



# Economic Impact of Retaliatory Tariffs from Mexico and China on the US Dairy Sector

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# Glossary

CAGR	Compound Annual Growth Rate
CWT	Hundredweight
DOC	US Department of Commerce
EU	European Union
FAS	USDA Foreign Agricultural Service
FTE	Full Time Equivalent
GAIN	USDA Global Agricultural Information Network
GATS	Global Agricultural Trade System
GDP	Gross Domestic Product
GTT	Global Trade Tracker
HS	Harmonized System of Tariffs
IMPLAN	Impact Analysis for Planning
IP	Intellectual Property
ITA	International Trade Administration
ME	Milk Equivalent
MFN	Most Favored Nation
MT	Metric Ton
NAFTA	North American Free Trade Agreement
SAM	Social Accounting Matrix
USDEC	US Dairy Export Council
USTR	US Trade Representative

# Disclaimer

This report was produced for the US Dairy Export Council (USDEC). Its purpose is to assess the economic impact of retaliatory tariffs from Mexico and China on the US dairy sector.

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# I. EXECUTIVE SUMMARY

In response to the US imposition of tariffs on select Mexican and Chinese imports following the release of two US Section 232 investigations and a US Section 301 investigation, these countries retaliated against select US exports including dairy products.

- China imposed an additional 25 percent tariff on US exports in response to the US Section 301 investigation. As a result, total tariffs on selected US dairy products range from 27 percent to 45 percent.
- Mexico imposed tariffs on most US cheeses that range from 20 percent to 25 percent.

This study evaluates the impact of the above retaliatory tariffs placed by China and Mexico on the US dairy sector in terms of US exports to those countries, the resulting impact on US farm-gate prices and US dairy farm sector revenues and the overall impact on the US economy. Informa analyzed the impacts compared to its baseline forecasts for the period 2018 to 2023.

China and Mexico are vital to US dairy product exports. These two countries combined account for around 35 percent of total US dairy exports worth approximately \$1.9 billion. The study finds that China's and Mexico's retaliatory tariffs significantly impact the US dairy sector.

- US dairy product exports combined could fall by \$115 million in 2018 and \$415 million in 2019.
- From 2018-2023, US dairy product exports combined could fall by roughly seven percent from baseline projections worth \$2.7 billion.
- Farm gate prices are expected to fall roughly \$0.64 per hundredweight (cwt) to average around \$16.44/cwt through 2023 compared with the baseline price forecast of \$17.09/cwt through 2023.
- Lower farm-gate prices are forecast to reduce farm-gate revenues by roughly \$1.5 billion in 2018 and roughly \$3 billion in 2019. From 2018-2023, the lower farm-gate prices are forecast to reduce farm-gate revenues by \$16.6 billion.
  - Lost exports to China account for the bulk of the impact on farmers. Of the total \$16.6 billion loss in farm-gate revenue, \$12.2 billion or roughly 73 percent can be attributed to Chinese tariffs. Lost exports to Mexico account for the remainder of approximately \$4.4 billion or 27 percent of the total loss.
- When including impacts of reduced exports to industries that are linked to the dairy farming industry, US economic output is reduced by \$8.3 billion through 2023, GDP is reduced by \$3.5 billion and indirectly risks over 8,200 jobs throughout the broader economy.

The current trade situation between the US and China and the US and Mexico is very fluid. The US tariffs placed on select Chinese and Mexican goods as well as the Chinese and Mexican retaliatory tariffs placed on select US goods can all be removed at any time. But, with the current tariffs in place, the US dairy sector is being negatively impacted and will suffer more the longer these tariffs remain in place.

## II. INTRODUCTION

The US Dairy Export Council (USDEC) commissioned Informa Agribusiness Consulting (Informa) to evaluate the potential impact of the retaliatory tariffs placed by China and Mexico on the US dairy sector in terms of US exports to those countries, the resulting impact on US farm-gate prices and US dairy farm sector revenues and the overall impact on the US economy. Informa analyzed the impacts compared to its baseline forecasts for the period 2018 to 2023.

### A. Section 232 and Section 301 Investigations

Following the release of two Section 232 investigations and a Section 301 investigation, the US administration acted earlier this year to adjust the level of imports entering the US. The two Section 232 investigations analyzed the potential threat to US national security from the current level of steel and aluminum imports. The Section 301 investigation analyzed potential unfair trade practices being conducted by China; specifically, in intellectual property and forced technology transfer. Ultimately, it was determined through the investigations that the current level of steel and aluminum imports pose a threat to US national security and that China is conducting unfair trade practices in intellectual property and forced technology transfer. As a result, Section 232 tariffs were placed on all steel and aluminum imports with only a few countries exempt and Section 301 tariffs were placed on several Chinese goods. In response to these tariffs, several countries, including China and Mexico, placed retaliatory tariffs on US goods. US dairy products were among the products impacted by the Chinese and Mexican tariffs.

### B. Trade

The US exports well over ten times the number of dairy products to Mexico and China than it imports from both countries. Between the two countries, Mexico is the larger importer primarily due to NAFTA and geographic proximity to the US. Total US dairy product exports to the world in 2017 were worth \$5.4 billion. Of that \$5.4 billion, China and Mexico combined accounted for \$1.9 billion or 35 percent of US dairy product exports.

Mexico is the world's fifth largest importer of dairy products in terms of quantity and eighth largest importer in terms of value. The US is by far the largest supplier of dairy products to Mexico, accounting for around 70 percent of Mexico's total dairy imports. US dairy exports to Mexico in 2017 were 525,000 MT worth \$1.3 billion.

China is the world's second largest importer of dairy products in terms of quantity and value. New Zealand and the European Union (EU) are the largest dairy suppliers to China; however, the US represents around nine percent of this growing market. US dairy exports to China in 2017 were 386,000 MT worth \$577 million.

## C. Retaliatory Tariffs

China placed retaliatory tariffs on dairy products imported under 21 HS codes. Prior to the retaliatory tariffs, the targeted US dairy products entered China under tariffs between 2 and 20 percent. The retaliatory tariffs increased that rate to between 27 and 45 percent. The US faces steep competition in China from New Zealand and the EU. Given the strong trade relationship between China and New Zealand and the EU, these high-level tariffs placed on US dairy products are taking a sizeable toll and will lead to a significant drop in US dairy exports.

Mexico placed retaliatory tariffs on products imported under four HS codes representing the majority of cheese exports. Prior to the retaliatory tariffs, the targeted US dairy products entered Mexico under a zero tariff. The retaliatory tariffs moved that rate to between 20 and 25 percent. These tariffs have undoubtedly impacted the US dairy industry and will do so moving forward, but the entirety of US dairy exports to Mexico will not be lost. This is due to the strong trade relationship with established logistical networks between the US and Mexico and the fact that these tariffs imposed on US dairy products are still lower than tariffs faced by other major producing countries.

Exports play a vital role in the US dairy sector. Among trading partners, Mexico and China are two of the largest importers of US dairy products with 24 percent of exports going to Mexico and 11 percent going to China. Unfavorable trading environments with these partners potentially impact over a third of US dairy exports.

## III. BACKGROUND

### A. Brief Description of Events

Citing threats to national security and unfair trade practices, the current US administration has taken steps to address those concerns through the imposition of tariffs on a variety of goods from countries determined to be adversely impacting the United States through trade. Under statute, the United States may impose trade restrictions on foreign countries in response to practices determined to be unfair or that threaten national security. This authority is derived from Section 232 of the Trade Expansion Act of 1962 for restrictions pertaining to national security, and Section 301 of the Trade Act of 1974 for restrictions pertaining to a broad range of unfair trade practices. An investigation is conducted to determine whether trade adjustments may be warranted and, based on the report findings, actions to adjust trade may be put in place.

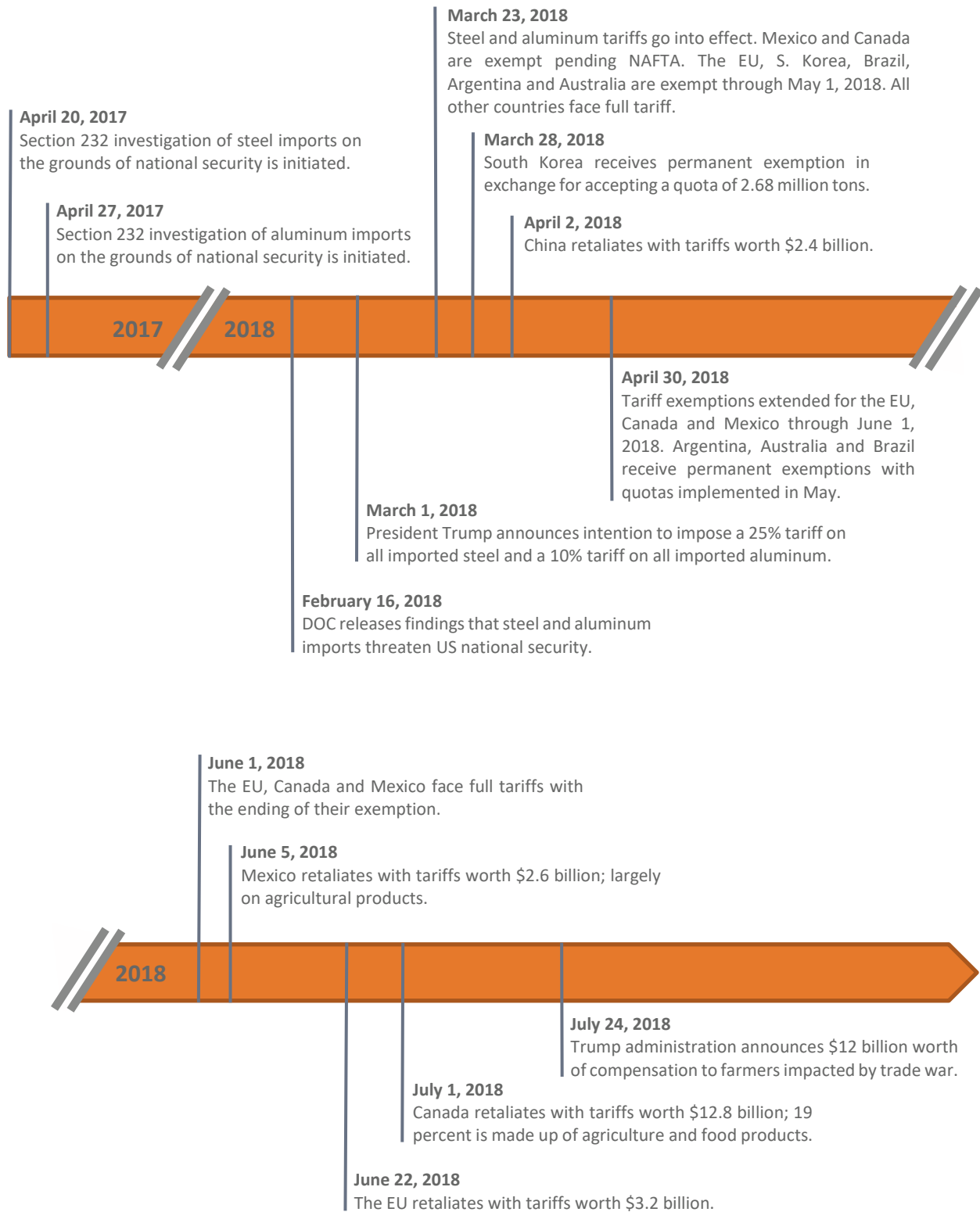
#### 1. Section 232 Investigation

The Trade Expansion Act of 1962 provides authority under Section 232 for the current US administration to impose trade sanctions on a foreign country where it is determined that imports from that foreign country pose a threat to US national security. An investigation, referred to as a Section 232 investigation, is conducted on the impacts of those imports on US national security and the Secretary of Commerce, based on the investigation findings, recommends to the President that either action be taken to adjust the level of imports or that there is no threat to national security and no trade adjustment action should be taken.

