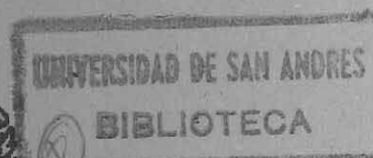


CICLO DE SEMINARIOS 1995
DEPARTAMENTO DE ECONOMIA

**Puramente animal,
Pastoral Production and
Early Argentine Economic
Growth. 1825-1865.**

Carlos Newland - Barry Poulson



**Universidad de
San Andrés**

Sem.
Eco.
95/14



**Universidad de
San Andrés**

DEPARTAMENTO DE ECONOMIA

**Puramente animal, Pastoral
Production and Early Argentine
Economic Growth 1825-1865.**

Carlos Newland (Fundación Ortega y Gasset Argentina y
Universidad de San Andrés)

Barry Poulson (University of Colorado)

San Andrés

CICLO DE SEMINARIOS 1995

Día: Martes 3 de octubre

9:00 hs.

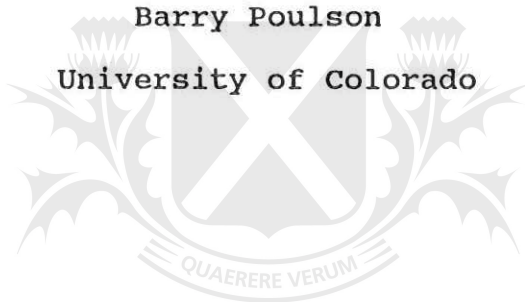
PURAMENTE ANIMAL, PASTORAL PRODUCTION AND EARLY ARGENTINE
ECONOMIC GROWTH 1825-1865*

Carlos Newland

Fundación Ortega y Gasset Argentina and
Universidad de San Andrés

and

Barry Poulson
University of Colorado



Universidad de.
San Andrés

*This paper was written in 1995 when both authors were Visiting Professors at the Universidad Carlos III de Madrid.

ABSTRACT

This study extends research on Argentine economic growth back to the early years of pastoral activity from 1825 to 1865. Rapid expansion of Argentina's economy was linked to the increase in demand for these products in world markets. Argentina fits in general terms the standard export base model used to explain economic development in young empty countries in the nineteenth century. However, in this early period Argentina presents the anomaly of increased labor intensity in pastoral production.

Universidad de
San Andrés

PURAMENTE ANIMAL, PASTORAL PRODUCTION AND EARLY ARGENTINE
ECONOMIC GROWTH 1825-1865

1. INTRODUCTION

The late nineteenth and early twentieth centuries have always been described as the golden age of Argentine agriculture and generally studies have concentrated on that period. This study extends research back to 1825-1865, a time of rapid growth in pastoral products, which dominated agricultural activities. Rapid increase of pastoral production was closely tied to the expansion of exports to European and American markets. The development of the economy was linked to this expansion in pastoral exports, thus Argentina fits the export base model often used to explain economic growth in young empty countries during the nineteenth century.¹ However, analysis of the sources of this growth reveals some anomalies that do not fit the standard export base model. The first part of this paper explores the empirical evidence for change in agriculture from 1825 to 1865; the second part of the paper disaggregates the sources of that development; and the final section summarizes the conclusions and implications of the research. The production data are decade averages for the 1820's and 1860's; the data for factor inputs are for the years 1825 and 1865. These estimates are based upon the very limited statistical evidence available prior to the formation of a unified Argentine Republic in the early 1860's.

2. GROWTH IN PASTORAL PRODUCTION AND EXPORTS, 1825-1865

The Argentine economy was dominated by pastoral activities until the last quarter of the century, when nonpastoral agricultural production expanded. A traveler across the country in 1855 commented on the 'purely animal'² character of the economy, and another contemporary referred to Argentina as a 'civilization of the hide'.³ These pastoral activities were concentrated in the Littoral. The Littoral included the provinces of Buenos Aires, Entre Rios, Corrientes, and Santa Fe, comprising 45 million hectares of land potentially usable for agriculture.⁴ About half the Argentine population lived in the Littoral in this period. The importance of agricultural production in this region is reflected in the fact it accounted for 90% of the exports of the country.⁵ For this reason our analysis of Argentine economic growth in this early period focuses on the Littoral.

Insert Table 1

Pastoral activities were the basis for a rapidly growing economy from 1825 to 1865. In the above table the growth of agricultural production from 1825 to 1865 is estimated at 6.1% per year. This rate of growth is significantly higher than that for later periods, estimated at 4% for 1862 to 1900, 3.5% for 1900 to 1929, and 1.2% for subsequent years.⁶ Beginning in the Great Depression, Argentine agriculture entered a long period of relative stagnation which continued over much of the post World War Two period. Thus, if any period is to be identified as the

golden age of Argentine agriculture it should probably be the early years from 1825 to 1865, when agricultural production expanded more rapidly than in any other phase in Argentine history.

