



**HighQuest**  
P A R T N E R S

## **USSEC- Analysis of Transit Times, Transportation Costs and Predictability of Delivery**

Prepared for The United States Soybean Export Council (“USSEC”) and the Soy Transportation Coalition (“STC”)

September 23, 2014

# Our Understanding of the Situation

- The United States Soybean Export Council (“USSEC”), along with the Soy Transportation Coalition, is interested in developing a promotional piece that will quantify and compare transportation costs, transit times and predictability of delivery of transporting soybeans from the U.S., Argentina and Brazil to the major destination markets.
- The origins that have been selected include:
  - Mitchell, SD;
  - Davenport, IA;
  - Sorriso, Mato Grosso state, Brazil;
  - Londrina, Parana state, Brazil; and
  - Rufino, Santa Fe province, Argentina
- The destination markets that have been selected include:
  - Shanghai, China;
  - Tokyo, Japan;
  - Kaohsiung, Taiwan;
  - Jakarta, Indonesia;
  - Ho Chi Minh City, Vietnam;
  - Manila, Philippines;
  - Hamburg, Germany;
  - Rotterdam, the Netherlands; and
  - Port Said, Egypt

# Table of Contents

- **Executive Summary**
- **Transportation Costs**
- **Transit Times**
- **Predictability of Delivery**

# Executive Summary- Transportation Costs

- The cost of moving soybeans out of Sorriso, MT are higher than out of any other origin. This is primarily due to the high cost of moving soybeans from Sorriso to the primary ports in southern Brazil (Santos and Paranagua).
  - The cost of transporting soybeans by truck (truck accounts for ~60% of the soybeans moved from MT to the ports) from Sorriso, MT to Santos and Paranagua accounts for approximately 70% of the total transportation cost to move soybeans to final destination markets.
  - The cost of transporting soybeans from Londrina, PR to Paranagua is significantly lower than from Sorriso, MT due to the shorter distances that truckers have to travel. In this case, interior transportation accounts for approximately 35% of the total transportation cost to move soybeans to final destination markets.
- Argentina enjoys the cheapest transportation costs to the major destination markets primarily due to the fact that interior freight rates in Argentina are very low due to the short distances that soybeans have to travel to reach the port of Rosario. Although Argentina does experience some disadvantages in ocean freight due to the fact that Upriver facilities cannot load full Panamaxes due to low drafts in the Parana River and thus must be topped off in either Bahia Blanca or Rio Grande, the interior transportation advantage more than makes up for any ocean freight disadvantages.
- The U.S. has two outlets for exporting soybeans: the PNW and the Gulf. Although the PNW has a significant advantage over the Gulf in ocean freight rates to Asia, the cost of interior rail freight to the PNW is substantially higher than the cost of barge freight to the Gulf. As a result, the Gulf has enjoyed a transportation cost advantage to major Asian destinations over the PNW over the last five years. The PNW is not competitive on shipments to Europe and Egypt due to ocean freight distances.

# Executive Summary- Transportation Costs

## Average Transportation Costs from Major Origins to Major Destinations from 2009-13 (\$/MT)

	Mitchell, SD-PNW	Davenport, IA- NOLA	Sorriso, MT-Santos	Sorriso, MT- Paranagua	Londrina, PR- Paranagua	Rufino, SF- Rosario
Shanghai, China	\$85.00	\$77.96	\$174.77	\$186.83	\$84.81	\$77.12
Tokyo, Japan	\$82.15	\$76.61	\$179.22	\$187.68	\$85.66	\$77.97
Kaohsiung, Taiwan	\$86.70	\$78.46	\$178.32	\$186.78	\$84.76	\$77.07
Jakarta, Indonesia	\$93.70	\$80.96	\$175.07	\$183.53	\$81.51	\$73.82
HCMC, Vietnam	\$90.65	\$79.66	\$176.42	\$184.88	\$82.86	\$75.17
Manila, Philippines	\$88.70	\$82.76	\$175.42	\$187.48	\$85.46	\$77.77
Hamburg, Germany	N/A	\$56.46	\$156.32	\$165.93	\$63.91	\$56.22
Rotterdam, Netherlands	N/A	\$56.01	\$156.32	\$165.33	\$63.31	\$55.62
Port Said, Egypt	N/A	\$58.41	\$157.72	\$166.08	\$64.06	\$56.37

## Average Interior Freight as a Percentage of Total Freight from Major Origins to Major Destinations 2009-13 (%)

	Mitchell, SD-PNW	Davenport, IA- NOLA	Sorriso, MT-Santos	Sorriso, MT- Paranagua	Londrina, PR- Paranagua	Rufino, SF- Rosario
Shanghai, China	63%	31%	70%	69%	32%	29%
Tokyo, Japan	64%	32%	68%	69%	32%	28%
Kaohsiung, Taiwan	61%	31%	68%	69%	32%	29%
Jakarta, Indonesia	56%	30%	70%	71%	34%	30%
HCMC, Vietnam	58%	31%	69%	70%	33%	29%
Manila, Philippines	59%	29%	70%	69%	32%	28%
Hamburg, Germany	N/A	43%	78%	78%	43%	39%
Rotterdam, Netherlands	N/A	43%	78%	78%	43%	40%
Port Said, Egypt	N/A	42%	77%	78%	43%	39%

# Executive Summary- Transit Times in the U.S.

- While soybeans in the U.S., on average, have to travel the longest distances to reach the export facilities in NOLA and the PNW, the advanced rail and river infrastructure allows for soybeans to reach these markets in a timely manner and the modern infrastructure at the ports allows for quick loading and limited delays.
  - This is an advantage because rail lines and barges allow U.S. exporters to load a greater quantity of soybeans at a given time reducing per unit transportation costs, despite the longer distances.
- Travel times from Mitchell, SD to the major destination markets average approximately 19 days fewer than travel times out of Davenport, IA. The interior freight differential is 14 days, while the ocean freight differential is approximately five days.
- The ocean freight differential is even greater when one considers that the PNW is not competitive to Europe. The ocean freight from the PNW to Asian markets averages 17.67 days, while ocean freight from NOLA to the Asian markets averages 31.6 days, making the average transit time spread to Asia approximately 38 days.

Comparison of Transit Times between Mitchell, SD and Davenport, IA to Major Destination Markets						
	Mitchell, SD- PNW	PNW- destination	Mitchell, SD- Destination	Davenport IA- NOLA	NOLA- destination	Davenport, IA- Destination
Shanghai	8	16.80	24.80	22	29.80	51.8
Tokyo	8	12.80	20.80	22	27.30	49.3
Kaohsiung	8	16.50	24.50	22	31.10	53.1
Jakarta	8	22.30	30.30	22	34.80	56.8
Ho Chi Minh City	8	19.80	27.80	22	34.30	56.3
Manila	8	17.80	25.80	22	32.30	54.3
Rotterdam	8	26.60	34.60	22	14.50	36.5
Hamburg	8	27.40	35.40	22	15.20	37.2
Port Said	8	31.50	39.50	22	19.40	41.4
Average	8	21.28	29.28	22	26.52	48.52

## Executive Summary- Transit Times in Argentina

- In Argentina, soybeans reach the export facilities via truck, but the majority of soybean production occurs within 120-210 miles (200-350 KM) of the major ports leading to short interior transportation times. Also, the export facilities are located in areas which are relatively easy to access via highway and there is limited congestion at the ports. As a result, interior transit times in Argentina are shorter than in any of the major origins.
- However, Argentina does experience problems on the ocean freight side as the majority of the country's export capacity is located on the Parana River, and the river only has a draft of around 35 feet. This means that Panamax vessels can only load approximately 44,000 MT of soybeans in Rosario and then exporters have to top off their vessels in either Bahia Blanca or Rio Grande, which adds several days to ocean vessel transit times.
  - During summer months, especially during drought conditions, the draft of the river can recede due to a lack of rainfall which leads to vessels either holding less cargo or the potential for the river to be closed for extended periods.

Transit Times from Rufino, SF, Argentina to Major Destination Markets					
	Rufino, SF- Rosario	Rosario-Destination	Waiting Time at Port	Top Off	Rufino, SF- Destination
Shanghai	1	34.00	2.17	2.50	38.67
Tokyo	1	32.10	2.17	2.50	36.77
Kaohsiung	1	32.40	2.17	2.50	37.07
Jakarta	1	26.30	2.17	2.50	30.97
Ho Chi Minh City	1	29.50	2.17	2.50	34.17
Manila	1	31.30	2.17	2.50	35.97
Rotterdam	1	19.10	2.17	2.50	23.77
Hamburg	1	19.80	2.17	2.50	24.47
Port Said	1	21.60	2.17	2.50	26.27
<b>Average</b>	<b>1</b>	<b>27.34</b>	<b>2.17</b>	<b>2.50</b>	<b>32.02</b>

# Executive Summary- Transit Times in Brazil

- Brazil faces multiple transportation challenges both in the interior and at the ports.
  - Soybean production has grown at a much higher rate than storage infrastructure. As a result, farmers are forced to sell their soybeans at harvest and move the soybeans in trucks over long distances to the primary ports of Santos and Paranagua.
  - 61% of Brazilian soybeans move to Brazilian ports via truck, yet highway infrastructure in Brazil is decrepit and traffic levels are high (particularly during the harvest) which leads to significant spillage and congestion on the roads.
  - Law 12.619 passed in 2013 limits truckers' driving hours to eight hours per day and forces truck drivers to take at least a ½ hour break for every four hours of driving. This law was passed for safety concerns, but it has increased the number of days it takes truckers to travel from Mato Grosso and Parana to the ports of Santos and Paranagua substantially.
  - Brazilian ports are highly inefficient in their ability to offload trucks. During the harvest period, truck lines to enter ports have been reported to be as long as 30 miles (50KM) which leads to increased transit time delays.
  - Port infrastructure is weak. Drafts are too low to handle Cape size vessels in most ports and the channels need to be widened to increase vessel flow in the port areas. The Brazilian government has determined that it will dredge and increase the size of the channels in both Santos and Paranagua, but these projects are still up for bid.
  - Individual berths in Santos and Paranagua are uncovered. This means that vessels cannot be loaded when it rains which adds to waiting times and increases demurrage and other logistics costs for exporters. In 2013, the Port of Paranagua reported 51 days of halted grain loading during the first six months of the year, leading to ocean vessel waiting times that reached as high as 65 days during the peak season.



# Executive Summary- Opportunities to Decrease Brazilian Interior Transit Times

- The Brazilian government has begun to auction several highway and rail concessions to the private sector and the Ports of Santos and Paranagua have established electronic waiting for dump pits in an effort to decrease interior transit times.
- One of the concessions granted to the private sector is likely to have a significant impact on transit times in the future (the granting of a stretch of the BR-163 to Odebrecht).
  - The BR-163 is a highway which travels from Santarem in Para state through the soybean growing region in Mato Grosso and down to the major ports. This highway is of critical importance to the soybean industry as it enables farmers from Mato Grosso to reach the export ports in both the north and south of Brazil. The southern stretch of the BR-163 has been operational for years, but it has been in the hands of the Brazilian government which has mismanaged the road. The granting of the southern stretch of the BR-163 to Odebrecht, a private construction company, is likely to improve road conditions substantially as Odebrecht will be responsible for maintaining the road. This is likely to lead to improved roadways and lower transit times to the south when completed.
  - However, what will really improve the situation in Santos and Paranagua is if the northern section of the BR-163 is auctioned to the private sector. Currently, the vast majority of the northern route is unpaved and in the rain season it can be impassable. If this section of the highway were built up and improved, it would give soybean and corn farmers the option to truck their products to the southern or northern ports and would reduce congestion in Paranagua and Santos considerably.
  - Despite the exciting possibilities that this highway could offer, construction on both the northern and southern routes has been delayed by extensive bureaucracy in the federal and state governments, and it is unlikely that the full benefits of the BR-163 will be recognized in the near term.
- The electronic dump pits at the Ports of Santos and Paranagua have already made a substantial impact on waiting times for trucks to enter these ports. Upon loading soybeans in Sorriso or Londrina, truckers use an electronic device to program their dump date and time and request a dump date be assigned for the planned arrival at the port. Within a few hours after registering, the trucker can check to see which dump date and have been assigned to his load.
  - The ports set up this system as a result of the enormous traffic waiting to dump soybeans in 2012 and 2013. This system allows Santos and Paranagua to receive each day only the amount of soybeans and corn they can handle on a daily basis and to program the arrival of trucks accordingly.
  - As a result, Santos and Paranagua organize the arrival of trucks loaded with grains in four shifts: 12 AM- 6 AM; 6 AM- 12 PM; 12 PM- 6 PM; and 6 PM- 12 AM. A truck driver's slot will lie within these periods, and the ports allow for five hours of leeway.
  - The Port of Paranagua indicated that the wait is not to exceed 12 hours for a driver registered within their online system.
  - The one key caveat is that truckers must be registered within the ports online system in order to be eligible for the program.
  - This electronic system is expected to reduce waiting times for truckers registered within the system substantially, and reports out of Brazil say that lines are currently 30% shorter than they were in 2013.

# Executive Summary- Brazilian Transit Times to Major Destinations

Comparison of Brazilian Transit Times to Major Destinations Markets (Days)

	Sorriso-Santos	Waiting Time	Santos-Destination	Sorriso-Destination	Sorriso-Paranagua	Waiting Time	Paranagua-Destination	Sorriso-Destination	Londrina-Paranagua	Waiting Time	Paranagua-Destination	Londrina-Destination
Shanghai	8.5	9.05	32.80	50.35	9.25	10.93	32.80	52.98	6	10.93	32.80	49.73
Tokyo	8.5	9.05	34.30	51.85	9.25	10.93	34.30	54.48	6	10.93	34.30	51.23
Kaohsiung	8.5	9.05	31.60	49.15	9.25	10.93	31.60	51.78	6	10.93	31.60	48.53
Jakarta	8.5	9.05	25.50	43.05	9.25	10.93	25.50	45.68	6	10.93	25.50	42.43
Ho Chi Minh City	8.5	9.05	28.60	46.15	9.25	10.93	28.60	48.78	6	10.93	28.60	45.53
Manila	8.5	9.05	30.10	47.65	9.25	10.93	30.10	50.28	6	10.93	30.10	47.03
Rotterdam	8.5	9.05	16.30	33.85	9.25	10.93	16.30	36.48	6	10.93	16.30	33.23
Hamburg	8.5	9.05	17.10	34.65	9.25	10.93	17.10	37.28	6	10.93	17.10	34.03
Port Said	8.5	9.05	18.80	36.35	9.25	10.93	18.80	38.98	6	10.93	18.80	35.73
Average	8.5	9.05	26.12	43.67	9.25	10.93	26.12	46.30	6	10.93	26.12	43.05

- Surprisingly, interior transit times from the Brazilian interior to Santos and Paranagua (including the waiting times to enter the port) are relatively low compared to U.S. routes.
- However, the ocean vessel waiting times at the ports as well as the fact that the per unit transportation cost of moving soybeans by truck (relative to barge and rail) make interior transportation costs in Brazil very high and impact the competitiveness of Brazilian farmers substantially.
- It is the interior transportation costs which reduce prices for soybeans grown in Mato Grosso to a level where soybean farmers in Mato Grosso receive some of the lowest cash prices for their soybeans in the world.

# Executive Summary- Comparison of Total and Interior Transit Times from Major Origins to Destinations

Total Transit Times Between Key Origin and Destination Markets (Days)						
	Mitchell, SD	Davenport, IA	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina, PR	Rufino, SF
Shanghai	24.8	51.8	50.3	53.0	49.7	38.7
Tokyo	20.8	49.3	51.8	54.5	51.2	36.8
Kaohsiung	24.5	53.1	49.1	51.8	48.5	37.1
Jakarta	30.3	56.8	43.0	45.7	42.4	31.0
Ho Chi Minh City	27.8	56.3	46.1	48.8	45.5	34.2
Manila	25.8	54.3	47.6	50.3	47.0	36.0
Rotterdam	N/A	36.5	33.8	36.5	33.2	23.8
Hamburg	N/A	37.2	34.6	37.3	34.0	24.5
Port Said	N/A	41.4	36.3	39.0	35.7	26.3
<b>Average</b>	<b>25.7</b>	<b>48.5</b>	<b>43.7</b>	<b>46.3</b>	<b>43.1</b>	<b>32.0</b>

Interior Transit Time Breakout by Major Origin (Days)						
	Mitchell, SD- PNW	Davenport, IA- NOLA	Sorriso- Santos	Sorriso- Paranagua	Londrina-Paranagua	Rufino- Rosario
Transit to Port	8.00	22.00	8.50	9.25	6.00	1.00
Waiting Time at Port	0.00	0.00	9.05	10.93	10.93	2.17
<b>Total</b>	<b>8.00</b>	<b>22.00</b>	<b>17.55</b>	<b>20.18</b>	<b>16.93</b>	<b>3.17</b>

# Executive Summary- Predictability of Delivery

- Currently, HighQuest has received survey responses from 4 countries (China, Taiwan, Vietnam and Thailand) and 28 buyers have responded to these surveys.
- The respondents have identified Brazil as the least predictable origin in terms of shipment delays due to long vessel waiting times at the ports during the peak season, although both Vietnam and Thailand reported that they experience lengthy shipment delays regardless of origin.
- Many of the respondents (especially in China and Taiwan) said that predictability of delivery does matter to them because of the impacts that shipment delays have on their businesses. Impacts that buyers listed included:
  - High demurrage costs which get passed on to the buyer either through direct payment or in the initial price of the soybeans;
  - Potential foreign currency and interest rate risk;
  - The inability to match soybean purchases with sales of the end product which can lead to risk management issues;
  - Customer complaints focused on the timeliness of soybean meal and oil delivery
  - If the shipment arrives too late in China, the buyer may be forced to purchase soybeans at higher spot prices from domestic buyers or even from another origin;
  - Potential slowdowns in capacity utilization; and
  - Potential forced changes in buying patterns which could lead to international buyers increasing their purchases prior to the peak season in an effort to avoid costly delays during peak season.
    - In this case, buyers have to build additional storage to support additional soybean purchases and face additional inventory and working capital costs.

# Executive Summary- Examples of the Impact of Predictability of Delivery

- Two classic examples of the impact of late arrivals occurred last year in China and Thailand.
- In China, Sunrise Group, a large soybean trading company based in Shandong Province, was forced to cancel 3 million MT in soybean purchases from Brazil.
  - Sunrise has limited soybean processing capacity and the majority of its revenue comes from trading imported soybeans in the domestic market.
  - Sunrise had to substitute its 3 million MT of Brazilian purchases with purchases from soybean traders in the domestic market as well as some from the U.S. in order to fill its customer orders which led to a decrease in the availability of soybeans in the domestic market and higher local prices for soybeans as the market was expecting 3 million MT to arrive which never did.
  - The actual result was a net loss of 6 million MT of soybeans for crushers in China and considerable reputational risk damage for Sunrise as the delayed shipment meant that the only way that Sunrise could fill its customer orders was by buying soybeans in the domestic market, thus limiting soybean availability in China and raising prices for the entire market.
  - Sunrise lost considerable sums of revenue from the delays and was not able to fill its orders in a timely manner and as a result, the company announced in 2014 that it was in serious danger of exiting the market.
- In Thailand, Inteqc Feed reported that it had to purchase 5,000 MT of soybeans in the domestic market at significantly higher prices than its initial payment for imported soybeans due to late arrivals. The numbers were pretty staggering. Inteqc paid \$600/MT (or \$3 million) to cover the late arrivals at a price of 1,000 Thai Baht/MT higher than they had paid for their initial soybeans, which went directly to the businesses bottom line.

