

LATE COLONIAL PRICE TRENDS IN SELECTED LATIN AMERICAN CITIES

In the past quarter century research into colonial price history has caused scholars to re-examine some long-standing views about the Latin American colonial economies. Whereas earlier studies analyzed mainly grains such as maize and wheat, recent publications include dozens of products from comestibles to household items and building materials to fabrics. Grain price trends may only offer a partial and incomplete portrait of general price movements and of the overall economic health of the city or region from which the prices were collected. Grain prices still constitute a valuable source for studying economic conditions and crises, but when they are combined with prices of many different products the findings reveal a more complex mosaic of economic forces at work. Indeed the price databank is rich enough now that price trends in seven late colonial cities can be compared and analyzed. The cities chosen for this study are Zacatecas (Mexico), Lima and Arequipa (Peru), Potosí (Bolivia), Santiago (Chile), Buenos Aires (Argentina) and Rio de Janeiro (Brazil). It is worth noting that although Mexican price studies more or less dominated the field in the 1960s and 1970s the recent published research of South American scholars, especially in Peru, has allowed for a broader and deeper understanding of colonial price trends. Some of the best series in terms of years covered and products included are from South America. Even more recently as young scholars with strong training in econometrics have entered the fray with pointed criticisms of my work and the work of others the richness of the debate has grown. The time has arrived, perhaps, to look beyond the boundaries of a single region or a single colony, and to begin to examine what regions or colonies share in common with respect to late colonial trends and how they differ. If noting else, this “on-line” essay with links to various datasets will allow others to inaugurate more analytical inquiries into price trends in divergent regions than my skills permit. It is the on-line capabilities to assemble and compare many different datasets that may help to push the research along more intriguing paths.

Reasons for choosing these cities and these years (1750-1820) are that many of the best datasets belong to the late colonial era and price studies have figured to some degree in the merging historiography over colonial reform, economic change and

independence movements. Given the amplitude of data can the study of prices shed further light on the tensions and crosscurrents with the social and economic systems that might help to explain the presence or absence of a rebellious outlook in the pre-independence period? In the simplest terms the search is for evidence of discontent in times of changing prices and price levels. While the search is straightforward the establishment of a relationship between the behavior of prices and the behavior of citizens is extraordinarily difficult. Can rising prices or price volatility cause citizens to become rebels? Or is it more likely that the link between prices and fundamental discontent was more reflective than deterministic? Price swings may simply make citizens more acutely aware of a deteriorating social order or the fears of such. The initial step is to try to pin down as precisely as possible how prices behaved. While the price series are more supple and serviceable in the late colonial period than earlier periods, they are still inadequate for the level of precision that modern-day specialists can achieve with their datasets. Nonetheless the late colonial datasets allow researcher to move away from such heavy reliance on grain prices as a proxy for all prices and to create a more diverse base of prices for commodities, luxuries and properties (including rentals). One important perspective that a comparative framework presents is that prices for a specific place and a specific product might have a less unique appearance when compared to prices from other places or for other products. In my view the more prices the better, even when some series are less worthy than others. The task is to sort through the data of variegated quality to find the notable and useful benchmarks that can expand the knowledge of how prices behaved.

Cities depended on a fairly broad network to provide the goods that urban dwellers needed. Some cities like Buenos Aires not only were surrounded by highly productive agricultural lands but also had access to coastal and overseas trade. Other cities like Potosí had neither. The cost of transportation plus disruptions in agricultural production or commercial activity could have a more severe impact on prices and price levels in the latter cities. An improved ratio between births and deaths fueled population growth across eighteenth-century Latin America. In the cities, however, natural growth combined with in-migration pushed up urban populations even faster. Could the agricultural and commercial infrastructure satisfactorily accommodate the urban

expansion? To date there is no clear-cut answer to this question. When epidemics or famines or other catastrophes struck, the effects could be severe in terms of death toll and human deprivation. But cities recovered from these crises, and citizen well-being, notoriously difficult to measure under any circumstance, (abundance, scarcity and everything in-between), did not appear to endure any long-term contraction because of the brief periods of shortages of commodities and rising prices. Normally in the years following these crises supplies grew, and prices returned to pre-crisis levels. It has been suggested that in the late colonial years the crises were so severe and frequent that urban dwellers were confronted not just with rising prices provoked by natural disasters but also with rising price levels as a result of price spikes and agricultural contractions. It has been further suggested that discontent over prices (and incomes) became another grievance against the rule of Spain, and eventually all the grievances became the seeds for rebellion and independence. To be sure price changes could make a difference in these economies with economic infrastructures and wage systems that left consumers unprotected and unsatisfied, but by the same token links between inflation and revolution can be hard to demonstrate. What I hope to achieve by analyzing the behavior of prices in a comparative framework is to in order to determine if any basis whatsoever exists to postulate such a linkage.

Sources and Methods

The most frequently used sources for the study of price trends historically have been accounts kept by religious institutions – convents, hospitals, and schools. That is mainly true of these series. The exception is *Zacatecas* whose prices were drawn from *alcabala* ledgers. (In Arequipa, both religious and *alcabala* documents were used to build the database, but ecclesiastical transactions dominate.) The sources, whether ecclesiastical or royal, do not measure uniform commercial activities. It would be beneficial generally for comparative prices histories if only a single category of transactions, retail or wholesale, could be analyzed. But the historical evidence does not appear in such a convenient format. Sales to religious institutions, for example, should not be confused with sales to individual consumers. Because of their status or size these institutions might have the power to negotiate special prices for bulk purchases that ordinary citizens could not. Similarly *alcabala* accounts contained information (product, price, volume, etc.) on an

array of transactions that mixed wholesale with retail. In addition, of course, sloppy and inconsistent bookkeeping can yield data of lower quality than researchers might hope for. (And we should not overlook how often researchers themselves unwittingly make transcription errors.) With the *alcabalas* there was a further complication: the same product could be taxed more than once as it moved along the transportation system, even though multiple taxation was technically illegal. Correcting for this is impossible. In the end researchers are left with imperfect data. In my view the best and only way to compensate for inherent defects in historic prices is to collect as much data as possible, to focus on general trends rather than more narrowly-defined goals and to extend the comparative framework across as many regions and products as possible.

Price histories have relied heavily on prices indices to explain price movements. An index will show the relative change in the price of a product measured against an established base. The base can be constructed in several ways. The most frequently used approach is to select a year or a group of years (from which an average is computed) with low or stable prices as the base. A second and somewhat simpler technique is to make the first year the base year without regard to how it compares, typically or atypically, to other years within the series. In both these approaches choice is crucial in terms of how the index will look. Several people looking at the same series could make different choices. In comparative analysis, however, standardizing the various series is a desirable goal. Thus, a third approach is to compute an average price and to construct indices from average prices rather than specific periods or years. Years covered may vary from series to series, but at least the computational model would agree from series to series. Regardless of the method chosen, the overall appearance – direction, magnitude and change – will be the same even though the index numbers differ. The first approach is preferred in part because it allows researchers to measure price inflation between the base period when prices were low or not rising and later years when prices had moved higher. That may or may not be the result when the second approach is used. If prices were high or rising in the initial year relative to the rest of the series, then the results would probably be less likely to document inflation. The third approach does not try to choose between low or high, falling or rising, prices, but rather it seeks to discern trends based

on average prices. Choosing an index will depend ultimately on what one is trying to accomplish.

Whatever approach is used, the construction of an index is a straightforward exercise. Once a base price is chosen all the prices are divided by the base price and then multiplied by 100. The final step converts ratios to percentages. Thus for Y(ear) n a figure of 125 would mean that price in that year was 25 percent higher than in the base year. In this essay the index numbers measure relative changes between the series average as the base year and all the recorded yearly prices.

All the series taken from other sources have been recalculated in accord with a base average instead of a base year. Some methodological problems need to be noted. The immediate problem was what products to include in a city's index. A few basic commodities like grains appear in all the city databases, but the number and the array of products differed significantly from database to database. The creation of a matching product list for all the cities proved to be too restrictive. The Buenos Aires series had the fewest products (under 10) and Lima the most (over 100 of which about 40 appear in this essay). For now the product lists have not been standardized. Each city price index is unique in terms of its content. Additionally there is the question of whether or not to organize the lists into such categories as local, American and overseas products. Such an approach is entirely possible, but I have opted instead to make the indices as inclusive as possible. At a later date I may decide to analyze prices along regional lines. The rationale behind general, inclusive indices is to underscore the fact that late eighteenth-century urban markets dealt in a variety of products from domestic maize to imported cloth. A third problem arises because price researchers prefer to compute average (monthly or yearly) price from price and volume. Computing average prices without taking into account quantities can allow a few extreme prices (high or low) with thin volumes to distort the averages. When prices are tied to quantities, we can be more confident that averages reflect prices with the most frequent transactions rather than those at the extremes. But researchers do not always find volumes to be specific enough to be useful. (A load of wheat at 5 *reales* per pound is specific enough in terms of price but not in volume.) In some instances researcher copy only price per unit and ignore total volume. This so-called weighted approach has not been used uniformly in all the city series, and

unfortunately I cannot introduce retroactively. Differences between weighted and unweighted series are usually small but since they exist, they should be acknowledged. A final question is how to manage series in which data are missing for some or many years. There are statistical tools for estimating missing prices and filling the gaps. There are no indications that estimating has been used in any of these series. In the end all price series are imperfect, and while researchers should work hard to purge the defects and inconsistencies, they will always have less than perfect datasets from which to draw their conclusions.

A final qualification should be noted. Researchers have created price indices to be used as deflators to answer other economic questions for progress or lack thereof in a given economic setting. I have noted above the difficulty in measuring living standards based on price data. This does require that a list of commodities and their prices be assembled to reflect what it cost for average family or household to achieve a certain level of well-being. Under these circumstances care must be taken in which commodities are included and what percentage of that well-being they accounted for. And then they are weighed against an index of compensation since urban dweller by and large consumers rather than producers. I will comment on what data may exist on wage and salary levels in these cities, but I have not attempted to create price and wage indices that measure living standards in order to compare the relative well-being from city to city. That may be possible in the future, but much more rigorous research must be undertaken in the collection of prices and wages (if that is possible) and in the determination of what should be placed in the basket of items to be used to measure living standards.

General Price Indices

All Cities

After computing a price index for each product in the city's database I then assembled them into a general city index. Such an index could be weighted: i.e. each product would be assigned a ranking in terms of its importance to the consumer or household. That is not the case with these city indices. Proper weightings require more information than we have. These city indices are simple arithmetic calculations – adding up the index numbers for each product and dividing by the number of products. Such indices are not

very accurate for observing consumption patterns, but they can be helpful in following price trends. So as not to mislead the reader I have shown on the accompanying general index chart the number of products for which there are prices in each year. The number of products as well as the particular products included in each annual general index will affect the overall trend. For the most part the annual data do not distort the general city indices.

FIGURE 1
Composite Unweighted Indices, All Cities

Based on Series Averages with Count of Commodities in each City Series

Years	Buenos Aires Index	Buenos Aires Count	Santiago Index	Santiago Count	Arequipa Index	Arequipa Count	Potosí Index	Potosí Count	Lima-Haitian Index	Lima-Haitian Count	Lima-Macera Index	Lima-Macera Count
1750			103.93	1			93.75	12			107.12	17
1751			92.22	5			114.92	11			97.14	9
1752			80.14	5			93.99	13			85.25	7
1753			81.80	4			101.13	10			78.91	8
1754			96.96	7			129.24	11			81.88	10
1755			88.12	7	120.88	12	143.93	10			88.12	9
1756			87.02	7	114.98	10	118.43	12			79.58	15
1757			85.66	7	111.16	11	112.49	14			78.28	15
1758			99.52	7	113.12	11	122.27	10			76.49	13
1759			99.48	7	103.61	8	104.89	13			83.66	16
1760			108.10	4	105.08	11	99.16	12			88.59	17
1761			78.09	5	112.92	9	107.41	13			86.11	16
1762			64.95	6	117.50	9	98.22	12			91.97	17
1763			88.73	5	104.54	10	107.27	10			84.83	13
1764			83.52	6	106.75	10	81.57	6			98.21	10
1765			87.01	7	110.23	7	107.35	9			92.43	17
1766			88.90	6	98.41	7	89.01	4			95.28	21
1767			96.88	6	99.96	9	92.82	6			84.50	25
1768			84.68	5			85.59	6			91.87	27
1769			89.58	7			96.67	8			89.09	25
1770			90.49	7			92.51	11			82.37	28
1771			94.73	7			109.12	10			84.11	31
1772			108.19	7			89.24	9			92.29	30
1773			103.67	7			114.92	12			88.47	25
1774			92.24	7	80.50	6	106.45	11			76.67	20
1775	89.90	3	93.48	7	76.09	4	104.89	12			77.96	26
1776	93.21	8	86.14	6	69.33	5	112.01	11			77.84	29
1777	97.93	5	85.84	7			98.61	9			82.23	24
1778	95.14	7	92.47	7			103.08	9			81.13	23
1779	91.85	7	93.37	7	75.68	4	80.09	13			93.02	23
1780	120.09	3	102.87	7			76.22	11			91.46	22
1781	115.74	5	109.84	7	78.11	4	99.89	10			94.38	26
1782	112.45	5	125.98	7			105.88	12			103.60	24
1783	91.11	7	112.97	7	132.91	8	119.03	11			103.69	28
1784	94.73	6	109.31	2	95.26	5	112.13	10			118.11	30
1785	101.65	6	135.19	5	126.18	6	94.08	11			129.26	26
1786	103.26	7	109.80	6	99.57	10	93.23	11			100.52	25
1787	94.78	6	102.00	6			87.91	12			97.64	25

1788	92.12	7	108.39	6			97.43	10			95.66	25
1789	86.71	6	97.24	4			85.16	11			92.51	25
1790	87.10	6	89.28	4	80.50	7	93.29	10	91.05	2	92.37	24
1791	83.69	6	100.69	5			88.27	9	94.39	2	97.85	22
1792	69.49	8	99.42	6	86.24	8	88.19	10	82.59	2	103.26	21
1793	63.42	6	77.23	1	77.26	9	104.63	12	99.01	1	96.38	29
1794	73.18	5	92.48	2	84.65	6	87.84	12	86.80	6	97.06	24
1795	82.42	7	98.45	5	118.06	1	79.89	13	81.95	5	96.82	24
1796	91.34	7	112.91	4	75.51	6	89.11	15	76.84	2	90.72	14
1797	97.63	8	107.41	4	124.99	9	98.31	13			96.54	15
1798	88.74	7	117.62	5	99.92	7	87.78	13	74.89	4	98.50	14
1799	92.63	7	124.16	5	113.04	7	93.62	10	90.35	10	100.78	24
1800	87.10	7	114.57	5			82.49	9	93.58	7	101.84	27
1801	103.48	6	102.64	1			91.14	7	87.59	10	105.85	31
1802	100.93	6	106.36	5			94.19	5	92.54	10	107.13	29
1803	123.73	8	123.26	4			88.64	9	93.45	8	105.14	24
1804	120.55	6	113.32	4			93.79	7	99.02	11	105.73	25
1805	131.08	6	126.37	7			109.06	9	98.70	9	106.80	28
1806	131.05	8	116.20	6	78.59	2	96.32	10	96.60	13	104.04	28
1807	118.83	6	129.21	6			91.40	12	86.91	11	103.67	26
1808	114.68	5	118.37	5			100.60	14	99.18	12	106.29	26
1809	126.03	5					85.21	10	100.86	12	105.17	26
1810	113.82	7			187.50	1	80.96	10	96.13	13	103.60	29
1811	122.96	7			93.50	4	109.49	6	111.64	12	106.63	22
1812	129.05	2			105.71	9	120.68	12	100.37	10	102.60	20
1813							124.44	8	92.96	10	108.46	24
1814					82.17	8	144.05	4	90.01	10	105.89	16
1815					69.32	7	167.86	1	86.86	10	100.58	16
1816							136.16	2	92.99	8	118.02	20
1817					73.02	9			112.42	11	116.73	16
1818					77.86	9			100.35	9	129.06	18
1819									109.78	6	124.31	17
1820									131.46	8	131.62	21
1821									174.33	10	163.95	20
1822									139.30	9	152.28	16
1823									114.85	6	121.38	14
1824									148.41	4	142.27	6
1825									117.73	3		
1826									95.30	5		
1827									105.45	3		
1828									77.40	2		
1829												
1830									82.02	3		
1831									76.42	6		
1832									73.73	7		
1833									82.71	3		
1834												
1835												
1836												
1837												
1838												
1839												
1840									68.82	2		
1841									82.18	1		

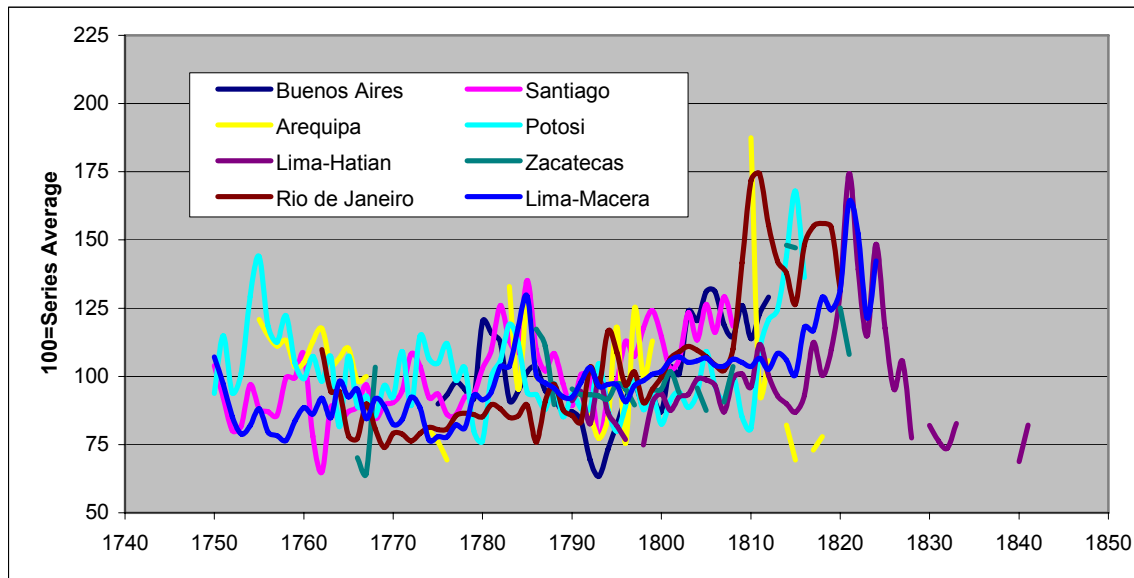
Years	Rio	Zacatecas		Composite Index		
	Janeiro Index	Count	Index	Count	All Cities	# Cities
1750					98.84	2
1751					103.57	2
1752					87.06	2
1753					91.47	2
1754					113.10	2
1755					117.64	3
1756					106.81	3
1757					103.10	3
1758					111.64	3
1759					102.66	3
1760			79.11	17	97.86	4
1761					99.47	3
1762	109.77	1			97.61	4
1763	94.46	13			98.75	4
1764	94.37	15			91.55	4
1765	78.29	9			95.72	4
1766	77.17	6	70.19	11	84.74	5
1767	89.90	13	64.38	9	88.79	5
1768	80.71	18	103.43	1	88.60	4
1769	73.90	16			86.71	3
1770	79.05	13			87.35	3
1771	78.83	18			94.23	3
1772	76.24	18	84.17	23	89.46	4
1773	79.04	18			99.21	3
1774	81.32	18			90.13	4
1775	80.44	17			88.96	5
1776	80.78	18			88.29	5
1777	85.50	16			91.97	4
1778	86.49	19			94.29	4
1779	86.06	19			85.41	5
1780	85.17	19			96.09	4
1781	89.67	6	272.05	4	127.55	6
1782	88.16	3			108.12	4
1783	84.91	17			108.19	5
1784	85.52	2			99.39	5
1785	89.46	17			109.31	5
1786	75.95	2	117.36	12	99.86	6
1787	90.68	18	111.06	20	97.29	5
1788	97.19	2	89.69	20	96.96	5
1789	87.81	1			89.23	4
1790	85.71	18	95.39	19	88.90	7
1791	83.28	2	93.28	20	90.60	6
1792	103.36	19	93.32	19	88.95	7
1793	96.64	2	92.82	21	87.29	7
1794	116.60	17	91.78	21	90.48	7

1795	108.72	17	97.27	22	95.25	7
1796	96.76	11	95.36	19	91.12	7
1797	101.66	9	89.54	20	103.26	6
1798	90.35	8			93.22	6
1799	95.26	10	95.00	18	100.58	7
1800	99.71	6	95.38	19	95.47	6
1801	106.50	9	101.74	18	98.85	6
1802	109.02	9	93.96	19	99.50	6
1803	111.02	4			108.02	5
1804	109.64	2	95.70	17	105.34	6
1805	107.19	8	87.57	17	110.00	6
1806	104.24	9			103.83	6
1807	102.18	10	90.61	18	103.19	6
1808	110.00	8	103.66	18	107.75	6
1809	141.62	8			113.43	4
1810	171.72	6	100.67	16	125.13	6
1811	174.31	8			122.38	5
1812	155.46	6			122.25	5
1813	142.23	6			119.88	3
1814	137.80	7	148.04	18	120.42	5
1815	126.44	6	147.10	17	119.52	5
1816	148.12	8			125.76	3
1817	155.00	11			113.48	3
1818	155.98	14			111.40	3
1819	154.63	14			132.21	2
1820	131.58	8	125.09	10	129.37	3
1821			108.06	9	141.20	2
1822					139.30	1
1823	135.50	2			125.17	2
1824					148.41	1
1825					117.73	1
1826					95.30	1
1827					105.45	1
1828					77.40	1
1829						
1830					82.02	1
1831					76.42	1
1832					73.73	1
1833					82.71	1
1834						
1835						
1836						
1837						
1838						
1839						
1840					68.82	1
1841					82.18	1

Two sets of prices exist for Lima, Peru, to be discussed further in section on Lima.

	Count	Maximum Index	Minimum Index
Buenos Aires	38	131.09	63.42
Santiago (Chile)	59	135.19	65.00
Arequipa	39	187.50	69.32
Lima-Haitian	67	167.86	76.22
Lima-Macera	44	174.33	68.81
Potosí	67	167.86	76.22
Rio de Janeiro	75	163.95	76.49
Zacatecas (Mexico)	60	174.31	73.90

FIGURE 2
Trends Based on Composite Index for Each City



When the seven city composite indices (seven cities but eight indices) are plotted on a single chart, they exhibit an undulating pattern. Although the chronologies of the indices are different, all the indices save one (Santiago, Chile) extend into the insurgency decade, 1810-1820. While some indices reached new highs after 1810, other indices fell to new lows. From 1750 to 1810 the indices moved within a range of 50 and 150. This means that indices rose or fell by 50 percent. Indices tended to cluster around the base line (100) or below between 1750 and 1795 and around the base line or above after 1795. The 1780s represented a deviation from the aforementioned generalization in that some of the indices reached new highs. But the 1790s witnessed sharp declines and in a few instances new lows. In the middle of the 1790s the indices generally reversed course and

began to climb. Even as some climbed above 100, others barely reached that level. But collectively the eight indices appear to be on an upturn. The indices did not move in tandem. Local and regional conditions influenced individual city indices, even though all the indices shared some common underlying characteristics. Those special characteristics will figure in the foregoing discussions of individual indices. To what extent do these trends document or not document late eighteenth-century inflation? It is certainly hard to identify any enduring inflation before 1795, and even after that until 1810 the trends present a mixed picture. To be sure inflationary pressures may well have been greater after 1800 than before.

How variable were these indices when compared to each other? Variability can be measured by calculating a *coefficient of variation* (standard deviation/mean). None of the indices was excessively volatile. They range was 15 to 35 percent. (Coefficients can be converted to percentages.) Zacatecas had the highest and Santiago the lowest. The Zacatecas series may have been affected by the fact that its price data were concentrated in the decades from 1780 through 1800. It is possible that if the series could be filled in for the decades prior to 1780, the coefficient might be lower. The coefficients for the other series were in the high teens and low twenties. How much volatility is too much in these pre-industrial economies remains unknown. These figures do not appear to support a view of constant or extreme variation in prices. To be sure some prices skyrocketed during crises but just as surely prices dropped rapidly in the aftermath of the crises. Indeed agricultural crises were part and parcel of eighteenth-century life, and they could have an immediate, adverse effect on prices of some basic commodities. But not all prices were so affected. The prices of some products changed very little over the course of time. What happened to basic commodity prices may well have been the greatest concern to the average citizen. The rise of the insurgency in the early nineteenth century added to the volatility of the indices, but it had a selective impact. Prices did fluctuate, sometimes severely, but they also manifested long periods of relatively little change.

Buenos Aires

Buenos Aires was designated the capital of the new viceroyalty of Río de la Plata in 1776 as a part of the Bourbon administrative reorganization. For the local economy that was a

major event. Included in its jurisdiction were Upper Peru (now detached from Lima) and the legendary silver camp of Potosí (Bolivia). Although Potosian traders had long used Buenos Aires instead of Lima to move bullion and merchandise, the designation legitimized the linkage between the camp and the port and expanded the port's commercial base and network. While trade remained fundamental to Buenos Aires's prosperity in the late eighteenth century, the growth in population and the inflow of bullion had helped to diversify the city's economy. Lyman Johnson, a long-time student of *porteño* economic life, is the author of a thoughtful essay about the material culture of late eighteenth-century Buenos Aires. As a part of that examination he analyzed prices and incomes, and he found both were rising. Johnson compiled prices from local convent accounts. His series encompassed some of the most-widely traded commodities in the Buenos Aires local market, although several important staples (bread and fresh meat and fish) were excluded because their prices were controlled through municipal regulations.¹

FIGURE 3
Comparison of Garner & Johnson Price Indices, Buenos Aires

Year	Garner Index base=series aver	Count Total 8	Count %	Johnson Index base=1776
1775	89.90	3	37.5%	
1776	93.21	8	100.0%	100.00
1777	97.93	5	62.5%	133.20
1778	95.14	7	87.5%	128.60
1779	91.85	7	87.5%	131.10
1780	120.09	3	37.5%	153.00
1781	115.74	5	62.5%	171.00
1782	112.45	5	62.5%	169.40
1783	91.11	7	87.5%	163.00
1784	94.73	6	75.0%	164.80
1785	101.65	6	75.0%	163.70
1786	103.26	7	87.5%	165.80
1787	94.78	6	75.0%	131.40
1788	92.12	7	87.5%	100.90
1789	86.71	6	75.0%	98.60
1790	87.10	6	75.0%	97.50

¹ Johnson, "The Price History of Buenos Aires During the Viceregal Period," in Lyman Johnson and Enrique Tandeter, eds., *Essays on the Price History of Eighteenth-Century Latin America*. Albuquerque, NM: University of New Mexico Press, 1990, 137-172. For a contrary view, see Ruggiero Romano, "Movimiento de los precios y desarrollo económico: El caso de Sudamérica en el siglo XVIII," *Desarrollo Económico*, 3:1 (1963), 31-55, and "Some Considerations on the History of Prices in Colonial Latin America," in Johnson & Tandeter, eds., *Essays on the Price History of Eighteenth-Century Latin America*. Albuquerque, NM: University of New Mexico Press, 1990, 35-72.