Two Section 232 investigations were initiated in April of 2017; one on the importation of steel into the US and another on the importation of aluminum into the US. Both investigations determined that the US steel and aluminum sectors, are important industries to US national security and imports were adversely impacting the sectors resulting in a threat to US national security. Based on these findings, the Secretary of Commerce recommended to the President that action be taken to adjust the importation of steel and aluminum through a quota or tariff. Acting on this recommendation, a tariff of 25 percent was placed on steel imports and a 10 percent tariff was placed on aluminum imports.

While Mexico was initially exempt from these tariffs, that exemption ended on June 1, 2018, leaving Mexico facing the full tariff on steel and aluminum. Conversely, China was at no time exempt and faced the full tariff rates at initial implementation on March 23, 2018. Strong pushback in the international community resulted in several countries imposing retaliatory tariffs on a variety of US goods; including Mexico and China. Mexico retaliated with tariffs worth \$2.6 billion; largely targeting US agricultural products including several types of cheese. China retaliated as well with tariffs worth \$2.4 billion on April 2, 2018; however, dairy products were not impacted by these tariffs.

## Exhibit 1: Timeline of Section 232 Investigation and Actions



## 2. Section 301 Investigation

Section 301 of the Trade Act of 1974 is a key enforcement tool that may be used to address a wide variety of unfair acts, policies, and practices of US trading partners<sup>1</sup>. Similar to a Section 232 investigation, a Section 301 investigation is conducted to assess the impact of imports. However, instead of focusing on US national security, a Section 301 investigation focuses on a broad range of unfair trade practices. Specifically, a 301 investigation sets out three categories of acts, policies, or practices of a foreign country that are potentially actionable:

- (i) trade agreement violations;
- (ii) acts, policies or practices that are unjustifiable (defined as those that are inconsistent with US international legal rights) and that burden or restrict US Commerce; and
- (iii) acts, policies or practices that are unreasonable or discriminatory and that burden or restrict US Commerce.<sup>2</sup>

A Section 301 investigation was initiated by the US Trade Representative (USTR) on August 18, 2017 at the behest of President Trump. Findings of the report were released on March 22, 2018 and it was determined that unfair trade practices are being conducted by China in intellectual property (IP), innovation and technology.

In response to these findings, a tariff of 25 percent was placed on select Chinese goods worth approximately \$34 billion on July 6, 2018 with another \$16 billion set to take effect on August 23, 2018. In response to this, China placed a retaliatory tariff of 25 percent on select US goods also worth roughly \$34 billion with another \$16 billion stated to potentially take effect as the US imposes their second wave of tariffs. These initial tariffs have escalated the tension from what was previously harsh words to the trade war in which the two countries find themselves.

Following China's retaliation, President Trump asked the USTR to explore adding an additional \$200 billion worth of Chinese goods at a 10 percent tariff rate. Seven weeks later, President Trump directs the USTR to consider a 25 percent tariff rate on Chinese goods instead of 10 percent. In response, China has threatened adding duties of 5-25 percent on US goods worth \$60 billion. Additionally, the Trump administration announced \$12 billion worth of compensation to go to farmers caught in the cross hairs of the trade war.

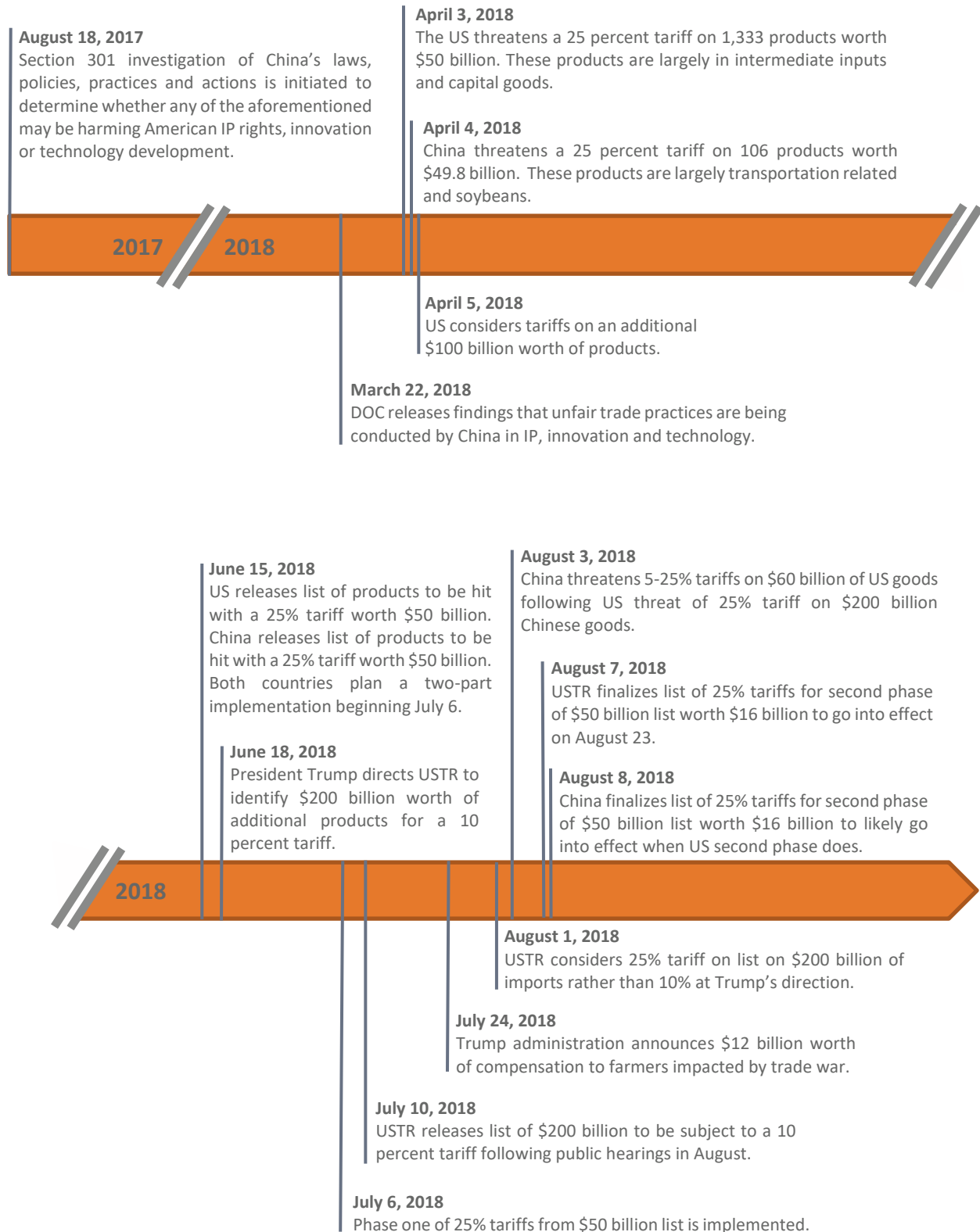
For this report, we focus on the tariffs that have been put in place on US goods and not those that have simply been discussed. Among the many sectors impacted by the Chinese tariffs, dairy is one of them. The specific dairy products impacted will be discussed later in this chapter.

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<sup>1</sup> <https://ustr.gov/sites/default/files/Section%20301%20FINAL.PDF>

<sup>2</sup> <https://ustr.gov/sites/default/files/Section%20301%20FINAL.PDF>

## Exhibit 2: Timeline of Section 301 Investigation and Actions



## B. US Dairy Trade and Retaliatory Tariffs

US dairy trade with Mexico and China is largely one sided. The US exports well over ten times the amount of dairy products to Mexico and China than it imports from both countries. Between the two countries, Mexico is the larger importer primarily due to NAFTA and geographic proximity to the US. Total US dairy product exports to the world in 2017 were 2.2 million MT worth \$5.4 billion. As shown in Exhibit 3 and Exhibit 4, China and Mexico combined accounted for 911,000 MT worth \$1.9 billion or 35 percent of US dairy product exports by value and 42 percent by volume.

**Exhibit 3: US Dairy Product Export – Value**

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mexico	853,310	935,220	637,371	836,361	1,166,445	1,226,701	1,429,215	1,643,942	1,280,058	1,217,797	1,312,298
Canada	318,291	375,845	333,409	385,823	444,357	469,692	569,320	590,719	554,129	630,296	636,698
China	153,552	179,472	137,467	237,188	362,158	414,976	706,206	695,197	451,164	386,192	576,969
Japan	184,865	207,995	131,388	203,788	277,373	284,662	303,455	408,504	273,404	205,973	291,163
S. Korea	92,070	99,895	76,252	130,745	223,737	225,169	300,664	415,277	305,456	231,426	279,788
Philippines	152,015	210,940	78,096	185,467	280,470	317,412	363,957	421,528	251,271	226,968	242,856
Australia	35,906	39,333	15,411	53,158	88,466	104,923	135,618	173,372	136,992	108,712	186,337
Indonesia	136,264	209,244	66,293	161,243	212,655	190,556	315,768	274,908	182,982	158,316	132,131
Vietnam	52,844	84,467	57,056	157,357	187,509	139,684	240,769	263,684	168,347	119,666	112,443
Malaysia	102,268	116,617	37,533	94,272	137,251	133,745	181,485	181,369	122,709	86,648	90,175
Other	896,847	1,293,708	664,804	1,243,870	1,405,821	1,615,598	2,168,053	2,027,398	1,513,195	1,327,708	1,521,997
<b>Total</b>	<b>2,978,232</b>	<b>3,752,736</b>	<b>2,235,080</b>	<b>3,689,272</b>	<b>4,786,242</b>	<b>5,123,118</b>	<b>6,714,510</b>	<b>7,095,898</b>	<b>5,239,707</b>	<b>4,699,702</b>	<b>5,382,855</b>

