

Who eats quality meat?

Consumers and the national meat reserves program in Mongolia

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ABSTRACT

Following the dissolution of socialist collectives and privatization of livestock in Mongolia in 1993, meat prices quickly rose to the point of becoming unaffordable for many consumers. In an effort to moderate prices and dampen extreme seasonal price fluctuations, the Government of Mongolia introduced a national meat reserves program in 2005, offering price subsidies for consumers and direct funding for participating meat packers. Despite this intervention, however, consumer prices have continued to rise rapidly. In this article, drawing on a survey of urban consumers and meat retailers, we examine the impacts of meat reserves on the meat market in Mongolia and discuss the broader policy implications of the Mongolian case study.

Keywords: Food security, Food reserves, Pastoralism, Meat, Mongolia

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INTRODUCTION

National food reserves, typically in the form of grain stores, provide a key mechanism for limiting vulnerability to food shortages or price volatility in developing nations (Lilliston and Ranallo 2012; Wright 2012). Yet food reserves are expensive to maintain – potentially requiring considerable state investments or subsidies – and may predominantly benefit politically well-positioned actors. In this article we present a case study of the meat reserves program in Mongolia, discussing some of the conditions that have moderated its success. We argue that government funds devoted to meat reserves in Mongolia's case have primarily benefited participating meat packers, despite the appearance of helping consumers through subsidized retail meat prices.

Mongolia has faced significant food security challenges following the collapse of the socialist command economy in 1990. Upon the dissolution of state-managed agricultural collectives in 1993, the formal meat supply chain effectively collapsed, leading to seasonal meat shortages and rising prices for urban consumers. In an effort to moderate prices and to dampen extreme seasonal price fluctuations, the Government of Mongolia introduced a meat reserves program in 2005. This ongoing program has operated through the provision of subsidies to large-scale private meat packers, who are contracted by the state to procure beef, mutton, and goat carcasses, store this meat over the winter, and release set quantities of meat to the consumer market at fixed prices in late winter and early spring. The distribution of meat is conducted through a network of grocery and convenience stores in residential areas, with limits on the amounts that can be purchased by a given household. Unfortunately, far from creating a stable meat supply, these measures appear to have contributed to price inflation and instability. The government intervention – which aims to support urban consumers – has had little positive impact for small-scale livestock producers, but appears mainly to have benefited new intermediary buyers and sellers.

In this article we explore the issues surrounding meat prices in Mongolia, focusing on government intervention and its consequences. We discuss how Mongolian people use meat in their daily diet, describing the implications of meat prices on their everyday lives, then examine how government intervention in meat production and sales have affected meat prices and generated unanticipated consequences.

METHODS

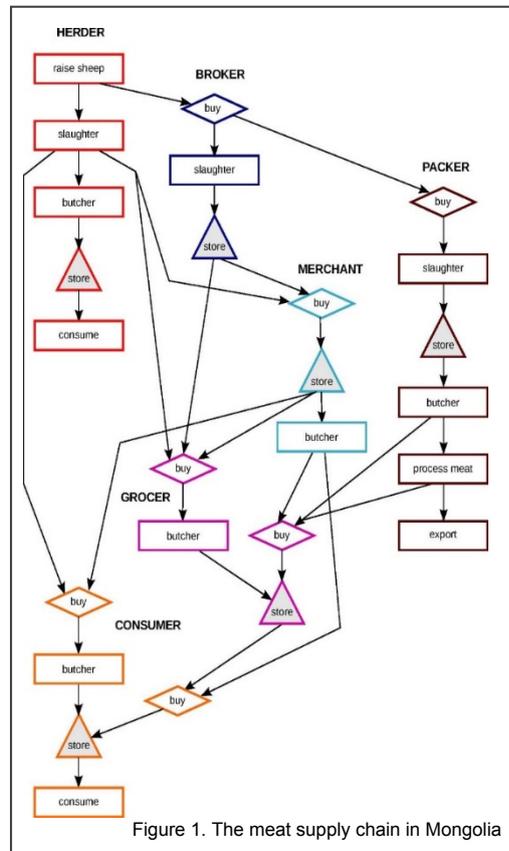
In-depth data on consumer practices were gathered through unstructured interviews with 10 urban households, conducted in spring 2014. These households were selected as purposive, stratified sample representing three different income categories. The data obtained from in these interviews were corroborated by two brief surveys, in which we asked about the preferences and buying practices of meat consumers ($n=260$) and meat resellers ($n=87$) in the city of Ulaanbaatar, selected by cluster sampling at eight key meat markets in early December 2014.

In addition to these interviews, we conducted a textual analysis of government decisions and reports, as well as studies by development agencies concerning the meat value chain and food security. Although we found public data on the meat reserve program to be unreliable and contradictory, we were able to cross-check public figures against limited data obtained from the meat packing company “Just-Agro” LLC, one of the participants in the meat reserve program.