1791	83.69	6	75.0%	97.10
1792	69.49	8	100.0%	88.70
1793	63.42	6	75.0%	89.00
1794	73.18	5	62.5%	85.20
1795	82.42	7	87.5%	109.50
1796	91.34	7	87.5%	129.25
1797	97.63	8	100.0%	125.40
1798	88.74	7	87.5%	114.40
1799	92.63	7	87.5%	112.00
1800	87.10	7	87.5%	129.40
1801	103.48	6	75.0%	153.80
1802	100.93	6	75.0%	130.80
1803	123.73	8	100.0%	240.60
1804	120.55	6	75.0%	240.90
1805	131.08	6	75.0%	224.30
1806	131.05	8	100.0%	205.40
1807	118.83	6	75.0%	189.20
1808	114.68	5	62.5%	173.00
1809	126.03	5	62.5%	157.00
1810	113.82	7	87.5%	173.70
1811	122.96	7	87.5%	190.10
1812	129.05	2	25.0%	
Maximum	131.08			240.90
Minimum	63.42			85.20
Count	38			36

FIGURE 4
Buenos Aires Prices (Garner Series)

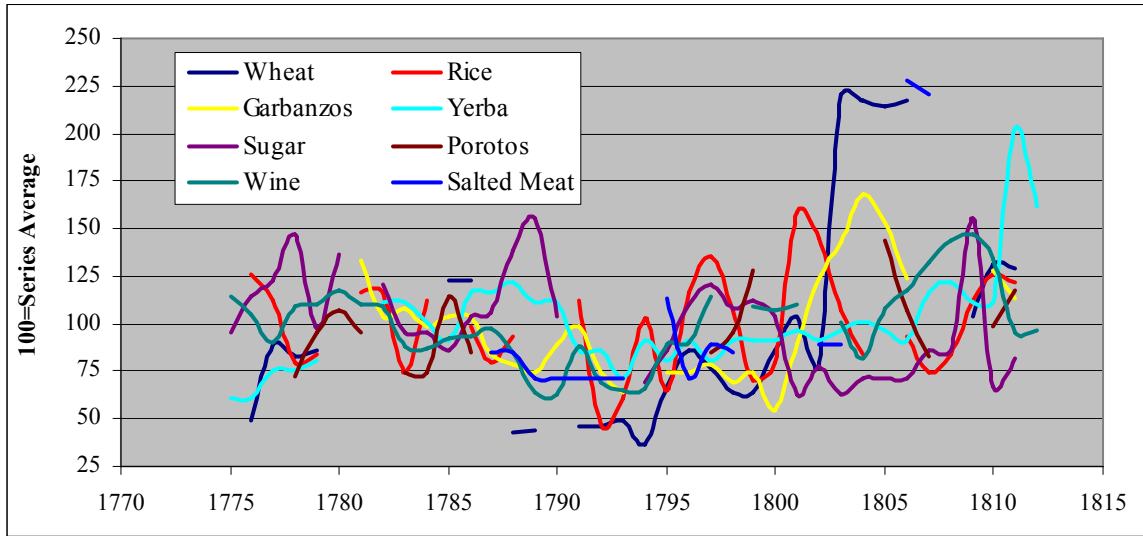


FIGURE 5
Buenos Aires Price Index (Garner Series)

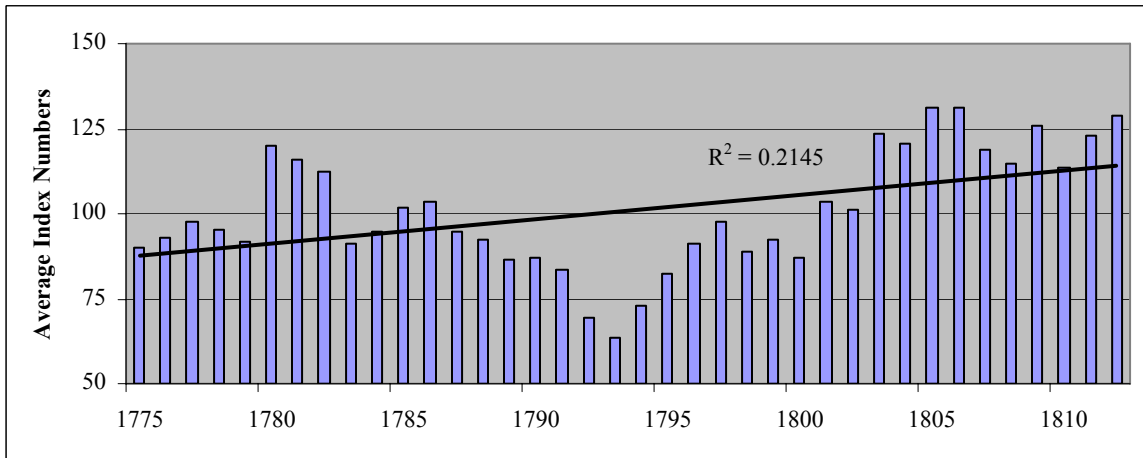
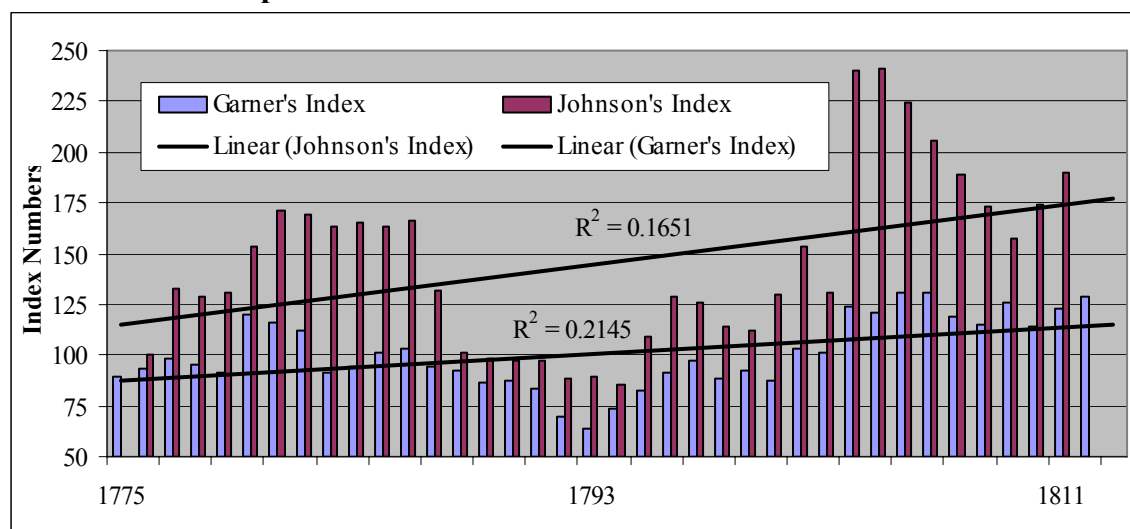


FIGURE 6
Comparison of Garner & Johnson Buenos Aires Indices



The series includes eight products: wheat, rice, garbanzos, yerbas (herbs), porotos (beans), sugar, wine, and salted meat. The period covers about three-dozen years -1775 to 1812. This includes several years of conflict between *porteños* and British invaders in the early 1800s. Prices reflect two broad patterns: from the middle 1770s into the early 1790s, they rose until the middle of the 1780s and then fell over the next ten years; from the mid-1790s until the end of the series they rose and tended to remain high. Price inflation may be an apt description for the period from 1795 to 1812, although how inflationary will depend on what happened to local incomes. What distinguished price behavior in the second period from the first was that at the end of the second period prices remained well above the level from where they had begun. Clearly events between 1803-1806 pushed prices to their highest levels between 1775 and 1812. The decline that followed the expulsion of the British still left prices comparatively high levels. Although the trend line rose by 0.6 percent per year between the 1770s and 1810s, that line was strongly influenced by what happened after the middle of the 1790s. But we should not become too wedded to the rate of change because from a technical standpoint the r-squared value of 18 percent indicates that the trend line is not a very good predictor of the series' behavior. That should not surprise us. Simple observation reveals that only toward the end of the period under review did prices begin to show any trend. Even if this were the rate, it would require a century and a quarter before the price index doubled.

Let us consider briefly Johnson's composite index and the differences between his and mine. First, his timeframe is 1776, the base year, to 1811, the last year, for a total of 36 years (two fewer than mine). Second and more importantly his components are weighted: i.e. wheat, treated as the most important staple, is given four times more weight in the index than rice. Finally, his index includes a weighted value for rent. I did not include rents among prices. Our indices will follow a similar undulating pattern, but the magnitude of changes in prices will be greater in his index than mine because so much weight is given to wheat within his index. Wheat as a staple deserved a heavier weighting within the index (he makes a good case for his assigned rankings) than any other item, and at the same time it was the most volatile in price of all the items. His index rose by nearly 1 percent per year (compared to my 0.6 percent) although the *r*-squared value for his is not much stronger than mine (not unexpected). We could argue over how to choose the terminal years and assign the weightings, but in the end both indices show that prices after 1795 rose but remained high. Johnson's ultimate consideration is to relate the behavior of prices to living standard levels. My interest is more restrictive: relative changes in prices over time. In both approaches by the end of the colonial period *porteños* faced higher prices than any time in the late colonial period.

Indices for prices of individual items did not always move in step with the composite index. Wheat is of special interest. Its average price across the whole period was 32 to 33 *reales* per *fanega*. But the price was volatile, indeed the most volatile, with a coefficient of variation of 56 percent. Wheat prices remained high from 1803 to 1806 and then dropped by almost half from 1809 to 1811. Johnson offers an extended discussion of the Buenos Aires wheat market. The aforementioned high prices, he notes, were a combination of natural disasters (1802-1804) and British incursions (1804-1806). Moreover throughout the period speculations came to play a larger and larger role in the local wheat market. Although details of how speculators manipulated the market are sparse (here and in other cities where such activities have been alleged), they generally concern the financial clout of speculators (at times in association with millers and bakers). They could buy up a substantial quantity of unharvested wheat (from farmers normally heavily in debt) and then to withhold the wheat from the marketplace until prices rose above (often much above) what they had paid the farmers. Whether cornering

the market worked in periods of normal or abundant harvests remains to be studied. For most of the last quarter of the eighteenth century wheat prices were below the series average. The wheat series contains prices for 28 of the 37 years (1775-1812), and in only seven years were prices higher than the series' average. Between the mid-1780s and mid-1790s wheat prices fell into the teens. Was it possible that low prices drove farmers to reduce wheat acreage or quit wheat cultivation? If so, the result would mean when demand began to rise, as it would almost inevitably, fewer producers meant higher prices for local consumers. Why did wheat farmers not begin to increase production to take advantage of higher prices? Apparently they carried too much indebtedness to win approval for loans to expand their operations. *Porteño* consumers entered a period the imbalance in supply and demand led relatively higher wheat prices. And under these conditions, of course, speculators would be better able to affect prices by manipulating wheat supplies.²

To what extent did other products in Johnson series suffer inflationary pressure? To be sure the picture was mixed. Each product followed its own path. But like wheat all the products registered new highs (except sugar which matched an earlier high) in the decade after 1800. How permanent were these highs? It depends on when the high was reached. In the case of rice, a new high price was reached in 1801 after which prices fell back to an index range between 75 and 125 but a range comparable to earlier decades. Prices of *yerba* remained low until 1807 and 1808 and then began to climb until it reached a record high at the end of the series. A third path may be cited with *garbanzo* prices: they moved progressively higher from 1802 through 1804, when a new record was reached, fell back in 1805 and 1806 and then remained at that level (around 120) until the series ended. Finally sugar prices were stuck at 75 after 1800 except for one year, 1809, when the price matched an earlier high in 1789. (Sugar was raised in the interior of the viceroyalty, but apparently *porteño* sugar was imported from Cuba in exchange for products processed in the city.) The remaining products - wine, *porotos* and meat - fit one of these patterns. Although a mixed picture sustained price inflation is easier to identify after 1795 or 1800 than before. From Johnson's perspective the final decade of the

² See Johnson's discussion on wheat, speculation and inflation in "Price History of Buenos Aires," in Johnson & Tandeter, eds., *Essays on the Price History*, 143, 148-165.

colonial period unlike earlier decades had a disproportionate share of natural disasters and external disruptions, all of which helped to push up prices. And with higher prices came diminished living standards for *porteños* after several decades of improving expectations. By how much those living standards were eroded remains open to debate because they were conceived in terms of certain price weightings. When the unweighted price index in Buenos Aires is compared to other late colonial cities, as we shall see, price inflation was potentially more serious in Buenos Aires than elsewhere.

Santiago

On the Pacific side was another growing city, Santiago, the capital of Chile. Although Chile belonged to the Viceroyalty of Peru, it was separately governed as a province. The capital and the province have been the subject of several price inquiries during the last quarter century. José Larraín (with Armando de Ramón) has published major essays on Chilean prices, wages, living standards and growth patterns. The prices are melded together from accounts of eight different convents in and around Santiago. None of the individual convent accounts covers the whole century and a half. In thinking about these data Larraín confronts important questions about what type of transaction - wholesale or retail – these entries represented and how to treat regulated prices in the Santiago market. He accepts as inevitable that indices will include a mixture of wholesale and retail prices as well as some regulated prices because few other sources exist for the study of prices. And many of us who pursue price studies would agree with his assessment. Although mainly concerned with the period after 1750, I will briefly summarize Larraín's findings over the long term, 1630 to 1808. Larraín's general index (1754-1758=base years) shows prices falling until the end of the seventeenth century after which they rose to new highs at the beginning of the eighteenth century. (Larraín observes that an earthquake, a rebellion and other exogenous factors throw the city's economy into turmoil in the second half of the seventeenth century.) From those highs, prices slid until they matched the lows of the late seventeenth century. In the fourth quarter of the eighteenth century they turned upward again, a trend that continued until the end of the series in 1808. The late-eighteenth-century upswing in Santiago prices was more moderate than the period of inflation at the turn of the century, although it was nonetheless evident. Larraín's price

inquiry had a larger goal in mind: to create a suitable index from which to measure gross national or domestic product. In accord with the methodology that I have laid out above I have recalculated Larraín's prices for flour, sugar, tallow, potatoes, lard, wine and mutton in order to create an index based on the average price in each price series. These recalculations, as was the case with Johnson's data, will yield somewhat different results from the general index used by Larraín.³

Larraín price research covers nearly 40 years, and I want to incorporate as much of his work on the last half of the eighteenth century as I can. Let me first start with the series he published in Lyman Johnson and the late Enrique Tandeter's anthology *Essays on the Price History of Eighteenth-Century Latin America* (1990). In that essay he dealt primarily with seven products noted above; also in that essay and in other essays he introduced other price datasets that were somewhat more comprehensive than the list of seven. But first things first – the discussion ahead compares his weighted series computed from a base of 1754-1758 of seven products with my unweighted series computed from a series average. Following that I will introduce some other datasets assembled by Larraín. In general terms the course that Santiago prices followed after 1750 whether the series of seven or a larger series is in focus the results on how prices perform do not change significantly. Larraín conclusions from the totality of the data appear to be on the mark.

³ Larraín, "Gross National Product and Prices. The Chilean Case in the Seventeenth and Eighteenth Centuries, in Johnson & Tandeter, eds., *Essays on the Price History*, and an earlier version, Larraín, "Movimiento de precios en Santiago de Chile, 1749-1808: Una interpretación metodológica," *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, 17 (1980), 199-259. Original publication with price data sets was A. de Ramón, Armando de and J. Larraín. *Orígenes de la vida económica chilena, 1659-1808*. Santiago: Centro de Estudios Públicos, 1982.

Figure 7
Comparison of Garner & Larrain Price Indices, Santiago

Year	Garner Index base=series average	Count Total 7	Count %	Larrain Index base=1754-1758 (excludes sugar)
1750	103.93	1	14.3%	111.12
1751	92.22	5	71.4%	106.06
1752	80.14	5	71.4%	108.37
1753	81.80	4	57.1%	104.32
1754	96.96	7	100.0%	102.23
1755	88.12	7	100.0%	93.81
1756	87.02	7	100.0%	95.88
1757	85.66	7	100.0%	96.35
1758	99.52	7	100.0%	112.06
1759	99.48	7	100.0%	114.46
1760	108.10	4	57.1%	89.58
1761	78.09	5	71.4%	89.53
1762	64.95	6	85.7%	73.67
1763	88.73	5	71.4%	97.70
1764	83.52	6	85.7%	87.93
1765	87.01	7	100.0%	97.27
1766	88.90	6	85.7%	98.78
1767	96.88	6	85.7%	102.88
1768	84.68	5	71.4%	99.65
1769	89.58	7	100.0%	100.63
1770	90.49	7	100.0%	103.52
1771	94.73	7	100.0%	117.94
1772	108.19	7	100.0%	136.64
1773	103.67	7	100.0%	120.77
1774	92.24	7	100.0%	103.45
1775	93.48	7	100.0%	105.61
1776	86.14	6	85.7%	103.41
1777	85.84	7	100.0%	98.13
1778	92.47	7	100.0%	103.49
1779	93.37	7	100.0%	102.60
1780	102.87	7	100.0%	111.86
1781	109.84	7	100.0%	119.22
1782	125.98	7	100.0%	139.14
1783	112.97	7	100.0%	134.75
1784	109.31	2	28.6%	129.89
1785	135.19	5	71.4%	163.93
1786	109.80	6	85.7%	133.01
1787	102.00	6	85.7%	120.17
1788	108.39	6	85.7%	122.58
1789	97.24	4	57.1%	113.77
1790	89.28	4	57.1%	107.24
1791	100.69	5	71.4%	112.86

1792	99.42	6	85.7%	112.43
1793	77.23	1	14.3%	105.34
1794	92.48	2	28.6%	114.09
1795	98.45	5	71.4%	113.82
1796	112.91	4	57.1%	112.11
1797	107.41	4	57.1%	128.59
1798	117.62	5	71.4%	142.44
1799	124.16	5	71.4%	148.61
1800	114.57	5	71.4%	151.39
1801	102.64	1	14.3%	148.09
1802	106.36	5	71.4%	141.02
1803	123.26	4	57.1%	159.43
1804	113.32	4	57.1%	152.38
1805	126.37	7	100.0%	151.24
1806	116.20	6	85.7%	148.16
1807	129.21	6	85.7%	160.77
1808	118.37	5	71.4%	157.08
Maximum	135.19			163.93
Minimum	64.95			73.67
Count	59			59

FIGURE 8
Santiago Prices (Garner Series)

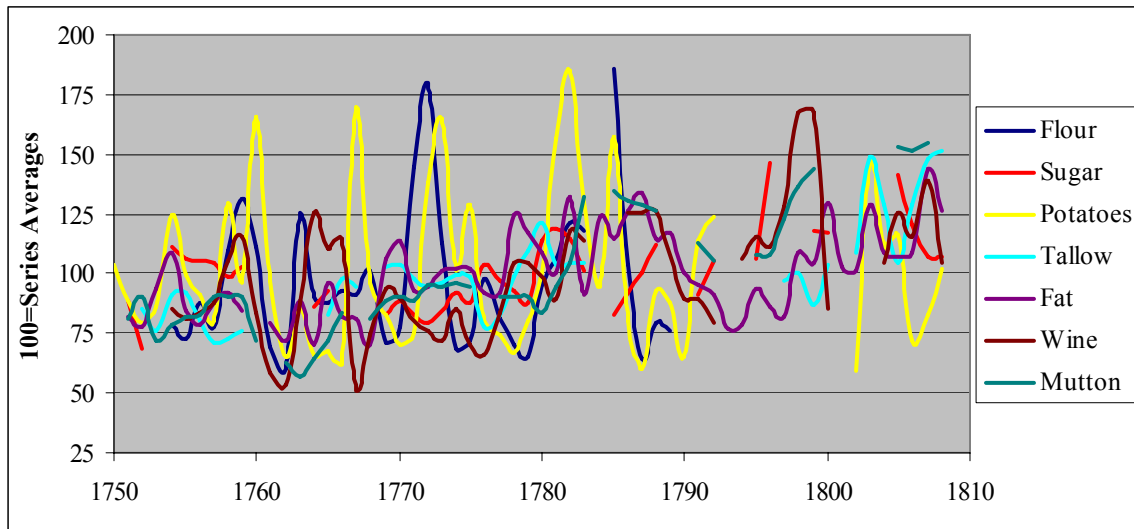


FIGURE 9
Santiago Price Index (Garner Series)

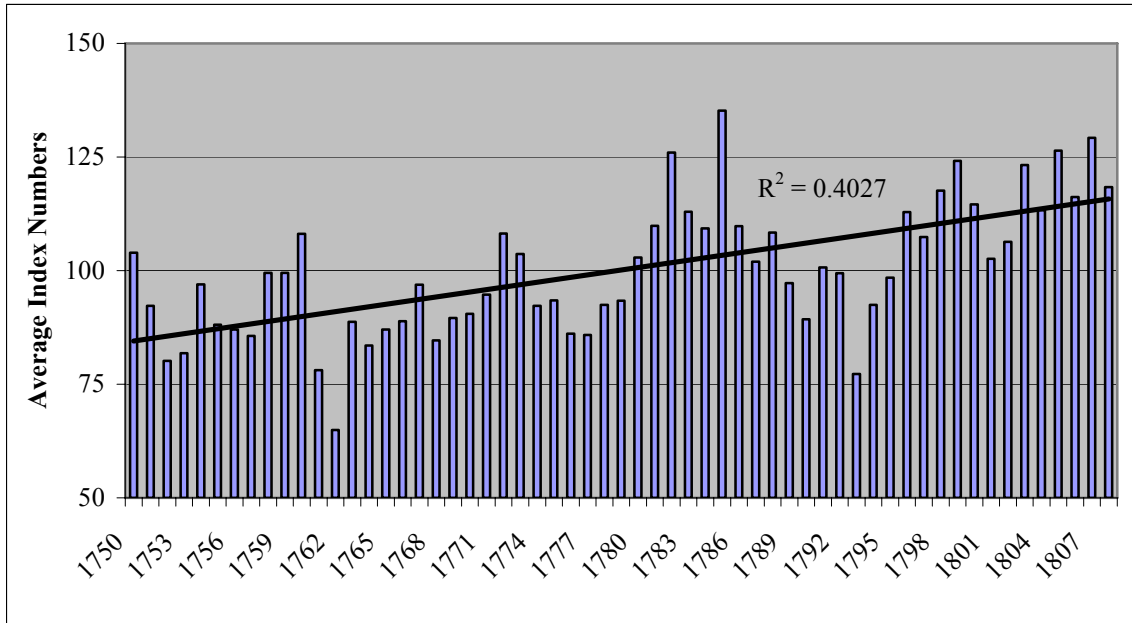


FIGURE 10
Comparison of Garner & Larrain Prices Indices

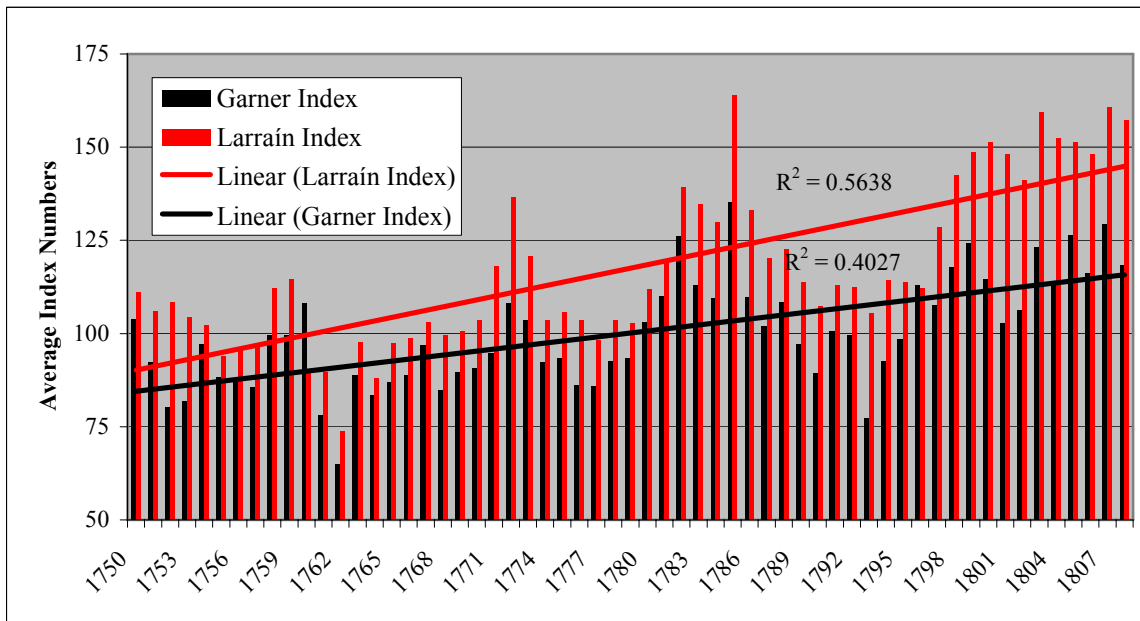


Figure 10 illustrates that when prices of the seven products are assembled in accord with predetermined weightings they show a somewhat stronger ascent after 1750 than my unweighted prices. In both series there are dips along the way so the ascent is not

in any sense (to no one's surprise) a straight line. Prior to the 1780s both series have numerous observations around 100 or below. After the 1780s those observations become less frequent. In Larraín's series after 1799 all his observations are between 125 and 150 (and even higher); in my series they fall between 100 and 125. The point to be stressed is that Santiago prices (of these seven selected products) fell from some new highs in the mid-1780s to the area of 100 and then shot back up to 125 and as even above 150. Santiago prices appear to be trending higher during the 60 years before independence began, although with the caveat that the post-1750 period was hardly strongly inflationary. Larraín is fully cognizant of this spurt in prices during the first decade of the nineteenth century. The explanation is a combination of rising urban populations and declining agricultural production especially in livestock. "The development of the social base, the growth of urban groups, mining groups, and poor campesinos who invested their limited incomes in foodstuffs, forcefully brought pressure to bear on the internal market."⁴ Larraín's research into agricultural production underscores the possibility that output was more robust in the first three-quarters of the eighteenth century with the result that inflation was better behaved, and that in the last quarter plus the early years of the nineteenth century some imbalances in the agricultural sector led to rising prices. The rate of growth in the general index is just under 0.6 percent and very close to what was found for Buenos Aires. The trend line for Santiago does a somewhat better job of explaining the behavior of prices than the trend line for Buenos Aires (r-squared is .39). Measured against the series average the index moved from 103 in 1750 to 118 in 1808. Prices were about 15 percent higher at the end of the series than at the start. One could argue from the numbers alone that Santiago appeared to enter a more price inflationary period after 1800 than at any other time in the previous 50 years. Without the upswing in prices from 1800 to 1810 Santiago prices exhibited little tendency to rise with any permanency.

Flour and potatoes prices show the highest variability among the seven in the index. Flour prices, of course, moved in accord with wheat prices, which could be highly volatile here and elsewhere. Although flour purchases appeared in convent accounts, the accounts do not reveal if the purchases were made in the open market or from the

⁴ Larraín, "Gross National Product and Prices," in Johnson & Tandeter, eds., *Essays on the Price History*, 124.

municipal granary (that could regulate prices). Potatoes, it turns out, was the next most volatile behind flour. In five years potatoes surpassed 150 (compared to two for flour), but for most of the years potatoes resided below 100. Of further interest is that potatoes shot up higher during periods when the prices of other products and therefore the general index had fallen substantially. Why is unclear. Wine and mutton prices were the next most volatile while sugar (an imported commodity), tallow and lard were the least volatile. In terms of coefficient of variation calculations none of the commodities was excessively volatile. All the coefficients exist within a range of 16 to 39.⁵

Larraín's assignment of weightings for his general index is worth commenting upon. Mutton receives the highest weighting (34.0 percent), and wine the lowest (4.5 percent). After mutton the next highest weighting was flour at 25.1 percent. These weightings are based on the percentage of each product in the total outlays of the convents' accounts. Sugar was imported, and therefore Larraín assigned it to another index that followed the path of import prices. In the second half of the eighteenth century the index of prices of imported goods versus the index of prices of domestic products were not dissimilar. The import index had a less notable rise in prices after the mid-1780s than the domestic index.⁶ For domestic and imported goods prices were at or below 100 for many years before the 1780s. After the mid-1780s that pattern did not hold as prices for domestic and imported goods reached some of the highest levels since the early eighteenth century. There was an interlude of lower prices in the mid -1790s, but for most years between 1785 and 1810 Santiago consumers paid more overall for a conventional basket of goods to sustain their existence. Larraín's domestic index was at 111 in 1750 and finished the period at 157, an increase 46 percent whereas my index went 104 to 118 for a smaller increase of 14 percent. Larraín's index showed a growth of 0.08 percent per year and mine 0.06 percent. It can be noted that average prices for the base period 1754-1758 were among some of lowest prices between 1750 and 1810. One can say legitimately that from some of the lowest prices to some of the highest prices between

⁵ Computation of coefficient of variation: flour=39%; sugar=16%; potatoes=32%; tallow=20%; fat=18%; wine=25%; and mutton=25%.

⁶ Larraín, "Gross National Product and Prices," in Johnson & Tandeter, eds., *Essays on the Price History*, Graph 5.4, 123. I have not actually made separate calculations on changes on prices for domestic products and imported products. This is based on observing the changes in graphs created by Larraín.

1750 and 1810 the increase amounted to a *half* of a doubling of the index. When a series average is used, it amounted to a sixth. In short how much inflation was too much? That is hard to determine. That depended largely on the flexibility of incomes. On the face of it whether 15, 30 or 60 percent over 60 years, one would be hard pressed to argue this was rampant inflation. Moderate or modest would be a more apt description, and yet for those urban dwellers (different rules may apply for rural dwellers) whose incomes changed little or actually declined higher prices and especially volatile prices may have exacted a larger toll than can be discerned in the statistics. Part of the problem with both series is that some serious gaps in price data exist. For example, after 1790 the price series for mutton and flour, the two highest weightings, have obvious gaps that have been filled with estimates. If actual transactions could be cited, they might differ (either higher or lower) from the estimates. In any event the estimates for mutton and flour lean toward the high rather than low, and that pushes up the index during the last two decades before 1810. Overall Larraín offers a somewhat more sanguine appraisal about Chilean price trends in the second half of the eighteenth century than Johnson did for Buenos Aires. Larraín proposed that the generally falling prices of imported goods acted counterbalance to the somewhat more inflationary prices of domestic goods. But the counterbalance was also temporary, noted above. Larraín is inclined to believe that over the long haul of the eighteenth century stability tended to characterize Chile's price history with some local agricultural products rising in price only in the late decades in reaction to a modest dislocation caused by domestic economy shifting to greater production of export commodities at the expense of products for domestic consumption. This does not appear (in either composite index) to have been a highly risky shift.⁷

Larraín presents another set of prices for the second half of the eighteenth century that interest me because the list of products is more comprehensive, covering almost two dozen products. The prices do appear not in an annual format but rather in the format of quinquennial averages from 1750 to 1808. This limits the analytical potential that is related to annual data. In any event Larraín proceeds to create a weighted index with the base as 1754-1759 and a quinquennial index number for each product and then an

⁷ Larraín, "Gross National Product and Prices," in Johnson & Tandeter, eds., *Essays on the Price History*, 124-126.

average index number for each quinquennium. His efforts reveal that over 60 years the quinquennial index rose from 100 to 135, an increase 35 percent.⁸ From 1750 to 1780 the index hovered around 100, and then after 1780 it jumped to near 120 in the second half of the 1780s, fell back to near 100 in the 1790s and then jumped again to the 130 in the 1800s. On a quinquennial basis prices of more than 20 products showed a moderate increase over a 60-year period. The nominal average quinquennial prices of some products more than doubled over time. Mutton, for example, went from a quinquennial average of about 4.8 *reales* per unit to about 8.5 *reales* between 1749-1753 and 1804-1809. Another meat product, *charqui* nearly tripled, from 12.5 *reales* per *quintal* to 35.25 *reales*. Some related livestock products like lard or fat also rose in price. The contraction of the livestock industry in the face of an expanding produce and grain agriculture was Larraín explanation for the higher meat prices. With some non-livestock products the reverse effect can be seen. Onions, for example, decline from 1.8 *reales* per hundredweight to 1.0 *real* from 1749-1753 to 1804-1809. Flour and potatoes, while volatile, registered slight increases of 1 to 2 *reales* per *fanega*. Chiles actually fell in price by almost 50 percent. Fresh fish declined in price by almost a quarter, but dried fish rose by a third. Non-food products. Sugar, which was imported, almost doubled in price. Non-food products such as wool and shoes moved in both directions.⁹ In short Santiago prices ranged from inflationary to deflationary in the half century before independence. The net result is that some prices, indeed prices of some essentials, may have not only risen but may have established higher levels by the end of the colonial period that began to squeeze consumers' pocketbooks. At the same time the data indicate that there were some bargain to be had. The interplay of these two dynamics warrants caution in relating the potential of economic dissatisfaction to stir revolt.