# Table of Contents

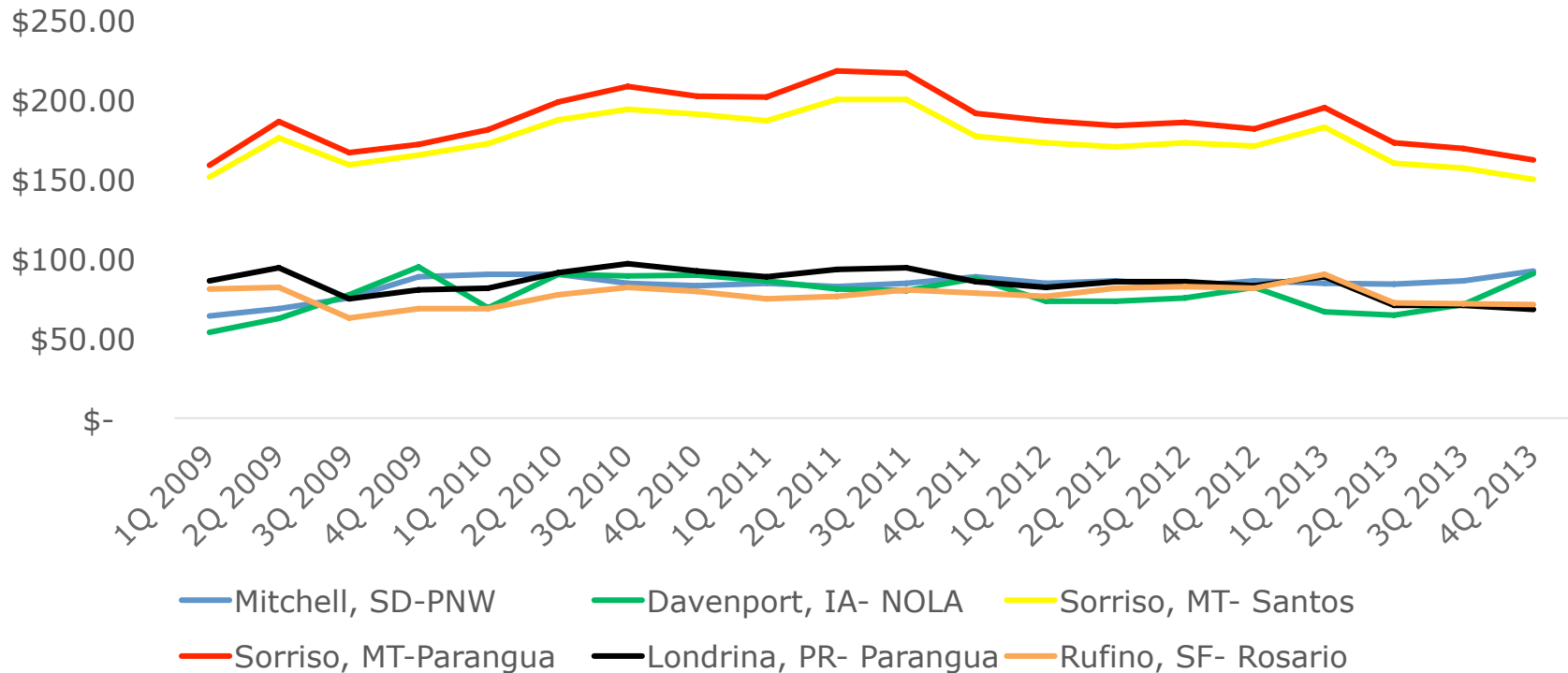
- Executive Summary
- **Transportation Costs**
- Transit Times
- Predictability of Delivery

# Transportation Costs

- The impact of transportation costs on delivered prices of soybeans to China varies by origin, but cannot be overstated.
- The U.S. enjoys favorable transportation costs to Shanghai, China due to its rail and river transportation infrastructure and its shorter distance to Shanghai than Argentina and Brazil.
- Argentina also enjoys extremely favorable interior transportation costs as the vast majority of soybean production is located within 180 miles (300 KM) of the primary port of Rosario. However, ocean freight rates to China out of Rosario are higher than the other origins due to distance and the fact that Argentine soybean shippers can only load 44,000 MT at Rosario due to the depth of the Parana river and are forced to top off cargoes in either Bahia Blanca, Argentina or Rio Grande do Sul, which leads to additional days on the water.
- Brazil can be divided into two sections: the south and the north.
  - Southern Brazil is the traditional hub of Brazil's soybean industry. Soybean growers in southern Brazil enjoy substantial advantages over northern Brazilian growers because they are much closer to the traditional ports of Santos and Paranagua, meaning interior freight rates are much lower in this region and cash prices are generally higher. However, this region of the country is very well developed in terms of soybean production and there is limited room for expansion in the region.
  - Northern Brazil is where expansion in the Brazilian soybean industry is expected to occur. Soybean growers in northern Brazil are at a disadvantage to soybean growers in the South due to the great distances (over 600 miles or 1,000 KM) that they have to travel to reach Santos and Paranagua. Transportation costs can add as much as 40% to the delivered price of soybeans at these ports and force soybean growers in the north to sell at discounted prices to those in the south.

# Comparison of Total Transportation Costs to Shanghai, China

Total Transportation Costs to China by Origin (\$/MT)



Average Transportation Costs to Shanghai, China						
	Mitchell, SD-PNW	Davenport, IA- NOLA	Sorriso, MT- Santos	Sorriso, MT-Parangua	Londrina, PR- Parangua	Rufino, SF- Rosario
2009	\$ 74.16	\$ 72.16	\$ 162.76	\$ 170.77	\$ 83.92	\$ 73.70
2010	\$ 87.12	\$ 84.67	\$ 186.05	\$ 197.26	\$ 90.52	\$ 76.96
2011	\$ 85.04	\$ 83.65	\$ 190.88	\$ 206.72	\$ 90.50	\$ 77.54
2012	\$ 84.84	\$ 75.96	\$ 171.61	\$ 184.22	\$ 84.08	\$ 80.50
2013	\$ 86.82	\$ 73.25	\$ 162.33	\$ 174.69	\$ 74.53	\$ 76.43

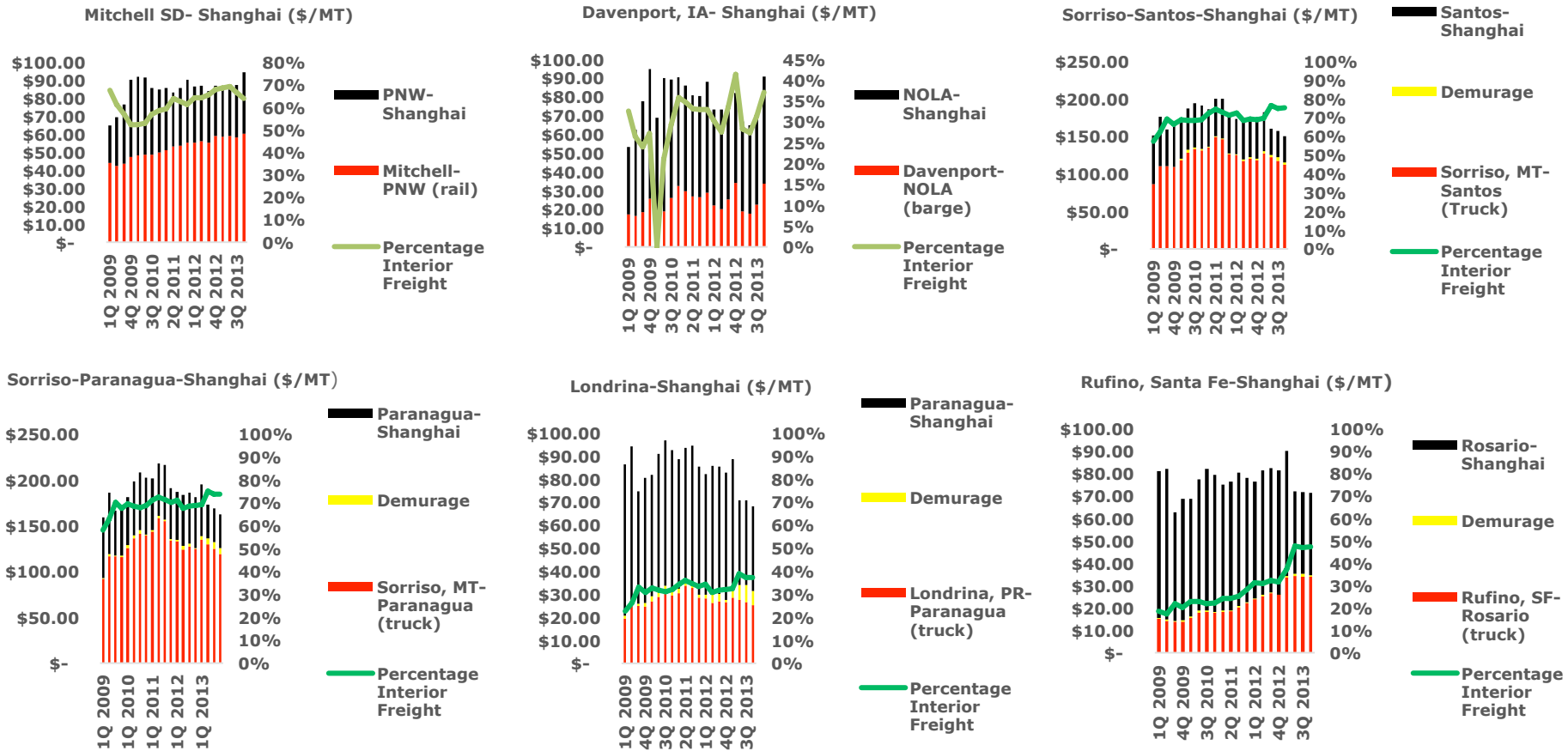


# Transportation Cost Spreads between the Origins- Shanghai, China

	Transportation Cost Spreads between the Origins to Shanghai, China (\$/MT)									
	Mitchell - Davenport	Mitchell- Sorriso	Mitchell- Sorriso	Mitchell- Londrina	Mitchell- Rufino	Davenport- Mitchell	Davenport- Sorriso	Davenport- Sorriso	Davenport- Londrina	Davenport- Rufino
2009	\$2.01	(\$88.60)	(\$96.60)	(\$9.75)	\$0.47	(\$2.01)	(\$90.60)	(\$98.61)	(\$11.76)	(\$1.54)
2010	(\$3.81)	(\$98.93)	(\$110.15)	(\$3.40)	\$10.16	\$3.81	(\$101.38)	(\$112.60)	(\$5.85)	\$7.71
2011	\$1.39	(\$105.83)	(\$121.68)	(\$5.46)	\$7.50	(\$1.39)	(\$107.22)	(\$123.07)	(\$6.85)	\$6.11
2012	\$8.88	(\$86.77)	(\$99.39)	\$0.76	\$4.34	(\$8.88)	(\$95.65)	(\$108.26)	(\$8.12)	(\$4.54)
2013	\$13.57	(\$75.51)	(\$87.86)	\$12.29	\$10.40	(\$13.57)	(\$89.08)	(\$101.43)	(\$1.28)	(\$3.17)
Average	\$4.41	(\$91.13)	(\$103.14)	(\$1.11)	\$6.57	(\$4.41)	(\$96.79)	(\$108.79)	(\$6.77)	\$0.91

- In terms of total transportation cost spreads, Rufino (in Santa Fe province, Argentina) is the most competitive origin to Shanghai. It has a \$0.91/MT advantage on the Davenport, IA to NOLA route and a \$6.57/MT advantage on the Mitchell, SD to the PNW route. This is largely due to the fact that it is located 156 miles (261 KM) from the Port of Rosario which drastically reduces interior freight cost.
- While ocean freight rates are lower from the PNW to China than from the Gulf, interior transportation is significantly higher. Soybeans have to travel much greater distances to reach the PNW from Mitchell, SD than to reach NOLA from Davenport, IA. The average transportation spread has favored the Davenport, IA- NOLA route since 2009.
- Londrina, PR to Paranagua is relatively competitive with Mitchell, SD on transportation costs to Shanghai. This is largely due to the fact that Londrina is located 161 miles (268 KM) from the port of Paranagua.
- The transportation cost spread between the Sorriso to Santos and Paranagua and the U.S. is prohibitive. Santos is somewhat lower due to the fact that it is a shorter distance from Sorriso to Santos (714 miles or 1,190 KM) than to Paranagua (757 miles or 1,262 KM). Interior truck rates account for the vast majority of the difference.

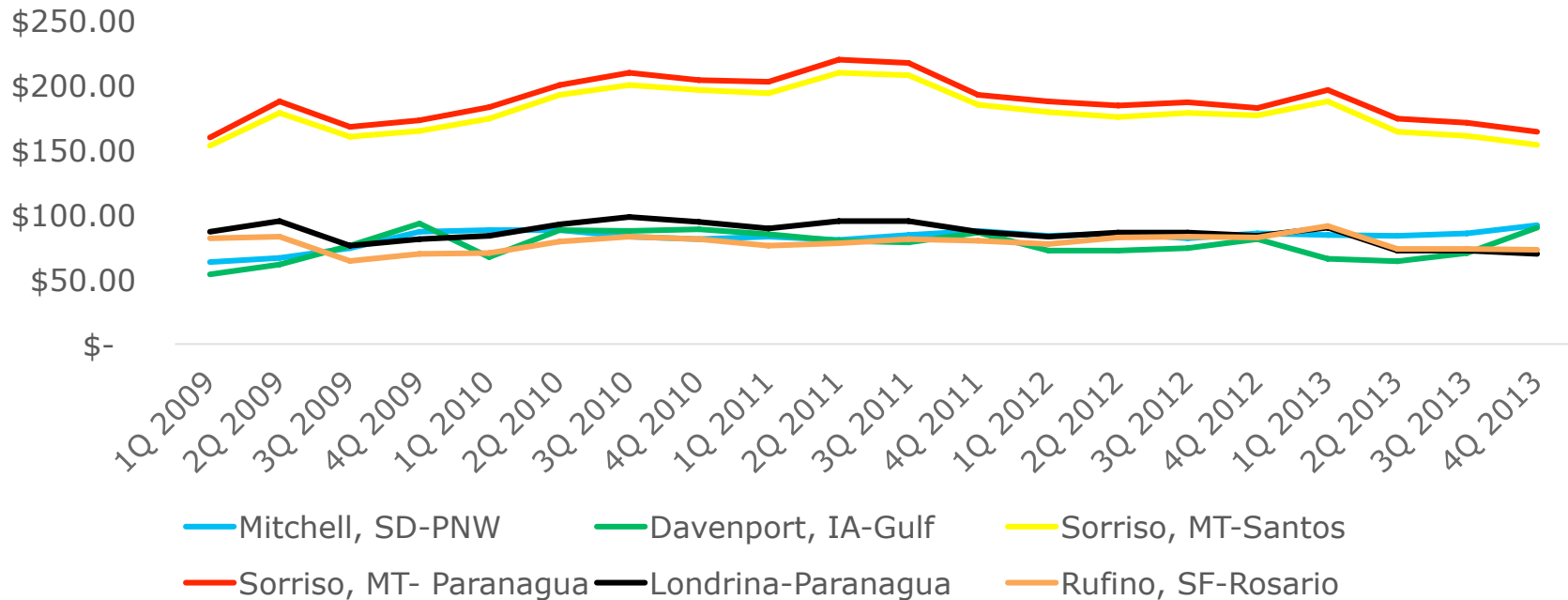
# Breakout of Transportation Costs to Shanghai, China by Origin by Quarter



Interior Freight as a Percentage of Total Freight to China						
	Mitchell, SD- Shanghai	Davenport, IA- Shanghai	Sorriso-Santos- Shanghai	Sorriso-Paranagua-Shanghai	Londrina-Shanghai	Rufino, SF- Shanghai
Average 2009-2013	63%	31%	70%	69%	32%	29%

# Comparison of Total Transportation Costs to Tokyo, Japan

Total Transportation Costs to Tokyo, Japan by Origin (\$/MT)



Average Transportation Cost to Tokyo, Japan							
	Mitchell, SD-PNW	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT- Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 72.44	\$ 70.87	\$ 163.73	\$ 171.51	\$ 84.66	\$ 74.45	
2010	\$ 84.89	\$ 87.81	\$ 190.46	\$ 198.59	\$ 91.85	\$ 78.29	
2011	\$ 83.67	\$ 82.30	\$ 198.63	\$ 207.65	\$ 91.43	\$ 78.47	
2012	\$ 83.82	\$ 74.85	\$ 177.15	\$ 184.77	\$ 84.63	\$ 81.05	
2013	\$ 85.92	\$ 72.44	\$ 166.12	\$ 175.87	\$ 75.71	\$ 77.61	

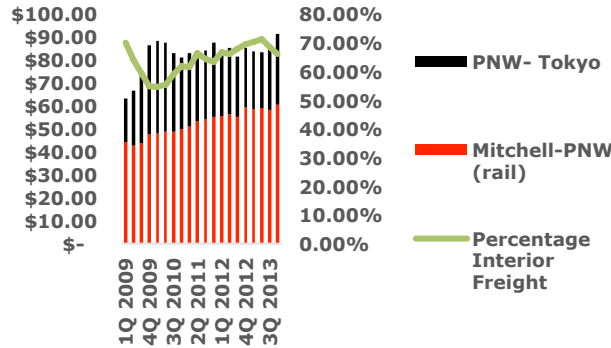
# Transportation Cost Spreads between the Origins- Tokyo, Japan

Transportation Cost Spreads to Tokyo, Japan between the Origins (\$/MT)										
	Mitchell-Davenport	Mitchell-Sorriso- San	Mitchell-Sorriso-PR	Mitchell-Londrina	Mitchell-Rufino	Davenport-Mitchell	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport-Rufino, SF
2009	\$1.57	(\$91.29)	(\$99.08)	(\$12.23)	(\$2.01)	(\$1.57)	(\$92.86)	(\$100.65)	(\$13.80)	(\$3.58)
2010	(\$2.92)	(\$105.57)	(\$113.70)	(\$6.96)	\$6.60	\$2.92	(\$102.65)	(\$110.78)	(\$4.04)	\$9.52
2011	\$1.37	(\$114.96)	(\$123.98)	(\$7.77)	\$5.20	(\$1.37)	(\$116.33)	(\$125.35)	(\$9.14)	\$3.83
2012	\$8.97	(\$93.33)	(\$100.96)	(\$0.81)	\$2.76	(\$8.97)	(\$102.31)	(\$109.93)	(\$9.78)	(\$6.21)
2013	\$13.48	(\$80.20)	(\$89.95)	\$10.21	\$8.32	(\$13.48)	(\$93.68)	(\$103.42)	(\$3.27)	(\$5.16)
Average	\$4.49	(\$97.07)	(\$105.53)	(\$3.51)	\$4.17	(\$4.49)	(\$101.56)	(\$110.03)	(\$8.00)	(\$0.32)

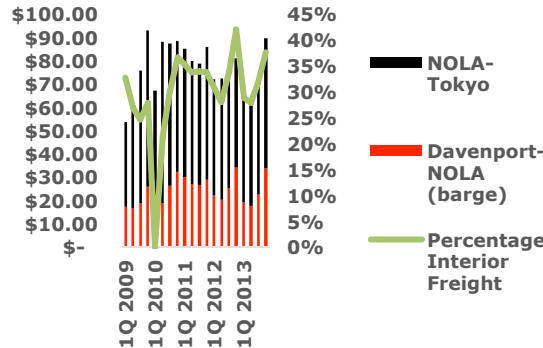
- In terms of total transportation cost spreads, Davenport, IA is the most competitive origin to Tokyo. It has a \$0.32/MT advantage on the Rufino, SF to Rosario route and a \$4.49/MT advantage on the Mitchell, SD to the PNW route. This is largely due to the longer shipping distance and higher ocean freight rates from Rosario to Japan than from NOLA to Japan.
- While ocean freight rates are lower from the PNW to China than from the Gulf, interior transportation is significantly higher. Soybeans have to travel much greater distances to reach the PNW from Mitchell, SD than to reach NOLA from Davenport, IA. The average transportation spread has favored the Davenport, IA- NOLA route since 2009.
- The transportation cost spread between the Sorriso to Santos and Paranagua and the U.S. is prohibitive. Santos is somewhat lower due to the fact that it is a shorter distance from Sorriso to Santos 714 miles (1,190 KM) than to Paranagua 757 miles (1,262 KM). Interior truck rates account for the vast majority of the difference.