THE MEAT VALUE CHAIN IN MONGOLIA

Despite the introduction of some semi-intensive livestock production methods in the socialist period, most livestock in Mongolia continues to be herded by small-scale, mobile pastoralists, whose holdings range from as few as 100 to upward of 1000 animals. Mongolian herders largely continue to keep five primary species of livestock – sheep, goats, horses, cattle, and camels – as they have done for many centuries, moving between seasonal camps and grazing their herds on shared lands. Mobility remains a significant dimension of most herders’ adaptive strategy, particularly in the arid and semi-arid regions of the Gobi, though patterns of movement differ according to geographic circumstances in different parts of the country (Simukov 1935; Humphrey and Sneath 1999).

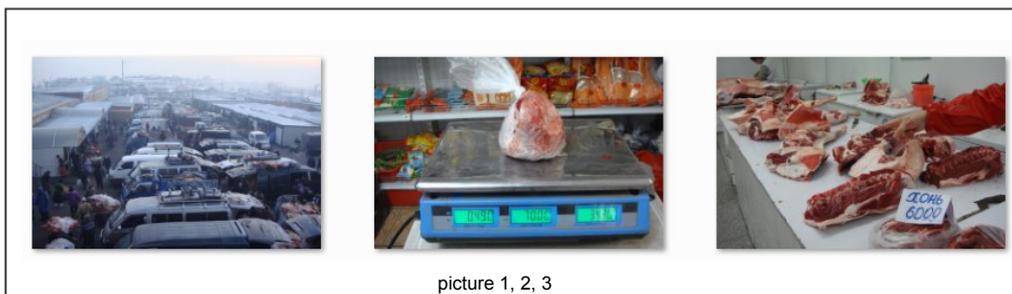
Throughout recent history, milk and meat production has been guided by a combination of herders’ own subsistence needs and the requirements of the non-herding population. Up to the early twentieth century herds and rangelands were substantially controlled by monasteries and princes, who maintained extensive livestock holdings or extracted livestock tributes from their subjects (Humphrey and Sneath 1999: 222–25; Fernandez-Gimenez 1999; Natsagdorj 1967). These “feudal” relations were progressively eliminated in the two decades following the People’s Revolution of 1921, as livestock were redistributed to poorer herders. By 1959 the vast majority of Mongolian herders had been gathered into state-controlled socialist collectives (*negdel*), which maintained specialized herds with subsidized inputs (Shirendev 1976: 552–63; Humphrey 1978). These collectives were dissolved in the early 1990s, following the collapse of the Soviet-backed socialist regime,



leading to a chaotic loss of institutions for livestock commodity marketing and distribution. While several intensive, consolidated dairy farms have begun operating in the past decade, meat continues to be supplied to the domestic market through a largely informal supply chain.

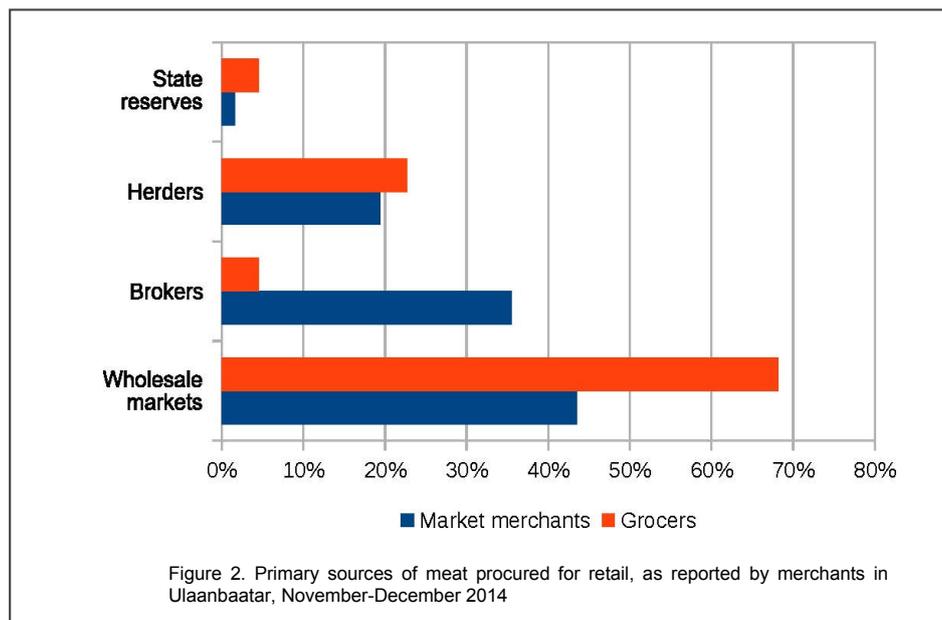
As shown in figure 1, the meat supply chain in Mongolia encompasses several actors and process streams. Herders typically manage livestock for a combination of domestic consumption, cash sale to brokers, and provisioning of winter meat supplies (*idesh*) for relatives. The slaughter and butchery of meat to be consumed by immediate and extended kin occurs entirely within the herder's home.¹ Some livestock brokers operate as itinerant intermediaries, buying up livestock from herders and selling to other brokers at central livestock markets or to meat packers. Other brokers maintain facilities at one of the commodities markets situated outside the city limits, buying livestock, wool, and hides, and selling dressed carcasses at wholesale prices to merchants at consumer markets. These merchants may also buy directly from rural brokers, or acquire meat from livestock-owning relatives or associates.

