

Strangling Speculation: The Effect of the 1903 Viennese Futures Trading Ban

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Ever since the emergence of futures markets, the effect of futures trading on spot price volatility has been subject to debate. A variety of studies find that futures trading allows better supply-demand regulation, and offers hedging opportunities (Keynes, 1930; Jacks, 2007; Günay and Haque, 2015). Information flowing from futures to spot markets is believed to be essential for pricing cash transactions (Cox, 1976; Garbade and Silber, 1986; Fama and French, 1987). In this paper, I test the effects of futures trading on the cash market by looking at what happens if it no longer exists. To do so, I go back to the early twentieth century, when futures trading in the Viennese grain market was banned permanently. Using daily spot and futures prices collected from archived quotation lists and newspapers, with prices from Budapest as a control, I test two hypotheses: (I) the futures trading ban increased the volatility of spot prices, as the risk-allocation and information transmission function of futures towards cash markets was no longer maintained; and (II) the ban reduced information flows from futures to spot markets.

The Vienna and Budapest markets provide a unique setup because they were similarly organised, offered equal grain types, and were the only Austro-Hungarian locations with a futures trade in grain. The ban only affected the Viennese market. Several anti-futures trading movements, driven by scepticism towards speculation, developed in the 1880s and 1890s, for example in Texas, Ohio, and Berlin. Unlike in Vienna, none of these resulted in a permanent prohibition, which makes them unsuitable for testing lasting effects. With Budapest as a control, spot price volatility in Vienna is found to increase after the ban, with a higher intra-day variation of spot prices. Information flows between the futures and spot markets of Vienna and Budapest are found to have existed prior to the ban, which links to the information transmission and the close ties between the two cities. After futures trading is prohibited in Vienna, Budapest futures prices with three to six months maturity continue to Granger-cause Viennese spot prices.

The paper is structured as follows: in the first section, the extant literature is discussed. The second section provides historical information. In the third section, I present the data. In the fourth section, I elaborate on the empirical strategy. I assess futures-spot information flows and the ban's effects on spot price volatility. To conclude, I discuss my findings in a wider context.

Historical Background

In 1875, the Agricultural Products Exchange had established a futures trade to enhance competitiveness (Treibl 1903, p. 224). Persistent scepticism towards speculation quickly led to attempts to ban futures trading. In autumn 1900, an inquiry was launched, which eventually led to the New Law of 4 January 1903, prohibiting any trade in futures. The ban came into effect on 10 April 1903. The last futures prices were listed on 9 April 1903. Futures trading based on the exchange's clearing entity and trading terms became subject to legal prosecution. To Austrian citizens, futures trading at other locations, particularly at the BSCE, was not allowed.¹ Newspapers reported that the Viennese market became unpopular after the ban. Producers turned to direct sales in the provinces.² Some Viennese firms started to use the Budapest spot market.³ Figure 1 shows that in the year

¹ *Wiener Landwirtschaftliche Zeitung*, 8 May 1907.

² *Wiener Landwirtschaftliche Zeitung*, 19 April 1903.

³ *Deutsches Volksblatt*, 10 Aug. 1904.

following the ban, the spot quantities of wheat sold at the BSCE, however, underwent no sustained increase. The ban also caused speculators to abstain from the Viennese grain market.⁴ They switched to company shares or other commodities such as cotton or coffee.⁵

<<INSERT FIGURE 1>>

Futures trading and the spot market

Futures complement spot markets. In their risk-transfer role, they reallocate risk from producers to speculators (see Gutierrez, 2012). Futures prices reflect supply, demand and inventory news (Cox, 1976, p. 1215). While radical news can provoke large price fluctuations (see Hilliard and Reis 1999), futures lower spot price volatility (Jacks, 2007, p. 346). Assuming rational expectations, the existence of a futures market implies that prices constitute the best estimate from available information on the price at the futures contract's delivery date (Jacks, 2007, p. 346). In a competitive futures market, information is reflected instantaneously (Etienne et al., 2013, pp. 12-20). This has been shown empirically: a number of studies on the introduction of futures trading found a decrease in spot price volatility favoured by enhanced pricing. Edwards (1988), Holmes (1996) and Bologna and Cavallo (2002) demonstrated that the introduction of futures trading positively affected information transmission and price discovery.