# Breakout of Transportation Costs to Tokyo, Japan by Origin by Quarter

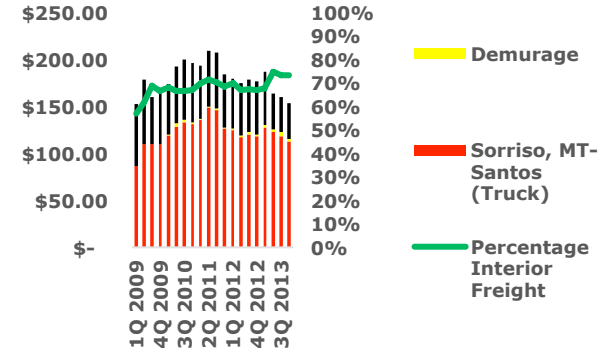
Mitchell, SD- Tokyo (\$/MT)



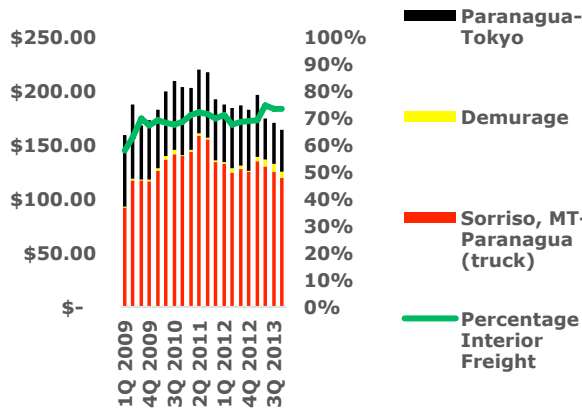
Davenport, IA- Tokyo (\$/MT)



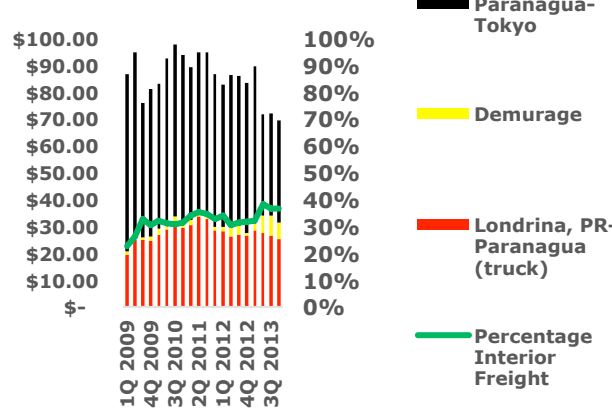
Sorriso-Santos-Tokyo (\$/MT)



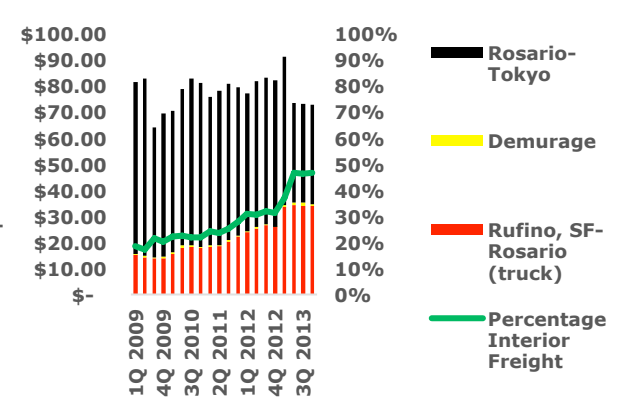
Sorriso-Paranagua-Tokyo (\$/MT)



Londrina-Tokyo (\$/MT)



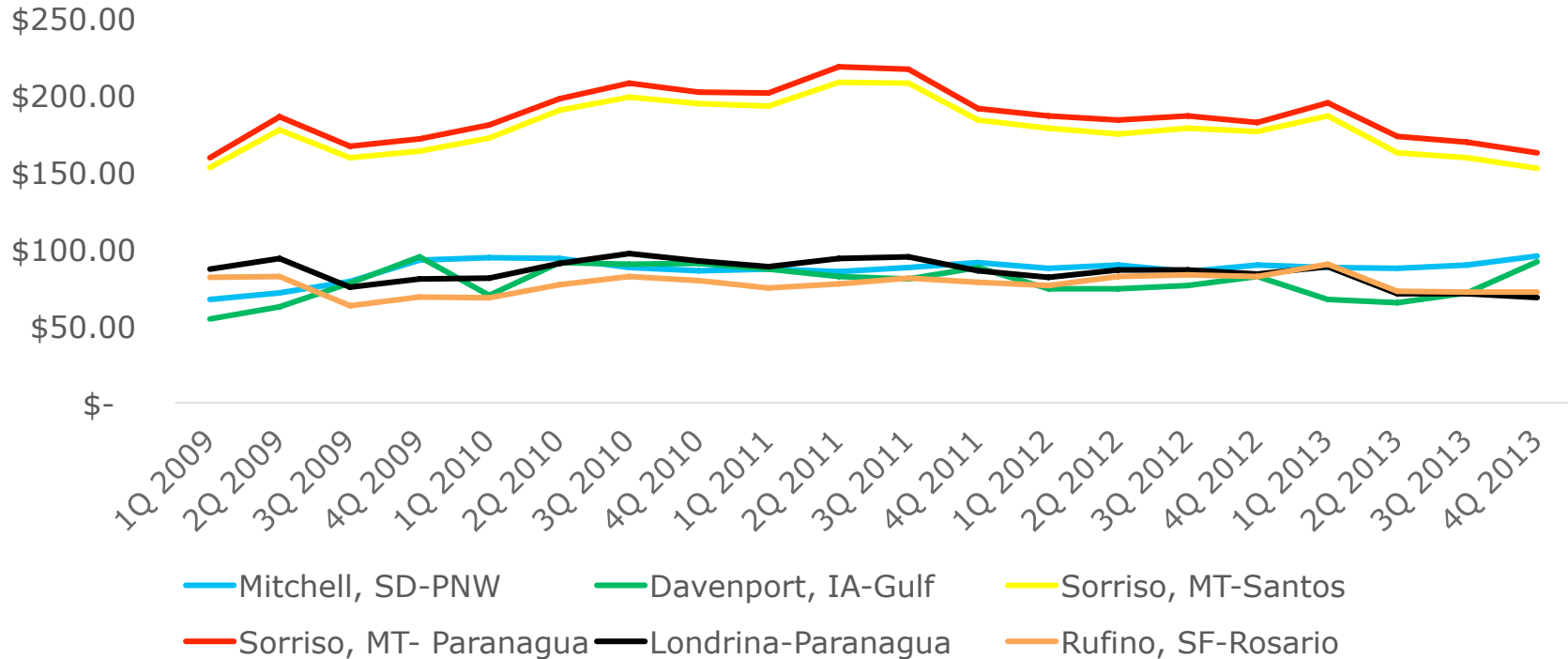
Rufino, Santa Fe-Tokyo (\$/MT)



Interior Freight as a Percentage of Total Freight to Japan						
	Mitchell, SD- Japan	Davenport, IA- Japan	Sorriso-Santos- Japan	Sorriso-Paranagua-Japan	Londrina-Japan	Rufino, SF- Japan
Average 2009-2013	64%	32%	68%	69%	32%	28%

# Comparison of Total Transportation Costs to Kaohsiung, Taiwan

Total Transportation Costs to Kaohsiung, Taiwan by Origin (\$/MT)



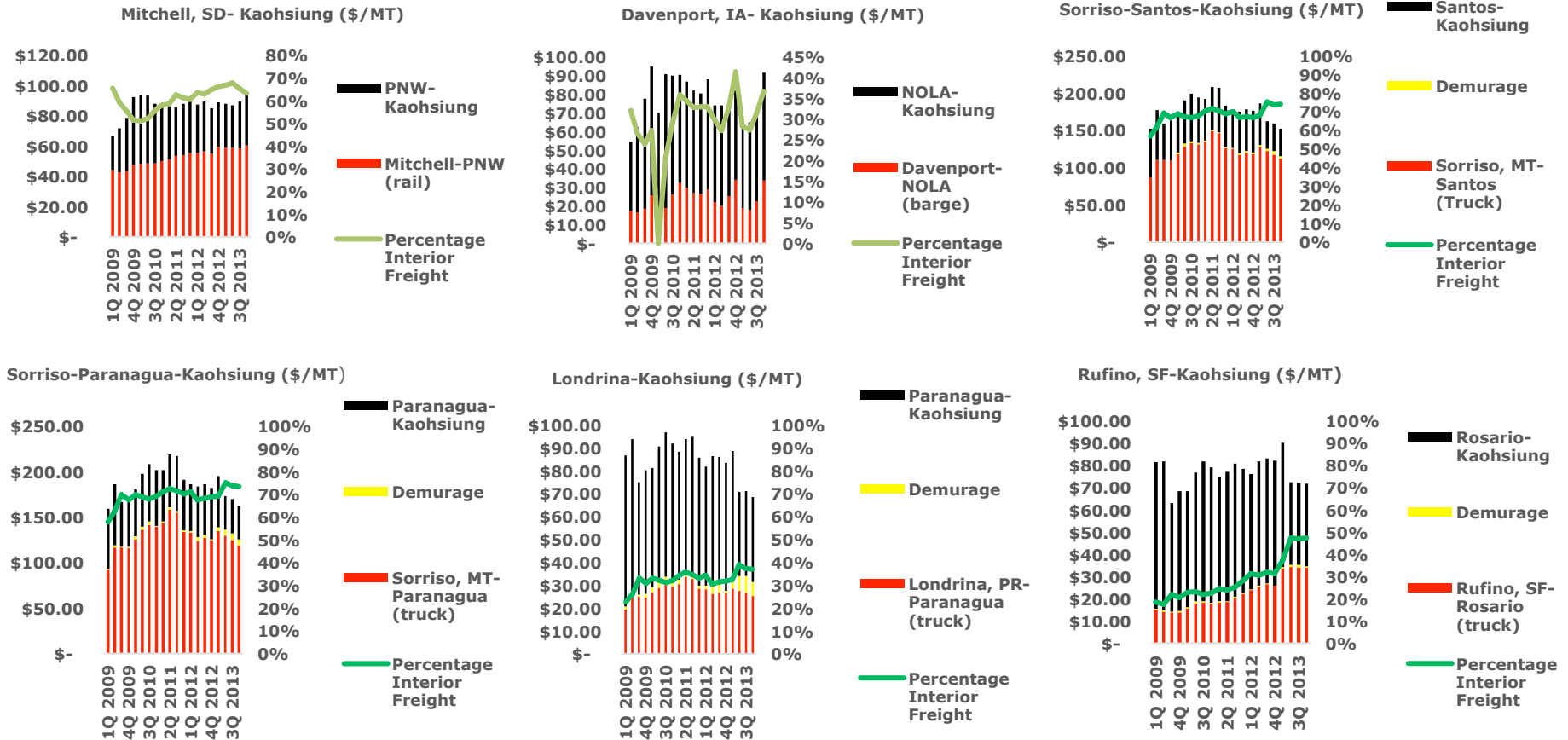
Average Transportation Cost to Kaohsiung, Taiwan							
	Mitchell, SD-PNW	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 77.44	\$ 72.37	\$ 162.98	\$ 170.76	\$ 83.91	\$ 73.70	
2010	\$ 90.39	\$ 90.48	\$ 188.71	\$ 196.84	\$ 90.10	\$ 76.54	
2011	\$ 87.92	\$ 84.30	\$ 197.88	\$ 206.90	\$ 90.68	\$ 77.72	
2012	\$ 87.82	\$ 76.60	\$ 176.90	\$ 184.52	\$ 84.38	\$ 80.80	
2013	\$ 89.92	\$ 73.69	\$ 165.12	\$ 174.87	\$ 74.71	\$ 76.61	

# Transportation Cost Spreads between the Origins- Kaohsiung, Taiwan

Transportation Cost Spreads to Kaohsiung, Taiwan between the Origins (\$/MT)										
	Mitchell-Davenport	Mitchell-Sorriso- San	Mitchell-Sorriso-PR	Mitchell-Londrina	Mitchell-Rufino	Davenport-Mitchell	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport-Rufino, SF
2009	\$5.07	(\$85.54)	(\$93.33)	(\$6.48)	\$3.74	(\$5.07)	(\$90.61)	(\$98.40)	(\$11.55)	(\$1.33)
2010	(\$0.09)	(\$98.32)	(\$106.45)	\$0.29	\$13.85	\$0.09	(\$98.23)	(\$106.37)	\$0.38	\$13.94
2011	\$3.62	(\$109.96)	(\$118.98)	(\$2.77)	\$10.20	(\$3.62)	(\$113.58)	(\$122.60)	(\$6.39)	\$6.58
2012	\$11.22	(\$89.08)	(\$96.71)	\$3.44	\$7.01	(\$11.22)	(\$100.31)	(\$107.93)	(\$7.78)	(\$4.21)
2013	\$16.23	(\$75.20)	(\$84.95)	\$15.21	\$13.31	(\$16.23)	(\$91.43)	(\$101.17)	(\$1.02)	(\$2.91)
Average	\$7.21	(\$91.62)	(\$100.08)	\$1.94	\$9.62	(\$7.21)	(\$98.83)	(\$107.29)	(\$5.27)	\$2.41

- In terms of total transportation cost spreads, Rufino is the most competitive origin to Kaohsiung, Taiwan. It has a \$2.41/MT advantage on the Davenport, IA to NOLA route and a \$9.52/MT advantage on the Mitchell, SD to the PNW route. The short interior distance between Rufino and Rosario account for most of the difference, but Argentina also enjoys ocean freight advantages over NOLA to Taiwan.

# Breakout of Transportation Costs to Kaohsiung, Taiwan by Origin by Quarter

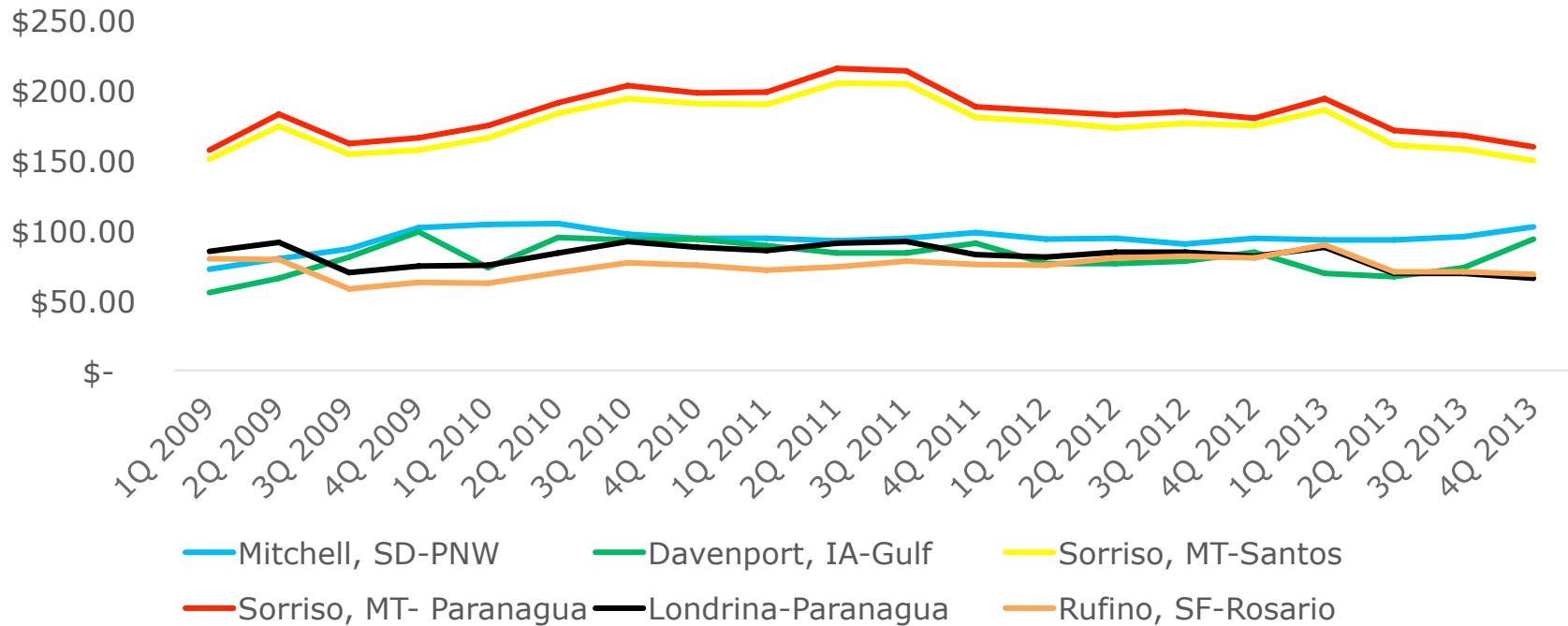


Interior Freight as a Percentage of Total Freight to Taiwan						
	Mitchell, SD- Taiwan	Davenport, IA- Taiwan	Sorriso-Santos- Taiwan	Sorriso-Paranagua-Taiwan	Londrina-Taiwan	Rufino, SF- Taiwan
Average 2009-2013	61%	31%	68%	69%	32%	29%



# Comparison of Total Transportation Costs to Jakarta, Indonesia

Total Transportation Costs to Jakarta, Indonesia by Origin (\$/MT)



Average Transportation Cost to Jakarta, Indonesia							
	Mitchell, SD-PNW	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 84.94	\$ 75.12	\$ 158.98	\$ 166.76	\$ 79.91	\$ 69.70	
2010	\$ 99.89	\$ 93.81	\$ 183.21	\$ 191.34	\$ 84.60	\$ 71.04	
2011	\$ 94.67	\$ 86.80	\$ 194.88	\$ 203.90	\$ 87.68	\$ 74.72	
2012	\$ 93.07	\$ 78.60	\$ 175.15	\$ 182.77	\$ 82.63	\$ 79.05	
2013	\$ 95.92	\$ 75.69	\$ 163.12	\$ 172.87	\$ 72.71	\$ 74.61	

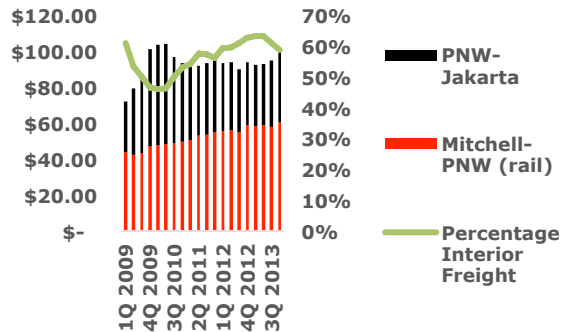
# Transportation Cost Spreads between the Origins- Jakarta, Indonesia

Transportation Cost Spreads to Jakarta, Indonesia between the Origins (\$/MT)										
	Mitchell-Davenport	Mitchell-Sorriso- San	Mitchell-Sorriso-PR	Mitchell-Londrina	Mitchell-Rufino	Davenport-Mitchell	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport-Rufino, SF
2009	\$9.82	(\$74.04)	(\$81.83)	\$5.02	\$15.24	(\$9.82)	(\$83.86)	(\$91.65)	(\$4.80)	\$5.42
2010	\$6.08	(\$83.32)	(\$91.45)	\$15.29	\$28.85	(\$6.08)	(\$89.40)	(\$97.53)	\$9.21	\$22.77
2011	\$7.87	(\$100.21)	(\$109.23)	\$6.98	\$19.95	(\$7.87)	(\$108.08)	(\$117.10)	(\$0.89)	\$12.08
2012	\$14.47	(\$82.08)	(\$89.71)	\$10.44	\$14.01	(\$14.47)	(\$96.56)	(\$104.18)	(\$4.03)	(\$0.46)
2013	\$20.23	(\$67.20)	(\$76.95)	\$23.21	\$21.31	(\$20.23)	(\$87.43)	(\$97.17)	\$2.98	\$1.09
Average	\$11.69	(\$81.37)	(\$89.83)	\$12.19	\$19.87	(\$11.69)	(\$93.06)	(\$101.53)	\$0.50	\$8.18

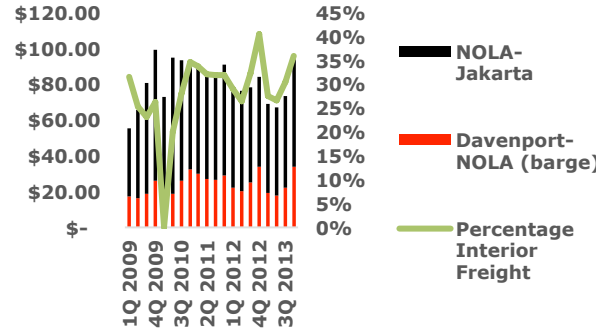
- In terms of total transportation cost spreads, Rufino is the most competitive origin to Jakarta, Indonesia. It has a \$8.18/MT advantage on the Davenport, IA to NOLA route and a \$19.87/MT advantage on the Mitchell, SD to the PNW route. The short interior distance between Rufino and Rosario account for most of the difference, but Argentina also enjoys significant ocean freight advantages over NOLA to Indonesia as the travel time between Argentina and Jakarta is 8.5 days shorter than from NOLA to Jakarta.
- The Londrina, PR to Paranagua route to Jakarta is also more competitive than either U.S. route to Jakarta. Londrina is favored by \$0.50/MT over NOLA and \$12.19/MT over the PNW. This is entirely due to the spread in days on the water which favors Paranagua by 9.3 days over NOLA and which favors the PNW by only 3.2 days over Paranagua.
- Indonesia is different than most other Asian markets in that the majority of soybeans imported by the country are used for human consumption rather than for crush purposes. As a result, the U.S. can overcome these transportation spreads due to large quantity of food-grade soybeans that it produces compared to Argentina and southern Brazil.