This current distribution chain offers the greatest benefits for large-scale herders, who most frequently sell directly to consumer markets or to slaughterhouses affiliated with meat packers. Smaller-scale herders, in contrast, more often sell to intermediary brokers, who consolidate livestock before reselling it to slaughterhouses, livestock markets, or consumer food markets. Such brokers offer substantially below-market buying rates in exchange for up-front cash payments, and in some cases cash advances or the provision of dry goods on credit. Farther down the supply chain, independent grocery stores and merchants at meat markets tend to buy from wholesale markets, though approximately one fifth of surveyed meat retailers indicated that they procure meat directly from herders. By contrast, under 5% of surveyed retailers reported buying from meat reserves (figure 2).



A key feature of this meat supply (picture 1,2 and 3) chain is its diversified character; it does not constitute a linear process leading from herder to consumer, but a network of changing paths. The actors we identify as “herders”, “brokers”, “merchants” (meat market), and “meat packers” specialize in different activities, but in practice any of these actors may slaughter and butcher animals, store carcasses, and process or sell meat. Our diagram (figure 1) depicts several alternative paths meat can take from herder to consumer. The shortest path leads

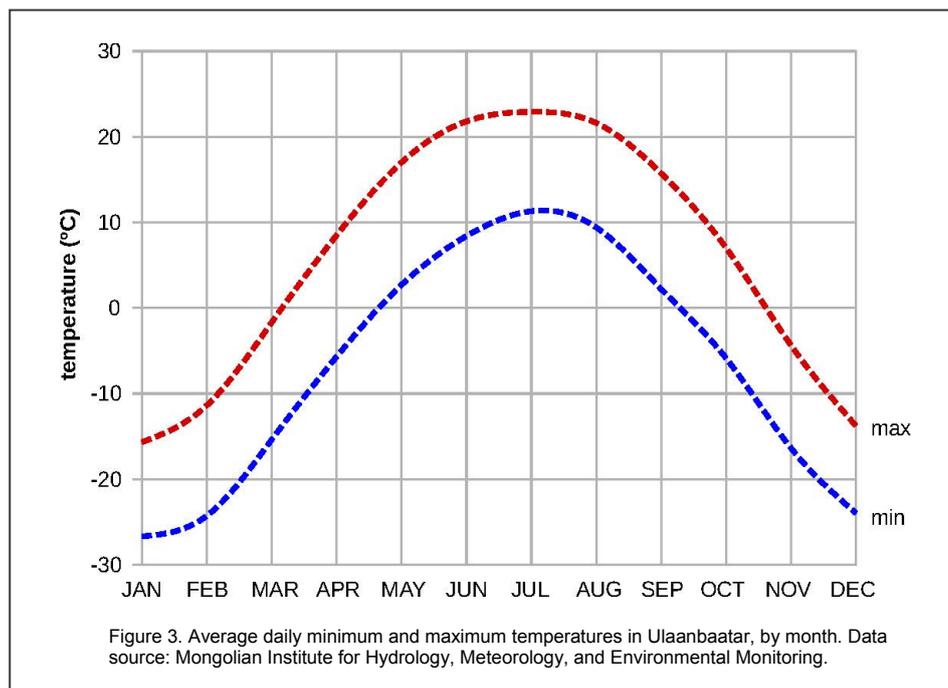
directly from herder to consumer, representing an arrangement where urban residents have relatives or hired herders manage livestock on their behalf, often in return for non-cash remuneration. The importance of this type of arrangement is evident from official livestock ownership records, which show that 31% of the national livestock in Mongolia is owned by non-herders, with 64.2% of livestock-owning households – including full-time herders – possessing fewer than 200 animals.² The relatively short supply path *herder – grocer – consumer* is also common, being the typical procurement method reported by a quarter of grocers included in our survey (figure 2). Distribution paths leading through meat markets (e.g., *herder – broker – merchant – grocer – consumer*) are the primary arrangement reported by 68 % of grocers. These paths may involve a variable number of intermediaries, as wholesale merchants at meat markets might buy from brokers, livestock markets, or directly from herders. Significantly, individual participants in the meat supply chain often report diverse and opportunistic relations with upstream actors, allowing them to adapt rapidly to supply-side changes. Consolidating meat procurement and storage activities in the hands of meat packers reduces the complexity of the supply chain, however, and in so doing may reduce the flexibility of suppliers.



