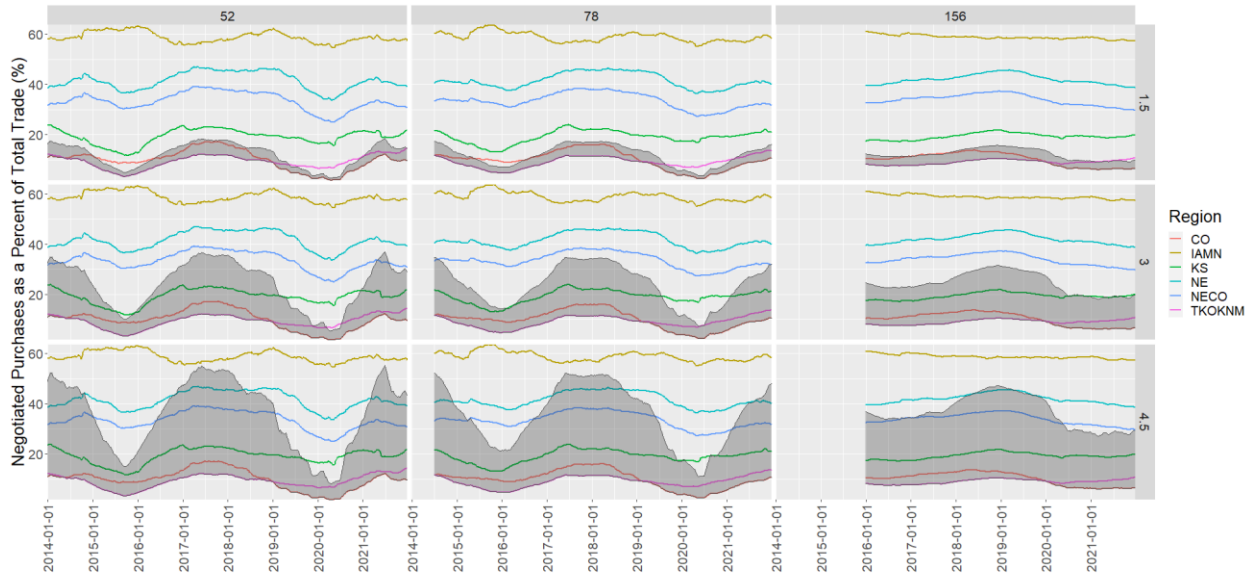


Figure 9. Negotiated Trade Minimum Requirements as Determined by Minimum Percentage Trade and Maximum Trade as 300x Minimum Trade Varying the Maximum Level and the Number of Weeks Included in the Rolling Moving Average, 2013-2021.

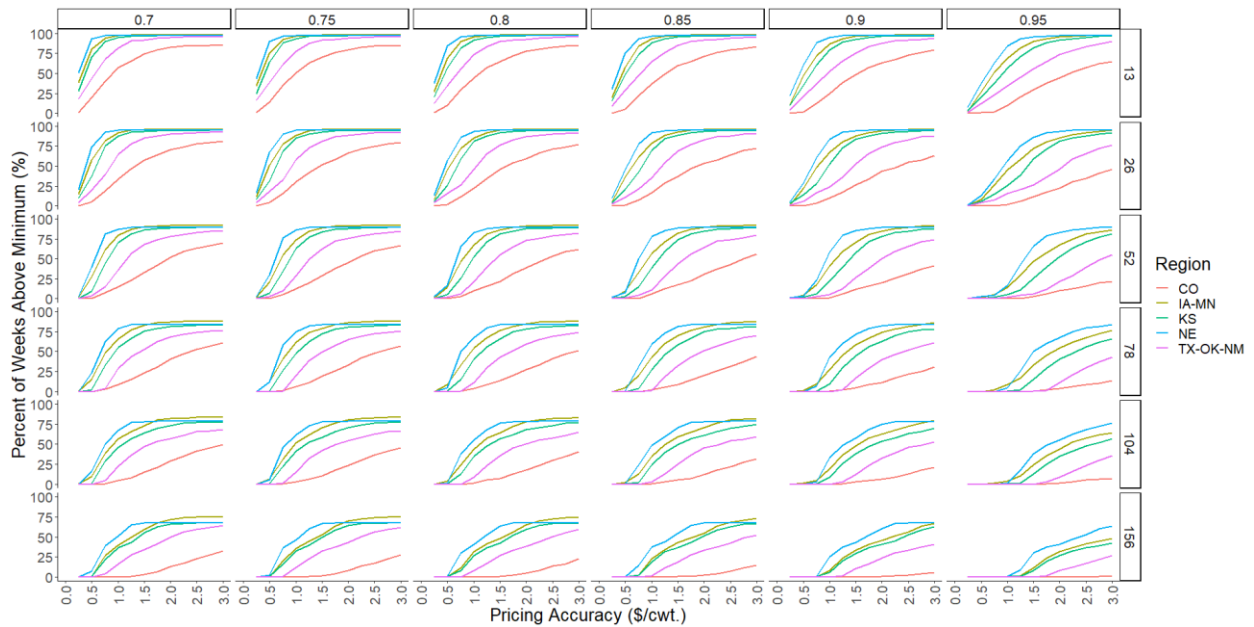


Figure 10. Estimated Percent of Weeks above Minimum Using Different Lengths of Rolling Variance, Probability (P), and Pricing Accuracy (c) by Region, 2013-2021.