# Breakout of Transportation Costs to Jakarta, Indonesia by Origin by Quarter

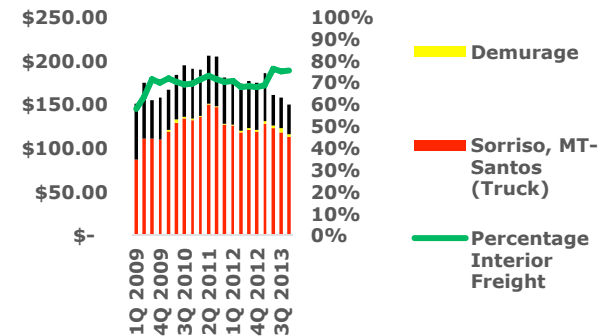
Mitchell, SD- Jakarta (\$/MT)



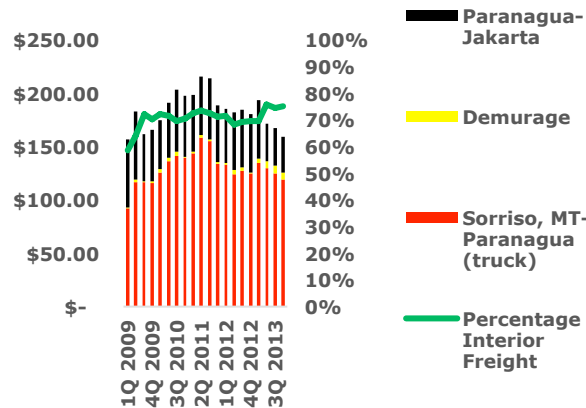
Davenport, IA- Jakarta (\$/MT)



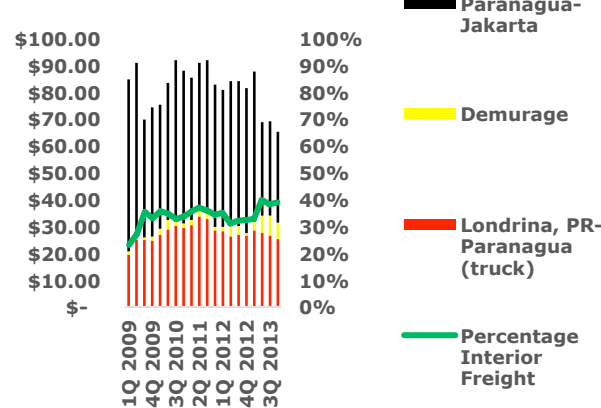
Sorriso-Santos-Jakarta (\$/MT)



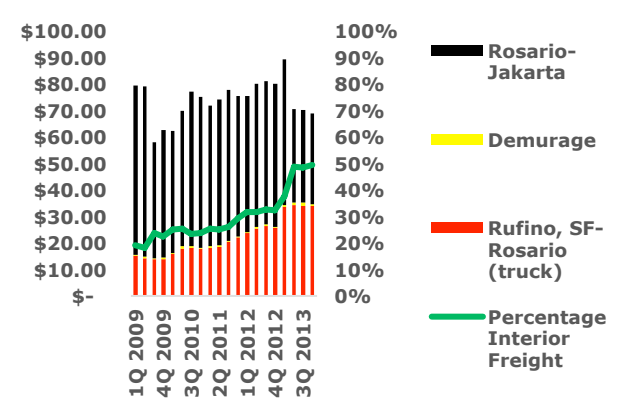
Sorriso-Paranagua-Jakarta (\$/MT)



Londrina-Jakarta (\$/MT)



Rufino, SF-Jakarta(\$/MT)

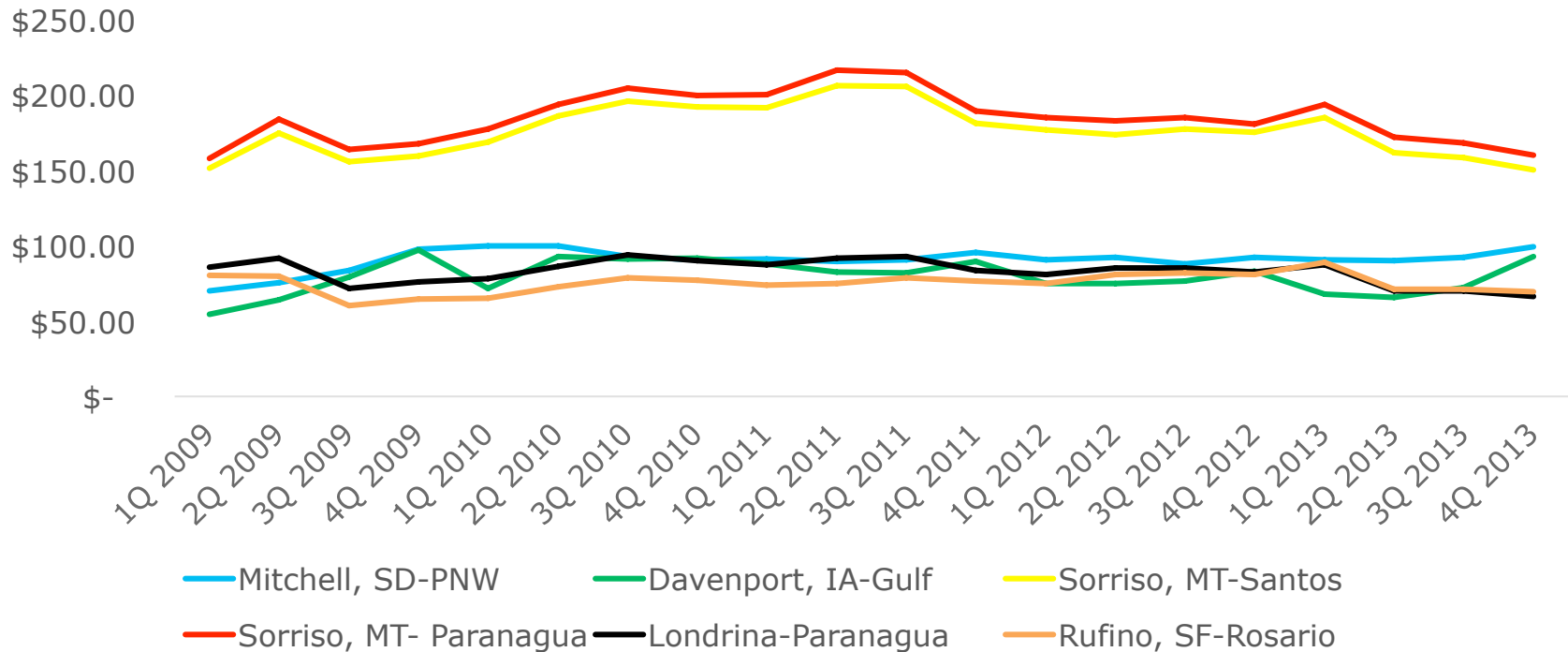


Interior Freight as a Percentage of Total Freight to Indonesia

	Mitchell, SD- Indonesia	Davenport, IA- Indonesia	Sorriso-Santos- Indonesia	Sorriso-Paranagua-Indonesia	Londrina-Indonesia	Rufino, SF- Indonesia
Average 2009-2013	56%	30%	70%	71%	34%	30%

# Comparison of Total Transportation Costs to Ho Chi Minh City, Vietnam

Total Transportation Costs to Ho Chi Minh City, Vietnam by Origin (\$/MT)



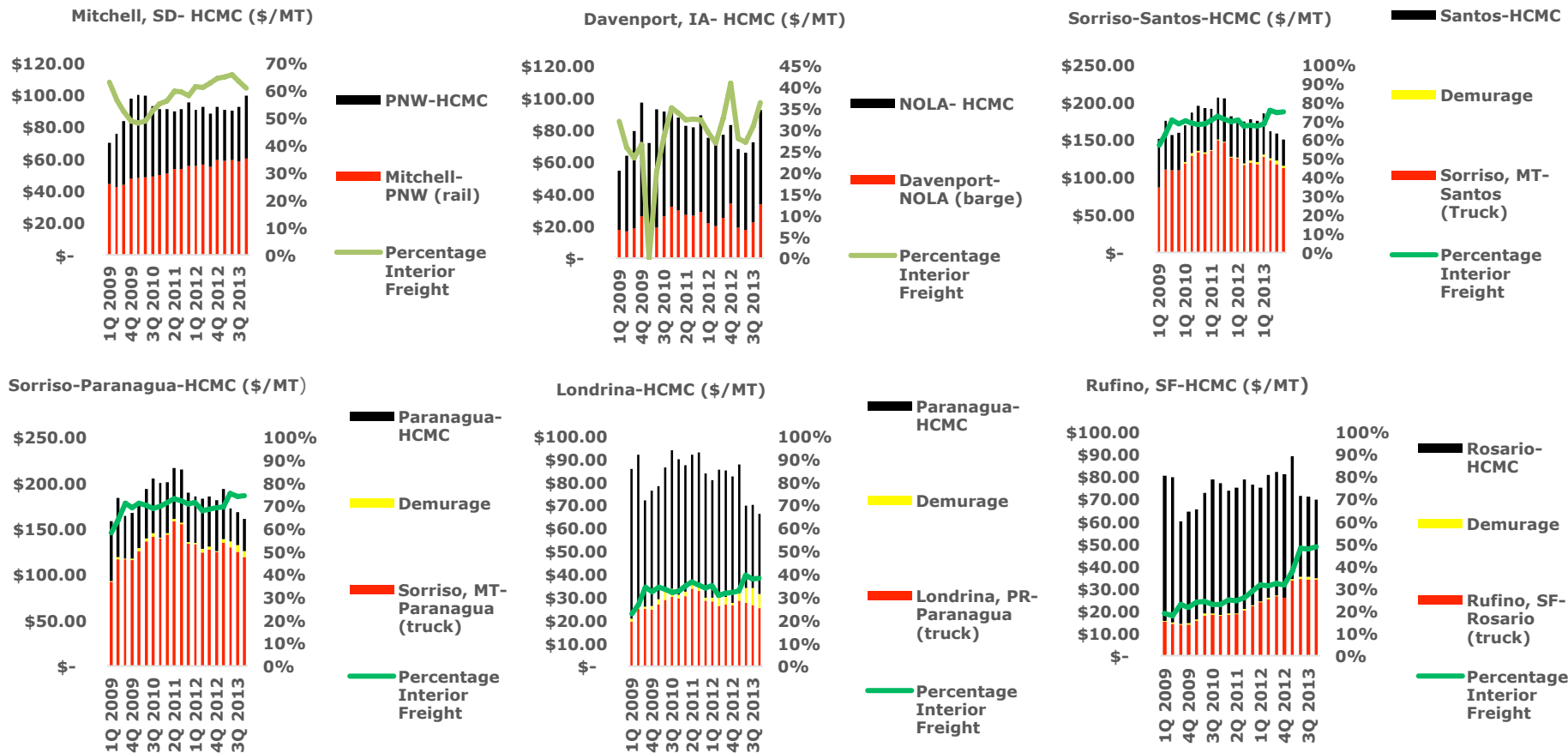
Average Transportation Cost to Ho Chi Minh City, Vietnam							
	Mitchell, SD-PNW	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 81.69	\$ 73.75	\$ 160.48	\$ 168.26	\$ 81.41	\$ 71.20	
2010	\$ 95.89	\$ 92.10	\$ 185.71	\$ 193.84	\$ 87.10	\$ 73.54	
2011	\$ 91.67	\$ 85.42	\$ 196.13	\$ 205.15	\$ 88.93	\$ 75.97	
2012	\$ 90.82	\$ 77.43	\$ 175.90	\$ 183.52	\$ 83.38	\$ 79.80	
2013	\$ 93.17	\$ 74.68	\$ 163.87	\$ 173.62	\$ 73.46	\$ 75.36	

# Transportation Cost Spreads between the Origins- Ho Chi Minh City, Vietnam

Transportation Cost Spreads to Ho Chi Minh City, Vietnam between the Origins (\$/MT)										
	Mitchell-Davenport	Mitchell-Sorriso- San	Mitchell-Sorriso-PR	Mitchell-Londrina	Mitchell-Rufino	Davenport-Mitchell	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport-Rufino, SF
2009	\$7.94	(\$78.79)	(\$86.58)	\$0.27	\$10.49	(\$7.94)	(\$86.73)	(\$94.52)	(\$7.66)	\$2.55
2010	\$3.79	(\$89.82)	(\$97.95)	\$8.79	\$22.35	(\$3.79)	(\$93.62)	(\$101.75)	\$5.00	\$18.56
2011	\$6.24	(\$104.46)	(\$113.48)	\$2.73	\$15.70	(\$6.24)	(\$110.70)	(\$119.73)	(\$3.51)	\$9.45
2012	\$13.39	(\$85.08)	(\$92.71)	\$7.44	\$11.01	(\$13.39)	(\$98.48)	(\$106.10)	(\$5.95)	(\$2.38)
2013	\$18.49	(\$70.70)	(\$80.45)	\$19.71	\$17.81	(\$18.49)	(\$89.19)	(\$98.94)	\$1.22	(\$0.68)
Average	\$9.97	(\$85.77)	(\$94.23)	\$7.79	\$15.47	(\$9.97)	(\$95.74)	(\$104.20)	(\$2.18)	\$5.50

- In terms of total transportation cost spreads, Rufino is the most competitive origin to Ho Chi Minh City, Vietnam. It has a \$5.50/MT advantage on the Davenport, IA to NOLA route and a \$15.47/MT advantage on the Mitchell, SD to the PNW route. The short interior distance between Rufino and Rosario account for some of the difference, but Argentina also enjoys significant ocean freight advantages over NOLA to Vietnam as the travel time between Argentina and Jakarta is 4.8 days shorter than from NOLA to Jakarta.
- While the Londrina, PR to Paranagua route to Jakarta is slightly less competitive than the Gulf (\$2.18/MT), it is more competitive than the PNW (\$7.79/MT). This is due to higher interior freight rates from Mitchell, SD to the PNW compared to the short interior travel from Londrina to Paranagua which offsets the fact that sailing days from the PNW to Vietnam are 8.8 days shorter than from Paranagua.
- Vietnam has represented a major growth market for soybean exports over the last five years as a new 3,000 MT/day soybean processing facility was built by Bunge near Ho Chi Minh City.