The “meat packers” represented in figure 1 correspond to participants in the state-subsidized meat reserve scheme, who may purchase livestock directly from brokers or from the livestock markets, but who also have been reported to buy up the supplies of dressed carcasses at consumer markets. These meat packers store, then subsequently butcher and package the carcasses, which are then provided to the public through a network of participating grocery and convenience stores. Beyond their participation in the meat reserve program, the meat packers derive most of their income from the domestic sale and export of processed meats, mainly

in the form of sausage and canned meat products. It is important to keep in mind that formal reserves constitute only one of several mechanisms of meat storage in Mongolia. Herders themselves typically slaughter and butcher several animals for winter consumption in late autumn (October-November), often storing the meat in wooden or stone sheds constructed in shaded areas, where the ground will remain frozen until well into spring. It is also common for Mongolians living in rural towns and in the city to acquire carcasses in autumn, either from herder relatives or from markets, and to store frozen meat in sheds or on apartment balconies for consumption throughout winter.

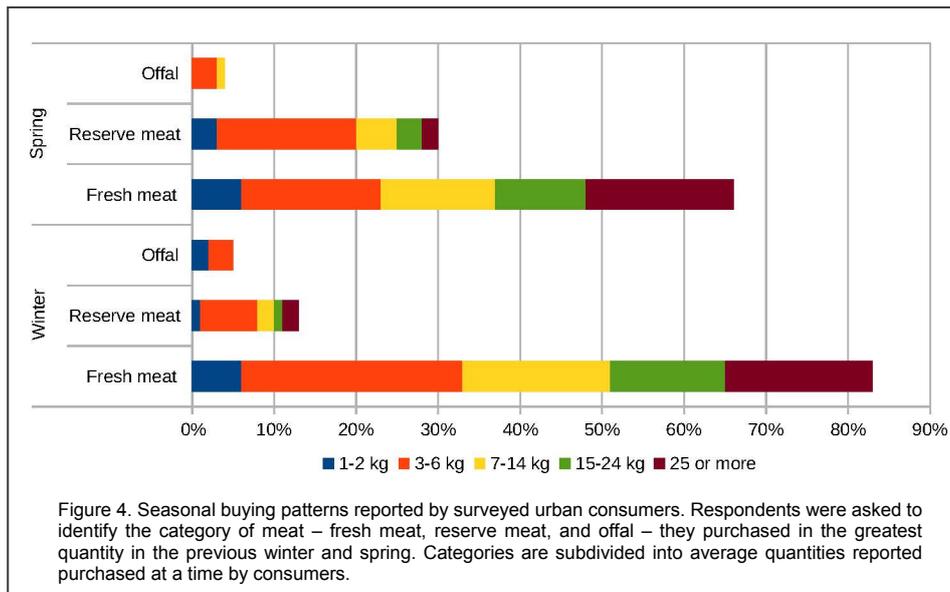
The seasonality of meat production in Mongolia is largely dictated by climate, due to reliance on natural cold for the freezing of meat during part or all of the processing and storage chain. As shown in figure 3, temperatures in much of Mongolia are consistently below freezing from approximately the beginning of November to mid-March. Herders and brokers typically prepare carcasses in November, which can be inexpensively stored without artificial refrigeration until March. Consumer prices for meat naturally begin to increase at this point, peaking in May, due to the combination of higher storage costs and the lack of fresh meat entering the market supply (see figure 6 and discussion below).



MEAT CONSUMPTION PATTERNS IN MONGOLIA

Meat continues to be a main food staple in Mongolia, in part due to the nation's pastoral heritage. Annual meat consumption per capita is 92.6 kg in rural areas and 88.8 kg in Ulaanbaatar (Mercy Corps and Mongolian Assets Market Association 2010). Mongolia ranked 32nd in the world by meat consumption in 2009, but 97th by meat production in 2011 (FAO 2013a; FAO 2013b). Mutton is the preferred

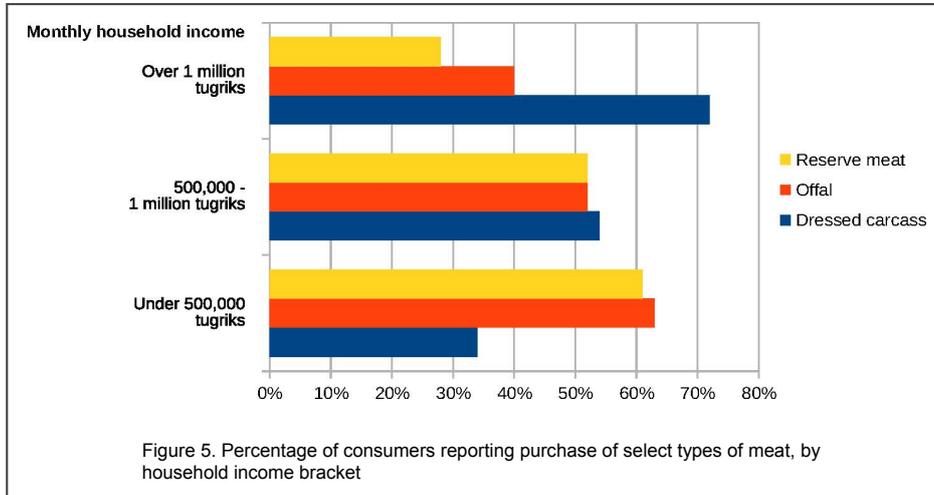
meat in all parts of Mongolia, followed by beef, or yak meat among residents of mountainous areas. Camel meat is consumed infrequently in the Gobi, and hardly at all in the northern steppe and forested ecological zones, where camels are rare. Although boiled mutton may constitute a meal on its own – particularly just after an animal has been slaughtered – everyday dishes typically include wheat flour, rice, and potatoes. Our survey data indicate that monthly meat consumption ranges from 17-40 kg per household.