Early economists, such as Mill (1871), Kohn (1891) and Keynes (1930), had already supported futures markets. Fear of 'undue' speculation came from the assumption that it would destabilise spot prices and impose losses. Countering the destabilisation argument, Günay and Haque (2015, p. 267) showed that futures decrease risk, allowing prices to be competitive. The testable hypotheses of this paper are: (I) The ban of futures trading increased the volatility of spot prices as the risk-allocation and information transmission function of futures towards cash markets was no longer maintained, and (II) the ban reduced information flows from futures to spot markets.

Data

To test the effect of the ban, I collected daily spot and futures price ranges at market close for wheat, rye, oats and corn for October 1902 to October 1903. Sources for Viennese prices are archived quotation lists of the Agricultural Products Exchange – for Budapest, the newspapers *Pester Lloyd* and *Ostdeutsche Rundschau*. Both cities sold equal types of wheat, rye, and oats. Corn was traded on the Budapest futures market, but ceased to be traded on the Viennese futures market in November 1902. While the grain quality weight range stayed constant, the daily price spread was subject to frequent changes, based on the high-lows in the previous trading session. I treat 10 April 1903 as the first day without a futures trade. Investors could buy spring, summer, and autumn contracts. In Vienna, spring futures prices were listed between August and April. In late March, the listing of May-June futures prices started. From October 1902 until the ban, traders could buy contracts with maturity in autumn 1902 or spring 1903, equivalent to the years before. Speculators still could make full use of the Viennese futures market prior to the ban. Table 1 provides harvest statistics and shows that the 1902 and 1903 harvests were stable and are unlikely to have caused stronger seasonality.

<<<INSERT TABLE 1>>>

⁴ *Neue Freie Presse*, 1 March 1903.

⁵ *Ostdeutsche Rundschau*, 9 March 1902; *Arbeiter-Zeitung*, 30 March 1902; *Die Zeit*, 14 Sep. 1905.

The effect of the ban

Empirical Strategy

I hypothesise that the ban caused an increase in spot price volatility, as the information-transmission function of futures markets was no longer maintained. This should be reflected in a larger intra-day spread of spot prices. To test this, I run a difference-in-difference analysis, using prices from Budapest as a control. I also assess Granger causality between the cities to study changes in information flows.

Future-spot Granger causality

After the ban, information might have flown in from Budapest. In early May 1903, the newspaper *Neues Wiener Tagblatt* reported that uncertainty led to dependence on Budapest. When futures trading ended in Vienna, investors in Budapest could buy May or October futures contracts for wheat, rye and oats, May, June, July, August or September contracts for corn. Table 2 shows that before the ban, futures prices in each city Granger-caused spot prices in the other. After the ban, Budapest futures prices with maturity in summer or autumn Granger-caused spot prices in Vienna. This implies that pricing information in Vienna was available, possibly preventing a distortion of prices.

<<<INSERT TABLE 2>>>

Effects on intra-day variation

This section examines the effects of the ban on the intra-day spread. Spot prices from Budapest and corn from Vienna, traded exclusively on the spot market, are used as controls. An important precondition is that futures trading did not migrate to Budapest after the ban. Figure 2 shows that no longer-term migration took place.

<<<INSERT FIGURE 2>>>

Tables 3 and 4 provide the results. In Table 3, the intra-day variation of wheat, rye, oats and corn as dependent variables is explained by *Vienna*, a dummy taking on 1 for prices from the Viennese market, *Post ban*, a dummy taking on 1 for the post-ban period, and the interaction term *Post ban*Vienna*, taking on 1 if both factors hold true. The intra-day variation of wheat, rye and oats spot prices in Vienna significantly increased after the ban.