Source: FAS GATS

**Exhibit 4: US Dairy Product Export – Quantity**

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Mexico	280,953	290,749	277,270	313,811	370,705	403,511	415,545	452,352	480,260	502,251	524,609
China	90,755	120,328	153,078	198,382	236,362	254,045	342,124	339,426	293,954	314,575	386,486
Canada	145,240	126,112	115,962	129,251	137,794	133,491	133,166	131,817	125,008	139,242	142,780
Philippines	62,389	70,384	51,003	84,639	83,837	86,735	103,479	118,362	110,854	124,954	123,184
Japan	102,874	106,299	87,969	106,402	107,557	100,122	106,638	131,144	105,635	100,275	120,726
S. Korea	49,048	38,105	36,647	55,408	68,967	74,154	92,957	116,019	97,049	85,303	90,429
Indonesia	52,846	69,162	46,793	76,542	82,142	74,416	107,569	85,206	76,489	98,393	68,480
Australia	16,566	18,281	10,518	28,483	32,589	29,674	45,818	53,258	49,255	35,816	66,196
Vietnam	24,682	36,307	45,419	76,109	72,289	66,650	83,360	93,256	82,463	81,563	58,301
New Zealand	4,691	6,026	13,797	24,368	54,680	57,227	66,474	75,478	70,619	67,544	57,952
Other	384,684	492,860	315,429	508,321	487,459	515,086	635,998	551,264	479,238	471,827	512,401
<b>Total</b>	<b>1,214,726</b>	<b>1,374,612</b>	<b>1,153,884</b>	<b>1,601,717</b>	<b>1,734,380</b>	<b>1,795,111</b>	<b>2,133,128</b>	<b>2,147,582</b>	<b>1,970,823</b>	<b>2,021,742</b>	<b>2,151,545</b>

Source: FAS GATS

In response to the initial US tariffs following the Section 232 and Section 301 investigation findings, Mexico and China imposed retaliatory tariffs on select US dairy products. These retaliatory tariffs are adversely impacting US dairy exports and will continue to do so for as long as they are in place. To understand the economic loss associated with the tariffs, a baseline model was run forecasting US dairy exports through 2023 under normal circumstances and was compared to a variation of the model accounting for the potential drop in US dairy exports as a direct result from the retaliatory tariffs. Normal circumstances in this context are defined as US dairy exports to China and Mexico in the absence of the retaliatory tariffs placed on US dairy products. The variation of the baseline model forecasts the potential drop in exports allowing for a direct comparison in export volumes and values through 2023. The specific tariffs imposed by China and Mexico on US dairy products along with their impacts are discussed in the next two sections.



## 1. China

As shown in Exhibit 5, US dairy product exports to China in 2017 were worth \$577 million or roughly 11 percent of total US dairy product exports by value. While US exports of dairy products to China have historically been lower than the US's top export market of Mexico, China has been increasing imports over a number of years. Annual growth in total US dairy product exports is around 6 percent while US dairy exports to China have been growing far above that at 14 percent annually over the past decade.

**Exhibit 5: US Dairy Product Exports to China**

Year	World		China		% China Share of World	
	MT	\$1,000	MT	\$1,000	MT	\$1,000
2007	1,214,726	2,978,228	90,755	153,552	7.5%	5.2%
2008	1,374,613	3,752,732	120,328	179,472	8.8%	4.8%
2009	1,153,884	2,235,082	153,078	137,467	13.3%	6.2%
2010	1,601,717	3,689,267	198,382	237,188	12.4%	6.4%
2011	1,734,380	4,786,243	236,362	362,158	13.6%	7.6%
2012	1,795,110	5,123,122	254,045	414,976	14.2%	8.1%
2013	2,133,127	6,714,510	342,124	706,206	16.0%	10.5%
2014	2,147,582	7,095,901	339,426	695,197	15.8%	9.8%
2015	1,970,823	5,239,709	293,954	451,164	14.9%	8.6%
2016	2,021,742	4,699,695	314,575	386,192	15.6%	8.2%
2017	2,151,545	5,382,850	386,486	576,969	18.0%	10.7%
<b>% Annual Growth</b>	5.9%	6.1%	15.6%	14.2%		

Source: FAS GATS

Over 55 percent of Chinese dairy product imports come from New Zealand alone while approximately 9 percent comes from the US. Combined, New Zealand and the EU supply over 80 percent of China's dairy product imports. While these two countries have a strong hold on the Chinese market, the US represents an important minority share of critical importance to the US industry.

As shown in Exhibit 6 and Exhibit 7, New Zealand and the EU supply around 1.6 million MT of dairy products to China worth nearly \$4 billion in 2017. New Zealand alone supplies roughly 900,000 MT worth \$2.7 billion in 2017. The US represents a smaller share, supplying approximately 338,000 MT of dairy products to China worth \$426 million in 2017.

**Exhibit 6: China Dairy Product Imports – Value**

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	744,634	862,891	1,030,397	1,969,614	2,620,573	3,215,831	5,187,799	6,412,061	3,180,587	3,371,463	4,818,566
<b>New Zealand</b>	290,918	320,380	584,725	1,297,439	1,642,153	2,021,411	3,273,581	4,132,189	1,710,973	1,841,475	2,715,576
<b>EU</b>	219,660	226,571	240,799	305,785	465,599	628,682	878,819	1,105,472	807,637	885,176	1,216,892
<b>United States</b>	106,516	151,428	102,416	178,597	292,580	313,621	544,075	585,420	296,994	267,221	426,192
<b>Australia</b>	81,196	125,786	72,306	127,798	133,953	138,748	227,508	315,412	263,606	288,860	369,664
<b>Other</b>	46,345	38,726	30,152	59,994	86,288	113,369	263,817	273,568	101,377	88,730	90,242

Source: GTT

### Exhibit 7: China Dairy Product Imports – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	298,702	351,068	598,022	745,390	905,968	1,145,834	1,592,176	1,812,608	1,610,682	1,955,585	2,173,991
<b>New Zealand</b>	94,930	78,439	247,364	380,778	434,268	590,442	796,573	881,487	626,304	764,955	901,140
<b>EU</b>	99,827	106,619	143,961	138,981	201,620	259,552	352,116	463,692	543,496	680,700	711,316
<b>United States</b>	57,498	109,159	148,087	159,355	191,412	204,280	277,312	277,874	264,005	310,072	338,039
<b>Australia</b>	25,827	39,479	35,536	40,054	40,070	46,482	68,085	98,755	113,153	134,360	160,644
<b>Other</b>	20,618	17,372	23,077	26,223	38,597	45,078	98,090	90,800	63,725	65,499	62,852

Source: GTT

The US faces steep competition in the Chinese market from New Zealand and the EU. The retaliatory tariffs China has imposed on US dairy products have decreased the ability of the US dairy sector to compete with other suppliers. As China continues to grow and demand more dairy products, any loss in market share becomes more difficult to reclaim as other countries fill the gap from decreased US exports to China. Shown in Exhibit 8 are the retaliatory tariffs China placed on US dairy products.

### Exhibit 8: Chinese Import Tariffs on Select US Dairy Products

HS Code	Product	MFN Rate Jul 1	Added 232 Rate Apr 2	Applied Rate Jul 1	Additional 301 Rate Jul 6	New Applied Rate Jul 6
0401.10.00	Milk & cream, fat≤ 1%, not concentrated nor sweetened	15	0	15	25	40
0401.20.00	Milk & cream, fat 1%-6%, not concentrated nor sweetened	15	0	15	25	40
0401.40.00	Milk & cream, fat 6%-10%, not concentrated nor sweetened	15	0	15	25	40
0401.50.00	Milk & cream, fat > 10%, not concentrated nor sweetened	15	0	15	25	40
0402.10.00	Milk & cream in solid forms, fat≤1.5%	10	0	10	25	35
0402.21.00	Milk & cream in solid forms, fat >1.5%, not sweetened	10	0	10	25	35
0402.29.00	Milk & cream in solid forms, fat >1.5%, sweetened	10	0	10	25	35
0402.91.00	Milk & cream not in solid form, concentrated, not sweetened	10	0	10	25	35
0402.99.00	Milk & cream not in solid form, concentrated, sweetened	10	0	10	25	35
0403.10.00	Yogurt	10	0	10	25	35
0403.90.00	Buttermilk	20	0	20	25	45
0404.10.00	Whey and modified whey	2	0	2	25	27
0404.90.00	Other products that contain natural milk constituents	20	0	20	25	45
0405.10.00	Butter	10	0	10	25	35
0405.20.00	Dairy spreads	10	0	10	25	35
0405.90.00	Other fats & oils derived from milk	10	0	10	25	35
0406.10.00	Fresh cheese, curd	12	0	12	25	37
0406.20.00	Grated or powdered cheese	8	0	8	25	33
0406.30.00	Other processed cheese	8	0	8	25	33
0406.40.00	Blue-veined cheese, other-veined cheese	8	0	8	25	33
0406.90.00	Other Cheese	8	0	8	25	33

Source: FAS GAIN Reports

#### (a) HS Code: 0401

Around 18 percent of Chinese dairy imports by value and 31 percent by volume enter the country under HS code 0401. As shown in Exhibit 9 and Exhibit 10, imports under HS 0401 amounted to 668,000 MT in 2017 worth \$879 million. The items covered under this code are: Milk and cream, not concentrated no containing added sugar or other sweetening matter.

### Exhibit 9: China Dairy Imports Under HS 0401 – Value

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	6,618	12,859	19,704	28,189	60,471	118,750	234,402	408,238	484,550	639,735	879,352
<b>EU</b>	2,278	3,500	5,889	10,704	21,620	50,046	129,720	237,875	276,786	361,974	413,457
<b>New Zealand</b>	3,789	7,242	10,505	15,810	33,208	45,464	57,969	82,977	115,141	188,455	377,621
<b>Australia</b>	448	1,686	1,442	1,381	4,945	14,583	24,985	49,425	64,790	66,198	69,094
<b>S. Korea</b>	7	210	1,450	51	156	3,533	8,853	15,658	17,370	16,237	14,152
<b>Other</b>	97	221	418	243	542	5,123	12,875	22,304	10,464	6,870	5,027

Source: GTT

### Exhibit 10: China Dairy Imports Under HS 0401 – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	4,109	7,535	12,763	15,889	40,521	93,795	184,567	320,206	459,556	634,101	667,556
<b>EU</b>	1,219	1,953	4,168	6,886	18,117	49,804	113,525	203,039	302,005	412,137	367,636
<b>New Zealand</b>	2,236	3,567	5,577	7,420	17,236	24,662	33,235	45,217	74,735	131,792	209,962
<b>Australia</b>	594	1,719	1,601	1,423	4,529	12,981	21,736	42,546	62,402	73,169	76,187
<b>S. Korea</b>	3	178	1,196	37	137	1,924	4,639	7,728	8,870	8,693	7,793
<b>Other</b>	57	117	221	123	502	4,426	11,431	21,676	11,544	8,311	5,978

Source: GTT

The EU accounts for about 47 percent of China's milk and cream import value under HS code 0401, followed by New Zealand with 43 percent, Australia with eight percent, South Korea with two percent and other suppliers with less than a percent.

