

The World after the 'Spanish Dollar'.

Spanish American Silver after Independence, the 'First Global Crisis' in the 1820s and its mechanisms of international transmission.

III Seminar in Economic History

Bank of Spain

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Main initial hypothesis:

Silver production in New Spain/Mexico significantly influenced the nearly global co-evolution of international prices from the 1770s to the 1840s.

Testing that strong hypothesis has required:

- I. Studying New Spain/Mexico, Hispanic America and world silver production and global circulation
- II. Considering the gold/silver price in the West and silver/copper price in the East
- III. Paying attention to world's production of gold and to different monetary regimes
- IV. Analyzing prices (CPIs and grain prices) in both West and East
- V. Statistically determining the relationships between prices (co-movements) across the world and between those prices and silver production in New Spain/Mexico

The “*real de a ocho*”, protagonist of the globalization of the Early Modern Era

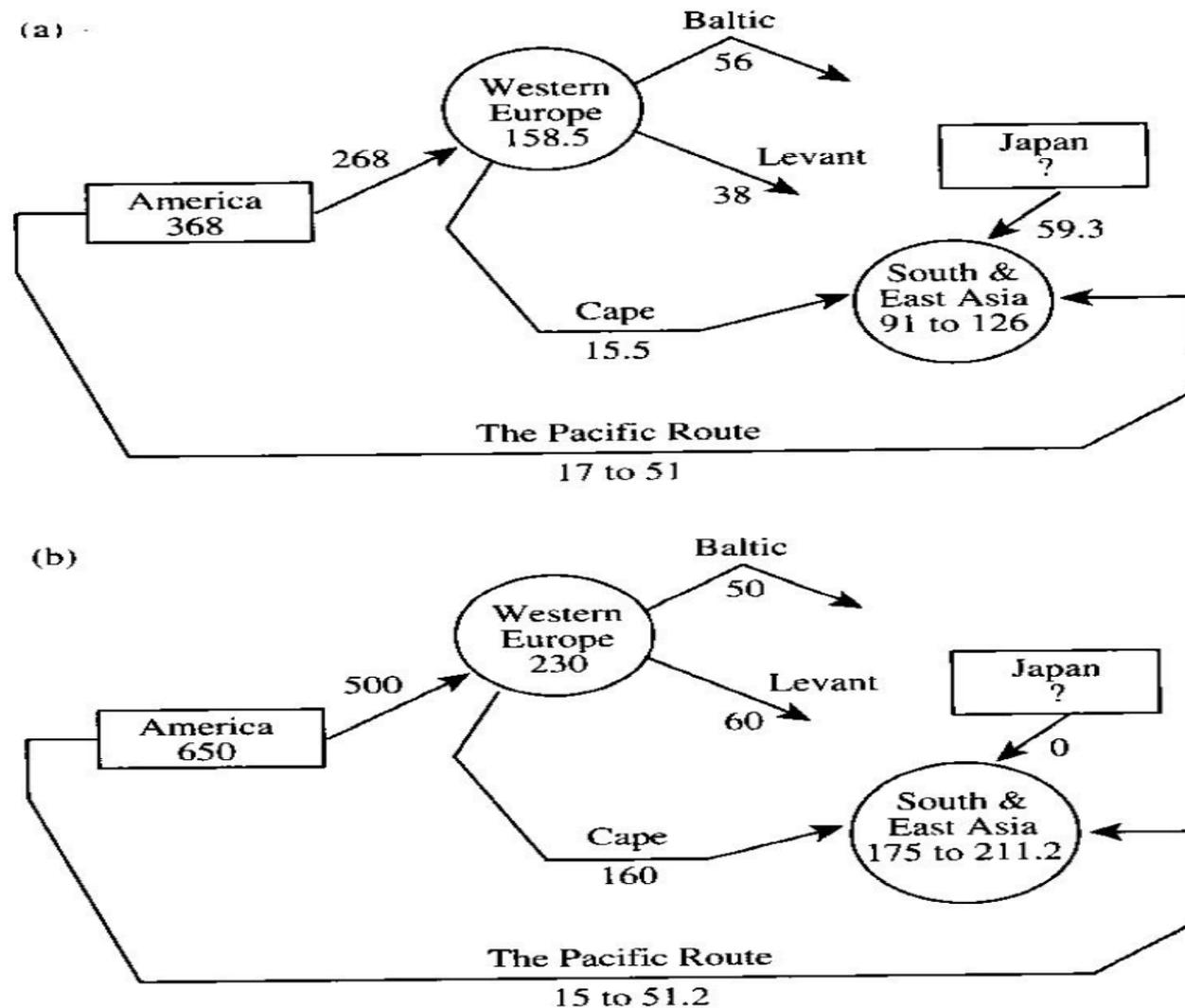


FIGURE 4.7. Intercontinental silver flows, early seventeenth and eighteenth centuries (kilograms per annum): (a) 1600–50; (b) 1725–50. *Source:* de Vries (2003, figure 2.3a,b). Note: the figures in rectangles (exporting regions) represent production, while the figures in circles (importing regions) represent domestic absorption.

