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THE DEMAND FOR MOTOR VEHICLES IN LATIN AMERICA 2/

prepared by

The Economic Commission for Latin America

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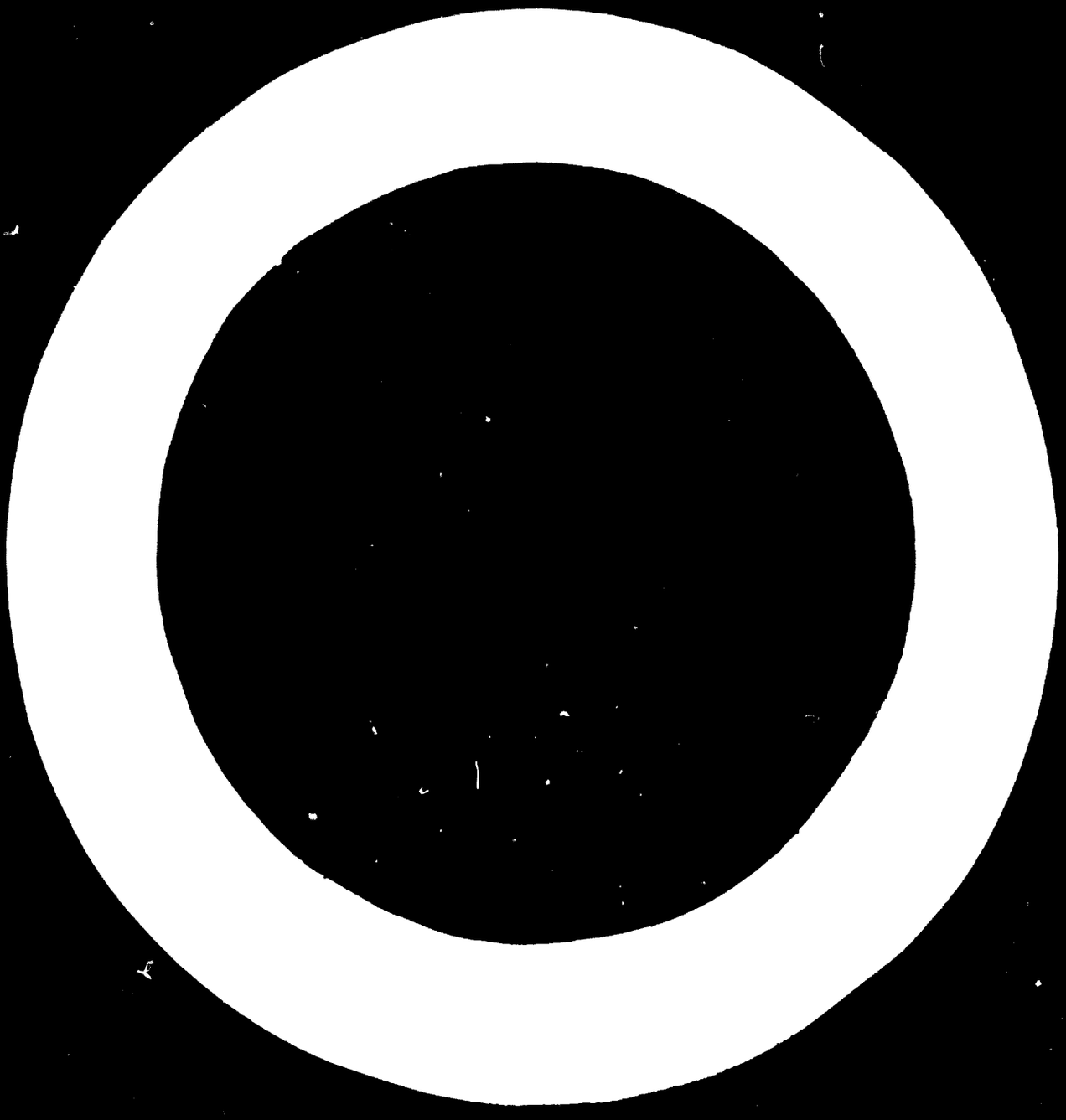

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THE DEMAND FOR MOTOR VEHICLES IN LATIN AMERICA.

UNIDO. 1970. 100 p.

The aim of the present study is to estimate the magnitude of the demand of motor vehicles in Latin America up to 1985. To this end, consideration has been given, on the one hand, to the historical evolution of the apparent consumption and supply of passenger cars and commercial vehicles in the different countries, and, on the other, to possible changes in the general economic situation and conditions of supply, which are likely to have a decisive influence on the volume and type of vehicles required by each of the national markets in the future.