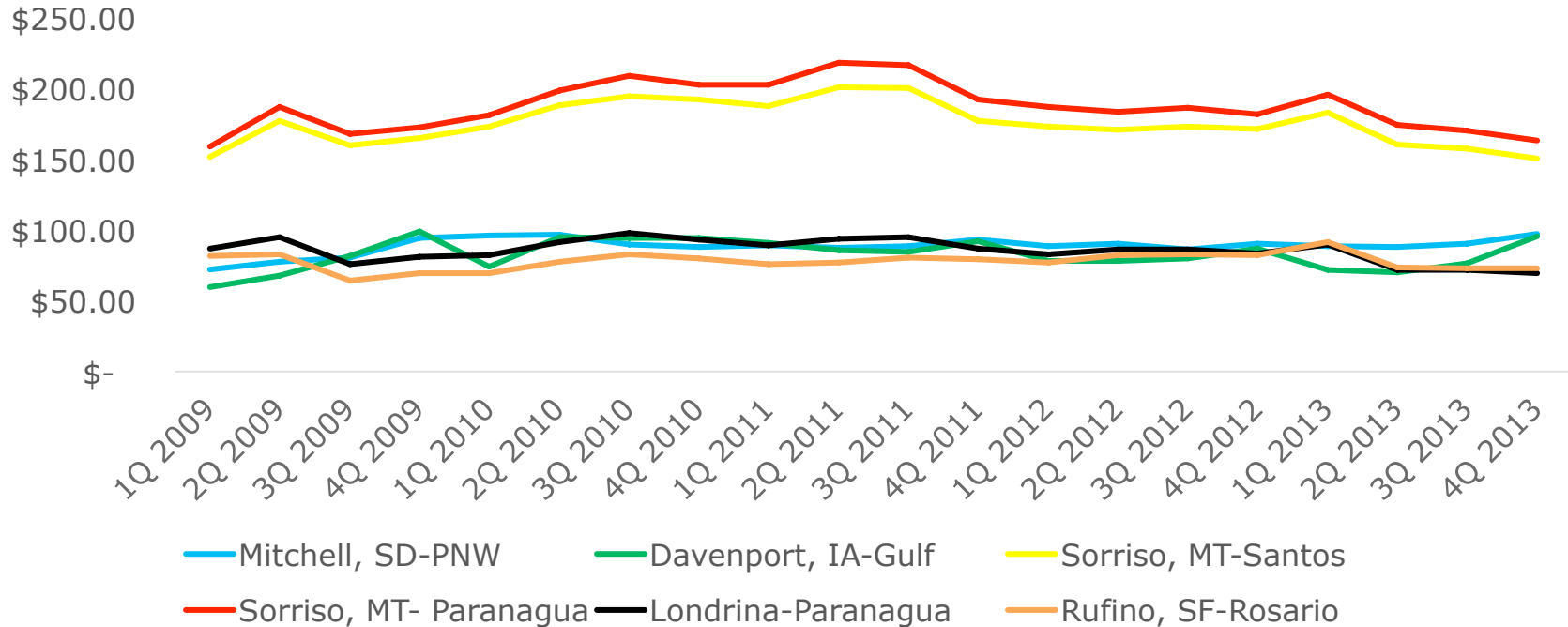
# Breakout of Transportation Costs to Ho Chi Minh City, Vietnam by Origin by Quarter



Interior Freight as a Percentage of Total Freight to Vietnam						
	Mitchell, SD- Vietnam	Davenport, IA- Vietnam	Sorriso-Santos- Vietnam	Sorriso-Paranagua-Vietnam	Londrina-Vietnam	Rufino, SF- Vietnam
Average 2009-2013	58%	31%	69%	70%	33%	29%

# Comparison of Total Transportation Costs to Manila, Philippines

Total Transportation Costs to Manila, Philippines



Average Transportation Cost to Manila, Philippines						
	Mitchell, SD-PNW	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina-Paranagua	Rufino, SF-Rosario
2009	\$ 81.19	\$ 76.87	\$ 163.48	\$ 171.51	\$ 84.66	\$ 74.45
2010	\$ 92.64	\$ 94.48	\$ 186.96	\$ 197.84	\$ 91.10	\$ 77.54
2011	\$ 89.67	\$ 88.30	\$ 191.63	\$ 207.40	\$ 91.18	\$ 78.22
2012	\$ 88.82	\$ 80.85	\$ 172.15	\$ 184.77	\$ 84.63	\$ 81.05
2013	\$ 91.17	\$ 78.44	\$ 162.87	\$ 175.87	\$ 75.71	\$ 77.61

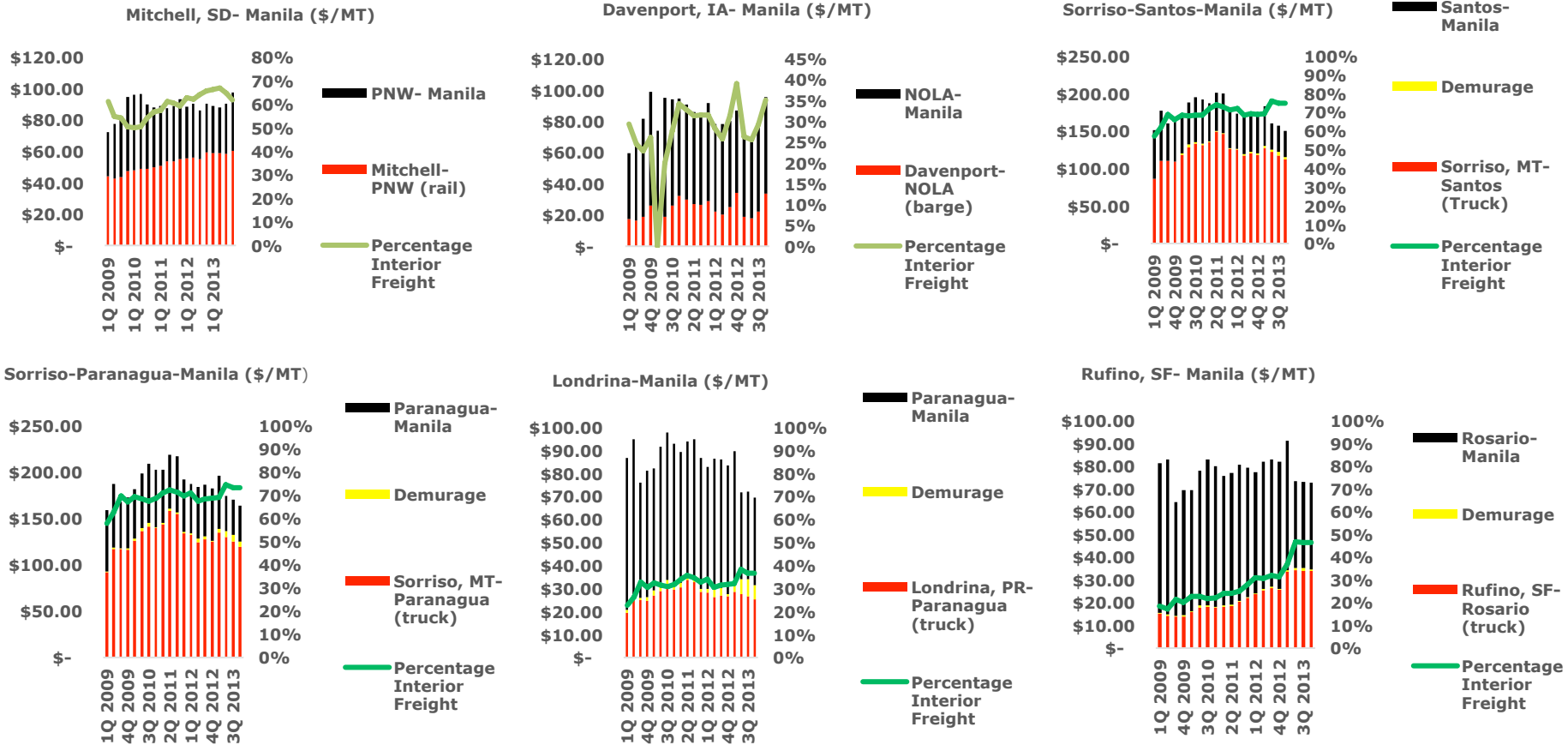
# Transportation Cost Spreads between the Origins- Manila, Philippines

Transportation Cost Spreads to Manila, Philippines between the Origins (\$/MT)										
	Mitchell-Davenport	Mitchell-Sorriso- San	Mitchell-Sorriso-PR	Mitchell-Londrina	Mitchell-Rufino	Davenport-Mitchell	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport-Rufino, SF
2009	\$4.32	(\$82.29)	(\$90.33)	(\$3.48)	\$6.74	(\$4.32)	(\$86.61)	(\$94.65)	(\$7.80)	\$2.42
2010	(\$1.84)	(\$94.32)	(\$105.20)	\$1.54	\$15.10	\$1.84	(\$92.48)	(\$103.37)	\$3.38	\$16.94
2011	\$1.37	(\$101.96)	(\$117.73)	(\$1.52)	\$11.45	(\$1.37)	(\$103.33)	(\$119.10)	(\$2.89)	\$10.08
2012	\$7.97	(\$83.33)	(\$95.96)	\$4.19	\$7.76	(\$7.97)	(\$91.31)	(\$103.93)	(\$3.78)	(\$0.21)
2013	\$12.73	(\$71.70)	(\$84.70)	\$15.46	\$13.56	(\$12.73)	(\$84.43)	(\$97.42)	\$2.73	\$0.84
Average	\$4.91	(\$86.72)	(\$98.78)	\$3.24	\$10.92	(\$4.91)	(\$91.63)	(\$103.69)	(\$1.67)	\$6.01

- In terms of total transportation cost spreads, Rufino is the most competitive origin to Manila, Philippines. It has a \$6.01/MT advantage on the Davenport, IA to NOLA route and a \$10.92/MT advantage on the Mitchell, SD to the PNW route. The short interior distance between Rufino and Rosario accounts for all of the difference in transportation costs.
- While the Londrina, PR to Paranagua route to Jakarta is slightly less competitive than the Gulf (\$1.67/MT), it is more competitive than the PNW (\$3.24/MT). This is due to higher interior freight rates from Mitchell, SD to the PNW compared to the short interior travel from Londrina to Paranagua which offsets the fact that sailing days from the PNW to the Philippines is 12.3 days shorter than from Paranagua.
- The Philippines is a small market for soybean imports due to the country's limited soybean processing capacity, and the vast majority of soybean complex imports into the country is soybean meal where the U.S. and Argentina compete for



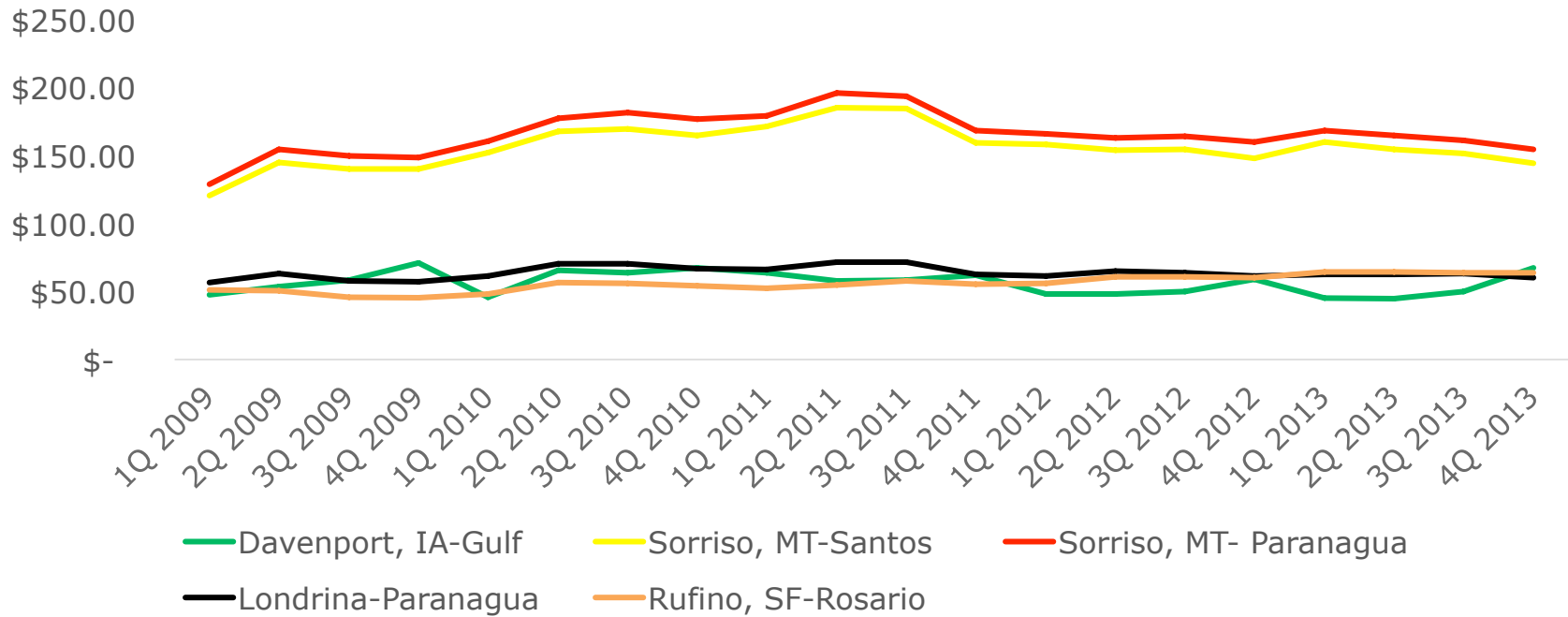
# Breakout of Transportation Costs to Manila, Philippines by Origin by Quarter



Interior Freight as a Percentage of Total Freight to Philippines						
	Mitchell, SD- Philippines	Davenport, IA- Philippines	Sorriso-Santos- Philippines	Sorriso-Paranagua-Philippines	Londrina-Philippines	Rufino, SF- Philippines
Average 2009-2013	59%	29%	70%	69%	32%	28%

# Comparison of Total Transportation Costs to Hamburg, Germany

Total Transportation Costs to Hamburg, Germany by Origin (\$/MT)



Average Transportation Cost to Hamburg, Germany						
	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 57.62	\$ 136.48	\$ 145.51	\$ 58.66	\$ 48.45	
2010	\$ 65.81	\$ 163.71	\$ 174.09	\$ 67.35	\$ 53.79	
2011	\$ 60.55	\$ 175.13	\$ 184.40	\$ 68.18	\$ 55.22	
2012	\$ 51.35	\$ 153.65	\$ 163.27	\$ 63.13	\$ 59.55	
2013	\$ 51.94	\$ 152.62	\$ 162.37	\$ 62.21	\$ 64.11	

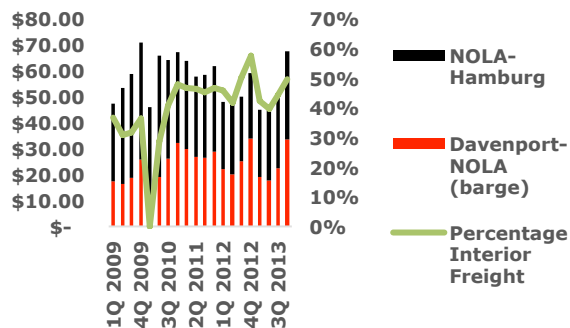
# Transportation Cost Spreads between the Origins- Hamburg, Germany

Transportation Cost Spreads to Hamburg, Germany between the Origins (\$/MT)				
	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport- Rufino, SF
2009	(\$78.86)	(\$87.90)	(\$1.05)	\$9.17
2010	(\$97.90)	(\$108.28)	(\$1.54)	\$12.02
2011	(\$114.58)	(\$123.85)	(\$7.64)	\$5.33
2012	(\$102.31)	(\$111.93)	(\$11.78)	(\$8.21)
2013	(\$100.68)	(\$110.42)	(\$10.27)	(\$12.16)
<b>Average</b>	<b>(\$98.86)</b>	<b>(\$108.48)</b>	<b>(\$6.45)</b>	<b>\$1.23</b>

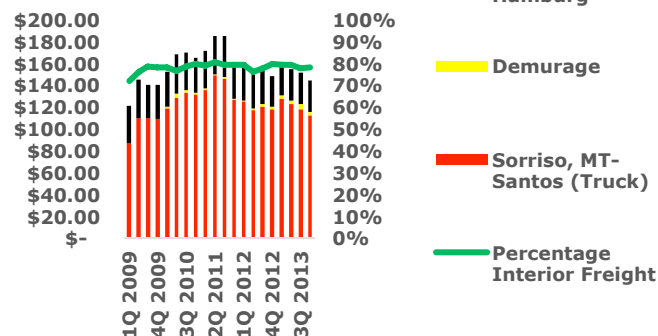
- The PNW is not competitive to Europe or the Mediterranean Basin on soybean shipments due to the great distances that soybeans have to travel from the PNW to reach these markets and, therefore, has been left out of this analysis.
- Rufino is the most competitive to Germany despite longer ocean transit times and higher ocean freight rates due to its competitiveness on interior freight. Overall, over the last five years, Rufino is \$1.23/MT more competitive than the Davenport to NOLA route.
- Overall soybean shipments have declined over the last decade as European processors have shifted away from crushing soybeans to rapeseed due to the booming biodiesel industry. However, Europe is the world's leading importer of soybean meal.

# Breakout of Transportation Costs to Hamburg, Germany by Origin by Quarter

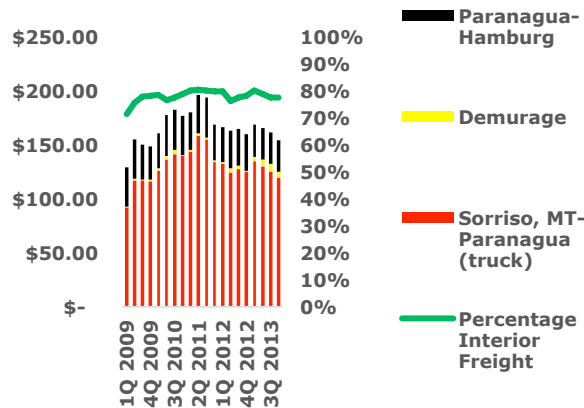
Davenport, IA- Hamburg (\$/MT)



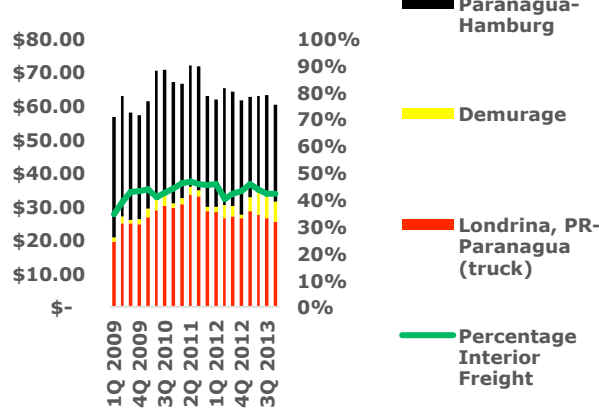
Sorriso-Santos-Hamburg (\$/MT)



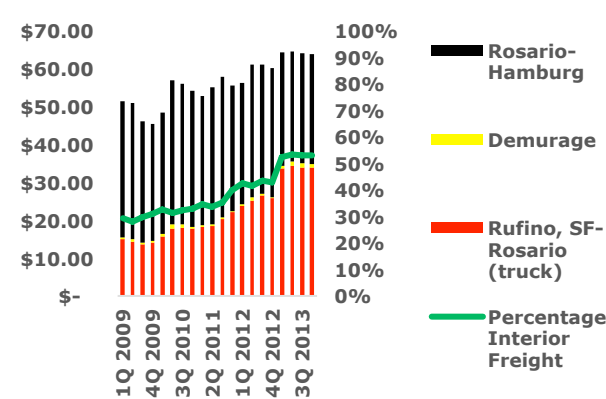
Sorriso-Paranagua-Hamburg (\$/MT)



Londrina-Hamburg (\$/MT)



Rufino, SF-Hamburg (\$/MT)

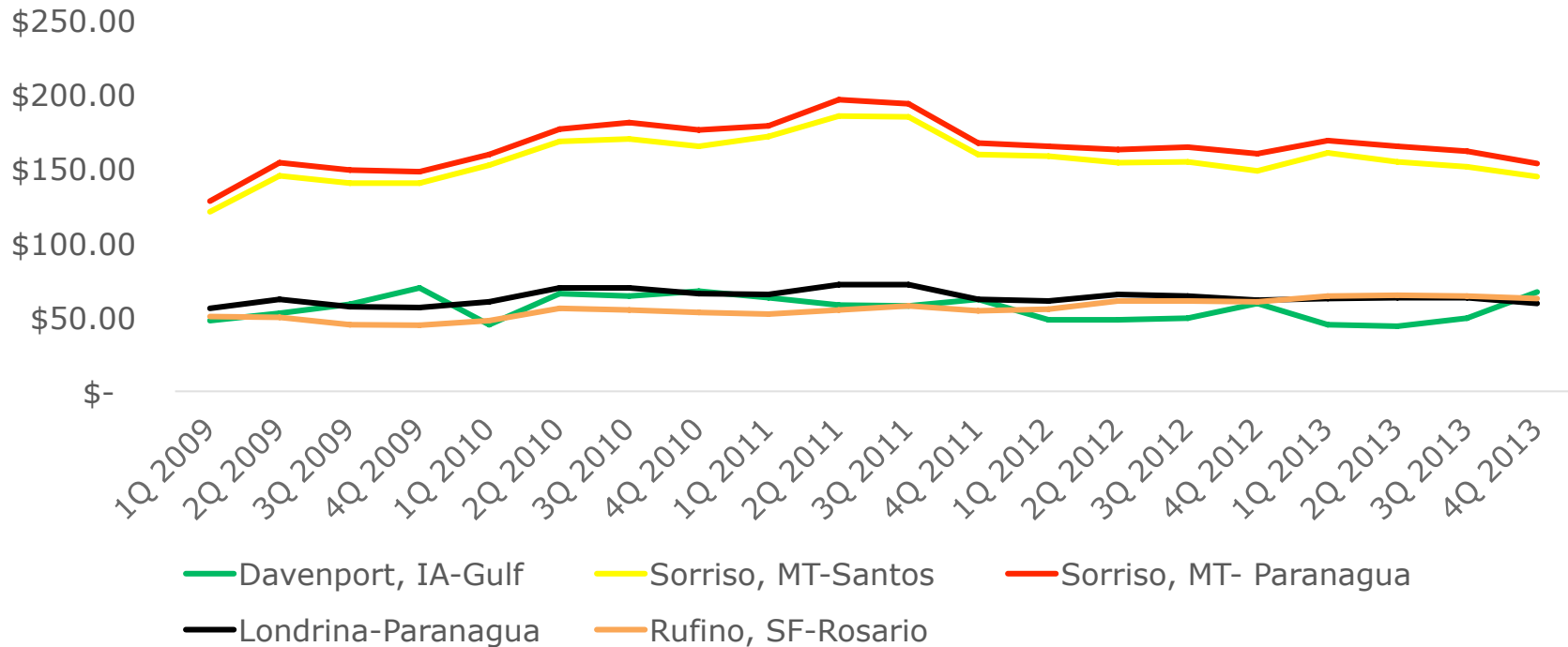


Interior Freight as a Percentage of Total Freight to Hamburg

	Davenport, IA- Hamburg	Sorriso-Santos- Hamburg	Sorriso-Paranagua-Hamburg	Londrina-Hamburg	Rufino, SF- Hamburg
Average 2009-2013	43%	78%	78%	43%	39%