Insert Table 2

Rapid growth of the Argentine economy in the years 1825 to 1865 was linked to dynamic changes in the production and export of pastoral products.⁷ At the beginning of this period pastoral production was predominantly cows and horses; cow and horse hides accounted for 76% of total exports in 1822. These hides were produced for a variety of uses in the European market, especially in the making of shoes. The production and export of hides reached a peak in the early nineteenth century declining in subsequent years. By 1870 cow and horse hides accounted for less than one third of Argentine exports. There was a falling trend in world prices for hides over the period.⁸

In contrast to the slower pace of production and export of cow and horse hides, the production of wool and sheep hides expanded at a rapid pace.⁹ Between 1825 and 1865 the production of wool grew over 16% per year, virtually all of which was destined for the European and American markets. While sheep were practically nonexistent in the 1820s, by 1870 wool accounted for 25.4% of total exports and sheep hides for 7.7%. The rapid growth of world demand for Argentine wool was reflected in a tripling of prices over the period.¹⁰ Argentine wool was utilized primarily in the manufacture of blankets and rugs. Before 1820 there was very

little demand for local wool because it was dirty and short compared to European wool. However, over time these defects were overcome through crossbreeding of local sheep with Merino sheep to produce a greater quantity of wool, and through technical innovations in the textile industry that reduced the cost of cleaning the wool.

Tallow export also experienced rapid growth in this early period. This product was used in making soap and candles. From a small level of output in the 1820's tallow production advanced more than 12% per year, and accounted for more than 25% of total exports by 1870. The expansion of Argentine tallow output was tied to the growth of sheep production. The 1850s was a unique decade because the European market for tallow was disrupted by the Crimean War, cutting off Russia's trade in that market. Argentina benefited from the resulting higher prices for tallow.¹¹

The rapid growth in production and export of Argentine pastoral products is accounted for by the aforementioned products, wool, sheep hides, and tallow. Other pastoral products, apart from cow and horse hides, experienced slower rates of growth in production and export. These other products included salted meat, produced for the slave populations of Brazil and the Caribbean, and horse hair, used for filling furniture and pillows. Both of these products declined as a share of pastoral production and export.

3. ACCOUNTING FOR GROWTH IN ARGENTINE PASTORAL PRODUCTION

Rapid growth in the Argentine economy from 1825 to 1865 required dynamic changes in pastoral production and export in response to shifts in world demand. In a relatively short period of time Argentina was transformed from a cow and horse economy into an economy with an expanded role for sheep. This early growth of a pastoral economy was linked to Argentina's success in capturing a larger share of world markets for these products. The significance of these structural changes is especially apparent when compared to early 20th century agricultural growth. Over much of the 20th century Argentina has experienced a decline in its share of world production and export of agricultural products. Argentina failed to sustain the dynamic changes that enabled it to successfully exploit world markets for pastoral products in the 19th century. Growth accounting provides a useful first approximation in contrasting the growth of agricultural production in the 19th and 20th centuries.

Insert Table 3

Growth accounting is used to compare agriculture in the years from 1825 to 1865 with agriculture in the later period from 1900 to 1929 for which comparable data are available.¹² This comparison reveals some anomalies in early Argentine agricultural growth. The rate of growth of land inputs into pastoral production in the early years is less than half the growth of cultivated land inputs in agricultural production in the latter

period. The rate of growth of capital inputs is also lower in the early period compared to the latter period. On the other hand labor inputs increase in the early years at more than double the rates of the latter period. The rapid growth of labor force is not surprising for a young empty country in the 19th century, however, the rapid increase in labor inputs combined with the slower pace of growth in land and capital inputs meant that labor/land ratios and labor/capital ratios were rising in the early years. This is anomalous not only compared to the later period of agricultural growth in Argentina, but also compared to agricultural growth in the United States in the midnineteenth century.¹³

Changes in total factor inputs account for roughly half of the growth in agricultural output between 1825 and 1865, but account for virtually all of the growth in output for 1900-1929.¹⁴ Agricultural productivity advanced quite rapidly, at 3.3% per year and was responsible for about half of the growth in agriculture output in the early period. In contrast the rate of productivity advance was virtually nil in the later period.

Insert Table 4

Changes in the Factor Inputs: Land

Argentina was clearly a resource abundant country in the 19th century, indeed more resource abundant than other frontier countries such as the United States. The abundance of resources was reflected in the cheapness of land in Argentina compared to

other countries. In 1850 an Argentine farm worker could purchase a hectare of land with less than a weeks wages, whereas in the United States a farm worker would need two months wages, and in England almost three years wages.¹⁵

