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Carneros y Chuño: Price Levels in Nineteenth-Century Peru

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AMONG other dark legacies, nineteenth-century Peru remains an example of statistical "dark ages." The Peruvian state was essentially prestatistical; until recently, it lacked the need and capacity for systematic collection of economic, social, and demographic indicators on so nominally a governed people. The challenge of unearthing and preparing usable data thus falls to modern students of Peru.

In the past decade, historians have managed to create from scratch fruitful new estimates of Peruvian foreign trade and export activities like mining. They have revised figures on such elusive quantities as the expansion of the public sector and its internal and external debts. New statistics on demographics, land tenure, business and monetary history, tariffs, labor force, and gross national product have appeared.[1] Most of these ad-

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1. Shane J. Hunt, "Growth and Guano in Nineteenth-Century Peru," discussion paper 34, Research Program in Economic Development (hereafter RPED) (Princeton, 1973) (cited below instead of abridged version published in *The Latin American Economies: Growth and the Export Sector, 1880–1930*, Roberto Cortés Conde and Hunt, eds. [New York, 1985], 225–319) and "Price and Quantum Estimates of Peruvian Exports, 1830–1962," discussion paper 33, RPED (1973); Heraclio Bonilla, "La coyuntura comercial del siglo XIX en el Perú," *Desarrollo Económico*, 12:46 (July–Sept. 1972), 305–331; Alfonso W. Quiroz, *La deuda defraudada: Consolidación de 1850 y dominio económico en el Perú* (Lima, 1987); José Deustua, *La minería peruana y la iniciación de la república, 1820–1840* (Lima, 1986); Carlos Contreras, *Mineros y campesinos en los Andes* (Lima, 1987); Cecilia Méndez, "La otra historia del guano: Perú, 1840–1879," *Revista Andina*, 5 (July 1987), 7–46; Nils Jacobsen, "Landtenure and Society in the Peruvian Altiplano: Azángaro Province, 1770–1920" (Ph.D. diss., University of California, Berkeley, 1982); Rory Miller, "The Population Problem in Late Nineteenth-Century Lima" (manuscript, Amsterdam, 1988); Carlos A. Boloña, "Tariff Policies in Peru, 1880–1980" (D. Phil. thesis, Oxford University, 1981); Paul Gootenberg, "Artisans and Merchants: The Making of an Open Economy in Lima, Peru, 1830 to 1860" (M. Phil. thesis, Oxford University, 1981) and "Population and Ethnicity in Early Repub-

vances still cover the fairly accessible external and formal sectors of Peru's economy, however, and we are a long way from statistics worthy of formal economic analysis. Scattered archival sources do in fact exist for a variety of quantitative tasks. But a conspicuous bottleneck is our lack of a domestic price series—a critical tool for advanced analyses of even the meager statistics on hand.

This study offers new information on consumer goods prices from nineteenth-century Lima and attempts to work them into a standard cost-of-living index and long-run estimates of inflation. While preliminary, these price deflators may be used for measuring "real" economic trends, that is, what economists call growth at constant prices. Inflation, as we knew from such qualitative signs as popular bread protests, became chronic in republican Peru, and this fact has bedeviled historians' efforts to accurately describe development. According to nominal expenditure data, for example, the Peruvian state would have expanded some ten times in the course of the guano age—surely an exaggeration if not controlled for the era's inflation.[2] Moreover, even in their simplest forms, price data help illuminate the links between broad economic developments and everyday social life. In the nineteenth century, Peru slogged through two decades of late colonial economic turmoil (1800–24); two decades of postindependence depression (1824–45); and three decades of frenetic guano prosperity, before the export collapse of the mid-1870s. Prices are a clue to how these events struck ordinary Peruvians and to numerous other problems in social history.

Readers should note, however, that all measures of price levels are little more than an economist's invention, and thus open to endless improvement and interpretation. Historical—even current—price data are notoriously poor for countries such as Peru, especially if culled from secondary accounts with ill-defined standards of collection. Moreover, most

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lican Peru: Some Revisions" (forthcoming, *Latin American Research Review*, 1990). By no means is this an exhaustive list of recent quantitative studies.

This is not to underestimate the contributions of Peru's pioneer statisticians (such as Garland and Rodríguez), whose concerted work began at the turn of this century; see the excellent survey by Hunt and Pablo Macera, "Peru," in *Latin America: A Guide to Economic History, 1830–1930*, Cortés Conde and Stanley J. Stein, eds. (Berkeley, 1977), 548–578.

2. Hunt, "Growth and Guano," Tables 8–9 (which considers this inflation problem) or Javier Tantaleán Arbulú, *Política económico-financiera y la formación del estado: Siglo XIX* (Lima, 1983), chaps. 11–12 (which does not). Price research is scant for Peru; apart from Quiroz (below), the only studies are colonial. For Cuzco, see Luis Miguel Glave and María Isabel Remy, *Estructura agraria y vida rural en una región andina: Ollantaytambo entre los siglos XVI y XIX* (Cuzco, 1983), chap. 11. There are also two unpublished 1975 data collections by Macera for Arequipa (1627–1767) and Lima (1667–1738). A preliminary version of this present study was Gootenberg, "Artisans and Merchants," App. 11, which should no longer be cited.

of the existing archival price series for Latin America come from the colonial era or from rural zones, and not from cosmopolitan centers such as the one purposely selected here. Understandably, then, we have as yet no comprehensive or methodical price indices for nineteenth-century Latin America.[3] This exercise aims to spur further research, simply by showing its feasibility.

The opening section presents the new archival food price data used. The following section devises appropriate price weights for a nineteenth-century cost-of-living index. These prices and index then yield new estimates and periodizations of Peruvian price movements. Besides illustrating the steps to a historical price index, the study underscores the indispensability of social history evidence for quantitative tasks. And it concludes by exploring in detail some applications of the new statistics to the economic, social, and political history of Peru.

Food Price Data

Peruvian governments never amassed systematic price data in the nineteenth century. For fragmentary information, four published sources exist. In 1870, amid rising urban unrest over subsistence costs, a regional commission headed by Lima Mayor Manuel Pardo put out a 161-page report on inflation. The survey, consisting mainly of heated opinions on the roots of the problem, also contains wholesale data for 29 common meat and grain products, in order to compare prices in 1854/55 and 1869. Jorge Basadre presented some of these haphazardly collected prices, and Pablo Macera even tabulated them into a series, within a wide-ranging qualitative discussion of inflation at the height of the guano age.[4] The commission's data reveal a doubling of prices for some staples, such as lentils and chicken, over the 15 years.

3. The closest find to a nineteenth-century price index is Miguel Urrutia, "Estadísticas de precios, 1846–1933" in *Compendio de estadísticas históricas de Colombia*, Miguel Urrutia and Mario Arrubla, eds. (Bogotá, 1970), chap. 3, which recognizes the inadequacies of basing the index on intermittent data fitted to modern expenditure weights. For some of the many advances in colonial price history, see *Essays on the Price History of Eighteenth-Century Latin America*, Lyman L. Johnson and Enrique Tandeter, eds. (Albuquerque, 1989). Most Latin American price indices begin around 1913–17, when new methodologies, inflation, and political pressures made price research imperative; see B. R. Mitchell, *International Historical Statistics: The Americas and Australasia* (Detroit, 1983), Tables 11–12, 844–845.

4. Lima, Consejo Provincial, *Datos e informes sobre las causas que han producido el alza de precios de los artículos de primera necesidad que se consumen en la capital* (Lima, 1870); Macera, "Las plantaciones azucareras andinas (1821–1875)," in *Trabajos de historia*, Macera, comp., 4 vols. (Lima, 1977), IV, 235–275; Jorge Basadre, *Historia de la República del Perú*, 7 vols., rev. 5th ed. (Lima, 1963–64), IV, 1761–68. A more qualitative report is J. B. H. Martinet, *Carestía de víveres en Lima, 1875* (Lima, 1977, reprint). Hunt uses the 1855/69 prices most methodically; see "Growth and Guano," 75.

More recently, the historian Alfonso Quiroz, seeking ways to assess the social impact of the "consolidation" of the internal debt, discovered new food price data for the period 1847–65. These retail prices were gathered from hospital ledgers at the charitable archive of the Beneficencia Pública de Lima, and cover 23 items of popular consumption, such as *carnero* (mutton), beans, chickpeas, rice, and *chuño* (Andean freeze-dried potatoes).[5] The dramatic fluctuations evident in certain items led Quiroz to identify two peak "crises de subsistencia," in 1850 and 1856.

Two other works lie at the extremes of this study, and some of their data can be incorporated. Marcel Haitin, after digging in accounts of hospitals and suppressed monasteries (in a host of archives), averaged prices for seven major food commodities of late colonial Lima (1799–1824), which reveal, he argues, a hidden dynamism in the regional agrarian economy. On the other end of the curve, following the grave monetary upheavals of the Pacific War, other Lima commissions investigated rising prices of some twelve major components of the Lima diet, which form an 1897–1906 series.[6] Still other historians, such as Vincent Peloso, have explored qualitative aspects of Lima consumption, nutrition, and supply networks.

The archives are then the best and only source for new data. The appendix to this study presents my original archival evidence on 29 Lima subsistence goods from 1826 to 1873 (see Appendix). These are averages of weekly findings; wherever evident, the prices are standardized into reales per pound (8 reales = 1 peso before 1862, 10 reales = 1 *sol* thereafter). Prices of minor products such as herbs, and price fragments, are omitted, but the appendix does include the usable (consistent) data from the published works just mentioned.

Some of the new prices, following Quiroz's lead, are derived from bimonthly purchasing records of two hospitals, San Andrés and La Cari-

5. Quiroz, *La deuda defraudada*, 109–123 and App. I, which analyzes the data more fully than his 1980 B.A. thesis and makes use of my 1981 index. This archive is not very accessible.

6. Marcel Haitin, "Prices, the Lima Market, and the Agricultural Crisis of the Late Eighteenth Century in Peru," *Jahrbuch für die Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, 22 (1985), 167–198; an abridged version appears in *The Economies of Mexico and Peru During the Late Colonial Period, 1760–1810*, Jacobsen and Hans-Jürgen Puhle, eds. (Berlin, 1986), 281–298. Most of Haitin's data (which cover 13 products) are from the Hospital Real de Santa María (in the Beneficencia archive); others are from hospital, school, and convent accounts in the Instituto Riva-Agüero and Archivo General de la Nación, Lima (hereafter AGN). See also Lima, Cámara de Comercio, *Memoria presentada por el Consejo de Administración de la Cámara de Comercio de Lima a la Junta General de 11 de feb. de 1899 siendo presidente el sr. D. Manuel Candamo* (Lima, 1899); prices tabulated (with others) in Peter Blanchard, *The Origins of the Peruvian Labor Movement, 1883–1919* (Pittsburgh, 1982), Table 7; Vincent C. Peloso, "Succulence and Sustenance: Region, Class and Diet in Nineteenth-Century Peru," in *Food, Politics, and Society in Latin America*, John Super and Thomas Wright, eds. (Lincoln, 1985), 46–64.

dad, and of the Colegio de San Carlos, all maintained by the Beneficencia (for 1826, 1829, and 1840–65).[7] These are retail prices, the favorite of price historians, and robust enough with more than a dozen readings a year, usually from their original market receipts. While the charity may have received some unusual bargains (on bread for instance), the market prices also were checked by a scrupulous comptroller. Similar institutional accounts for government-run convents were discovered in the Archivo General de la Nación (AGN): the infirmaries of San Francisco and Santo Domingo list excellent data for 1829, 1831, and 1833.[8] Another mine of price quotations is the books of military hospitals (such as Santa Ana) run by the Ministry of War and Marine.[9] Located as well in the AGN, they provide a complete series of food items for the 1830s, based on the typical inventory of purchase receipts. Unfortunately, archival records become sporadic after 1843; weaker series were encountered under the Ministry of Government for 1848–52 and 1859–65 (San Carlos, San Bartolomé, Santa Ana, and San Andrés).[10]

7. Archivo de la Beneficencia Pública de Lima (hereafter ABPL), Libros de los Hospitales y Colegios; Cuenta por Colegio de Educandas de la Caridad, 1826–27, 9302/69; Gasto diario por Hospital de la Caridad, 1826–27, 9301; Hospital Unido de Santa Ana—cuenta de gastos, 1828, 9202; Hospital de San Andrés, planilla de pagos, 1840–41, 9051; Cuenta general de cargo y data del Hospital de la Caridad, 1841, 9302; Cuenta general de cargo y data del Hospital de San Andrés, 1842, 9052; and varied 1830s fragments from Cofradía records. (Gabriela Ramos graciously assisted in research.) I also use Quiroz's analogous ABPL data (*La deuda defraudada*, App. I) from the San Andrés and Santa Ana hospitals, 1847–56 and 1859–65; note, however, modest differences (in the appendix) from my research in the same hospital records held in the AGN.

8. AGN, section R. J. (Ministerio de Justicia), Cuentas de Conventos Supresos, San Francisco, Gastos de esta enfermería, 1829–32, leg. 5; San Francisco, Descalzos, Santo Tomás, Santo Domingo, Enfermería y cuentas, 1829–33, leg. 6. The eleven other legs. are useful for wage data only (some outside Lima), or already form the basis for Haitin's colonial series, "Prices and the Lima Market," App. 11, Tables 1–12. The first six years of the appendix are averages from his data (which cover additional years); the 1799/1800 meat prices are from María Pilar Pérez Cantó, "Abastecimiento de la ciudad de Lima en el s. XVIII," in *Historia problema y promesa: Homenaje a Jorge Basadre*, F. Miró Quesada, F. Pease, and D. Sobrevilla, eds., 2 vols. (Lima, 1978), I, 467–470.

9. AGN, Hospitales Militares, 1826, H-1 OL 152/1079–1172; Ministerio de Guerra y Marina, Hospital Santa Ana, 1829, H-1 OL 189/1128–1167; Guerra y Marina, Cuentas y gastos del Hospital Militar Santa Ana, 1830, H-1 OL 200/2034–2056; Hospital Militar de Santa Ana, 1831, H-1 OL 210/1525–1528; Santa Ana, 1832, H-1 OL 218/1045–1056; Santa Ana, 1833, H-1 OL 227/953–960; Santa Ana/Bellavista, 1834, H-1 OL 235/1411–1414; Hospital Militar, 1835, H-1 OL 243/1167–1173; Santa Ana, 1837, H-1 OL 257/469–501; Santa Ana, 1838, H-1 OL 266/738–756; Santa Ana, 1839, H-1 OL 273/1139–1140. Other years, from 1826 to 1847, were searched under "Comisarios" and other headings.

10. AGN, Ministerio de Guerra y Marina, Presupuestos de sueldos y gastos de los Hospitales Santa Ana, San Andrés, y San Bartolomé, 1848, H-1 OL 343/1094–1184; Hospital Militar San Bartolomé, 1849, H-1 OL 352/583–595; Ministerio de Gobierno, Instrucción Pública y Beneficencia, Hospitales Santa Ana, San Andrés y San Bartolomé, 1850, H-1 OL 356/591–637; Santa Ana y San Andrés, 1851, H-1 OL 363/705–728; Cuentas y planillas de gastos diarios del Colegio de San Carlos, 1852, H-1 OL 371/330–596; San Carlos, 1856, H-1

Except for the lacunas of 1843–46 and 1857–58, a complete and consistent archival price series now exists for 1830–65. Combined with other sources, a reliable and wide record for essentials exists from 1826 to 1873. When we include some of Haitin's archival colonial prices (which lack vital mutton and beef), and interpolate stable years from fragments, the series runs from 1800 to virtually the Pacific War.

A most lamentable gap yet remains—the years 1874–79. The late 1870s were a time of severe monetary instability, a period whose data are critical for any price index that aims to connect our macrostatistics through the denouement of the guano age. These prices were fruitlessly sought in the array of available primary sources. Other historians will no doubt resolve the 1870s gap as they uncover purchasing records of nearby haciendas, monasteries, or military units. What cannot be resolved is a direct linking of price series from before and after the Pacific War.[11] The era's chaotic devaluations and inflation (reaching perhaps 800 percent between 1879 and 1885) must sober any historian.

One notable strength of the prices is that they are virtually free of the seasonal variations that bedevil most preindustrial prices series. Lima lay in a semitropical agrarian hinterland, where crops and livestock could be supplied with great regularity. The diversity of foreign suppliers to the coast (of grains, beans, and other articles) also smoothed fluctuations in this consummate market economy. In fact, the only periodic disturbances perceptible at the archival level were the sharp man-made monthly price hikes that could occur during caudillo wars, when supply routes were blocked. (One sees this graphically, for example, at the climax of the civil war of 1834.[12]) A weakness of this series, on the other hand, is the

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OL 398/1121–1135; Ministerio de Guerra y Marina, Documentos comprobantes de los gastos del Hospital Militar, 1860, H-1 OL 432/1059–1084; Hospitales Militares, 1861, H-1 OL 439/1715–1725; Presupuestos del Hospital Militar, 1862, H-1 OL 447/1578–1592; Tesorería Principal, Presupuesto de gastos del Hospital Militar, 1864, H-1 OL 460/1326; Inspección del Hospital de San Andrés (and Santa Ana), 1865, H-1 OL 472/361–381.

11. The 1897–1906 appendix prices (averaged from Blanchard, *Peruvian Labor*, Table 7) are simply a signpost. Boloña, "Tariff Policies in Peru," Tables 3.1 and 3.2 provides the indirect estimates of wartime inflation.