This report is the first part of a study on the perspectives and possible ways of regional integration of the motor-vehicle industry in Latin America. The study is being carried out under an agreement between the Inter-American Development Bank (IDB) and the Economic Commission for Latin America (ECLA) and with the collaboration of the United Nations Industrial Development Organization (UNCDI)

The present document is restricted and has been issued only with a view to obtaining comments and suggestions before the final version is prepared.

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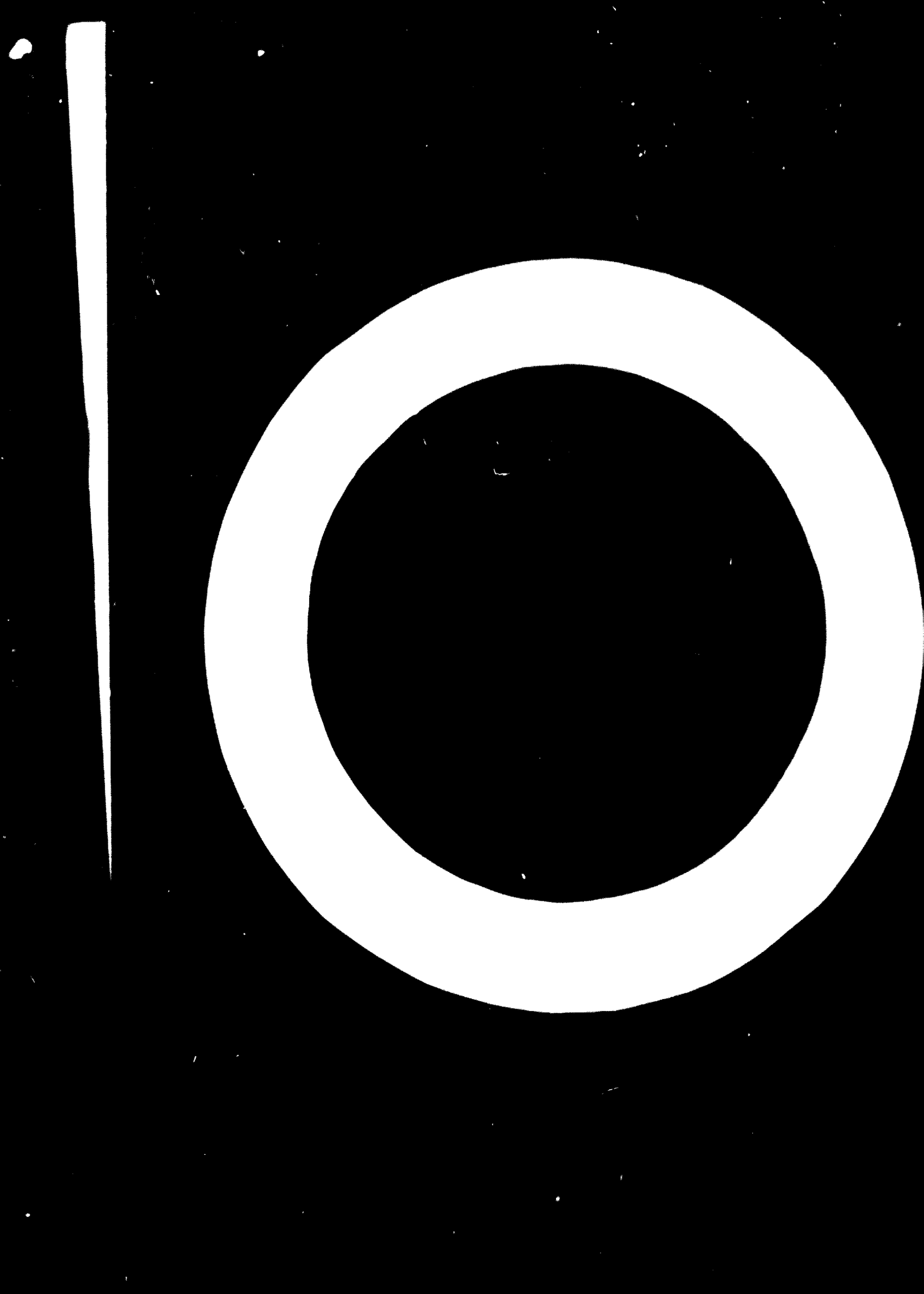

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/I. [illegible]

THE DEMAND FOR MOTOR VEHICLES IN LATIN AMERICA

I. CURRENT SITUATION

The most outstanding features of the motor vehicles park in Latin America are the age of the vehicles and the slow growth of the stock up to 1960.