#### (b) HS Code: 0402

Roughly 46 percent of Chinese dairy imports by value and 34 percent by volume enter the country under HS code 0402. As shown in Exhibit 11 and Exhibit 12, imports under HS 0402 amounted to 743,000 MT in 2017 worth \$2.2 billion. The items covered under this code are: Milk and cream, concentrated or containing added sugar or other sweetening matter.

### Exhibit 11: China Dairy Imports Under HS 0402 – Value

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	325,872	401,258	586,549	1,395,524	1,656,838	1,941,777	3,605,611	4,458,312	1,529,388	1,514,618	2,208,101
<b>New Zealand</b>	223,902	216,885	478,965	1,136,487	1,357,164	1,670,050	2,869,713	3,537,287	1,197,415	1,163,850	1,651,335
<b>EU</b>	16,671	21,665	47,133	97,126	112,657	126,042	246,306	367,391	152,413	169,111	274,175
<b>Australia</b>	45,975	89,348	40,719	87,332	77,029	57,431	125,715	162,600	108,168	128,343	191,322
<b>United States</b>	26,668	58,317	14,004	42,940	72,579	58,121	223,595	216,889	59,613	37,912	83,147
<b>Other</b>	12,657	15,043	5,727	31,639	37,409	30,133	140,282	174,145	11,779	15,403	8,122

Source: GTT

### Exhibit 12: China Dairy Imports Under HS 0402 – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	99,096	101,783	249,507	417,344	454,405	578,624	863,682	932,874	558,258	624,231	743,047
<b>New Zealand</b>	71,905	50,955	204,320	336,804	367,105	495,569	686,527	728,750	447,772	503,561	549,825
<b>EU</b>	4,816	5,427	18,169	30,328	33,051	39,405	61,046	85,288	57,766	67,206	102,786
<b>Australia</b>	12,481	24,558	18,232	25,071	21,929	16,733	28,208	33,288	27,164	31,406	53,804
<b>United States</b>	6,543	16,492	6,211	14,854	21,622	18,739	55,587	49,862	21,596	16,240	33,836
<b>Other</b>	3,351	4,351	2,576	10,288	10,699	8,177	32,312	35,685	3,960	5,817	2,794

Source: GTT

New Zealand accounts for about 75 percent of China’s milk and cream import value under HS code 0402, followed by the EU with 12 percent, Australia with nine percent, the US with four percent and other suppliers with less than a percent.

**(c) HS Code: 0403**

Approximately one percent of Chinese dairy imports by value and 2 percent by volume enter the country under HS code 0403. As shown in Exhibit 13 and Exhibit 14, imports under HS 0403 amounted to 34,000 MT in 2017 worth \$66 million. The items covered under this code are: Buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or flavored or containing added sugar or other sweetening matter, fruits, not or cocoa.

**Exhibit 13: China Dairy Imports Under HS 0403 – Value**

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	2,036	2,870	4,434	4,172	8,926	24,866	40,151	36,669	27,760	42,167	66,878
<b>EU</b>	547	1,242	1,370	1,597	3,222	5,852	6,156	6,685	10,087	23,098	49,854
<b>New Zealand</b>	129	50	1,072	213	2,183	14,549	28,800	23,278	9,556	10,164	10,838
<b>Switzerland</b>	1	234	496	741	1,065	1,308	1,565	1,735	3,389	3,024	2,486
<b>Australia</b>	654	644	689	993	1,424	1,460	2,024	2,275	1,850	1,740	1,818
<b>United States</b>	49	58	93	123	295	186	162	1,251	655	1,363	1,232
<b>Other</b>	657	643	713	505	737	1,512	1,442	1,446	2,223	2,779	650

Source: GTT

**Exhibit 14: China Dairy Imports Under HS 0403 – Quantity**

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	721	785	1,578	1,228	2,545	7,897	10,240	8,717	10,273	20,989	34,156
<b>EU</b>	172	305	433	522	1,068	2,246	2,232	2,622	4,922	13,009	27,929
<b>New Zealand</b>	36	13	605	49	603	4,304	6,558	4,317	2,947	4,571	4,331
<b>United States</b>	13	14	18	29	53	74	55	334	252	623	599
<b>Switzerland</b>	-	62	130	185	230	316	372	373	740	667	580
<b>Australia</b>	177	137	146	221	259	253	326	456	453	415	428
<b>Other</b>	320	254	246	222	332	704	697	615	960	1,705	290

Source: GTT

The EU accounts for about 75 percent of China’s import value under HS code 0403, followed by New Zealand with 16 percent, Switzerland with four percent, Australia with three percent, the US with two percent and other suppliers with one percent.

**(d) HS Code: 0404**

Around 14 percent of Chinese dairy imports by value and 24 percent by volume enter the country under HS code 0404. As shown in Exhibit 15 and Exhibit 16, imports under HS 0404 amounted to 530,000 MT in 2017 worth \$666 million. The items covered under this code are: Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified.

### Exhibit 15: China Dairy Imports Under HS 0404 – Value

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	319,474	313,033	284,226	344,874	571,391	748,063	850,453	788,402	525,442	452,387	666,351
<b>EU</b>	184,938	179,603	168,510	172,129	295,455	405,999	440,863	416,325	273,980	215,153	319,900
<b>United States</b>	73,429	81,134	80,138	121,805	189,674	212,115	267,954	294,089	181,440	186,206	280,825
<b>Argentina</b>	8,713	6,051	8,510	10,606	29,075	56,961	74,319	45,830	34,000	20,609	16,295
<b>New Zealand</b>	17,932	20,727	9,633	20,732	31,739	45,316	34,646	10,294	14,519	13,975	14,164
<b>Ukraine</b>	3,121	1,442	1,715	2,857	3,554	716	2,311	-	516	2,296	12,534
<b>Other</b>	31,341	24,076	15,718	16,744	21,894	26,956	30,360	21,862	20,988	14,148	22,634

Source: GTT

### Exhibit 16: China Dairy Imports Under HS 0404 – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	167,584	213,506	288,752	264,560	344,275	378,380	434,070	404,433	435,754	497,220	529,629
<b>United States</b>	49,723	90,478	140,019	141,524	162,933	173,615	206,987	208,378	229,373	283,885	290,499
<b>EU</b>	90,618	96,055	118,129	97,545	145,063	162,227	167,511	162,234	162,298	165,803	186,733
<b>Argentina</b>	5,046	2,817	5,767	4,805	16,803	23,556	37,259	22,058	28,107	24,838	15,092
<b>Ukraine</b>	2,200	1,875	3,175	3,075	3,050	550	1,625	-	925	3,700	13,600
<b>New Zealand</b>	4,787	6,753	3,728	5,140	4,900	5,741	4,568	1,427	3,142	3,107	3,297
<b>Other</b>	15,210	15,528	17,933	12,472	11,527	12,691	16,121	10,337	11,910	15,886	20,410

Source: GTT

The EU accounts for about 48 percent of China's whey import value under HS code 0404, followed by the US with 42 percent, Argentina with two percent, New Zealand with two percent, Ukraine with two percent and other suppliers with three percent.

#### (e) HS Code: 0405

Roughly 10 percent of Chinese dairy imports by value and 4 percent by volume enter the country under HS code 0405. As shown in Exhibit 17 and Exhibit 18, imports under HS 0405 amounted to 92,000 MT in 2017 worth \$500 million. The items covered under this code are: Butter, including dehydrated butter and ghee, and other fats and oils derived from milk; dairy spreads.

### Exhibit 17: China Dairy Imports Under HS 0405 – Value

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	36,838	59,044	65,716	91,405	183,685	195,662	226,120	378,011	265,483	303,150	500,158
<b>New Zealand</b>	26,096	46,412	53,231	73,496	159,700	169,827	189,576	331,736	212,626	248,639	417,377
<b>EU</b>	5,921	7,575	6,593	8,328	12,548	13,901	20,847	27,078	37,565	43,627	69,207
<b>Australia</b>	4,558	3,927	4,981	7,282	8,228	9,019	8,236	7,814	11,088	8,307	10,697
<b>Other</b>	263	1,130	911	2,299	3,208	2,914	7,461	11,384	4,205	2,577	2,877

Source: GTT

### Exhibit 18: China Dairy Imports Under HS 0405 – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	14,002	13,553	28,444	23,449	35,676	48,326	52,301	80,405	71,258	81,865	91,566
<b>New Zealand</b>	10,542	10,918	24,398	19,500	31,282	43,155	45,670	72,951	60,929	70,807	78,837
<b>EU</b>	1,559	1,339	1,623	1,555	1,887	2,213	3,193	3,867	6,769	8,466	10,287
<b>Australia</b>	1,789	1,024	2,135	1,779	1,827	2,265	1,827	1,512	2,613	1,996	1,956
<b>Other</b>	113	272	286	614	679	693	1,611	2,074	948	596	487

Source: GTT

New Zealand accounts for about 83 percent of China's butter import value under HS code 0405, followed by the EU with 14 percent, Australia with two percent and other suppliers with one percent.

## (f) HS Code: 0406

Approximately 10 percent of Chinese dairy imports by value and 5 percent by volume enter the country under HS code 0406. As shown in Exhibit 19 and Exhibit 20, imports under HS 0406 amounted to 108,00 MT in 2017 worth \$498 million. The items covered under this code are: Cheese and curd.

**Exhibit 19: China Dairy Imports Under HS 0406 – Value**

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	53,796	73,827	69,770	105,450	139,263	186,713	231,062	342,428	347,963	419,406	497,725
<b>New Zealand</b>	19,071	29,064	31,320	50,701	58,160	76,205	92,876	146,617	161,715	216,391	244,241
<b>EU</b>	9,305	12,988	11,303	15,901	20,097	26,841	34,927	50,118	56,806	72,214	90,299
<b>Australia</b>	16,059	16,472	16,352	21,322	28,651	39,208	52,676	81,425	64,773	76,955	87,226
<b>United States</b>	6,289	11,187	7,696	12,765	28,528	38,808	43,005	55,644	53,413	40,976	60,235
<b>Other</b>	3,072	4,116	3,099	4,761	3,827	5,651	7,578	8,624	11,255	12,871	15,725

Source: GTT

**Exhibit 20: China Dairy Imports Under HS 0406 – Quantity**

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	13,190	13,904	16,978	22,921	28,545	38,811	47,316	65,973	75,580	97,179	108,036
<b>New Zealand</b>	5,425	6,233	8,735	11,864	13,143	17,010	20,015	28,825	36,779	51,116	54,887
<b>Australia</b>	4,417	3,432	4,490	5,170	5,990	8,059	11,167	17,336	15,277	19,968	21,107
<b>EU</b>	1,443	1,538	1,439	2,146	2,434	3,657	4,609	6,641	9,735	14,080	15,945
<b>United States</b>	1,193	1,998	1,691	2,704	6,270	8,954	10,010	11,635	11,658	8,956	12,905
<b>Other</b>	710	703	623	1,038	708	1,131	1,514	1,537	2,132	3,058	3,190

Source: GTT

New Zealand accounts for about 49 percent of China's cheese import value under HS code 0406, followed by the EU with 18 percent, Australia with 18 percent, the US with 12 percent and other suppliers with three percent.