Quiroz (personal communication, 1989) has scoured the 1880s–1890s period for price data, to no avail. For the 1870s gap, a logical place to seek data similar to those presented here (and regional prices) is the Archivo Histórico-Militar del Perú; its catalogue, though, lists no obvious accounts. With no success, I also sought data from convent records in the Archivo Arzobispal de Lima.

12. AGN, Ministerio de Guerra y Marina, Cuentas del Hospital de Santa Ana, Jan.–Mar. 1834, H-1 OL 253/1411–1414. With so little seasonal variation, no moving averages or trend calculations were warranted. Compare Lima with Bogotá's extreme seasonal variations: Urrutia, "Estadísticas de precios," 84 and monthly tables. Lima/Callao's bustling overseas foodstuffs trade was clearly a factor, for even coastal plantation prices reveal greater market fluctuation (Peloso, personal communication, 1988, concerning study of Hacienda Palto, 1867–70).

Variations in product quality were also not a problem. Most superior quality designa-

dearth of data on liquors and other liquid refreshments—which played a substantial role in the daily life of Limeños. When in hospitals, convents, or school, such substances were substituted by a remarkable array of medicinal products and herbs, whose make-up may interest historians of medicine.

Other sources supplement the archival ones, but must be taken with caution. From time to time, newspapers and census takers published reports from city markets. Lima's dailies sometimes started (and then stopped) regular and detailed notations of wholesale and retail prices. Among the finest data found were *El Comercio*'s biweekly "Plaza del Mercado" reports for 1864–65 and *La Patria*'s analogous columns for 1871–73. I also considered such samples as 1828 wholesale lists from *El Telégrafo de Lima* and 1837 CIF import prices (*El Redactor Peruano*) for the already significant foodstuffs trade.[13] For 1860, there are (probable) wholesale plaza prices gathered by the indefatigable statistician Manuel A. Fuentes for his *Guía histórica-descriptiva, administrativa, judicial y de domicilio de Lima*. Like Fuentes's other guides, this is a mine of untapped statistical material (useful here, for example, is his quantification of all agricultural goods brought into the city).[14]

British and U.S. consular dispatches often reveal price data, particularly for the grain trades that so interested both parties (after 1843, British consuls were systematically tracking flour and wheat prices on a world scale). One suggestive British memo from 1842 compares basic living costs in seven major Latin American capitals, no doubt as a ploy for higher salaries. Bear in mind that Lima, with its cramped agrarian hinterland, remained the dearest of all regional posts, confirming both the complaints of its inhabitants about high costs and the overvalued nature of its currency.

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tions (notably for meats and flours) are clearly indicated with prices (most commonly, in periodical market lists). In the archival military and religious records, qualities are remarkably consistent (i.e., very basic), and those were the grades followed in the supplementary sources.

13. "Plaza de Mercado," *El Comercio*, Sept. 2, 1862, all Jan.–June 1864; "Crónica," ibid., all May–June, Aug. 1865; "Precios por mayor de productos nacionales," *La Patria*, all Oct. 1871, Sept.–Dec. 1872, Jan. 1873, with separate meat reports; "Precios corrientes, por mayor, de la plaza de Lima," *El Telégrafo de Lima*, Aug. 12, Sept. 1, Nov. 12, 1828; *El Redactor Peruano*, all May–Oct. 1836; *El Mapa Político y Literario*, all June–Oct. 1843 (grain prices). (All newspapers are published in Lima.)

Newspapers also contain many protest articles such as "Carestía" and "Carestía de carne," *El Comercio*, Sept. 28–30, 1865; or "Creciente carestía," *La Patria*, Mar. 7, 1873 (which, for example, claims food prices rose "one-third" that year). Again, all available papers were searched for missing data years; newspaper price fragments are omitted from the appendix.

14. Manuel A. Fuentes, *Guía histórico-descriptiva, administrativa, judicial y de domicilio de Lima* (Lima, 1860), esp. "Precios corrientes de algunos víveres, licores y de otros artículos de primera necesidad," 233–234 and all chap. 4. I use such surveys below for expenditure weights.

Prices for food, housing, and servants were twice those of Santiago and Buenos Aires, even before the Peruvian inflation of the 1850s.[15] Finally, along with such supplementary prices, I take Macera's tabulated data for 1855 and 1869 (and his strong flour series) also into account, despite their sometimes uncertain provenance.[16]

Historically, Lima was the wheatbread capital of South America, making the price of bread a special problem. Most accounts report a constant, customary, or controlled price of bread throughout much of the century—the *postura de pan* available at bakeries at four to five "pieces" a real, or less for charities. In fact, the quality and weight of these loaves varied widely. Often with the connivance of the municipality, monopolistic bakers adjusted loaf size and adulterated flour grades to reflect their real costs. Therefore, where possible, wholesale flour prices constitute the bread series, and, where these are lacking, a correlated U.S. wholesale index is used (in the early republic, substantial North American and Chilean flour imports stabilized prices in Lima).[17] The wobbly downward trend that results is more precise than the constant price of bread assumed in other works.

In Table I, all of the usable data are simplified into 1830-based indices for each of eleven major food categories. In this study, 1830 will be the reference year; by then, prices had clearly settled at traditional levels fol-

15. H. Wilson to Earl of Aberdeen, "An approximate calculation of the expenses of living in the several capitals of the Spanish American states," Aug. 7, 1842, in Public Record Office, Foreign Office, Series 61, Correspondence between British diplomatic and consular officers in Peru and the Foreign Office (hereafter FO 61/vol.), FO 61/93. A similar 1826 report (Ricketts to Canning, July 22, 1826, FO 61/8) already complained of prices twice those found elsewhere. Typical grain reports are Miller, Dec. 31, 1842, FO 61/92 and Mar. 27, 1843, FO 61/98. A price sample from North American reports is found in Despatches from U.S. consuls in Callao, U.S. National Archives, Record Group 59, M155 (hereafter M155/vol.), Trevill, Oct. 1, 1861, M155/4.

16. Macera, "Plantaciones azucareras," Tables 35–37, 39 (orig. source: Consejo Provincial, *Datos e informes sobre el alza de precios*); not a clue is provided as to how these prices were gathered, though different locations are often indicated. Martinet's 1870s *Carestía de víveres*, despite the title, is very short on price data.

17. Flour prices from Macera, "Plantaciones azucareras," Table 39 (1852–69) or above consular and archival sources; 1800–40s U.S. index from *Historical Statistics of the United States: Colonial Times to 1970* (Washington, 1975), Part 1, Table E-124. Wheat Flour, 1800–1970 (Philadelphia wholesale). Cross-checked with less-useful Chilean data in Arnold J. Bauer, *Chilean Rural Society from the Spanish Conquest to 1930* (Cambridge, 1975), App. 1 (Santiago flour) and Sepúlveda series.

For insight into bread markets, see Gremio de Panaderos, *Aclaración documentada sobre las causas que han promovido la contienda de panaderos, dada por la Junta Directiva del Gremio* (pamphlet, Lima, 1842); or Archivo Municipal de Lima (hereafter AML), Libros de Cabildo, 1824–38, nos. 46–49, which also document a variety of early attempts at food price controls in the city. On the initial U.S. supply role, consult Gootenberg, *Tejidos y harinas, corazones y mentes: El imperialismo norteamericano del libre comercio en el Perú, 1825–1840* (Lima, 1989), chaps. 2–4.

TABLE I: Indices of Key Food Groups (1830 = 100)

Item/year	1799–1800	1804–1805	1809–10	1814–15	1819–20	1822–23	1826	1827
Mutton	72	(72)	96m	94m	101m	130m	100	103
Beef	104	(104)	—	—	—	—	139	117
Poultry	89	89	(89)	82	101	190	129	123
Lard	265	294	224	208	364	—	90	(90)
Rice	93	108	90	85	132	272	88	91
Beans	83	75	105	100	100	—	126	106
Noodles	—	—	—	—	—	—	87	85
Sugar	125	105	99	89	103	171	229	119
Bread/flour	201	183	165	167/135w	116/439w	134/772w	96	102
Cooking fuel	—	—	—	—	—	—	120	113
Others	81	97	101	105	132	112	100	149

Item/year	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838
Mutton	109	95	100	99	86	80	81	80	(80)	71	72
Beef	125	—	100	92	90	87	88	82	(82)	81	81
Poultry	111	95	100	86	97	115	107	93	(93)	102	95
Lard	140	88	100	118	150	177	201	133	50ws	130	133
Rice	68	87	100	86	63	63	85	(85)	47ws	69	70
Beans	63	—	100	100	94	108	(108)	—	—	58	(58)
Noodles	100	(100)	100	81	94	98	94	88	(88)	—	—
Sugar	107	—	100	71	76	81	67	70	60	104	93
Bread/flour	108	102	100	114	99	124	100	118	178	182	160
Cooking fuel	108	(108)	100	100	100	111	108	113	(113)	152	150
Others	100	(100)	100	94	109	108	90	97	116	104	132

Item/year	1839	1840	1841	1842	1843–46	1847	1848	1849	1850	1851
Mutton	73	66	67	64	—	(61)	61	80	85	84
Beef	81	80	80	81	—	77	75	78	82	82
Poultry	95	79	79	79	—	(105)	105	105	109	116
Lard	155	168	113	116	—	116	109	112	116	133
Rice	76	68	63	63	—	56	58	100	92	64
Beans	—	—	—	—	—	91	83	99	96	103
Noodles	62	60	60	60	—	44	56	54	55	51
Sugar	107	64	76	75	—	77	74	67	85	81
Bread/flour	148	106	112	111	(96) —	134	119	90	74	90
Cooking fuel	150	125	125	(125)	—	(96)	96	100	100	100
Others	96	85	88	88	—	83	66	81	89	92

lowing the extraordinary supply disruptions of the independence wars. These indices are averages of the most consistent and reliable appendix prices, after their standardization into real/pound ratios from the maze of archival quantity units and, for some foods, differing quality grades. (The daunting challenge is safely converting such archaic and imprecise measures as *botijas*, *cargas*, *costales*, or *sacos* of rice.) The number of minor and occasional products is further reduced in the table, except insofar as a

TABLE I: (continued)

Item/year	1852	1853	1854	1855	1856	1857–58	1859	1860	1861	1862
Mutton	(84)	91	82	82	(82)	—	91	106	91	91
Beef	92	92	87	87	(87)	—	156	264	185	185
Poultry	(116)	126	111	158	143	—	142	221	(221)	(200)
Lard	109	99	133	155	227	—	228	187	162	177
Rice	66	70	89	72	120	—	86	123	111	(111)
Beans	(103)	109	46?	92	242	—	92	209	(209)	—
Noodles	65	60	(60)	53	55	—	55	63	56	50
Sugar	(81)	60	67	67	96	—	117	139	103	108
Bread/flour	94	83	75	94	102	88/94	88	78	73	80
Cooking fuel	—	(107)	107	(107)	100	—	146	114	114	114
Others	101	90	103	84	126	—	85	119	81	82

Item/year	1863	1864	1865	1866–68	1869	1870	1871	1872	1873
Mutton	91	91	140	—	136	(136)	211	157	157
Beef	162	183	177	(272?) —	242		289	361	361
Poultry	(200)	(200)	204	—	190	(190)	(190)	—	—
Lard	193	157	232	—	310	(310)	217	194	(194)
Rice	80	97	83	—	98	(98)	154	173	(173)
Beans	150	166	261	—	233	(233)	218	213	(213)
Noodles	50	55	65	—	—	—	100	85	—
Sugar	88	105	104	—	106	(106)	172	150	(150)
Bread/flour	72	70	73	80/94/92	78	(78)	65	59	(59)
Cooking fuel	(114)	116	(116)	—	146	(146)	—	—	—
Others	87	135	137	—	115	(115)	(101)	101	(101)

Source: Appendix, averaged prices. ( ) = interpolations; (m) = meat averages; (w) = war wheat prices; (ws) = wholesale. "Others" is mean of potatoes, *chuño*, chickpeas, maize, squash, and soap. For unit conversions, see n. 18.

combined "Others" index represents prices of potatoes, *chuño*, chickpeas, maize, squashes, and soap.[18]

On the whole, despite the occasional obstacles placed by supply monopolies and municipal price controls, Lima's populace clearly faced a diverse agrarian supply shed and competitive markets. Limeños were sub-

18. Throughout this study, minor price gaps (only in stable years) are filled using item prices from the prior year. This method avoids unwarranted swings back to 1830 price levels. See n. 30, below, on treatment of base years.

Standard conversions include 1 arroba = 25 lbs.; 1 quintal = 4 arrobas = 100 lbs. Fanega measures are by volume, and thus vary with the product; e.g., maize = 135 lbs.; wheat = 135 lbs.; beans = 182 lbs.; lima beans = 156 lbs.; and flour barrels ranged from 190 to 196 lbs. (sources: Barton, June 30, 1843, FO61/99; Miles, Aug. 9, 1855, M155/1). "Sacos" conversions are fine flour, 200 lbs.; beans, 200 lbs.; chickpeas, 200 lbs.; maize, 154 lbs., etc. (*La Bolsa*, Jan. 4, 1842). Interpolated conversions (from simultaneous readings) include rice, 10 botijas = 2 sacos or 1 costal/carga (with sacos/fanegas at 180–190 lbs.); firewood, 30 tercios = 1 carga = 1.15 quintal. For whole lambs, the conversion rate is 8 kilograms per head (or 20 lbs., later weights): see Pérez Cantó, "Abastecimiento de Lima," 469.

ject to short- and long-term price shifts in staples like meat, rice, beans, and cooking fats. Yet, even these disaggregate figures suggest trends. Most prices skyrocketed during the independence struggles, then quickly stabilized. By the early republican period, between 1830 and 1848, prices appear largely in decline, as northern *chacras,* haciendas, and trade continued their recovery from the wounds of war.[19] Overall, meat prices descended some 20 to 40 percent, and similar falls affected rice, beans, noodles, sugar, and a host of minor goods. After 1848, the reverse set in: an inflationary movement. Rising prices appear more fitful and flagrant in some lines of consumption—poultry, beans, rice—than in others—sugar, pasta, and imported flour. (The late 1850s emergency decrees for duty-free food imports coincide closely in timing and products with the price hikes observed here.) By the 1860s, most prices would remain far above 1840s levels, and some, such as those for beef and beans, at more than twice their original norms. Many explanations, we will see, are available for these trends.

In spite of the clarity of the trends seen in Table I, individual prices frequently moved in contrary directions and degrees. In and of themselves, moreover, food data cannot reveal the overall impact of price fluctuations on popular welfare, much less be used to deflate nominal statistics and trends. Such tasks require the construction and application of a weighted cost-of-living index.

A Nineteenth-Century Cost-of-Living Index

A cost-of-living index, such as those based on modern survey analysis, is a weighted average of price relatives over time. Put simply, the statistic shows the proportional change in overall expenditure needed to maintain a fixed level of consumption, as measured in some typical "base-year" family market basket. If a later basket B, with identically weighted items, costs 15 percent more to purchase than the original basket A, then inflation is 15 percent.[20] While in some sense a culture-bound measure, a cost-of-living index provides a far more meaningful account of price

19. The most detailed study of initial agrarian supply conditions is Juan Rolf Engelsen, "Social Aspects of Agricultural Expansion in Coastal Peru, 1825–1878" (Ph.D. diss., University of California, Los Angeles, 1977), chaps. 1–3. For emergency free-trade decrees of the 1850s, see P. Emilio Dancuart, *Anales de la hacienda pública del Perú* (Lima, 1902–), VI, 17–18.

20. One guide to the practice of price indexes is R. G. D. Allen, *Index Numbers in Theory and Practice* (London, 1975); for price theory, historians can follow Donald N. McCloskey, *The Applied Theory of Price* (New York, 1982), one of the few texts written with us in mind. But also bear in mind that even current price indices in the developed world come under criticism, and that consumer-price indices, the best indicator of welfare, do not always make an optimal macroeconomic deflator.

movements than noting that certain living costs seem to wildly fluctuate. Economists often deploy more sophisticated statistics for macroeconomic GNP deflators, but the consumer-price index remains the most tangible and direct measure of all.

Peru's government, of course, did not conduct consumer research in the nineteenth century. Appropriate expenditure weights must be devised from scratch, to build a cost-of-living index that can employ our new price data for inflation estimates. The earliest Peruvian attempt to scientifically gauge consumption patterns was in 1920; the first official cost-of-living index followed in 1925, though an incisive review by Shane Hunt calls its accuracy into question (among other defects, it showed bread costing over one-fifth of family income). In fact, the oldest reliable survey, if still problematic for some items, is the 1957 census of Lima/Callao family budgets. For comparison, these modern expenditure weights are displayed in Table II. In lieu of other methods, Hunt was forced to fit these weights to the published Lima 1855/69 price data to calculate deflators for his guano-age GNP figures.[21] By his heroic guesswork, price levels rose some 75 percent between 1855 and 1869, or only 32 percent if one included a stable price of bread.

Historians, however, are bound to question the anachronistic application of modern weights to prices from the 1850s. In a century of change, large shifts were likely in relative prices, and thus in budget weights—as well as in tastes for such traditional delicacies as *carnero* and *chuño*. Other nineteenth-century inflation "guesstimates" use indirect methodologies without the aid of expenditure weights or even local price data. Such is the cliometric exercise of Carlos Boloña for the 1870s to 1900s, which imputes domestic price levels (an acute inflation) from divergencies between North Atlantic price indices and Peruvian rates of currency devaluation. This methodology cannot be applied to the earlier era, which lacks decent exchange rate data. Further, since it uses cross-national index comparisons, it is less reliable than the direct knowledge of price movements from a consumer index.[22] The nineteenth century, for all these reasons, requires its own cost-of-living weights.