Since 2004, the average consumer price of mutton – the most strongly preferred meat among Mongolian consumers – has increased fivefold, from 1,600 to 8,000 tugriks.³ Studies commissioned by development agencies, notably Mercy Corps' meat market study and beef value chain studies (Mercy Corps and USDA 2008; Mercy Corps and Mongolian Assets Market Association 2010), have concluded that intermediary brokers and wholesalers more than double the price of meat as it is conveyed from the herder to the consumer in Ulaanbaatar. But in-depth interviews and research among herders reveal that there are other factors affecting meat prices in Ulaanbaatar. According to informants at the Khuchit Shonkhor meat market, the operators of large-scale cold meat storage facilities effectively control the price of meat in Ulaanbaatar. These wholesalers reportedly buy up significant quantities of meat at Khuchit Shonkhor or other meat markets in autumn, when the price of meat is lowest, thereby reducing supply and keeping prices at shops and smaller markets artificially high. As the incoming supply of meat from producers drops off in winter and spring, the wholesalers gradually begin to release their stored meat, regulating supply in an effort to increase prices. Most of these sellers have received low interest loans and subsidies from the government to buy winter reserve meat, which are required to be sold at fixed prices in the spring. According to the Mercy Corps study (2010), such wholesalers controlled around 44% of the meat supply.

MEAT PRICES: CONSUMER PERCEPTIONS AND GOVERNMENT INTERVENTIONS

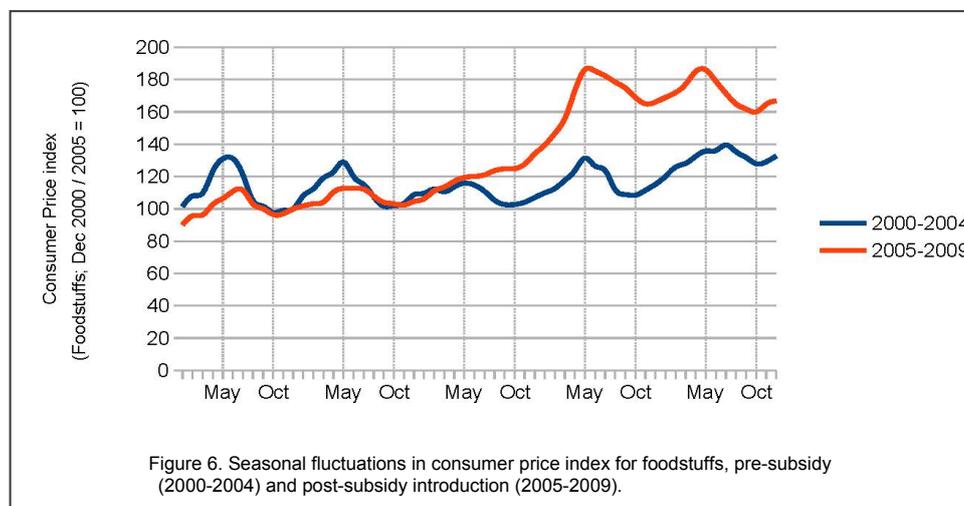
Consumers we interviewed in Ulaanbaatar reported a variety of coping strategies in response to high meat prices – such as reducing overall meat consumption, buying offal more frequently, or purchasing meat in bulk whenever possible. Meat purchasing strategies correlate strongly to income: 72 % of consumers with monthly incomes greater than 1 million tugriks reported purchasing full carcasses, for instance, but only a third of consumers with household incomes below 500,000 tugriks did the same (figure 5).⁴ Conversely, 61% of lower-income consumers but only 28% of higher-income consumers reported purchasing reserve meat. Mongolian consumers purchase reserve meat due to its being substantially less expensive than fresh meat in winter and spring, but do not consider it to be of particularly good quality: only 7% of surveyed consumers stated that the quality of reserve meat was “good”, while two-thirds of respondents considered the quality of reserve meat to be “adequate”. Two-thirds of surveyed consumers stated that reserve meat was, in their view, priced appropriately for what it was worth; only 8% of respondents considered reserve meat “inexpensive”. Offal consumption is also higher among less affluent households, but retailers note that an increasing number of wealthy consumers are buying blood and organ meat – especially liver and stomach – ostensibly in consideration of its therapeutic benefits, though possibly also as a result of income pressures.