Pastoral production in Argentina was concentrated in the Littoral, a region with extensive plains and natural prairies, rain distributed throughout the year, a temperate climate, and easy access to the rivers belonging to the La Plata basin.¹⁶ While Argentina was a resource abundant country, the land actually devoted to pastoral production in the Littoral advanced at a relatively slow pace from 12 million hectares in 1825 to 27 million hectares in 1865, or about 2% per year. The growth of land devoted to pastoral production was closely tied to the expansion of the frontier and the occupation of unoccupied public lands within the Littoral. The military campaigns gradually opened new territory to husbandry in regions containing hostile indian populations. For instance, the frontier in Buenos Aires Province was expanded in the 1820s and again in 1833, but then temporarily halted due to indian attacks in the 1850s. Pastoral land in the Province of Buenos Aires increased threefold, and that in Santa Fe doubled over the period; while in the other provinces of the Littoral, Entre Rios and Corrientes, the increase was smaller.¹⁷

As the price of wool increased in world markets it became increasingly profitable to convert some of the best lands of the Littoral to sheep production, and to shift cow and horse production to the frontier.¹⁸ Given the heterogeneous nature of the land it is difficult to calculate the evolution of average

price, however, it is estimated that the value of land was increasing about 7% per year.¹⁹ This evidence helps us to resolve the anomaly that Argentina was a resource abundant country, yet land devoted to pastoral production increased relatively slowly. Argentina was able to exploit world market opportunities for pastoral production primarily through more intensive utilization of existing land within the Littoral, and to a lesser extent through extension of the frontier.

It should be emphasized that this definition of land focuses on the natural prairie land actually brought into pastoral production. This differs from the usual definition of land input as land under cultivation generally used in other studies of Argentine agriculture, such as the Díaz Alejandro (1970) study. The justification for this different definition is that land in pastoral production accounts for virtually all of the agricultural output of the early period, whereas land in cultivated crops dominate agricultural production in the later periods.²⁰

Universidad de
San Andrés

Changes in the Factor Inputs: Capital

Capital markets in Argentina were relatively primitive throughout the 19th century as reflected in high capital costs. While interest rates declined in the 19th century they were still significantly higher than European rates. Interest rates reached very high levels between 1810 and 1820,²¹ and then decreased somewhat in the following decades when rates are estimated at 20%

per year.²² Returns to investment attracted significant flows of capital from Europe into Argentina. Argentina exhibited the classic balance of payments of a young developing country with net capital inflows offsetting a balance of trade deficit.²³

The modest pace of capital formation reflected the unique characteristics of the capital stock in Argentina in this early period. Much of the investment in pastoral activities consisted of livestock, with some minor improvements in the form of houses, wells, gutters, and dams. The value of livestock, which is used as a proxy for total capital in pastoral production, grew 2.5% per year over the period.²⁴ Sheep, which represented 1% of rural capital in 1825, increased to account for over 25% in 1865. Investments in livestock were frequently damaged by indian attacks and stealing of cattle, especially on the frontier lands. This was particularly harmful in the 1850s, when the Province of Buenos Aires lost more than half a million head of cattle due to indian raids.²⁵ This is in contrast to later periods when a peaceful frontier and greater security in property attracted increased capital into rural activities. By the end of the 19th century and the early 20th century capital was also attracted into a wider range of activities. Higher capital output ratios within the agricultural and nonagricultural sectors accompanied the acceleration in rates of capital formation in this later period.

While slow rates of capital formation in early pastoral activities reflected problems unique to Argentina's frontier economy, the country also was affected by internal and external shocks. In this early period inflation and economic instability

were linked to monetary expansion, a problem that has marked much of Argentina's history.²⁶ Argentina suffered three blockades to the port of Buenos Aires, covering about a nine year period, that seriously disrupted foreign trade. Civil wars added additional elements of risk in a primitive capital market. Thus, while Argentina's pastoral economy was inherently risky, it would surely have attracted increased capital inflows and achieved higher rates of capital formation if there had been greater economic and political stability.

Changes in the Factor Inputs: Labor

In order to explain the rapid growth of labor inputs in this period we need to understand the shifts in both demand and supply of workers in pastoral production. On the demand side the changes in product mix were accompanied by a significant increase in the demand for workers. Wool production required about the same ratio of capital per unit of land, but required much higher labor inputs per unit of land and capital. While one peon could care for 900 cows covering 1000 hectares,²⁷ one shepherd could care for a flock of 1500 sheep covering 200 hectares.²⁸ This translates into more labor intensive production and a significant increase in demand for labor in pastoral activities.

On the supply side Argentina was often compared to California in terms of low density of population and labor force in the 19th century. The scarcity of labor was reflected in high wages in Argentina, at least double the comparable wage rates in Spain²⁹ and in surrounding countries at the time.³⁰ These wage

differentials attracted a rapid growth of immigrants from Europe into Argentina's rural sector, especially Irish and Basque shepherders. In the Littoral, rates of immigration were much higher than population growth rates. Immigrants constituted about 15% of the population of the region in 1819, and 23% in 1869. In addition to rapid rates of immigration and natural increase, the Littoral attracted internal migration from the interior of the country. In earlier periods population in the interior had provided food, supplies, mules and goods for the mines in Upper Peru (present day Bolivia). But by the early 19th century that mining production had collapsed, which left a pool of potential workers in the interior of Argentina. In 1819 11% of the population of the Littoral region had come from the interior regions, while in 1869 the share was still 5.9%.³¹ The labor force of the Littoral increased even more rapidly than population. Labor force in pastoral production is estimated to have increased 4.6% per year compared to a 3.1% rate of population growth.³² This rapid rate of growth in the pastoral labor force resulted in a slow rate of increase in wages. According to one estimate, average monthly salaries for agricultural workers were 7.5 silver pesos in 1804, 10 pesos in 1854, and 12 pesos in 1864.³³