The addition of new units to the park between 1950 and 1960 was very uneven owing to the fact that internal demand was met almost exclusively by imports, the volume of which depended on the balance-of-payments situation in each country. In most of them, the irregularity of new additions to the park was offset by extending the useful life of the vehicles already on the road. Although the position varied greatly from country to country, the overall result was an aging of the motor-vehicle park in Latin America.

It was not until 1960 that the Latin American vehicle park began to increase more rapidly as a result of the development of the automotive industry in Argentina and Brazil and following the establishment of motor-vehicle assembly industry on a broader basis in Chile, Mexico, Peru and Venezuela.

Table 1 shows the evolution of the stock of motor vehicles in Latin America between 1955 and 1967. An analysis of the data contained in the table shows that, during the same period, the stock of vehicles rose at an accumulative average annual rate of 6.4 per cent, the average rate for passenger cars being 5.6 per cent, and for industrial vehicles (lorries, pick-ups, buses, etc.) 6.8 per cent.

Despite the fact that the number of motor vehicles in use in Latin America has grown considerably in the last five years, it is still very small compared with other world regions. In 1966 the total Latin American stock of vehicles was only 3.1 per cent of the world total of 180 million vehicles, while the North American and European shares of the world total were 34 and 31 per cent, respectively.

Table 1

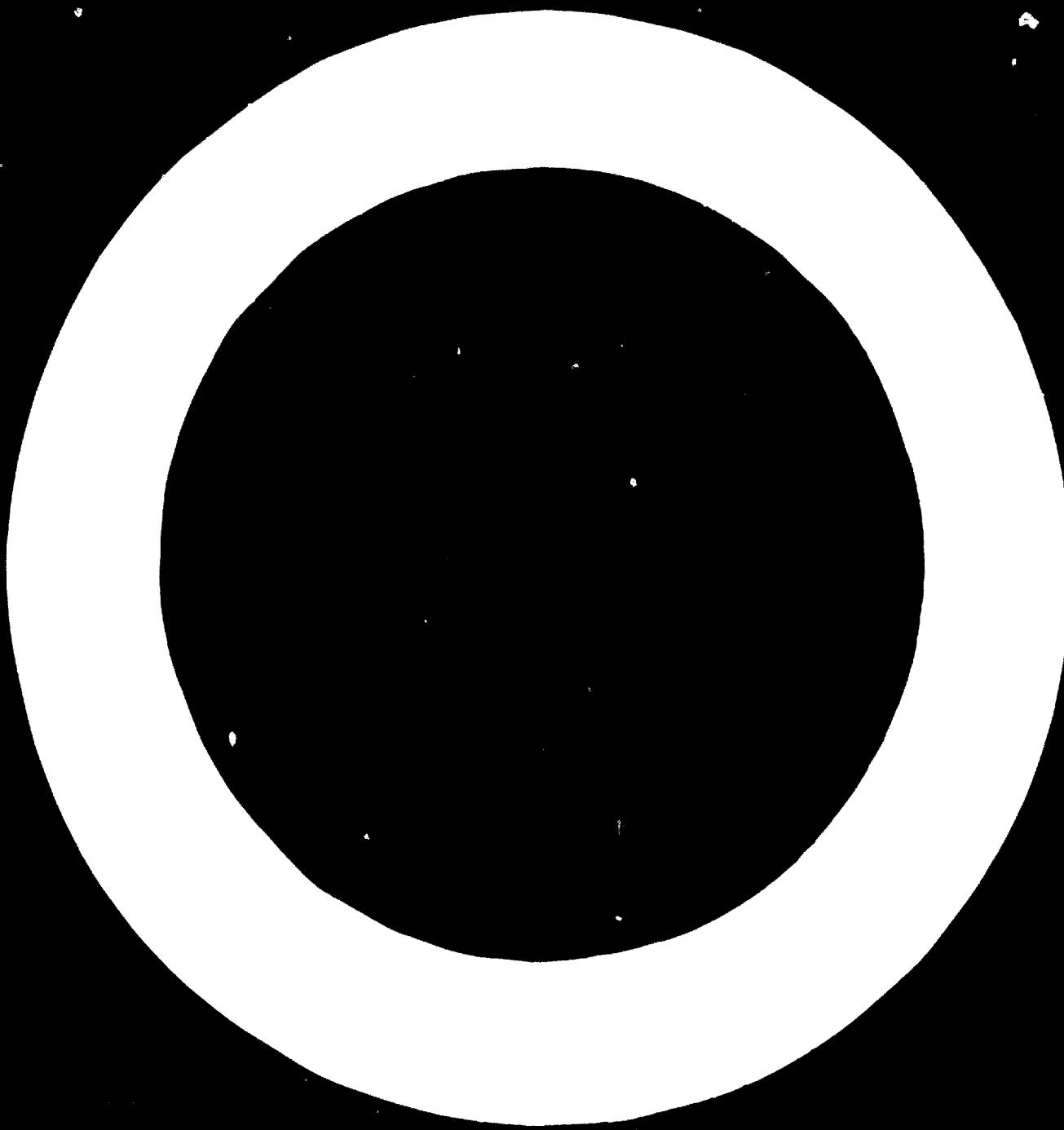


Table 1

LATIN AMERICA[a/]: EVOLUTION OF MOTOR-VEHICLES PARK, 1955-1967

(Units)

Year	Passenger cars	Commercial vehicles	Total
1955	1 476 277	1 251 265	2 727 542
1956	1 548 651	1 304 022	2 852 673
1957	1 671 486	1 418 998	3 090 484
1958	1 777 391	1 500 817	3 278 208
1959	1 991 056	1 677 024	3 668 080
1960	2 186 532	1 824 254	4 010 786
1961	2 457 344	1 942 181	4 399 525
1962	2 677 312	2 088 286	4 765 598
1963	3 001 013	2 218 920	5 219 933
1964	3 264 490	2 355 734	5 620 224
1965	3 743 342	2 513 770	6 257 112
1966	4 212 290	2 665 034	6 877 324
1967	4 421 615	2 771 500	7 193 115

Source: ADEFA, ANFAVEA, ANIA, FIAT.

a/ The data supplied correspond to the combined motor-vehicle park of the following countries: Argentina, Bolivia, Brazil, the Central American countries, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

If the regional vehicle parks are compared on the basis of population, that is, the density of vehicles in use per thousand inhabitants, it can be seen (table 2) that Latin America occupies the fourth place among the six world regions considered, with a vehicle density 4.5 times less than that of Europe, which comes third, and 2.5 times greater than that of Africa, the next lowest. The table also shows that, between 1960 and 1965, vehicle density in Latin America grew more rapidly than in the other regions, except Europe and Asia, which is logical in view of the fact that this was the period in which the car industry really began to develop in Latin America, and it is precisely in the early stages of development that growth is greatest.