## 2. Mexico

Mexico has been the number one destination for US dairy products for decades, accounting for 24 percent of US exports by value in 2017 or around \$1.3 billion (Exhibit 21). US dairy product exports to Mexico have been growing at a compound annual growth rate (CAGR) of 4.4 percent. While 4.4 percent shows growth, it is lower than the CAGR of 6.1 at which total exports have been growing. Although exhibiting a slower growth rate than China, the volume sent to Mexico far exceeds the volume sent to China.

### Exhibit 21: US Dairy Product Exports to Mexico

Year	World		Mexico		% Mexico Share of World	
	MT	\$1,000	MT	\$1,000	MT	\$1,000
2007	1,214,726	2,978,228	280,953	853,310	23.1%	28.7%
2008	1,374,613	3,752,732	290,749	935,220	21.2%	24.9%
2009	1,153,884	2,235,082	277,270	637,371	24.0%	28.5%
2010	1,601,717	3,689,267	313,811	836,361	19.6%	22.7%
2011	1,734,380	4,786,243	370,705	1,166,445	21.4%	24.4%
2012	1,795,110	5,123,122	403,511	1,226,701	22.5%	23.9%
2013	2,133,127	6,714,510	415,545	1,429,215	19.5%	21.3%
2014	2,147,582	7,095,901	452,352	1,643,942	21.1%	23.2%
2015	1,970,823	5,239,709	480,260	1,280,058	24.4%	24.4%
2016	2,021,742	4,699,695	502,251	1,217,797	24.8%	25.9%
2017	2,151,545	5,382,850	524,609	1,312,298	24.4%	24.4%
% Annual Growth	5.9%	6.1%	6.4%	4.4%		

Source: FAS GATS

NAFTA grants the US tariff free access to much of Mexico's market where other top dairy producing countries, such as New Zealand, Australia and the EU, face tariffs. As such, over 70 percent of Mexico's dairy product imports come from the US (Exhibit 22 and Exhibit 23).

### Exhibit 22: Mexico Dairy Product Imports – Value

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	1,634,144	1,470,080	1,032,329	1,233,968	1,613,446	1,548,039	1,719,435	1,795,800	1,439,733	1,471,133	1,655,340
<b>United States</b>	894,760	904,817	629,299	806,826	1,056,900	1,138,524	1,346,545	1,462,485	1,058,030	1,064,821	1,178,252
<b>New Zealand</b>	355,457	282,765	207,663	224,761	291,607	183,383	190,836	151,873	145,261	220,657	202,806
<b>EU</b>	112,835	65,031	43,147	51,786	78,815	98,259	64,823	73,781	114,680	103,719	182,723
<b>Other</b>	271,094	217,467	152,220	150,596	186,124	127,873	117,231	107,661	121,763	81,937	91,560

Source: GTT

### Exhibit 23: Mexico Dairy Product Imports – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	481,320	406,306	436,504	399,088	443,320	469,432	450,017	435,132	493,368	550,623	584,400
<b>United States</b>	258,789	275,996	272,585	282,136	314,543	357,254	358,558	360,143	381,045	424,185	459,013
<b>EU</b>	29,136	11,882	11,956	11,800	16,847	24,845	12,472	14,919	34,492	30,904	58,055
<b>New Zealand</b>	109,778	62,819	91,739	61,289	65,191	48,331	47,834	32,411	41,106	66,404	40,756
<b>Other</b>	83,617	55,608	60,225	43,864	46,738	39,001	31,154	27,658	36,726	29,130	26,575

Source: GTT

US exports face less competition in Mexico than in China given NAFTA and geographic proximity; however, any measure that increases the cost of trade between the US and Mexico decreases the profitability of trade and opens the door for competing countries to capture US market share. The retaliatory tariffs (Exhibit 24) that Mexico has placed on US dairy products is having and will continue to have adverse impacts on the sector.

### Exhibit 24: Mexican Import Tariffs on US Cheese

HS Code	Product	Unit	Imp Tax	Current Tariff	Total Tax/Tariff
0406.10.01	Fresh cheese (unripe), including that of whey (Lacto serum), and cottage cheese (requesón).	KG	25	0	25
0406.20.01	Cheese of any kind, grated or powder.	KG	20	0	20
0406.90.04	Grana or Parmegiano-reggiano, with a fat content by weight less than or equal to 40%, with a water content by weight, in non-fat material, less than or equal to 47%; Danbo, Edam, Fontal, Fontina, Fynbo, Gouda, Havarti, Maribo, Samsøe, Esrom, Italic, Kernhem, Saint-Nectaire, Saint-Paulin or Taleggio, with a fat content by weight of less than or equal to 40%, a content by weight of water, in non-greasy matter, greater than 47% without exceeding 72%.	KG	20	0	20
0406.90.99	Other	KG	25	0	25

Source: FAS GAIN Reports

#### (a) HS Code: 0406

Roughly 31 percent of Mexican dairy imports by value and 21 percent by volume enter the country under HS code 0406. As shown in Exhibit 25 and Exhibit 26, imports under HS 0406 amounted to 122,000 MT in 2017 worth \$518 million. The items covered under this code are: Cheese and curd.

### Exhibit 25: Mexico Dairy Imports Under HS 0406 – Value

(\$ '000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	344,660	333,251	261,851	329,722	362,462	408,116	480,150	518,219	502,362	495,788	518,079
<b>United States</b>	165,019	191,883	162,468	208,193	223,323	291,518	366,495	401,727	380,109	371,437	386,542
<b>EU</b>	44,976	43,163	27,737	39,099	36,633	39,578	38,929	44,863	54,773	68,437	64,339
<b>Uruguay</b>	36,281	36,409	21,134	25,369	43,882	29,313	28,877	34,136	35,274	28,885	34,013
<b>Chile</b>	62,696	52,798	27,227	42,918	42,055	28,858	26,394	20,945	13,706	10,981	16,367
<b>New Zealand</b>	32,437	7,111	17,102	10,315	14,533	15,802	16,835	12,157	16,207	13,999	15,116
<b>Other</b>	3,252	1,888	6,182	3,827	2,037	3,047	2,621	4,392	2,292	2,050	1,704

Source: GTT

### Exhibit 26: Mexico Dairy Imports Under HS 0406 – Quantity

(MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>World Total</b>	86,036	68,246	73,074	80,360	78,054	89,317	103,394	99,206	116,054	126,094	121,510
<b>United States</b>	39,816	40,989	42,945	52,220	51,005	66,147	81,652	78,195	87,784	89,327	91,212
<b>EU</b>	9,672	7,415	6,343	7,492	5,388	6,791	5,962	7,260	11,785	18,838	13,892
<b>Uruguay</b>	9,494	7,025	6,517	6,172	8,322	5,941	6,020	6,007	7,623	8,979	8,011
<b>Chile</b>	16,033	11,055	8,614	10,090	9,012	6,072	5,285	4,172	3,350	3,187	4,090
<b>New Zealand</b>	10,257	1,488	6,192	3,528	4,016	3,861	4,069	2,905	5,131	5,428	4,076
<b>Other</b>	764	274	2,463	857	310	505	406	667	381	335	230

Source: GTT

The US accounts for about 75 percent of Mexico's cheese import value under HS code 0406, followed by the EU with 12 percent, Uruguay with seven percent, Chile with three percent, New Zealand with three percent and other suppliers with less than a percent.



## IV. TARIFF IMPACTS ON US DAIRY PRODUCT EXPORTS

### A. Baseline

The baseline model is a forward-looking model that forecasts US dairy production, domestic consumption, trade and stocks through 2023 on a milk equivalent<sup>3</sup> (ME) basis. The baseline is run under normal circumstances which, in this context, are defined as US dairy exports to China and Mexico in the absence of the retaliatory tariffs placed on US dairy products.

As shown in Exhibit 27 and Exhibit 28, total US dairy exports have grown 130 percent from 6.6 million MT on an ME basis in 2007 worth nearly \$3 billion to 15.3 million MT in 2017 worth approximately \$5.4 billion. Compound annual growth over this time was 8.7 percent. Under the baseline scenario, total US dairy exports are expected to increase to 19.1 million MT (Exhibit 29) in 2023 worth around \$8 billion (Exhibit 30) resulting in a compound annual growth of 3.7 percent.

**Exhibit 27: Baseline US ME Balance Table – Quantity**

('000 MT)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Production</b>	84,101	86,062	85,768	87,360	88,899	90,747	91,152	93,339	94,511	96,234	97,108
<b>Imports</b>	3,122	2,944	2,565	2,223	2,390	2,570	2,410	2,574	3,098	2,721	2,716
<b>Exports</b>	6,599	7,855	6,329	9,184	9,958	9,934	12,335	12,590	11,288	12,711	15,262
<b>China</b>	858	1,021	823	1,194	1,409	1,487	2,047	1,965	1,546	1,834	2,149
<b>Mexico</b>	1,518	1,807	1,456	2,112	2,338	2,600	2,663	2,895	3,190	3,407	3,392
<b>Other</b>	4,223	5,027	4,050	5,877	6,211	5,847	7,626	7,729	6,552	7,470	9,721
<b>Dom. Cons.</b>	80,035	80,297	81,333	80,141	81,420	82,586	81,557	82,786	85,790	86,648	86,941
<b>Total Stocks</b>	5,352	5,623	5,970	6,072	6,033	6,469	6,867	6,538	6,153	7,473	6,745

Source: Informa Agribusiness Intelligence

**Exhibit 28: Baseline US ME Balance Table – Value**

(\$ '000'000)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Imports</b>	2,553	2,772	2,192	2,169	2,480	2,718	2,664	3,019	3,069	2,966	2,856
<b>Exports</b>	2,978	3,753	2,235	3,689	4,786	5,123	6,715	7,096	5,240	4,700	5,383
<b>China</b>	154	179	137	237	362	415	706	695	451	386	577
<b>Mexico</b>	853	935	637	836	1,166	1,227	1,429	1,644	1,280	1,218	1,312
<b>Other</b>	1,971	2,638	1,460	2,616	3,258	3,481	4,579	4,757	3,508	3,096	3,494