With this evidence regarding changes in factor inputs and factor prices, part of the anomaly of early pastoral production in Argentina can be resolved. Labor inputs were increasing much more rapidly than either land or capital inputs, and this rapid growth of the pastoral labor force was accompanied by rising labor/land and labor/capital ratios. While agricultural wages

were high in Argentina compared to other countries, a relatively elastic supply of labor into pastoral production moderated any increase in wage rates. In contrast, the supply of land and capital increased at a slower pace. While land costs were low in Argentina compared to other countries, the cost of land available for pastoral production was rising sharply. Capital costs remained high over the period as a whole compared to capital costs abroad. Thus, in these early years the cost of labor was falling relative to the cost of land and capital inputs into pastoral production. Rising labor/land, and labor/capital ratios were consistent with these changes in relative factor prices.

In contrast rapid growth of agricultural production in the United States in the midnineteenth century was accompanied by falling labor/land and labor/capital ratios. In this sense Argentina does not fit the standard export based model used to explain expansion in agricultural production and export in other resource abundant economies of the western hemisphere in this period.

Changes in Factor Productivity

Given the unique changes in factor inputs into Argentine agriculture in these early years, the changes in factor productivity are even more anomalous. Total factor productivity increased 3.3% per year, and accounted for approximately half of the growth in pastoral production. Thus rapid growth in productivity accompanied the shift toward a more labor intensive technology in Argentine agriculture. Far from being a backward

stagnant sector, as assumed in much of the development literature, the agricultural sector experienced rapid technological change and productivity advance.

The most important technological change was the crossbreeding of local Creole sheep, with merino sheep imported from several European countries. This crossbreeding doubled the amount of wool produced per animal.³⁴ The production of sheep tallow also increased with this crossbreeding.³⁵ It should be emphasized that these technological changes increased the labor input per unit of output in Argentine pastoral production. Sheep production was in general a more labor intensive activity than cattle production, and the new breeds of sheep required even greater inputs of labor per animal.³⁶ Thus technological change, as well as changes in relative factor prices, explain the anomaly of rising labor/land and labor/capital ratios in early pastoral production.

Although of lesser importance for productivity advance, several technological changes increased output from cattle. The production of cattle tallow was increased by sacrificing animals at more advanced ages.³⁷ In the saladeros, establishments where meat, hides and tallow were extracted, the use of steam vats increased the amount of tallow extracted per animal.³⁸ A very simple innovation increased the capacity for maintaining livestock herds in times of drought; the bottomless bucket permitted the extraction of water from wells with greater rapidity and ease. The conservation of hides, essential given the time that their shipment required, benefitted from the application of arsenic that impedes deterioration of hides.³⁹ The

occupation of frontier lands by cattle and horses produced an increase in productivity. Over time the animals transformed the land, eliminating the coarse grasses and generating tender nutritious grasses.⁴⁰

As noted earlier, political and economic instability did not provide an institutional framework conducive to rapid economic growth. However, there were some institutional changes which were particularly important in increasing rural productivity. In particular, a clearer definition and enforcement of property rights through the introduction of compulsory registration of brands and of branding livestock from the decade of the twenties facilitated the identification of the animals by their proprietors.⁴¹ This definition and enforcement of property rights in livestock was essential, given the lack of fences between the estancias.

4. CONCLUSIONS

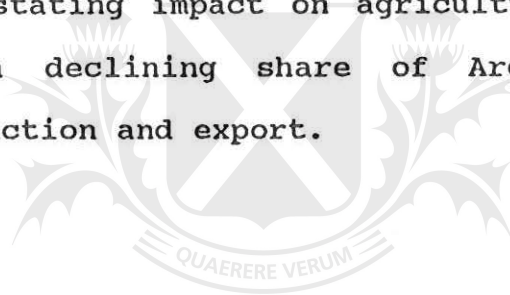
In this study we explore the source of Argentine economic growth from 1825 to 1865. If any period should be identified as the golden age of Argentine agriculture it is these early years of expansion in pastoral production and exports. In contrast, the early 20th century witnessed a slower pace of growth and productivity advance in agricultural production; and over much of the 20th century stagnation in the agricultural sector has been accompanied by retardation of the economy as a whole.