<<<INSERT TABLE 3>>>

In Table 4, the intra-day variation of Viennese spot prices is explained by the regressors *Corn*, *Post ban* and *Post ban*Corn*, using corn as a control. After the ban, the intra-day variation of wheat, rye and oats significantly differed from corn.

<<<INSERT TABLE 4>>>

As a robustness check, I also compare the period 8 October 1902 to 3 January 1903 to 14 April to 7 July 1903, excluding 4 January until the ban came into effect (see Appendix Tables I and II). The volatility-increasing effect of the ban still holds.

Conclusions

This paper has examined the consequences of the 1903 futures trading ban in the Viennese grain market on spot price volatility. I found that the intra-day variation of spot prices significantly increased. Information flows between futures and spot markets changed. After the ban, information flow in from the Budapest futures market. Despite the availability of pricing information, the Viennese grain market lost importance. International traders left, local producers switched to direct sales and speculators to other assets. Strangling speculation may have come at too high a cost: the market was abandoned and the supply of grain severely affected.⁶ Further research is needed to determine the long-run effects on the Viennese grain market and on the stock market.

⁶ *Neues Wiener Journal*, 29 April 1903.

References

- Austria. Archives of the Agricultural Products Exchange in Vienna. 1030 Vienna.
- Austria. Austrian State Archives. 1020 Vienna.
- Austria. ANNO – AustriaN Newspapers Online. <http://anno.onb.ac.at/>
- Bologna, Pierluigi, and Cavallo, Laura. “Does the introduction of futures effectively reduce spot market volatility? Is the futures effect immediate? Evidence from the Italian stock exchange using GARCH.” *Applied Financial Economics* 12 (2002): 183-92.
- Cox, Charles C. “Futures Trading and Market Information.” *The Journal of Political Economy* 84, no. 6 (1976): 1215-37.
- Edwards, Franklin R. “Futures Trading and Cash Market Volatility: Stock Index and Interest Rate Futures.” *Journal of Futures Markets* 8, no. 4 (1988): 421- 39
- Fama, Eugene F., and French, Kenneth R. “Commodity future prices: some evidence on forecast power, premiums, and the theory of storage.” *Journal of Business* 60 (1987): 55–73.
- Garbade, Kenneth D., and Silber William. “Price Movements and Price Discovery in Futures and Cash Markets.” *The Review of Economics and Statistics* 65, no. 2 (1983): 289-97.
- Günay, Samet, and Haque, Mahfuzul. “The effect of futures trading on spot market volatility: evidence from Turkish Derivative Exchange.” *International Journal of Business and Emerging Markets* 7, no. 3 (2015): 265-85.
- Hilliard, Jimmy E. and Reis, Jorge. “Valuation of Commodity Futures and Options under Stochastic Convenience Yields, Interest Rates, and Jump Diffusions in the Spot.” *Journal of Financial and Quantitative Analysis* 33, no. 1 (1998): 61-86.
- Holmes, Phil. “Spot Price Volatility, Information And Futures Trading: Evidence From A Thinly Traded Market.” *Applied Economics Letters* 3 (1996): 63-66.
- Jacks, David S. “Populist versus theorist: Futures markets and the volatility of prices.” *Explorations in Economic History* 44 (2007): 342-62.
- Keynes, John M. *A Treatise on Money*. London: Macmillan, 1930.
- Kohn, David. *Der Getreideterminhandel: Wesen. Nationalökonomische Bedeutung. Einfluss auf das Getreidegeschäft*. Berlin: Duncker und Humblot, 1891.
- Mill, John S.. *Principles of political economy*. London: Longmans, Green, Reader, and Dyer, 1871.
- Treibl, Adolf. *Die Wiener Produktenbörse: Börse für landwirthschaftliche Producte in Wien*. Vienna: Selbstvlg., 1903.