The Peruvian Cities

Price series exist for Lima, Arequipa and Potosí, and the indices that I and other scholars have created from these series will present a different perspective on the inflation

⁸ Larraín, "Movimiento de precios en Santiago," *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, 17, 241-242.

⁹ Larraín, "Movimiento de precios en Santiago," *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, 17, 239.

question. All three cities had been governed under Viceroy of Peru until the 1777 when Upper Peru and its legendary silver city, Potosí, had been attached to the newly created Viceroyalty of Río de la Plata. The reorganized Viceroyalty of Peru embraced what was known as Lower Peru and the two cities of Arequipa and Lima. The reorganization reflected a longstanding reality that a substantial volume of ore and merchandise had been diverted from the prescribed route between Lima and Potosí to the unauthorized route from Upper Peru to Buenos Aires (to my knowledge no reliable estimates of this exchange). The administrative shift had to affect the economies of Lower Peru and Lima adversely, although how adversely remains to be documented. Trade and exchange between Lower Peru and Upper Peru did not cease but was to some degree reduced. In analyzing these price series it is important to keep this adjustment in mind, even though the impact of the adjustment on the respective price series is more a matter of speculation than documentation.

Potosí had cast a long shadow over the Peruvian economy from the middle of the sixteenth century, when silver was first discovered, until the end of colonial rule. Its silver output was unprecedented. It peaked in the first half of the seventeenth century at between seven and eight million *pesos* annually and often accounted for 60 to 70 percent of all the silver registered in South America. A century-long decline from the second quarter of the seventeenth century through the first quarter of the eighteenth century shrunk output by 80 percent. In middle of the eighteenth century through a combination of lower silver taxes and mercury prices (among other things) Potosí had reversed the decline and over the next half century had restored output to about 50 percent of its former highs. These reforms stimulated investment in rehabilitation and drainage projects throughout the Potosian District, but rising production did not necessarily lead to rising profitability. Obstacles remained, not the least of which was that the cost of extracting and refining ore was still too high for investors, mainly merchants, to realize the returns that they could have in other ventures or in other camps. The Potosí silver industry was still a factor in the Andean economy, although compared to earlier times its star quality had dimmed. Other mining camps came on line after 1750 and at times challenged the front-running status of Potosí, but Peruvian or Andean mining never returned to the legendary position that it had occupied in the first 100 years. The analysis of post-1750

prices not only in Potosí but elsewhere will reflect that the changing circumstances within the mining sector.

FIGURE 11
Arequipa Composite Price Index (Garner Series)

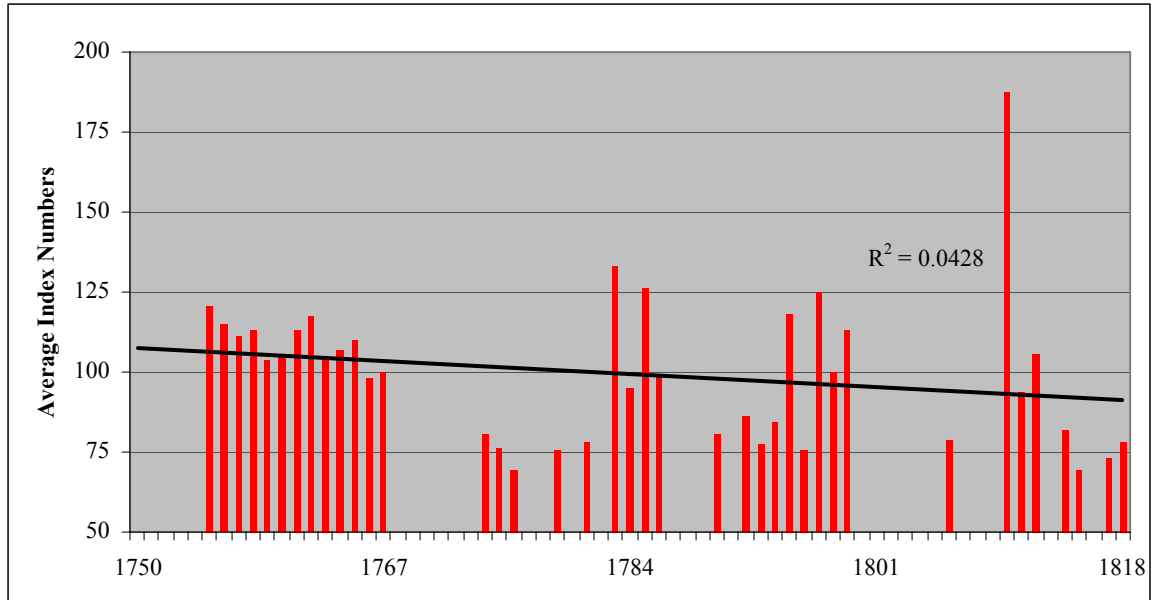


FIGURE 12
Potosí Price Index (Garner Series)

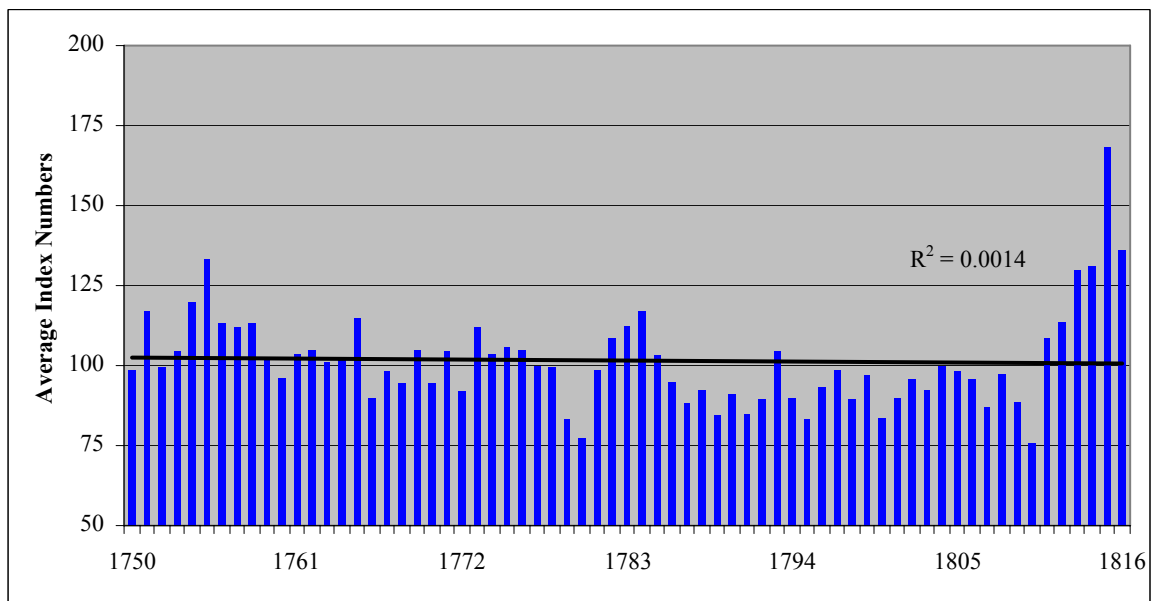
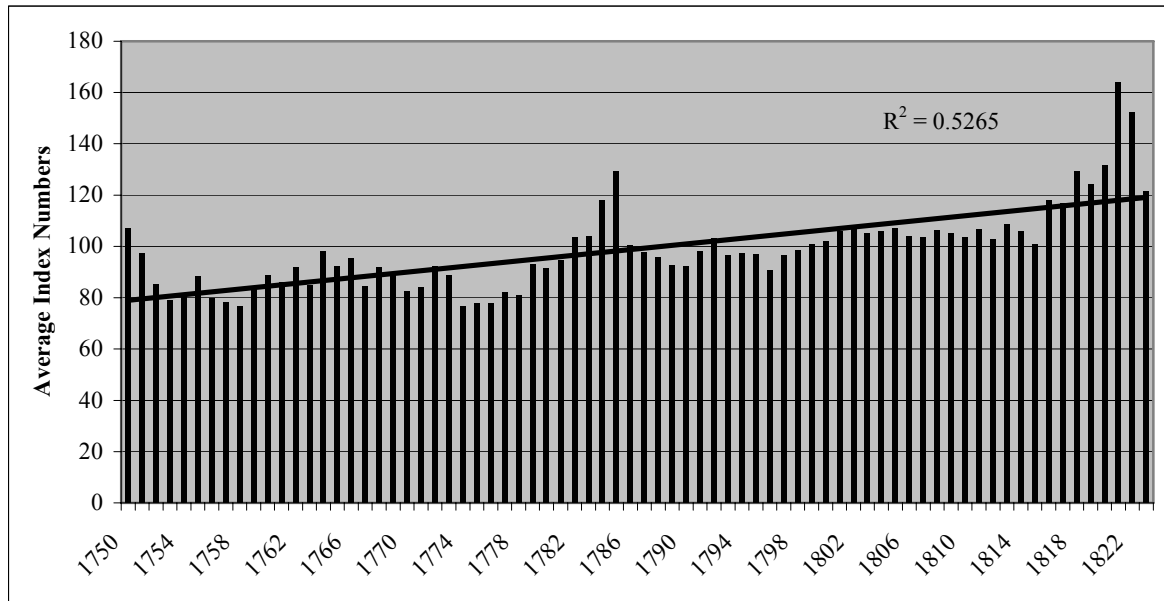


FIGURE 13
Lima Price Index (Macera Prices, Garner Series)



Peruvian cities followed different paths after 1750. (All the published indices have been recomputed on the basis of series averages.) The three Peruvian indices, as shown in Figures 11-13, have different terminal years, and that will affect how the trends should be characterized. (In the databank accompanying this essay, charts with different terminal points may be consulted or in fact created by the user.) Arequipa's index ends in 1818 with a downward slant even though from the mid-1780s there were some notable spikes in the price index. In the case of Potosí, whose terminal year is 1816, the trend is flat with some obvious upticks in prices in the last half dozen years. Finally in Lima through 1824, its terminal year, the price index edges higher with an obvious surge in the 1820s. Each of these indices must be looked at in detail before any conclusions about inflation can be drawn.

Potosí price data, taken mainly from the records of Friary of San Antonio de Padua of the Franciscan Order, cover about 40 different products from the 1670s through the 1810s.¹⁰ For the period 1750-1816 28 products have been included in the general

¹⁰ Enrique Tandeter and Nathan Wachtel, "Prices and Agricultural Production. Potosí and Charcas in the Eighteenth Century," in Johnson & Tandeter, eds., *Essays on the Price History*, 201-276. (Originally

index. They include grains, tubers, sugar, salt, meat, fish, wool, leather, wine, honey, soap and oil. Let me make three technical comments about Tandeter and Wachtel's series. First, their price data appear as index numbers, based on average prices for each product from 1770 to 1779. Without access to actual yearly prices or to the base-year average, I have had to make my own 'backward' conversions. After calculating an average base price for each product from 1770-1779, (without knowing if it the same price that Tandeter and Wachtel used to construct each product index), I have converted annual index numbers to prices for each product. Then, I calculated a base price (an average of the series) for each product and created a new index from the base price. Second, my series averages are computed from 1750 to 1816 and not from the full period, 1670 to 1816. This brings the Potosí index into conformity with the other city indices. Finally, weighting of products does not play a role in either their calculations or mine.¹¹

A further word about Tandeter and Wachtel's price study is in order. As scholars within the French *analiste* tradition, they approach Potosian price history as a series of *conjonctures*, which emphasize a spatial relationship between Potosí and the areas that supply the goods that trade in Potosí. The goods are assembled into four *conjonctures*: oceanic (overseas), American (interregional), regional (hinterlands) and local (vicinity). The aim is to assess the behavior of the prices of the goods in each category.¹² Their conclusions relative to each category share a common theme: little evidence of sustained price inflation in the second half of the eighteenth century. Decline or stagnation more accurately describes price behavior with some short-term but modest inflection in prices along the way.¹³

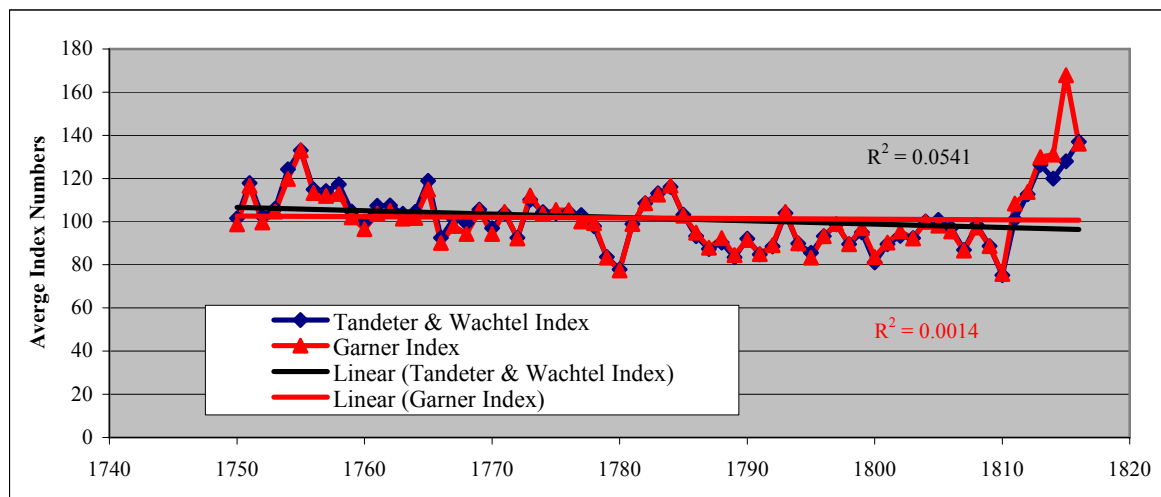
published as "Conjonctures inverses," in *Annales, économie, sociétés, civilizations*, 3 (1983). Also a Spanish version published by Centro de Estudios de Estado y Sociedad, Buenos Aires, 1983.)

¹¹ These products were not consumed in equal volumes. If quantities existed along side of prices, then the differing consumption patterns could be accounted in calculating annual average prices. The other method is to assign weightings based on assumptions about how products ranked in terms of demand. So far as I can determine neither of these techniques were used in compiling these data. Nor did I attempt to assign weightings.

¹² Tandeter and Wachtel, "Prices and Agricultural Production," in Johnson & Tandeter, eds., *Essays on the Price History*, 202.

¹³ Tandeter and Wachtel, "Prices and Agricultural Production," in Johnson & Tandeter, eds., *Essays on the Price History*, 269. Tandeter and Wachtel have a special interest in Ruggiero Romano's seminal price study in footnote 1. "Ruggiero Romano had insisted...on the originality of the South American *conjoncture*: a fall of 40 to 50 percent from the beginning until the end of the century, stability from 1765. Our study confirms that interpretation on general lines, although we may suggest nuances and corrections....We are

FIGURE 12
Comparison of Tandeter/Wachtel & Garner Indices Based on Annual Average Index Numbers



My recalculated general index, based on 28 products (none from the oceanic *conjuncture*), indicates that prices from 1750 to 1816 behaved as Tandeter and Wachtel described them.¹⁴ Figure 12 compares my 28-product price index based on series averages and the same 28 products based on the index numbers published by Tandeter and Wachtel. Both indices rose above 100 into the low 130s in the decade of the 1750s and again in the independence decade (1810-1820). Index numbers for 1815 and 1816 should be ignored since they were computed from no more than one or two prices. But in general prices were higher after 1810 than before. For more than half the years the indices fluctuated between the mid 70s and 100. When the indices rose above mean, except for the decades noted, they fluctuated between 100 and 120. Of equal interest is that the index lacks a volatile appearance, and coefficient-of-variation computations tend to confirm this.¹⁵ The price of light woolens proved to be the most volatile followed by grains like wheat, oil and salt, all of which were in the mid- or upper-thirty-percent range. Most of the products were in the low teens and twenties (percentages). Overall, however,

confronted...with various *conjunctures*, superimposed or even interwoven, which correspond to the different economies whose flows converge on the Upper Peruvian market" (264, 269).

¹⁴ I cannot compare Figure 11 with any comparable graph in the Tandeter and Wachtel essay. I have, therefore, created a graph based upon Tandeter and Watchel's index numbers for the 28 products that Figure 11 includes. Within their essay they use charts of logarithmic scales to plot actual prices.

¹⁵ The coefficients of variation have been computed for each of the 28 products and appear in the Potosí file of the accompanying price databank.

price movements over the whole period, 1750-1816, do not indicate a strongly inflationary environment. Weather, it would appear, was less of a negative factor in the second half of the eighteenth century than the first half. Only in the middle and late 1750s did weather conditions cause such scarcities and disruptions that prices remained high for several years. Other weather-induced shortages during the period pushed up prices for a year or two. An evident rise in prices coincided with the well-known revolts of Tupac Amaru and Tupac Catari in the mid-1780s, but the rise was modest and short-lived. Indeed Tandeter and Wachtel propose that the sharp decline in prices in the years prior to the revolts may have been more significant than the temporary price increases during the years of the revolts.¹⁶ In any event prices were in decline from the mid-1780s well into the 1790s. In fact, during the next 20 years (1784-1803) the index was hard-pressed to reach or exceed 100. After 1810, of course, as the independence movement spread, some shortages pushed up prices for certain foodstuffs like grain, sugar and meat. I would be remiss in not pointing out that some of the basic foodstuffs like grains lack price data for some crucial years in that 20 years period, and if price data for the missing years could be found and added to the database, the individual price series as well as the general index may look different.

FIGURE 14
Indices for Food/Beverage and Other, Potosí, (Garner Series)

Year	Garner Index base=series ave	Count Total 28	Count %	Food & Drink Garner Series	Count Total 19	Count %	Other Garner Series	Count Total 9	Count %
1750	99	23	82%	96	15	79%	105	8	89%
1751	117	21	75%	114	16	84%	126	5	56%
1752	100	21	75%	98	16	84%	105	5	56%
1753	105	18	64%	105	15	79%	101	3	33%
1754	120	17	61%	122	14	74%	109	3	33%
1755	133	18	64%	143	14	74%	98	4	44%
1756	113	22	79%	116	18	95%	100	4	44%
1757	112	23	82%	112	17	89%	113	6	67%
1758	113	19	68%	117	14	74%	100	5	56%
1759	102	24	86%	101	16	84%	104	8	89%
1760	96	21	75%	98	15	79%	94	6	67%
1761	104	20	71%	104	14	74%	103	6	67%
1762	105	19	68%	104	15	79%	110	4	44%
1763	101	17	61%	106	13	68%	87	4	44%
1764	102	15	54%	92	12	63%	139	3	33%

¹⁶ Tandeter and Wachtel, "Prices and Agricultural Production," in Johnson & Tandeter, eds., *Essays on the Price History*, 271.

1765	115	20	71%	113	15	79%	122	5	56%
1766	90	8	29%	91	6	32%	88	2	22%
1767	98	16	57%	97	12	63%	102	4	44%
1768	94	15	54%	94	13	68%	98	2	22%
1769	105	19	68%	105	13	68%	105	6	67%
1770	94	21	75%	91	16	84%	104	5	56%
1771	104	21	75%	106	17	89%	99	4	44%
1772	92	19	68%	91	13	68%	95	6	67%
1773	112	22	79%	108	17	89%	125	5	56%
1774	104	20	71%	105	16	84%	99	4	44%
1775	105	23	82%	104	16	84%	108	7	78%
1776	105	18	64%	104	14	74%	109	4	44%
1777	100	18	64%	97	13	68%	108	5	56%
1778	99	16	57%	99	12	63%	100	4	44%
1779	83	23	82%	81	16	84%	88	7	78%
1780	77	19	68%	78	15	79%	74	4	44%
1781	99	19	68%	100	15	79%	94	4	44%
1782	108	22	79%	113	16	84%	97	6	67%
1783	112	21	75%	123	14	74%	92	7	78%
1784	117	19	68%	111	15	79%	136	4	44%
1785	103	20	71%	97	16	84%	125	4	44%
1786	95	20	71%	95	13	68%	96	7	78%
1787	88	20	71%	87	14	74%	91	6	67%
1788	92	19	68%	95	13	68%	87	6	67%
1789	84	16	57%	87	12	63%	76	4	44%
1790	92	16	57%	89	11	58%	98	5	56%
1791	85	15	54%	89	11	58%	75	4	44%
1792	89	18	64%	91	13	68%	85	5	56%
1793	104	20	71%	113	13	68%	88	7	78%
1794	90	20	71%	92	13	68%	86	7	78%
1795	83	20	71%	85	15	79%	79	5	56%
1796	93	26	93%	94	18	95%	92	8	89%
1797	99	22	79%	99	17	89%	99	5	56%
1798	89	22	79%	91	17	89%	86	5	56%
1799	97	20	71%	94	14	74%	104	6	67%
1800	84	15	54%	82	11	58%	88	4	44%
1801	90	13	46%	93	10	53%	80	3	33%
1802	95	9	32%	91	6	32%	104	3	33%
1803	92	15	54%	91	13	68%	98	2	22%
1804	100	13	46%	93	9	47%	115	4	44%
1805	98	15	54%	106	11	58%	76	4	44%
1806	96	18	64%	95	14	74%	96	4	44%
1807	87	19	68%	89	16	84%	74	3	33%
1808	97	20	71%	91	15	79%	115	5	56%
1809	89	15	54%	83	11	58%	104	4	44%
1810	76	13	46%	71	10	53%	90	3	33%
1811	108	7	25%	111	5	26%	102	2	22%
1812	114	16	57%	116	13	68%	105	3	33%
1813	130	11	39%	119	9	47%	179	2	22%
1814	131	7	25%	102	3	16%	153	4	44%

1815	168	1	4%				168	1	11%
1816	136	2	7%	169	1	5%	104	1	11%
Max	168	26		169	18		179	8	
Min	76	1		71	1		74	1	

FIGURE 15
Comparison of Price Indices, Potosí, Food & Beverage v. Other (Garner Series)

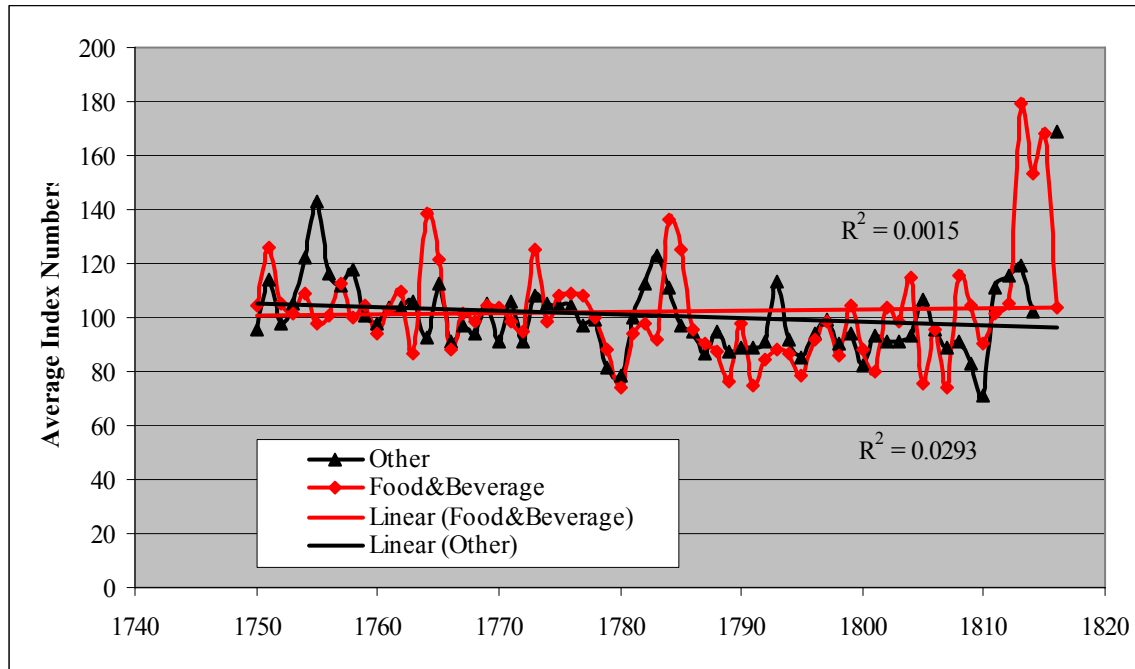
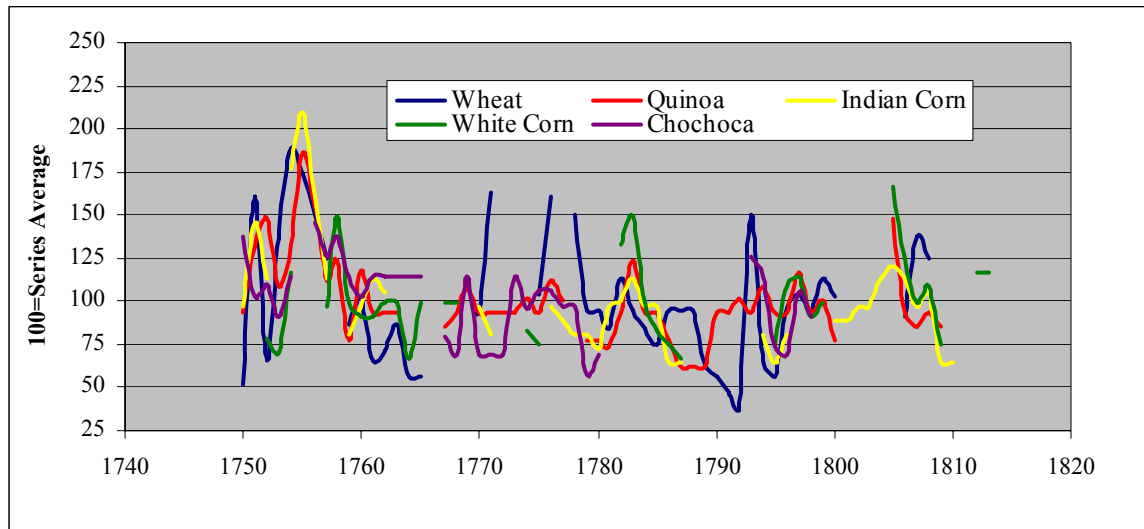


FIGURE 16
Grain Price Index (Garner Series)



It is legitimate to ask whether the 28-product index that I have assembled from Tandeter and Wachtel databank contained products that were not traded as regularly as other products. I can, for example, isolate the grains - wheat, quinoa, chochoca, white corn and Indian corn – and plot them separately from the other products on the grounds that they occupied a basic position in the local diet. When plotted, they were well above the base of 100 in the mid-1750s and then for the next half-century they more often than not fell below 100 with the exception of wheat, which could be highly volatile. The long stretches when various grain prices were missing could, of course, affect the overall trends. In lieu of trying to segregate the more from the less commonly traded products (so far as I could determine Tandeter and Wachtel did not rank commodities according to use) I separated the products into foods and beverages and other (non-comestibles such as tiles, bricks, tableware and cloth). Presumably foodstuffs traded in larger quantities on a daily basis than household utensils and building materials. Comestibles consist of 19 of the 28 products. That in itself is a long list, and it could be argued that within that list some comestibles were more heavily consumed than others. Without more information about volumes of sales it is a guessing game as to what products – comestibles and non-comestibles – should be weighted higher in terms of demand. In any event indices composed of the two categories –foods/beverages and other - does not look much different from the all-inclusive index, whether I base the two indices on Tandeter and

Wachtel's index numbers or on mine. As illustrated in Figure 15 when the index numbers for food/beverages and other are plotted the statistics indicate that no trend can be verified after 1750; on the other hand a simple observation of the index numbers underscores a clustering of the data points around 100, although some annual relative changes were as high as 80 percent against the series average. On the other side changes below 100 did not exceed 30 percent.¹⁷ There were periods when the indices moved above 100 and remained above for several years. In every case (except the post-1810 period when the data end in 1816) the indices dropped back below 100 for several years. In the quarter century before 1810 Potosí experienced a long phase of relatively low prices especially with foods and beverages. The food and beverage index recorded two years above 100 – 1793=113 and 1805=106 – while the other category had five years. The high index numbers for 1815 and 1816 cover only one or two products and can be safely disregarded. Fifty-five percent of the years between 1750 and 1816 in both categories registered numbers of 100 or below. Clearly in the independence decade (after 1810) the index rose to its highest levels after a quarter century during which it exceeded 100 only once – 104 in 1793. By stripping out food and beverage prices from the larger index, I have not been able to detect a pattern with prices of foodstuffs that differed significantly from the general index.