21. Hunt, "Real Wages and Economic Growth" (manuscript, Princeton, 1974), later published as "Evolución de los salarios reales en el Perú: 1900–1940," *Economía* (Lima), 3 (June 1980), 83–124. The anomaly in the 1957 survey is the high proportion of food outlays (suggesting poverty) with high meat outlays (suggesting affluence)—which may not be fully explicable by the Limeño cultural preference for meat, discussed below.

The weights in Table II are from Dirección Nacional de Estadística y Censos, *Boletín de Estadística Peruana*, 5/6 (1962), 24. For earliest surveys used in comparison, see Oscar F. Arrús, *El costo de la vida en Lima y causas de su carestía* (Lima, 1927) or *Estadística de precios y números indicadores* (Lima, 1920). See Hunt, "Growth and Guano," 75, 187, for inflation estimates, which could not be replicated here.

22. Boloña, "Tariff Policies in Peru," Tables 3.1, 3.2, and App. A.3 4–9. Actually, con-

TABLE II: Modern Expenditure Weights (Lima/Callao, 1957)

Item	Percentage of family budgets		
	Workers		
		Percentage of food budget	White collar
All Food	55.61		47.04
Bread	5.17	9.30	
(Meat)	(22.92)	(41.22)	
Beef	12.15	21.85	
Mutton	3.44	6.19	
Pork	7.33	13.18	
Oils/lard	2.52	4.54	
Rice	5.17	9.30	
Beans	4.24	7.62	
Sugar	3.25	5.84	
Noodles	1.38	2.48	
Potatoes	5.03	9.00	
Corn	0.69	1.24	
Flour	0.44	0.80	
Milk	2.47	4.44	
Coffee	2.34	4.21	
Housing	12.65		15.92
Clothing	10.07		12.32
Diverse	21.67		24.72
Transport	7.47		8.55
Furnishings	5.86		5.39
Health	3.73		4.40
Recreation	1.79		2.67
Liquor and tobacco	1.86		2.38
Education/culture	0.96		1.33
Totals:	100.00		100.00

Sources: Dirección Nacional de Estadística y Censos, *Boletín de Estadística Peruana*, 5 (1962), 23–25; food tabulation based on Hunt, "Real Wages and Economic Growth," Table 4–15.

Constructing these historical weights is a difficult but not impossible task. The method followed here builds rudimentary expenditure weights

sular records show that nineteenth-century Peruvian exchange rates varied from the fixed official rates, fluctuating with export conditions; see, e.g., Miles to Clay, July 15, 1859, M155/3. Until the 1860s, official exchange rates were invariably listed as one peso = one U.S. dollar; five pesos = one £ (British pound sterling). After 1900, consumer-price indices (though unlinkable) begin. See Rosemary Thorp and Geoffrey Bertram, *Peru 1890–1977: Growth and Policy in an Open Economy* (New York, 1978), Tables 6.9 and 6.16. The Colombian price index cited above (n. 3) relies on modern weights.

The methodological "index number problem" of price comparisons is discussed in R. Bacon and W. Beckerman, "International Comparisons of Income Levels: A Suggested New Measure," *Economic Journal*, 76:303 (Sept. 1966), pp. 519–537 or Simon Kuznets, *Modern Economic Growth: Rate, Structure, and Spread* (New Haven, 1966), chap. 7.

TABLE III: Artisan Diet Weights, 1869

Item	In grams	As expenditures (%)		Amended (%)
Meats	460	Meat	34.25	34.3
Bread	287	Bread	10.53	21.0
Rice	172	Rice	8.02	8.0
Dried beans	115	Beans	8.02	8.0
White sugar	57	Sugars	5.15	5.1
Brown sugar	41			
Lard	57	Lard	4.95	4.9
Noodles	24	Noodles	1.77	1.8
Fuel	460	Fuel	21.69	10.8
Milk	3	Others	5.62	6.1
Tea	3			
Vinegar	2			
Salt	24			
Minor . . .	—			
Totals	1,705 grams at 35.5 centavos		100.0	100.0

Sources: Lima, Consejo Provincial, *Datos e informes sobre el alza de precios* (1870), 117; see text for method. Amended by food budgets of Hospital Santa Ana, Feb.–May 1837, AGN H-1 OL 257/469–501.

from three sources: a model artisan diet from 1869, archival hospital budgets, and aggregate consumption expenditures for the city of Lima in 1837. The combined midcentury weights may then be compared to modern survey weights, though the aim is to create the most fitting index for the historical price record.

The closest find to a contemporary food budget survey is an exemplary artisan diet from Lima's Escuela de Artes y Oficios. Fortunately, the 1869 regional price commission published this model, as their crude way of suggesting the impact of inflation on popular living standards. The artisans' daily food intake was listed only in grams, at a total cost of 35.5 centavos.[23] With but minor headaches, unit food prices of 1869 can be multiplied against gram quantities to reveal relative food expenditures; these are reassembled in Table III as percentage weights of a full food budget.

The results are by and large compatible with food budgets analyzed from hospital archives throughout the century. We can say that the typical Lima family spent roughly 34 percent of its food budget on meats (we knew that Limeños were voracious meat eaters); 5 percent each on lard

23. Consejo Provincial, *Datos e informes sobre el alza de precios*, 117, used with prices throughout; the difficulties arise from interpolating the few missing item prices for 1869. This diet is very similar to daily *raciones* costs, e.g., those listed in Hospital de Santa Ana, Jan. 1865, AGN H-1 OL 472/382–388, which range from 3 to 3.25 reales; see also sailors' rations in *El Redactor Peruano*, Nov. 14, 1836.

and sugars (and that their diet was unhealthy); and 8 percent on each of the staples of rice and beans. Furthermore, these proportions were homogeneous for the population at large, for it is known that significant class differences had not yet emerged in creole cuisine.[24]

Two further adjustments were necessary. First, the undifferentiated meat weight—for *carnero*, beef, and poultry—is apportioned on a straight one-third basis, i.e., 11.4 percent each, since meats were substitutes for each other. Second, two of the original weights, for bread and fuel, are readjusted to realistic proportions of 21.0 and 10.8 percent respectively, as calculated from 1837 hospital outlays.[25] The need to get bread right is obvious for Lima. Fuel (chiefly firewood) is also a vital, if overlooked, item to include in a price index. Used in cooking and other household chores, it suffered sharp price vacillations as the century progressed (from rapid deforestation of the coast and the subsequent 1860s switch to imported coal).

Diets, however, only reveal the average weights of *food* outlays, and Limeños did not live by *carnero* alone. What proportion did subsistence play in overall family expenses? The best data can be derived from a remarkably detailed series of surveys of the city's global consumption, such as the one produced by Fuentes for 1858. The optimal information, however, comes from José María Córdova y Urrutia's *Estadística histórica, geográfica, comercial e industrial* for Lima province in 1837. This census forms a more complete estimate of area purchases; provides convincing evidence on the collector's method; cross-checks with other sources (such as consular reports and hospital records); and avoids some bizarre relative price shifts of the guano age.[26]

24. Peloso, "Succulence and Sustenance," 47–50. In 1860, Limeños consumed 97.15 lbs. per capita of meat, one of the highest levels in the world (Fuentes, *Guía histórico-descriptiva*, 158–159). For the municipality after 1860, meat supplies, not bread, became the overriding pacifier for urban dwellers; after the model penitentiary, the new *camal* was the city's proudest civic improvement.

25. Bread and fuel adjustments based on study of hospital budgets throughout the period; final calculations from Cuentas del Hospital Santa Ana, all Feb.–May 1837, AGN H-1 OL 257/469–501. The most useful corroborative document is Diario de Hospital de la Caridad, 1827, ABPL, 9302, which lists its budget subtotals for bread, meat, fuel, and "plaza" products. On changing meat and fuel consumption, see discussions in Macera, "Plantaciones azucareras," 243–255, 256–258. There were also discernible taste changes in meat consumption—declining shares of poultry and rising shares of beef. Oddly enough, most records show little pork consumption in the nineteenth century, though lard found its way into virtually all cooking.

26. José María Córdova y Urrutia, *Estadística histórica, geográfica, industrial y comercial de los pueblos que se componen las provincias del departamento de Lima* (Lima, 1839), chap. 9, "Riqueza y consumos que hacen los habitantes," and passim; the housing item is added from imputed urban rents, p. 131. Compare Fuentes, *Estadística general de Lima* (Lima, 1858), 705–716 and fragmentary surveys in Fuentes, *Guía histórico-descriptiva*, chap. 4 (1860); Pérez Cantó, "Abastecimiento de Lima," 468 (1790s); and Haitin, "Prices and

TABLE IV: Lima Consumption Expenditures in 1837

Item	Outlays (1,000 pesos)	Percentage
Market Foods	4,986	34.9
Bread	1,246	8.7
Liquor	764	5.4
Tobacco	623	4.3
Ice	156	1.1
(Total food)	(7,775)	54.5
Clothing (and household textiles)	1,639	11.5
Housing (imputed rents)	1,108	7.8
Footwear	983	6.9
Furniture	541	3.8
Lighting (candles, etc.)	154	1.1
Transport (animal care/carts)	574	4.0
Government (taxes)	884	6.2
Private services (lawyers, scribes)	294	2.1
Recreation (gambling, etc.)	218	1.5
Health care (doctors' fees)	85	0.6
(Total diverse goods/services)	(3,733)	26.2
Total	$14,255,000	100.0

Source: Calculated from Córdova y Urrutia, *Estadística histórica de Lima*, chap. 9 and p. 131. For comparisons, items are aggregated like modern weights.

The census data in Table IV contain the necessary global expenditure weights: foodstuffs as a whole at 54.5 percent; clothing and home textiles at 11.5 percent; rents at 7.8 percent; and diverse goods and services at 26.2 percent. These weights represent general trends. They are, in fact, the averaged post facto consumption pattern of each and every Limeño. Only one adjustment was necessary to the original data; liquor and tobacco are considered as essential foodstuffs, something that the profligate inhabitants of Lima no doubt felt at the time.[27] Finally, the arti-

the Lima Market," Table I (1814). 1837 census data are cross-checked with trade estimates in Wilson to Palmerston, "Commercial Report on the Trade of Peru in 1837," Sept. 29, 1838, FO 61/53.

27. This is a serious observation, though the index will have to assume (in lieu of archival prices) that liquor/tobacco prices moved with the complex of other agrarian goods. Hospital budgets clearly demonstrate that these "vices" were close substitutes (in budget proportions) to the medicines consumed there. Nor is 10 percent of income excessive for this outlay; modern Andean peasants, for example, allot as much as 10 to 17 percent of monetary incomes on coca, drink, and cigarettes. See Adolfo Figueroa, *La economía de la sierra del Perú* (Lima, 1983), Table III.4. Conceivably, simpler expenditure weights could have been based on the various 1837 data alone; but the 1869 artisan diet proved far more precise, and overall the differences in the two approaches appear minimal.

TABLE V: Nineteenth-Century Cost of Living Weights

Item	Percentage of budget	Percentage of Food
Food	54.5	
(Meat)	(18.7)	(34.3)
Mutton	6.2	11.4
Beef	6.2	11.4
Poultry	6.2	11.4
Bread	11.4	21.0
Rice	4.4	8.0
Beans	4.4	8.0
Sugar	2.8	5.1
Lard	2.7	4.9
Noodles	1.0	1.8
Fuel	5.7	10.5
Others	3.5	6.4
		100.0
Textile clothing	11.5	
Housing	7.8	
Diverse (services, etc.)	26.2	
Total	100.0	

Sources: Tables III and IV combined. Food: Consejo Provincial, *Datos e informes sobre el alza de precios*, 117; overall budget: Córdova y Urrutia, *Estadística histórica de Lima*, chap. 9.

san food weights and urban expenditure weights are merged to yield the nineteenth-century cost-of-living index, the one ready for use in Table V.

How trustworthy are these independently derived weights? Apart from the checks already noted and literary observations of the day, comparisons with modern weights (Table II) reveal the expected trends and some insights into social history. A striking coincidence occurs in food expenses; nineteenth-century Limeños spent 54.5 percent of their incomes on food, and modern workers 55.6 percent. The two leading items, meat and bread, account for roughly half of all food consumption—though, as one would hope, less bread and more meat grace the tables of modern workers. Outlays on minor staples all fall within 1 percent of each other, but recent urbanites have modestly diversified their nutrition. Engel's law is modestly in force.[28]

28. Engel's law, the most basic of consumption theories, predicts that as incomes rise food should decline as a proportion of budget expenses, discounting such "superior" goods as meat. Reluctantly, one draws long-term social and welfare implications from these data. Could, for example, the slightly higher proportion of modern workers' incomes spent on

Nineteenth-century consumers allotted 11.5 percent of their budgets to textiles, modern ones 10 percent; housing expenses rose from 7.8 to 12.7 percent. Both trends are predictable during industrialization in a burgeoning metropolis like Lima. Even diverse expenses appear closely matched, though this conceals some typical signs of urban "progress," for example, rising transport and health costs. And Limeños still love, if with less abandon, to smoke and drink.

Besides verifying the comparability of the new weights, long-term comparisons may support an economic truism. Cultural influences, or an enduring complex of taste preferences, are a fundamental determinant in consumption patterns. A Limeño of the 1950s, despite all the changes in the city, would have recognized and shared the *gustos* of one of its inhabitants of the century before (more than those of a Japanese, Mexican, or Scottish consumer of either era). This stubborn tendency has been noticed by economic historians studying centuries of English price history, and it is recognized in the greater methodological caveats to cross-cultural than to historical price comparisons.[29] Thus, it is safe to use these coastal creole weights in Table V for all of the nineteenth century. But only at great risk could we extend them to the other Peru of the Indian sierra.

Measuring Inflation

An actual price index, built from price information and budget weights like those above, is still at best an educated guess at changes in price levels. The statistician can choose to manipulate weights and data to achieve a lowerbound, upperbound, or realistic aggregate of the prices

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food indicate a deterioration in urban lifestyles, as proletarianization progressed among the independent poor? (It might also reflect faults in the 1957 survey, mentioned above, or the fact that the 1837 census reflected all classes of urban consumers, not just workers.)

Even the signs of "modernizing" consumption here are ambiguous in welfare terms. Higher expenses on rents, health, and transport could just as well indicate greater overcrowding, sickness, and time (and money) wasted commuting to distant jobs from modern class-segregated neighborhoods. These conundrums afflict all long-term studies of consumption and welfare; higher income need not spell higher utility.

29. E. H. Phelps Brown and Sheila V. Hopkins, "Seven Centuries of the Prices of Consumables, Compared with Builders' Wage-Rates," *Economica*, 23 (Nov. 1956), 297. See also David Felix, "De Gustibus Disputandum Est: Changing Consumer Preference in Economic Growth," *Explorations in Economic History*, 16 (July 1979), 260–296. (Felix's studies of consumption have important implications for Third World growth patterns.) Consult budgets in Albert Fishlow, "Comparative Consumption Patterns, the Extent of the Market, and Alternative Development Strategies," in *Micro-Aspects of Development*, Eliezer B. Ayal, ed. (New York, 1973), esp. Table 3.1. This cultural "truth" on Peruvian consumption patterns may no longer hold, given the rapid "Americanization" (and immiseration) of Lima consumption since the 1960s.

at hand; and in this mathematical task, too, the historian must integrate social history evidence. Out of the range of possible calculations, we now construct two distinct price indices for 1800 to 1873: first, a simple retail food price index, and second, a more elaborate and more weighted index of general inflationary trends. Depending on its intended use, the optimal measure will be the most cautious, comparable, and verisimilar one.

The first index simply measures the internally weighted aggregate shift in food prices. As a conception of inflation, it assumes that agrarian prices determined the price level in general—the not-uncommon physiocratic notion that all prices rose in tandem with the fortunes of agriculture. The starting year (100) selected is 1830, although it is not technically a "base year," since our weights are an amalgam from the years 1837/69. By 1830, prices had stabilized after the inflationary crisis of the independence wars; it was a year of robust data and the base year of other series needing deflators.[30] By itself, a subsistence index is appropriate to certain tasks in social history, for example, understanding the motives behind the bread and bean riots so common in nineteenth-century Lima. In this case, its strength lies in the particularly solid set of local food prices found.

The calculation is a standard Laspeyres index. First, the food expenditure weights (set at 100, as in Table V) are multiplied against the 1830-based indices of itemized price rises (Table I). To be precise, the index is a weighted measure of *changes* in price levels relative to 1830. So, to illustrate, an indexed number of 88 (as seen with lard in 1829) represents a 12 percent *decrease* in price; when multiplied by its weight of 4.9, this produces a component change of −60. Alternatively, the index number for chicken in 1850 (109) represents a price *rise* of 9 percent since 1830, which after weighting by 11.4 contributes a score of +103.

More than five hundred such calculations make the building blocks for the final index. The second step, then, is to add each year's eleven food item total. When deflated by one hundred, this number reveals the year's aggregate change in price level. (For example, the total of 962 in 1839 = +9.6 = the index number 109.6, or 9.6 percent higher prices than

30. One "physiocratic" study (at least how others regard it) is Enrique Florescano, *Precios del maíz y crisis agrícolas en México (1708–1810)* (Mexico City, 1969). A major purpose of the present study is to explore other determinants of Latin American price levels, in the politically central "Westernized" regions.