In 1809 the Argentine patriot, Mariano Moreno, predicted accurately the future of the Argentine economy. Like the

classical economists of his day he argued the the growth and prosperity of the Argentine economy would be linked to its success in expanding agricultural goods in exchange for manufactured goods that could not be produced locally at a low cost.⁴² The following decades were to prove Moreno and the classical economists right. Argentina experienced rapid economic growth linked to the expansion of pastoral production and exports. That growth was accompanied by dynamic changes in product mix, factor inputs, and factor productivity in pastoral production. While rapid growth of the Argentine economy from 1825 to 1865 fits an export base model, some of these dynamic changes were unique to Argentina's pastoral economy. Within the Littoral region labor inputs were increasing more rapidly than either land inputs or capital inputs. Rising labor/land and labor/capital ratios were a rational response to changes in product mix, relative factor prices, and technological change. We should emphasize that this evidence does not contradict the convergence hypothesis that motivates much of the current research in economic history. The product flows and factor flows for Argentina are precisely what we would expect in a young empty country of the western hemisphere in the 19th century. This early period of rapid growth in pastoral production and export was accompanied by a falling wage/rent ratio. Indeed the rate of change in these relative factor prices is more rapid than one might predict based only on factor endowments in Argentina.

Mariano Moreno advocated trade liberalization to promote Argentina's incipient agricultural export industries. Over much of the 19th century Argentina did in fact pursue policies of

trade liberalization and deregulation that benefitted the export sector. A clearer definition of property rights in land and animals was also important in the expansion of the pastoral economy. These institutional changes were conducive to rapid growth of agricultural production and exports in the 19th century. This golden age of Argentine agriculture is in contrast to the 20th century. Beginning in the Great Depression Argentina introduced policies of protectionism and regulation of the domestic economy. Macroeconomic policies have resulted in hyperinflation and economic instability over much of the post World War Two period. These dirigiste policies have had a particularly devastating impact on agriculture and have been accompanied by a declining share of Argentina in world agricultural production and export.



Universidad de
San Andrés

Table 1. Pastoral Production in Argentina 1821-1830 and 1861-1870

Product	Quantity		Annual Growth Rate
	1821-1830	1861-1870	
Cow Hydres (units)	606,101	1,968,167	3.0
Sheep Hydres (units)	--	5,501,320	--
Horse Hydres (units)	296,889	144,647	-1.8
Horse Hair (tons)	431	2,692	4.7
Wool (tons)	255	100,986	16.1
Tallow (tons)	383	39,771	12.3
Salted Meat (tons)	4,771	19,142	3.5
Index of Total Volume of Pastoral Production	100	1,068	6.1

Source: 1821-1823: Academia Nacional de Historia (1978), p. F; 1825 and 1829: Parish (1958), p. 511; 1861-1870: *Memoria del Ministerio de Hacienda* (1871). The index of total volume of

agricultural production is the geometric mean of the rates of growth of production, weighted with 1823 prices (average of prices of the available months) and 1869 prices (average of prices for the months of February, June and December), taken from Academia Nacional de Historia (1978), p. G and *Anales de la Sociedad Rural Argentina* (1869).



Universidad de
San Andrés

Table 2. Composition of Argentine Exports, 1822, 1843 and 1870

	1822	1843	1870
Cow and Horse Hides	76.4	71.9	31.3
Sheep Hides	--	2.2	7.7
Wool	0.9	7.9	25.4
Salted Meat	9.6	4.4	4.4
Tallow	3.4	7.5	25.8
Horse Hair	3.1	3.4	2.6
Other	6.5	2.7	2.8

Note: only exports from Buenos Aires port.

Source: 1822: Parish (1958, p. 511); 1843: Great Britain, House of Commons, *Parliamentary Papers* (1847, 64:2, p. 398); 1870: *Estadística de las Aduanas de la República Argentina* (1870, pp. 122-125).

Table 3. Output, Factor Inputs, and factor Productivity in Argentine Agriculture: 1825-1865 and 1900-1927 (overall annual rates of change)

	Land	Labor	Capital	Prod.	TFP
1825-1865	2.0	4.8	2.5	6.1	3.3
1900-1929	4.6	2.4	3.3	3.5	-0.03

Source: Estimates for 1825-1865 are based upon the data for output and factor inputs in pastoral production contained in tables 1 and 4 in this article. The value for animals and land for the early period were based upon the estimates for the value of animals and land in Buenos Aires in 1857 from Mulhall (1885, p. 17). It is assumed that the value of animals and land in other provinces of the Littoral were proportional to that for the 1880s estimated by Mulhall (1885, p. 17). The return to land and capital is estimated at 20% based upon Brown (1979, p. 154), and Mulhall (1885) p. 22. The return to labor is based upon a monthly salary in 1857 of 10 silver pesos, according to Brown (1979, p. 175). The resulting weights for each of the factor inputs are 35% for land, 20% for labor, and 45% for capital. Estimates for 1900-1929 are based upon the data in Díaz Alejandro (1970, pp. 142-144). The weights for the factor inputs used by Díaz Alejandro are 37.5% for land, 25% for labor, and 37.5% for capital. These weights are consistent with those estimated for the early period. Between these two periods the value of land increased, and there was a rapid expansion of the labor force, resulting in increased

weights for these factor inputs. Substituting the weights for factor inputs used by Díaz Alejandro in the early period does not significantly change these findings regarding the sources of growth in early pastoral production.