Pertinent to the analysis of prices are the tithe data from the Archbishopric of La Plata. Using tithe records as a proxy for agricultural output has sparked controversy among scholars. Under Tandeter and Wachtel's *modus operandi* tithe analysis relates to the behavior of prices of products in the regional *conjuncture*. These products included mainly grains and tubers that were cultivated on large haciendas and delivered from regions named Oruro (north), Cochabamba and La Plata (east), Chichas (south) and Carangas (west) that collectively were identified as the “vast zone” known as Charcas and the Archbishopric of La Plata. There was also livestock component to the regional *conjuncture*. Native agricultural communities may have only contributed modestly to these commercial transactions. Tandeter and Wachtel offer a fairly detailed analysis of the relationship between the movement of prices for products identified with the regional

¹⁷ I do not show a chart of Tandeter and Wachtel's index numbers for 1750 to 1816 in the text. A chart can be studied in the databank that accompanies this essay.

conjoncture and the movement of revenues from tithes. It must be noted that the prices related to transactions in Potosí and not in the regional itself while the tithes related to revenues received by the Archbishopric for products sold under its auspices to pay the tithes. Still the relationship between tithes collected in Charcas and prices paid in Potosí can be studied for intertwining patterns. Charcas like other regions in Spanish America experienced periods in which the weather favored agriculture (including ranching) and when it did not. After 1750 weather was a factor on at least three occasions: 1755, 1783-1784 and 1805. Scarcities pushed up what the prices that were paid for goods at public tithe auctions, and that had a corresponding impact on prices paid for goods in Potosí. The most notable decline in the tithe curve after 1750 came in 1781 at the outbreak of the Tupac revolts, which directly or indirectly interfered with the auctions. Thus the rise in prices relative to the tithes can be considered on two levels: bad weather resulted in higher bids when auctioned and therefore higher prices when sold, and falling production in response to civil disturbances also led to higher bids and higher prices.¹⁸ After due consideration of the many variables that affect tithes and prices Tandeter and Wachtel conclude that there may well be a period of extended “true” or real growth in tithes and therefore in actual agricultural output from 1760 to 1790 that “would coincide, logically, with the long-term downward movement in agricultural prices.” (The downward trend in prices is apparent in both prices series.) The intriguing questions posed by Tandeter and Wachtel with reference to Potosí and the region that served its agricultural needs is: from 1760 to 1790 was the increase in production greater than the increase in population, and then after 1790 did production hit “a new ceiling”?¹⁹

¹⁸ Tandeter and Wachtel, “Prices and Agricultural Production,” in Johnson & Tandeter, eds., *Essays on the Price History*, 253. The authors also employ price deflationary techniques to test their conclusions (254-257).

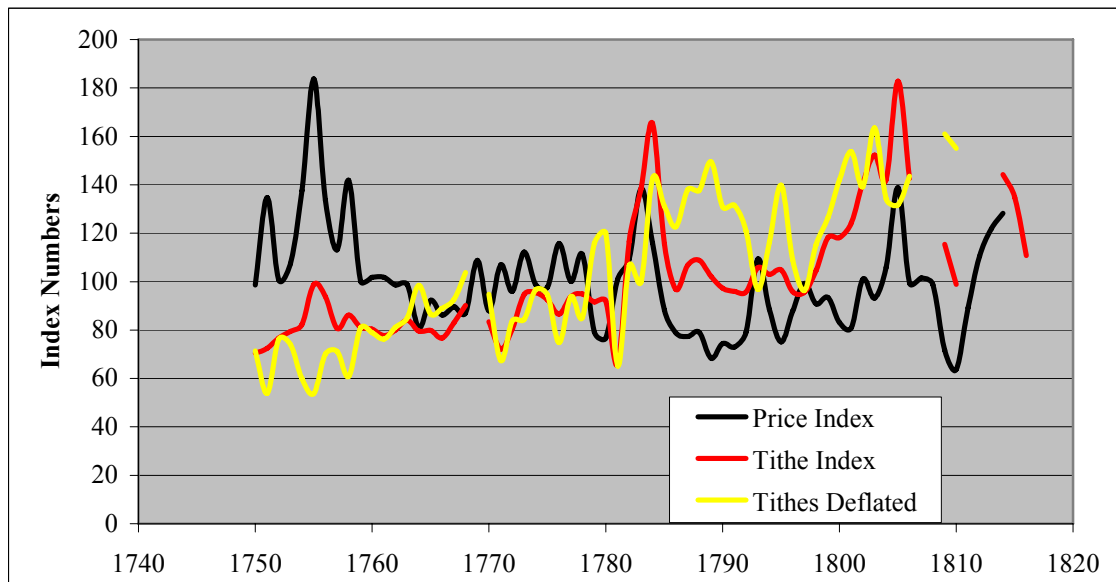
¹⁹ Tandeter and Wachtel, “Prices and Agricultural Production,” in Johnson & Tandeter, eds., *Essays on the Price History*, 256.

FIGURE 17
Potosí Prices for Charcas Products and Charcas Tithes

Year	Charcas Prices 7 Products base=series averages	Charcas Tithes Pesos Mean=128,366	Charcas Tithes Index base=series averages	Charcas Tithes Deflated
1750	99	89,324	70	71
1751	135	91,889	72	54
1752	101	97,316	77	76
1753	107	100,890	80	74
1754	138	104,576	82	60
1755	184	125,538	99	54
1756	134	119,044	94	70
1757	113	102,255	81	71
1758	142	109,428	86	61
1759	100	102,912	81	81
1760	102	102,011	80	79
1761	102	98,601	78	76
1762	99	101,499	80	81
1763	99	106,689	84	85
1764	81	101,043	80	98
1765	92	101,356	80	87
1766	86	97,363	77	89
1767	90	105,317	83	93
1768	87	114,450	90	104
1769	109			
1770	88	105,786	83	95
1771	107	91,578	72	67
1772	96	101,979	80	84
1773	112	120,101	95	84
1774	99	121,179	95	97
1775	98	117,270	92	94
1776	116	109,848	87	75
1777	100	119,093	94	94
1778	111	120,410	95	85
1779	79	116,308	92	116
1780	77	116,680	92	120
1781	101	83,578	66	65
1782	109	147,938	117	107
1783	138	175,375	138	100
1784	116	209,775	165	143
1785	88	146,800	116	131
1786	79	122,775	97	123
1787	77	135,499	107	138
1788	79	138,126	109	138
1789	68	129,630	102	149
1790	74	123,503	97	131
1791	73	121,711	96	132
1792	79	121,399	96	121
1793	109	134,138	106	97

1794	89	130,599	103	116
1795	75	133,082	105	140
1796	88	121,612	96	109
1797	99	121,500	96	96
1798	91	132,757	105	115
1799	93	149,906	118	126
1800	83	149,884	118	142
1801	81	157,717	124	154
1802	101	178,492	141	139
1803	93	193,276	152	163
1804	106	180,231	142	134
1805	139	232,035	183	132
1806	99	180,978	143	144
1807	102			
1808	99			
1809	72	146,389	115	161
1810	64	125,503	99	155
1811	89			
1812	110			
1813	122			
1814	128	182,986	144	113
1815		170,853	135	
1816		140,566	111	
Max	184	232,035	183	163
Min	64	83,578	66	54

FIGURE 18
Potosí Prices, Charcas Tithes



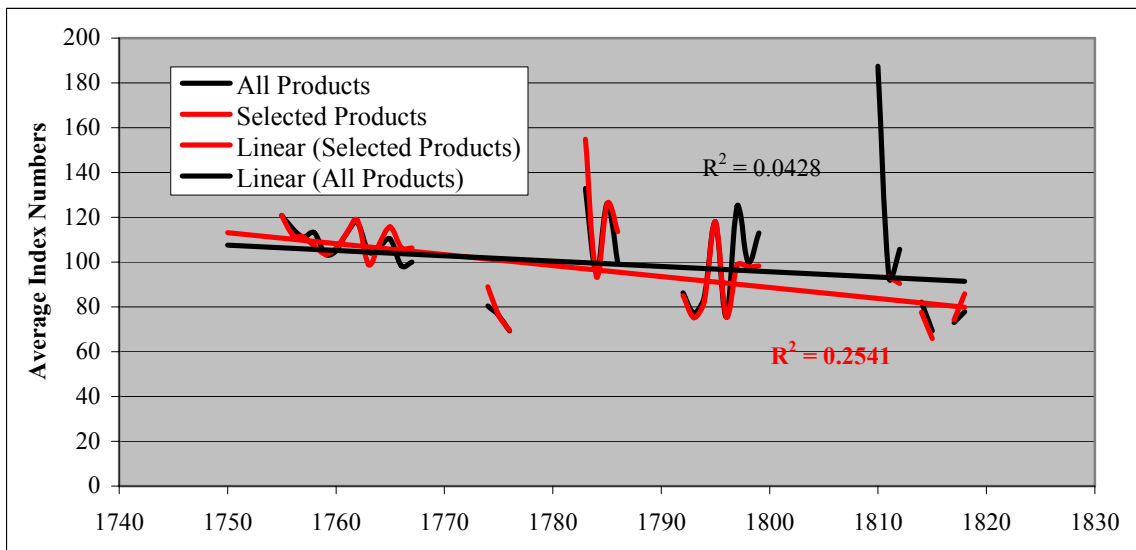
Tandeter and Wachtel illustrate the behavior of tithe data in several different graphs that appear to be drawn on logarithmic scales. The three principal graphs – Tithe Index, Tithe Index Deflated with Price Index Adjusted for a Moving Average and Tithe Index Deflated – show tithes rising after 1750, although the magnitude of the rise and the slope of the curve vary from series to series. To simplify matters I have created a tithe dataset that includes a tithe series based on annual nominal revenues, a tithe index computed from a series average, an index of seven products shipped from Charcas to Potosí based on a series average and a tithe index deflated with the price index. Figure 18 presents a startling juxtaposition of prices and tithes. Up to 1780 prices of Charcas products in Potosí resided above their base 100 where as tithes, nominal and deflated, sat below their base 100. After 1780 their positions more or less switch to the extent that more tithe observations come in above 100 and more price observations below 100. The switchover in 1780 was unmistakable. The implied message is that prices of Charcas agricultural products in Potosí were more inflated before 1780 in part because production in Charcas had lagged, and conversely prices, although volatile, had trended downward in part because production has expanded. It would help, of course, if more information on the volume of goods sold at tithe auctions could be gathered in addition to the revenues collected from the sales. It is doubtful that this disparity between production and prices could continue indefinitely. Low prices could eventually discourage producers from further expansion, if that was possible, and even lead to cutbacks in order to improve their margins. The independence period intervened so that the contraction hypothesis was never tested. It cannot be ignored that Charcas production as measured by tithes and Potosí prices for Charcas goods moved in different directions. On the face of it price inflation did not appear to be a threatening issue in the half century before the independence period.

FIGURE 19
Arequipa Price Indices (Garner Series)

Year	Garner Index base=series ave	Count Total 14	Count %	Garner Index minus Rouen cloth, iron & paper base=series ave	Count Total 11	Count %
1750						
1751						
1752						
1753						
1754						
1755	121	12	86%	121	10	91%
1756	115	10	71%	112	9	82%
1757	111	11	79%	111	11	100%
1758	113	11	79%	107	9	82%
1759	104	8	57%	104	8	73%
1760	105	11	79%	106	10	91%
1761	113	9	64%	113	9	82%
1762	118	9	64%	119	8	73%
1763	105	10	71%	99	9	82%
1764	107	10	71%	108	8	73%
1765	110	7	50%	116	6	55%
1766	98	7	50%	107	5	45%
1767	100	9	64%	106	7	64%
1768						
1769						
1770						
1771						
1772						
1773						
1774	80	6	43%	89	3	27%
1775	76	4	29%	76	3	27%
1776	69	5	36%	70	3	27%
1777						
1778						
1779	76	4	29%	75	3	27%
1780						
1781	78	4	29%	73	3	27%
1782						
1783	133	8	57%	155	5	45%
1784	95	5	36%	94	2	18%
1785	126	6	43%	126	6	55%
1786	100	10	71%	114	7	64%
1787						
1788						
1789						
1790	80	7	50%	83	6	55%
1791						
1792	86	8	57%	85	7	64%
1793	77	9	64%	75	8	73%

1794	85	6	43%	83	5	45%
1795	118	1	7%	118	1	9%
1796	76	6	43%	76	6	55%
1797	125	9	64%	99	6	55%
1798	100	7	50%	98	5	45%
1799	113	7	50%	98	5	45%
1800						
1801						
1802						
1803						
1804						
1805						
1806	79	2	14%	79	2	18%
1807						
1808						
1809						
1810	188	1	7%			
1811	93	4	29%	93	4	36%
1812	106	9	64%	90	6	55%
1813						
1814	82	8	57%	78	5	45%
1815	69	7	50%	66	5	45%
1816						
1817	73	9	64%	74	6	55%
1818	78	9	64%	86	6	55%
Max	188	12	86%	155	11	100%
Min	69	1	7%	66	1	9%

FIGURE 20
Arequipa Price Indices (Garner Series)



Note: Selected products are All Products minus imported products of Rouen cloth, iron and paper.

The behavior of prices in Arequipa, a city in Lower Peru under the jurisdiction of Lima, reinforces the model of stagnant or falling prices during the half century before the independence period. Kendall Brown's research has resulted in price series based on a combination of convent, *alcabalas* and *novenos* records over almost 200 years. For this study I have relied primarily his price dataset drawn from the Jesuit records as described in Johnson and Tandeter's *Essay on the Price History of the Eighteenth Century*. Unfortunately, some large gaps exist in the data during the period being considered in this essay. Brown's price investigations have a larger aim: to establish consumption patterns for typical Hispanic and Mestizo Arequipa families. His analysis of these patterns has led him to observe that families, rich and poor, may well have been better off by the end of the century because price inflation was virtually non-existent. Of course, "better off" or "worse off" will depend in large part on what happened to Arequipa wage levels, an issue that remains to be studied. In terms of prices alone little inflation can be detected from Brown's assembled data.²⁰

Arequipa had a different economic structure from other cities in this study. It was a provincial center that had important administrative, religious and commercial responsibilities. It had developed a diversified economy, at least in the agricultural sphere, despite its altitude (8,000 feet) and aridity. Many staples (grains and tubers) were cultivated close to the city, and sugar and cotton were grown in more distant valleys (with a more tropical climate). The production and export of brandy grew in the eighteenth century and became a major cash product for Arequipa and the surrounding region. A few silver camps operated within the Arequipa region, and the city benefited from the exchange of merchandise for silver with them as well as with the bigger camps in the high Andes. By the end of the eighteenth century Arequipa may have had a population of more than 60,000, a figure that would rank it among the largest cities in Lower Peru and in Spanish South America. Against this backdrop of economic and demographic growth, one might expect to see some price inflation.²¹

²⁰ Brown, "Price Movements in Eighteenth-Century Peru—Arequipa," in Johnson & Tandeter, eds., *Essays on the Price History*, 173-200, especially 192-194..

²¹ Brown, "Price Movements in Eighteenth-Century Peru—Arequipa," in Johnson & Tandeter, eds., *Essays on the Price History*, 173-174.

Like the other city indices the Arequipa annual index is an average of index numbers for all products for which prices exist. The individual product indices are, as explained earlier, computed from series averages rather than base years. Let me also reiterate that the addition of trend lines plus R-squared values was done to suggest the direction in the movement of annual average index numbers, although as the R-squared values indicate these trend lines do not capture many of the observations. In Brown's various publications that analyze prices he does not, to my knowledge, create a composite index for all the products in his databank. In arriving at an annual price for each product Brown calculated not the mean but the median. With this alternate approach in mind I too calculated both means and medians for each product. The result was that the two sets of index numbers were so close with most products that for purposes of consistency I stayed with the arithmetic mean for the Arequipa index.

Acknowledging that the data gaps - 1750s, 1770s and 1800s - are a cause for caution in generalizing about the direction and magnitude of the index, I have found that the indices registered little evidence of inflation, just as Brown had proposed. The main dataset compiled by Brown consists of 14 products, most of which were produced locally or regionally. Three (of the 14) were imports: Rouen, paper and iron. (Figure 20 includes series for all products and for products minus imports.) Prices were high in the late 1750s and the early 1760s, but except for a few individual years prices tended lower from the middle of the 1760s to the end of the colonial period. The index actually reached the highest level in the middle 1780s but only for the years surrounding the Tupac rebellions. Drought conditions may have caused the prices to rise in the middle 1750s and again ever so briefly in the middle 1790s. For most years, however, the index was at 100, slightly above it, or notably below it. The most volatile product was olive oil, which was produced in the valleys closer to the coast, and the least volatile was wheat, grown in the vicinity of Arequipa. (Coefficients of variations for Arequipa can be accessed through the databank that is linked to this essay.) Brown argues that the eighteenth-century agricultural economy had grown to a point that made Arequipa largely self-sufficient except for unpredictable disasters like droughts and rebellions. Ever increasing supplies keep prices in check. Brandy, wine and one or two other product were exportable (to other regions), but by and large what was produced and around Arequipa was consumed there. As noted

above, increasing supplies could result in such low prices that returns did not justify further investments and could eventually lead to curtailment of supplies and increases in prices. Wine prices fell in the third quarter, perhaps from over-production, and then reversed in the fourth quarter as more and more wine was converted to brandy, which was exported to the altiplano. Brandy prices locally, however, actually fell in the fourth quarter. So the export of brandy may have had little effect on brandy prices in Arequipa, but it may have helped to push up wine prices. Overall, if any price inflation existed in Arequipa or the region, it was short-lived, and this lends support to the view that this enhanced the economic well being of local households. One wonders if declining prices in Arequipa (like Potosí) was an indication of deflation, and if so how deflation would play out in terms of continuing investments in the commodities sectors and employment levels. And that would require some rethinking about how to interpret economic well-being in a period of falling prices.²²

Another part of Brown's price databank can be explored with respect to trends after 1750. These prices were found in the accounts known as *novenas*. The church collected a 10-percent tithe from Spanish landowners (Indians were generally exempt). Various rules and regulations applied to what production was taxable and what was exempt. The tithed production was usually sold through public auction, and a ninth of the income was assigned to the treasury for construction and improvement of universities, hospitals and churches. The *novenos* when transferred to the government were often recorded in the royal ledgers with the prices as well as the quantities of goods.²³ Despite many questions on how well ecclesiastical tithes reflected agricultural operations and transactions what interests me about *novenos* is the availability of quantities sold along side of prices at which they sold. Brown dataset includes revenues delivered to the treasury from the sales of wines, wheat, corn and potatoes. I have limited my analysis to wheat, corn and potatoes between 1750 and 1800. What the church and the treasury valued was the income derived from the sale of tithable products, and that meant that

²² Brown, "Price Movements in Eighteenth-Century Peru—Arequipa," in Johnson & Tandeter, eds., *Essays on the Price History*, data appear on 176-179.

²³ These data were published in Brown, *Bourbons and Brandy, Imperial Reform in Eighteenth-Century Arequipa* (Albuquerque, NM: University of New Mexico Press, 1986), 224-229. My gratitude to Kendall Brown for additional information on the *novenas* administration.

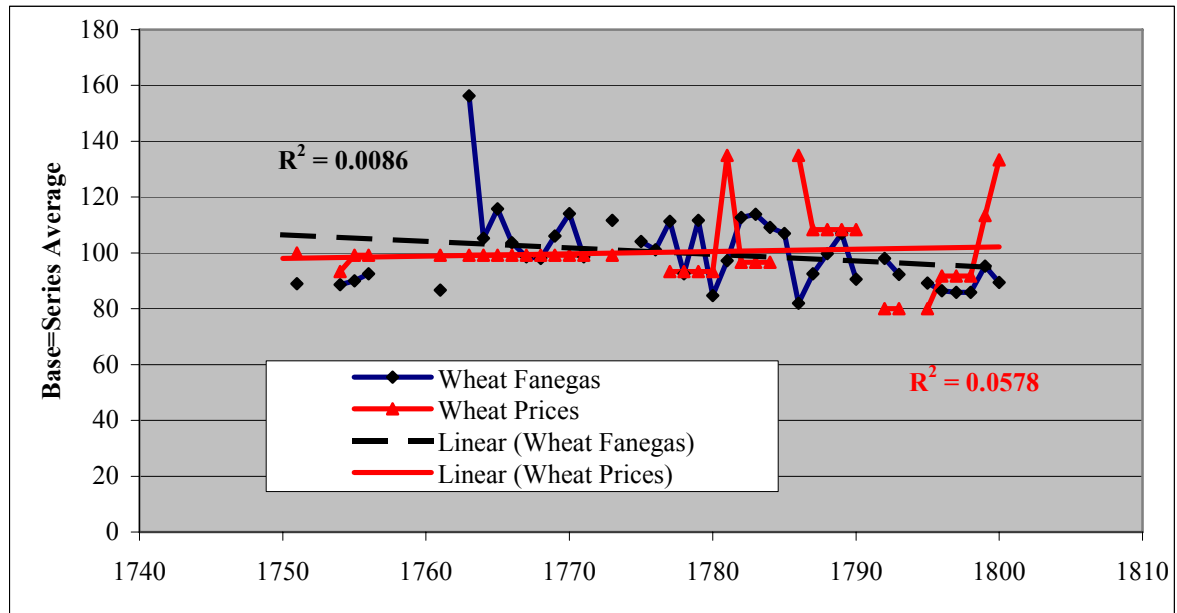
once the tithes were assessed and the products delivered, they had to be sold. The sales of these products should both reflect market conditions and influence them. Thus, the relationship between how much was sold and for what price (even though these transactions may have involved some manipulations) opens another window on how these colonial markets worked. In short, the tithe sales did not occur in a market vacuum.

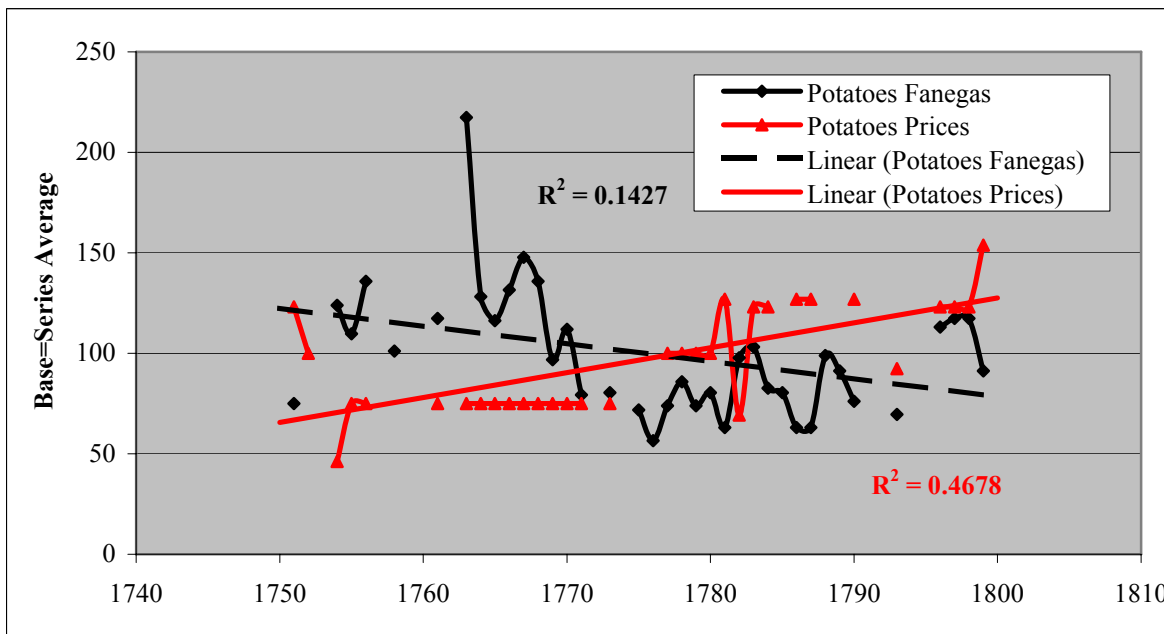
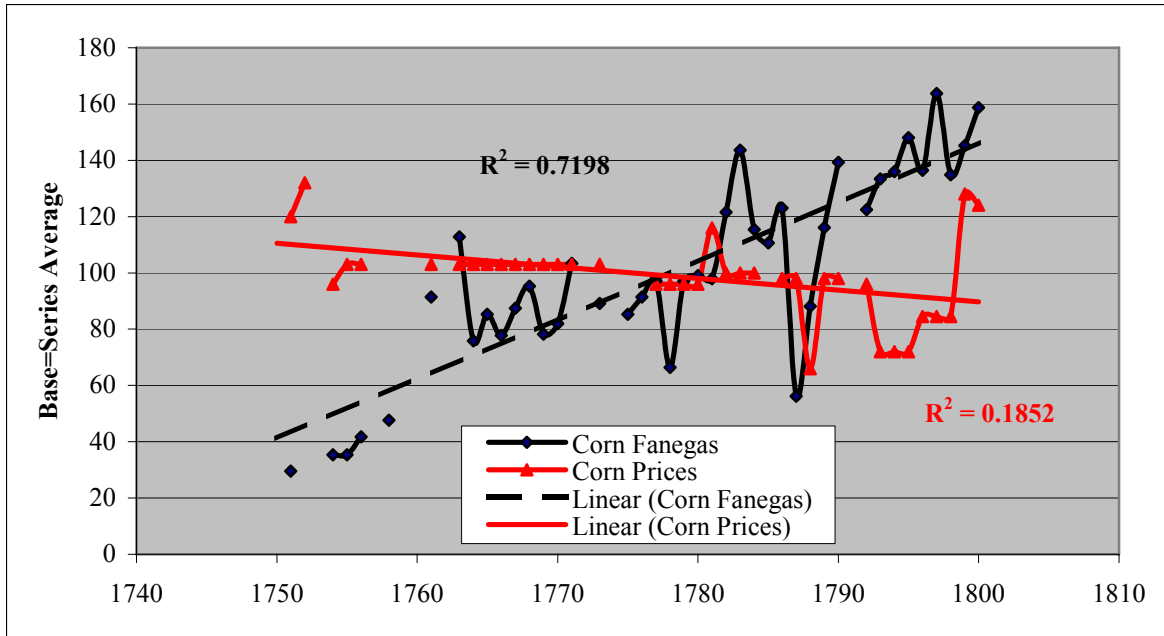
FIGURE 21
Indices For Volume & Price, Wheat, Corn, Potatoes, Arequipa

Year	Wheat Index 1750-1800 Fanegas	Wheat Index 1750-1800 Reales	Corn Index 1750-1800 Fanegas	Corn Index 1750-1800 Reales	Potato Index 1750-1800 Fanegas	Potato Index 1750-1800 Reales
Ave	360.49	30.09	421.54	24.75	91.49	12.52
1750						
1751	89	100	30	120	75	123
1752				132		100
1753						
1754	89	93	35	96	124	46
1755	90	99	35	103	110	75
1756	93	99	42	103	136	75
1757						
1758			48		101	
1759						
1760						
1761	87	99	91	103	117	75
1762						
1763	156	99	113	103	217	75
1764	105	99	76	103	128	75
1765	116	99	85	103	116	75
1766	104	99	78	103	132	75
1767	99	99	87	103	148	75
1768	98	99	95	103	136	75
1769	106	99	78	103	97	75
1770	114	99	82	103	112	75
1771	99	99	103	103	79	75
1772						
1773	112	99	89	103	80	75
1774						
1775	104		85		72	
1776	101		91		57	
1777	111	93	97	96	74	100
1778	93	93	66	96	86	100
1779	112	93	97	96	74	100
1780	85	93	99	96	80	100
1781	97	135	98	116	63	127
1782	113	97	122	100	98	69
1783	114	97	144	100	103	123
1784	109	97	115	100	83	123

1785	107		111		80	
1786	82	135	123	98	63	127
1787	93	108	56	98	63	127
1788	100	108	88	66	99	
1789	107	108	116	98	91	
1790	91	108	139	98	76	127
1791						
1792	98	80	123	96		
1793	92	80	133	72	70	92
1794			136	72		
1795	89	80	148	72		
1796	86	92	136	85	113	123
1797	86	92	164	85	117	123
1798	86	92	135	85	117	123
1799	95	113	145	128	91	154
1800	89	133	159	124		
Max	156	135	164	132	217	154
Min	82	80	30	66	57	46

FIGURES 22, 23, 24
Indices for Wheat, Corn and Potatoes, Arequipa





The immediate observation is that the three graphs differ in significant ways. I should state from the outset that the total volumes are small given the time period of 50 years. For wheat the total was less than 15,000 *fanegas*, for corn 18,000, and for potatoes 3,400. (A *fanega* is equal to about 1.5 bushels.) In both volume and price wheat had the least variation. (See accompanying databank for calculations of coefficients of variation.) With some notable exceptions the data points cluster around the base. Although trend-

lines have been added, they are unverifiable. In observing the data one may be inclined to conclude that it is difficult to account for much change at all in the wheat market. There should be a negative correlation between volume and price – rising volume and declining price as well as the converse. The correlation between fanegas of wheat and prices of what is negative but at only .09, hardly persuasive. The wheat market in terms of tithe transactions was simply lackluster. With corn a change of view is necessary. As Brown proposed, corn was growing in importance with respect to the local market whereas wheat was stagnant. Quite clearly as the quantity of corn sold in tithe auctions grew the price fell. The trends, observed rather than calculated, are fairly impressive. Correlation between volume and price is a -.24, somewhat more useful than the wheat number. The crossover of the trend-lines around 1780 cannot be ignored. When correlations between volume and price are computed for the 30 years from 1750 to 1780 and then for the 20 years from 1780 to 1800 an inverse relationship is registered at -.32 for the first period but is lost in the second period when it is positive but so low as not to affirm any association. As the volume of corn sold rose in the 1780s prices were more or less stuck. In the 1790s, however, as the volume continued to rise prices first fell and then rose. Brown points out that hacienda production of corn grew in the second half of the eighteenth century in response to rising demand. For almost a dozen years (1780-1792) the prices that corn fetched held steady – within several points of 100 – but the volume of corn sold was less predictable. In the mid 1790s volume and price followed a more expected path with the former rising and the latter falling, but then in the late 1790s the relationship deviated again with both volume and price reaching unusually high index levels. The market conditions for the sale of corn could be robust over short periods.²⁴ Finally the behavior of potatoes stands in sharp contrast to both wheat and corn. Potatoes sold for higher prices at the end of the 50 years as the volume of potatoes for sale declined. There is a moderately strong negative correlation of -.48 as prices rose and quantities fell. One can observe noticeable variation in both variables, and in fact the coefficients of variation are high both for price and volume – price the highest of the

²⁴ The coefficients of variation are high for volume (35 percent) and low for price (14 percent). One can observe greater volatility in the volume variable, although such observations (without knowing the statistics) can sometimes be misleading.

three at 27 percent and volume the second highest at 32 percent. The quantity of potatoes to sell reached the highest point (217) on any of the three indices, but then over the next half-dozen years it fell to 79. During the 1760s the prices was stuck at a low 75. But the decline in volume of sales had the effect of pushing up prices, and as the volume of potatoes sold remained below 100 for most of the years between 1775 and 1800 prices paid sat in the upper 120s for more than half the years and finally breached 150 at the end. The higher prices eventually resulted in higher potatoes sales during the last half of the 1790s. Of the three products collected through the tithes and sold by agents in behalf of the church potatoes showed the most inflationary tendency, nearly doubling over 50 years.