A global currency for centuries



Table 1: Production of silver, 1601-1850.
(Millions of fine ounces)

	New Spain/ Mexico	%/World	South America	%/World	Hispanic America	%/World	World total
1601-1700	306,6	24,1	800,6	62,9	1107,2	87,0	1271,9
1701-1800	1044,5	57,0	598	32,6	1642,5	89,6	1832,8
1801-1810	178	62,1	83,6	29,2	261,6	91,3	286,6
1811-1820	100,3	57,8	48,4	27,9	148,7	85,7	173,4
1821-1830	85,1	55,4	39,7	25,9	124,8	81,3	153,5
1831-1840	106,5	54,0	60,3	30,6	166,8	84,5	197,3
1841-1850	135,4	53,4	72,6	28,6	208	82,1	253,4
1811-1850	427,5	55,0	221,1	28,4	648,6	83,4	777,7

Source: White (1930a)

Figure 1: Estimates of silver production in New Spain/Mexico, 1770-1848.

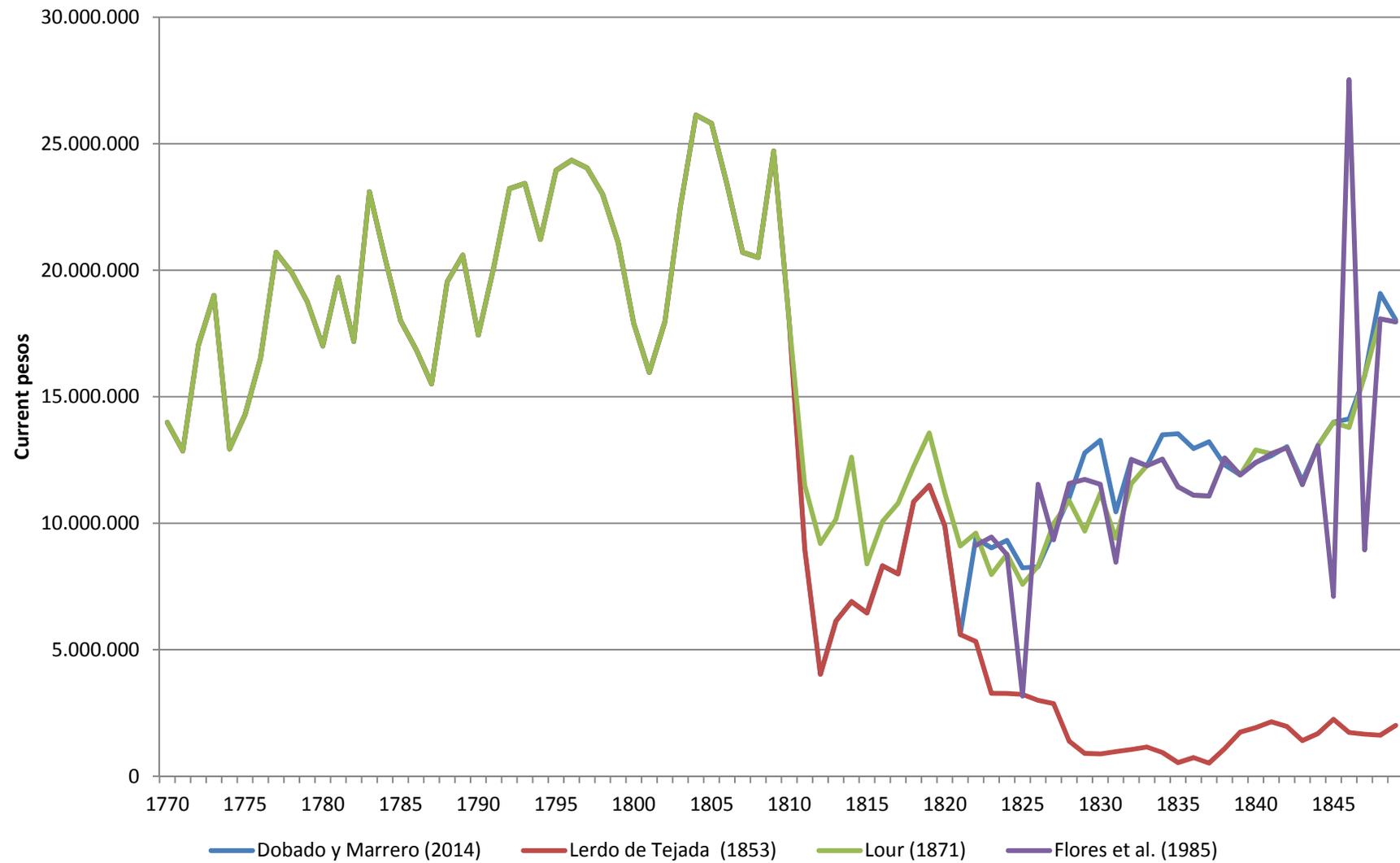
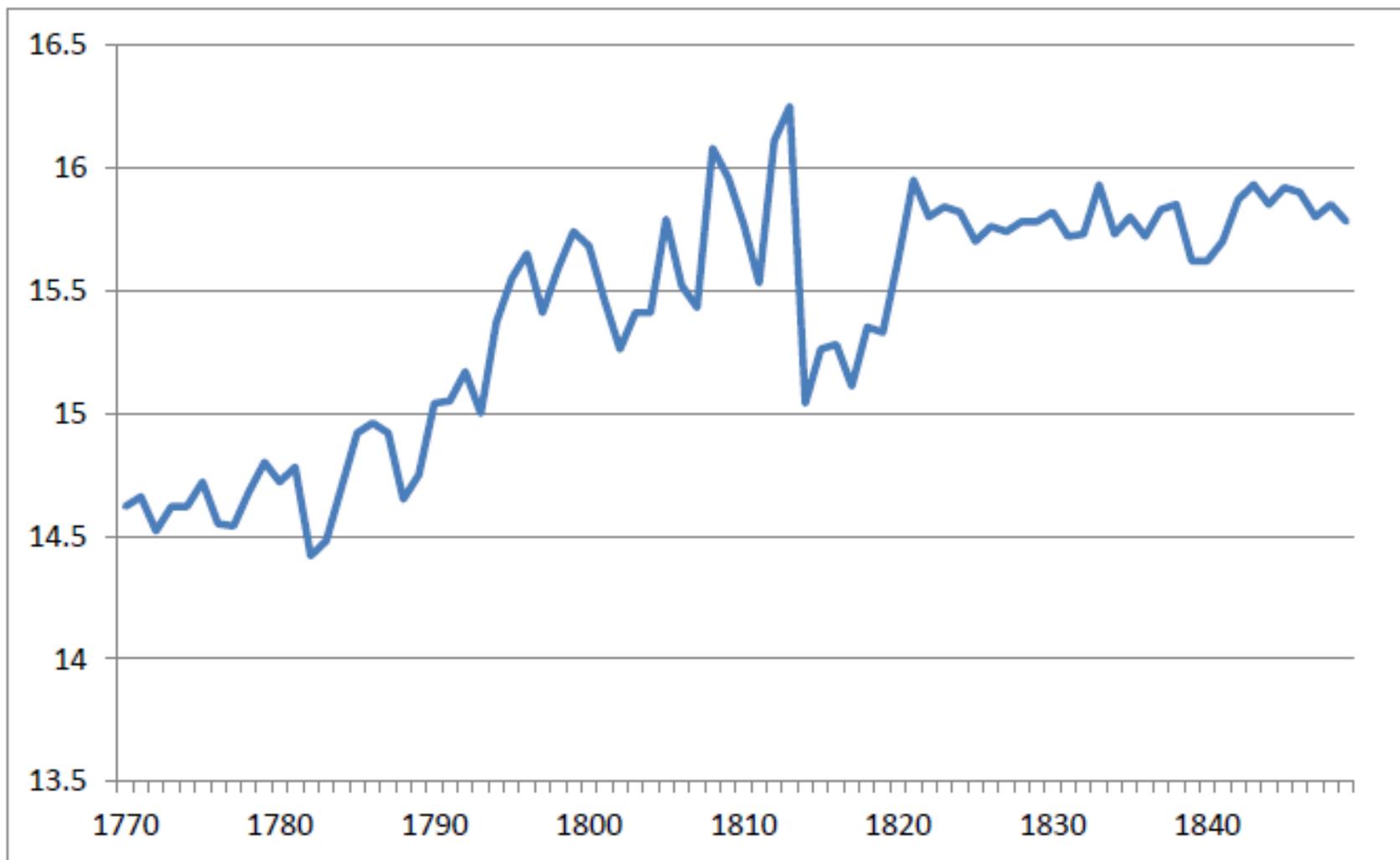
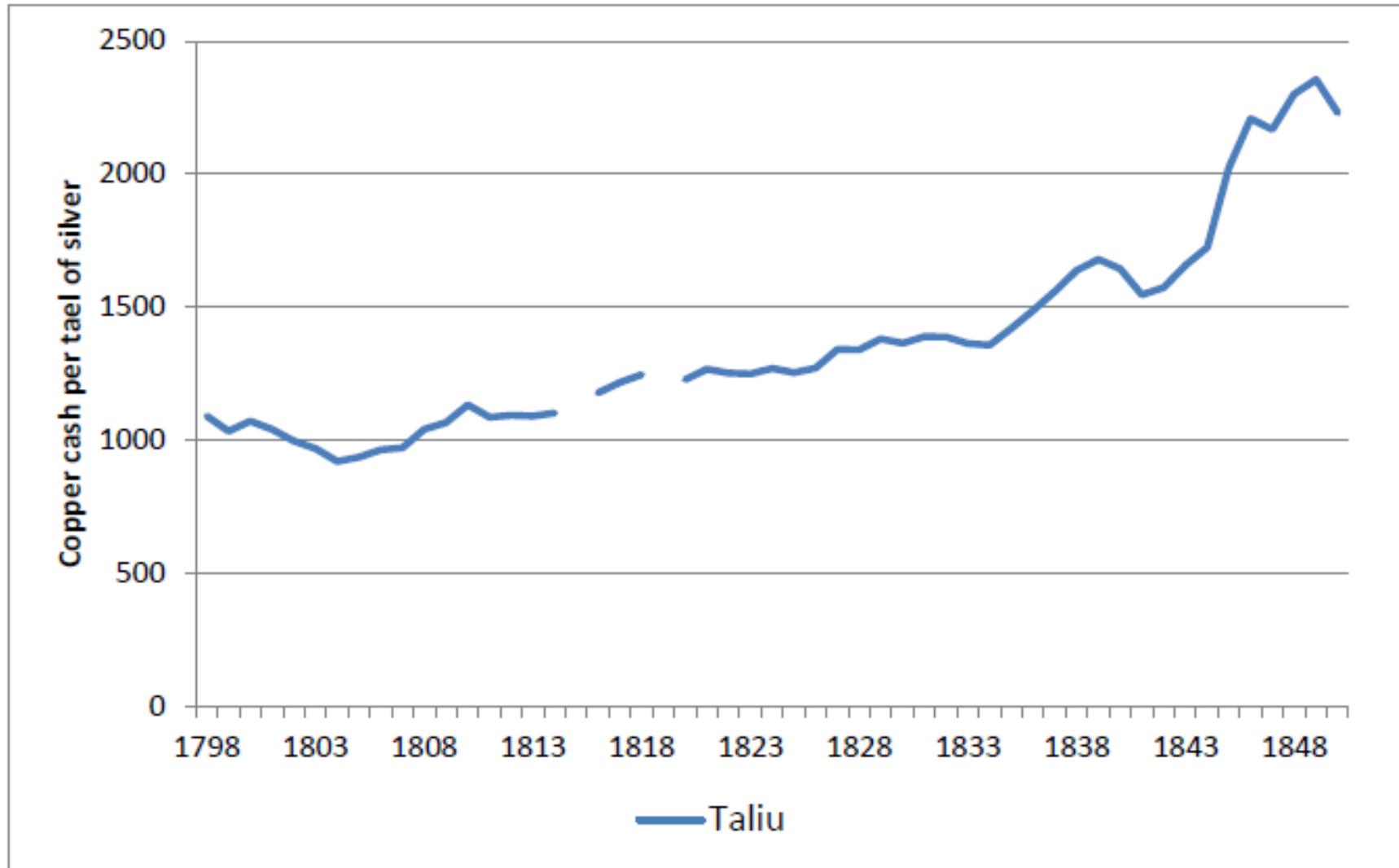