Table 1: Harvest statistics of the Austro-Hungarian Empire, in million tons

	Austria				Hungary (incl. Croatia and Slavonia)			
	1903	1902	1901	1900	1903	1902	1901	1900
Wheat	1.25	1.35	1.20	1.11	4.40	4.90	3.62	4.14
Rye	2.06	2.09	1.92	1.39	1.20	1.47	1.20	1.17
Oats	1.86	1.82	1.72	1.71	1.27	1.29	1.07	1.11
Corn	0.41	0.34	0.45	0.37	3.45	2.6-2.8	2.86-3.25	

Sources: K.K. Statistische Zentral Kommission (1903), Wiener Landwirtschaftliche Zeitung (20 Aug. 1902); Pester Lloyd (04 Sep. 1902 and 31 Jan. 1904). *Notes:* The 1901-2 Budapest corn harvests are based on estimates from newspapers.

Table 2: Commodity-wise future-spot Granger causality between Vienna and Budapest before and after the ban

Month applying to futures contract	BEFORE: Grang. Causality futures Vienna and spot Budapest	BEFORE: Granger Causality futures Budapest and spot Vienna		AFTER: Granger Causality futures Budapest and spot Vienna						
	Spring 1903	April 1903	May 1903	May 1903	July 1903	August 1903	September 1903	October 1903	April 1904	May 1904
	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>	<i>f-stat</i>
Wheat - MIN	10.241***	19.08 ***		1.312				16.696 ***	0.558	
Wheat - MAX	10.992***	8.199 ***		2.363				11.88 ***	1.149	
Rye - MIN	7.449***	5.470*						5.375 ***	2.061	
Rye - MAX	5.651***	5.625 ***						8.065 **	5.199 *	
Oats - MIN	3.867**	0.449		0.481				3.437*	3.795	
Oats - MAX	2.243	1.686		0.310				3.227*	2.314	
Corn - MIN			2.927	6.369*	29.255 ***	6.723 ***	6.810*			0.210
Corn - MAX			1.623	3.915	25.92 ***	4.795 **	3.417			0.418

Sources: Agricultural Products Exchange; *Pester Lloyd, Ostdeutsche Rundschau*. Notes: The table distinguishes between different maturities of futures contracts. Before the ban, only futures prices with spring maturity were listed: denominated “spring” prices for Vienna, and “April” or “May” prices for Budapest. After the ban, prices with May and October 1903 up to May 1904 maturities for wheat, rye and oats, and May, July-October 1903 and April and May 1904 maturities for corn are listed for Budapest.

Table 3: Difference-in-difference results on the intra-day variation of spot prices

	Wheat	Rye	Oats	Corn
Post ban	0.078***	0.107***	0.020*	-0.039*
*Vienna	(0.013)	(0.01)	(0.01)	(0.017)
Post ban	-0.074***	-0.090***	-0.011	0.004
	(0.009)	(0.007)	(0.007)	(0.012)
Vienna	-0.006	-0.069***	-0.077***	0.028*
	(0.009)	(0.007)	(0.007)	(0.012)
Intercept	0.441***	0.281***	0.274***	0.175***
	(0.007)	(0.005)	(0.005)	(0.017)
Adj. R ²	0.130	0.238	0.238	0.012
F-Stat.	29.14***	60.06***	60.00***	3.353***