# Comparison of Total Transportation Costs to Rotterdam, Netherlands

Total Transportation Costs to Rotterdam, Netherlands by Origin (\$/MT)



Average Transportation Cost to Rotterdam, Netherlands						
	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 57.12	\$ 136.48	\$ 144.51	\$ 57.66	\$ 47.45	
2010	\$ 65.81	\$ 163.71	\$ 173.09	\$ 66.35	\$ 52.79	
2011	\$ 60.05	\$ 175.13	\$ 183.90	\$ 67.68	\$ 54.72	
2012	\$ 51.10	\$ 153.65	\$ 163.02	\$ 62.88	\$ 59.30	
2013	\$ 51.19	\$ 152.62	\$ 162.12	\$ 61.96	\$ 63.86	

Source: USDA Brazilian Transportation Report; Transportation Consultants, Inc; HighQuest Analysis

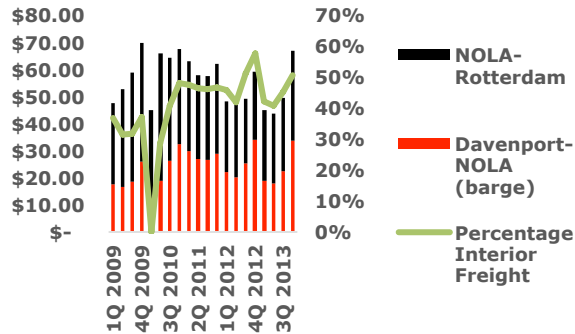
# Transportation Cost Spreads between the Origins- Rotterdam, Netherlands

Transportation Cost Spreads to Rotterdam, Netherlands between the Origins (\$/MT)				
	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport- Rufino, SF
2009	\$ (79.36)	\$ (87.40)	\$ (0.55)	\$ 9.67
2010	\$ (97.90)	\$ (107.28)	\$ (0.54)	\$ 13.02
2011	\$ (115.08)	\$ (123.85)	\$ (7.64)	\$ 5.33
2012	\$ (102.56)	\$ (111.93)	\$ (11.78)	\$ (8.21)
2013	\$ (101.43)	\$ (110.92)	\$ (10.77)	\$ (12.66)
<b>Average</b>	<b>\$ (99.26)</b>	<b>\$ (108.28)</b>	<b>\$ (6.25)</b>	<b>\$ 1.43</b>

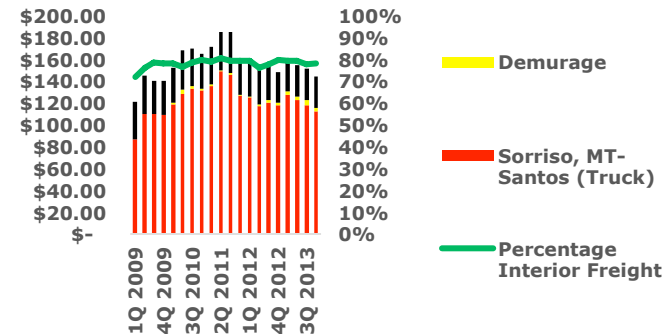
- Rufino is most competitive to the Netherlands despite longer ocean transit times and higher ocean freight rates due to its competitiveness on interior freight. Overall, over the last five years, Rufino is \$1.43/MT more competitive than the Davenport to NOLA route.

# Breakout of Transportation Costs to Rotterdam, Netherlands by Origin by Quarter

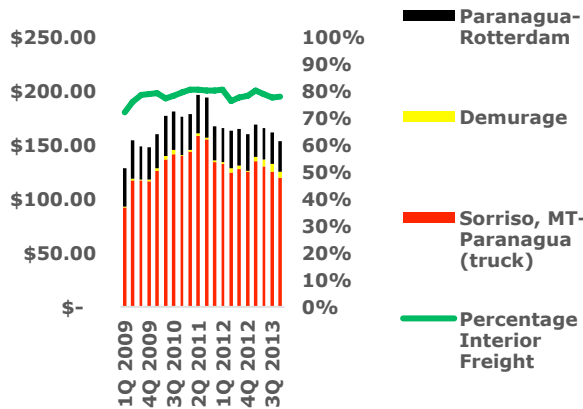
Davenport, IA- Rotterdam (\$/MT)



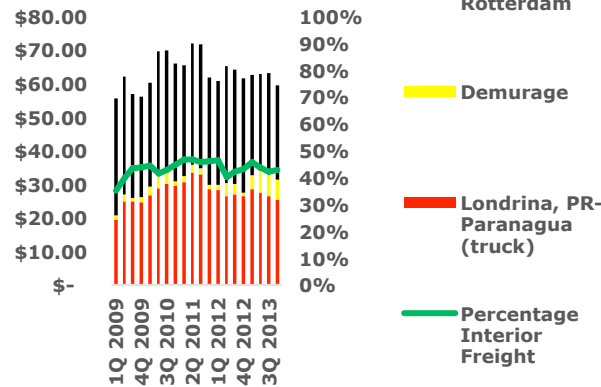
Sorriso-Santos-Rotterdam (\$/MT)



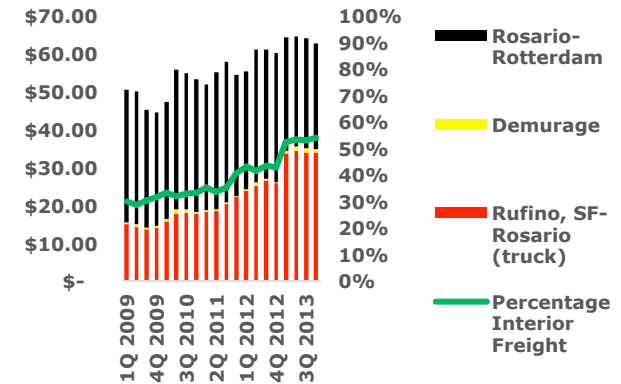
Sorriso-Paranagua-Rotterdam (\$/MT)



Londrina-Rotterdam (\$/MT)



Rufino, SF- Rotterdam (\$/MT)

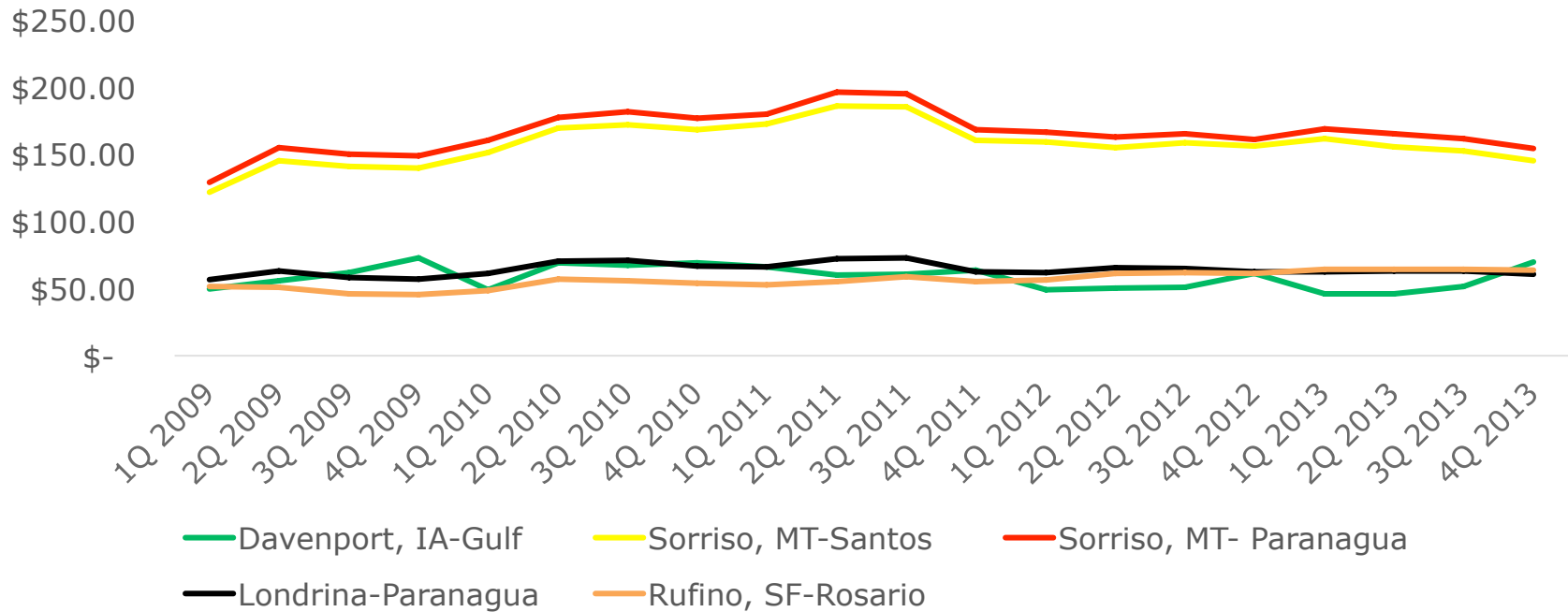


Interior Freight as a Percentage of Total Freight to Rotterdam

	Davenport, IA- Rotterdam	Sorriso-Santos- Rotterdam	Sorriso-Paranagua-Rotterdam	Londrina-Rotterdam	Rufino, SF- Rotterdam
Average 2009-2013	43%	78%	78%	43%	40%

# Comparison of Total Transportation Costs to Port Said, Egypt

**Total Transportation Costs to Port Said, Egypt by Origin (\$/MT)**



Average Transportation Cost to Port Said, Egypt						
	Davenport, IA-Gulf	Sorriso, MT-Santos	Sorriso, MT- Paranagua	Londrina-Paranagua	Rufino, SF-Rosario	
2009	\$ 59.87	\$ 136.73	\$ 145.51	\$ 58.66	\$ 48.45	
2010	\$ 68.48	\$ 164.96	\$ 174.09	\$ 67.35	\$ 53.79	
2011	\$ 62.55	\$ 176.13	\$ 184.65	\$ 68.43	\$ 55.47	
2012	\$ 52.85	\$ 157.15	\$ 163.77	\$ 63.63	\$ 60.05	
2013	\$ 53.19	\$ 153.62	\$ 162.37	\$ 62.21	\$ 64.11	



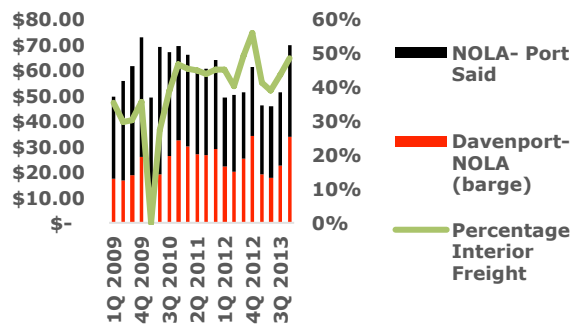
# Transportation Cost Spreads between the Origins- Port Said, Egypt

Transportation Cost Spreads to Port Said, Egypt between the Origins (\$/MT)				
	Davenport-Sorriso-San	Davenport-Sorriso-PR	Davenport-Londrina	Davenport- Rufino, SF
2009	(\$76.86)	(\$85.65)	\$1.20	\$11.42
2010	(\$96.48)	(\$105.62)	\$1.13	\$14.69
2011	(\$113.58)	(\$122.10)	(\$5.89)	\$7.08
2012	(\$104.31)	(\$110.93)	(\$10.78)	(\$7.21)
2013	(\$100.43)	(\$109.17)	(\$9.02)	(\$10.91)
<b>Average</b>	<b>(\$98.33)</b>	<b>(\$106.69)</b>	<b>(\$4.67)</b>	<b>\$3.01</b>

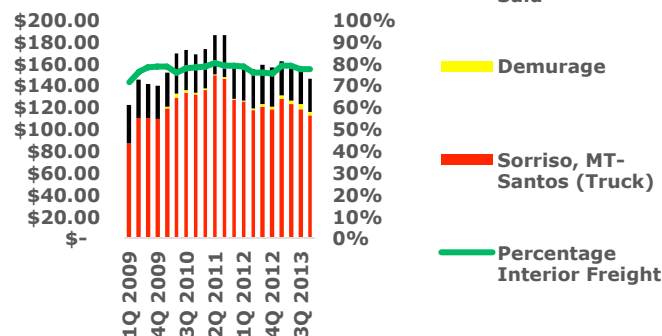
- Rufino is most competitive to Port Said, Egypt despite longer ocean transit times and higher ocean freight rates due to its competitiveness on interior freight. Overall, over the last five years, Rufino is \$3.01/MT more competitive than the Davenport to NOLA route.
- The reason that Rufino is slightly more competitive to Egypt than to northern Europe is due to the shortly shorter sailing distance from Argentina to Port Said than to Hamburg or Rotterdam.

# Breakout of Transportation Costs to Port Said, Egypt by Origin by Quarter

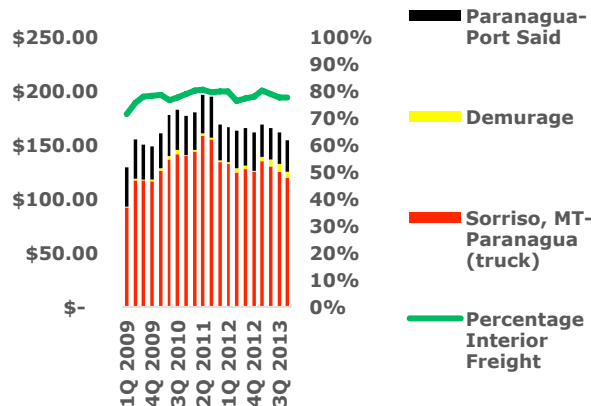
Davenport, IA- Port Said (\$/MT)



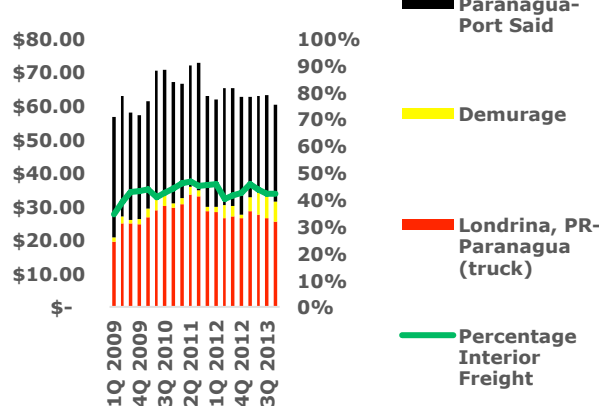
Sorriso-Santos-Port Said (\$/MT)



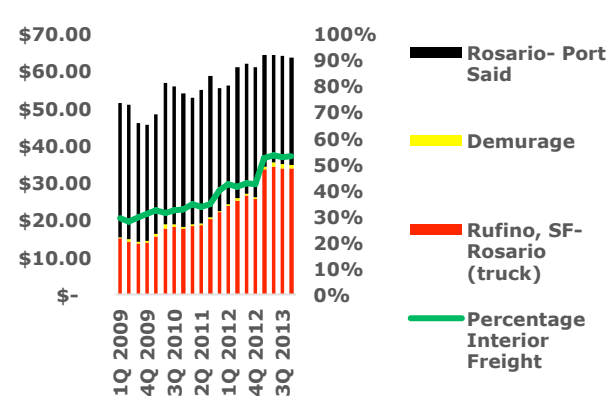
Sorriso-Paranagua-Port Said (\$/MT)



Londrina-Port Said (\$/MT)

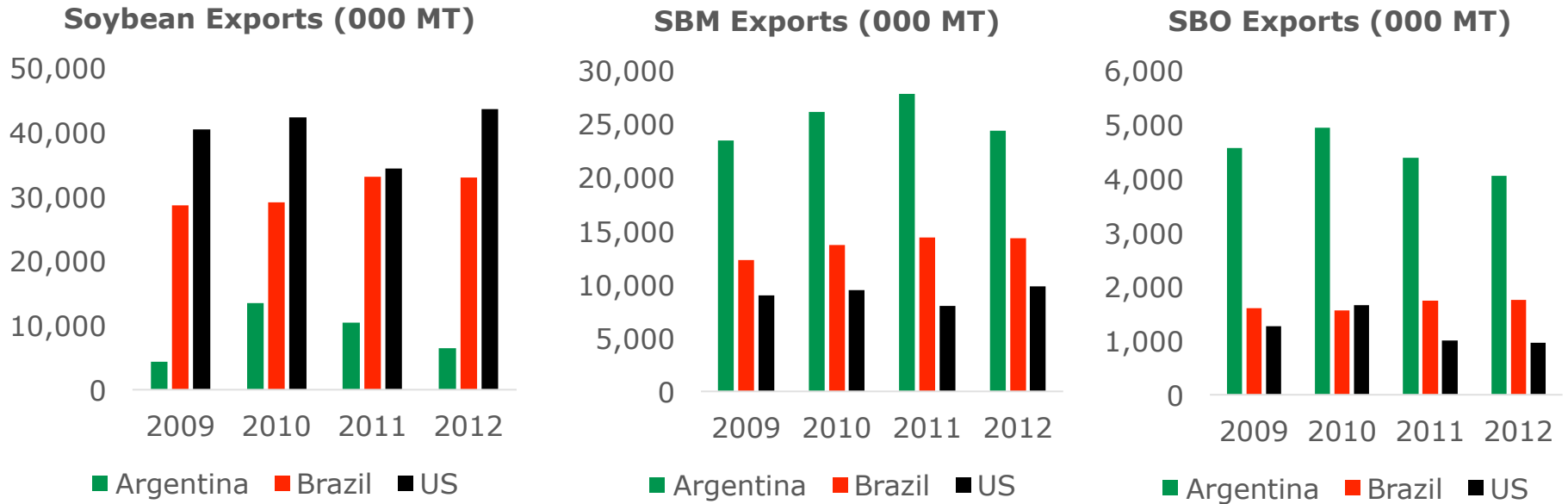


Rufino, SF- Port Said (\$/MT)



Interior Freight as a Percentage of Total Freight to Egypt					
	Davenport, IA- Egypt	Sorriso-Santos- Egypt	Sorriso-Paranagua-Egypt	Londrina-Egypt	Rufino, SF- Egypt
Average 2009-2013	42%	77%	78%	43%	39%

# Soybean Complex Export Matrix



- Despite the fact that Rufino, Argentina is favored over the PNW to all origins and is favored over NOLA to all origins except Shanghai, China in terms of transportation costs, there is one very important fact that must be considered before assuming that Argentina is the most competitive soybean exporter.
- The Argentine export differential tax favors exporting soybean meal and oil over exporting soybeans which means that the vast majority of soybeans are processed in Argentina and sold as soybean meal and oil into the export markets.
- This, and the fact that from 2009-12 China accounted for 80.3% of Argentina's soybean exports, mean that there are very little soybeans available out of Argentina to the other destination markets, allowing the U.S. and Brazil to be more competitive in these markets than the transportation costs show.