Figure 2: Gold/silver ratio, 1770-1849



Source: Officer and Williamson (2017).

Figure 3: Copper cash/silver ratio in China, 1798-1850



Source: Chang (1975).

Table 2: World production of silver and gold, 1801-1850.
(Metric tons)

	Ag	%Δ	Au	%Δ	Ag/Au
1801-1810	286,6		5,8		49,4
1811-1820	173,4	-39,5	3,8	-34,5	45,6
1821-1830	153,5	-11,5	4,7	23,7	32,7
1831-1840	197,4	28,6	6,6	40,4	29,9
1841-1850	253,4	28,4	17,1	159,1	14,8

Source: White (1930).

Price co-movements (almost) all around the world (I)

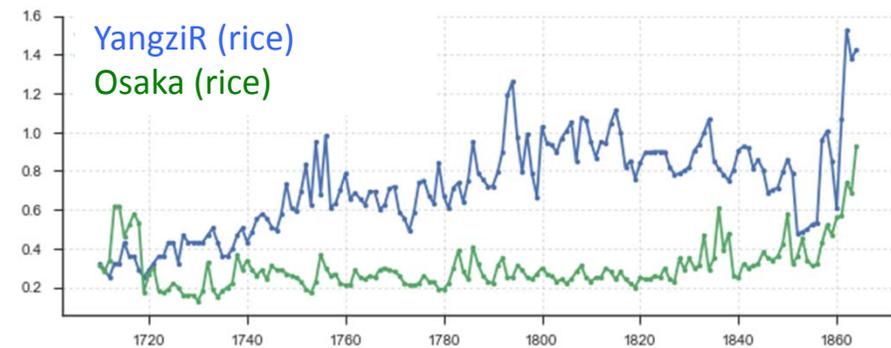
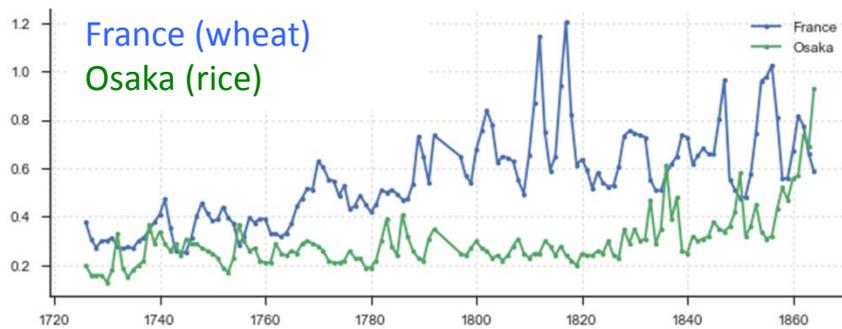
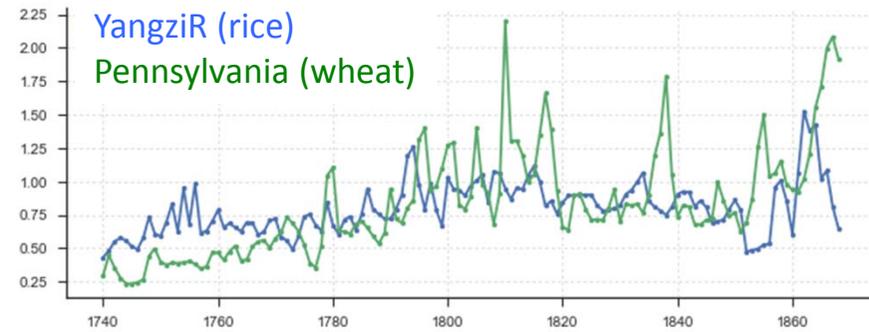
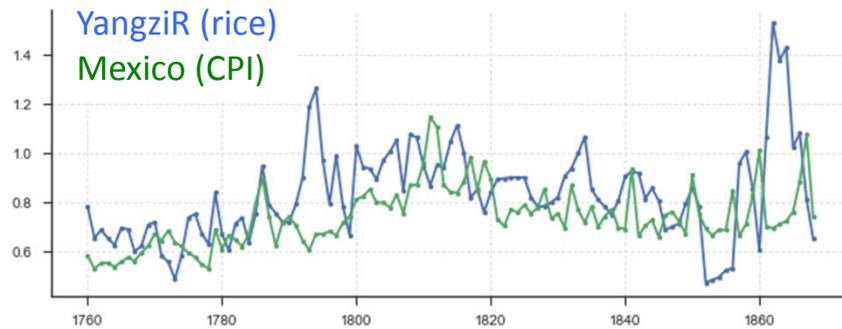
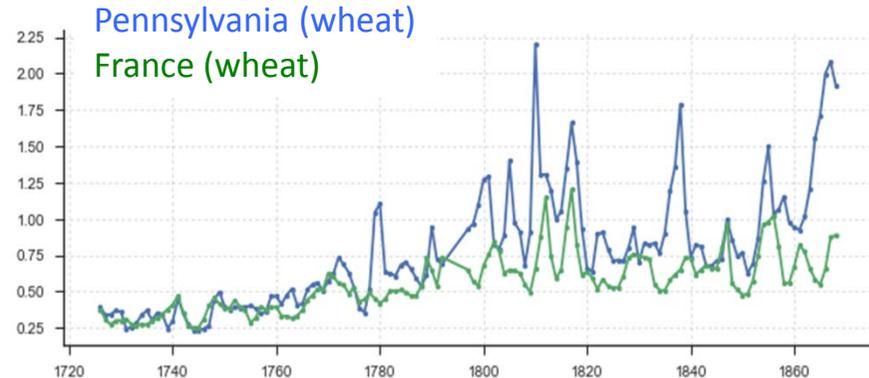
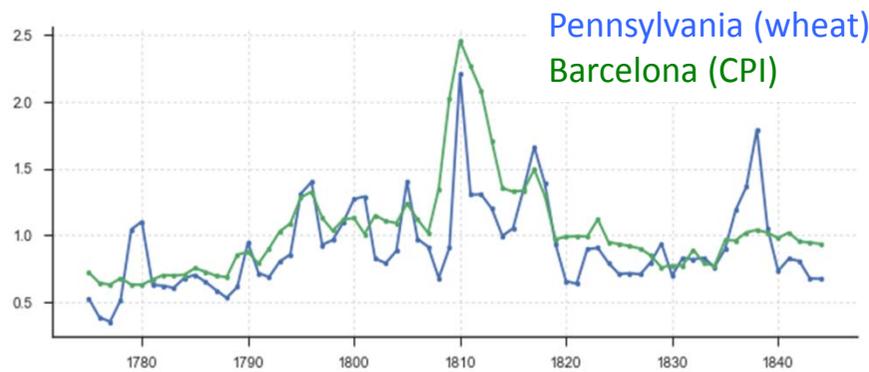
Background:

1. Pairwise co-integration relationships between wheat price series from Amsterdam and Holland, Arévalo (inner Spain), London and Southern England, Gdansk, Milan, Strasbourg and Vienna, in Europe, and Pennsylvania, in North America (Dobado et al., 2012)
2. Pairwise co-integration relationships within China and Japan but disconnection between them (Dobado et al., 2015)

Now we: a) include additional price series to test whether (1) holds for CPIs and/or prices in other locations and b) check if China or Japan co-move with the set of prices in (1).