Source: Informa Agribusiness Intelligence

**Exhibit 29: Baseline US ME Balance Table Forecast – Quantity**

('000 MT)	2018 (H2)	2019	2020	2021	2022	2023
<b>Production</b>	99,050	100,833	102,537	104,383	105,531	106,586
<b>Imports</b>	2,641	2,689	2,743	2,866	2,834	2,868
<b>Exports</b>	15,784	16,120	16,996	18,053	18,712	19,072
<b>China</b>	2,462	2,614	2,885	3,004	3,289	3,494
<b>Mexico</b>	3,426	3,511	3,695	3,843	3,959	4,057
<b>Other</b>	9,896	9,995	10,415	11,206	11,464	11,522
<b>Dom. Con.</b>	87,637	87,899	88,339	89,046	89,206	90,041
<b>Total Stocks</b>	5,017	4,519	4,464	4,614	5,060	5,401

Source: Informa Agribusiness Intelligence

<sup>3</sup> **Milk Equivalent** is the quantity of fluid milk used in a processed dairy product, usually expressed on a milk fat basis, e.g. one pound of cheese is the equivalent of 9.88 pounds of milk. (Source: USDA National Agricultural Library)

**Exhibit 30: Baseline US ME Balance Table Forecast – Value**

	2018 (H2)	2019	2020	2021	2022	2023
<b>Imports</b>	3,041	3,096	3,158	3,300	3,263	3,302
<b>Exports</b>	6,685	6,807	7,150	7,607	7,848	7,970
<b>China</b>	610	648	715	744	815	866
<b>Mexico</b>	1,599	1,639	1,725	1,794	1,848	1,894
<b>Other</b>	4,476	4,520	4,710	5,068	5,185	5,211

Source: Informa Agribusiness Intelligence

**1. China**

Currently, China is the second most important destination for US dairy exports. Exports to China have grown 150 percent from roughly 860,000 MT on an ME basis worth \$154 million in 2007 to 2.1 million MT worth \$577 million in 2017. Compound annual growth over this time was 9.6 percent. Under the baseline scenario, US dairy exports to China are expected to increase to 3.5 million MT in 2023 worth \$866 million resulting in a compound annual growth of 7.3 percent.

**2. Mexico**

Mexico has been the number one destination for US dairy products for decades. Exports to Mexico have grown over 120 percent from 1.5 million MT on an ME basis worth \$853 million in 2007 to 3.4 million MT worth \$1.3 billion in 2017. Compound annual growth over this time was 8.3 percent. Under the baseline scenario, US dairy exports to Mexico are expected to increase to almost 4.1 million MT in 2023 worth \$1.9 billion resulting in a compound annual growth of 3.4 percent.

**B. Tariff Impact Forecast**

The retaliatory tariff model, like the baseline model, is a forward-looking model that forecasts US dairy production, domestic consumption, trade and stocks through 2023 on an ME basis. The retaliatory tariff model considers the impact of the retaliatory tariffs on US dairy exports and forecasts the impacts on exports as an integral part of the US dairy sector.

**Exhibit 31: Tariff Impact US ME Balance Table Forecast – Quantity**

('000 MT)	2018 (H2)	2019	2020	2021	2022	2023
<b>Production</b>	98,852	99,949	101,048	102,867	103,999	104,935
<b>Imports</b>	2,571	2,588	2,680	2,778	2,783	2,820
<b>Exports</b>	15,364	14,330	14,904	15,848	16,305	16,491
<b>China</b>	2,093	653	634	621	615	606
<b>Mexico</b>	3,366	3,067	3,237	3,377	3,484	3,561
<b>Other</b>	9,906	10,609	11,033	11,850	12,205	12,324
<b>Dom. Con.</b>	87,737	88,255	88,696	89,916	90,185	90,997
<b>Total Stocks</b>	5,067	5,019	5,147	5,029	5,520	5,787

Source: Informa Agribusiness Intelligence

### Exhibit 32: Tariff Impact US ME Balance Table – Value

(\$ '000'000)	2018 (H2)	2019	2020	2021	2022	2023
<b>Imports</b>	2,593	2,610	2,703	2,802	2,807	2,845
<b>Exports</b>	6,570	6,392	6,658	7,090	7,299	7,386
<b>China</b>	519	162	157	154	153	150
<b>Mexico</b>	1,571	1,432	1,511	1,576	1,626	1,662
<b>Other</b>	4,480	4,798	4,990	5,359	5,520	5,574

Source: Informa Agribusiness Intelligence

Under the retaliatory tariffs, US dairy exports to China and Mexico are expected to decrease through 2023 by nearly 15 million MT worth \$4.2 billion. While total US dairy exports are forecast to decline over this timeframe, a portion of the lost exports to China and Mexico are expected to enter other markets. This reduces the total export loss from nearly 15 million MT worth \$4.2 billion to 11.5 million MT worth \$2.7 billion. Domestic production is forecast to increase through 2023, but at a slower rate of 1.2 percent annual growth versus 1.5 percent annual growth under the baseline. Domestic consumption is forecast to increase slightly through 2023. As domestic prices decline with the surplus of supply on the market, domestic consumption is forecast to rise. With the sudden loss in the Chinese and Mexican markets, stocks are expected to rise the highest in the short term as excess product is worked through the system before the US industry can adjust through increased exports to other markets, decreased production or other avenues in the domestic market.

### Exhibit 33: US ME Balance Table, Baseline and Tariff Difference – Quantity

('000 MT)	2018 (H2)	2019	2020	2021	2022	2023	Total
<b>Production</b>	-198	-884	-1,489	-1,516	-1,532	-1,652	<b>-7,270</b>
<b>Imports</b>	-70	-101	-63	-88	-51	-48	<b>-420</b>
<b>Exports</b>	-419	-1,790	-2,092	-2,205	-2,408	-2,581	<b>-11,494</b>
<b>China</b>	-369	-1,960	-2,252	-2,382	-2,673	-2,887	<b>-12,524</b>
<b>Mexico</b>	-60	-444	-458	-466	-475	-496	<b>-2,399</b>
<b>Other</b>	10	614	618	643	741	802	<b>3,429</b>
<b>Dom. Con.</b>	100	356	357	870	979	956	<b>3,618</b>
<b>Total Stocks</b>	50	500	683	415	460	386	<b>2,494</b>

Source: Informa Agribusiness Intelligence

### Exhibit 34: US ME Balance Table, Baseline and Tariff Difference – Value

(\$ '000'000)	2018 (H2)	2019	2020	2021	2022	2023	Total
<b>Imports</b>	-447.9	-485.5	-454.6	-497.9	-455.7	-457.3	<b>-2,799</b>
<b>Exports</b>	-114.9	-415.3	-492.3	-517.0	-549.3	-584.2	<b>-2,673</b>
<b>China</b>	-91.5	-485.9	-558.0	-590.4	-662.6	-715.6	<b>-3,104</b>
<b>Mexico</b>	-27.8	-207.1	-214.0	-217.6	-221.9	-231.4	<b>-1,120</b>
<b>Other</b>	4.5	277.6	279.7	291.0	335.2	362.9	<b>1,551</b>

Source: Informa Agribusiness Intelligence

## 1. China

US dairy exports to China are forecast to be more heavily impacted by the retaliatory tariffs than exports to Mexico. US dairy exports make up less than ten percent of total Chinese dairy imports; a small share compared to New Zealand and the EU that command approximately 60 percent and 21 percent of Chinese dairy imports respectively. With the relatively small share of the Chinese market that the US holds, adverse impacts to Chinese consumers due to the tariffs can be mitigated by increased imports from other

major suppliers that have established trade routes into China. While somewhat higher prices for products containing dairy will be experienced in China due to the tariffs, the desired impact to the US dairy sector that China intends with the tariffs is achieved while minimizing the harm to Chinese consumers.

Under the tariff impact model, US dairy exports to China are forecast to drop off sharply due to the retaliatory tariffs. Exports were 2.1 million MT in 2017 worth \$577 million. Under the baseline, exports are forecast to increase to 3.5 million MT in 2023 worth \$866 million. With the imposition of Chinese tariffs on select US dairy products, exports to China are forecast to fall to around 600,000 MT in 2023 worth \$150 million. Cumulatively through 2023, this equates to a loss of 12.5 million MT worth \$3.1 billion.

## **2. Mexico**

Mexico is the number one destination for US dairy products making up roughly 70 percent of total Mexican dairy imports. With this large share the US holds in the Mexican market, US dairy exports to Mexico are sensitive to any changes in market conditions. Despite this, US dairy exports to Mexico are forecast to decrease, but not as heavily as exports to China. US exporters still hold significant freight advantages into Mexico over other major suppliers such as the EU and New Zealand. This allows US exporters to take on some increased tariffs without losing significant market share in the short-term. However, the longer the tariffs are in place, the better positioned other suppliers may become to export to Mexico, such as the EU and Mexico implementing a free trade agreement granting the EU significant dairy access into Mexico.

US dairy exports to Mexico are forecast to drop due to the retaliatory tariffs. Exports were 3.4 million MT on an ME basis in 2017 worth \$1.3 billion. Under the baseline, exports are forecast to increase to 4.1 million MT worth \$1.9 billion in 2023. With the imposition of Mexican tariffs on US cheese products, exports to Mexico are forecast to be 3.6 MT in 2023 worth \$1.7 billion. Cumulatively through 2023, this equals a loss of 2.4 billion MT worth \$1.1 billion.

## V. IMPACT ON US FARMERS

The retaliatory tariffs are having, and will continue to have, a significant impact on US dairy farmers; especially in terms of farm-gate revenue. The retaliatory tariffs effectively raise the price of US dairy products in Chinese and Mexican markets. This price increase for Chinese and Mexican importers results in a decrease in quantity demanded as importers shift to lower cost suppliers. This decrease in quantity demanded in the world market leads to excess supply in the US market which lowers the price in the US. This sudden drop in price adversely impacts farmer's margins resulting in lower farm-gate revenue.

When margins are low, farmers reduce their herd by affordability. When demand declines leading to a fall in price and subsequently lower margins, farmers do not adjust herd sizes to meet the new demand, they adjust herd sizes to what they can afford. If a given price supports so many head and price drops, farmers adjust their herd to a level at which their operation can remain sustainable. With this reaction taking place on a disaggregated level across the entirety of the country, the herd reduction and ensuing reduction in milk production is often larger than the reduction in demand. This happens not only because decisions are being made independently based on each farmer's own economic feasibility, but also given the fact that when hard times hit, some farmers decide to retire early or sell off instead of adjusting to weather the hard times. This all leads to a disproportionately higher reduction in production given the reduction in demand.

The reduction in price that occurs from decreased demand allows US dairy products to become more attractive domestically as well as in foreign markets where the same products, previously sold at a higher price, are now priced low enough for import. This change allows the US dairy sector to begin to rebound from the tariff impacts. While this is good news for dairy, the US dairy herd takes time to rebuild. This necessity to rebuild negates the growth that would have been experienced if there had not been a need to consolidate following the tariff impacts. Meaning, instead of the US dairy sector simply continuing to grow from current levels, the sector now must fight to regain lost footing. Depending on how long the tariffs are in place, the US dairy sector may be working its way back to previous levels for years to come.