Many urban consumers blame herders for what they perceive as artificially high meat prices – an opinion manifested in the public discourse of “lazy herders” and their sense of “entitlement” in times of ecological crisis (Ericksen 2014). This discourse reflects public uncertainty over the relationship of herders and the state in the area of food security. Livestock are constitutionally recognized as “national wealth and under state protection” (article 5.5), and the state indeed intervenes to provide assistance to herders at times of ecological crisis, but these measures have been seen by some as promoting herders’ welfare to a greater extent than consumers’ food security – particularly insofar as herders are viewed as keeping meat prices

artificially high during periods of abundant supply.⁵ But an analysis of wage and meat price increases suggests that consumer concerns related to meat price increases may in fact be overstated. Whereas the average price of mutton increased from 837 tugriks in 1998 to 7,356 tugriks in 2013, monthly household incomes increased in the same period from 23,279 to 439,289 tugriks. Thus the cost of 25 kilograms of mutton – which we might take as an approximate amount consumed monthly by an urban family of four⁶ – was equivalent to 90 percent of average monthly household income in the late 1990s and early 2000s, but dropped to an average of 72% of household income in 2002-2007, and amounted to only 42% of household income in 2013. Expressed in constant currency units, meat prices doubled in the 15-year period beginning in 1998 while wages increased by a factor of four.

In an effort to limit seasonal meat price fluctuations, the Government of Mongolia initiated market controls beginning in 2005, in the form of the winter and spring meat reserve program. At that time the average price of meat was 2,124 tugriks per kilogram of mutton and 2,348 tugriks per kilogram of beef. Prior to this intervention the price had been relatively stable, averaging from 1,135 to 1,596 tugriks in the preceding four-year period. Following the intervention, however, the price of meat began to rise markedly, and by 2013 the price of mutton had reached 7356 tugriks – an increase of 360%. As shown in figure 6, which plots the consumer price index of meat over the five-year periods preceding and following the government meat reserve program intervention, the introduction of consumer price subsidies did not succeed at eliminating price fluctuations. Both prior to and following the intervention, meat prices followed a predictable cyclical pattern. Prices regularly dropped due to increased supply in autumn, a time of year when a high proportion of animals are slaughtered – livestock being at their fattest, cooler outdoor temperatures allowing carcasses to be prepared and transported without refrigerated facilities, and many herder households needing immediate cash income in order to pay school fees. As livestock can lose up to 30% of their live weight under winter grazing conditions (Kemp et al. 2013), animals intended for wintertime consumption are rarely slaughtered later than October or early November,



resulting in a diminishing supply over the course of the winter. Consequently prices rise gradually throughout winter, as a reflection of the increased cost of extended storage for carcasses kept until spring. Prices peak in May, at which point they begin to drop again as fresh meat enters the supply chain. The average standard deviation of the price index was 7.8 in the five years preceding the meat storage program and 8.3 in the five years following its introduction.

The reasons for these price fluctuations are not straightforward. Herders suffered from the occurrence of *zud* (severe winter weather) in 2009-2010, losing almost 10 million livestock – approximately a quarter of the national total. This event should have been expected to translate into meat shortages, in turn leading to price increases. Surprisingly, however, meat prices actually decreased in 2009. The following year, in which meat reserves were not stocked, prices increased by only 32%, whereas in all other years since 2005 prices have increased by more than 50% per annum. In the period 2006-2010, the Government of Mongolia spent a total of 7.7 billion tugriks in subsidies (officially termed “incentives”) to meat reserve companies, transferring a further 8 billion tugriks to 20 companies in 2011, 16 billion tugriks to 10 companies in 2012, and 11.4 billion tugriks to 12 meat companies in 2013. Despite these increasing expenditures, meat prices have not stabilized, but have in fact increased drastically – from 3,790 to 7,350 tugriks – since government spending increased in 2011-2013. In addition to these direct subsidies, the government has provided low interest loans to meat-reserve companies, amounting to 67 billion tugriks in 2012 and 87 billion tugriks in 2013. We found that official data concerning the quantity of meat reserves, the premiums provided, or the selection of meat-reserve companies were either classified or unreliable. However, based on reports to Parliament by the Ministry of Industry and Agriculture and by the Prime Minister, with corroborating details from various government press releases, we were able to compile the information presented in table 1.

Year	Mutton price (tugriks)	Beef price (tugriks)	Meat exports (tonnes)	Reserve meat (tonnes)	Premium (million tugriks)	Premium (tugriks per kg)	Meat reserve packers
2000	1135	1103	16700				
2001	1157	1182	19800				
2002	1076	1173	23300				
2003	1352	1435	15100				
2004	1596	1724	8400				
2005	2124	2348	7800	n/a	n/a	n/a	n/a

Year	Mutton price (tugriks)	Beef price (tugriks)	Meat exports (tonnes)	Reserve meat (tonnes)	Premium (million tugriks)	Premium (tugriks per kg)	Meat reserve packers
2006	2273	2500	11700	3000	700	500	11
2007	2642	2851	10900	3300	835	500	8
2008	3371	3673	10300	7000	2400	500	13
2009	2860	3309	18000	7000	2400	500	6
2010	3790	4241	26800	2800	1400	650	9
2011	4125	4695	10600	16000	8000	800	20
2012	6637	7291	20000	12000	16000	1000	10
2013	7356	8230	n/a	11446	11400	1000	12