Does this more detailed analysis of three tithes product change the overall impression about the behavior of prices in Arequipa after 1750? Not really. The preponderance of the price data collected and analyzed by Brown and further analyzed here indicates that prices if not declining were stagnant. Brown's further study of agricultural conditions reinforces the notion that price inflation after 1750s if it existed at all was short-term and selective. When price trends for Potosí and Arequipa are viewed in tandem, they do not show much sustained inflation.

Since the sixteenth century Lima had served as the capital of the Viceroyalty of Peru that included virtually all of Spanish South America. At the beginning of the fourth quarter Lima's authority was significantly reduced as two new viceroyalties in the north and the south were created. It is unclear how extensively these administrative changes affected Lima's economy and in particular its commercial activities. Economic stagnation has characterized historical writing on Lima in the last half-century. Without a doubt the reorganization had an effect especially with respect to the mining industry. Potosí remained a large silver center, and under the new plan its financial link shifted from Lima to Buenos Aires. That affected not only the flow of royal treasure but the network of private commerce. Recent research, however, has found that Lima's late colonial economy may have experienced more prosperity and growth than previously acknowledged. The Peruvian economy in general and Lima's in particular had been under strain since the late seventeenth century because of the relentless slide in Potosí's silver output. A surge in mining in Lower Peru in camps like Pasco plus population

growth may have actually shielded Lima's late-eighteenth-century economy from a more severe crisis after the severing of Upper Peru. At the very least recent publications on price movements in the capital and the region have opened a promising line of inquiry into larger economic questions.

By far Lima has the biggest price database of the seven cities, thanks mainly to the work of Pablo Macera and his team and later the research of Marcel Haitin. Their principle sources were the financial records of convents, hospitals and other religious institutions. The chronology of the two studies differed in that Macera collected and published data from the middle of the sixteenth century to the end of the colonial period and included more than 100 products while Haitin collected data from 1790 into the 1840s and included about a dozen products. Macera offered little analysis of the collected data whereas Haitin used prices as a vehicle to examine economic changes in and around Lima. Although they used the same type of sources, they did not use the same sets of records or include the same groups of products. But for the years in which their databases overlap their respective indices do not diverge significantly.

FIGURE 25
Lima Price Indices (Macera Prices, Garner Series)

Year	Garner Index base=series ave	Count 37	Count %	Garner Index base=series ave	Count Total 37	Count %
1750	107	17	46%	112	17	46%
1751	97	9	24%	100	9	24%
1752	85	7	19%	88	7	19%
1753	79	8	22%	83	8	22%
1754	82	10	27%	85	10	27%
1755	88	9	24%	91	9	24%
1756	80	15	41%	83	15	41%
1757	78	15	41%	82	15	41%
1758	76	13	35%	79	13	35%
1759	84	16	43%	88	16	43%
1760	89	17	46%	93	17	46%
1761	86	16	43%	90	16	43%
1762	92	17	46%	96	17	46%
1763	85	13	35%	89	13	35%
1764	98	10	27%	103	10	27%
1765	92	17	46%	97	17	46%
1766	95	21	57%	100	21	57%
1767	85	25	68%	88	25	68%
1768	92	27	73%	96	27	73%
1769	89	25	68%	93	25	68%
1770	82	28	76%	86	28	76%

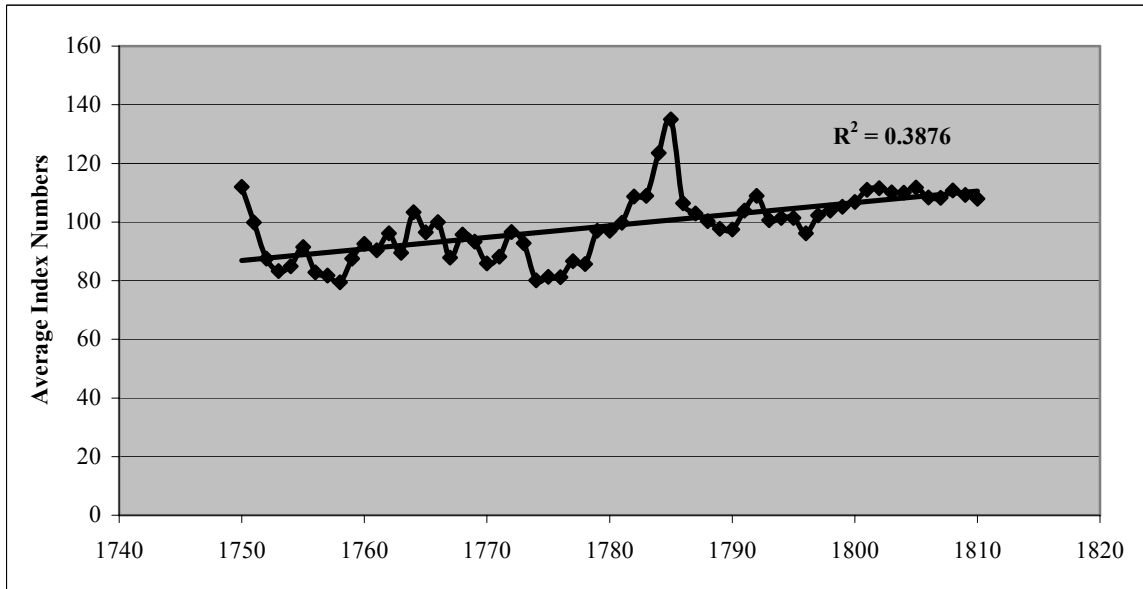
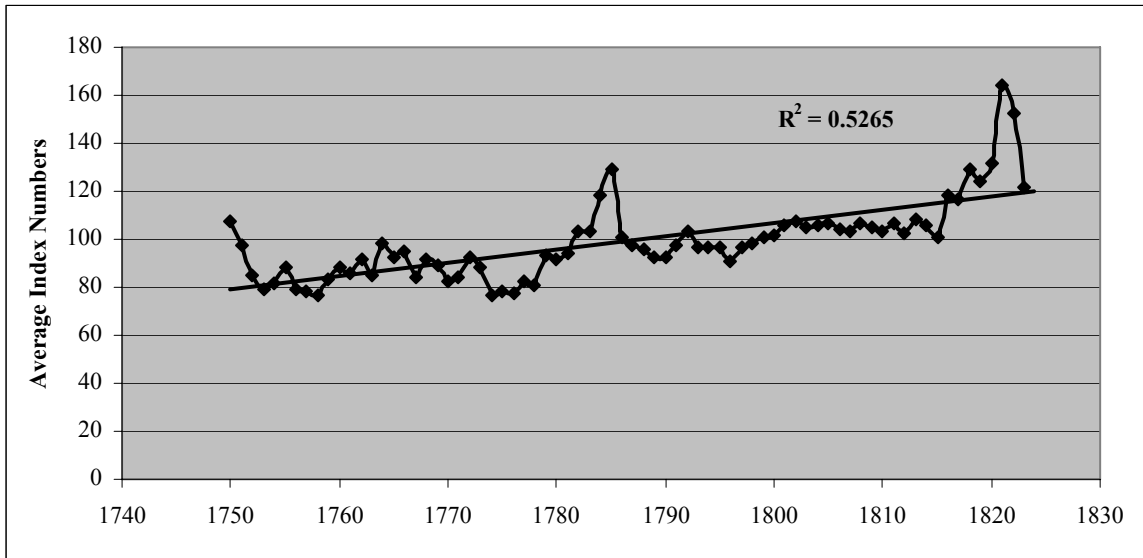
1771	84	31	84%	88	31	84%
1772	92	30	81%	97	30	81%
1773	88	25	68%	93	25	68%
1774	77	20	54%	80	20	54%
1775	78	26	70%	81	26	70%
1776	78	29	78%	81	29	78%
1777	82	24	65%	87	24	65%
1778	81	23	62%	86	23	62%
1779	93	23	62%	97	23	62%
1780	91	22	59%	97	22	59%
1781	94	26	70%	100	26	70%
1782	104	24	65%	109	24	65%
1783	104	28	76%	109	28	76%
1784	118	30	81%	124	30	81%
1785	129	26	70%	135	26	70%
1786	101	25	68%	106	25	68%
1787	98	25	68%	103	25	68%
1788	96	25	68%	100	25	68%
1789	93	25	68%	98	25	68%
1790	92	24	65%	98	24	65%
1791	98	22	59%	104	22	59%
1792	103	21	57%	109	21	57%
1793	96	29	78%	101	29	78%
1794	97	24	65%	101	24	65%
1795	97	24	65%	101	24	65%
1796	91	14	38%	96	14	38%
1797	97	15	41%	102	15	41%
1798	98	14	38%	104	14	38%
1799	101	24	65%	105	24	65%
1800	102	27	73%	107	27	73%
1801	106	31	84%	111	31	84%
1802	107	29	78%	112	29	78%
1803	105	24	65%	110	24	65%
1804	106	25	68%	110	25	68%
1805	107	28	76%	112	28	76%
1806	104	28	76%	108	28	76%
1807	104	26	70%	108	26	70%
1808	106	26	70%	111	26	70%
1809	105	26	70%	109	26	70%
1810	104	29	78%	108	29	78%
	107	22	59%			
	103	20	54%			
	108	24	65%			
	106	16	43%			
	101	16	43%			
	118	20	54%			
	117	16	43%			
	129	18	49%			
	124	17	46%			
	132	21	57%			

164	20	54%
152	16	43%
121	14	38%
142	6	16%

Max	164	31	135	31
Min	76	6	79	7

Note: The series averages differ because one is computed for 1750-1824 and the other for 1750-1810.

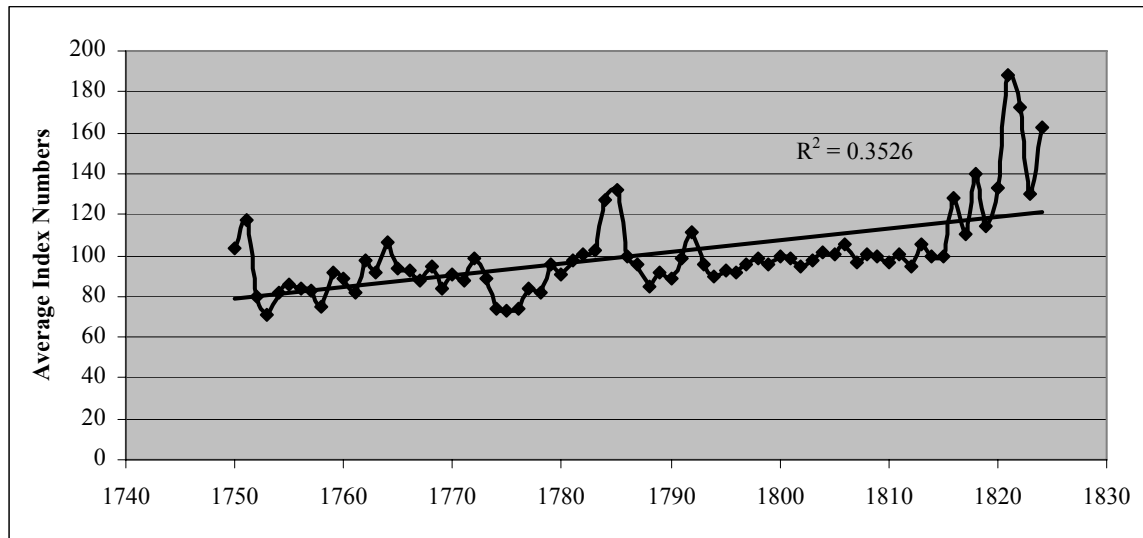
FIGURES 26, 27
Lima Price Indices (Macera Prices, Garner Series)
1750-1824 & 1750-1810



First let me turn to the Macera database.²⁵ Although it contains more than 100 products, I have thus far analyzed about a third of the database. My general, composite index includes 37 items of which almost 60 percent appeared in the annual basket on average each year. I have presented the data in two chronological versions: 1750-1824 and 1750-1810. The most interesting observation is that while both versions have upward slanting index numbers the range between 1750 and say 1820 is 120 to 80. For nearly every year between 1750 and 1780 the index number was 100 or below, and for many years after 1780 the index numbers clustered around 100. The worse years for the indices were the revolt years of the mid-1780s and the most intense independence phase. The upward bias for the second version 1750 to 1810 is somewhat less severe because average prices of most products are lower, and therefore the index numbers for individual products and the average of the index numbers for all products will be lower. Still the upward slant is unmistakable because the annual index definitely moved toward higher ground after 1780. It was not simply that the index spiked in the mid-1780s but that the whole index shifted upward. While the Lima index drawn from Macera's database has a more defined upward slant than the indices for Arequipa and Potosí it does not suggest that the city was in the grips of rampant inflation. Of course, as noted before, the impact of price inflation involves so much more than prices alone, and for Lima citizen even a slight move up in prices might have had a negative impact.

²⁵ Pablo Macera, "Los Precios de Peru: Siglo xvi-xix, Fuentes, 3 vols. (Lima: Banco Central de Reserva, 1992), 1:41-73.

FIGURE 28
Lima Price Index, 12 Products (Macera Prices, Garner Series)



Analysis of the Macera-based index is complicated by the fact that it includes so many different products. It is almost an embarrassment of riches. I have selected 12 products that correspond to products that appeared in other cities' indices, although the Lima select index does not exactly match any other city index. The 12 products are maize, quinoa, wheat (substitute for flour), oil, lard, garbanzos, potatoes, sugar, salt, chicken, mutton and wine. These represent some basic comestibles that could be found in most urban households. This index as a subset of the composite index has an appearance similar to but not exactly the same as the composite index. Based on a calculation of an annual average of the index numbers for all 12 products, the index of the subset was below 100 for 20 years until the 1780s. During the revolt period prices shot up above 120 and afterwards returned to the pre-1780 levels, and for most years until 1815 the index numbers seldom strayed more than a few points from 100. As the independence movement intensified, prices shot up above 120 again and then above 150. As the independence period was winding down prices were as high as they had ever been since 1750. The difference between the select index and the general index concerns the two decades before 1810. In the mid-1780s as the prices of some comestibles like oil, garbanzos and wheat rose sharply, the prices of other products such as sugar and mutton fell. Other products among the twelve showed little change. For the majority of the years between 1750 and 1810 or 1820 the prices of the 12 products hugged the baseline (100).

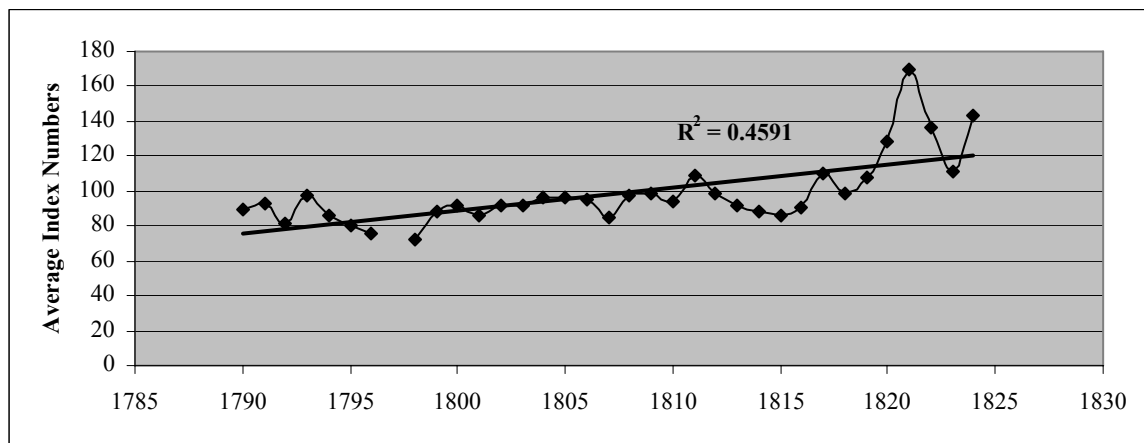
Among the 37 products the figures for coefficient of variation (one way to measure volatility) ranged from 11 to 46 percent. Fourteen percent of the products had a coefficient of variation of .15 or below, 57 percent between .16 and .30, 24 percent between .31 and .45 and 5 percent over .45. The two most volatile were olive oil and the spice saffron, both of which were imported, and the two least volatile were chickens and sugar. About half (18-19) of the products had coefficients of .22 or below. A sizeable number, then, experienced modest price variation over the full period 1750-1824. Many basic foods – rice, maize, fish, butter, sugar, honey, meat, poultry, brandy and wine – belonged to the low volatility price category. A few such items like beans (white, black etc.) belonged to the high category.

FIGURE 29
Lima Price Index (Haitin Prices, Garner Series)

Year	Garner Series base=series ave	Count Total 13	Count %
1790	89	2	15%
1791	92	2	15%
1792	82	2	15%
1793	97	1	8%
1794	86	6	46%
1795	80	5	38%
1796	76	2	15%
1797			
1798	72	4	31%
1799	88	10	77%
1800	92	7	54%
1801	86	10	77%
1802	91	10	77%
1803	92	8	62%
1804	97	11	85%
1805	97	9	69%
1806	95	13	100%
1807	85	11	85%
1808	97	12	92%
1809	99	12	92%
1810	94	13	100%
1811	109	12	92%
1812	99	10	77%
1813	91	10	77%
1814	88	10	77%
1815	85	10	77%
1816	91	8	62%
1817	110	11	85%
1818	99	9	69%

1819	107	6	46%
1820	128	8	62%
1821	170	10	77%
1822	136	9	69%
1823	111	6	46%
1824	144	4	31%
Max	170		
Min	72		

FIGURE 30, 31
Lima Price Index (Haitin Prices, Garner Series)
1790-1824, 1790-1810



Haitin pursued his price inquiry with a focus on the relationship between the hinterlands and the Lima market.²⁶ The price index constructed from Haitin's database follows a modest rise in prices from 1790 to 1820 (and beyond). The index was about 92 in 1790, 75 in 1798, and then moved back and forth between 90 and 110 for the next 15 years. Haitin observes that meat prices were regulated, and that would affect their trends and, of course, would affect the indices (as we have noted in other municipal economies). Whatever inflation existed, it probably derived from rising demand in the Lima market as population approached 80,000 by 1810. In the 1790-1824 chronology war-related disruptions after 1820 pushed up average prices of many products, and that raised the composite index to abnormally high levels. Furthermore the dataset thinned out during the early 1820s. As a result with fewer products at higher prices the composite is skewed

in a way that for most years before 1815 the composite index numbers (averages of index numbers for individual products) resided at 100 or below. If the dataset were limited to a shorter chronology, say 1790 to 1810 or to 1815 all the price averages and index numbers would change. The composite index in particular would show a clustering around 100, but the numbers would fall both above and below the base.²⁷ Different averages and scales do not change the overall view that prices of agricultural goods delivered to the Lima market up to around 1820 remained well-behaved. Prices may have experienced some upward bias but it was hardly robust. In short, whatever demographic growth occurred in and around Lima in the late colonial decades, the agricultural hinterlands in Haitin's view with prosperous small-scale farming operations met the challenge. The suggestion is that such operations could be as efficient or perhaps more efficient than the large commercially oriented estates and certainly could be prosperous even in the face of competition from estate owners and grain speculators. Prices could be influenced by an array of influences from weather to speculation to exportation, and yet what seems to emerge from these city studies (and indirectly the producing regions around) is that despite cycles and manipulations the tendency was toward "enough" production, especially in grains and other staples, to keep prices in check.

FIGURE 32**Comparison of Macera & Haitin Price Data (Garner Indices)**

Year	Garner Index Macera Prices base=series ave	Garner Index Haitin Prices base=series ave	Count (11) Macera	% Count	Count (10) Haitin	% Count
1790	82	89	9	82%	2	20%
1791	96	92	10	91%	2	20%
1792	111	82	6	55%	2	20%
1793	91	97	10	91%	1	10%
1794	85	90	9	82%	5	50%
1795	88	80	8	73%	5	50%
1796	88	76	5	45%	2	20%
1797	93		5	45%	0	0%

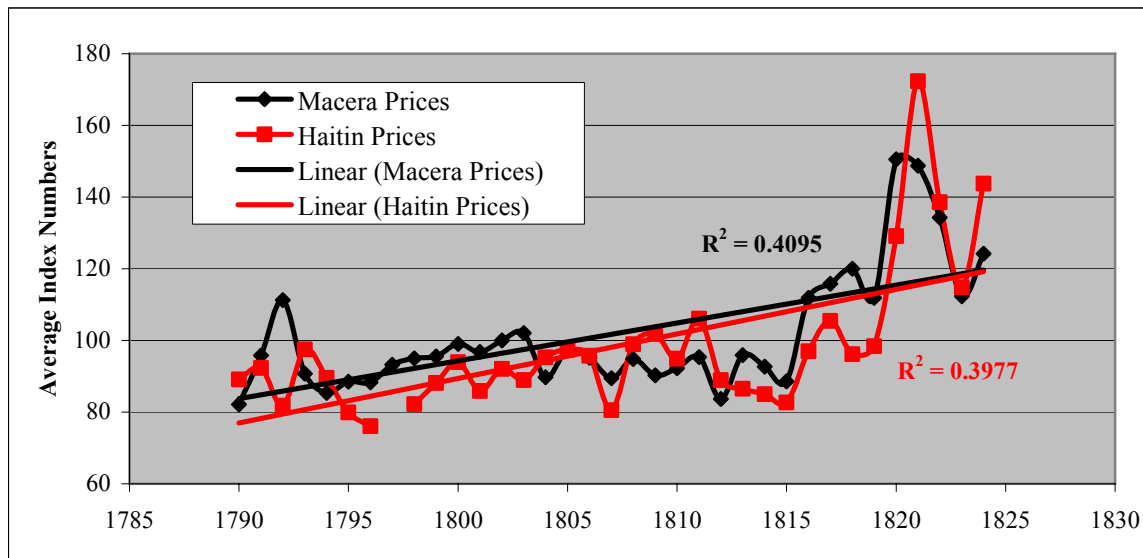
²⁶ Marcel Haitin, "Prices, The Lima Market, and the Agricultural Crisis of the Late Eighteenth Century in Peru," *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, 22 (1985), 167-198.

²⁷ If the averages for each product were based on data from 1790 to 1810, the index numbers would change. Each annual average number computed for the composite index would also change, and the results would show that slightly more than half of the numbers fell below 100 and the rest above 100. While the upward tilt would be somewhat stronger, the fact remained that prices clustered around 100 for nearly 20 years and evidenced no serious inflation.

1798	95	82	4	36%	3	30%
1799	96	88	8	73%	7	70%
1800	99	94	9	82%	6	60%
1801	97	86	11	100%	8	80%
1802	100	92	9	82%	8	80%
1803	102	89	6	55%	7	70%
1804	90	95	7	64%	8	80%
1805	97	97	10	91%	7	70%
1806	95	96	9	82%	10	100%
1807	89	81	8	73%	8	80%
1808	95	99	9	82%	9	90%
1809	90	102	7	64%	9	90%
1810	92	95	9	82%	10	100%
1811	95	106	9	82%	9	90%
1812	84	89	8	73%	8	80%
1813	96	87	9	82%	8	80%
1814	93	85	7	64%	8	80%
1815	89	83	6	55%	8	80%
1816	112	97	6	55%	6	60%
1817	116	105	7	64%	8	80%
1818	120	96	6	55%	7	70%
1819	112	98	7	64%	4	40%
1820	151	129	7	64%	7	70%
1821	149	172	6	55%	9	90%
1822	134	139	6	55%	8	80%
1823	112	115	5	45%	5	50%
1824	124	144	3	27%	4	40%
Max	151	172				
Min	82	76				

Note: Total counts differ because Macera's dataset had two series for *aguardiente* (brandy) and Haitin had one.

FIGURE 33
Lima Indices, Selected Products
(Macera & Haitin Prices, Garner Indices)



Some products appear in both Macera's dataset and Haitin's. They both used ecclesiastical records but not necessarily the same records.²⁸ The products were brandy, black beans, chickpeas, hens, honey, potatoes, quinoa, rice, soap and sugar. These were basic household goods, although how they ranked among all household purchases is not known. To make the two series compatible I have calculated or used an average price for each product from 1790 to 1824. The index numbers shown in Figures 32 and 33 are (as in previously discussed indices) averages of yearly index figures for products with price data for each year. I have included the "count" of products and prices in each year as a cautionary notation: index numbers for years with small counts may not be as solid or reliable as years with nearly full counts. What emerges from this exercise are two indices with a relatively high correlation of .82. Figure 33 illustrates how similar their paths were, although some notable differences can be observed. In some years the Macera-price index posts higher numbers than the Haitin-price index, and in other years the reverse is true. Both indices remain around or below the base of 100 well past 1810. And both indicate sharply higher prices during the most intense war years during independence. Price inflation in Lima markets appeared to be mild during the late colonial years in spite

²⁸ I have not scrutinized their sources to the extent needed to determine what overlap if any existed.

of demographic growth and economic recovery. New urban economic pressures did not ignite an inflationary cycle, at least in the consumption patterns of the religious orders. Outside of the religious orders (their accounts provide much of the price data analyzed thus far) ordinary urban consumers may have faced more contentious markets conditions than showed up in the transactions recorded in the ecclesiastical accounts. But until more non-ecclesiastical price data are assembled and published, analysis of price trends and market actions will depend on what is available to study.

Zacatecas

Zacatecas, founded as a mining camp in the middle of the sixteenth century, remained one of the three or four most important silver producers in the late colonial period. The price index for Zacatecas was calculated on the basis of sales recorded in the *vientos* section of the *alcabalas* ledgers and has been revised since it was first published in the early 1970s. The revisions, however, have not altered the pattern or trend to any significant degree. The dataset consists of 23 products, a mixture of food, household items and clothing. Annual average prices were computed by multiplying volume times price in each transaction, summing the product and dividing by total volume. In effect, this creates an index of weighted prices, not weighted in terms of consumption but volume.²⁹ The composite index drawn up from these prices edged up only slightly between 1760 and 1821 and remained virtually flat between 1760 and 1810. Still, when the values are plotted and a trend is “eye-balled”, the pattern is flat. In one-third of the years (30) the composite price index rose above 100, and in most of those years the upside was modest. For the remaining two-thirds the index fell below 100, but like the upside the downside was generally modest. The most obvious departure from the base line was 1781. With data for just four products (the least of any year) the general index jumped to over 270, a sharp departure from a range of 80 to 110. Cheese had the most outlandish change because with only one recorded transaction the price was 700 percent higher than the series average. From 1779 through 1781 Zacatecas was caught in the throes of a moderately severe smallpox epidemic that may have caused prices to run up.

²⁹ Garner, “Problèmes d’une ville minière mexicaine à la fin de l’époque coloniale: prix et salaires à Zacatecas (1760-1821),” *Cahiers des Amériques Latines*, 6 (1972), 75-111.

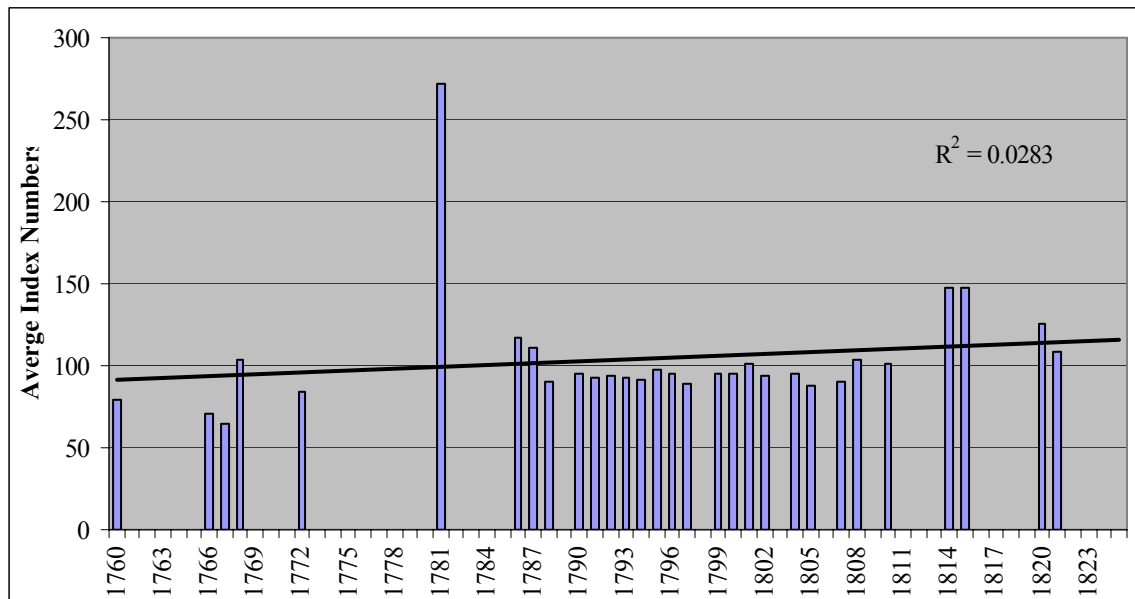
More than likely, though, the absence of data pushed the index higher than it might have been if more products had been represented. If 1781 were excluded as an outlier or an aberration, the composite index would just look flatter or more trendless.