/Table 2

Table 2

COMPARISON OF THE DEGREE OF MOTORIZATION IN LATIN AMERICA AND THE OTHER WORLD REGIONS

(Index: Latin America = 100)

	Number of motor vehicles per thousand inhabitants		
	1955	1960	1965
North America a/	1 510	1 883	1 588
Oceania	1 293	1 058	939
Europe	330	376	446
Latin America	100	100	100
Africa	53	42	38
Asia	10	10	15

Source: Estimates based on data taken from Automobile Facts and Figures and the United Nations Demographic Yearbook.

a/ United States and Canada.

In comparing the vehicle density in the different regions, account should be taken of certain circumstances which characterize the position of Latin America, namely: the age of the stock, which is much greater in Latin America than in Europe, Oceania and North America in particular; the differences in income levels, which largely account for the differences in absolute terms in the number of motor vehicles per thousand inhabitants (income is very unevenly distributed in Latin America, both by country and per capita); and lastly, the population growth rate, which is much higher in the Latin American countries than in Europe or North America.

The apparent consumption of motor vehicles in Latin America - taken as the sum of the units assembled or produced in the various countries, plus imports of assembled vehicles - showed a spectacular upswing between 1955 and 1966, rising from roughly 195,000 units in 1955 to 730,000 in 1966, an average annual growth rate of 12.7 per cent. However, a separate analysis

/of the

of the consumption of passenger cars and commercial vehicles (table 3) shows that the larger increase was in passenger cars. In quantitative terms, consumption of passenger cars grew at an annual average rate of 15.4 per cent during the period considered, while the equivalent figure for commercial vehicle consumption was 9.3 per cent.

This significant fact - the greater increase in the demand for passenger cars than for industrial vehicles - is commonly characteristic of developing countries, particularly countries in the early stages of development.

In the first place, even though, as a general rule, only a small proportion of the population is in a position to buy passenger cars, these represent an important share of total consumption expenditure. Moreover, the automobile is not only a means of transport, it is a symbol of progress, and this factor helps to push up demand. The slower increase in the demand for commercial vehicles is largely due to the inadequate development of this type of transport in many countries; highway networks are inadequate and generally in poor condition; the useful life of this type of vehicle is shorter than that of passenger cars, and replacement of spare parts is difficult in those countries with balance-of-payments problems which do not have an automobile industry.