To be a technical "base year," the expenditure weights would have had to have come from 1830, too. Broad (or shifting) weights are common in historical price studies (see Phelps Brown and Hopkins, "Seven Centuries of Prices"), so long as the historian then avoids certain index-linking problems. A trickier question is the choice of 1830 for base-year prices; yet, using a broader interval instead (such as 1830–34) barely affects the results. On both issues, consult Roderick Floud, *An Introduction to Quantitative Methods for Historians* (London, 1979), 122–129.

TABLE VI: Retail Food Price Index, Lima, 1800–73 (1830 = 100)

Year	Index		Further weighted	Year	Index	Further weighted
1800	123.8		113.0	1847	93.7	96.6
1805	121.1			1848	88.5	
1810	115.8		108.6	1849	90.6	
1815	111.9	(105.1)[a]		1850	89.4	94.2
1820	121.4	(189.2)[a]	111.7	1851	92.5	
1822	169.3	(201.2)[a]		1852	94.2	
1826	116.0			1853	91.6	
1827	109.4			1854	89.1	
1828	105.3			1855	99.0	
1829	99.6			1856	121.5	
1830	100.0		100.0	1857	(118.6)	
1831	97.9			1858	(119.9)	
1832	94.9			1859	109.4	
1833	104.9			1860	147.4	125.8
1834	100.2			1861	129.3	
1835	98.6			1862	124.6	
1836	(104.6)			1863	117.9	
1837	109.1			1864	124.6	
1838	110.0			1865	141.3	
1839	109.6			1866	153.5	
1840	92.8		96.1	1867	(156.4)	
1841	91.9			1868	(156.0)	
1842	91.5			1869	152.9	
1843	(88.3)			1870	(152.9)	128.8
1844	(88.3)			1871	150.1	
1845	—			1872	149.5	
1846	—			1873	(149.5)	127.0

Sources: Tables I and III. Calculations with 1869 food weights = 100; further weighted = index x.545 + 45.5; ( ) are interpolations.

[a] Factoring in war wheat averages (1815–22).

in 1830.) Along the way, we can prudently resolve the last gaps in the series.[31]

The result, in Table VI, is metropolitan Lima's retail food price index from 1800 to 1873. Recall that this is our most promiscuous measure of deflation/inflation, one that assumes that all prices reflect the volatile behavior of foodstuffs. Yet it is still more accurate than impressions gathered from individual food fluctuations, for it is weighted, and these weights include bread and other price-stable items.

The food index demonstrates a late colonial deflationary trend (10 percent), interrupted by a 51 percent independence-war hike peaking in

31. See n. 18 above; the complete flour series makes the difference here.

1822. A rapid stabilization followed, with a continuing deflation in the 1830s, despite two caudillo-war crests. By the mid-1840s, aggregate food prices had descended 10 to 12 percent below 1830 levels, or more than one-fourth (28.7 percent) since the start of the century. As early as 1849, a fitful guano-age inflation began. Food prices rose 6 percent between 1848 and 1853, followed by significant spurts in 1854–56 (36 percent), 1859–60 (35 percent), and 1863–66 (33 percent). Overall in the high guano age, food prices had doubled.[32] By contemporary norms, felt in the pockets of workers, this was a startling inflation.

Of course, foodstuffs were not the sole expense for consumers. A more cautious approach would further weight this food index in the overall consumption basket, assuming that other prices (for clothing, for example) remained stable. This is also shown, at intervals, in Table VI. (Calculation is simple: the food price index is deflated by its proportion in budgets, .545 × the food index; for each year .455 × 100 is added, which has the effect of holding all other prices constant.) Even if conservative, the assumption of price stability in other goods is not unfounded, given the era's downward pressures on tradables; nor was it ever realistic to assume that, in a city, prices reflected agrarian conditions alone. When weighted this way, all price movements appear roughly half as strong. Prices fell only 11 percent from 1800 to 1830, and the total inflation from 1830 to 1873 was only 27 percent.

On the other hand, an annual food price index is not always sensitive to the wild fluctuations that could occur in moments of crisis. During the independence struggles, for example, blockades, hoarding, and spiking spread panic among Lima's vulnerable population. To illustrate, we can use a bakery price series unearthed by one historian for the war years 1812–21 (during which bulk wheat prices swung between 3.5 and 25 pesos!). When factored into our index, this suggests that food prices may have doubled at the height of shortages.[33]

The second major index to calculate is a measure of general inflation. In this, we integrate the impact of falling prices of imported manufac-

32. For comparisons of these results, recall that Hunt's simpler guano-age food index reports 32 percent inflation in the period 1855–69 ("Growth and Guano," 75); this is close to my estimate, especially if Hunt was using the most weighted method. Quiroz specifies (by comparisons) two peak subsistence crises, in 1850 and 1856 (*La deuda defraudada*, 110–111); only the latter appears significant here. See Macera, "Plantaciones azucareras," Table 37, for wholly unweighted price changes.

33. Weighted calculations based on data from John T. S. Melzer, "The Rise in the Price of Wheat for the 'Bakery in the Street of the Fishmarket' in the City of Lima 1812–1821," *The Accounting Historians Journal*, 15 (Spring 1988), Table 3. This article is a revealing account of a subsistence crisis of the era, and of the Lima bread sector. Recall that our bread series is based on flour prices, and, for these early years, international ones.

tures, rising urban rents, and the overall effects of inflationary behavior and expectations. This index assumes that all prices shifted together—as a weighted average of the prices of foodstuffs, imported textiles, and rents. The most realistic and warranted model of prices in Peru's opening economy, it is the one most likely followed by consumers, workers, and entrepreneurs, and it is congruent with many descriptions of the age. As the merchant J. F. Lembecke testified in 1869, "everything has gone up in proportion—wages, crafts, salaries, rents. . . ."[34]

Separate indices for textiles and rents are found in Table VII. By 1830, North Atlantic textiles had flooded traditionally sheltered Peruvian markets, although their effects (through contraband) were perceptible as far back as the eighteenth century. Chiefly cheap industrial cottons, textiles remained the bulk of Peru's nineteenth-century import bill (70 to 90 percent by some accounts); by 1840, they dominated the clothing sector in Lima, and they set the price of cloth in virtually all parts of the country.[35] In a sense, cottons serve as proxy for all foreign manufactures, though their prices are the ones that fell most sharply with the English industrial revolution. It should be kept in mind that the initial expenditure weight for clothing and home textiles was 11.5 percent.[36]

The textile index is constructed from two distinct sources, for greater realism. For 1800 to 1830, I have used prices of U.S. sheet cottons. Until 1830, New England shippers were actually the major suppliers of "tocuyos" to Peru. These prices are also the best indication of what Peruvians would have experienced at the far end of a market interrupted by international wars and various obstacles to trade, including colonialism and initial republican tariffs. The index, like other sources, reveals an unstable trend

34. Most notably, the long accounts in Consejo Provincial, *Datos e informes sobre el alza de precios* (quote, 13); or Martinet, *Carestía de víveres*, 20. Lembecke was wrong insofar as urban wages, at least, did not keep up with inflation; see discussion below.

35. Heraclio Bonilla, "La expansión comercial británica en el Perú," *Revista del Museo Nacional* (Lima), 15 (1974), 253–275, esp. Table 3; for the consumption effects on the opening economy, see Gootenberg, "Artisans and Merchants," chaps. 1 and 5. A detailed survey for analyzing growing import consumption (1845–49) is the appendix to Consejo de Estado, "Proyecto de reforma del Reglamento de Comercio y varios otros documentos que con él tienen relación," *El Rejistro Oficial*, Aug. 12, 1850.

36. The original expenditure data (Table IV) also implicitly contain weights for domestic manufactured goods (artisanal furniture, candles, shoes), whose combined weight in 1837 was 11.8 percent, about equal to the import bill. For lack of price data not much else can be done here. The share of home manufactures, and their use of imported inputs, also shifted significantly during the century. By the late 1850s, this sector was declining relative to imported crafts; yet, by the mid-1870s, an incipient import substitution emerged. See Gootenberg, "Artisans and Merchants," chaps. 2, 5.

This index must assume, then, that domestic manufactures prices followed the price level in general. These are a few of the problems that make any detailed analysis of tradables/nontradables prices so difficult.

TABLE VII: Textile and Rent Indices

Imported Textiles (1830 = 100)

Year		Year		Year	
1800	169.7	1836	84.9	1855	42.5
1804–1805	197.6	1837	75.5	1856	44.1
1809–10	228.3	1838	71.0	1857	45.8
1814–15	208.4	1839	70.5	1858	43.4
1819–20	158.7	1840	65.0	1859	45.4
1822–23	139.1	1841	62.9	1860	45.8
		1842	55.2	1861	44.4
1824	95.7	1843	52.0	1862	53.4
1825	102.7	1844	53.0	1863	69.3
1826	97.1	1845	52.0	1864	78.9
1827	89.6	1846	49.3	1865	70.1
1828	87.8	1847	54.2	1866	70.7
1829	92.2	1848	45.1	1867	59.1
1830	100.0	1849	44.2	1868	53.1
1831	90.8	1850	47.6	1869	54.9
1832	78.6	1851	45.0	1870	51.2
1833	79.0	1852	44.8	1871	49.0
1834	80.1	1853	47.2	1872	52.1
1835	85.7	1854	43.7	1873	50.7

Rents (1854 = 100)

Year		Year	
1854	100.0	1864	236.9
1855	109.0	1865	258.2
1856	118.8	1866	281.4
1857	129.5	1867	306.7
1858	141.2	1868	334.3
1859	153.9	1869	364.4
1860	167.8	1870	396.8
1861	182.9	1871	432.5
1862	199.4	1872	471.4
1863	217.3	1873	513.8

Sources: Textiles: (1800–30), *Historical Statistics of the United States*, Series E 123–134; cotton sheeting (1830–73), Mitchell, *British Historical Statistics*, Prices 19, cotton piece exports, 761.

Rents: (1854–73) calculated as 9 percent annual increase from Consejo Provincial, *Datos e informes sobre el alza de precios*, "Cuestión habitación" (crosscheck: *predios urbanos* tax data).

to 1820, followed by a 60 percent drop in prices during the 1820s.[37] After 1830, when the English came to dominate the market, I use British FOB

37. Based on *Historical Statistics of the United States*, Series E, 123–134. These price trends are in line with those reported in two detailed British "Reports on Trade," Ricketts to Canning, Dec. 27, 1826, FO 61/8, and Wilson to Canning, Jan. 19, 1834, FO 61/26. They

prices of export cottons. These underscore the delayed but full impact of the industrial and transport revolutions on Peru's opening economy, with its progressively falling tariffs. By the 1840s and '50s, cloth prices had declined another 50 percent since 1830—a considerable savings for consumers—but they did rise again in the 1860s with the "cotton famine" and other inflationary pressures of the era.[38]

Housing prices also varied dramatically in the nineteenth century. In fact, by the 1870s, rent hikes became a matter of grave official and popular concern, on a par with food issues. After actually receding during the post-independence depression, Lima's population exploded during the guano age, largely through internal migration in the 1850s. The city doubled in size from about 55,000 to 120,000 by the 1870s, and rents soared accordingly.[39] Another influence was the concentration of Peru's plutocracy in the capital, where the newly rich frenetically bid up housing prices.

Our best estimate of housing prices comes from the 1869 price commission. Average rent increases were placed at 8 to 10 percent annually between 1855 and 1869 (shop rents inflated even faster at a 12 to 15 percent rate). If this seems outrageously high, urban real estate taxes (those on *predios urbanos*) lend corroborating evidence: their sum tripled from 1850 to 1870, and then doubled in the early 1870s.[40] In Table VII, an index at 9 percent is calculated with base year 1854. Both the index and the tax data suggest a quadrupling of rents by 1873. Such a wrenching relative price change might render the rent weight (7.8 percent of budgets) rather conservative, since it reflected conditions in 1837. At the same time, this

realistically differ from the early sharp industrial price cuts reported in Albert H. Imlah, *Economic Elements in the Pax Britannica: Studies in British Foreign Trade in the Nineteenth Century* (Cambridge, 1958), chap. 2 and App. Table 2.

38. "Average Value of Cotton Piece Goods Exported—United Kingdom 1821–1965," B. R. Mitchell, *British Historical Statistics* (Cambridge, 1988), Prices 19, in 761 (original source: T. Ellison, *The Cotton Trade of Great Britain*, London, 1886). These trends also explain why Peru's last *obrajes* fell by the early 1840s, and the first modern textile factories succeeded in the 1860s. A modest bias might result from use of these series, if rates of change differed substantially between FOB and CIF prices; obviously, a locally derived cloth series would be preferable.

39. Córdova y Urrutia, *Estadística histórica de Lima*, 19, 33–35; Fuentes, *Lima: Apuntes históricos, descriptivos, estadísticos y de costumbres* (Lima, 1925; orig., 1866), 10–11. The 1869 commission (11–12) placed great stress on population growth, which it estimated (well above census figures) at "140–150,000." See Miller, "Population Problem in Lima," for appraisals.

40. Basadre, *Historia de la República*, IV, 1763 (from *Datos e informes sobre el alza de precios*, "Cuestión habitación"). The *predios* data studied are from Hunt, "Growth and Guano," 120 and Tantaleán, *Política económico-financiera*, Table 4. The best figures (in pesos to 1860, thereafter soles) are 45,000, 1837; 42,000, 1850; 68,000, 1860; 72,000, 1864; 96,000, 1871; and 192,000, 1874—the last distorted by stricter collection. Hunt uses these data for an 1866/76 price deflator (100 percent), but his earlier 1850s data seem shaky.

housing inflation can implicitly capture changes across a wider range of domestic services.

Before 1855, to be sure, housing prices moved along with other prices in the regional economy. They were stationary or falling until 1845, with the economic recession and population loss in Lima. This trend is clear from the tax records and from declining area farm rents. Rents likely rebounded modestly with the demographic and business revival between 1845 and 1855, much like other prices, before skyrocketing thereafter.[41] The way to represent this pattern is simply to omit housing from the index until 1855.

The general inflation index in Table VIII thus combines two calculations. It is a linked index. First, for 1800 to 1854, the original food and clothing weights become 100, or the total change in prices (54.5 + 11.5 = 66 is recast as 100 = 82.6 + 17.4). The two reweighted series are then summed for each year. Second, for 1855 to 1873, the multipliers for food, clothing, and housing become, in similar fashion, 73.8, 15.6, and 10.6 respectively, and the three components are added for those years. Both calculations assume that all prices (even those omitted) behaved in tandem with the large portion of prices accounted for in the weights. The indices link in 1854–55.

Linking these two distinctly weighted indices is sound, with their minimal divergence in the years 1854–55. Moreover, it is methodologically desirable. For in this way we actually do capture part of the long-term relative price change that must have ensued when consumers shifted their midcentury savings from cheaper textiles into their higher rents.

Table VIII also contains a specific guano-age index, intended for statistical work on the post-1850 export era. The model and weights are identical to the second set in the general inflation index, which was multiplied by 1.202 to make 1854, rather than 1830, "100." In 1854 prices began their ascent, after more or less stationary behavior during the initial decade of the guano age. This index graphically isolates the guano-age change in price levels: 30 to 60 percent by the first decade after 1854, and 70 to 100 percent overall by the following decade.[42] If it was a dramatic shift, the explanation lies mainly in the mid-1850s trough in meat, flour, and textile prices. Consumers lost these benefits altogether by the

41. Tantaleán, *Política económico-financiera*, Table 4 (for 1830s–1840s *predios* data); Engelsen, "Aspects of Agricultural Expansion," chap. 1. The timing of the urban rent takeoff is also seen in "Estado de los artesanos de Lima," *El Correo de Lima*, Oct. 16, 1851 and "A la Representación Nacional," *El Comercio*, Dec. 30, 1858. In the early guano age, many indicators rose in tandem with inflation: Gootenberg, "Artisans and Merchants," Table 7.

42. Again, recall Hunt's estimate of 1855–69 inflation at 75 percent (excluding bread)—nearly the same figure as my more detailed one.

TABLE VIII: Inflation Indices

Year	1830 = 100	Year	1830 = 100	Guano age 1854 = 100
1800	131.8[a]	1847	86.8	
1805	135.2	1848	80.9	
1810	135.4	1849	82.5	
1815	128.7	1850	82.1	
1820	127.9	1851	84.2	
1822	164.0	1852	85.6	
1826	112.7	1853	83.9	
1827	105.9	1854	81.2	100.0[c]
1828	102.3	1855	90.2[b]	109.6
1829	98.3	1856	109.1	131.1
1830	100.0	1857	108.4	130.3
1831	96.7	1858	(110.2)	132.5
1832	92.1	1859	104.1	125.1
1833	100.4	1860	134.2	161.3
1834	96.7	1861	121.7	146.3
1835	96.4	1862	121.4	145.9
1836	101.2	1863	120.9	145.3
1837	103.3	1864	129.4	155.5
1838	103.2	1865	142.6	171.4
1839	102.8	1866	154.1	185.2
1840	88.0	1867	157.2	189.0
1841	86.9	1868	(158.8)	190.9
1842	82.0	1869	160.0	192.3
1843	80.6	1870	162.9	195.8
1844	82.2	1871	164.3	197.5
1845	(82.0)	1872	168.4	202.4
1846	(81.5)	1873	172.7	207.6

Sources: Tables I, V, VI, VII.
Method: See text. ( ) are interpolations.
1830 = 100 weights:
[a] 1800–55, Table VI food index x.826 + Table VII textile index x.174.
[b] 1855–73, food index x.738 + textile index x.156 + rent index x.106; 1855 is mean.
1854 = 100 weights:
[c] 1854–73, same as [b]; index is 1.202 × 1830 index.