Table1. Meat prices and government-led meat reserves for spring to stabilize prices.
(Source: NSO, Ministry of Industry and Agriculture, 2005-2014)

DISCUSSION: IMPACTS OF MEAT PRICE STABILIZATION IN MONGOLIA

We have discussed the case of the meat reserves program in Mongolia as a government intervention seeking to manage market supply of a staple food commodity, in order to limit seasonal price variations for consumers. In this instance the Government of Mongolia sought partly to subsidize the winter storage costs for meat – which enters the supply chain in summer and autumn – in order to reduce the impacts of storage costs on retail prices in late winter and in spring. But the meat reserves program was also represented as a food security enhancement measure, intended to guarantee the stable availability of meat to urban consumers – creating a supply that would be resilient to the impacts of ecological crisis, social instability, or market failure.

Alternative solutions might have been envisaged. For instance, the Government of Mongolia could have directly managed the reserves; subsidies could have been designed to enable consumers to purchase meat in autumn themselves and store it privately over winter; or winter and spring meat supplies could have been managed through a network of consumer cooperatives, potentially working in tandem with herder cooperatives. The mechanism that was ultimately chosen supported participating meat warehouse owners, but has reduced the economic power available to other actors in the supply chain. In this light we suggest that the resilience of the meat supply chain may actually have been compromised, rather than enhanced, by the meat reserves program.

Further, our ethnographic research reveals socially stratified practices of buying different types of meat depending on income level – prime cuts, joints,

single-meal portions, or offal – which appear to deepen divisions within society, with different meats becoming part of an emergent class identity. Mongolian society has become divided over meat prices, with some urban citizens blaming and even despising herders. Our survey results clearly indicate that consumers with greater disposable incomes are less reliant on the reserve meat system, instead buying meat in large quantities in autumn and storing it privately over winter. A majority of surveyed consumers stated that reserve meat is of “poor” or “adequate” quality, reflecting a variety of concerns raised in greater depth in our ethnographic interviews: the presence of tough, flavourless meat; apparent deterioration of the meat during long-term storage; or packaged retail units containing large amounts of bone and gristle, which may not be visible from the exterior of the package. These concerns are perhaps unsurprising, given that the meat packers participating in the reserve program were effectively guaranteed a fixed income regardless of the quality of the product – thus having no economic incentive to procure high-quality meat, store carcasses under optimal conditions, or package the meat in such a way as to appeal to consumers.

In the absence of a targeted meat procurement system, government meat reserve initiatives have been misused and have fuelled domestic price growth. Despite increases in consumer meat prices that, as mentioned above, have effectively doubled in constant currency units over the past fifteen years, price gains appear to have benefited meat packers and brokers to a greater extent than they have helped consumers or small-scale livestock producers. Indeed, herders continue to sell their livestock or meat at prices less than half of the actual market value (Mercy Corps and Mongolian Assets Market Association 2010).

On this evidence, government efforts to decrease or stabilize meat prices have been an unqualified failure. According to the 2013 State auditor’s report, there have been many elements of fraud and corruption in the allocation of subsidies and selection of participating companies. In our view, however, the government intervention was fundamentally undermined by the absence of controls related to the supply of meat entering the reserve warehouses. Meat that would normally have ended up at consumer markets was diverted to winter storage – including both livestock that was bought up over the summer and carcasses bought from retail markets. The resulting reduction in summer supply can be seen to have had an effect on summer retail meat prices, which normally might have been expected to drop to an even greater degree. These conditions were of course advantageous to the reserve companies, who not only benefited from government subsidies, but were able to generate a profit through the resale of meat at higher market prices. These companies received a government subsidy of 1000 tugriks for every kilogram of meat sold, and an additional 1080 tugriks per kilogram in storage costs, but also received the majority of the sale price of the meat – which was subsidized for consumers, but still linked to current average retail prices. Additionally, our informants report that some meat packers who benefited from subsidies in fact prioritized exports of processed meat over domestic sales of reserve meat.

Despite these failings, it remains desirable that meat reserves be maintained

in Mongolia for food security purposes. If managed effectively, meat reserves can limit price volatility, protect against food shortages following an exceptionally harsh winter, and prevent price speculation during periods of reduced supply. But the Mongolian case study offers valuable lessons about some risks that arise from the implementation of such a program with inadequate oversight. The fact that the Mongolian meat reserves were managed by corporate meat packers, rather than by the state itself, appears to have facilitated corruption and price manipulation. More significantly, however, the program seems to have been undermined by its focus on storage and retail distribution alone. Since the procurement of meat for the national reserves was not directly managed by the state, meat packers effectively diverted meat from existing market supply chains, which pushed up retail prices. This case study suggests, therefore, the need for food reserves to be managed as a complete process chain, rather than being managed simply at the point of storage and distribution. Without integrated governance of supply, storage, and distribution, such a reserves system cannot be effective at stabilizing prices and assuring the provision of quality meat for consumers.