FIGURE 34
Zacatecas (Mexico) Price Index, Food & Non-Food Indices

Year	General Index base=series ave	Count Total 23	Count %	Food Index base=series ave	Non-Food Index base=series ave
1760	79	17	74%	80	75
1761					
1762					
1763					
1764					
1765					
1766	70	11	48%	70	71
1767	64	9	39%	59	67
1768	103	1	4%		103
1769					
1770					
1771					
1772	84	23	100%	87	77
1773					
1774					
1775					
1776					
1777					
1778					
1779					
1780					
1781	272	4	17%	272	
1782					
1783					
1784					
1785					
1786	117	12	52%	122	103
1787	111	20	87%	119	91
1788	90	20	87%	93	81
1789					
1790	95	19	83%	98	89
1791	93	20	87%	94	91
1792	93	19	83%	88	108
1793	93	21	91%	90	102
1794	92	21	91%	89	98
1795	97	22	96%	100	91
1796	95	19	83%	91	105
1797	90	20	87%	89	90
1798					
1799	95	18	78%	99	86

1800	95	19	83%	95	97
1801	102	18	78%	107	93
1802	94	19	83%	96	90
1803					
1804	96	17	74%	95	98
1805	88	17	74%	84	94
1806					
1807	91	18	78%	85	102
1808	104	18	78%	104	102
1809					
1810	101	16	70%	106	92
1811					
1812					
1813					
1814	148	18	78%	158	132
1815	147	17	74%	158	132
1816					
1817					
1818					
1819					
1820	125	10	43%	130	112
1821	108	9	39%	107	109
Max	272			272	132
Min	64			59	67

FIGURE 35
Zacatecas Price Index (Garner Series)



Mining dominated the Zacatecan economy (even after 300 years), but some ranching had grown up around the city in conjunction with the need for animals and their by-products in mining and refining. An intendant's report on Zacatecas's economy in the mid-1790s documented, however, what many others had written about earlier – the economic base remained narrow and was devoted almost solely to the extracting and refining of ores. Almost everything (including staples) consumed in Zacatecas had to be shipped in from other regions, mainly to the south. Obviously, since so much had to be transported 50 or 100 or more miles, the prices that Zacatecan consumers paid had to reflect a premium for that transport cost. Did that make Zacatecan prices higher than cities that had better access to the producing regions? The transport-cost component has seldom been treated in colonial economic studies. Thus, it is hard to say whether Zacatecas's situation was particularly unique in this regard. There is no evidence yet to suggest that because Zacatecas was so dependent on producing regions at some distance from the city it had more price inflation than other cities.³⁰

Under Spanish colonial law municipalities could regulate an array of products, mainly comestibles, sold within the local market. Only a few staples like grain and meat were regulated and not always assiduously. A local rancher usually negotiated a contract to supply (up to 5 years) a quantity of fresh meat at a specified price that was then sold in the licensed butcher shops. It is clear from the *alcabalas* accounts that a considerable amount of meat and fish, fresh and preserved, was sold outside the contract system in the *pulperías* and the open market area. Maize and flour (the latter was imported not as wheat but as flour because Zacatecas lacked milling facilities) were sold at the municipal granary, but unlike other such granaries (e.g. Mexico City) prices were not fixed. Rather all grain dealers were required to register with *alhóndiga* officials, to post the quantity

³⁰ I treat the transportation question with respect to maize in *Economic Growth and Change in Bourbon Mexico* (Gainesville, FL: University Press of Florida, 1993), 181-183. The computations were the work of my collaborator, Spiro Stefanou. Commercial link between Zacatecas and other areas has been intelligently analyzed by Rosalina Ríos Zúñiga, "Comercio indígena en Zacatecas a fines del siglo XVIII. Análisis de un documento (1792)," in Jorge Silva Riquer and Antonio Escobar Ohmstede, eds., *Mercados indígenas en México, Chile y Argentina. Siglos XVIII-XIX*. Mexico: Instituto de Investigaciones Dr. José María Luis Mora and Centro de Investigaciones y Estudios Superiores en Antropología Social, 2000, 116-147. Also see Richard Salvucci discussion of transport/transactional costs in "Agriculture and the Colonial Heritage of Latin America: Evidence from Bourbon Mexico," in Jeremy Adelman, ed., *Colonial Legacies, The Problem of Persistence in Latin American History* (New York & London: Routledge, 1999), 132.

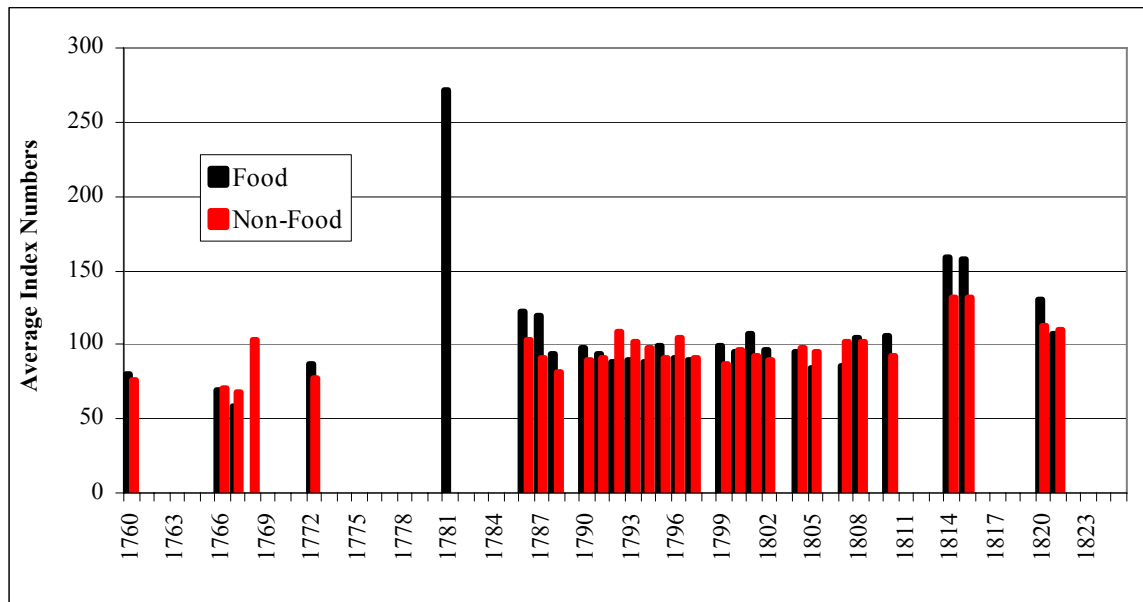
and price of their grain and to report all sales (which the *ayuntamiento* taxed in order to maintain the granary) at the end of the day. Although, strictly speaking, not price-fixing, it certainly allowed for intervention or manipulation that might distort how the market would price these grains. The fact that a range of prices was posted at the *alhóndiga* implied a degree of competition in the local grain market. In the case of flour, sold mainly to bakeries, fluctuations in flour prices did not immediately affect bread prices, which were fixed by law. What higher or lower flour prices meant was that bakers would adjust the volume of flour used in a loaf of bread rather than the price of a loaf. These markets were not free from manipulation or intervention by governments or speculators, but neither were they constrained by rigidly imposed price schedules. Even in the grain market negotiation of price was standard fare. Any close reading of the *alcabalas* accounts reveals that prices reacted to many different factors, which in modern parlance might be summarized under “conditions of supply and demand”. In all likelihood the advantage lay with producers, distributors and speculators, but by the same token the absence of any long-term inflationary pressure indicates that whatever their advantage was it was limited.³¹

It is of interest that the city's mining resurgence, which began in the third quarter of the eighteenth century and continued into the first decade of the nineteenth century, did not result in price inflation. Silver output nearly tripled between 1760 and 1810, and population growth went from under 20,000 to more than 30,000 and perhaps as high as 40,000. If growth were calculated from the first index number in 1760 to the last in 1821, the annual rate was 0.52 percent. But the r-squared value stipulates that this figure is virtually useless. (If the rate were defensible, it would require nearly a century for the price index to double.) Volatility was evident but could be classified as mild. Price levels may have been lower in the 1760s when Zacatecan mining was in doldrums and somewhat higher from the 1770s onward as mining recovered and expanded. But the rising fortunes of mining and related businesses did not account for rapid inflation in the sense that supplies ran so far behind demand that the market could force a reallocation in terms of higher prices.. The abnormality of 1781 has already been discussed. Let me acknowledge that prices were still high in 1786. There is an explanation. In addition to

³¹ Garner, “Problèmes d’une ville minière mexicaine,” *Cahiers des Amériques Latines*, 6 (1972), 75-111.

the aforementioned epidemic other famines and epidemics occurred from 1784 through 1787 in Zacatecas and more importantly in the producing regions to the south. Thus, prices were higher in the 1780s (although surely not as high as the 1781 index figure suggests), but as the natural disasters subsided, so too did prices. Of importance in this regard is that the mining expansion, which might lead to an imbalance between supply and demand (not uncommon in times of growth), did not affect prices at all or only marginally. By comparison, famines and epidemics could have a devastating (albeit short-lived) effect on prices. It was probably true across Mexico and Spanish America that while supplies (based on the behavior of prices) appeared adequate to maintain the growing and shifting populations, urban economies were vulnerable to disruptions that could leave the consuming public with few or any recourses.

FIGURE 36
Comparison of Zacatecas Food and Non-Food Indices



I have separated the list of products into food and non-food to see if prices in these categories followed different paths. In general their paths did not diverge to any significant degree. For the two decades, 1790 to 1810, prices of food and non-foods seldom strayed far from the base of 100. The stability of Zacatecan prices with the exception of the 1780s (discussed above) and the 1810s (independence decade) focuses more attention on the supply side rather than the demand side. Granted the city's

aggregate disposable income grew as the worker pool grew. What is somewhat harder to explain is the capacity of the producing regions to meet the demand without bottlenecks and other breakdowns. Most eighteenth-century studies of Mexican agriculture suggests that increasing output came largely from adding acres and shifting uses as well as introducing innovations. Increasing agricultural capacity was essential not only because of general demographic growth but also and more specifically because of urban migration. Prices of a wide array of consumer and household products would be sensitive to changes in the producing areas, and except for crises related to weather or disease (I put aside for the moment the independence period) the prices paid for comestibles and non-comestibles in Zacatecas between 1760 and 1810 were relatively stable. I would be remiss not to warn that serious gaps exist in the Zacatecas dataset prior to 1780 (the collection of the *alcabalas* passed back and forth between the treasury and the commercial guild between 1750 and 1780), and if price data could be recovered from those decades, the price series and statistics might have a different look. For the time being the gaps cannot be remedied.³²

Some maize and flour prices can be added to the mix for late-eighteenth-century Zacatecas. These are drawn from the *alhóndiga* records, which recorded the name of the dealer, the town from which the grain was sent, the quantity (and sometime the quality), the declared price and the tax collected on the declared price. The *alhóndiga* did not set a single price for grain sales on any given day. What the *alhóndiga* records reported was the vendors' posted prices, but those records also showed that the vendors adjusted those prices, presumably in response to local demand. The adjustments were noted because the vendors paid their fees and taxes on the actual prices that the grains actually sold for, not the posted prices. Matching up the posted prices with the adjusted prices proved to be a difficult task. The records were not always as accurate and complete as they had to be to follow the trail of these sales. To overcome this defect I have created a range of posted prices for each year and then estimated what would appear to be an average price. It must be understood that these are estimated prices for maize and wheat. The maize-price series embraced a 14-year period between 1753 and 1819 and the flour-price series a 9-year

³² See Garner, "Problèmes d'une ville minière mexicaine," *Cahiers des Amériques Latines*, 6 (1972) for discussion of the *alcabalas* sources. Article is available on-line at www.historydatadesk.com.

period between 1788 and 1819. These series revealed a fairly strong upward bias in large part because of very high prices in 1817. Scarcities were reported from time to time during the independence decade, and that would explain such the rise in prices after 1810. If 1817 were excluded the upswing would be far less dramatic. Indeed for most of the years maize and flour prices were close to the series average (which equals 100) or below it. Data from the last decade before the independence period are lacking, and while grain prices could have behaved no differently from other food prices, they remain an unknown. The general index recorded a small increase between the 1760s and the 1790s and the 1800s, and grain prices may well have followed a similar path. Given what is known about the late colonial Mexican economy and specifically the late colonial Zacatecan economy one might expect some price inflation, and it appears that “some” but not much is what occurred.

Among scholars of Mexico’s late colonial economy there is an expectation buttressed by some price studies that inflation accompanied eighteenth-century demographic and economic growth. But the assembled price datasets are not always so straightforward. Years ago when I created a colony-wide maize-price series I concluded that some inflation could be documented in the secular trend after 1700 and I proposed that while maize prices could spike during weather-related agricultural crises, they tended to fall back to and sometimes below pre-crisis levels. Some evidence suggested that maize-price levels after the famines of the 1780s remained higher than normal and therefore pointed to a more inflationary phase between the 1780s and the independence period. It was hard to confirm this observation through the analysis of price trends of other products. Recently Carlos Ponzio has applied more sophisticated analytical tools to various price series including mine. While he argues for more research on the dynamics of the eighteenth-century Mexican economy (and I agree), his own calculations indicate that “inflation was absent before 1770” but that inflation picked up in the last 40 years before the independence period. His estimated price level index (article must be consulted to explain how he constructed the index) revealed that prices began rising in the 1770s, first in the 1780s, fall back in the 1790s and then peaked again in the 1800s.³³

³³ Carlos Ponzio, “A Pair of Unpleasant Variables for the Broad-Based Expansion of Eighteenth Century Mexico,” provided to me by the author. The Estimated Price Level Index appears on typescript page 42.

His estimates are higher than what I had estimated from more primitive computations, and it remains to be seen as he continues his research whether these estimates will survive further scrutiny. Let it be said at this juncture that Zacatecas's price data exhibited some inflationary tendencies but no more than what was seen in several other late colonial urban markets. It is clear, of course, that the inflationary question for late colonial Mexico and its urban markets will remain open for some time.

Rio de Janeiro

The last of the cities to be analyzed is the capital (in the eighteenth century) of Portugal's colony, Brazil. Influenced by Ruggiero Romano's research on Santiago and Buenos Aires, Harold Johnson jr. published an important essay on money circulation and price behavior in Rio de Janeiro from the 1760s into the 1820s.³⁴ The impact of money on prices is hard to estimate because the question of velocity cannot be easily divined from the evidence at hand. Still, putting aside the role of money, we can make good use of Johnson's prices. His database includes 19 products, divided into four categories of products: (1) locally produced and consumed with some being exported; (2) locally produced and consumed with large exports to Portugal and re-exports from Portugal; (3) produced elsewhere in Brazil or Spanish America but consumed locally and also "re-exported" from Brazil; and (4) imported from abroad. The importance of the references to the local products and export markets arises from Johnson's conclusion that the changing nature of the export market could affect prices in Rio de Janeiro as well as local consumption patterns. Group 1 included fish oil, lime, bricks, corn, beans, manioc flour, and cane brandy; Group 2 rice, white and dark sugar; Group 3 wheat flour, bacon and dried meat; and Group 4 olive oil, vinegar wine, brandy butter and wax. (As I have done with other general city indices, I have shown Johnson's data with and without overseas products on the accompanying spreadsheets.)

See also discussion of eighteenth-century Mexican prices in Ponsio "Globalisation and Economic Growth in the Third World: Some Evidence from Eighteenth-Century Mexico," *Journal of Latin American Studies*, 37 (2005), 13-16.

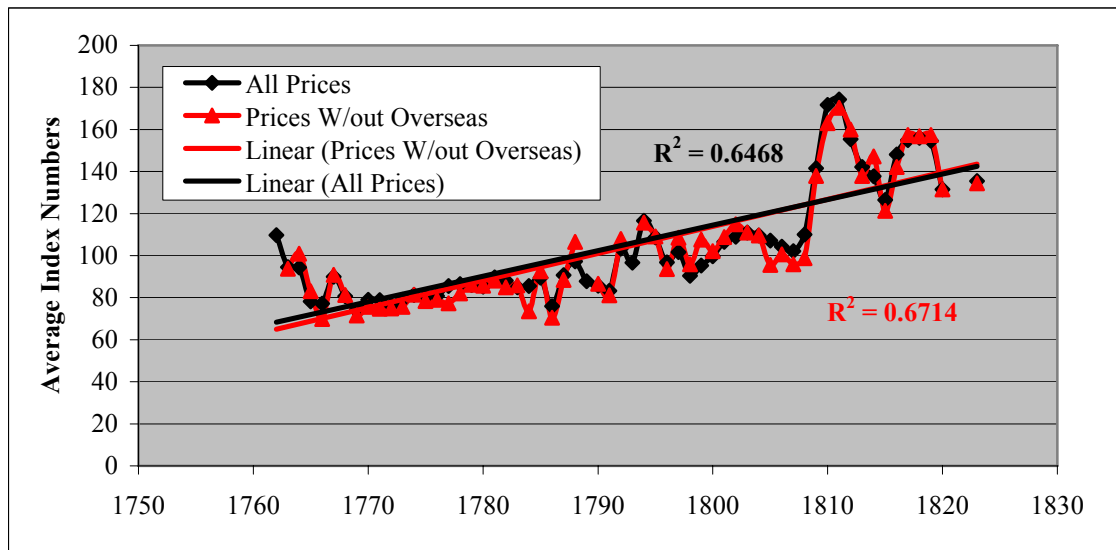
³⁴ Johnson, "A Preliminary Inquiry into Money, Prices, and Wages in Rio de Janeiro, 1763-1823," in Alden, ed., *Colonial Roots of Modern Brazil: Papers of the Newberry Library Conference*. Berkeley and Los Angeles, CA: University of California Press, 1973, 230-280. The appendix with prices of products begins on p. 268. See Romano citations above.

FIGURE 37
Rio De Janeiro Price Index (Garner Series)

Year	Garner Index base=series ave	Count	Count %	Garner Index w/out Overseas base=series ave	Count	Count %	Garner Index Food Base=series ave	Count	Count %
1762	110	1	5%						
1763	94	13	68%	94	8	62%	92	10	77%
1764	94	15	79%	101	10	77%	97	12	92%
1765	78	9	47%	83	7	54%	87	6	46%
1766	77	6	32%	70	4	31%	74	5	38%
1767	90	13	68%	91	7	54%	93	9	69%
1768	81	18	95%	81	12	92%	81	12	92%
1769	74	16	84%	72	11	85%	76	11	85%
1770	79	13	68%	76	9	69%	83	10	77%
1771	79	18	95%	75	12	92%	81	12	92%
1772	76	18	95%	75	12	92%	79	12	92%
1773	79	18	95%	76	13	100%	82	13	100%
1774	81	18	95%	81	13	100%	86	13	100%
1775	80	17	89%	78	12	92%	84	12	92%
1776	81	18	95%	79	12	92%	85	12	92%
1777	85	16	84%	77	10	77%	91	10	77%
1778	86	19	100%	82	13	100%	90	13	100%
1779	86	19	100%	86	13	100%	89	13	100%
1780	85	19	100%	86	13	100%	86	13	100%
1781	90	6	32%	88	5	38%	96	3	23%
1782	88	3	16%	85	2	15%	98	1	8%
1783	85	17	89%	86	12	92%	85	12	92%
1784	86	2	11%	73	1	8%			
1785	89	17	89%	93	11	85%	91	12	92%
1786	76	2	11%	70	1	8%			
1787	91	18	95%	88	12	92%	89	12	92%
1788	97	2	11%	107	1	8%	107	1	8%
1789	88	1	5%						
1790	86	18	95%	87	12	92%	85	13	100%
1791	83	2	11%	81	1	8%			
1792	103	19	100%	108	13	100%	109	13	100%
1793	97	2	11%				81	1	8%
1794	117	17	89%	116	11	85%	118	13	100%
1795	109	17	89%	109	13	100%	114	12	92%
1796	97	11	58%	94	7	54%	97	7	54%
1797	102	9	47%	109	6	46%	113	5	38%
1798	90	8	42%	96	5	38%	95	4	31%
1799	95	10	53%	108	6	46%	100	6	46%
1800	100	6	32%	102	5	38%	101	3	23%
1801	106	9	47%	109	8	62%	112	5	38%
1802	109	9	47%	115	7	54%	113	6	46%
1803	111	4	21%	111	4	31%	110	3	23%
1804	110	2	11%	110	2	15%	110	2	15%
1805	107	8	42%	96	4	31%	110	5	38%
1806	104	9	47%	101	6	46%	97	6	46%

1807	102	10	53%	96	7	54%	82	5	38%
1808	110	8	42%	99	5	38%	94	3	23%
1809	142	8	42%	138	5	38%	132	5	38%
1810	172	6	32%	163	4	31%	122	2	15%
1811	174	8	42%	170	5	38%	142	4	31%
1812	155	6	32%	160	4	31%	138	3	23%
1813	142	6	32%	138	5	38%	147	4	31%
1814	138	7	37%	147	5	38%	142	4	31%
1815	126	6	32%	121	5	38%	106	3	23%
1816	148	8	42%	142	5	38%	146	4	31%
1817	155	11	58%	157	8	62%	164	8	62%
1818	156	14	74%	157	11	85%	162	10	77%
1819	155	14	74%	157	11	85%	147	10	77%
1820	132	8	42%	132	5	38%	129	7	54%
1821									
1822									
1823	135	2	11%	134	1	8%			
Max	174			170			164		
Min	74			70			74		

FIGURE 38
Rio De Janeiro Price Indices (Garner Series)



Rio de Janeiro's general index, which I constructed from Johnson's database, shows that prices were clearly higher in the last decade of colonial/royal rule than 60 year earlier. Much of the rise, however, took place after 1800 and more specifically after 1810. Prior to 1800 the index has a fairly flat appearance. In fact for most of the third and fourth quarters the index was below 100, and only after 1800 did it establish a more permanent level above 100. The pronounced upswing of the trend line for the general

index derives from first the unusually low prices in the 1760s and 1770s and then from the unusually high prices in the 1810s. In the third quarter of the eighteenth century prices in other cities fell to low levels, but prices in Rio de Janeiro may have fallen to some of the lowest levels and perhaps more importantly remained there for the longest period. Conversely at the end of the colonial period although some other city indices broke through 150 and almost reached 200 for a few years Rio de Janeiro reached these levels and stayed there. So the steeper trend line results from very low prices at the beginning of the period to very high prices at the end. Rio de Janeiro stands out in comparison to the other cities (Lima, Buenos Aires and Santiago) with rising price trends. At the same time Rio de Janeiro prices hovered between 75 and 100 for more most of the period from 1760 to 1820. The pre-independence appeared to have few inflationary pressures until the arrival of the Portuguese monarchy.

FIGURE 39
Rio De Janeiro Food Price Index (Garner Series)

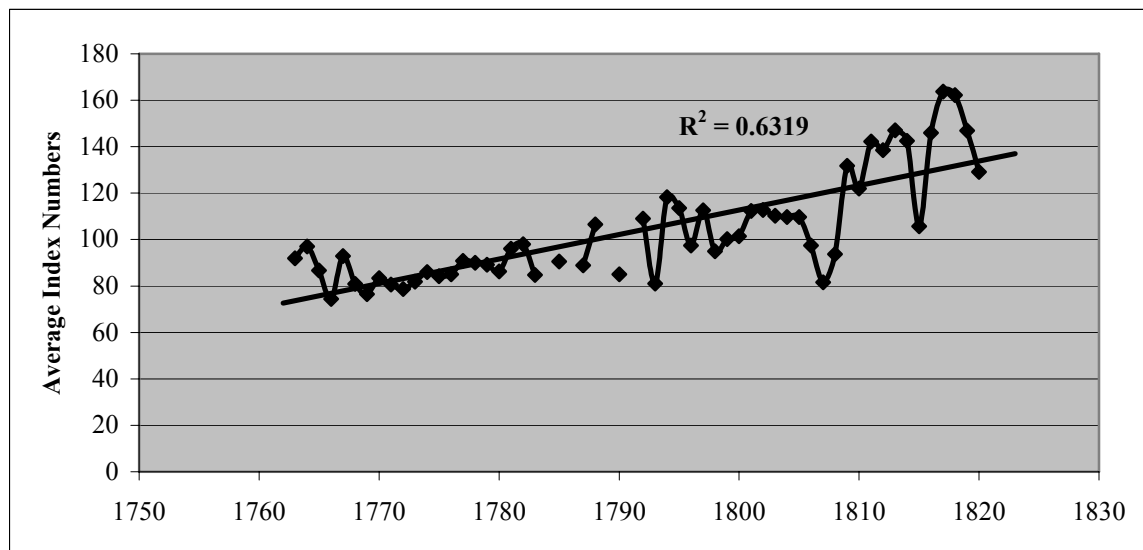
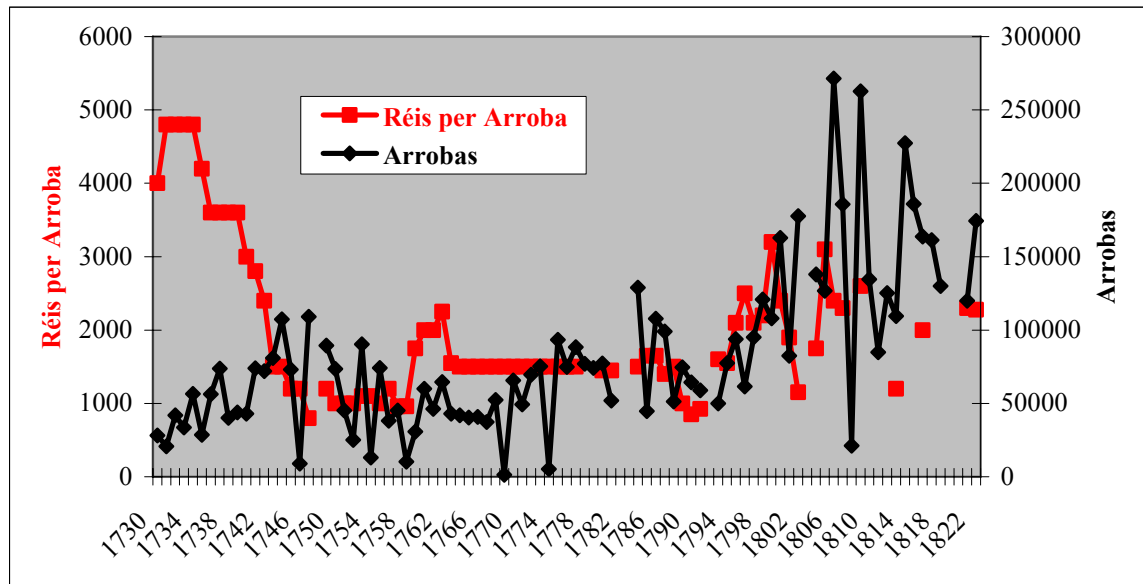


FIGURE 40
Cocoa Exports from Pará, Brazil (Alden Series)



Johnson analysis of the price trends emphasizes two themes. The first has to do with increasing exports of certain products like grain, sugar, rice, meat and other agricultural goods in demand in Europe as well as in America. Concomitant with the rise in exports of commodities was the rise in the imports of slaves, who provided the labor to allow farms and estates to push up output. In addition, of course, as more slaves were added to the labor force, more agriculture was needed to support slavery. Johnson does not offer specific figures on exports (or imports) that might be compared with price trends, but a few other scholars have tried to fill the gap. In particular, Dauril Alden has presented data on exports of *cacao* from Pará in Brazil's Amazon region.³⁵ While the export of *cacao* represents a different set of economic and financial dynamics from many of the products in the Rio de Janeiro price database, patterns of volume and price after 1790 or 1800 indicate both were on the rise (although not necessarily in tandem) after several decades of a flat performance. Rising demand within the colonial economies was

³⁵ Alden, "The Significance of Cacao Production in the Amazon Region During the late Colonial Period: An Essay in Comparative Economic History," *Proceedings of the American Philosophical Society*, 120:2 (1976), 103-135. Alden has also studied prices in Salvador but for a period (1670-1769) not compatible with this essay. Little inflation (certainly less than what Johnson found in Rio de Janeiro) can be detected in the series constructed by Alden. See Alden, "Price Movements in Brazil Before, During, and After the Gold Boom, With Special Reference to the Salvador Market, 1670-1769," in Johnson & Tandeter, eds., *Essays on the Price History*, 335-371.

met without much long-term inflationary impact on prices, but when that rising demand became linked to export markets, the inflationary impact became noticeable. Rio de Janeiro Buenos Aires like Santiago and Buenos Aires may have experienced more price inflation (as measured by trend lines) than the other four cities because their producers began to supply two markets, one interior and the other exterior. But the fact that so much of Rio's severe inflation occurred after the arrival of the court and the outbreak of war in the New World and in Europe may be a sign that other non-market factors came into play in the final years of the colonial rulers.