1860s. But that is precisely how inflation must have felt—alarming—to the generation living through the guano age.

Of all the indices, the long-range 1830 measure of general inflation is the most cautious, comprehensive, realistic, and solidly grounded. It represents, in my opinion, the optimal cost-of-living indicator, and can also be used as a statistical price deflator.[43] Peruvian price levels had

43. Specifically, the strength of this index lies in its attempt to capture the effects of domestic and traded goods beyond foodstuffs; the relative strength of the food price index lies in its fuller local data base. A valuable crosscheck of the index would involve indirect measures based on exchange rates, notwithstanding the challenges of amassing correct exchange rate data (see n. 22).

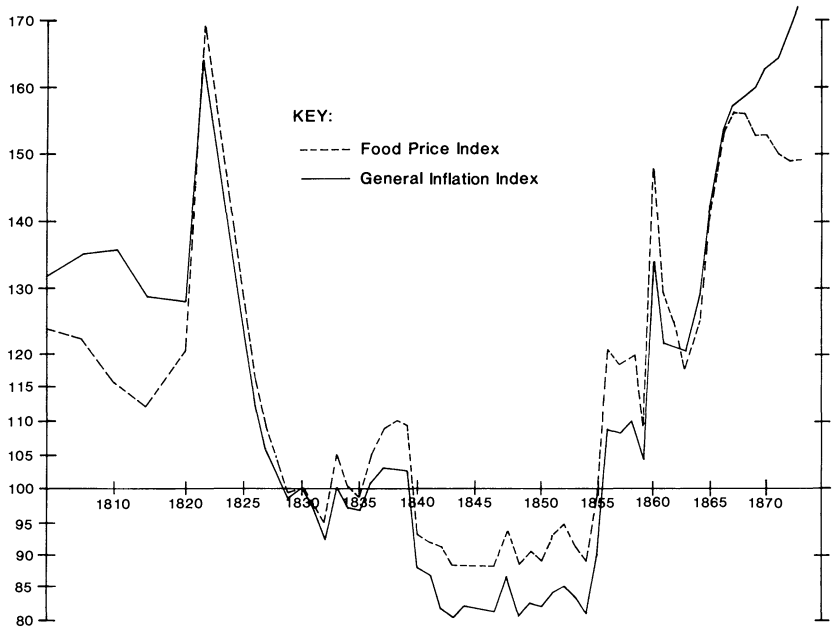

FIGURE 1: Price Levels in Peru, 1800–73 (1930 = 100)

clearly marked stages in the nineteenth century. Price levels were dropping slightly in the final decades of colonial rule, even if interrupted by the inflationary spiral of the independence wars. Two decades of deflation followed, bottoming out at 12 to 18 percent below 1830 levels, as the guano age began. In the mid-1850s, rapid inflation struck, which continued (with sharp fluctuations) throughout the remainder of the export era. By 1873, the price level stood 73 percent higher than 1830, or 32 percent above colonial norms. Beyond that point, Peru's mercurial price history remains to be explored.

Periodization and Origins

By now, the strength and limits of these data and methods should be readily apparent. Price series remain ever open to additions and improvements, but these numbers do offer more precision and meaning than the qualitative guesses of the past. Through Figure 1, which portrays the food price index and the inflation index, readers may follow changing Lima price levels from 1800 to 1873. This supports a new periodization of price history—and may also help sort out possible factors behind the movements of price.

From the perspective of aggregate prices, the new periodization looks like the following:

1) *1800–14: Moderate Deflation.* Possible gains in agrarian productivity, or more efficient commercial practices, were already at work on the *ancien régime*, according to these thin data. However, the Bourbon shipping and political crises of the era offset much of the downward effect, as Peru could not fully benefit from the price falls of the infant industrial revolution. This incipient deflation contrasts with inflation surmised from unweighted agricultural series, or as seen in agrarian prices in late viceregal Cuzco, Bolivia, and Mexico.[44]

2) *1815–24: Sharp War Inflation.* The supply disruptions of the independence struggles are notorious—the blockades, urban shortages, exactions of marauding armies, devastation of valleys such as Chancay and Mantaro, the flight of slaves. Together, they pushed up prices nearly 40 percent by 1822. This remains a timid estimate; transitory food shortages alone may have shot prices up twofold. The pressures to declare "free trade" in 1821 thus become even clearer. Monetary influences are harder to decipher, for San Martín's unbacked fiscal emissions of 1822–23 were likely countered by the era's deflationary losses of metallic money supply. This capital-bullion flight reached some 27 million pesos between 1819 and 1825. Relative price changes are also hard to pinpoint: prices of imported manufactures plummeted after 1821, just as those of domestic foodstuffs soared. But the impact appears erratic until the import "oversupply" crisis of the mid-1820s.[45]

3) *1825–46: Stabilization and Deflation.* Price levels stabilized remarkably well in the aftermath of independence, continuing their slide until the mid-1840s. Two caudillo-war peaks alone disrupt this trend. Indeed, once allowance is made for all three military crises (1815–24, 1833, and 1836–39), a secular deflationary movement is visible ever since 1800. Prices were sinking about 1 percent annually. This deflation has not been recognized before, except in the slump afflicting rural estates.

Several supply factors likely account for the 18 percent deflation from 1830 to 1846 (or 27 percent from 1826). The price falls involved both do-

44. Haitin, "Prices and the Lima Market," App. 11; Glave and Remy, *Estructura agraria: Ollantaytambo*, Table XI–I; John H. Coatsworth, "The Limits of Colonial Absolutism: The State in Colonial Mexico," in *Essays in the Political, Economic, and Social History of Colonial Latin America*, Karen Spalding, ed. (Newark, DE, 1982), 40, 46; Brooke Larson, *Colonialism and Agrarian Transformation in Bolivia: Cochabamba, 1550–1900* (Princeton, 1988), App. Table A-5. All these, of course, are agrarian price trends.

45. Timothy E. Anna, "Economic Causes of San Martín's Failure in Lima," *HAHR*, 54:4 (Nov. 1974), 657–681 (on paper money). The best look at 1820s price changes is Ricketts to Canning, "On the Commerce of Peru," Dec. 19, 1826, FO 61/8—which estimates 50 percent import price cuts since 1821 "free trade," and calculates bullion exports.

mestic foodstuffs and tradables. Until 1845, political-military instability kept Peru in deep economic recession, yet estates were able to quickly reconstitute. However, their only market was a depressed one. Most coastal farmers survived by switching from Pacific exports (sugar, tobacco) to provisions for local consumers, at a time of shrinking town populations and demand. On the tradables side, textile prices took their sharpest-ever plunge in this period (more than 50 percent). This time consumers perceived the savings, as they combined with Atlantic shipping advances and the dismantling of Peruvian tariffs (completed in textiles by 1840).[46]

Local and international monetary factors were also at play. Peru's chronic balance-of-payments gaps of the period—resolved by continuing exports of coin—may have permitted these downward macroeconomic price adjustments. By the 1840s, the revival of silver mining and the diversification of exports would have halted this effect. In any case, the impetus to deflation in Peru must have been formidable. Most contemporary analysts, in contrast, had predicted inflationary pressures from currency debasement (the influx from mid-1830s onward of "feeble" Bolivian coin), or had envisioned elevated food prices from the era's stiff agrarian protectionism.[47]

4) *1846–54: Moderate Guano Reflation.* By the mid-1850s, prices were beginning to wobble up toward 1830 levels. The notable finding, however, is that the early expansionary effects of social peace and guano exports did not translate rapidly into an inflation. While urban population, business, and demand rebounded quickly in the late 1840s, this did not, for example, spawn supply bottlenecks. Domestic food prices did not leap until the labor crisis of the 1854–55 civil war.

Overall, this reflation does indicate spreading domestic demand felt from guano exports—contrary to enclave models of the bonanza, which argue that the export produced negligible income effects in the domestic economy.[48] Latent inflationary pressures may have been developing; yet

46. For agrarian issues, see Engelsen, "Aspects of Agricultural Expansion," chap. 2; Burga's series for nineteenth-century tithes might support this analysis. Most analyses of imports to the early republics (e.g., D. C. M. Platt, *Latin America and British Trade, 1806–1914* [New York, 1973], part 1) overlook the dramatic impact of real price changes. Even with a stagnant import bill (like Peru's until the late 1840s), the actual amount (real value) of these manufactures, given their price falls, had doubled.

47. On monetary adjustments and agrarian protection, see Gootenberg, *Between Silver and Guano: Commercial Policy and the State in Postindependence Peru* (Princeton, 1989), chap. 3 and on mining, see Deustua, *Minería peruana*. The debates over debasement are vast: see, e.g., E. M., *La moneda en el Perú* (Lima, 1859). This and other sources actually predicted inflations of 20 to 25 percent starting in the 1830s.

48. Jonathan Levin, *The Export Economies: Their Pattern of Development in Historical Perspective* (Cambridge, 1960), chap. 2, "Peru in the Guano Age." Hunt already argues this point about inflation in "Growth and Guano," 85.

they were contained by the continuing descent of import prices (in wage goods like grains and textiles), which was readily absorbed after Peru's Manchesterian free-trade law of 1852.

Quiroz has specifically analyzed monetary factors in this period. He rejects the contemporary polemic that the massive internal debt consolidation of these years (nearly 24 million pesos by 1853) fueled inflation; the disbursed public debt bonds did not function as a "quasi-money." The timing and degree of inflation shown here fully support that argument.[49] However, one should not discount excess demand as a distinct result of this redistribution, even if part of the spending leaked abroad by way of luxury imports.

5) *1855–73: Severe Guano-Age Inflation.* Price levels rose precipitously in the mature guano age: some 70 percent by 1865, and 108 percent overall by 1873. As contemporaries noted, the civil war of 1854–55 marked the start of acute inflation; sharp fluctuations also struck in 1859–60 (during a major export crisis) and in 1864–66 (during the costly war with Spain). By the mid-1860s, however, these events clearly formed part of a secular inflation.

The years 1854–56 represent a conjunctural crisis in food supply (whose prices rose 36 percent) which led to emergency decrees for duty-free food imports in 1855, 1857, and 1859. But freer trade could not abate an encompassing inflation, now felt on every front—in domestic housing costs and, if less dramatically, in consumer tradables (textiles, grains) and domestic agriculture. By the 1870s, this pattern of inflation had completed Peru's long-term shift in relative prices, the one first glimpsed in the 1820s: a cheaper tradables sector was edging out domestic production. The causes of inflation must have been the broadest ones, such as the rapid loan-financed growth of the state; the dramatic expansion of Lima's population; and the proliferation of local banks issuing unbacked paper notes.

Since, by the 1860s, inflation had become an overtly political and popular controversy, homespun theories arose to explain it. For the outbreak of the crisis in 1854–56, historians discuss short-term stresses: the dislocations of war, the impact of slave manumission on coastal agriculture, and, with least evidence, the effects of Andean epidemics. The 1869 re-

49. Quiroz, *La deuda defraudada*, 113–119, for an informative and incisive review of 1850s inflation theories, like those reported wholesale in Macera, "Plantaciones azucareras," 235–265. Specifically, Quiroz rightly argues that the massive bond emissions of 1850–52 did not coincide with inflation and that, when bond releases were paralyzed in 1855–57, inflation became rampant. Using specific product comparisons, Quiroz also cogently specifies slave manumission as the more probable spur to inflation. For a graphic account of the 1854–55 supply crisis, see Miles to Clay, "Report on Trade," Sept. 30, 1856, M155/3.

gional price commission,[50] by then examining a chronic problem, spoke of coin depreciation (the impact of monetary conversions in 1857 and 1863); the 1864–65 conflict (more clearly reflected by this index); the general "expansion" of Lima (i.e., demand factors); and persisting agrarian labor shortages. On weaker grounds, contemporaries and historians alike fault the transformation of nearby farms into export-oriented cotton and sugar plantations, without considering the probable efficiency gains of increasing food imports.[51]

Demography, supply conditions, and wages exhibited peculiar and revealing patterns during this period: perhaps a structural basis for urban inflation. The 1850s influx of rural and foreign migrants to Lima (that doubled urban population) spurred housing inflation, as did the concentration of Peru's emerging plutocracy in the capital. For the first time, urbanization also strained local food supply sheds, as seen, for example, in the surge in meat prices and fuel prices (from sheer deforestation). All the while, Peru's intensifying rural labor shortage helped maintain higher food prices. The mystery is why this inflationary social pattern persisted for more than two decades. Falling (real) urban wages and rising coastal agricultural wages should have reversed such demographic pressures on food and housing supplies.[52]

Still, inflation could not have flourished if not allowed by expansionary monetary conditions—just as Peru's previous deflation had occurred amid a shrinking money supply. The post-1860 growth in Peruvian money supply was caused by the sudden birth and multiplication of a Lima banking network (linked to the guano trade) and by the influx of foreign credit (linked to expansion of the state). In the 1870s alone, fiscal notes increased fourfold.[53] The abundance of exchange was reflected in the rapid fall in

50. An apt question is why the commission was even formed in 1869; our index reveals the preceding three years as an interval of mild inflation. The initial stated concern was meat prices, though broader inflation had now become a chronic problem (evident when price levels did not fall back after the Spanish war). Above all one suspects politics: the emergence of the Pardista reform faction—*civilismo*—hoping to exploit popular urban discontent. See Margarita Giesecke, *Masas urbanas y rebelión en la historia: Golpe de estado, Lima, 1872* (Lima, 1978), chaps. 2, 4.

51. Consejo Provincial, *Datos e informes sobre el alza de precios*, passim; Martinet, *Carestía de víveres*; Macera, "Plantaciones azucareras," 235–265. Macera's Andean epidemic theory seems implausible, given the population advances reported by the 1862 census; in any case, few supplies came to Lima from those regions. Ultimate blame placed on transformations to export agriculture belongs to an old, and seemingly eternal, polemic: see, e.g., Henry K. Slajfer, "Los enclaves de exportación y la agricultura alimenticia en el Perú de los años 1890–1920: A propósito de la tesis de R. Thorp y G. Bertram," *Histórica*, 4 (Dec. 1980), 243–254.

52. These issues are discussed under "Social Analysis."

53. Carlos Camprubí Alcázar, *Historia de los bancos en el Perú (1860–1879)* (Lima,

interest rates, approaching negative real rates, even as inflation raged on. Moreover, until the mid-1870s export crisis, none of these expansionary forces were constrained by demand-soaking tools such as monetary controls, devaluation, taxation, or recession.

6) *1874–1885: Inflationary Chaos . . . to Liberal Control?* Direct data on prices are lacking for the last quarter of the nineteenth century, but other evidence suggests some trends. Inflation escalated during the crisis-ridden late 1870s, according to exchange rate analysis and contemporary accounts. A monetary inflation seems probable, even if attenuated by silver-standard depreciation (starting in 1872) and the economy's export-credit collapse of 1875. Intense monetary instability accompanied the Pacific War and its aftermath (1879–85); price levels may have risen 800 percent.[54]

By the 1890s, however, prices had stabilized, and Peru's modern record begins. Policy makers may also have absorbed at least one painful lesson from the nineteenth century; until the present nightmares, an orthodox liberal Peru managed to contain inflation better than most countries of the region.[55]

Even new price data are unlikely to alter these broad stages of price movements, except for the 1870s. But understanding the causes and impact of inflation is likely to advance well beyond this unavoidably sketchy and eclectic analysis.

Applications and Analysis

Sparse data, price theory, and common sense all dictate the cautious use of a historical price series. Table IX consists of deflators, based on the inflation index, for use in further statistical work. What, then, are some of the pressing practical applications of price data to the economic, social, political, and regional history of the Peruvian "dark ages"?

1) *Economic Analysis.* Price movements can help illuminate murky domestic economic developments during Peru's first century of independence. Usually, these developments are glimpsed only through external indicators, such as export performance. Caution is needed in such analyses,

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1957). For a discussion of interest rates, see Macera, "Plantaciones azucareras," 129–150. New work on nineteenth-century monetary history (Quiroz; Hünefeldt et al.) may clarify these issues.

54. Boloña, "Tariff Policies in Peru," chap. 3, for 1879–85. Hunt, for GNP deflators, indirectly (from tax records) puts inflation at 100 percent between 1866 and 1876 ("Growth and Guano," 121). Clues such as "Creciente carestía" (*La Patria*, Mar. 7, 1873) would corroborate continuing mid-1870s inflation; Martinet, in *Carestía de víveres*, 21, flatly denies it.

55. Thorp and Bertram, *Peru*. The query is whether the severe 1870s–1880s inflation directly affected the outlook of policy makers when they opted for an "orthodox" liberal reconstruction of Peru in the 1890s; the disastrous export experience of the passing century might have convinced them otherwise.