Universidad de
San Andrés

Table 4. Factor Inputs in Pastoral Production in the Littoral, 1825-1865

Factor inputs	Quantity		Annual Growth Rate
	1825	1865	
Land (million hectares)	12	27	2.0
Cattle (millions)	4	7.9	1.7
Sheep (millions)	1.6	31.5	7.7
Horses (millions)	1.5	3.5	2.1
Total Capital	5	13.5	2.5
Labor	11,000	72,000	4.8

Source:

Land: Estimates for the quantity of land are based on Mulhall (1885). If the surface is measured in terms of land of good quality and location, equivalent to land from Pergamino (Buenos Aires), the increase is greater, i.e. the quantity of land increased from 2.4 millions of hectares to 7.1 millions. These latter quantities are based upon weighting the land by its value

in every county, according to the structure of prices of the decade of the 1880's included in Mulhall (1885). However, the structure of prices could have changed in those decades due to the impact of the railroad, therefore we prefer to utilize unweighted estimates for total hectares in the calculations.

Animals: The number of cattle and horses in 1825 is estimated based on Parish (1839, pp. 371-373), Maeder (1990, p. 186) and *Almanaque* (1968, p. 271). The number of horses is very tentative, since an early estimate for Buenos Aires was not found. The stock of sheep in 1825 are valued according to Chiaramonte (1982, p. 42), with the assumption that 90% of the animals were located in the Littoral. The stock of cattle and horses in 1865 is estimated according to Mulhall (1885, p. 20) and the sheep according to Latham (1868, p. 367).

Capital: Total capital is expressed in heads of cattle, with horses and sheep converted to cattle according to the prices of the time. According to Burgin (1975, p. 57) and Mulhall (1885, p. 23), the price of a cow was 10 silver pesos and the price of a sheep 0.3 silver pesos c. 1825. According to Mulhall (1885, p. 23), in 1865 prices were 10 silver pesos for cows, 1.1 silver pesos for sheep, and 6 silver pesos for horses. The 1865 price for horses was used for 1825. According to the data presented by Barba (1967, p. 66) there was no significant change in the relative price of cows and horses between 1825 and 1865.

Labor: The male population occupied in cattle raising in 1825 is

calculated based on García Belsunce (1976) for Buenos Aires, and by Maeder (1969a) for Corrientes and Entre Rios. The population in cattle raising in Santa Fe is assumed to be proportional to that for Corrientes and Entre Rios. The population at the end of the period for all the provinces in the Littoral was obtained from the *Primer Censo* (1872). It is assumed that the rural workers not classified in a specific subsection (labourers, slaves) followed the same pattern of occupation as that for the classified workers.



Universidad de
San Andrés

REFERENCES

Academia Nacional de Historia (1978), *Informes sobre el comercio exterior de Buenos Aires durante el Gobierno de Martín Rodríguez*, Buenos Aires.

Almanaque Político y de Comercio de la Ciudad de Buenos Aires para el Año de 1826 (1968), Buenos Aires.

Alvarez, J. (1966), *Las guerras civiles argentinas*, Buenos Aires.

Allende, A. (1958), *La Frontera y la Campaña del Estado de Buenos Aires (1852-1853)*, La Plata.

Amaral, S. (1989), "Alta inflación y precios relativos. El pago de las obligaciones en Buenos Aires (1826-1834)", *El Trimestre Económico* 221, pp. 163-191.

Anales de la Sociedad Rural Argentina (1871) V (Jan.- Dec.).

Barba, E. (1967), "Notas sobre la situación económica de Buenos Aires en la década de 1820", *Trabajos y Comunicaciones* 17, pp. 65-71.

Barros, A. (1975), *Fronteras y Territorios Federales de las Pampas del Sur*, Buenos Aires.

Brown, J. (1979), *A Socioeconomic History of Argentina, 1776-*

1860, Cambridge.

Burgin, M. (1975), *Aspectos Económicos del Federalismo Argentino*, Buenos Aires.

Cortés Conde, R. (1979), *El Progreso Argentino 1880-1914*, Buenos Aires.

Chiaramonte, J. (1982), *Nacionalismo y Liberalismo Económico en Argentina 1860-1880*, Buenos Aires.

Christensen, P. (1981), "Land Abundance and Cheap Horsepower in the Mechanization of the Antebellum United States Economy", *Explorations in Economic History* 18, 309-329.

Díaz Alejandro, C. (1970), *Essays on the Economic History of the Argentine Republic*, New Haven.

Estadística de las Aduanas de la República Argentina correspondiente al Año de 1870 (1870).

Fogarty, J. (1985), "Staples, Super-Staples and the Limits of Staple Theory: the Experiences of Argentina, Australia and Canada Compared", in D. C. M. Platt and G. di Tella eds, *Argentina, Australia and Canada. Studies in Comparative Development 1870-1965*, London, 19-36.