# Table of Contents

- Executive Summary
- Transportation Costs
- **Transit Times**
- Predictability of Delivery

# Transit Times Introduction- U.S. and Argentina

- Argentina, Brazil and the U.S. are completely different markets in terms of interior infrastructure and the relative distance from the major soybean growing regions to the primary soybean export ports.
- While soybeans in the U.S., on average, have to travel the longest distances to reach the export facilities in NOLA and the PNW, the advanced rail and river infrastructure allows for soybeans to reach the export markets in a timely manner and the modern infrastructure at the ports allows for quick loading and limited delays.
- This is an advantage because rail lines and barges allow U.S. exporters to load a greater quantity of soybeans at a given time reducing per unit transportation costs, despite the longer distances.
- In Argentina, soybeans reach the export facilities via truck, but the majority of soybean production occurs within 120-210 miles (200-350 KM) of the major ports leading to short interior transportation times. Also, the export facilities are located in areas which are relatively easy to access via highway and there is limited congestion at the ports.
- The vast majority of soybeans are processed in country and sold into the export market as soybean meal and soybean oil which means that there is sufficient storage at the ports and farmers do not have to wait at the ports to dump their soybeans.

# Transit Times Introduction- Brazil

- Brazil is an entirely different matter. Soybean and corn production has grown substantially over the past five years (especially in the Center-West state in Mato Grosso), yet storage and transportation infrastructure have not grown with it.
- Currently, approximately 61% of the soybeans moved in Brazil are transported via truck over long distances on mainly unpaved roads which leads to long transit times and significant spillage on the way to the ports. (Spillage has been estimated to be as high as 3% of the crop according to Dr. Peter Goldsmith at the University of Illinois.)
- During soybean peak season in Brazil, the lack of storage infrastructure has forced soybean farmers to sell their crop at harvest and has led to increasing traffic on the poor highways. Lines to dump soybeans at Santos and Paranagua were estimated to be as long as 30 miles (50 KM) as truckers waited to dump soybeans at the port.
- On top of this, port infrastructure in Brazil is very weak. The Brazilian government has determined that it will dredge and increase the size of the channels at the ports of Santos and Paranagua to expedite traffic flows, but these projects are still up for bid.
- At the same time, the public berths in Santos and Paranagua lack cover for soybeans that are being loaded onto ships which means when it rains, corn and soybeans cannot be loaded onto vessels adding to waiting times and increasing demurrage and other logistics costs for exporters.
- While the Brazilian government recognizes that the country has an infrastructure problem, and has put several projects up for private auction over the last five years (including granting the rights for the BR-163 stretching from Mato Grosso to Santarem in the north and Santos in the South to Odebrecht), many of these projects are behind schedule due to bureaucracy and the fact that the projects that are being offered lack the IRR to interest the private sector. The same is true at the ports.

# Interior Transit Times- U.S.

- There are two major interior soybean transit routes to reach the export market in the U.S.
  - Western Corn Belt to the PNW- rail
  - Mississippi River to NOLA- barge
- For the Western Corn Belt to the PNW route we used Mitchell, SD (a major shuttle train hub) as a proxy, while for the Mississippi River to NOLA route we used Davenport, Iowa as a proxy.
- Over the last two years, the PNW route has experienced a 15% decrease in train speeds, which has led to slower turn times for shuttle trains and capacity reduction for grains moving to the PNW. As a result, turn times on shuttle trains have declined from 3x per month to 2x per month which means that less soybeans are available for export out of the region. The primary reasons for the decrease in train speeds include:
  - Track improvement work and
  - Increased traffic and tight rail car capacity due to increased petroleum, intermodal, coal and automobile volumes.
- The Mississippi River route is controlled by the barge freight market. The route from Davenport, IA to NOLA is a very safe route, but there are several problems with this route as well.
  - It can take as long as 22 days for a barge leaving from Davenport to reach NOLA due to the fact that barges have to wait at various locks along the river and barges have to be switched onto longer tows with bigger tow boats in St. Louis.
  - During the winter months, certain segments of the river system can freeze (particularly the upper Mississippi and the Illinois River). This means that farmers in these regions have to ship their grains to the export market either prior to the Dec-Jan period, or they have to store them until the river thaws.
  - During months when the rivers are frozen, export terminals in NOLA rely on grain from the Ohio, lower Illinois, Arkansas and lower Mississippi Rivers as well as rail to barge transfers in St. Louis.

# Comparison of Transit Times between Mitchell, SD and Davenport, IA to Major Destination Markets

Comparison of Transit Times between Mitchell, SD and Davenport, IA to Major Destination Markets						
	Mitchell, SD- PNW	PNW- destination	Mitchell, SD- Destination	Davenport IA- NOLA	NOLA- destination	Davenport, IA- Destination
Shanghai	8	16.80	24.80	22	29.80	51.8
Tokyo	8	12.80	20.80	22	27.30	49.3
Kaohsiung	8	16.50	24.50	22	31.10	53.1
Jakarta	8	22.30	30.30	22	34.80	56.8
Ho Chi Minh City	8	19.80	27.80	22	34.30	56.3
Manila	8	17.80	25.80	22	32.30	54.3
Rotterdam	8	26.60	34.60	22	14.50	36.5
Hamburg	8	27.40	35.40	22	15.20	37.2
Port Said	8	31.50	39.50	22	19.40	41.4
Average	8	21.28	29.28	22	26.52	48.52

- Transit times from Mitchell, SD to the major destination markets average approximately 19 days fewer than travel times out of Davenport, IA. The interior freight differential is 14 days, while the ocean freight differential is approximately five days (both favoring Mitchell).
- The ocean freight differential is even greater when one considers that the PNW is not competitive to Europe. The ocean freight from the PNW to the Asian markets averages 17.67 days, while ocean freight from NOLA to the Asian markets averages 31.6 days, making the average transit time spread approximately 38 days.
- Both ports average almost no waiting times or demurrage costs.
- Despite the long transit times from Davenport, IA, this route is still considered to be more competitive. This is due to the fact that the average per unit transportation cost to ship via barge is substantially lower than shipping via train.



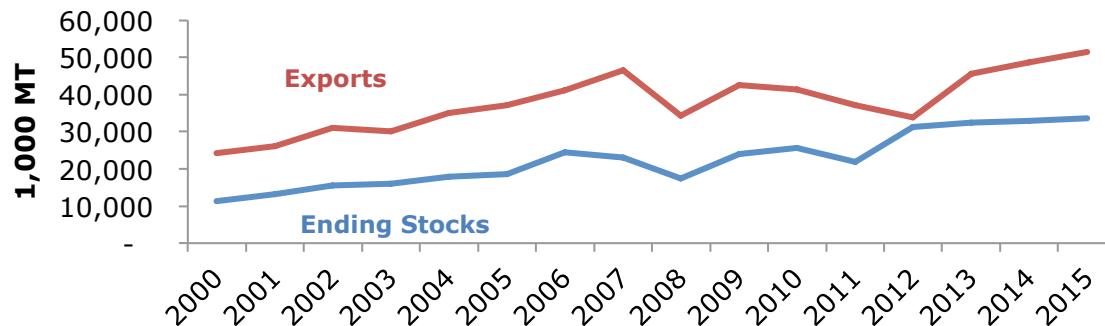
# Transit Times- Argentina

- In Argentina, we used Rufino, Santa Fe as the proxy for soybean shipments from origin to destination. Rufino is located in the major soybean producing region of Santa Fe province and is located 156 miles (261 KM) from the major soybean export port of Rosario.
- Given Argentine trucking rules (no more than 8 hours on the road per day), this means that a truck carrying soybeans from Rufino to Rosario would have to average approximately 19.6 MPH to reach Rosario in a day, which is very likely to happen.
- As a result, interior transportation in Argentina is shorter than in any of the major origins.
- Argentina does not have the same problems as Brazil as the vast majority of soybean ports are privately owned and have large amounts of storage as they are usually accompanied by a processing facility due to the differential export tax. As a result, Argentine farmers do not have to wait in long lines to dump their soybeans and vessel waiting times are relatively low (approximately 30% of what Brazil experiences).

# Challenges for Argentine Transportation Times

- The majority of export capacity in Argentina is on the Parana River, and the river only has a draft of around 35 feet. This means that Panamax vessels can only load approximately 44,000 MT of soybeans in Rosario and then exporters have to top off their vessels in either Bahia Blanca or Rio Grande do Sul, which adds several days to transit times.
- During the summer months, especially during drought conditions, the draft of the river can recede due to a lack of rainfall which leads to vessels either holding less cargo or the potential for the river to be closed for extended period.
- Due to the economic crisis and the fact that dollars on the black market are trading at 2x the official exchange rate, Argentine farmers have been holding their soybeans on farm and either waiting for better prices or for the exchange rate spread to narrow. It is expected that the Argentine government will devalue the currency, but that it will be a soft landing rather than the hard landing experienced in 2003. As a result, stocks are expected to remain high in the near future unless there is significant demand pull for Argentine soy complex exports which would force exporters to increase prices to ensure supply.
  - This is not likely to have a significant impact on transit times as it leads to less traffic at the ports, but it could have a significant impact on export volumes out of Argentina. However, this was not the case in 2013.

## Soybean Complex Exports vs. Ending Stocks



# Argentine Transit Times to Major Destinations

Transit Times from Rufino, SF, Argentina to Major Destination Markets					
	Rufino, SF- Rosario	Rosario-Destination	Waiting Time at Port	Top Off	Rufino, SF- Destination
Shanghai	1	34.00	2.17	2.50	38.67
Tokyo	1	32.10	2.17	2.50	36.77
Kaohsiung	1	32.40	2.17	2.50	37.07
Jakarta	1	26.30	2.17	2.50	30.97
Ho Chi Minh City	1	29.50	2.17	2.50	34.17
Manila	1	31.30	2.17	2.50	35.97
Rotterdam	1	19.10	2.17	2.50	23.77
Hamburg	1	19.80	2.17	2.50	24.47
Port Said	1	21.60	2.17	2.50	26.27
<b>Average</b>	<b>1</b>	<b>27.34</b>	<b>2.17</b>	<b>2.50</b>	<b>32.02</b>

- Interior transit times from Rufino to Rosario average 1 day as the distance between the two cities is 261 KM (or 157 miles).
- Ocean vessels occasionally have to wait at port or in the river to load, but the average number of days waiting is 2.17 during peak season which is much lower than waiting times in Brazil.
- The big difference between Argentina and the other origins is that the Parana River has a low draft (approximately 35 feet) which means Panamax vessels cannot load fully. As a result, vessels leaving Rosario are generally loaded at 44-46,000 MT and are forced to top off in either Bahia Blanca and Rio Grande do Sul. This top off adds an additional 2-3 days to the journey.
- Vessels leaving Argentina for Asia take the southern route through the Indian Ocean as it is quicker than going through the Panama Canal. As a result, ocean vessel travel times to Southeast Asia are shorter than from NOLA, while ocean vessel transit times to China and Japan are slightly longer than NOLA. NOLA has the transit time advantage to northern Europe and the Mediterranean Basin.

# Interior Transit Times- Brazil

- We used three routes as proxies for Brazil. These routes were chosen based on the quantity of soybeans that were moved on each route during 2012-2013 and account for approximately 25% of the soybeans moved to the export market during this time period. They also represent the main routes of soybeans moving from the north and south to the ports of Santos and Paranagua.
  - Sorriso, Mato Grosso to Santos via truck
  - Sorriso, Mato Grosso to Paranagua via truck
  - Londrina, Parana to Paranagua via truck
- The route between Sorriso, MT and Santos covers 714 miles (1,190 KM) and it takes between 3-5 days for the truck to reach Santos. At the beginning of the route, truckers must drive on largely unpaved roads until they reach the BR-163 which takes them into Santos. The route is marked with potholes which leads to high amounts of spillage of soybeans en route to soybeans (estimated to be as high as 3% of the total volume moved). During peak season, the BR-163 can be very congested because farmers that do not have storage capabilities are forced to sell their beans at harvest.
- The route between Sorriso, MT and Paranagua covers 757 miles (1,262 KM) and it takes between 4-5.5 days for the truck to reach Paranagua. This is largely due to the fact that the majority of this route is not on a major highway like the BR-163.
- The route between Londrina, PR and Paranagua covers 161 miles (268 KM) and it takes approximately 1.5 days for the truck to reach Paranagua.

# Challenges for Brazilian Interior Transit Times

- There are multiple challenges that a Brazilian farmers faces when trucking soybeans from Sorriso, MT and Londrina, PR to the ports of Santos and Paranagua including the poor interior infrastructure, multiple tolls, the long waiting lines to reach the ports, and the lack of rail and waterway infrastructure to reach the ports from the interior.
  - Poor interior infrastructure leads to slow transportation speeds for trucks to reach the ports and increased spillage of soybeans en route.
  - The major highways are toll roads causing multiple delays en route at toll stations.
  - The long waiting lines to reach the ports cause trucks to wait for at least 4-5 days during peak season just to unload their trucks at port.
  - The lack of rail and waterway infrastructure to reach the ports in the south and potentially alternative ports in the north leads to major congestion on the roads around the port increasing delays and waiting times.
- This situation has been exacerbated by a new law in Brazil limiting the amount of time truckers may drive per day. Law 12.619, passed in 2013, places the following limits on truck drivers' hours:
  - Truckers' driving hours are limited to eight hours per day. That may be extended to a maximum of ten hours in a day, but extra hours make the driver eligible for overtime compensation.
  - Truckers must take at least a ½ hour break every four hours. The break may be split into two or more smaller breaks over shorter periods of time.
  - Aside from the rest breaks, trucking companies are obliged to provide truckers with a one hour lunch period.
- This new law has been taken seriously by the Brazilian truck driving industry, as labor laws in Brazil are strictly enforced. The result has led to longer transit times for soybeans to reach the port. As an example, the Londrina, PR route to Paranagua takes 12-14 hours to complete which they used to be able to do in a day, but since the law was passed and enforced in 2013, this route now takes 1.5 days as truckers are not allowed to drive more than eight hours per day.

# Opportunities to Decrease Brazilian Interior Transit Times

- There are significant opportunities to reduce transit times to the ports as the Brazilian government has begun to auction off several highway and railway concessions to the private sector and the ports of Paranaguá and Santos have established electronic waiting for dump pits at each port.
- One of the concessions granted to the private sector is likely to have a significant impact on transit times in the future. In particular, the granting of a stretch of the BR-163 to Odebrecht.
  - The BR-163 is a highway which travels from Santarém in Pará State through the soybean growing region of Mato Grosso and down to Santos. This highway is of critical importance to the soybean industry as it enables farmers in Mato Grosso to reach the export ports in both the north and the south of Brazil. The southern stretch of the BR-163 has been operational for years, but it has been primarily in the hands of the Brazilian government which has completely mismanaged the road. The granting of the southern stretch of the BR-163 to Odebrecht, a private construction company in Brazil, is likely to improve road conditions substantially as Odebrecht will be responsible for maintaining the road. This is likely to lead to improved roadways and lower transit times to the south.
  - However, what will really improve the situation in Santos and Paranaguá is if the northern section of the BR-163 is auctioned to the private sector. Currently, the vast majority of the northern route is unpaved and in the rainy season it can be impassable. If this section of the highway were built up and improved, it would give soybean and corn farmers the option to truck their products to the southern or northern ports (depending upon their location) and would reduce congestion in Paranaguá and Santos considerably.
  - Despite the exciting possibilities that this highway could offer, construction on both the northern and southern routes has been held up by the extensive bureaucracy in the federal and state governments, and it is unlikely that the full benefits of this highway will be recognized in the near term.
- The electronic dump pits at the ports of Paranaguá and Santos have already made a substantial impact on waiting times for trucks to enter each port. Upon loading soybeans in Sorriso and Londrina, truckers use an electronic system to program their dump date and time and request a dump date be assigned for his planned arrival time at the port. Within a few hours after registering, he can check to see which dump date and time have been assigned to him.
  - The ports set up this system as a result of the enormous lines of trucks waiting to dump soybeans and corn in 2012 and 2013. This system allows Santos and Paranaguá to receive each day only the amount of soybeans and corn they can handle on a daily basis and to program the arrival of trucks accordingly.
  - As a result, Santos and Paranaguá organize the arrival of trucks loaded with grains in four shifts: 12 AM- 6AM; 6 AM- 12 PM; 12PM- 6 PM; and 6 PM- 12 AM. A truck driver's slot will lie within these periods, and the ports allow for five hours of leeway.
  - The Port of Paranaguá indicated that the wait, from entry to classification of the product to dumping is not to exceed 12 hours for a driver registered with their online system.
  - The one key caveat is that truckers must be registered within the ports online system to be eligible for the program.
  - This electronic system is expected to reduce waiting times for truckers registered within the system substantially.

# Comparison of Interior Transit Times in Brazil

## Sorriso, MT to Santos Route

Total transit time is 8.5 days during peak season. This includes four days traveling from Sorriso to Santos and 4.5 days to enter the port of Santos once the truck has arrived in the line waiting to get into the port. Total transit time is expected to improve due to the new electronic system at port dumping sites, assuming that truckers register for the online registration system.

## Sorriso, MT to Paranagua Route

Total transit time is 9.25 days during peak season. This includes 4.75 days traveling from Sorriso to Paranagua and 4.5 days to enter the port of Paranagua once the truck has arrived in the line waiting to get into the port. Total transit time is expected to improve due to the new electronic system at port dumping sites, assuming that truckers register for the online registration system.

## Londrina, PR to Paranagua Route

Total transit time is 6 days during peak season. This includes 1.5 days traveling from Londrina to Paranagua and 4.5 days to enter the port of Paranagua once the truck has arrived in the line waiting to get into the port. Total transit time is expected to improve due to the new electronic system at port dumping sites, assuming that truckers register for the online registration system.