Single Commodity Prices Indices

The construction of price indices is full of risk. In the case of these indices many averages have to be computed – average annual price for each product, an average index number for each product over a specified period of time and an average index number for a selection of products over a specified period. An additional disadvantage is that after all these averages have been computed for a basket of items the average annual index number (which appears in each city's composite index) may include the whole basket or only part of the basket. (The "count" is given to indicate the strength of the annual average index number.) Finally the foregoing composite indices do not attempt to rank the items in terms of their importance for the consumer. In some price studies the price of a product is computed by multiplying the price by the volume traded at each transaction, summing the results and dividing by the total volume. Such computations yield an average to accounts for price by volume and may be somewhat more accurate than simply averaging all the prices over a specified time. Part of the rationale behind standardizing the price series for all seven cities was to see if a comparative "mega" dataset might open new paths to analyze the relevance of price changes in late colonial history. All the indices reveal that prices could bounce around, but for many years after 1750, while not necessarily static, prices were noticeably stable. (Stable is a term that appeared frequently in the articles used in this essay.) This does not discount the presence of some price inflation (more in some cities than others and with varying consequences), but rather it brings into focus the need to weigh any upturn (or downturn) in the indices in

the context of the longer tendency. If stable is one unifying characteristic, can it be tested in other ways?

FIGURE 41
Maize Price Index

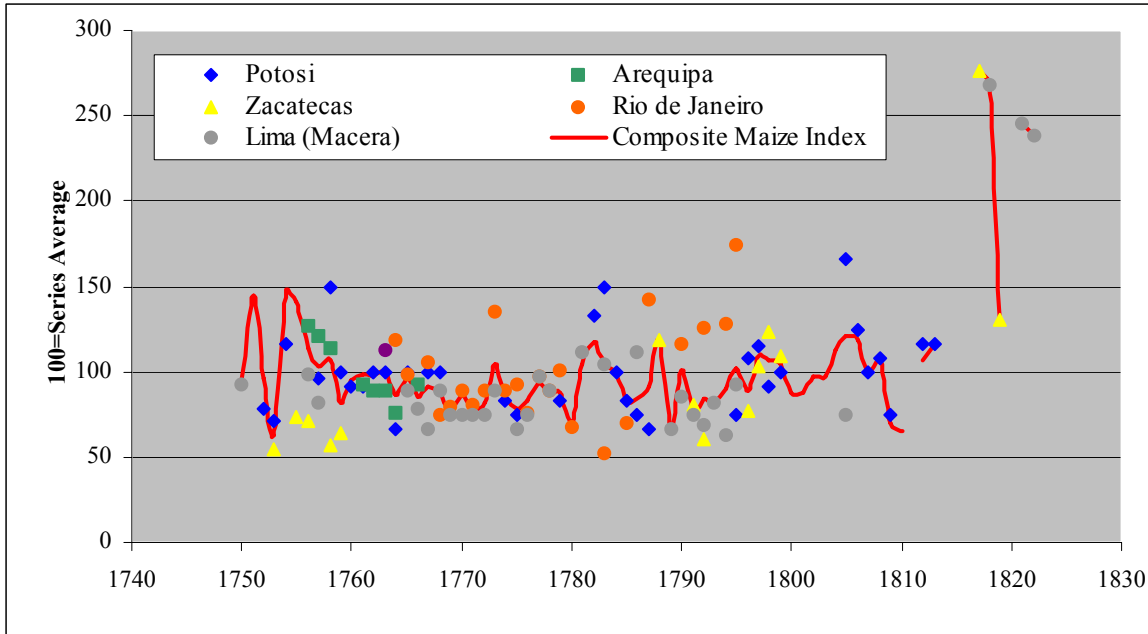


FIGURE 42
Wheat Price Index

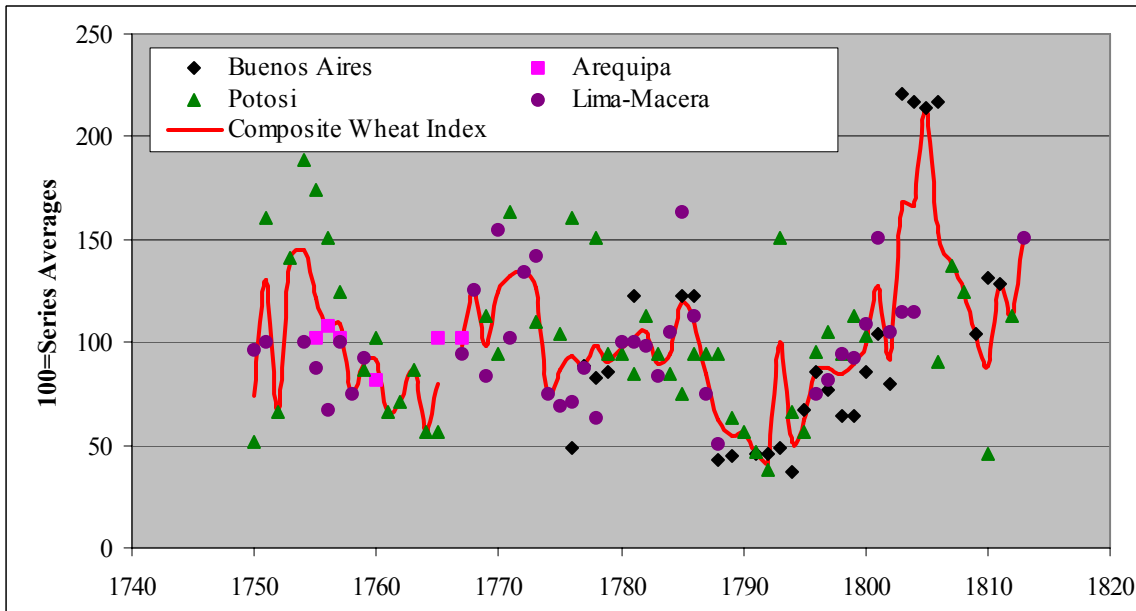


FIGURE 43
Flour Price Index

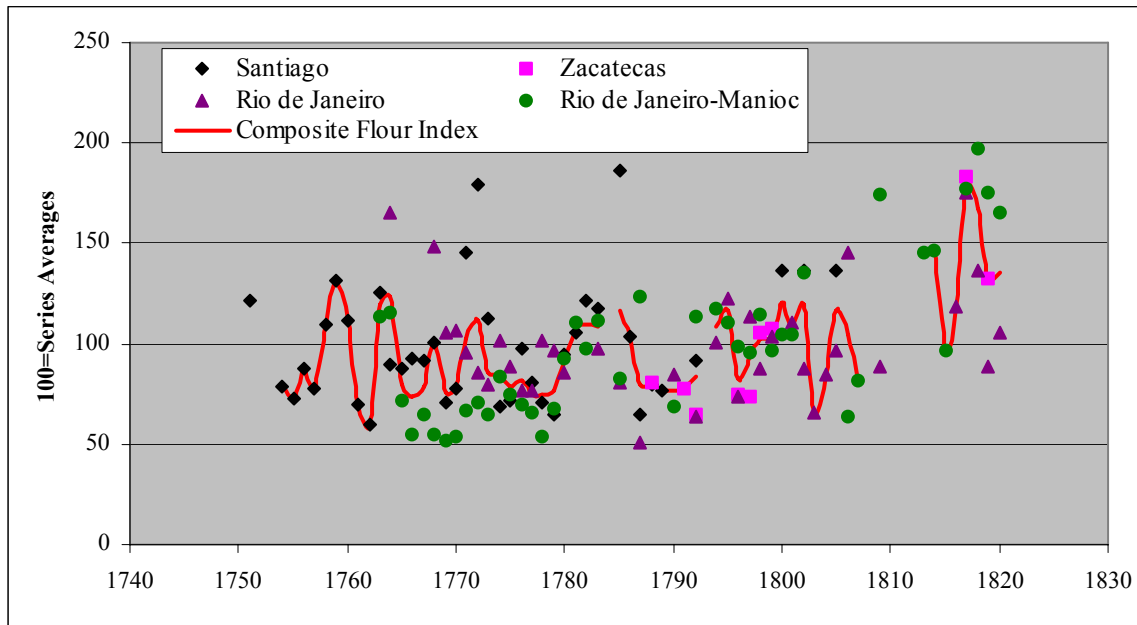


FIGURE 44
Potato Price Index

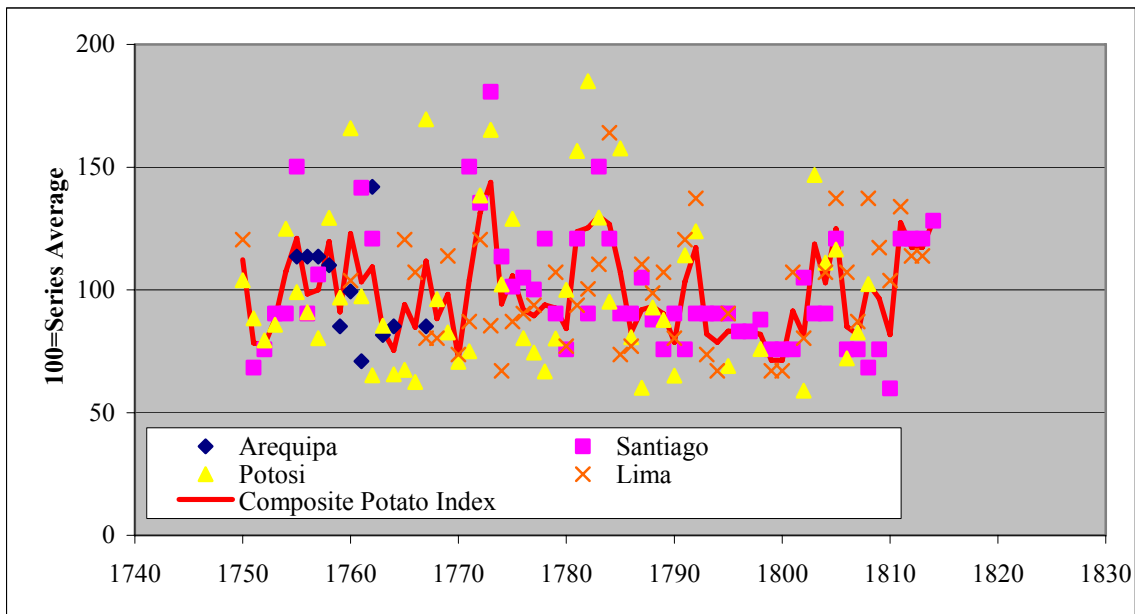


FIGURE 45
Sugar Price Index

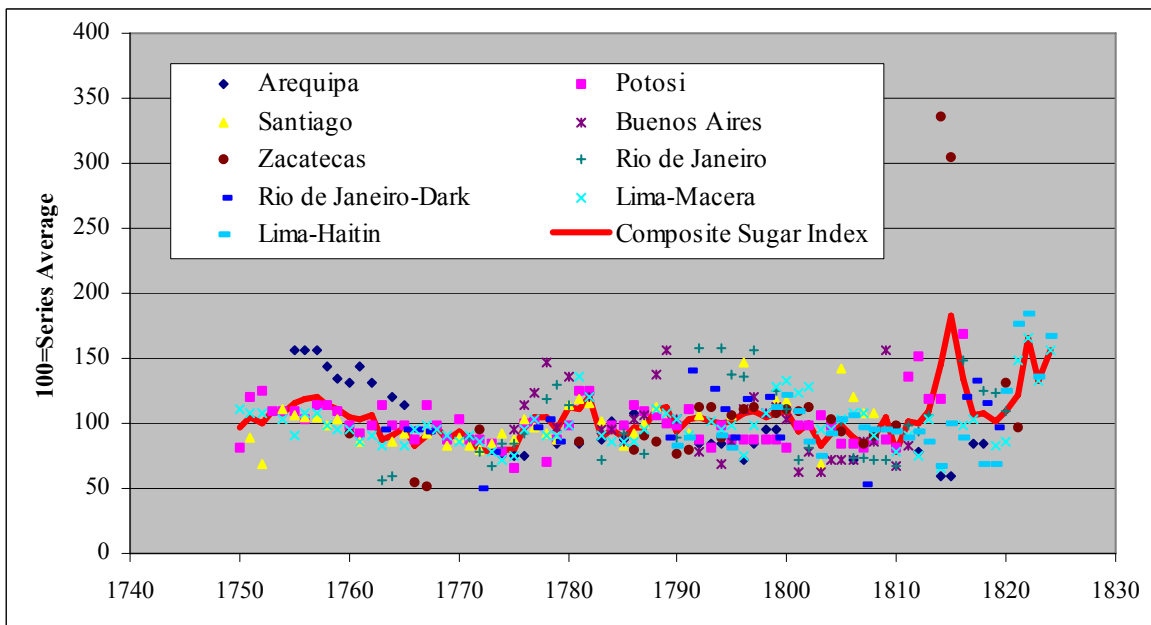


Figure 46
Wine Price Index

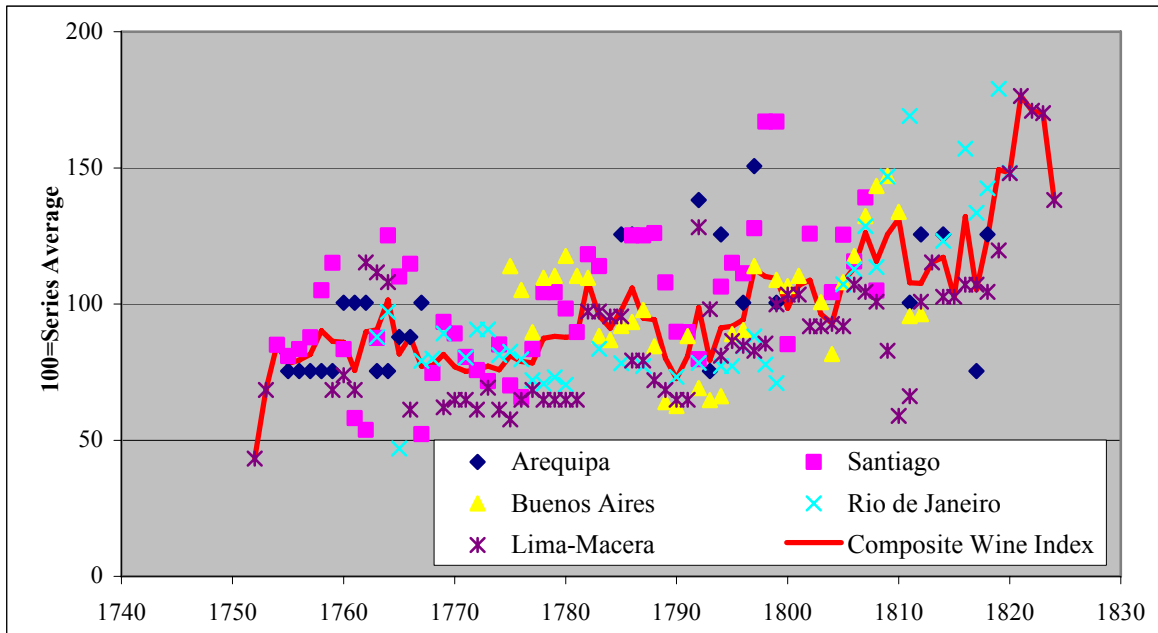
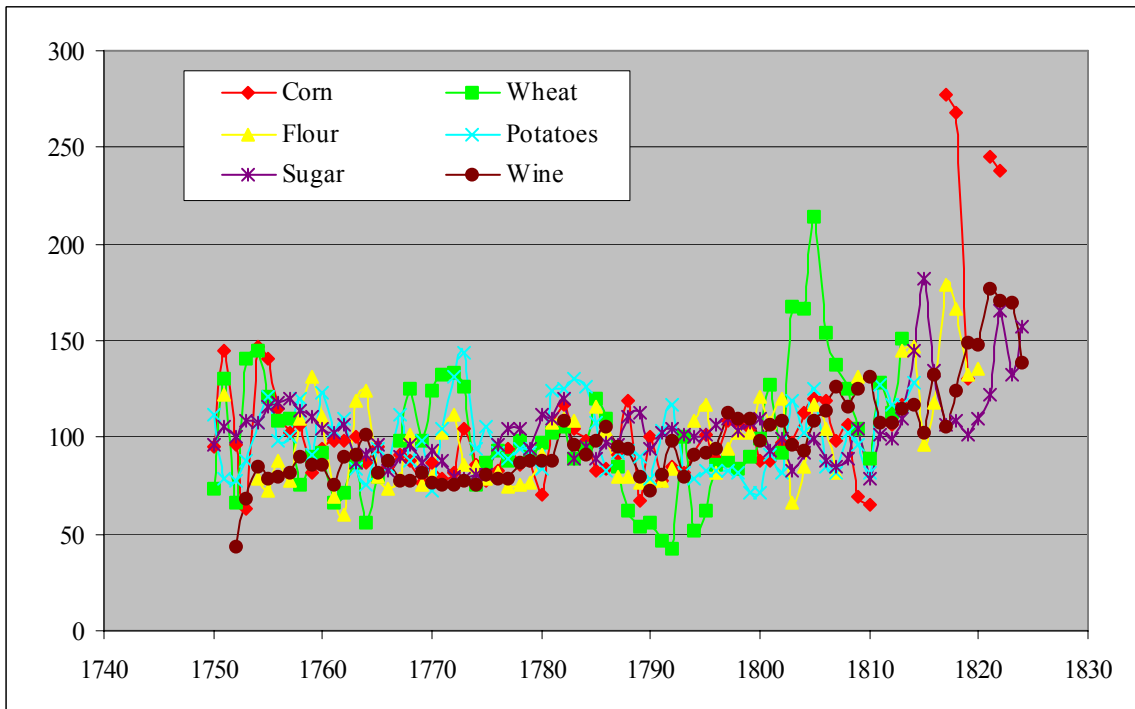


FIGURE 47
Composite Index Selected Commodities



The foregoing graphs (Figures 41-46) plot prices for six comestibles: maize, wheat, flour, potatoes, sugar and wine. Data do not exist for all cities, but they can be assembled for at least four cities and in one case – sugar – for all seven cities. The annual index number for each commodity is computed in the manner described for all the foregoing indices: the base is an average of the commodity's nominal prices. I have then added a composite index that consists of an average of all annual index numbers for each commodity. The purpose behind placing the composite index within the plotted annual index numbers for each comestible is to indicate how the composite index may capture the tendency of the individual series. It is imperfect but useful. Finally Figure 47 assembles all the composite indices of the individual commodities for the purpose of trying to identify how commodities clustered or diverged across markets. The portrayal of the performance of individual commodities singly and collectively is to try to address on an elementary level the relative price questions that many price historians and economists believe is crucial to understanding price trends. The question that they raise is how do prices perform relative to each other – do corn prices move in concert with bean prices.³⁶

One immediate point to observe is that while the prices of a single commodity in different markets as expressed in index numbers had a tendency to cluster around the baseline across the various markets, they could also be more widely dispersed in some markets. Three of the commodities could be classified as grains: corn, wheat and wheat's by product flour. In five markets for which corn series exist the index numbers generally fall between 50 and 150 at least until 1810. After 1810 with only data from Arequipa and Zacatecas the index penetrated the level of 250. Wheat and flour, by contrast, had a larger range before 1810. Wheat series exist for four of the seven cities and flour for the other three. In some years the wheat-flour series moved well above 150 and even fell below 50. In Buenos Aires wheat prices sat above 200 for several years around the occupation by the British of the port in 1804 and their subsequent eviction. Most urban scholars not only consider wheat a substitute for corn among urban consumers but also increasingly the preferred grain. Let it suffice here to say that whatever status wheat had assumed, it may

³⁶ See essay by Herbert Klein & Stanley Engerman, "Methods And Meanings in Price History," in Johnson & Tandeter, eds., *Essays on the Price History*, 14-15.

have had a somewhat more wide-ranging price structure relative to corn during the late colonial era. Potatoes, more important in the Andean region than elsewhere, had some high index numbers (above 150) between 1750 and 1780, mainly in Santiago and Potosí, but in the post-1780 period the range of prices grew more compact. Sugar prices were mainly in decline in most markets between 1750 and 1770, and after 1770 the most apparent upswings in sugar prices occurred in the Atlantic seaport cities of Rio de Janeiro and Buenos Aires. After 1810 all markets for which data existed suffered from rising prices. The final commodity, wine, had a different upward slant in its composite index. After 1770 Lima, Buenos Aires and Rio de Janeiro generally had falling prices while Arequipa and Santiago experienced the reverse. After 1800 all the markets tended to see higher wine prices.

Prices from several urban markets do not move and should not be expected to move in lockstep. Nor do prices of commodities in the same marketplace behavior that way. For some investigators the dispersion of prices, especially agricultural products that were so directly affected by weather, distance and productivity, made the construction of multi-commodity index even for just a single marketplace irrelevant. Averaging is often the technique, and averaging tends to smooth out the dispersion. Figure 47 was constructed from averaging the index numbers across several markets for each of the six commodities. Wheat was the most obvious exception on the upside to a pattern of clustering around the baseline with a preponderance of data points below the baseline, at least until 1810. In a simple correlation matrix the following results were computed:

	Corn	Wheat	Flour	Potatoes	Sugar	Wine
Corn		0.3244112	0.5607431	0.2406898	0.4828193	0.5479911
Wheat			0.1750289	0.283381	-0.1743141	0.2274253
Flour				0.045448	0.2131182	0.6039766
Potatoes					0.0585508	0.0098873
Sugar						0.4219556
Wine						

These data indicate positive or negative associations over time among the six commodities. For example, corn prices, shown as index numbers, have a positive association, sometimes moderately strong, with all other commodity prices, again displayed as index numbers. All these series tend to move in the same direction, up or

down, with some degree of uniformity. Wheat, on the other hand, has a much weaker association with all the commodities except corn, and in the case of sugar it had an inverse relationship. (The weak relationship between wheat and flour is interesting although not totally unexpected. Flour involves processing costs that did not affect wheat.) With respect to how flour prices moved with the prices of the remaining commodities there was no association with potatoes, only a weak one with sugar and a fairly strong one with wine. Sugar's relationship with corn and wine was strong, weak with flour and weaker still with potatoes and inversely with wheat. And finally wine except for potatoes had from weak to fairly strong relationships with the other commodities. In short the prices of the six products over the second half of the eighteenth century and into the nineteenth century moved up and down (or not all) some of the time, perhaps more often than not, and did not behave in isolation of each other. All of this requires more work and analysis, but for the moment the various indices that have been constructed and analyzed may have some relevance to the changing conditions of the late colonial years.³⁷

Trend By Trend

Price studies have often promised more than they have delivered. This is true not only for Latin American history but for European history where modern price history originated. The sources are far from pure, and they often embrace a mixture of regulated and unregulated transactions that obviously cast doubt on the authenticity of the prices themselves. In addition there are always questions about the market segment. A common and perhaps predominant source in Europe and the New World were accounts of purchases kept by religious institutions. Such accounts must surely reflect market conditions, but how well do they reflect the total market? Sources such as general sales taxes or specific taxes on grains, meats or other comestibles may reflect a wider market segment but may be compromised in other ways. How accurate and comprehensive were general sales taxes? Moreover sales taxes were often farmed out to others who paid annual stipends and left few accounts. In colonial Spanish America the royalization of

³⁷ More sophisticated variance analysis could be applied to prices in a single market as well as well prices across several markets.

alcabalas did not occur until the 1770s, and even afterwards some remote regions continued to farm out *alcabalas* collections. Price data derived from the sales of certain comestibles through public agencies are suspect because these agencies had the power (not always invoked) to fix prices. Other sources include hacienda and merchant accounts, and in Europe newspaper surveys of current prices.³⁸ In a curious way colonial sources are rich in price information but not necessarily the “right” information for creating series or indices that capture the impact of price behavior. It is perhaps too cynical to say the information is tainted (for some too tainted to be useful), but it is not too cynical to admit that the subsets that make up price series are of diverse and at times incompatible origins. Drawing conclusions about larger historical trends from price series demands caution.³⁹

In addition to inconsistencies with sources there is the problem of how to assemble and analyze the data that exist. Should prices of specific commodities from convent records be combined with prices from *alcabalas* records? Since indexing is the preferred analytical tool, how should a base be chosen from which annual index numbers could be calculated? Should index numbers for individual commodities be averaged in order to create a composite index – a basket of commodities? If a basket is to be assembled, should the commodities contained therein be weighted in order to reflect their relative importance within the marketplace? Should trend analysis be employed not to predict prices but to describe long-term movements either on their own or in combinations with other variables such as wages? Is price behavior basically cyclical, and should it be studied in that manner rather than in trends or waves (as Fischer proposes)? Can price studies be at all useful when divorced from other economic,

³⁸ David Hackett Fischer has a huge bibliography with commentary concerning price history in *The Great Wave, Price revolutions and the Rhythm of History* (New York: Oxford University Press, 1996), 363-501. By any measure it is intimidating. There are also a hundred pages of appendices and notes to be considered. At the risk of having overlooked how the scores of price series cited by Fischer were assembled (by other scholars) and from what sources, I am still inclined to say that the construction of these series (many of which are widely accepted and highly useful) was not of primary interest in the writing of *The Great Wave*. Nor should it be a deterrent to Fischer and others who have tried to find a place for price history in the larger historical pursuits. But the sources for prices in colonial Latin America should not be ignored because they may influence the outcome of any analysis of the price series.

³⁹ Let me note again that the prices discussed in this essay are for urban transactions. Rural price series are much harder to come by. See Richard Salvucci, “Agriculture and the Colonial Heritage of Latin America: Evidence from Bourbon Mexico” in Jeremy Adelman, ed., *Colonial Legacies, The Problem of Persistence in Latin American History* (New York & London: Routledge, 1999), 124-125.

demographic and social phenomena? The list of controversies and disagreements over sources, tools and designs for the study of prices is endless.⁴⁰ Let me reiterate that in this essay the sources are mixed indeed but the tools are simple, perhaps in the eyes of some primitive. I have constructed indices that depend heavily on averages. The aim is to see how prices of various commodities perform in diverse urban markets. In its most basic form price inflation is a question of do prices go up or down and by how much. It is true, of course, that for historical inquiries the question of the impact of rising or falling prices may be more relevant, but that question requires that once a price dataset has been constructed it is then analyzed in terms of other variables and factors. That step has not been taken in this essay, although it has been alluded to in those cities where data on wages and tithes have been compiled.

No single description captures the behavior of prices in these seven Latin American cities. That is as it should be. These cities responded to their own local and regional dynamics within their respective imperial systems. The most erratic behavior begins in the independence period and does not have much relevance to the pre-independence period. Prior to 1810 in some individual years sharp upticks (more so than downticks) were recorded in almost all the indices, but they were generally temporary. Many upticks can be linked to weather that resulted in small harvests, scarce supplies and high prices. Normally prices fell – sometimes significantly - in subsequent years once the agricultural sector recovered. When all the composite indices are plotted together, the post-1750 period has three characteristics: from the middle of the eighteenth century to the end (except for the 1780s) prices stabilized at or below the baseline of 100; in the first decade of the nineteenth century some upward bias can be detected, although not all indices shared the rise; and finally after 1810 indices pushed upward to new highs not seen in the previous half century. Inflationary pressures appeared to be most strident in the nineteenth century after a relatively quiescent 50 years in the second half of the eighteenth century. Of the seven cities four (the three Peruvian cities and Zacatecas) could be said to have registered little change in their indices between 1800 and 1810 while the remaining three (Santiago, Buenos Aires and Rio de Janeiro) had modest or

⁴⁰ See Fischer, *The Great Wave*, 405-435, the part of his bibliographic essay devoted to methodology and theory.

moderate upswings that may have actually originated in the late decades of the eighteenth century. All in all it is a picture that suggests that these urban markets were adequately served in the years leading up to the independence period.

It is instructive to invoke some of the findings in David Hackett Fischer's recent mammoth survey of world-wide prices since the Middle Ages. He identified four waves, and he placed eighteenth-century price history in the Third Wave, which he entitles the "Price Revolution". That wave encompasses a period from the second quarter of the eighteenth century through the various upheavals and revolutions of the late eighteenth and the early nineteenth centuries into the "Victorian Equilibrium" of the second half of the nineteenth century. His comments on Latin America are confined to a few sentences in which he quoted John Coatsworth's remark that prices were rising after 1790 and in the war years that followed. Prior to 1790 prices moved in different direction; some regions experienced falling prices while other regions witnessed rising prices. Fischer more or less leaves a discussion of late colonial Latin American prices with Coatsworth's citation. Above this brief summary was a graph (Figure 3.01) that was entitled "The Price Revolution of the Eighteenth Century" and had price data from England, United States and France. A visual comparison (since I lack Fischer's data) suggests that the trends in England, United States and France and in the seven-city composite index (Figure 2 above) share some characteristics. For most years between 1750 and 1800 prices throughout the Atlantic economies did not stray far to the upside from the base line of 100 and often resided below the base line. (Fischer's base is 1770.) After 1800 or perhaps more correctly 1790 prices began to show a stronger upward basis that ultimately pushes prices into a notably higher range. (The placement of the graph may have been purely coincidental.) It is risky to venture much beyond these few references based upon visual comparisons.⁴¹

Coatsworth's commentary (along with commentary by the late Ruggiero Romano) raised other questions with regard to the findings of the investigators (including my contribution) on eighteenth-century Latin American price history.⁴² Some of his

⁴¹ Fischer, *The Great Wave*, 121. Coatsworth, "Economic History and the History of Prices in Colonial Latin America," in Johnson & Tandeter, eds., *Essays on the Price History*, 22.