The results of this analysis is presented in the next table

Price co-movements (almost) all around the world (II)



Price co-movements (almost) all around the world (III)

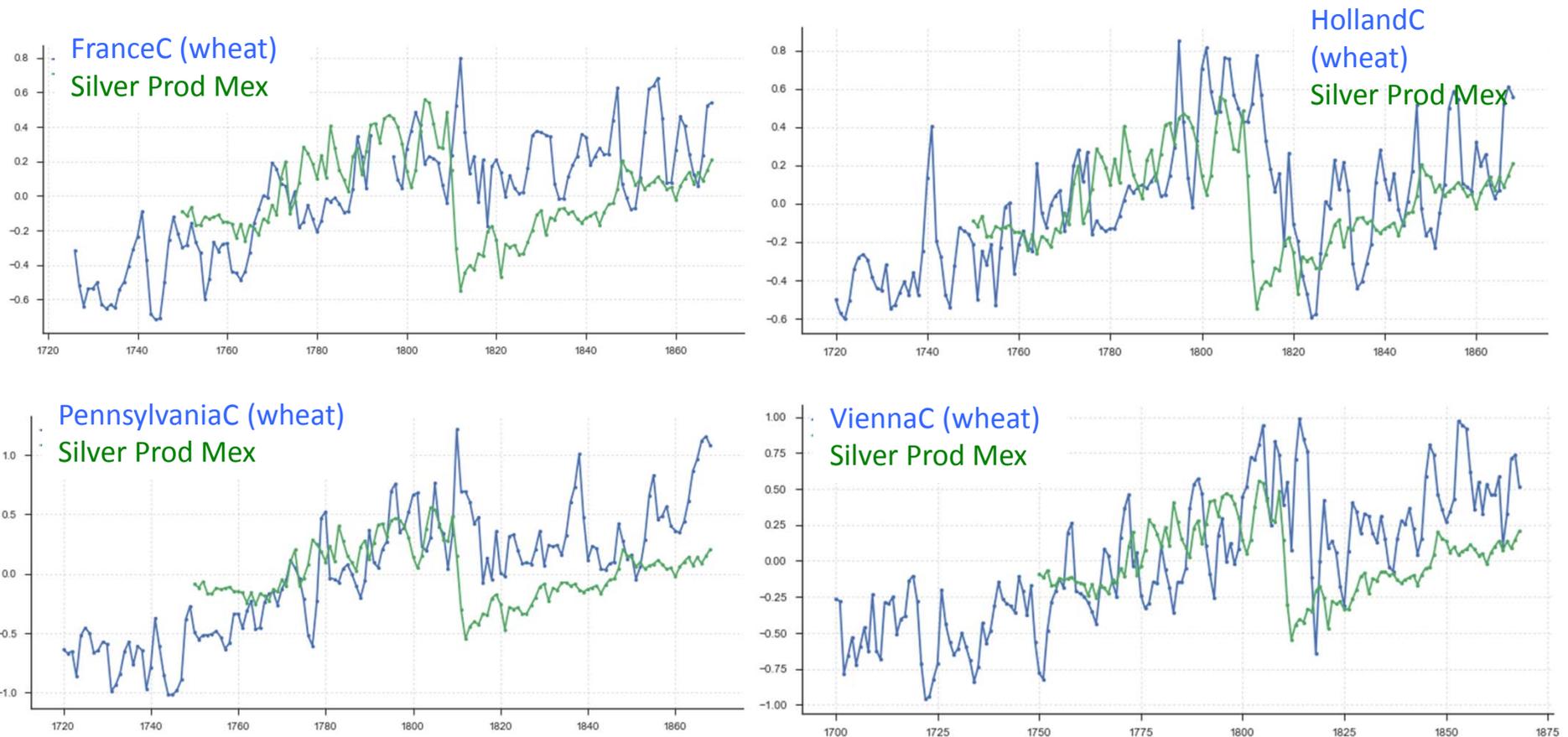
Pair of Series	# obs	ADF-stat	# lags AIC	p-value	Decision
<i>Pennsylvania - CPIMexResHi</i>	107	-4.493	1	0.000	Cointegrated
<i>Pennsylvania - CPIMexResLow</i>	107	-4.641	1	0.000	Cointegrated
<i>YangziRev - CPIMexResLow</i>	106	-4.401	2	0.000	Cointegrated
<i>YangziRev - CPIMexResHi</i>	106	-4.019	2	0.001	Cointegrated
<i>YangziRev - Pennsylvania</i>	127	-5.626	1	0.000	Cointegrated
<i>Pennsylvania - Barcelona</i>	68	-5.909	1	0.000	Cointegrated
<i>Holland - YangziRev</i>	146	-4.662	2	0.000	Cointegrated
<i>Pennsylvania - Palencia</i>	67	-5.512	2	0.000	Cointegrated
<i>Pennsylvania - France</i>	135	-4.333	3	0.000	Cointegrated
<i>YangziRev - Osaka</i>	149	-2.076	5	0.254	Not cointegrated
<i>Pennsylvania - Osaka</i>	139	-1.799	5	0.381	Not cointegrated
<i>CPIMexResLow - Osaka</i>	100	-2.461	4	0.125	Not cointegrated
<i>France - Osaka</i>	130	-2.211	4	0.202	Not cointegrated

A possible explanation for “Japan exceptionalism”:

“After the second half of the seventeenth century, rice prices in both countries began to diverge, and the synchronized movement was completely lost by the eighteenth century. The crucial period was the second half of the seventeenth century. Both countries suffered from shortages of silver, in Japan because of the outflow of silver and the growth of demand for money, in China because of the government’s isolationist policy. However, the two countries came up with different solutions. Japan reacted by withdrawing from the international system, while China responded by re-entering it. Thus the two economies took different paths in the eighteenth century and after.”
(Miyamoto and Shikano (2003, p. 185).