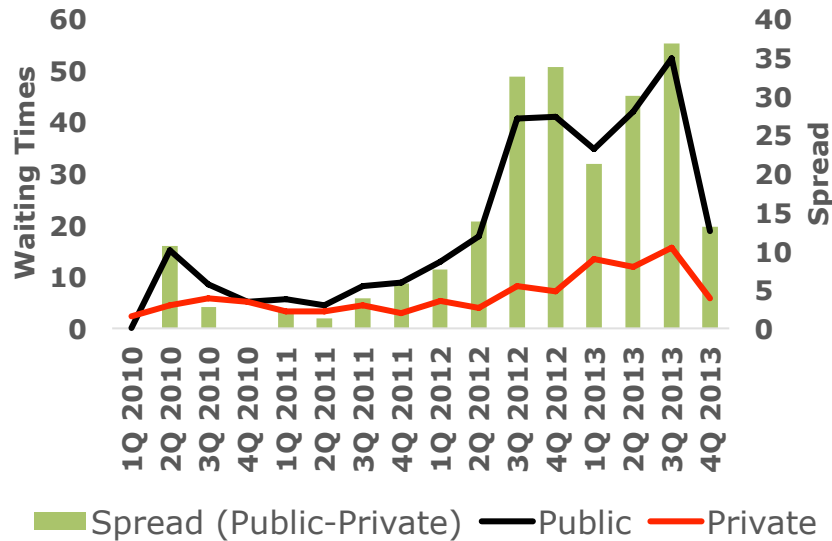
# Port Inefficiencies in Brazil

- Port infrastructure is another major challenge for Brazilian soybean exporters using the ports of Paranagua and Santos. Waiting times are not limited to trucks entering the ports, but also include vessels entering the ports. Brazil is working to improve ocean vessel waiting times and expand the volumes of cargo passing through its ports, but it still has a long way to go.
- Two of the major problems for Brazilian ports is their lack of draft and the narrow channels that ships have to pass through to reach the port.
  - The draft restrictions in Paranagua and Santos limit the amount of volume that can leave the port as these two ports cannot handle Cape-size or Post-Panamax, while the narrow channels limit the number of vessels that can enter and exit the port at a given time.
  - Both ports have announced concessions to the private sector for expanding the drafts and channels of each port, but the concessions have not been auctioned and it is likely to take time and considerable investment before the necessary improvements are made.
- Another significant factor that leads to ocean vessel delays in port is that the berths in Paranagua and Santos do not have protective structures to protect grains from rain and there is limited covered storage at the ports as well. Therefore, when it rains, vessels docked at the berths cannot load until the rain stops and trucks have limited access to unloading grains which leads to extended loading times.
  - An example of the delays caused by rain occurred in 2013, when the Port of Paranagua recorded 51 days of halted grain loading during the first six months of the year, leading to ocean vessel waiting times that reached as high as 65 days during the peak season.
  - HighQuest interviewed several port officials in both Santos and Paranagua about potential investments in structures that could protect grains during the rainy season and the general consensus was that this would never happen as it is too expensive to build protective covering which extends all the way out to the ship to justify the investment.

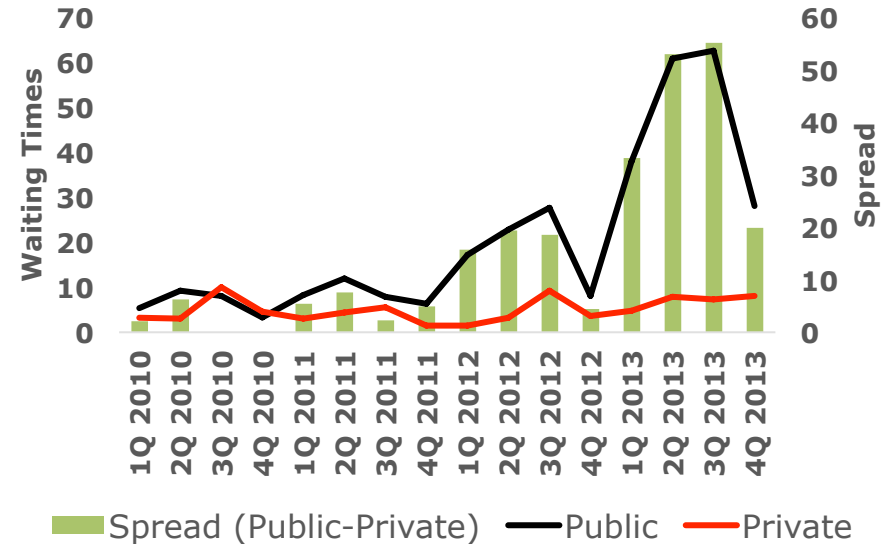


# Comparison of Private and Public Berth Waiting Times in Santos and Paranagua (2010-13)

## Public vs. Private Berth Waiting Times (Santos)



## Public vs. Private Berth Waiting Times (Paranagua)



- The vast majority of the ocean vessel waiting times occurs at public berths in Santos and Paranagua.
  - In Santos, the average waiting time for ocean vessels from 2010-13 was 21.08 days at public berths compared to 6.45 days at private berths (average spread 14.63 days).
  - In Paranagua, the average waiting time for ocean vessels was 20.39 days at public berths compared to 5.06 days at private berths (average spread 15.33 days).
- The challenge is that the public berths load the vast majority of soybeans leading to longer waiting times and higher demurrage costs at the Ports of Santos and Paranagua.

# Brazilian Transit Times to Major Destinations

Comparison of Brazilian Transit Times to Major Destinations Markets (Days)

	Sorriso-Santos	Waiting Time	Santos-Destination	Sorriso-Destination	Sorriso-Paranagua	Waiting Time	Paranagua-Destination	Sorriso-Destination	Londrina-Paranagua	Waiting Time	Paranagua-Destination	Londrina-Destination
Shanghai	8.5	9.05	32.80	50.35	9.25	10.93	32.80	52.98	6	10.93	32.80	49.73
Tokyo	8.5	9.05	34.30	51.85	9.25	10.93	34.30	54.48	6	10.93	34.30	51.23
Kaohsiung	8.5	9.05	31.60	49.15	9.25	10.93	31.60	51.78	6	10.93	31.60	48.53
Jakarta	8.5	9.05	25.50	43.05	9.25	10.93	25.50	45.68	6	10.93	25.50	42.43
Ho Chi Minh City	8.5	9.05	28.60	46.15	9.25	10.93	28.60	48.78	6	10.93	28.60	45.53
Manila	8.5	9.05	30.10	47.65	9.25	10.93	30.10	50.28	6	10.93	30.10	47.03
Rotterdam	8.5	9.05	16.30	33.85	9.25	10.93	16.30	36.48	6	10.93	16.30	33.23
Hamburg	8.5	9.05	17.10	34.65	9.25	10.93	17.10	37.28	6	10.93	17.10	34.03
Port Said	8.5	9.05	18.80	36.35	9.25	10.93	18.80	38.98	6	10.93	18.80	35.73
Average	8.5	9.05	26.12	43.67	9.25	10.93	26.12	46.30	6	10.93	26.12	43.05

- Surprisingly, interior transit times from the Brazilian interior to Santos and Paranagua (including the waiting times to enter the port) are relatively low compared to U.S. routes.
- However, the ocean vessel waiting times at the ports as well as the fact that the per unit transportation cost of moving soybeans by truck (relative to barge and rail) make interior transportation costs in Brazil very high and impact the competitiveness of Brazilian farmers substantially.
- It is the interior transportation costs which reduce prices for soybeans grown in Mato Grosso to a level where soybean farmers in Mato Grosso receive some of the lowest cash prices for their soybeans in the world.

# Transit Times from the Major Soybean Origins to the Major Soybean Destination Markets

Transit Times Between Key Origin and Destination Markets (Days)						
	Mitchell, SD	Davenport, IA	Sorriso, MT-Santos	Sorriso, MT-Paranagua	Londrina, PR	Rufino, SF
Shanghai	24.8	51.8	50.3	53.0	49.7	38.7
Tokyo	20.8	49.3	51.8	54.5	51.2	36.8
Kaohsiung	24.5	53.1	49.1	51.8	48.5	37.1
Jakarta	30.3	56.8	43.0	45.7	42.4	31.0
Ho Chi Minh City	27.8	56.3	46.1	48.8	45.5	34.2
Manila	25.8	54.3	47.6	50.3	47.0	36.0
Rotterdam	N/A	36.5	33.8	36.5	33.2	23.8
Hamburg	N/A	37.2	34.6	37.3	34.0	24.5
Port Said	N/A	41.4	36.3	39.0	35.7	26.3
<b>Average</b>	<b>25.7</b>	<b>48.5</b>	<b>43.7</b>	<b>46.3</b>	<b>43.1</b>	<b>32.0</b>

Transit Time Spreads between Key Origins and Destination Markets (Days)										
	Mitchell-Davenport	Mitchell-Sorriso-San	Mitchell-Sorriso-Par	Mitchell-Londrina	Mitchell-Rufino	Davenport-Mitchell	Davenport-Sorriso-San	Davenport-Sorriso-Par	Davenport-Londrina	Davenport-Rufino
Shanghai	(27.0)	(25.5)	(28.2)	(24.9)	(13.9)	27.0	1.5	(1.2)	2.1	13.1
Tokyo	(28.5)	(31.0)	(33.7)	(30.4)	(16.0)	28.5	(2.5)	(5.2)	(1.9)	12.5
Kaohsiung	(28.6)	(24.6)	(27.3)	(24.0)	(12.6)	28.6	4.0	1.3	4.6	16.0
Jakarta	(26.5)	(12.7)	(15.4)	(12.1)	(0.7)	26.5	13.8	11.1	14.4	25.8
Ho Chi Minh City	(28.5)	(18.3)	(21.0)	(17.7)	(6.4)	28.5	10.2	7.5	10.8	22.1
Manila	(28.5)	(21.8)	(24.5)	(21.2)	(10.2)	28.5	6.7	4.0	7.3	18.3
Rotterdam	N/A	N/A	N/A	N/A	N/A	N/A	2.7	0.0	3.3	12.7
Hamburg	N/A	N/A	N/A	N/A	N/A	N/A	2.6	(0.1)	3.2	12.7
Port Said	N/A	N/A	N/A	N/A	N/A	N/A	5.1	2.4	5.7	15.1
<b>Average</b>	<b>(27.9)</b>	<b>(22.4)</b>	<b>(25.0)</b>	<b>(21.7)</b>	<b>(9.9)</b>	<b>27.9</b>	<b>4.9</b>	<b>2.2</b>	<b>5.5</b>	<b>16.5</b>

- Mitchell, SD is the most competitive origin in terms of transit times to Asia. However, Mitchell loses competitiveness to Davenport on transportation costs because the per unit transportation costs of moving soybeans by barge is so much lower than moving soybeans via rail.

# Table of Contents

- Executive Summary
- Transportation Costs
- Transit Times
- Predictability of Delivery

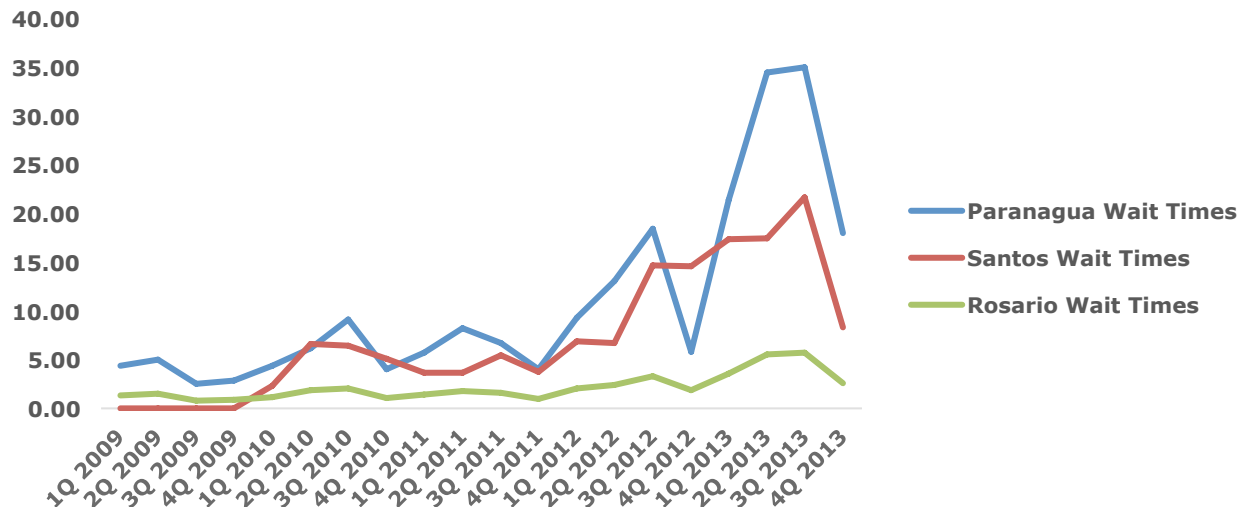
# Predictability of Delivery

- Respondents interviewed in China said that predictability of delivery is a key factor when deciding the origin to choose for soybean purchases.
- 26 Chinese soybean buying companies were sent surveys which posed questions about predictability of delivery and the impact that late shipments have on their business and 11 responded.
- Overall, the respondents identified Brazil as the least predictable origin in terms of late shipments during the peak export season followed by Argentina and the U.S.
- U.S. shipments arrive within three days of the expected arrival date and Argentine shipments arrive within one week, but Brazil can take as long as four weeks to arrive and the average amount of time that the respondents have to wait for shipments from Brazil during peak season is close to 15 days.
- Many of the respondents said that they would choose U.S. soybeans over South America during the months of February, March and September if the price spreads between the origins is narrow because of the dependability of U.S. shipments.
- The results of the survey can be found in the Word document attached along with this presentation.

# Waiting Times

- From 2009-2013, U.S. soybean shippers experienced very little to no waiting times in the PNW and NOLA and demurrage penalties were generally very low or nonexistent.
- Argentine wait times have increased during the peak season, but are still relatively short (about 30% of those in Brazil).
- In Brazil, wait times during the peak season have been extremely high over the last two years (especially in the public berths in Santos and Paranagua) due to weather challenges, the distance that soybeans have to travel to reach the port and overall port congestion.

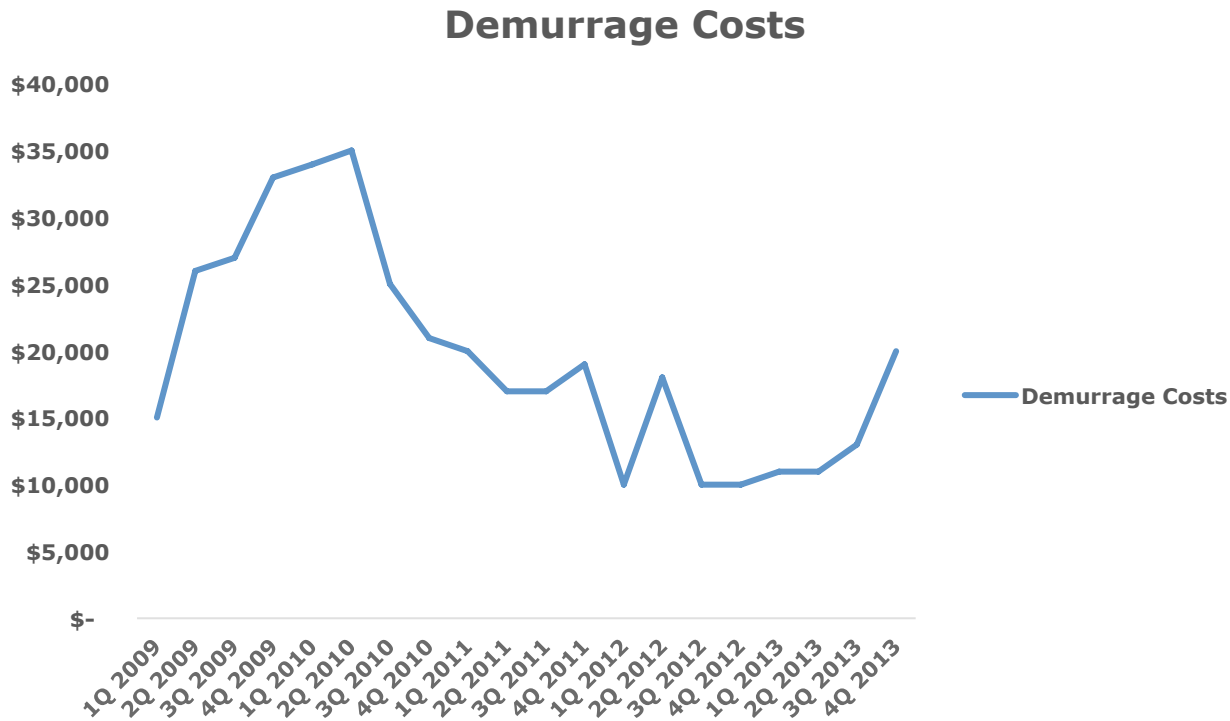
**Vessel Wait Times in Argentina and Brazil (Days)**



Source: Transportation Consultants, Inc; HighQuest Analysis

# Demurrage

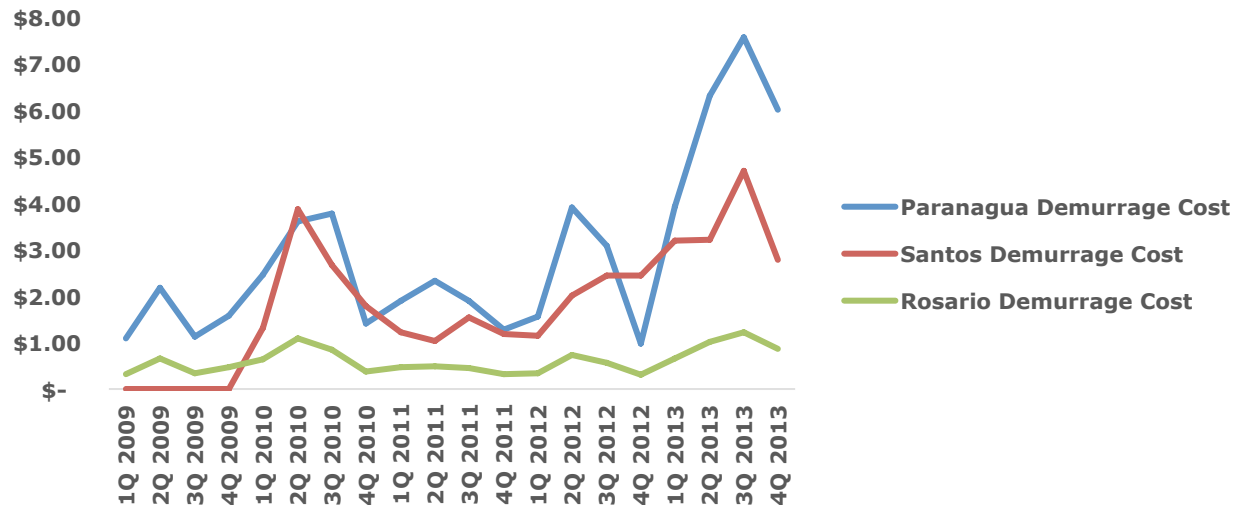
- The immediate impact of extended waiting times in Brazil is that the shipper must pay demurrage for every day that the vessel has to wait to load.
- From 2009-2013, demurrage penalties have fluctuated between \$10,000 and \$35,000 per day.



# The Impact of Waiting Times on Transportation Costs

- Assuming the average shipment of soybeans to China is 60,000 MT, demurrage costs added an additional \$2.90/MT on soybean shipments out of Paranagua, \$2.28/MT on soybean shipments out of Santos and \$0.61/MT on soybean shipments out of Rosario on average from 2009-13.
  - In the peak season for Brazil and Argentina (April-September), the average financial ramifications of wait times over the five year period increased to \$3.67/MT for Paranagua, \$2.69/MT for Santos and \$0.74/MT for Rosario.
  - The average financial ramification of wait times during the peak season in 2012 and 2013 was even higher. In 2012 and 2013, the average financial ramifications of wait times during the peak season increased to \$5.45/MT for Paranagua, \$3.09/MT for Santos and \$0.89/MT for Rosario.

Financial Ramifications of Demurrage (per metric ton)



Source: Transportation Consultants, Inc; HighQuest Analysis



## Other Ramifications of Late Arrivals

- Unpredictability of delivery in Brazil also has other consequences for soybean buyers. These include:
  - The inability to match soybean purchases with sales of the end product which can lead to risk management challenges;
  - Customer complaints focused on the timeliness of soybean meal and oil delivery;
  - If the shipment arrives too late, the buyer may be forced to purchase soybeans at higher spot prices from domestic brokers or even from another origin;
  - Potential slow downs in capacity utilization; and
  - If arrivals are consistently late during the peak season, the buyers might be forced to increase storage capacity so that they can hold more soybeans for processing in anticipation of late shipments and maintain their capacity utilization rates.