TABLE IX: Deflators

Year	1830 = 1.000	Year	1830 = 1.000	1854 = 1.000
1800	1.318	1847	.868	
1805	1.352	1848	.809	
1810	1.354	1849	.825	
1815	1.287	1850	.821	
1820	1.279	1851	.842	
1822	1.640	1852	.856	
1826	1.127	1853	.839	
1827	1.059	1854	.812	1.000
1828	1.023	1855	.902	1.096
1829	.983	1856	1.091	1.311
1830	1.000	1857	1.084	1.303
1831	.967	1858	1.102	1.325
1832	.921	1859	1.041	1.251
1833	1.004	1860	1.342	1.613
1834	.967	1861	1.217	1.463
1835	.964	1862	1.214	1.459
1836	1.012	1863	1.209	1.453
1837	1.033	1864	1.294	1.555
1838	1.032	1865	1.426	1.714
1839	1.028	1866	1.541	1.852
1840	.880	1867	1.572	1.890
1841	.869	1868	1.588	1.909
1842	.820	1869	1.600	1.923
1843	.806	1870	1.629	1.958
1844	.822	1871	1.643	1.975
1845	.820	1872	1.684	2.024
1846	.815	1873	1.727	2.076

Source: Table VIII indices.
Note: To deflate, divide nominal index or statistic by annual deflator.

however, since, to take one example, falling prices could reflect either economic contraction or growth-enhancing productivity changes.

For the 1825–45 period, Peru's deflation is another sign of the caudillo-era depression, and prices can help us understand its sources. For example, how well was the international price/specie flow mechanism operating in Peru's risky and disarticulated economy? According to classical theory, Peru's domestic price structure should have leveled in response to early trade gaps and bullion-coin exports—i.e., a decreasing local money supply. Tradables (imports) should have become dearer relative to home goods, ending this typical disequilibrium of the nascent Latin American republics.

But, did the modest domestic price declines actually observed (no more than 12 percent) represent an efficient or inefficient local adjustment process? Relative to plummeting foreign prices (more than 50 percent in

the 1820s–30s), they appear to have lagged. A faulty response, caused by any number of institutional or social factors, would have prolonged Peru's depression, by forcing quantity/output contractions instead of adjustments of price.

These issues are particularly relevant because Peru, like most of the region, was struggling with the first shocks of its nineteenth-century transformation to an open economy.[56] Why did Lima's economy always appear overvalued relative to foreign currencies? This could have been a factor in the economic and social dislocations that plagued Peru's early attempt at trade liberalization. Specifically, did sticky price behavior add fuel to Peru's initial (neomercantilist) protectionism, aggravate unemployment, or lead to a faster dominance of foreign goods?

Domestic price levels, not only overseas demand or the terms of trade, might also have affected Peru's export performance. New studies, for example, show that Peru's demolished silver mines of the Cerro de Pasco district actually recuperated quite rapidly in the postindependence period. By the early 1840s, output nearly reached colonial peaks. Deflation could have been one production incentive at play, by raising the real local purchasing power of silver. Conversely, Peru's mining sector quickly and mysteriously collapsed again at midcentury; inflation might have become one adverse cost-price factor.[57] This pattern of rise and decline was followed by most of Peru's other exports—apart from guano, which, among its other peculiarities, was peculiarly insensitive to domestic costs.

After 1845, the guano-age recovery is discernible in Lima's halting reflation, and by 1855, in the inflationary spiral unleashed by rising domestic demand. Guano drove up incomes and spending in the domestic economy, at least around Lima, where the benefits concentrated. On the other hand, existing estimates of export growth should be moderated in real terms. Overall, Hunt figures that guano sales brought a total of 454 million pesos to the Peruvian economy—for an extraordinarily high 71 percent "returned value" ratio.[58] (This, plus the evidence of inflation itself, refutes the traditional enclave interpretation of the guano boom, i.e., the

56. These issues are elaborated in Gootenberg, *Between Silver and Guano*, esp. chap. 3, which analyzes the variety of responses (economic, social, and political) to Peru's entry into the world economy. On price adjustments, see pp. 65–67 or Hunt, "Growth and Guano," 27. Nonwage labor, a mining economy, or faulty regional integration might lie behind sticky prices, and, surely, price factors were not the sole problem afflicting Peru's war-torn economy.

57. Deustua, *Minería peruana*; Hunt, "Growth and Guano," 43–51 (still the best cost analysis of nineteenth-century mining). Apart from guano/nitrates, most exports stagnated from 1840 to 1870. Hunt, "Price and Quantum Exports," Table 24.

58. Hunt, "Growth and Guano," parts iv–vi, which antiquated the Levin enclave model; in some sense, enclave notions persist in interpretations that stress lack of internal markets (or foreign plunder) as causes of nineteenth-century underdevelopment.

thesis that most guano income directly bypassed the local economy as payments to overseas interests.)

However, despite Peru's favorable terms of trade, by the 1860s inflation was eroding the real domestic value of the bonanza. How much guano benefits fell would have to be computed on a yearly cumulative basis, but Peruvians themselves readily sensed this dilemma at the time. To many, inflation was the most palpable sign of the economy's distress. It is one reason (besides fears of export exhaustion and mounting foreign debt) that this enormously prosperous period always seemed enveloped in an atmosphere of impending crisis.[59]

An earlier study of the Lima economy provides an example of the need to measure, with a price index, the real growth in the domestic economy. It was a detailed time series for Lima business revenues, derived from archival *patentes* tax registers. The aim was to pinpoint the differential effects of export trends on local commercial, manufacturing, and service groups. In nominal terms, the aggregate index ran: 1830, 100; 1834, 91.6; 1839, 91.8; 1844, 71.3; 1850, 98.3; 1857, 139.6; and 1861, 155.4. These numbers suggested a severe business slump by the 1840s, followed by a dramatic recovery at the outset of the guano age. However, when deflated by the new price index, the series (in constant 1830 pesos) becomes less dramatic: 100; 94.7; 89.3; 86.7; 119.7; 128.8; and 127.7 in 1861. Over three decades, business expanded by 28, not 55, percent. This draws a more realistic portrait of the extent of both depression and growth in republican Lima.[60]

The most challenging problem of the guano economy is also its largest one: did Peru experience *any* substantial and enduring productivity gains during this export bonanza? Even Hunt, who created a GNP estimate for 1876–77, remains in doubt. The clearest test, analogous to work on nineteenth-century Mexico and Brazil, requires comparisons of national product figures from before and after the export boom, and might even reveal where productivity faltered. A preguano GNP estimate is feasible, and the price index would allow for direct comparisons, particularly when improved data surface for the 1870s.[61]

59. For example, of the "crisis" literature, Manuel Pardo, *Estudios sobre la provincia de Jauja* (Lima, 1862), 26 speaks of the "alarming problem" of food prices in Lima as a spur to his famous reform plans, while Juan Capello and Luis Petriconi, *Estudio sobre la independencia económica del Perú* (Lima, 1876, repr. 1971), 26 reads inflation as another sign of the loss of national independence. Hunt, "Growth and Guano," 96 notes eroding real guano incomes in the context of Peru's declining savings rate.

60. Gootenberg, "Artisans and Merchants," Tables 2–3 and App. 1–11 (and this Table 9). The series actually covers 14 years of AGN Matrículas de Patentes, and later ones exist to extend it. For real per capita business revenues (by sector), consult Gootenberg, *Between Silver and Guano*, App. Tables 2.1–2.2.

61. Hunt, "Growth and Guano," 86–96 and appendix. Doubts exist around Hunt's GNP

A price series also allows us to more rigorously test explanations of Peru's "lost opportunity" with guano. Hunt's well-conceived model of the "rentier" economy of guano is now the paradigm. In this view, cost-price pressures were the culprit, not the enclavish nature of export-generated incomes. The demand effects released by guano rapidly reverberated in the domestic economy, and, as they did, helped release inflation. Guano-age inflation (and other factors) exacerbated chronically overvalued and inflexible exchange rates. Ultimately, this syndrome led to an import bias, a narrowing of the country's economic base, and the crippling of potential native entrepreneurs, such as artisans and factory pioneers.[62] By the 1860s, Peru had become an importing rentier nation, utterly dependent on the fortunes of guano. Peru had caught a "Dutch disease," but sought no cure.

With price data and indices, we can begin to test aspects of this hypothesis. Inflation is one building block of the model, yet both its origins and its impact remain a black box. For example, was the guano era's initial price change (1845–55), which now looks modest, truly strong enough to shift the economy to a damaging import bias? Or was this bias a more direct result of an ad valorem free-trade policy (1852 . . .) in an era of plunging import prices? Combined with other price information, such a study could even advance at the microlevel, examining how cost-price pressures affected workshops or factories struggling against import competition.[63]

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estimate, which was accomplished without a reliable price series: see Boloña, "Perú: Estimaciones preliminares del producto nacional, 1900–1942," *Apuntes* (Lima), 13 (1983), 3–14. A preguano estimate might exploit the untapped 1827 tax census (which includes crude aggregates of income by province), most of which survives as "Estadísticas" in *La Prensa Peruana* and *El Telégrafo de Lima*, 1827–29.

For comparative studies, see Coatsworth, "Obstacles to Economic Growth in Nineteenth-Century Mexico," *American Historical Review*, 83:1 (Feb. 1978), esp. 80–89; and Nathaniel Leff, "A Technique for Estimating Income Trends from Currency Data and an Application to Nineteenth-Century Brazil," *Journal of Income and Wealth*, 5 (1972), 355–368.

62. Hunt, "Growth and Guano," parts. iv–vi. Hunt's pithy work is cited repeatedly here, due to the remarkable range and precision of the problems it tackles. And while Hunt asks for statistical and historical tests of his theses, no critique or addendum has appeared in 15 years. For recent theory on rentier economies, see W. M. Corden, "Booming Sector and Dutch Disease Economics: Survey and Consolidation," *Oxford Economic Papers*, 36 (1984), 359–380.

63. In other words, Hunt's conception of cost-price pressures should be specified: the conclusion that "growth failure lay with the unresponsiveness of domestic entrepreneurs" ought to say more than that growth did not occur because growth did not occur. Inflation and tariff policy, of course, were not the sole culprits; the guano business itself, so impervious to local cost factors, was bound to have rentier effects.

Factory bankruptcy records are ideal for examining these problems: an example is AGN, Section H-8 (Tribunal de Consulado), Expediente promovido por D. Eugenio Rosel solicitando se aprueve el convenio celebrado con sus acreedores, 1851, Concursos/Contenciosos, leg. 19—an expanding candle factory that closed with the surge of imports after 1848.

If inflation emerged as an obstacle to growth, its chief mysteries lie after 1855. Once again, only a studied comparison of tradables/nontradables price indices can resolve the degree of distortion in real exchange rates, and their biases for different lines of production. Such studies have, for example, proved quite effective in understanding Peru's path to dependent development in the early twentieth century.[64]

In any case, the cursory evidence suggests that, contrary to Hunt's model, Peruvian inflation was not severely out of line with world trends, not even in domestic foodstuffs. At the same time, the secular shift to tradables is abundantly clear, even from the price data. But whatever the precise behavior of relative prices, the roots of this guano-age inflation still must be specified. Were domestic supply constraints so critical to overvaluation, as Hunt suggests, or do domestic food prices (and the evidence of abundant supplies) suggest other pushes?[65] Perhaps profligate Peru's recourse to overseas borrowing—which must have buoyed exchange rates above current export earnings—was part and parcel of the rentier syndrome.

On the whole, then, this price series sheds light on Peru's path to integration with the nineteenth-century world economy and on dilemmas shared by many of the opening Latin American economies of the era. One remarkable finding is that, over these seven decades, Peruvian price movements paralleled trends seen throughout the North Atlantic economy: the high-priced instability until the 1820s; the deflation to the 1850s; and the inflation from the mid-1850s to the mid-1870s.[66]

Does this rough correspondence mean we should abandon purely Peruvian causality? It at least implies that Latin American economies were well integrated with the world economy from an early date. An interest-

64. Thorp and Bertram, *Peru*, chaps. 3–7 is the exemplary analysis; Boloña, "Tariff Policies in Peru," is even more precise in its measurement of modern real exchange rates. I must reiterate the difficulties of comparing domestic and import price trends in the nineteenth century; above all, the categories themselves are elusive to define. A starting point is the customary listing of "Productos nacionales" and "Productos extranjeros" often seen in newspaper price reports (e.g., *La Patria*, Jan. 1872).

65. For example, little hard evidence supports the claim that a constraint emerged in meat supplies, despite the plaints of the 1869 commission. The statistics on cattle delivered to and processed in Lima show 50 to 75 percent increases in the late guano age alone, a rate exceeding that of population growth. See Macera, "Plantaciones azucareras," Table 38 and Martinet, *Carestía de víveres*, 16–17. Significantly, though, meat was one commodity where imports barely counted; i.e., it was isolated from international cost pressures.

On loans, see n. 83 below; my point is not a direct correlation between inflation and large loan issues, but that the steadily upward stream of foreign exchange from the early 1850s on helped postpone exchange rate adjustments.

66. With the Pacific War, Peru's price trends finally diverge from world movements. Two world indices consulted here were North American Wholesale (in Mitchell, *International Historical Statistics*, 835) and the British Rousseaux Indices (Mitchell, *British Historical Statistics*, Prices 3, pp. 722–723). In parts of Iowa, this phenomenon is known as the "law of one price."

ing test is whether the correlation proves weaker with colonial-era prices, and stronger as the century progressed. What will be learned about this process from new nineteenth-century indices from other parts of Latin America, including the rural zones? One also might investigate the price transmission mechanism from the world economy. It could have worked through high prices and demand for primary exports (as often assumed), combined with bullion movements, exchange rates, an expansive tradables sector, or even consumption effects and modern financial flows.[67] And, finally, to what extent did this price dynamic spread from commercial, coastal, cosmopolitan Lima to the backwaters of the Andes?

2) *Social Analysis.* A reliable price series can guide many forays into social history—from specifying distributive trends and class relations to identifying the causes and patterns of social protest. Prices may even illuminate the economic mentalities of an age.

On the broadest level, historians may wonder about the contrasting social effects of deflation and inflation in preindustrial settings, a theme of European historians from the Black Death to the price revolution of the sixteenth century.[68] A general proposition is that deflation tends to favor those groups whose consumption lies largely outside markets (the poor); conversely, inflation is often seen as redistributing income (through wages and profits) to wealthier classes. If wages (or payments in kind) are set by custom, the impact is stronger.

For Peru between independence and the guano age, deflation may have had a democratizing effect. It could have eased social distances by raising the real incomes of day laborers (*jornaleros*) and subsistence farmers vis-à-vis those of faltering elites linked to the urban commercial economy. Moreover, classic price and profit incentives to enclose popular resources (such as communal lands) were on the wane, as usual at a time of depressed prices and fragmented markets.[69] In the towns, guild mo-

67. For the colonial era, see Enrique Tandeter and Nathan Wachtel, *Precios y producción agraria: Potosí y Charcas en el siglo XVIII* (Buenos Aires, 1983); this book develops an elaborate model about the relationship between "European" and "American" prices (in this important international zone), but stops short of the correlations needed to test it. For a view of integration through export demand, see Bonilla, "La coyuntura comercial."

68. See, for example, Peter H. Ramsey, ed., *The Price Revolution in Sixteenth-Century England* (London, 1971) (one of myriad studies inspired by Earl Hamilton); for rural areas, Guy Bois, *La crise du féodalisme: Économie rurale et démographie en Normandie Orientale du début du 14e siècle au milieu du 16e siècle* (Paris, 1976) or, excusing the title, Witold Kula, *An Economic Theory of the Feudal System: Towards a Model of the Polish Economy, 1500–1800* (London, 1976).

69. All evidence suggests, for example, the declining profitability of coastal slavery during the deflation/depression period. See a specific rural price model in Hunt, "La economía de las haciendas y plantaciones en América Latina," *Historia y Cultura*, 9 (1975), 7–66; or evidence brought to case by Juan Martínez Alier, *Los huacchilleros del Perú: Dos estudios de*

nopolies revived, posing so minor a threat in a low-price era. There were many loosening social hierarchies in the postindependence era: between landlords and peasants, artisans and apprentices, masters and slaves.

The guano age, with its inflation, would have reversed trends on many fronts of class conflict. Did inflation tangibly aid the reconstitution of elites? Many factors can redistribute income during rapid growth. But it is precisely in the 1860s that one detects renewed efforts to expand Peruvian estates, some specifically for domestic food production. Apart from buoyant prices, old entails became less a burden to landlords, and new forms of credit became available at strikingly low (and plainly redistributive) real interest rates.[70] In Lima, inflating urban real estate must have become a hot investment for the rich. For urban areas, analysis might also focus on the relative class impact of imported and domestic goods. Did inflation distribute income and clout away from subsistence-level artisans, shopkeepers, and laborers, and toward elites whose marginal propensity to consume included a high penchant for cheapening imports? The price protests invariably erupted from below.

The content of popular protests (as in 1855, 1858, 1865, and 1872) always had something to do with prices. Indeed, Peloso argues that after midcentury subsistence became the most explosive people's issue in urban politics, integral to the political formation of a modern proletariat.[71] Peru's government placated the masses with growing recourse to free trade in foodstuffs, and precocious populists (such as Mayor Pardo) seized on the anti-inflationary issue. This price series underscores these developments,

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formaciones sociales agrarias (Paris, 1973); and Florencia E. Mallon, *The Defense of Community in Peru's Central Highlands: Peasant Struggle and Capitalist Transition, 1860–1940* (Princeton, 1983), chap. 2. For Lima, see Gootenberg, "The Social Origins of Protectionism and Free Trade in Nineteenth-Century Lima," *Journal of Latin American Studies*, 14:2 (Nov. 1982), 338–342, 351–358.