Price series and silver production in New Spain/Mexico (I)

Although some relation between most of prices and the production of silver is visually perceptible we have not found a statistical consistent relation (yet)



This is probably due to a violation of the assumption of invariant parameters (there is instability in time of the relationships)

Price series and silver production in New Spain/Mexico (II)

We face the problem from a different perspective stating the model:

$$\Pi_{i,t} = \beta_0 + \beta_1 S_t + \varepsilon_{i,t}$$

where i is a location,

$t = \{1751-1811, 1812-1860\}$,

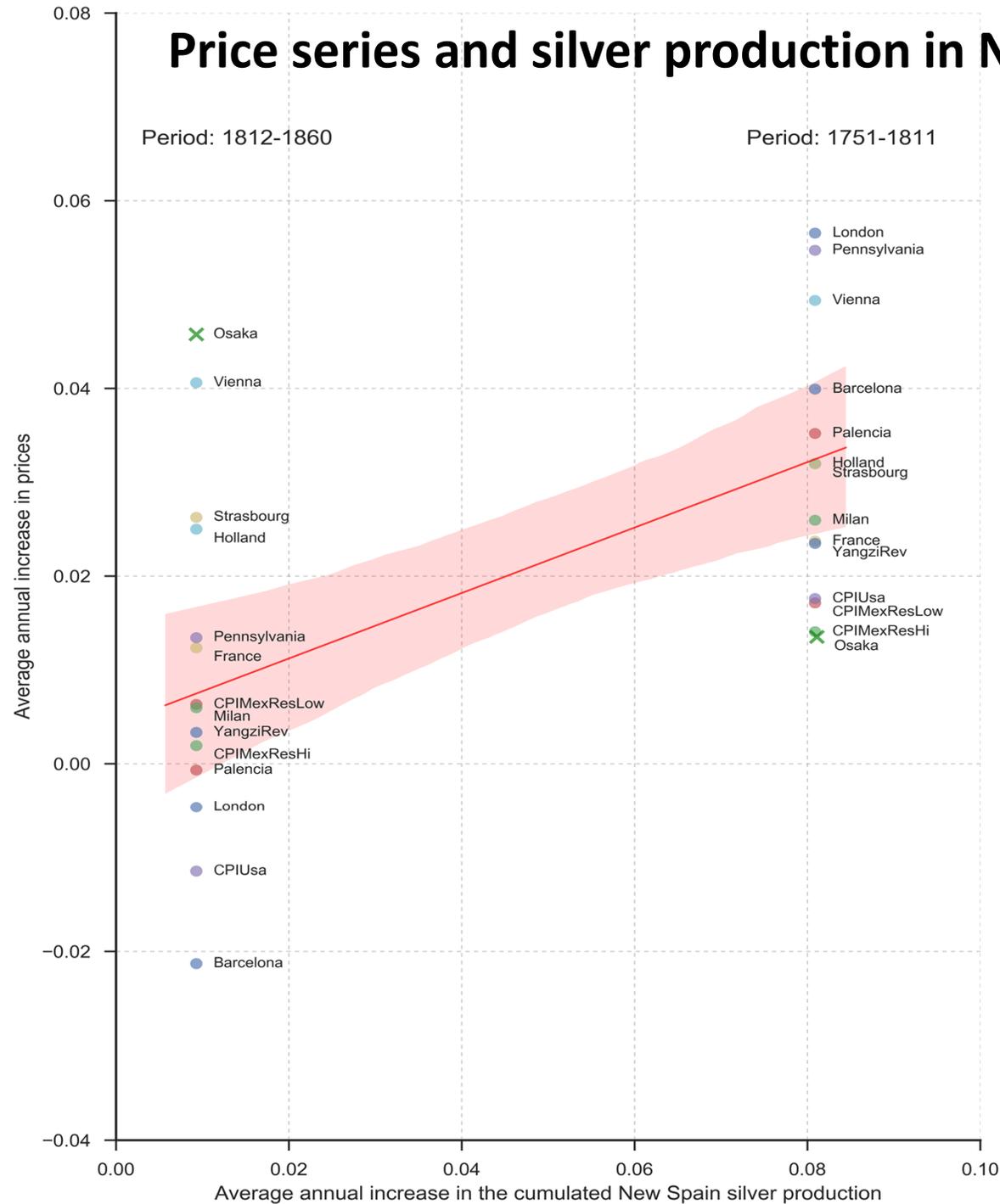
$\Pi_{i,t}$ is the average annual increase in prices (inflation) in i and period t , and

S_t is the average annual increase in the cumulated New Spain silver production (proxy for annual increase in stock)

Estimation for β_1 returns 0.35 with p-value of 0.001 for the null of $\beta_1 = 0$

Interpretation: The change in the average annual increase in stock of silver in Mexico between $\{1751-1811\}$ and $\{1812-1860\}$ is positively correlated with the average annual inflation in locations i .