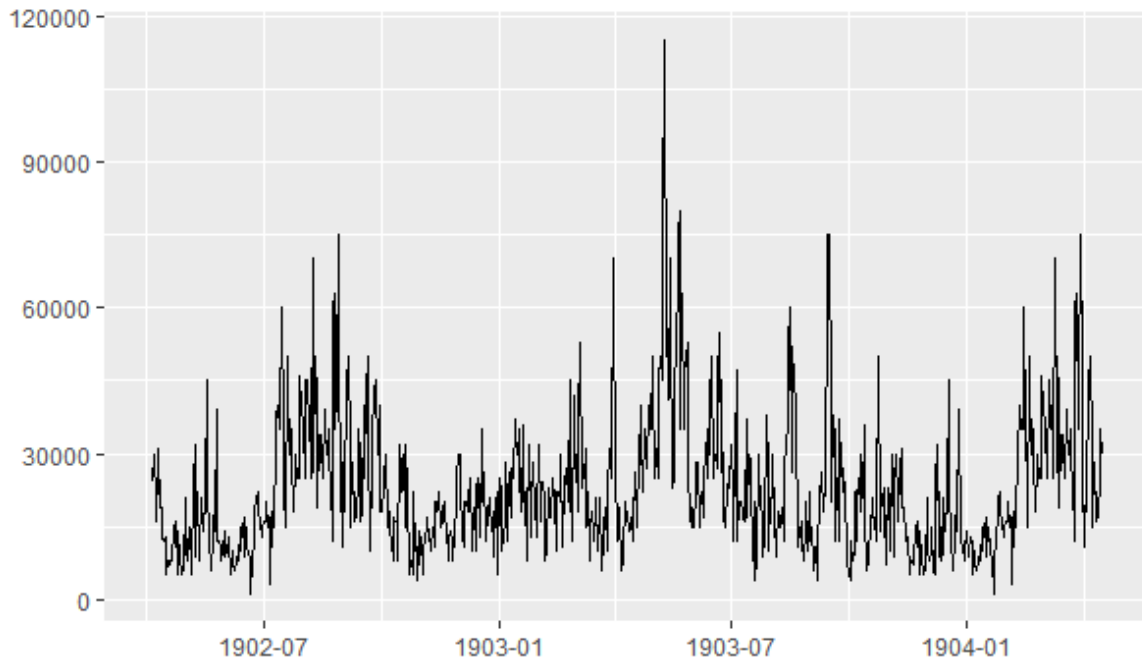
Sources: Agricultural Products Exchange; *Ostdeutsche Rundschau* for Budapest. Notes: The analysed window is 12 October 1902-9 October 1903 (N=284). The intra-day variation of spot prices of the equivalent grain types in Budapest is used as a control.

Table 4: Difference-in-difference results on the intra-day variation of spot prices within Vienna

	Wheat and corn	Rye and corn	Oats and corn
Post ban*corn	-0.039*** (0.013)	-0.052*** (0.006)	-0.044** (0.01)
Post ban	0.004 (0.009)	0.017* (0.008)	0.009 (0.007)
Corn	-0.232*** (0.009)	-0.009 (0.008)	0.006 (0.007)
Intercept	0.435*** (0.006)	0.212*** (0.007)	0.197*** (0.005)
Adjusted R ²	0.732	0.087	0.057
F-Stat.	518.00***	19.11***	12.5***