What all this comes down to is lower farm-gate revenue making farmers the biggest victims of the tariffs. The net loss to farmers at \$16.6 billion (Exhibit 35) is much greater than the net loss of exports at \$2.7 billion. Roughly 73 percent of the loss in farm-gate revenue is attributed to Chinese tariffs and 27 percent in attributed to Mexican tariffs.

### Exhibit 35: Farmer Impact – Aggregate Total (2018-2023)

	Baseline	Tariff	Change	% Change
Milk Price (Average, \$/cwt.)	17.09	16.44	-0.64	-3.8%
Milk Production ('000 MT)	618,960	612,875	-6,085	-1.0%
Herd Size ('000 Head)	58,139	57,455	684	1.2%
Domestic Consumption ('000 MT)	531,868	538,322	6,454	1.2%
Imports ('000 MT)	16,640	16,220	-420	-2.5%
Exports ('000 MT)	103,939	93,519	-10,420	-10.0%
Farm-Gate Revenue (Bil. \$)	233.39	216.82	-16.57	-7.1%

Source: Informa Agribusiness Intelligence

As shown in Exhibit 36, the baseline model forecasts an average price of \$17.09/cwt through 2023 with total production forecast at 619 million MT on an ME basis during the same timeframe. Under the retaliatory tariffs, price is forecast to drop \$0.64 to average around \$16.44/cwt (Exhibit 37) through 2023 with total production forecast at 613 million MT. This decline in price directly impacts farm-gate revenue. Under the baseline, farm-gate revenue through 2023 is forecast at roughly \$233 billion. Under the retaliatory tariffs, farm-gate revenue is forecast to total roughly \$217 billion through 2023. This equates to a reduction in farm-gate revenue worth \$16.6 billion.

### Exhibit 36: Farmer Impact – Baseline

	2018 (H2)	2019	2020	2021	2022	2023	Total
Milk Price (Average, \$/cwt.)	16.20	17.91	18.01	17.53	16.14	16.73	17.09
Milk Production ('000 MT)	99,050	100,833	102,547	104,393	105,541	106,597	618,960
Domestic Consumption ('000 MT)	87,637	87,899	88,339	89,046	89,206	89,741	531,868
Imports ('000 MT)	2,641	2,689	2,743	2,866	2,834	2,868	16,640
Exports ('000 MT)	15,784	16,002	16,872	17,900	18,529	18,853	103,939
Farm-Gate Revenue (Bil \$)	35.39	39.87	40.76	40.40	37.60	39.38	233.39

Source: Informa Agribusiness Intelligence

### Exhibit 37: Farmer Impact – Tariff Impact

	2018 (H2)	2019	2020	2021	2022	2023	Total
Milk Price (Average, \$/cwt.)	15.54	17.21	17.62	17.28	15.31	15.70	16.44
Milk Production ('000 MT)	98,852	99,949	101,048	102,867	103,999	104,935	612,875
Domestic Consumption ('000 MT)	87,637	88,655	89,098	90,524	90,796	91,613	538,322
Imports ('000 MT)	2,571	2,588	2,680	2,778	2,783	2,820	16,220
Exports ('000 MT)	15,364	14,418	14,991	15,909	16,340	16,497	93,519
Farm-Gate Revenue (Bil \$)	33.93	36.84	38.77	38.86	33.80	34.62	216.82

Source: Informa Agribusiness Intelligence

### Exhibit 38: Farmer Impact – Baseline and Tariff Difference

	2018 (H2)	2019	2020	2021	2022	2023	Total
Milk Price (Average, \$/cwt.)	-0.66	-0.70	-0.38	-0.25	-0.82	-1.03	-0.64
Milk Production ('000 MT)	-198.1	-883.9	-1,498.7	-1,525.7	-1,542.5	-1,661.9	-6,085
Domestic Consumption ('000 MT)	0.0	755.7	759.5	1,478.3	1,589.6	1,871.5	6,454
Imports ('000 MT)	-70.3	-100.8	-62.6	-88.0	-50.8	-47.6	-420
Exports ('000 MT)	-419.0	-1,584.4	-1,881.0	-1,990.7	-2,189.1	-2,356.1	-10,420
Farm-Gate Revenue (Bil \$)	-1.46	-3.02	-2.00	-1.54	-3.80	-4.76	-16.57

Source: Informa Agribusiness Intelligence

## A. Impacts from China

The impact from Chinese tariffs on US dairy products accounts for most of the total farm-gate revenue loss from the total retaliatory tariffs placed on US dairy products. Of the total farm-gate revenue loss of \$16.6 billion, China accounts for 73 percent at approximately \$12.2 billion.

**Exhibit 39: Farmer Impact – China Only**

	2018 (H2)	2019	2020	2021	2022	2023	Total
Milk Price (Average, \$/cwt.)	-0.48	-0.51	-0.28	-0.19	-0.61	-0.76	<b>-0.47</b>
Milk Production ('000 MT)	-145.6	-649.5	-1,101.4	-1,121.2	-1,133.5	-1,221.3	<b>-4,471</b>
Domestic Consumption ('000 MT)	0.0	555.3	558.1	1,086.4	1,168.2	1,375.3	<b>4,743</b>
Imports ('000 MT)	-51.7	-74.1	-46.0	-64.7	-37.3	-35.0	<b>-308</b>
Exports ('000 MT)	-307.9	-1,164.3	-1,382.3	-1,462.9	-1,608.7	-1,731.4	<b>-7,657</b>
Farm-Gate Revenue (Bil \$)	-1.07	-2.22	-1.47	-1.13	-2.79	-3.49	<b>-12.18</b>

Source: Informa Agribusiness Intelligence

## B. Impacts from Mexico

While the impact from the Chinese tariffs is larger, the Mexican tariffs still represent a sizeable impact on US farmers. Of the total farm-gate revenue loss of \$16.6 billion, Mexico accounts for 27 percent at roughly \$4.4 billion.

**Exhibit 40: Farmer Impact – Mexico Only**

	2018 (H2)	2019	2020	2021	2022	2023	Total
Diff Mexico Only							
Milk Price (Average, \$/cwt.)	-0.17	-0.18	-0.10	-0.07	-0.22	-0.27	-0.17
Milk Production ('000 MT)	-52.5	-234.3	-397.4	-404.5	-409.0	-440.6	-1,613
Domestic Consumption ('000 MT)	0.0	200.4	201.4	392.0	421.5	496.2	1,711
Imports ('000 MT)	-18.6	-26.7	-16.6	-23.3	-13.5	-12.6	-111
Exports ('000 MT)	-111.1	-420.1	-498.7	-527.8	-580.4	-624.7	-2,762
Farm-Gate Revenue (Bil \$)	-0.39	-0.80	-0.53	-0.41	-1.01	-1.26	-4.39

Source: Informa Agribusiness Intelligence

## VI. IMPACT ON US ECONOMY

### A. Input-Output Modeling

Input-output modeling was utilized to estimate the “ripple effects” that the dairy exports to Mexico have on the broader economy and key countries. The input-output tables and models allow determination of the impact of exogenous changes in final demand on output, while taking account of the interdependencies between different industries and regions, and accounting for leakages out of the economy through items such as imports and taxes.

For this analysis, IMPLAN Pro software was used. This IMPLAN model uses historical data to construct a fixed pricing model for 536 pre-defined sectors within the economy. This allows for a detailed examination of how various industries are impacted individually.

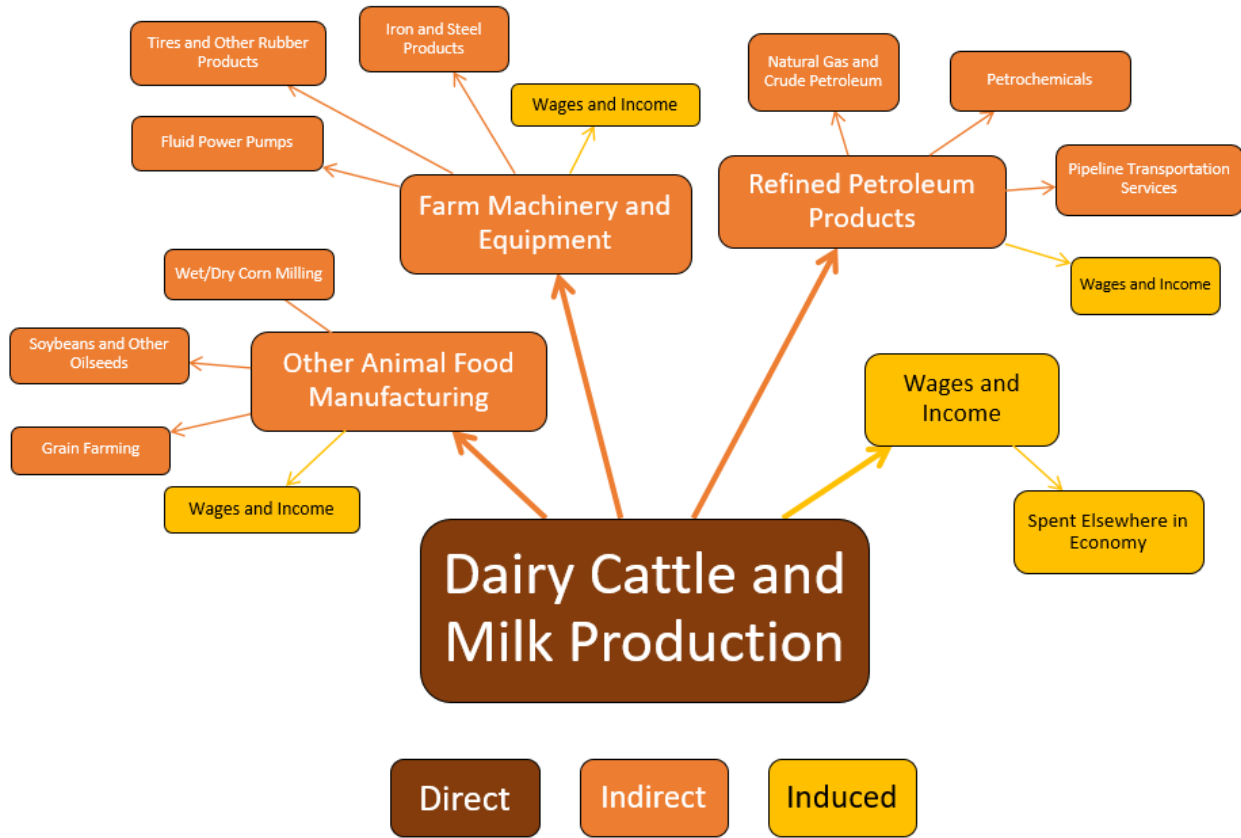
Informa used a customized approach to IMPLAN to estimate impacts on jobs, value added (essentially gross domestic product, or GDP) and output (industry sales). There are three different types of impacts incorporated into the analysis: direct, indirect and induced.