Price series and silver production in New Spain/Mexico (III)

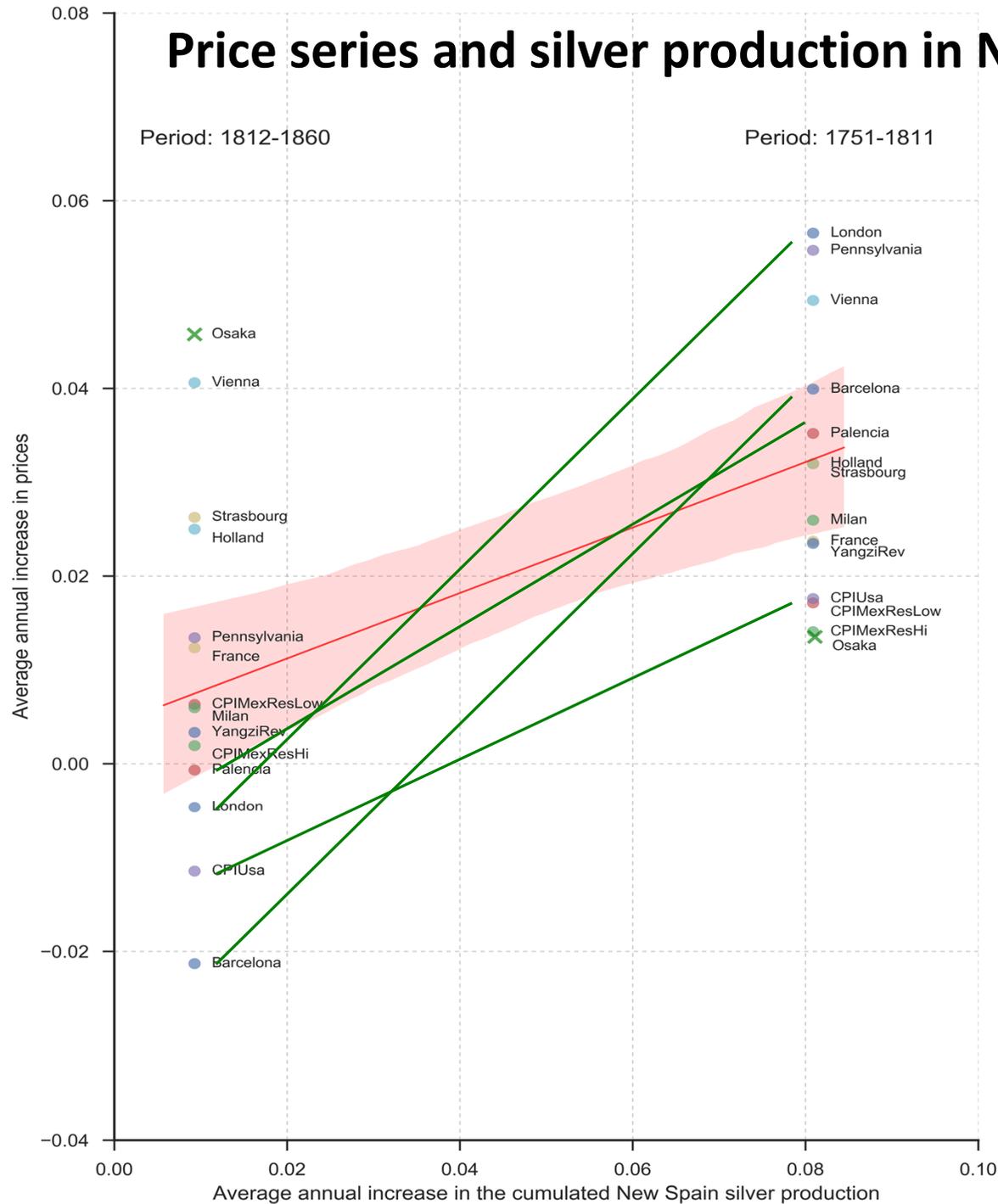


Graphical interpretation of the regression:

$$\Pi_{i,t} = \beta_0 + \beta_1 S_t + \varepsilon_{i,t}$$

The residuals of this regression may also be interpreted ...

Price series and silver production in New Spain/Mexico (III)



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Preliminary conclusions

- World prices dynamics (inflation followed by deflation) from mid-eighteenth to mid-nineteenth century (inverted U-shape centered sometime in the 1810s) very much resembles that of the sixteenth and seventeenth centuries studied by Martín Aceña (1992)
- Co-movements are observed both in West and East (Japan excepted)
- Silver production in New Spain/Mexico (growth followed by fall in 1810 and incomplete recovery afterwards) seems to play a role at explaining global prices dynamics

Further research

- Mexico's silver exports instead of production as explanatory variable of post-1810 international deflation
- Analysis of the residuals in Equation 1: Differences between countries in terms of participation in world trade and capital movements, distance from New/Spain Mexico and monetary regimes.
- London monetary market before, during and after the French and Napoleonic Wars (1792-1815)
- Relative silver scarcity, the crisis of 1825 and its monetary mechanisms of transmission
- The consequences of the relative silver scarcity in Mexico on the domestic financial market and its explanatory power regarding the "lost decades" in terms of economic development after independence (1820s, 1830s and 1840s)

Thank you very much!