Gallman, R. (1972), "Changes in total U.S. agricultural factor

productivity in the nineteenth century", *Agricultural History* 46, 191-209.

García Belsunce, C. dir. (1976) *Buenos Aires. Su Gente 1800-1830*, Buenos Aires.

García Sanz, A. (1979-1980), "Jornales agrícolas y presupuesto familiar campesino en España a mediados del siglo XIX", *Anales del CUNEF* (Curso 1979-1980), 49-71.

Giberti, H. (1970), *Historia Económica de la Ganadería Argentina*, Buenos Aires.

Gondra, L. (1943), *Historia Económica de la Argentina*, Buenos Aires.

Great Britain, House of Commons (1847), *Parliamentary Papers*.

Halperín Donghi, T. (1963), "La expansión ganadera en la Campaña de Buenos Aires", *Desarrollo Económico* 1-2, 57-110.

Halperín Donghi, T. (1978), "Bloqueos, emisiones monetarias y precios en el Buenos Aires Rosista", in *Homenaje a Jorge Basadre*, Lima, 307-341.

Hutchinson, Th. (1945) [1865], *Buenos Aires y Otras Provincias Argentinas*, Buenos Aires.

Latham, W. (1868), *The States of the River Plate*, London.

Lynch, J. (1989), "Foreign Trade and economic interests in Argentina, 1810-1850", in Reinhard Liehr ed., *América Latina en la época de Simón Bolívar. La formación de las economías regionales y los intereses económicos europeos 1800-1850*, Berlín, 139-155.

Maeder, E. (1969a), "La estructura demográfica y ocupacional de Corrientes y Entre Ríos, en 1820", *Cuadernos de Historia* 4, pp. 1-42.

Maeder, E. (1969b), *Evolución Demográfica Argentina desde 1810 a 1869*, Buenos Aires.

Maeder, E. (1990), "La riqueza ganadera de Corrientes en la época confederal (1827-1854)", *Res Gesta* 27-28, 177-197.

Moreno, M. (1810), *Representación de los Hacendados*, Buenos Aires.

Memoria del Ministerio de Hacienda (1871), Buenos Aires.

Moscatelli, G. (1991), "Los suelos de la Región Pampeana", en O. Barsky ed. *El Desarrollo Agropecuario Pampeano*, Buenos Aires, 11-76.

Mulhall, M. G. and E. T. (1885), *Handbook of the River Plate*,

London.

Parish, W. (1839), *Buenos Ayres and the Provinces of the Rio de la Plata*, London.

Parish, W. (1958), *Buenos Aires y las Provincias del Río de la Plata*, Buenos Aires.

Pomfret, R. (1981), "The Staple Theory as an Approach to Canadian and Australian Economic Development", *Australian Economic History Review* XXI, 133-146.

Primer Censo de la República Argentina (1872), Buenos Aires.

Reber, V. (1972), "British Mercantile Houses in Buenos Aires, 1810-1880" (Unp. Ph. D. Diss., University of Wisconsin).

Reber, V. (1979) *British Mercantile Houses in Buenos Aires. 1810-1880*, London.

Registro Oficial de la Provincia de Buenos Aires (1873).

Rosal, M. (1992), "El Río de la Plata en la primera mitad del siglo XIX: las relaciones comerciales entre el Interior y Buenos Aires, 1831-1835", *Boletín del Instituto de Historia Argentina y Americana "Dr. E. Ravignani"* 1, 49-75.

Sábato, H. (1990), *Agrarian Capitalism and the World Market*.

Buenos Aires in the Pastoral Age 1840-1890, Albuquerque.

Slatta, R. (1985), *Los gauchos y el ocaso de la frontera*, Buenos Aires.

U. S. Congress (1830-1870), *Commerce and Navigation*, vols. 1830-1870.

Urquiza Almandoz, O. (1978), *Historia Económica y Social de Entre Ríos (1600-1854)*, Buenos Aires.

Vicuña Mackenna, B. (1936), *Obras Completas*, Santiago.

Watkins, M. (1963), "A Staple Theory of Economic Growth", *The Canadian Journal of Economics and Political Science* XXIX, 141-158.

Wu Brading, C. (1969), "Un análisis comparativo del costo de vida de diversas capitales de Hispanoamérica", *Boletín Histórico de la Fundación John Boulton* 20, 229-266.