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REFERENCES

- Ericksen, A. (2014). "Depend on Each Other and Don't Just Sit: The Socialist Legacy, Responsibility, and Winter Risk Among Mongolian Herders." *Human Organization* 73 (1). SFAA: 38–49.
- FAO. (2013a). "Current Worldwide Annual Meat Consumption Per Capita, Livestock and Fish Primary Equivalent." <http://faostat.fao.org/site/610/DesktopDefault.aspx?PageID=610>.
- . (2013b). "Current Worldwide Annual Meat Production in Tonnes Per Country, Livestock and Fish Primary Equivalent." <http://faostat.fao.org/site/610/DesktopDefault.aspx?PageID=569>.
- Fernandez-Gimenez, M. E. (1999). "Sustaining the Steppes: A Geographical History of Pastoral Land Use in Mongolia." *Geographical Review* 89 (3): 315–42.
- Humphrey, C. (1978). "Pastoral Nomadism in Mongolia: The Role of Herdsmen's Cooperatives in the National Economy." *Development and Change* 9 (1): 133–60.
- Humphrey, C., and Sneath, D. (1999). *The End of Nomadism? Society, State, and the Environment in Inner Asia*. Durham: Duke University Press.

- Kemp, D. R., Han, G., Hou, X., Michalk, D. L., Hou, F., Wu, J. and Zhang, Y. (2013). “Innovative Grassland Management Systems for Environmental and Livelihood Benefits.” *Proceedings of the National Academy of Sciences* 110 (21). National Acad Sciences: 8369–74.
- Lilliston, B. and Ranallo, A. (eds.) (2012). *Grain Reserves and the Food Price Crisis: Selected Writings from 2008–2012*. Institute for Agriculture; Trade Policy. http://www.iatp-web.us/iatp/files/2012_07_13_IATP_GrainReservesReader.pdf.
- Corps, M., and Mongolian Assets Market Association. (2010). *Махны Зах Зээлийн Судалгаа [Meat Market Survey]*. Ulaanbaatar.
- Corps, M., and USDA. (2008). Report on Beef Sub-Sector Value Chain Analysis, Rural Agri-Business Support Program. Ulaanbaatar.
- Natsagdorj, A. S. (1967). “The Economic Basis of Feudalism in Mongolia.” Edited by Owen Lattimore. *Modern Asian Studies* 1 (3): 265–81.
- Shirendev, B. (ed.) (1976). *History of the Mongolian People’s Republic*. Translated by William A. Brown and Urgunge Onon. East Asian Research Center, Harvard University : distributed by Harvard University Press.
- Simukov, A. D. (1935). “Materiali Po Kochevomy Bitu Naseleniya MNR (Materials on the Nomadic Way of Life of the Population of Mongolia).” *Sovremni Mongolii* 6: 13.
- Wright, B. D. (2012). “International Grain Reserves and Other Instruments to Address Volatility in Grain Markets.” *The World Bank Research Observer* 27 (2). World Bank: 222–60. <http://hdl.handle.net/10986/4220>.

NOTES

1. The slaughter of livestock encompasses skinning and evisceration, resulting in a full carcass (guluuz). This is followed by primary butchery (the stage labelled “butcher” in figure 1). In the case of a sheep carcass this typically involves separating the carcass into seven joints or doloon khöl, meaning literally the “seven legs” – neck and backbone (khüzüü seer), fullbrisket (süvee övchüü), right and left shoulders (khaa), right and left legs (guya), and loin (uuts nuruu). Secondary butchery (not indicated in the diagram) involves the preparation of smaller cuts, and is commonly performed domestically by consumers in Mongolia.
2. Data on herd sizes were taken for 2013 from the Statistical Information Service of the National Statistics Office of Mongolia, <http://www.1212.mn/en/>. Official livestock counts are published for “livestock-owning households” and the narrower category of full-time “herder households”, though our field research experience suggests that distinguishing between these two categories is often problematic.

3. Consumer price data were gathered from the Statistical Information Service <http://www.1212.mn/en/>, and from the annual *Mongolian Statistical Yearbooks* published by the National Statistics Office of Mongolia.
4. At the time of our survey whole sheep carcasses were being sold for 100-110,000 tugriks – equivalent to at least 20% of the monthly household income described in the lower bracket of our survey, representing a third of respondents, and over half the minimum monthly wage of 192,000 tugriks.
5. For an example, see the article “Khotny asuudlaa khotynkhond tokhdog malchdyn khalamjiig khazaarlaya [Let us rein in herder welfare policy, which saddles urban citizens with the problems of herders, camps]”, published June 7, 2013 on the Mongol News agency web site. <http://www.mongolnews.mn/p/43061>.
6. The statistical methods employed by the National Statistics Office of Mongolia, as ratified by Decree 10/176 (2008) of the Director of the National Statistics Committee, assume a normative minimum daily meat consumption level of 175 g, equivalent to 5.3 kg per month, as defined by Decree 257 (2008) of the Minister of Health.