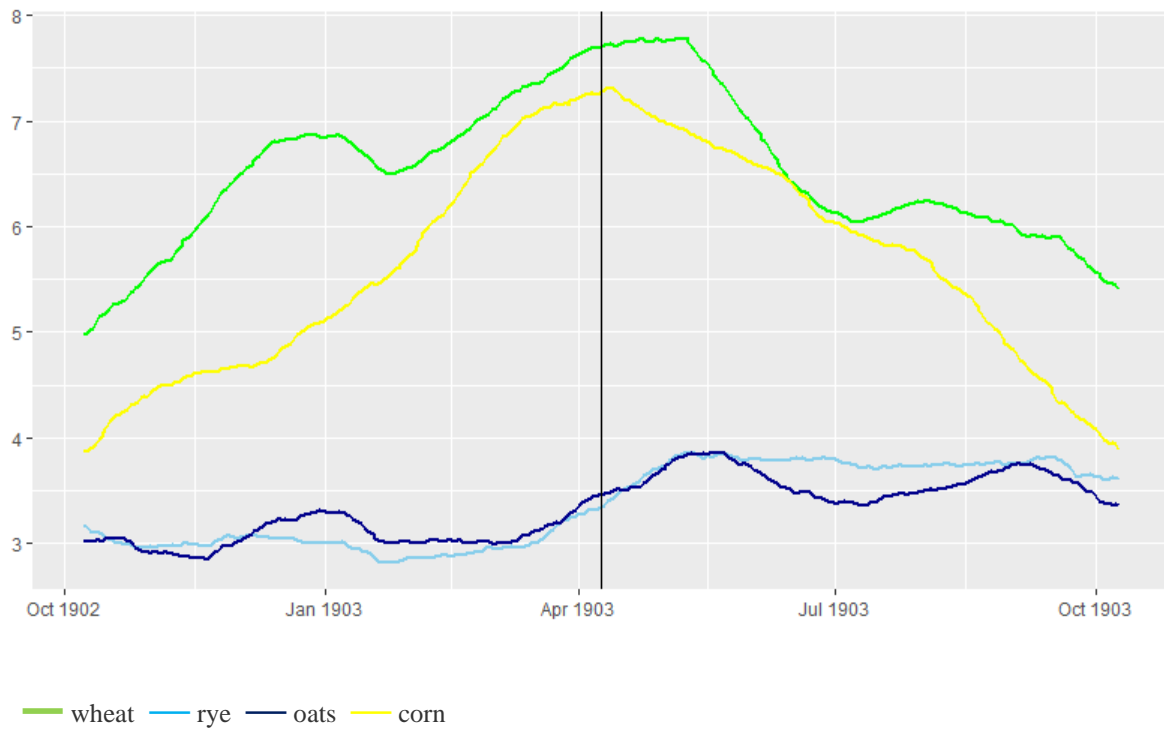
Sources: Agricultural Products Exchange. *Notes:* The analysed period is 12 October 1902-9 October 1903 (N=284). The intra-day variation of Viennese corn spot prices is used as a control.

Figure 1: Quantities of wheat traded on the spot market of the BSCE, in *Meterzentner*



Sources: Pester Lloyd, 1902-4. Notes: One *Meterzentner* corresponded to 100 kilograms.

Figure 2: Number of daily futures contracts in Budapest, moving averages



Source: Pester Lloyd. Notes: The summer months (July-September) count as the peak months of trade.

Appendix

Appendix Table I: Difference-in-difference results on the intra-day variation of spot prices

	Wheat	Rye	Oats	Corn
Post ban *Vienna	0.087*** (0.022)	0.138*** (0.015)	0.018 (0.020)	-0.060*** (0.011)
Post ban	-0.126*** (0.016)	-0.150*** (0.010)	-0.020 (0.014)	0.115*** (0.008)
Vienna	-0.009 (0.016)	-0.110*** (0.010)	-0.090*** (0.014)	0.018* (0.008)
Intercept	0.492*** (0.011)	0.336*** (0.007)	0.288*** (0.010)	0.094*** (0.006)
Adj. R ²	0.224	0.463	0.188	0.483
F-Stat.	27.10***	79.02***	21.88***	85.41***

Sources: Agricultural Products Exchange; *Ostdeutsche Rundschau* for Budapest. *Notes:* The period 8 October 1902-3 January 1903 is compared to 14 April-7 July 1903, N=136. The intra-day variation of spot prices of the equivalent grain types in Budapest is used as a control.

Appendix Table II: Difference-in-difference results on the intra-day variation of spot prices within Vienna

	Wheat and corn	Rye and corn	Oats and corn
Post ban*corn	0.095*** (0.014)	0.067*** (0.012)	0.057*** (0.007)
Post ban	-0.040*** (0.010)	-0.012 (0.008)	-0.002 (0.005)
Corn	-0.372*** (0.010)	-0.115*** (0.008)	-0.087*** (0.005)
Intercept	0.483*** (0.007)	0.226*** (0.006)	0.198*** (0.003)
Adjusted R ²	0.885	0.460	0.618
F-Stat.	696.70***	77.98***	147.10***

Sources: Agricultural Products Exchange. *Notes:* The period 8 October 1902-3 January 1903 is compared to 14 April-7 July 1903, N=136., leaving out the period of ban announcement. The intra-day variation of Viennese corn spot prices is used as a control.