- Direct impacts reflect the economic activity that occurs in the industry(ies) in which investments are made or other changes occur. In this analysis, the direct impacts occur primarily at the dairy manufacturing level, or the industries that export their dairy products to Mexico and China. The direct impact to a country/region is the amount of added economic output or sales; IMPLAN also provides a measure of GDP added, along with full time equivalent (FTE) jobs.
- Indirect impacts are the additional economic impacts that occur to upstream industries, as participants in the directly impacted industry purchase inputs and services in order to produce their commodity or product. For example, decreased cheese production resulting from fewer exports to Mexico and China creates indirect impacts on upstream industries such as support activities for agriculture and dairy farming.
- Induced impacts are those impacts created by changes in the spending of labor income and profits generated by the direct and indirect impacts. In this analysis, wages for the jobs directly and indirectly supported by dairy product manufacturing are spent on goods and services such as housing, medical treatments and groceries. The spending creates induced impacts in these industries.

To illustrate how the direct, indirect, and induced impacts ripple throughout an economy, a simple example from a direct change to the US dairy cattle and milk production industry in IMPLAN is shown in Exhibit 41.



**Exhibit 41: Example of Backward Linkages/Upstream Industries Applied to Dairy Production**



Source: Informa Agribusiness Intelligence

One caveat to consider when interpreting these results is the nature of the IMPLAN modeling system. IMPLAN uses linear, unbounded models to trace the effects of changes in one industry in the entire economy. As such, IMPLAN models do not account for non-linear responses by industries. For example, IMPLAN models do not account for diminishing marginal returns to increasing output, do not account for increasing efficiencies with scale or scope, and assume less than full employment. Moreover, IMPLAN models assume prices and wages are fixed. The net effect of these model specifics is that results from IMPLAN models often represent the upper bound on expected impacts. Models that account dynamically for changes in prices and wages and can incorporate non-linear responses may offer results near the lower-bound or the mid-point of expected result ranges. Future research in this area could include such models to give additional robustness to results and implications.

## B. Retaliatory Tariffs Impact on the US Economy

### 1. Aggregate Impact

Results from the IMPLAN models suggest the implementation of new tariffs on the select US dairy industry exports into China and Mexico will have broad-reaching, detrimental impacts on the US economy. The negative effects are created not only by the direct impact to the dairy farming industry, but also to industries linked to dairy farming, like grain farming, veterinary services, transportation, and others. Moreover, the reduced spending from workers formerly employed in the dairy farming industry impacts multiple additional industries such as grocery stores, hospitals, retail stores, and others. This will continue as these “ripple effects” churn through the economy generating support to business sales, GDP, and employment for many other industries.

Results from the IMPLAN model examining the impact of Mexican and Chinese import tariffs on US dairy exports confirm the importance of the dairy sector to the US national economy. In total, from 2018-2023, the direct impacts from recent retaliatory tariffs in China and Mexico on US dairy products are expected to reduce dairy farming industry sales by \$2.7 billion.

The total economic impacts (direct, indirect, and induced impacts) created by increased tariffs by China and Mexico on select US dairy products further emphasize the impacts these tariffs would have on the broader US economy. As shown in Exhibit 42, when including impacts to industries that are linked to the dairy farming industry, retaliatory tariffs by China and Mexico will reduce US economic output by \$8.3 billion from 2018-2023.

Beyond sales impacts, the lost dairy exports will reduce US GDP by \$3.5 billion, and indirectly risk over 8,200 jobs throughout the broader economy. These additional “ripple effects” are generated in two ways: as indirect effects and as induced effects. As previously discussed, indirect effects are the result of the dairy manufacturing industry purchasing inputs such as raw fluid milk from dairy farmers, natural gas, electricity, and other important inputs. Induced effects occur when wages that the dairy industry and other indirect industries pay their employees are spent elsewhere in the economy. When interpreting these indirect and induced numbers, it should be noted that as opposed to being directly generated by dairy product production for export (such as the direct impacts), these effects are instead indirectly supported by the dairy industry.

Cumulatively, the economic “ripple effects” of lost dairy exports are 3.17 times as large as the value of dairy exports. In other words, for every \$1 lost in dairy exports, there is an additional \$2.17 lost in economic activity. This is known as a Type Social Accounting Matrix (SAM) multiplier, which describes the total output created in the study region resulting from one dollar of direct output. It is calculated by dividing the total effect (direct, indirect and induced) by the direct effect.

## Exhibit 42: Aggregate Economic Impact of Retaliatory Tariffs on US Economy

(\$ Million)	Employment	Labor Income	Value Added	Output
<b>Direct Effect</b>	1,848	\$550.5	\$836.0	\$2,618.2
<b>Indirect Effect</b>	3,594	\$870.9	\$1,471.0	\$3,588.9
<b>Induced Effect</b>	2,767	\$661.3	\$1,174.8	\$2,101.0
<b>Total Effect</b>	8,209	\$2,082.7	\$3,481.9	\$8,308.1

Source: Informa Agribusiness Intelligence, IMPLAN

Note: Employment is not aggregated, selected from peak year 2023; Values in 2018 dollars

## 2. China Impact

From 2018-2023, new tariffs on the US dairy industry would result in a loss of over 12.5 million MT of milk equivalent dairy products to China, totaling \$3.0 billion in total sales received by producers. Results from the IMPLAN model examining the impact of the loss of dairy exports to China confirm the significant impact that would be felt on the US economy. Cumulatively, the loss of exports to China could risk 2,264 FTE jobs in the dairy farming sector (in peak year 2023), while directly reducing aggregate GDP by \$970 million.

The total economic impacts (direct, indirect, and induced impacts) created by China's retaliatory tariffs on US dairy products confirms the significant impact that these tariffs would have on the broader economy. When including impacts to industries that are linked to the dairy farming industry, the total \$3.0 billion in business sales is magnified to over \$9.6 billion. Beyond business sales impacts, total impacts of lost dairy exports to China are indirectly putting over 10,000 jobs at risk (in peak year 2023) across the US and \$4.0 billion in GDP from 2018-2023 (Exhibit 43).

## Exhibit 43: Aggregate Economic Impacts of Chinese Tariffs on US Economy

(\$ Million)	Employment	Labor Income	Value Added	Output
<b>Direct Effect</b>	2,264	\$638.9	\$970.3	\$3,038.8
<b>Indirect Effect</b>	4,402	\$1,010.8	\$1,707.3	\$4,165.3
<b>Induced Effect</b>	3,389	\$767.5	\$1,363.5	\$2,438.5
<b>Total Effect</b>	10,056	\$2,417.2	\$4,041.1	\$9,642.5

Source: Informa Agribusiness Intelligence, IMPLAN

Note: Employment is not aggregated, selected from peak year 2023; Values in 2018 dollars

## 3. Mexico Impact

As expected, the results from the IMPLAN model examining the impact of the loss in cheese exports to Mexico show smaller impacts to the US economy. From 2018-2023, Mexico's retaliatory tariffs on US cheeses are expected to result in a loss of over 2.4 million metric tons of exports, valued at \$1.1 billion in sales received by producers. In total, 234 FTE jobs are at risk (in peak year 2023), while directly reducing aggregate GDP by \$119.8 million.

When including impacts to industries that are linked to the dairy farming industry, the total \$1.1 billion in business sales is magnified to \$4.3 billion. Looking beyond business sales impacts, as shown in Exhibit 44, the total impacts of lost cheese exports to Mexico indirectly risk over 3,000 jobs across the US and nearly \$1.5 billion in GDP from 2018-2023.

Given that Mexico’s tariffs are all cheese-based (HS code 0406), the IMPLAN model was run with impacts on the Cheese Manufacturing sector (Industry Code 86). Cumulatively, the economic “ripple effects” of lost dairy exports are 3.88 times as large as the value of dairy exports. In other words, for every \$1 lost in cheese exports, there would be an additional \$2.88 lost in economic activity.

**Exhibit 44: Aggregate Economic Impacts of Mexican Tariffs on US Economy**

(\$ Million)	Employment	Labor Income	Value Added	Output
<b>Direct Effect</b>	234	\$78.5	\$119.8	\$1,107.2
<b>Indirect Effect</b>	1,704	\$527.5	\$863.4	\$2,287.7
<b>Induced Effect</b>	1,132	\$284.6	\$505.6	\$904.5
<b>Total Effect</b>	3,070	\$890.6	\$1,488.8	\$4,299.4

Source: Informa Agribusiness Intelligence, IMPLAN

Note: Employment is not aggregated, selected from peak year 2023; Values in 2018 dollars

## VII. CONCLUSION

The current trade situation between the US and China and the US and Mexico is very fluid. The US tariffs placed on select Chinese and Mexican goods as well as the Chinese and Mexican retaliatory tariffs placed on select US goods can all be removed as easily as they were put in place. However, as the tariffs stand, the US dairy sector is poised to lose significant export shares in China as well as shares in Mexico.

Under the retaliatory tariffs, price is forecast to drop \$0.64 to average around \$16.44/cwt through 2023 with total production forecast at 613 million MT. This decline in price directly impacts farm-gate revenue. Under the baseline, farm-gate revenue through 2023 is forecast at roughly \$233.4 billion. Under the retaliatory tariffs, farm-gate revenue is forecast to total roughly \$216.8 billion through 2023. This equates to a **reduction in farm-gate revenue worth \$16.6 billion**. In 2018, lower farm-gate prices are forecast to reduce farm-gate revenues by roughly \$1.5 billion and roughly \$3 billion in 2019. Lost exports to China account for the bulk of the impact on farmers. Of the total \$16.6 billion loss in farm-gate revenue, \$12.2 billion or around 73 percent can be attributed to Chinese tariffs. Lost exports to Mexico account for the remainder of approximately \$4.4 billion or 27 percent of the total loss.

US dairy exports to China and Mexico account for around 35 percent of total US dairy exports worth roughly \$1.9 billion. The retaliatory tariffs directly reduce this amount by increasing the cost of US dairy exports leading to adverse impacts on the US dairy sector. US dairy product exports combined could fall by \$115 million in 2018 and \$415 million in 2019. The direct impact on exports resulting from the retaliatory tariffs is approximately a \$2.7 billion loss through 2023. When including impacts to industries that are linked to the dairy farming industry, US economic output is reduced by \$8.3 billion through 2023 and indirectly risks over 8,200 jobs throughout the broader economy.

The reduction in exports creates a surplus in the domestic market leading to a reduction in price which negatively impacts farmer revenue. As discussed in chapter four, the decreased exports to China and Mexico lead to an excess domestic supply which puts downward pressure on prices. This decline in prices paired with slow adjustments to production lead to significant loss in farm-gate revenue.

The longer US dairy exports are subject to tariffs above and beyond normal rates, the more market share the US will lose to foreign suppliers of the Chinese and Mexican markets. The future is uncertain for US dairy farmers making it difficult to plan any distance into the future with realistic expectations. What is for certain, is the US dairy sector will continue to suffer under Chinese and Mexican retaliatory tariffs for as long as they are in place.

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