70. Engelsen, "Aspects of Agricultural Expansion," chaps. 2–5; Mallon, *Defense of Community*, 60–63, for a specific 1860s case of estate expansion for food markets. On the (literal) rentier class, see Quiroz, *La deuda defraudada*, chap. 6. In the Chilean case, a vast literature debates the class impact of nineteenth-century inflation.

Interest rates suggest many pertinent questions, including the redistributive (bank credit remained highly concentrated). Rates fell dramatically in the 1850s and 1860s, as both inflation and formal banking began. At 8 to 12 percent nominal interest, this meant *negative* real rates for much of the era. Conversely, during the first three decades of the republic, 36 percent annual charges had been the norm, during a deflationary era. Apart from changing risk factors, this pattern again suggests monetary sources of Peruvian price movements: a true scarcity of currency during the deflation, and an overabundant money supply by the late guano age. For an overview of credit, see Macera, "Plantaciones azucareras," 129–150. We need nineteenth-century research analogous to Quiroz's recent studies of modern financial institutions.

71. Peloso, "Succulence and Sustenance"; or Blanchard, *Peruvian Labor*, chap. 2. For two close analyses of these price protests, see Quiroz, *La deuda defraudada*, 119–123 and Giesecke, *Masas urbanas y rebelión en la historia*, chap. 4.

by unveiling a correspondence between protests and true inflationary moments. Still, there are limits to such analysis, for Limeño crowds indeed thought in subjective terms of "just" and customary prices, i.e., of a subsistence security, without sharp fluctuations. (Historians probing the relation between inflation and protest should perhaps concentrate on foodstuffs, and on variations around the trend, where popular perceptions themselves often focus.)[72]

Yet, before the 1850s, the main popular standard was actually the opposite one: incessant artisan demands for *higher* price levels through protectionism and guild monopoly. Rarely did popular groups embrace subsistence causes, not even against the Lima bread monopolies that took such flack after independence. This all makes sense amid a deflation. Between 1848 and 1858, however, the transformation of urban politics occurs. Craftsmen lost out to Manchesterian free trade, watched their guild powers vilified and undermined, and joined the noisy chorus for inexpensive wage goods.[73] This was not just the result of effective liberal propaganda, which by then was borrowing newfangled and populist Manchesterian ideas. The inflationary shock of the 1850s palpably helps to explain the shift to free-trade politics and policy, as well as this changing content of popular mobilization.

These matters are all part and parcel of the distributional question of the guano age. With a price index, this social question (as it was called) can become far more precise. Real wage rates, for example, could be explored thoroughly in Lima. Spotty data reveal that urban *jornales* remained stationary at the traditional 6 reales from independence through the 1850s; the daily wage then rose to 7 and 8 reales over each of the next two decades. Therefore, in constant 1830 reales, wage growth was on the order of 17 percent by 1840–42, or 19 percent by 1850–52—due simply to deflation. Wages then fell 7 percent below 1830 levels by 1860–62, and 19 percent below them by 1871–72.[74]

72. Such sentiments abound in Lima artisan writings, similar to E. P. Thompson's conception in "The Moral Economy of the English Crowd in the Eighteenth Century," *Past and Present*, 50 (May 1971), 76–136. The trend analysis of time series is clearly explained in Floud, *Quantitative Methods*, chap. 6. This is not always the appropriate tool; the historian must first ascertain that variations were patterned ones.

73. The shift in attitudes toward price levels can be seen graphically by comparing "Representación que han elebado los Gremios ante las Cámaras," *El Comercio*, Oct. 17, 1849, with the subsistence-cost supplications found in *Artesanos* (pamphlet, Lima, 1859). José Simeón Tejeda, *La emancipación de la industria* (Arequipa, 1852) and Gootenberg, "Artisans and Merchants," chap. 4, deal with guild monopoly. See José Silva Santisteban, *Breves reflexiones sobre los sucesos ocurridos en Lima y el Callao con motivo de la importación de artefactos* (pamphlet, Lima, 1859), 36–38, 54–55 for the Manchesterian response to artisan concerns with inflation and rents.

74. These are very tentative numbers, since *jornal* data are so spotty and inconsistent; I use hired peon wages from the hospital account books listed above. See Quiroz, *La deuda*

The striking finding here is that, given the largely stationary urban *jornal*, real wages dropped nearly a quarter (22 percent) during the first decade of the guano age. And this measure, of course, does not even consider the scourge of unemployment among Lima's teeming population, estimated at roughly 16 percent by 1858. Small wonder Lima's destitute violently took to the streets in December 1858 against this "fictitious prosperity."[75] Among the popular demands were lower rents and lower food duties, but not higher wages.

Does social custom help explain this adverse wage-distributional effect during inflation? Commercially oriented elites cope better with inflation, as they are accustomed to bargaining over prices as a way of life. For whatever reason (including adscriptive prejudice and barriers), popular groups seem to lag in adopting a haggling attitude on wages. In Lima, for example, the first recorded strike over wages occurred only in 1869—and was organized by construction workers, aptly enough, while tearing down the city's overflowing walls. But this is a more general query. In parts of rural Mexico, for instance, a stationary peon wage has been reported for most of the nineteenth century.[76] Surely that was a boon to hacendados, and a plague on workers, as price levels inched upward during the century.

Rural Peru had its peculiarities. Scattered evidence suggests that wages on coastal plantations rose dramatically in the late guano age: from a 3.5-real norm in the mid-1850s to anywhere between 7 and 20 reales by the early 1870s.[77] This was due to Peru's chronic agricultural labor shortage

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defraudada, Table 13; Macera, "Plantaciones azucareras," 165–168; or Hunt, "Growth and Guano," 87–88, for different nominal wage data. These sources (and even original surveys such as Martinet) often conflate rural and urban wages, or use servant wages that exclude the customary three-to-four-real daily food and lodging supplement; see Juan Norberto Casanova, *Ensayo económico-político sobre el porvenir de la industria algodonera fabril del Perú* (Lima, 1849), chap. 4, "Salarios," the most helpful contemporary guide to urban wages and living expenses. A superb source on wage differentials is the survey in Miles to Calhoun, Aug. 25, 1855, M155/1.

75. "Fictitious" or "false" prosperity is the name used by Basadre for the guano boom, following its contemporary critics. See *El Comercio*, all Dec. 1858–Jan. 1859 for artisan welfare perceptions and demands after the riots; partially reproduced in Francisco Quiroz Chueca, *La protesta de los artesanos, Lima-Callao 1858* (Lima, 1988). Male unemployment rate is from Fuentes, *Estadística general*, 621–623, and is probably low (if we consider the better job opportunities for foreign migrants).

76. Basadre, *Historia de la República*, V, 2,045–2,047; Harry E. Cross, "Debt Peonage Reconsidered: A Case Study in Nineteenth-Century Zacatecas, Mexico," *Business History Review*, 53 (Winter 1979), 480. A different analysis is found in Cross's "Living Standards in Rural Nineteenth-Century Mexico: Zacatecas, 1820–1880," *Journal of Latin American Studies*, 10:1 (May 1978), 1–19. Some of these effects of inflation can be seen in peasant struggles ("rational" or otherwise) to resist wage payments: see I. G. Bertram, "New Thinking on the Peruvian Highland Peasantry," *Pacific Viewpoint*, 15 (Sept. 1974), 89–111.

77. Obviously, given the thin data (and use of a Lima price index), these figures are but suggestive. I use various Macera and Hunt *jornal* figures ("Plantaciones azucareras," 164–

—the so-called *falta de brazos*—which meant, in reality, real 20 to 200 percent pay raises for workers, not counting the premium often afforded by food rations in kind. These estate costs no doubt added to high urban prices. Only landowners with the foresight and means to acquire coolies (with fixed long-term wage contracts) blunted the problem.

But why were real urban and rural wages moving in opposite directions after 1850? Price history suggests that migration patterns are worth exploring further in nineteenth-century Peru. Contrary to our image of Peru as an immobilized land, some 37,000 internal migrants flocked to Lima during the 1850s, becoming more than a third of the population. This human wave surely contributed to the dampening of urban wages during the guano age. Yet, what brought migrants to a reviving Lima, and not, according to all witnesses, to the expanding coastal plantations that were offering premium wages by 1860? One wonders about discrepancies between low provincial and inflated capital price levels—was this an initial (if chimerical) pull factor for those mainly seeking remittances back home?[78] It may have been easier to see high prices (or nominal rates of pay) than to calculate real wages. On the other hand, the Andean migrants' aversion to work on high-wage coastal estates seems even more perplexing. Perhaps theirs was not a price calculation at all, but a cultural aversion to oppressive estate regimes and to laboring along with oppressed minorities like coolies and blacks. These are among the more complex social history questions raised by the simple history of prices.

3) *Political Analysis.* State building has recently emerged as a pressing theme in the history of Peru. However, we still have little grasp of the real growth of the guano-age state, though this was in effect the formative stage for Peru's modern national/administrative state.

169; "Growth and Guano," 87), both based on J. B. H. Martinet, *L'agriculture au Pérou* (Paris, 1878). Around Lima itself, the gaps are startling, since by the 1870s, 2 soles (20 reales) was commonly offered for agricultural day work.

For an analysis of the rural labor shortage, see Macera, "Plantaciones azucareras," 150–192. The common assertion that coerced labor forms (such as coolies) dampened wages may be wrong. Price theory suggests the opposite, at least for the remaining free labor market, which may partly explain Peru's discrepancy between urban and coastal wages.

78. Alfredo G. Leubel, *El Perú en 1860 o sea anuario nacional* (Lima, 1861), 266; Fuentes, *Estadística general*, 625; in fact, by 1857, only a third of Lima's inhabitants were born there. See Henri Favre, "The Dynamics of Indian Peasant Society and Migration to Coastal Plantations in Central Peru," in *Land and Labour in Latin America*, Kenneth Duncan and Ian Rutledge, eds. (Cambridge, 1977), 253–269, our only study of migration and one suggesting the remittance pattern.

In still another trenchant analysis, Hunt employs the 1866 Rodríguez provincial wage survey to show that, through wages, negligible regional productivity change occurred in the guano age ("Growth and Guano," 87–93). One wonders how this evidence concurs with the migration figures; and whether through price differentials (i.e., remittances from high- to low-price zones) we have an overlooked variety of regional income transfers.

In current expenditures, state spending swelled from 4.5 to 48.8 million pesos between 1847 and 1872, or over tenfold! And this estimate excludes all external and internal debt transfers. Calculated in real terms—the resources the state actually commanded—that expansion was more in the range of 5.25 times, still an impressive record (or waste). The guano-age state's real revenues increased 4.7 times. Moreover, real growth was steadily upward; roughly 55 percent occurred before the elevated price level of the 1860s, and 45 percent thereafter.[79] So, inflation per se did not halt the expansion of the state.

Disaggregated trends should also be revised. One example is the statistics produced by the indefatigable Hunt on *empleomanía*, concerning the traditional allegation that the state threw away its income in low-productivity political employment. In the course of the guano age, if measured in constant prices, average salaries of senior bureaucrats such as ministers and prefects actually *decreased* some 44 to 59 percent. Global spending on civil servants and military men (including their pensions) went from 3.6 to 7.3 million pesos between 1847 and 1870, an apparent rise of 103 percent. In real terms, this meant a tiny change of 5.9 percent.[80] For these elites, the guano age was a surprisingly fictitious prosperity, too. To be sure, such analyses overlook other pertinent factors in income concentration, corruption, or influence, e.g., the existence of multiple prebends for elite family networks. But the clear point, as Hunt already suggested, is that bloated employment was not the core difficulty with the expanding guano-age state.

Social theorists have often postulated a close relationship between state building, extractive capacities, and inflationary cycles.[81] The guano-age

79. Based on Hunt, "Growth and Guano," Tables 8–9, eliminating all finance (debt) data, and using a 1.8 deflator. These figures are not very different from Hunt's own guess (n. 154) of a fourfold real increase in the guano age. In Tantaleán, *Política económico-financiera*, 141–144 the state is examined in current values alone, with some interesting results (and misunderstandings).

80. These are all recalculations of Hunt's data ("Growth and Guano," 81–82 and Tables 9, 11). One wonders, though, whether these low real salaries were such an unambiguous good thing: would this not have been a push, as well, to the high-level corruption that occurred?

Hunt's incisive calculation of the allocation of government spending (Table 10) could also be revised in real terms: since most of the wasteful transfers of guano income occurred in the preinflationary early 1850s, this would accentuate their negative impact on developmental prospects.

81. For example, Michael Mann, *The Sources of Social Power: A History of Power from the Beginning to A.D. 1760* (Cambridge, 1986), 1, esp. chaps. 13–14; Gabriel Ardant, "Financial Policy and Economic Infrastructure of Modern States and Nations," in *The Formation of National States in Europe*, Charles Tilly, ed. (Princeton, 1975), 169–242; and, of course, the classic formulations of Hamilton. For Peru's state fiscal struggles, see Gootenberg, *Between Silver and Guano*, chap. 5 (1820s–1850s) and Quiroz, *La deuda defraudada* (1850s–1860s).

state, however, was largely "autonomous" in that it owned and borrowed on an independent source of income, its guano monopoly. By 1855, the enriched treasury abandoned any dependence on direct taxation, and the state lacked the will and means to return to tribute and other taxes when deficits widened and costs rose. By the 1860s, greater than 70 percent of revenues came from sales of bird dung.

Major fiscal struggles thus did not revolve, as so often happens, around peasants, regional groups, or other taxable targets. Apart from its sheer wealth, this fiscal freedom is what probably allowed the state the ability to expand so rapidly, while avoiding the social conflict endemic to such processes during inflations. A revival of Indian tribute, for example, would have sparked sharp resistance, for quotas would have had to exceed customary levels.[82]

What, then, was the state's response to its perceived crises in real income? Peru turned outward to massive foreign credit in the 1860s and 1870s, amassing Latin America's largest debt on the London market. Historic proclivities, a mania for huge projects, a strong credit rating, and wavering guano sales all contributed to this outcome. Yet, one wonders also whether the inflation of the era became an incentive to this growing, and ultimately disastrous, recourse to overseas loans.[83] A relationship between inflation and loans is discernible in a typical fiscal ratchet-effect during Peru's episodes of war. In tandem, debt, spending, and inflation leapt upward, and the size of the public sector never returned to its previous levels.

And did overseas loans, in turn, just contribute to vicious inflationary borrowing cycles? This state appears to have done little, given its extractive strategy, to dampen inflationary demand—whereas those which rely on taxation or local borrowing do, inadvertantly and now purposely, as they expand. The guano-age leviathan appears inflationary in multiple senses of the word.

4) *Regional Analysis.* Some of the food prices in this study provide clues

82. This is precisely the fiscal struggle that fed into the Huancané Indian rebellion of 1867, after taxes were (briefly) reimposed to cover deficits from the war with Spain: see Jean Piel, "The Place of the Peasantry in the National Life of Peru in the Nineteenth Century," *Past and Present*, 46 (Feb. 1970), 108–133, which is a global fiscal interpretation. Perhaps, too, the mysterious quietism of the Andean peasantry during the first three decades of the republic was related to deflationary factors, even if the real weight of tribute (which then dominated finance) was modestly rising.

83. While no direct correlation is discernible between the years of massive loan issues (1853, 1862, 1865, 1870, and 1872) and inflationary peaks, Peru had been borrowing steadily since the late 1840s. See Gootenberg, *Between Silver and Guano*, 132–137, for historical analysis of this credit dependency; Carlos Marichal, *A Century of Debt Crises in Latin America* (Princeton, 1989), chaps. 4–5, for Peru's saga and aspects of inflationary borrowing in other countries.

to regional agricultural development, for example, the long-term shift in the price of lard coming from the valley of Chancay. Were there any productivity gains at work? And did true supply inelasticities exist with some of the products of more volatile price, such as rice or beef? We still have little grasp of the growing impact of food imports on local producers, or of estate decisions to invest for urban or overseas markets.[84] Continuous price data help here, but we surely need prices from estate and regional records as well.

Regional economic integration, often studied under the rubrics of "internal market development" or "commercial penetration," is a burning issue in Peru's modern historiography. The old image of an utterly disarticulated, nonmarket, immobilized, or "feudal" nineteenth-century Peru is fast fading. On the other hand, the extent of Peru's market integration is not directly addressed. Some historians still mistrust quantitative work, precisely on the ground that for fragmented regional economies any uniform statistical series will prove misleading.[85]

True, a spurious precision can infect economic history. But the core question here is actually empirical. To the extent that historians collect regional price data to complement these from coastal Lima, we could test the varying propositions that national market integration was nonexistent, decreasing, or increasing during the century. Cursory data suggest that Lima price levels were "higher" than those of provincial centers, though it is the time-series correlations between regional prices that matter in this problem.[86] With such studies, historians could resolve the possibilities, and limits, to further quantitative and market-type analyses in this preindustrial setting.

As discussed, Peru's coastal economy appears to have been deeply mired in world economic currents, and we need to know how these washed into the sierra. The most obvious need is to gather regional prices,

84. Engelsen, "Aspects of Agricultural Expansion," chaps. 2–5 contains the best information. One transition explored is Peter Blanchard's "Socio-Economic Change in the Ica Region in the Mid-19th Century" (manuscript, Amsterdam, 1988); Macera, "Plantaciones azucareras," 262–265, stresses traditional explanations. New research on Pisco planters by price-hunter Peloso may provide new answers.