⁴² The investigations and insights of Ruggiero Romano on both European and Latin American price history have guided many current scholars. His essay, "Some Considerations on the History of Prices" in Johnson

observations bear directly on points raised in this essay. Having observed that after 1790 prices in general across Latin America tend to be rising, Coatsworth highlighted the divergence within single markets and across several markets. “Price trends for different commodities, even within the same market, often diverge because of differently shifting supply and demand schedules. High rates of inflation or deflation can overwhelm such differences for short periods of time, but changes in the relative prices of commodities traded in the same market over the long run are common.” When studying price trends in different markets that lack the integration of today one must be conscious of the possible distinctness of individual urban markets. Even if trends of two or more such markets are moving in the same direction the prices of the commodities may move in different directions. Coatsworth and an associate studied five different commodities – sugar, potatoes, yerba mate, sugar and wine – across several markets with much of the data from the essays in Johnson and Tandeter. The correlations derived from regression analysis showed a mixture of results. Sugar was common to almost all the price series. Coatsworth concluded that three Pacific-bound cities – Lima, Arequipa and Santiago – had sugar prices that “tended to be highly correlated with each other,” while the Atlantic-bound cities – Salvador (Brazil), Buenos Aires and Potosí – “showed no correlation....” I have not included Salvador in this study because most of the data gathered and analyzed by Dauril Alden belonged to the first half of the eighteenth century. I have tested the association between sugar prices in Rio de Janeiro and Buenos Aires, and it is weak. And no relationship between Potosí and Buenos Aires sugar prices existed. Potosí was no doubt included with Buenos Aires because of the expanding trade network between

& Tandeter (*Essays on the Price History*, 35-71), apparently was not written specifically to comment on the essays edited by Johnson & Tandeter. Romano certainly had objections and criticisms that should be heeded. But his critique has a disjointed quality in that Romano added comments about the Johnson & Tandeter price studies to an essay that had been written independently of the anthology itself. His comments are more often than not directed at the state of research on Latin American prices (and to some extent European prices) prior to the publication of Johnson & Tandeter’s anthology. Despite my high regard for Romano’s contributions (including his criticisms of my earlier work on Zacatecan prices and wages), I found it hard to respond to his Johnson & Tandeter essay because it was written for another purpose. It appears that in Ruggiero’s mind the current research on colonial Latin American price history has been headed in the wrong direction because it has asked the wrong questions and in trying to answer those questions adopted the wrong methodologies. To comment properly on Ruggiero’s counsel would require a much broader approach than this essay has undertaken. Let me add one final comment: his research from decades ago about a deflationary trend in some South American economies has in fact been borne out by some current research models although not quite in the way that he had assumed.

Upper Peru and the Atlantic Coast especially after the viceregal reorganization. But in fact Potosí's moderately correlate with Arequipa's. The problem is the long gaps in latter's series. I have tested for association in three different periods after 1750 and in two of the three the relationship is moderately strong. The administrative reorganization did not end all ties between Upper and Lower Peru. Brown noted that the rise in the number of sugar haciendas along the coast (at Tambo and Camaná) served the Arequipa market, and Tandeter and Wachtel discussed sugar with reference to Arequipa ("which serves us as an indicator for the entire southern Peruvian area, for want of a Cuzco series that would correspond to Potosí's supplying area").⁴³ The correlations in sugar prices among the three markets of Lima, Arequipa and Santiago ranged from moderate to strong (although correlations with Arequipa have to be done for short periods because of the absence of data). I would agree with Coatsworth that sugar may be one of those products that had a common pattern across different, and I would even suggest that it may have been stronger than his analysis revealed. It must be understood that sugar, which Tandeter and Wachtel placed in the American *conjuncture*, was a plantation crop that most markets had to import from sugar-producing areas. Transactional costs like transportation could be a factor in determining price, but if a map identifying eighteenth-century sugar-producing areas could be drawn with the regional markets that they served, one might find that prices in those regions and their markets were often correlated.

What of the other products on Coatsworth list? With wine I found almost the opposite of Coatsworth: moderate correlation in wine prices between Rio de Janeiro and Buenos Aires but weak and negative correlations for the Pacific side. Part of the problem may be the data because there were long stretches of time when the price of wine did not change, especially true in Potosí in the third quarter. For sheep, mate and potatoes neither Coatsworth computations nor mine showed much association. The presence or absence of correlations among these different markets led Coatsworth to the conclusion that "two distant markets may be well integrated without displaying highly correlated prices for goods that are not normally traded between them." Knowledge of the mechanics of urban (and for that matter rural) markets is growing but slowly and irregularly. Lacking

⁴³ Brown, "Price Movements in Peru," and Tandeter and Wachtel, "Prices and Agricultural Production," in Johnson & Tandeter, eds., *Essays on the Price History*, 181 & 221.

highly correlated prices among commodities that may not be traded among various markets but may in fact trade in several different markets makes sense in terms of what is known about the late colonial economies.⁴⁴

The fact that prices of commodities (not always the same commodities) in several markets followed similar paths over the long term (Buenos Aires and Santiago with an upside bias and Arequipa and Potosí a downside bias) did not mean that they were linked except perhaps through the overseas and American *conjunctures* (to use Tandeter and Wachtel's terms). The more influential *conjunctures* in these urban markets were local and regional, and these *conjunctures* may have been almost solely confined to the markets that could be served to the degree that transaction and transportation costs were manageable.⁴⁵ If these markets were not linked directly in terms of the suppliers of the commodities that they mutually consumed, were there economic or demographic circumstances that operated beyond the boundaries of the urban markets and their regional suppliers? It is possible that agricultural regions, in particular grain-producing areas, underwent structural changes in the eighteenth century in terms of cultivation techniques and land allocations. More goods were produced to meet rising urban demand, and since many of these goods could not be imported cost-effectively over great distances, producing regions linked to urban markets boosted their output by pursuing similar alterations in productive modes. There was nothing unique about what was required. Essentially it amounted to adding more land and in some instances to improving how land was farmed or how products were harvested and processed or how agriculture was financed. The interesting question was whether the capacity to produce in some regions might have been pushed beyond what was needed with the result that prices began to stagnate. Even in markets where some upward tilt in the price indices was evident not all commodity prices followed the upwardness of the composite indices. The way in which these urban markets and their price indices behaved has more to do with how the markets were related to and affected by the regions to which they were linked.

⁴⁴ Coatsworth, "Economic History" in Johnson & Tandeter, eds., *Essays on the Price History*, 22-23.

⁴⁵ Coatsworth, "Economic History" in Johnson & Tandeter, eds., *Essays on the Price History*, 23, Garner, *Economic Growth and Change*, 55-57, 183-184, and Salvucci, "Agriculture and the Colonial Heritage" in Adelman, ed., *Colonial Legacies*, 124-125.

Behind all these price trends is the fundamental question of productive capacity, and on that issue while the research continues the findings are mixed. Over the long term of the emerging colonial economies domestic production grew in volume. Did colonial businesses also become more efficient and profitable as the scope broadened? Population growth is a given all across Latin America in the eighteenth century along with steady if not at times heavy rural-to-urban migration. And if the population was growing by whatever percentage demographers may want to calculate output of the goods needed to sustain the population had to increase. And since no Malthusian catastrophe overtook the New World, one can only conclude that output did increase sufficiently to preclude a catastrophe. Allocation and reallocation of resources in order to meet the demand of the marketplace is not well understood in these colonial settings, but they undoubtedly took place in ways that allowed the producing sectors to satisfy at a minimal level the needs of the consuming sector.

If prices behaved as these indices indicate what was the payoff for the principal participants, the consumers and the producers? For Arequipa consumers Brown proposed that they “were probably better off in terms of prices at the end of the Bourbon century than they were when Philip V [1700] came to power. Judging from the cost-of-living indexes [values of what hypothetical families consumed], however, the real decline in prices came before 1760; afterward, most prices remained relatively stagnant.” While somewhat more volatile in the second half of the eighteenth century than the first half, the trend line is basically flat. After 1750 they may not have gained any purchasing power, but they may not have lost any either.⁴⁶ In Buenos Aires Johnson’s overall assessment was less sanguine. Prices did not rise steadily or gradually after 1775, but instead they fluctuated during the fourth quarter of the eighteenth century but heading higher after 1800. The post-1800 upswing eclipsed the earlier upswings and more importantly proved to be more resilient. Johnson views those developments in less favorable terms because after 1800 *porteños* would probably have required wage increases to preserve their purchasing power and yet no evidence has emerged that wages were increasing in response to rising prices. It is possible, he speculates, that this widening disparity may

⁴⁶ Brown, “Price Movements in Eighteenth-Century Peru—Arequipa,” in Johnson & Tandeter, eds., *Essays on the Price History*, 193.

have advanced the cause for independence. How much disparity did it take to push the population or a segment of the population into rebellion? And did the fact that prices appeared to establish a new level in the 1800s (Johnson used phrase “brutal price inflation”) provide a crucial difference with the mid-1780s when prices advanced sharply and then plummeted to new lows by the early 1790s. Let me hasten to point out that while my general index based on series averages is high in the 1800s, Johnson weighted index is even higher. A link between inflation and rebellion is hard to prove unequivocally, but it is also hard to ignore in the case of Buenos Aires.⁴⁷

In Santiago and Potosí price trends were studied in terms of production trends as measured by tithe taxes. The procedure was to use prices to “deflate” the tithes so as to try to recover the “real” as opposed to the “nominal” value of agricultural production. In effect by deflating tithe series neutralizes any effect that price changes may have on tithe monetary values.⁴⁸ But as so often happens in economic history, the reconstruction of the past will proceed with records that are far less than perfect. In Santiago, it appears, conditions most favorable to *real* growth occurred in the first half of the eighteenth century, a period not covered by this essay. According to Larraín real growth slowed in the second half of the eighteenth century and then accelerated in the last decade before independence. My own calculation of growth based on Larraín's agricultural tithe series deflated by the agricultural price series from 1750 to 1808 was still an impressive 1.3 percent per year. His calculations reveal that growth slowed from 1.5 percent per year to 0.6 percent in the early 1760s and then accelerated after 1800. Larraín interprets these changes as a reflection of the “combination of slow growth and stable prices levels that indicates...that production increases were limited by the size of both internal and external markets.” Were Santiago citizens better off at the end of the colonial era? Larraín does not really address that question in the same way that Brown and Johnson do. Prices did rise between 1750 and 1810 but not excessively (more modestly in my index than in Larraín's), but much of the increase came after 1800. Even prices of imported goods (as

⁴⁷ Johnson, “Price History of Buenos Aires,” in Johnson & Tandeter, eds., *Essays on the Price History*, 151, 164-165. Johnson's price index was weighted, but his observations about the impact of prices on consumers are more so based on trends in prices and wagers.

distinguished in Larraín's study from local agricultural products) rose only modestly in the second half of the eighteenth century. Larraín noted how the agricultural region around Santiago had changed their regimen, most notably with an increase in wheat production and as more land was allocated to cultivation a decrease in livestock production. The deflated tithe index of agricultural and livestock production began to rise again around 1800, and that led Larraín to observe that “central Chile was again beginning to reach the limit of its potential” as it had in the first half of the eighteenth century. Where did the pressure come from? “The development of the social base,” writes Larraín, “the growth of urban groups, mining groups, and poor campesinos who invested their limited income in foodstuffs, forcefully brought pressure to bear on the internal market.”⁴⁹

In the Potosí study Tandeter and Wachtel also use the term “stable” to describe the price trends during the second half of the eighteenth century. As described above, Potosí prices rose briefly in the late 1750s and again more permanently in the independence decade. In between those decades of high prices the tendency was for prices to drift lower. Mining was still the main engine of the Potosian economy, and it underwent a recovery that began in the second quarter and lasted through the third quarter. From the fourth quarter to the end of the colonial period production leveled off and then declined. In a general way the price indices tend to track the production curve up to 1810. One would expect any expansion in mining to increase demand for goods and services and to exert some upward pressure on prices and any contraction to work in the opposite direction. In fact, though, other forces were at work, according to Tandeter and Wachtel. “The costs of the production of the metal...increase in Potosí throughout the century, at the same time as the pure silver content of exploitable mineral diminishes. Those structural difficulties in the mining economy constitute without a doubt a determining element that orients the other products sold in the Potosí market

⁴⁸ Some scholars treat tithe data as so flawed that they should not be used even as proxies for agricultural output. Since Larraín has developed a model combining tithes and prices, I will proceed without commenting on the quality of tithe data.

⁴⁹ Larraín, “Gross National Product and Prices,” in Johnson & Tandeter, eds., *Essays on the Price History*, 124, 125-126.

downward.”⁵⁰ In other words the squeeze on profit margins in mining operations helped to keep prices in check. In addition Tandeter and Wachtel’s wage index for unskilled workers (many mining jobs would not fall under unskilled) was static. The purchasing power was shrinking across Potosí’s socio-economic spectrum. If there were less money to spend, then commodity prices, even for basic foodstuffs, would be less inclined to rise except in times of crises (weather, warfare, etc.). On an abstract level the absence of price inflation should benefit urban consumers, but in the end that depended on the purchasing power of the consumers’ incomes. A more difficult matter to explain with respect to the Potosí market and the local price trends concerned tithes. They were collected from Spanish estates located in the surrounding region known as Charcas. The tithes whether in nominal or real values rose throughout the second half of the eighteenth century. (Recall that the prices assembled for all four *conjunctures* were for transactions at a single convent in Potosí, and therefore the tithes from a much larger region were deflated with Potosí market prices, not with regional prices.) What did the rise in tithes signify? If the prices of goods sold in Potosí from Charcas behaved as the various price trends indicate, what was the incentive to increase output in Charcas? The answer may be in a demographic anomaly: given the state of the mining industry Potosí’s population was probably not growing and may have been contracting, while the population of Charcas was expanding. To deflate Charcas’s tithes by the prices fetched in Potosí’s market for Charcas products may distort what was actually happening in the regional markets. By the end of the eighteenth century the deflated tithe series plateaued, after reaching new highs. This may have been weather-related, but Tandeter and Wachtel also propose that Charcas’s agricultural sector could have “encountered a new ceiling” that required producers to scale back.⁵¹ In Charcas as elsewhere increasing output primarily depended on adding more land. The risk in adding land was that the land would be marginal and therefore costly. Nominal output would rise slowly and *real* output probably not at all. In a related article Brooke Larson’s research on land tenure and market competition in and

⁵⁰ Tandeter and Wachtel, “Prices and Agricultural Production,” in Johnson & Tandeter, eds., *Essays on the Price History*, 270. For a further discussion of Potosí mining profits in the late eighteenth century see Tandeter, *Coercion & Market, Silver Mining in Colonial Potosí, 1692-1826* (Albuquerque, NM: University of New Mexico Press, 1993), 159-160.

around Cochabamba (about 200 miles north of Potosí) and one of the districts that contributed to the Archbishopric's tithe totals uncovers a more complicated set of dynamics. Exporting food, in particular grains, from Cochabamba to Potosí was not necessarily a money-maker. Adding marginal lands simply made the Potosí trade less profitable. Furthermore there was a market in and around Cochabamba to exploit. There was a surprising amount of competition between the large and small producers over control of land and markets. Larson made no estimates of how much of Cochabamba's agricultural produce ended up in Potosí or how much was withdrawn as producers engaged in local turf battles. Nor is it known whether other farming and ranching areas in the widely-scattered region known as Charcas and especially those that were closer to Potosí and perhaps more dependent for income on trade with Potosí underwent developments similar to Cochabamba.⁵² What emerges from the Cochabamba case is that the supply-area had to come to terms with a deflationary or perhaps a disinflationary market in late colonial Potosí, and trends in agricultural prices and indeed in all prices in Potosí eventually spelled trouble for producers and suppliers. Potosí was becoming less important to the outlying areas as they increasingly made their business decisions in relation to their own local circumstances. It was demand in Potosí rather than supply from outside that encapsulates its late colonial price history.

Lima's late colonial economy may have taken a turn for the better, perhaps in contrast to its sister cities. Prices hugged the baseline except during the middle 1780s and again during the independence decade. But they rose ever so slowly and gradually after 1750. Two price series can be constructed for late-eighteenth-century Lima, and while they exhibit some differences the overall trends are similar. Marcel Haitin constructed his price series in order to analyze the relationship between Lima market and the surrounding agricultural region that supplied that market. He notes contradictory pressures in and around Lima with growth in some areas and stagnation or contraction in others, but he finds enough evidence to suggest that the conventional view of a secular agricultural

⁵¹ Tandeter and Wachtel, "Prices and Agricultural Production," in Johnson & Tandeter, eds., *Essays on the Price History*, 257.

⁵² Larson, "Rural Rhythms of Class Conflict in Cochabamba," in Johnson & Tandeter, eds., *Essays on the Price History*, 294-297. In particular see the discussion about tithe farming and agricultural profits, 290-294.

crisis that spanned more than two centuries, from the late seventeenth into the twentieth century was misapplied. Many factors were at work in Lima's market: population growth, silver-mining expansion at Pasco and Hualgayoc, improving agricultural productivity, and continuing international commerce. In Haitin's view, the rise in prices (albeit slight) through the independence period tends to support a dynamic rather than an ill economy.⁵³ The potential deflationary condition identified in both Arequipa and Potosí was seemingly absent in Lima. Perhaps in an ironic way Lima's detachment from Potosí and Upper Peru actually forced the business community to reassess how to allocate its resources. Whatever the actual state of the regional economy little evidence exists that it had entered a major inflationary cycle prior to the insurgency.

Rio de Janeiro, the last of the South American cities, saw prices rise perhaps more sharply than in any other city. Johnson rejects the idea that Rio de Janeiro or Brazil despite heavy reliance on slave labor had evolved a "natural" as opposed to a "market" economy. Evidence suggests that wages paid to workers in the upper socio-economic level may have increased by 150 percent in the late colonial period. Slave seldom earned any income, and unskilled workers were often paid like "hired-out" slaves. This should not obscure the fact that slaves prices increased by almost the same percentage because slave owners envisioned a reasonable and profitable return on their investments. Rising wages could provide some protection against rising prices. Rio de Janeiro's economy over the late colonial decades may have become more dynamic than stagnant in spite of the colony's slave labor. It is worth noting that his essay was published in 1973 and had as its reference point the earlier work of Ruggiero Romano, whose examination of price trends in Chile and Argentina led him to conclude that those economies resembled a "feudal" (sometimes equated with natural) economy rather than a modern or proto-modern market economy. For Johnson an Atlantic port city like Rio de Janeiro (or one might add Buenos Aires) in the late eighteenth century did not fit the feudal model. Rather he portrayed it as a "dual economic system...where prices behaved in more volatile fashion, with a long-term upward tendency except for commodities which came from subsistence areas." Johnson's dual economy model did not imply that Rio de

⁵³ Haitin, "Prices, The Lima Market, and the Agricultural Crisis," *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, 22, 168-169, 173, 177-178, 180, 188-189.

Janeiro lacked a “market” economy: “...the economy of the city...and the surrounding region was clearly a ‘market’ economy, thoroughly monetized (although coin may have been scarce), and linked by trade (however irregular) with Europe and North America.”⁵⁴ Since Rio de Janeiro’s market had a large export business that included locally consumed comestibles as well as internationally traded goods, Johnson postulated that prices were more directly determined in the international sphere rather than in the domestic market. In fact a “domestic market” barely existed in large part because of the continuing presence of slavery that distorted wage levels and market elasticities. Even comestibles that were raised primarily for local consumption had a link to slavery: the more slaves imported the consumption of these products. Internal demand was not of sufficient strength or duration to influence price trends.⁵⁵ Internal demand appeared to be less instrumental in the development of Rio de Janeiro’s market than in the other cities discussed in this essay. The bifurcation between the subsistence domestic component and the robust international component is not easy to bridge by studying price trends. Johnson found reasons in these price trends to distinguish Rio de Janeiro and perhaps all of Brazil from what Ruggiero Romano found in Chile and Argentina, and of course later research has further disputed Romano’s characterization of these markets as “feudal” or “natural”.⁵⁶ If Romano could somehow be lifted out of Johnson’s analysis, would the dual description survive – part subsistence and part market. Johnson himself acknowledged that the post-1808 was inflationary but after a period of deflation. Another way to look at the price trends in Rio de Janeiro is that inflation began decades before the end of the first decade of the nineteenth century and may have been related to a changing domestic market that was expanding to accommodate population growth and whatever business activity was need to serve the population. Inflation was certainly more pronounced after 1808 than before.). It was certainly more pronounced after 1808, but in the preceding 30 years prices seemed to creeping ever higher, and that itself may be an indication of a broadening of Rio de Janeiro’s domestic market.

⁵⁴ Johnson, “A Preliminary Inquiry into Money, Prices, and Wages,” in Alden, ed., *Colonial Roots of Modern Brazil*, 264, 267.

⁵⁵ Johnson, “A Preliminary Inquiry into Money, Prices, and Wages,” in Alden, ed., *Colonial Roots of Modern Brazil*, 246, 265.

Zacatecas is the only Mexican city for which we have a price dataset other than grains. One of the colony's oldest camps Zacatecas enjoyed a mining revival from the 1760s and until the Hidalgo Revolt. Even after Hidalgo mining in Zacatecas continued to operate at a fairly respectable level. Along with the recovery came growth in population, trade and overall business activity. The price index (although containing some important gaps) had a slight upward trend to the end of the colonial era. Crises such as periodically affected the agricultural sector appear to be the main driver behind upsurges in prices, and they had for the most part a temporary effect. For a city that depended on an extensive supply network, since so little that Zacatecas consumed was raised locally, the absence of severe, sustained price inflation in the face of a silver revival that required thousands of workers who had to be fed, clothed and housed along with quantities of supplies for the mines and mills leads to the conclusion that on the whole what was needed was acquired with regularity. A small wage dataset mainly for semi-skilled and unskilled workers (which I have published in other articles) showed little upward movement. Shortages of workers at least in the aforementioned categories seldom appeared in local reports on the state of the local economy. The mining recovery that came to late colonial Zacatecas did not appear to fuel significant inflation, nor did it appear to promote much improvement in wage levels for many workers. One is left with a definite impression that the revival of mining and any related business activity in the second half of the eighteenth century yielded more mineral wealth but little economic change.⁵⁷

A final issue that few price studies address is the state of the currency. How did urban dweller pay for what they had to purchase? Colonial Latin American produced vast quantities of gold and silver, more than 80 percent of which was exported either as ingots or as coins.⁵⁸ It was not simply a question of whether enough coins were minted but whether enough small coins were available for the transactions carried by ordinary

⁵⁶ Johnson, "A Preliminary Inquiry into Money, Prices, and Wages," in Alden, ed., *Colonial Roots of Modern Brazil*, 246, 260-264.

⁵⁷ I have treated the state of Zacatecas's mining and its impact on the economy in several publications already noted in these footnotes.

⁵⁸ European price historians have given more attention to the question than Latin American price historians. See Romano's comments in "Some Considerations on the History of Prices," (39-40, 52-55) and Klein &

consumers. A *fanega* (1.6 bushels) of maize might cost 3 *pesos* or 24 *reales*. Some individuals or institutions might buy by the *fanega*. Skilled and unskilled wage earners earned perhaps 1 to 3 *pesos* per day. It was unlikely they would buy a full *fanega*. A *fanega* had approximately 60 quarts (US measure), and a *real* would buy 2.5 quarts. A certain number of transactions required a supply of *reales*, and for a purchase of less than 2.5 quarts even smaller coins came into play either in payment or for change. Coins of small denominations were essential unless some form of script or credit were used. Little is known about how many small coins circulated or whether those that were in circulation were of the values that they declared to be. Fraud and deception was easier with small coins than large ones. Complaints about shortages of coins were commonplace, and yet statistics on coins in circulation and on shortages of coins are few and far between that the complaints cannot be investigated. Current research in the records of the New World mints and other treasury sources may begin to fill in the picture.⁵⁹ Of the scholars cited in this essay Harold Johnson delved more thoroughly into the currency issues relative to price trends than others. His mint data indicate that there was “a progression from the highest value coin which is invariably minted in the greatest amount, to the lowest value which, with equal regularity, is minted in the smallest.” As he readily pointed out “what was acutely lacking was precisely the kind of money most necessary for the functioning of the retail trade and the purchases of the poorest classes.” The decline in Brazilian mineral output in the second half of the eighteenth century may account for an overall reduction in Brazilian coinage, but the other possibility cannot be ignored – that the government simply preferred to mint fewer small coins.⁶⁰ The common practice in the New World in both the Spanish and Portuguese colonies was to mint small coins as an alloy of silver and copper called *vellón*, although over time the amount of silver was reduced and income taxes eliminated. How much *vellón* circulated in the New World remains a mystery. In addition the colonial issued gold and silver coins that were

Engerman’s comments in “Methods and Meanings,” (12, 16), both in Johnson & Tandeter, eds., *Essays on the Price History*.

⁵⁹ Numismatists have published extensively on the types of coins issued by the New World mints, and many of these publications can be accessed through the World Wide Web. However, what remains to be documented more thoroughly is how many coins were actually in circulation in any given market.

fractions of the standard large coins. Again the volume of fractional coins is difficult to pin down. Finally Spanish coins in large part because of the mints' fairly strict controls over the content of the coin circulated all across the New World.⁶¹ In his study on mintage and money in Mexico, published more than 50 years ago, Wilbur Meek declared that money for local trade was scarce with many transactions, especially among the poor, involving less than half a *real* (of silver, which in the United States was worth 12.5 cents in 1800). Cocoa beans were used as substitutes, and in 1544 200 beans equaled one *real* of silver whereas around 1800 a *real* was said to equal between 144 and 192 beans. Beans may have acted as a token for silver, but their fluctuations relative to *reales* could only have complicated local transactions.⁶² This is not to say that all local transactions carried out without minted coins, but rather to say that scarcities of small-denomination coins in emerging urban markets may have required a substitute medium in order for businesses to operate at all. To what extent did shortages affect prices? An unknown. Theory suggests that not knowing the true value of a minted coin or its substitute would compel businesses to add a premium to the price of the transaction. Were urban prices fractionally higher because of these premiums? At the same time business were faced with a dilemma. To have any trade at all they had to take a risk with respect to the currency that would affect the premium and perhaps make any premium unpalatable.

Lyman Johnson in his study on Buenos Aires presents an intriguing perspective on how some workers were linked to the urban markets. Recall that when the price and wage indices constructed by Johnson are compared, the impact of inflation on wages was (in his word) "punishing". But Johnson is too good a scholar to leave it at that. Measuring

⁶⁰ Johnson, "A Preliminary Inquiry into Money, Prices, and Wages," in Alden, ed., *Colonial Roots of Modern Brazil*, 240-246. Johnson attempts to relate monetary and price trends by way of the Irving Fisher model, not convincingly. Data on velocity above all are lacking. (240, also footnote 22)

⁶¹ Debasement in which the pure metal content was adjusted downward should not be ignored. By the same token debasements were occasional rather than constant, and in spite of the debasements Spanish coins were still often preferred to other coins. Johnson acknowledged that the circulation of Spanish coins in late-eighteenth-century Brazil may have partially made up for the decline in minted Brazilian coins. The volume of Spanish is not known.

⁶² Meek, *The Exchange Media of Colonial Mexico* (New York: Kings Crown, 1948), 74-76. Also see Pedro Pérez Herrero, *Plata y libranzas. La articulación comercial del México borbónico* (Mexico City: El Colegio de México, 1988), 183-194. Pérez Herrero deduces by measuring bullion exports against mint records that less and less money was available to circulate. He considered the rise in the use of *plata en pasta* (a token coin) and *libranzas* (bills of exchange) as a consequence of the diminution of minted coins. I am in agreement with him, but the matter of how many small coins circulated remains to be uncovered.

prices is hard enough, but measuring wages can add to one's baldness. What were all the components of a worker's income? In repairing some buildings, which had belonged to a Jesuit college now under the control of the government, the superintendent wanted to attract workers – mainly bricklayers and unskilled laborers, some of whom were slaves – with wages lower than the prevailing compensation and to make up the difference with amenities like food. Workers received rations of food and beverage each day that they worked with skilled workers receiving not only “pricier” foodstuffs (white bread versus dark bread even though the latter was probably more nutritious) but also more food. Johnson calculated that it cost about one-half a *real* per day to feed each worker. By the superintendent's calculation it was “less costly” to feed the crew than to pay the wage that the market might dictate.⁶³ Rural workers has long received some income in the form of amenities, and some researchers have indicated that the absence of cash transactions by farm workers left rural economies to develop more slowly over time.⁶⁴ How widespread was the Buenos Aires experience, and equally important how widespread was it in the port? If employers whether public or private entered the marketplace to purchase comestibles for their workers, were they able to negotiate lower prices for bulk purchases than individual could expect on their own? The superintendent (who was apparently accused of administrative misconduct) may have only been motivated by the hope of saving the government money, and yet the practice has implications for how consumers were related to the markets in which they earned and spent income. The need for coins in these urban markets cannot be minimized, but it may have been finessed in different ways.

In all the cities there were long stretches in the third and fourth quarters of the eighteenth century when general index averages dropped and remained below the baseline of 100. Even in those cities with some long-term price inflation the trends advanced only modestly or moderately above the baseline. It cannot be denied, of course, that what may have caused urban population economic discomfort was the fact that the indices had fallen as low as they had. A rise in the index from say 75 to 110 might

⁶³ Johnson, “Price History of Buenos Aires,” in Johnson & Tandeter, eds., *Essays on the Price History* 156-157.

⁶⁴ Many scholars have written about the age systems of the rural estates. I dealt with it in *Economic Growth and Change*, 82-83.

actually represent a significant upturn for many citizens who saw little change in their incomes. The average price over the long term from which the indices were computed may have meant less to the average consumer than what happened to prices in the very short term. Moreover some products were more important or essential to the urban consumer than other products and how they performed in the short or long run may have influenced whatever perception the consumer had of changes in prices. Individual product indices were only considered briefly herein, and as they are looked at more closely in the future they may require some revision on how inflationary urban life was after 1750. More than likely the trends observed in the general city indices will remain in tact but with a keener sense of what was instrumental in moving these indices.