NOTES

1. On Staple Theory see Pomfret (1981), Watkins (1963) and Fogarty (1985). This approach has specifically been applied to Argentina in this period by Brown (1979).
2. Vicuña Mackenna (1936, II, p. 428).
3. See Giberti (1970, p. 73).
4. On the land available for cattle raising in the pampean region see Moscatelli (1991).
5. For example, 80,000 hides from the interior of Argentina reached Buenos Aires each year between 1831 and 1833. The total hides exported by Argentina in those years was around 750,000. The corresponding figures for the interior are from Rosal (1992, p. 64); the totals are derived from those shown in Table 2. Mulhall (1885, p. 77), calculated that in 1870 81% of Argentine trade originated from Buenos Aires. Parish (1958, pp. 522-523), estimated that toward middle of the century practically the whole of the exports originated in the provinces of the Littoral.
6. See Díaz Alejandro (1970, p. 142).
7. On the uses of the exported products see Brown (1979, pp. 50-68).
8. Prices of Buenos Aires hides in London covering the period can be found in Halperín Donghi (1963, p. 65), and Reber (1972, p. 323).
9. See Sabato (1990).
10. According to the American Customs valuation of argentine wool. See U. S. Congress (vols. 1829-1870), *Commerce and Navigation*.
11. Prices for argentine tallow during the period can be found in Halperín Donghi (1963, p. 65), and Reber (1972, p. 321).
12. The data for the early period corresponds exclusively to the Littoral, the data for the latter period to Argentina as a whole.
13. On the United States see Gallman (1972).
14. Pastoral output in the early period is measured through the volume of exports, local consumption of hides, tallow, wool and salted meat was marginal.
15. See Christensen (1981, pp. 312-313) for England and the United States, and Brown (1979, pp. 152, 164), for Buenos Aires.

16. The land from the interior of the country was of poorer quality and less favorable climate compared to the Littoral region. Most importantly the interior regions lacked access to navigable rivers, requiring expensive land transport to bring products to market.
17. Estimated according to Mulhall (1885).
18. Giberti (1970, pp. 153-154).
19. See Brown (1979, p. 152) and Cortés Conde (1979, p. 158).
20. One of the problems in this comparison of the sources of growth is that measures of land are not strictly comparable between the two periods. This study measures land inputs as natural prairie land utilized in pastoral production because this accounts for virtually all of the land utilized for agricultural production in the early period. Díaz Alejandro measures land inputs as land under cultivation. If natural pastures utilized in pastoral production were combined with cultivated land in the latter period then the growth of land inputs would be significantly lower than that used by Díaz Alejandro. However, this assumption would not significantly change the findings with regard to the sources of agricultural growth in the latter period. For example, if we assume that land inputs were increasing only 1% in the latter period, estimates of total factor productivity growth increase from -0.03 to 1.3%, which is still far below the 3.3% total factor productivity growth in the earlier period.
21. Gondra (1943, p. 323).
22. See Brown (1979, p. 154), Burgín (1975, p. 335). and Mulhall (1885, p. 22).
23. In almost every year for which data is available imports were greater than exports. See Brown (1979, p. 82); Chiaramonte (1982, p. 56) and Reber (1979, p. 20).
24. The livestock represented more than the 90% of the total capital in sheep establishments. See Hutchinson (1945, p. 314) and Latham (1868, pp. 221-222). In the estancias, cattle represented about 75% of total capital. See Barba (1967, p. 66).
25. See Allende (1958, p. 122) and Barros (1975, p. 61).
26. On Argentine inflation in this early period see Amaral (1989) and Halperín Donghi (1978).
27. See Slatta (1985, pp. 59-61); Cortés Conde (1979, p. 61); Alvarez (1966, pp. 67-68); Hutchinson (1945, p. 329).
28. See Latham (1868, pp. 218-221). Hutchinson (1945, pp. 310-311) indicates a larger number of sheep per hectare.

29. Comparison of salaries for 1860 in sterling pounds. The salary of an Argentine peon- ten silver pesos-, is taken from Brown (1979, p. 164). An agricultural labourer in Spain received the equivalent of 4 or 5 Argentine silver pesos: see García Sanz (1979-1980, p. 63).
30. Comparison for 1842, based on salaries of servants, weighted by their purchasing power, measured as a simple mean of the following products: bread, meat, milk, eggs, rent of housing and the price of a riding horse. The salaries in Buenos Aires were double those from Uruguay, and were triple those from Bolivia and Chile. See Wu Brading (1969).
31. The numbers for 1819 are tentative, and are estimated based on Maeder (1969a and 1969b) and García Belsunce (1976). The numbers for 1869 were calculated according the information given in the *Primer Censo* (1872).
32. Maeder (1969b).
33. Brown (1979, p. 164).
34. Brown (1979, pp. 138-139).
35. Latham (1868, p. 24).
36. According to Latham (1868, p. 85), the size of a flock of sheep decreased by half with the improvement of the animals.
37. Parish (1958, p. 524).
38. See Urquiza Almandoz (1978, pp. 174-177) and Lynch (1989, p. 143).
39. Alvarez (1966, p. 75).
40. See Latham (1868, p. 19).
41. For Buenos Aires see *Registro Oficial de la Provincia de Buenos Aires* (1873, vol. 1822, pp. 36-37 and vol. 1825, p. 44); for Entre Ríos see Urquiza Almandoz (1978, pp. 86-92).
42. Moreno (1810, p. 29).