85. Notably, by Macera, in the number-rich "Plantaciones azucareras," 260–261; also Alberto Flores Galindo, "Los rostros de la plebe," *Revista Andina*, 1 (Dec. 1983), n. 15. For a new view of "internal markets" (and perhaps Andean capitalism), see Nelson Manrique, *Mercado interno y región: La sierra central, 1820–1930* (Lima, 1987), esp. chaps. 1–3.

86. See, for example, national market analysis in Susan P. Lee and Peter Passell, *A New Economic View of American History* (New York, 1979), chap. 7. Regional town price levels are easily glimpsed in their tax registers (e.g., AGN H-4, Libros manuscritos republicanos: Arequipa, 1827, H-4 1621; Cuzco, 1826, H-4 1614; Huamanga, 1833, H-4 1705, and so on). Or see food prices in W. Smyth and F. Lowe, *Narrative of a Journey from Lima to Para, Across the Andes and Down the Amazon* (London, 1836), 43 (Cerro de Pasco), 66 (Huánuco).

and explore the range and depth of markets. However, regional concerns also raise the cultural/spatial dimension in all price studies. Lima's consumption patterns, which most resembled those of the West, formed the basis for this study's particular cost-of-living index. Regardless of findings on market influence, historians may justifiably decide that, culturally and ecologically, the various peoples and corners of Peru were worlds apart. A coastal index cannot suffice for all problems. Regionally based indices, derived from local consumption patterns, would be particularly apt for assessing the impact of price movements on welfare.[87]

Let me mention, in closing, the spirit of such research suggestions. Several decades ago, a venerable social scientist characterized the process of economic development itself as proceeding from a ferment of linkages, bottlenecks, and trickle-down effects; development is not a "balanced" process, nor from anyone's master plan. An awkward price, for example, might act as a stimulus to growth across many sectors.[88] Much the same can be said of progress in historical knowledge, which rarely flows smoothly or from agendas. Thus, more important than any of this study's rough findings are the spurs they may provide to our rapidly developing field.

87. For example, the prices of tubers, maize, and chicha would affect Andean consumers more. A prototype might be the detailed sierran production/consumption structures worked out by Figueroa in *La economía campesina* (esp. Table IV.6); indeed, one suspects that in his most traditional ("sierra-sur") communities expenditure patterns have not altered radically since the nineteenth century.

88. Albert O. Hirschman, *The Strategy of Economic Development* (New Haven, 1958): i.e., a pretty good strategy for knowledge, too.

APPENDIX: Price Data, 1800–73. In Current Reales (8 rls = 2 peso; 10 rls = 1 sol)

Year/Source (See key)	Carne de carnero (u/lb)	Carne de vaca (ar)	Gallinas (u)	Pollas (u)	Manteca (lb)	Aceite de comer (lb)	Azucar (lb)	Arroz (bot)
1799/1800 (H,PC)	16.0u	18	5.6		3.0		1.2	18.8
1804/05 (H)			5.7		3.27		1.0	21.8
1809/10 (H/Me)			5.6		2.54		0.95	19.8
1814/15 (H/Me)			5.2		2.9		0.86	17.0
1819/20 (H/Me)			8.4		4.1		0.99	26.6
1822/23 (H/Me)			12.0				1.64	54.7
1824–25 no data								
1826 (H)							1.5	17.6
1826 (BP)	22.0	24	8.17	3.0	1.02		2.2	17.7
1827 (H)							1.14	19.0
1827 (BP)	22.8	23.14	7.78	5.0				19.0
1827 (HM)		17.5						17.0
1828 (H)							0.89	14.5
1828 (BP)	24.0	21.67	7.0		1.79		1.26	15.0
1828 (TL)					1.38	13.12	0.92	11.5
1829 (HM)	21.0		6.0					
1829 (CS)					1.0			17.4
1830 (H)								17.7
1830 (HM)	22.0	17.3	6.4				0.96	22.5
1830 (CS)			6.25	4.0	1.13			
1831 (H)			5.54				0.7	17.4
1831 (HM)	21.5	16.0	6.64				0.75	
1831 (CS)			4.14	2.67	1.33		0.6	
1832 (H)			6.0				0.72	12.5
1832 (HM)	18.9	15.5	6.5		1.83		0.75	12.9
1832 (CS)			6.0	2.9	1.56		0.72	
1833 (H)								13.3

APPENDIX (continued):

Year/Source (See key)	Carne de carnero (u/lb)	Carne de vaca (ar)	Gallinas (u)	Pollas (u)	Manteca (lb)	Aceite de comer (lb)	Azucar (lb)	Arroz (bot)
1833 (HM)	17.6	16.0	6.5		2.1		0.72	12.0
1833 (CS)		14.0	8.0		1.89	2.0	0.83	
1834 (HM)	17.8	15.2	6.8		2.27		0.64	17.0
1835 (HM)	17.6	14.1	5.9	5.5	1.5	4.0	0.67	
1836 (RP-w)							.52–.64	
1837 (HM)	15.6	14.0	6.47		1.47		1.0	13.9
1838 (HM)	15.9	14.0	6.0		1.5		0.89	14.0
1839 (HM)	16.0	14.0	6.0		1.75		1.03	15.3
1840 (H)			4.96				0.63	12.0
1840 (BP)	14.6	13.8	5.02	3.04	1.9	3.12	0.60	15.3
1841 (H)			4.98				0.72	
1841 (BP)	14.8	13.8	5.0	3.0	1.28	2.45	0.73	12.6
1842 (BP/BC)	14.0	14.0	5.0		1.31	1.20	0.72	12.0
1843–46 no data								
1847 (Q/BP)		13.6			1.31		0.74	11.3
1848 (Q/BP)	13.5	13.0	6.62		1.2		0.71	
1848 (HM)	13.5	13.0	6.68		1.25	2.5	0.71	11.6
1849 (Q/BP)	16.9	13.0	6.62		1.25		0.69	19.6
1849 (HM)	18.5	14.0	6.62		1.26		0.60	20.8
1850 (Q/BP)	18.8	14.0			1.25		0.80	18.2
1850 (HM)	18.8	14.4	6.87		1.38	0.8	0.84	18.9
1851 (Q/BP)	18.5	14.2			1.5		0.76	12.7
1851 (HM)		14.0	7.34				0.79	13.2
1852 (SC)		16.0			1.23			
1853 (Q/BP)	20.6	16.0	8.0		1.12		0.58	14.1
1854/55 (Ma/69)	18.0	15.0	7.0		1.5		0.64	
1855 (Q/BP)	(18.0)	15.0	10.0		1.75			14.4

1856 (Q/BP)			9.0		2.75		0.92	23.2
1856 (SC)					2.38			
1857–58 no data								
1859 (Q/BP)	1(lb)	27.0	9.0		2.58		1.12	17.4
1860 (Q/BP)	1	27.0			2.0			23.7
1860 (HM)	1	32.0			2.35	1.45gl	1.16	
1860 (F)	1.5	50.0	8–20		2.0	2.5	1.50	25.9
1861 (HM)	1	32.0			1.83	1.76	0.99	
1862 (HM)	1	32.0			2.0		1.04	
1863 (Q/C)	1	28.0			2.18		0.84	
1864 (Q/BP)	1	28.0			1.75		0.80	
1864 (HM)	1	32.0			1.76		1.22	
1864 (C)		26.3–36.5		1.81				
1865 (Q/BP)		28.0			1.8			14.0
1865 (HM)	37.6/1.33lb	31.8	12.9		3.07	1.0		
1865 (C-r)	1.75				3.0			19.5
1865 (C-w)		29.6			2.47			
1866–68 no data	3.(C-r)							
1869 (Ma/69)	30	42.0	12–18		3.5		1.02	18.8
1870 no data								
1871 (P)	46.0/1.5lb	50.0			2.45	2.8	1.70	(30)
1872 (P)	34.5/1.4	62.5			2.75	2.8	1.44	(41)
1873 (P)	34.5/1.4	62.5						
1874–96 no data								
1897–1906 (B/L)	1.5?	40.0?					0.27?	

APPENDIX (continued):

YEAR	Arroz (car)	Arroz (cos-sc)	Arroz (lb)	Fideos (lb)	Frijol (fn)	Frijol prieto (fn)	Chuño (lb)	Quinua (fn/car)	Pallar (fn)	Garbanzos (fn)	Maíz (fn/car)	Harina de maíz (fn)
1799/1800						40.0		56.0	56.0	44.0	24	
1804/05						36.0		64.1	58.0	57.7		
1809/10						50.3		92.3	50.7	49.5		
1814/15	90.0					48.0		55.6		98.0		
1819/20					200?	48.0		127.3	84.0	98.0		
1822/23										70.0		
1824–25	n.d.											
1826	91.5		.47			56.0		78.0	64.0			
1826				1.39	68.7	56.0		112/216car	64.0		48	32.0
1827						56.0						
1827	88.8		.46	1.44	40.0	56.0		/232				
1827				1.28								
1828												
1828			.40	1.60								
1828					30.0			60.0		33.0	26	
1829												
1829	91.0											
1830												
1830			.60	1.60								
1830	96.3							48.9/.8ar				
1831										45.0		
1831			.56	1.50								
1831	100.6		.51	1.08	48.0			0.8ar		46.5		
1832								58.7	40.0	44.0		
1832			.32	1.50								
1832	65.2		.32					58/116	50.0	77cos	17	
1833									64.0	51.6		

1833			.32	1.56			8.0					
1833	68.9				52.0				64.0	52.8		
1834			.45	1.50								
1835				1.41			4.0					
1836			.24–.32									
1837			.37		28.0		3.0				29	
1838			.38				6.4					
1839			.32–.39	0.99			2.9			(.5lb)		
1840												
1840	148.0	74.9	.40	0.96			1.2					
1841												
1841	131.2	63.1	.34	0.96			1.5	32.0				
1842	112.6	48.0		0.96			1.5					
1843–46	n.d											
1847	112.7		.30	0.71	43.5		0.9	/114.0		39.8		
1848	113.8			0.94	39.5		0.9	113.2		42.0		
1848	116.0			0.85	40.0		1.1	116.0				32.0
1849	196.2		.52	0.80	47.5		1.3	136.0			22	40.0
1849		104.0	.53	0.72			1.9					
1850	182.0	76–125		0.80	46.2		1.4			57.3		33.8
1850	189.0			0.96			1.3+	76	48.0		36.7	
1850	127.2			0.82	44.0			/116.0		49.0		30.4
1851	131.2		52.8		55.0	62.0	1.2	60	68.0	47.5		37.3
1851			64.0	1.04								
1852	141.3			0.96	44.6			114.0	60.0	52.0		
1853			85.3		22.0	68.0				50.0	17–38	
1854/55				0.84			1.1		44.0	44.0		
1855	233.0			0.88		116		224.0	92.5			
1856	252.0		126.0									
1856												58.0
1857/58	n.d.											
1859	174.0			0.88	44.0		1.2					

APPENDIX (continued):

YEAR	Arroz (car)	Arroz (cos-sc)	Arroz (lb)	Fideos (lb)	Frijol (fn)	Frijol prieto (fn)	Chuño (lb)	Quinua (fn/car)	Pallar (fn)	Garbanzos (fn)	Maíz (fn/car)	Harina de maíz (fn)
1860	237.0			0.80			1.1					
1860		96.0		0.91			1.4					
1860			.69	1.33	(.67lb)				(1.1lb)	(.6lb)	(.5lb)	
1861	214.0	107.0		0.89			1.4					
1862				0.80			1.6					
1863			.48	0.80			1.5		(.48lb)			
1864				0.96								
1864				0.80			1.6					
1864	197.0		.58		56.0	(.5lb)		136	(.5lb)	(.5lb)		(.50lb)
1865	140.0			1.04			1.1	(1lb)				
1865				1.05		2.4					(.86lb)	
1865			.78		(.94lb)	(.94lb)	1.9	(1lb)	(1.2lb)			
1865	243.0				105.5	136.1	1.4	202.0	135.	144.0		
1866–68	n.d.											
1869		94.0			112.0	112.0				72.0	46	
1870												
1871	320.0		.80	1.60	105.0			111.		77.0	67	
1872	410.0		1.04	1.40	95–108.			(1.2lb)		77–120.	56	
1873	n.d.											
1897–1906			.74?		.37lb?					.31lb?		

APPENDIX (continued):

YEAR	Harina blanca (ar/cos/b/lb)	Papas (car/ser)	Camote (ser)	Zapallo (ser)	Chocolate (lb)	Javón (lb)	Sal (pdr)	Velas (m/u)	Leña (tr/v/qt/mu)	Carbón (cos/car/tn)
1799/1800		26.9		18.1		2.2				
1804/05		35.7		20.2		2.0				
1809/10	28wh	36.4		25.4		2.5				
1814/15	25wh	32.0		27.8		1.7				
1819/20	20bu 76wh	32.5		26.8		3.2				
1822/23	200wh	35.9		24.6		2.5				
1824–25	n.d.									
1826				13.8		2.2				
1826	163cos/26ar	/19.4	8.5	11.0			9		96v	23car
1827									.4tr	
1827	43.6ar	69.5/23.2	18.1	16.6			11	5.3m	10.8car	32car
1827									88v	
1828										
1828		56.0/34.0	24.0			2.0	10		104v	
1828	68.fn						7			
1829										
1829	32cos	30.8					10			
1830										
1830						1.7			.4tr	
1830	31.4				2.0		8		80v	14cos
1831		22.2				1.6				32car
1831						1.7			.4tr	
1831	35.7	22.5					26		8–11.1car	
1832		26.1								
1832						2.0			.32t/8car	32cos
1832	31.0	27.2							8car	9.3cos

APPENDIX (continued):

YEAR	Harina blanca (ar/cos/b/lb)	Papas (car/ser)	Camote (ser)	Zapallo (ser)	Chocolate (lb)	Javón (lb)	Sal (pdr)	Velas (m/u)	Leña (tr/v/qt/mu)	Carbón (cos/car/tn)
1833										32car
1833						2.0		.18u	.28t/8.7car	27car
1833	38.9					1.0			9.0car	
1834						1.5		.17u	8.6	
1835	(2lb)								9.0	
1836	56.0			48.0		(3qt)				
1837					1.5	2.0			12.2	
1838					1.5	2.0			12.0	
1839					2.0	1.5			12.0	
1840										
1840							17.7	3.9m	10.0	24car
1841										
1841				(1lb)	1.5			3.6m	10/110mu	
1842							11.		10.0	
1843/46	56fn/104b(mp)									
1847		23ser		10.4	11.4					
1848				10.8	11.2					
1848	14ar		9.2	11.5	11.0	1.3	1.5	10.	92v	
1849			18.0	10.2	13.0					
1849	56.0cos				2.0				7qt	
1850	45.4fn		18.6	12.7	13.2				7qt	
1850	48.0fn		20.0	11.8	16.0	1.2			88v	
1851				10.5	15.0				7qt	
1851			30.4	13.3	12.5	1.4	1.3	10.	8car/94v	
1852	59b(Ma/f)		32.0			1.2		12.		
1853	52b			10.0						
1854/55	47b								7.5qt	$16tn

1855	59b								
1856	64b			1.3				7qt	
1856									
1857/58	55b								
	58b								
1859	55b								
1860	49b								
1860	/.59lb			2.0	1.3	12.		8qt	$25tn
1860		(.36lb)	(.28lb)	4.0	1.0	(.5lb)	(4lb)	.5tr	
1861	46b/.491b				1.3			8qt	+$24tn
1862	50b/.56lb			1.9	1.3			8qt	+$24tn
1863	45b								
1864	44b			1.9	1.3				+$25tn
1864									
1864	/.50lb	72.0							
1865	46b			1.7					
1865	/.80lb								
1865	/.86lb								
1865		182.0							
1866/68	50b								
	58b–57b								
1869	49b							12.5qt	$19tn
1870									
1871	/.67lb								
1872	.54–68lb	135qt/1.4lb							
1873	n.d.								
1897–1906	.32lb?		.42lb?						

APPENDIX (continued):

Sources: See notes 4–17.

Source Key:

BC	British consular reports
B/L	Blanchard, *Peruvian Labor*, Table 7 (Lima commissions, 1897–1906)
BP	Beneficencia Pública de Lima (hospitals)
C	*El Comercio* (r-retail, w-wholesale)
CS	Conventos supresos, Archivo General de la Nación (AGN)
F	Fuentes, *Guía histórico-descriptiva*, 1860
H	Haitin, "Prices and the Lima Market," App. 11 (various)
HM	Hospitales militares (AGN)
Ma/69	Macera, "Plantaciones azucareras," Tables 35–37/1869 Lima commission
Ma/f	Macera, Table 39 (flour)
Me	Melzer, "Price of Wheat," Table 3
MP	*El Mapa Político y Literario*
P	*La Patria*
PC	Pérez Cantó, "Abastecimiento de Lima"
Q/BP	Quiroz, *La deuda defraudada*, app. I (Beneficencia Pública)
RP	*El Redactor Peruano*
SC	San Carlos Academy (AGN)
TL	*El Telégrafo de Lima*

Units: See n. 18.

ar	arroba	mu	mula
b	barrel	pdr	piedra
bot	botija	qt	quintal
bu	bushel	sc	saco
car	carga	ser	seron
cos	costal	tn	ton
fn	fanega	tr	tercio
g	gram	u	unit
gl	gallon	v	viaje
lb	pound	wh	wheat (bu)
m	mazo		