The increase in consumption was due almost entirely to the growth of production, by about 530,000 units or ten-fold between 1955 and 1966. However, production did not grow uniformly throughout the period; in the first five years growth was negligible, being restricted to the assembly of vehicles with a very few nationally manufactured components. Mexico was the most important country for motor-vehicle assembly during this period. The real development of production began in 1960 with the consolidation of the automotive industry in Argentina and Brazil. Other countries subsequently followed with the large- or small-scale manufacture or assembly of motor vehicles: Colombia, Chile, Peru, Uruguay, Costa Rica, etc. Bolivia, Ecuador and Paraguay do not have an automobile industry.

Imports of motor vehicles showed little variation between 1955 and 1966, and the fluctuations which occurred differ widely from country to country. Imports grew at an average annual rate of 12.5 per cent between 1955 and 1959, but followed a downward trend from 1959 to 1966, which was more marked in respect of imports of commercial vehicles.

/Table 3

Table 3

LATIN AMERICA a/: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1966

(Units)

Year	Production			Imports			Apparent consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	29 448	31 464	60 912	68 380	66 448	134 828	97 828	97 912	195 740
1956	23 134	43 613	66 747	66 838	70 925	137 763	89 972	114 538	204 510
1957	32 365	69 942	102 307	73 779	134 009	207 788	106 144	203 951	310 095
1958	46 088	98 286	144 374	87 126	117 200	204 326	133 214	215 486	348 700
1959	67 662	128 920	196 582	93 818	122 607	216 425	161 480	251 527	413 007
1960	118 699	171 561	290 260	86 839	67 044	153 883	205 538	238 605	444 143
1961	184 000	175 811	359 811	76 688	50 976	127 664	260 688	226 787	487 475
1962	219 392	186 651	406 043	53 749	43 576	97 325	273 141	230 227	503 368
1963	233 360	155 140	388 500	54 810	36 537	91 347	288 170	191 677	479 847
1964	309 739	187 467	497 206	63 691	37 226	100 917	373 430	224 693	598 123
1965	352 606	194 411	547 017	67 322	43 106	110 428	419 928	237 517	657 445
1966	390 940	209 928	600 868	79 391	47 819	127 210	470 331	257 747	728 078

Source: ADEFA, ANFAVEA, AMIA and FIAT.

a/ The data supplied in this table correspond to the following countries: Argentina, Bolivia, Brazil, the Central American countries, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela.

II. MOTOR-VEHICLE STOCK AND APPARENT CONSUMPTION IN SELECTED LATIN AMERICAN COUNTRIES

1. Argentina

The stock of motor vehicles in Argentina in 1967 represented about 24 per cent of the total Latin American park. Because of the difficulties in meeting demand normally between 1950 and 1958, owing to the scarcity of foreign exchange, it was necessary to extend the useful life of existing vehicles beyond the usual limit, so that the average age of the total stock increased considerably. For instance, in 1955, 65 per cent of passenger cars were more than 15 years old, and only 7 per cent were between 0 and 5 years old. In contrast, the situation in respect of lorries and other freight-carrying vehicles was somewhat better: only 24 per cent of such vehicles were more than 15 years old in 1955. As from 1959, the proportion of new vehicles in the total stock increased considerably; the first units produced in the country were designed to fill the gap caused by the aging of the stock, and an average of 10,000 passenger cars and 14,000 commercial vehicles were taken off the road annually. Thus, at the present time, 74 per cent of all vehicles are less than 10 years old, and the proportion is very similar for passenger cars and freight vehicles, considered separately. The proportion of buses less than 10 years old is 97 per cent, which is logical in view of the fact that these vehicles are in constant use. As regards the growth of total stocks, table 4 shows that up to 1960, stocks of passenger cars and commercial vehicles increased at much the same rate, by 7.1 and 8.2 per cent, respectively; but as from 1960 onwards, the stock of passenger cars grew more rapidly by 12.7 per cent, as national industry took over an increasing share of the supply for the domestic market. Passenger car density rose from 23 units per thousand inhabitants in 1960 to 46 units in 1967, exceeding the world average for the corresponding level of income. At the same time - the suppressed demand of the last few years having been satisfied - the stock of commercial vehicles grew by 7.1 per cent between 1960 and 1967, and their share in the total stock of vehicles declined from 45 to 37 per cent.

/Table 4

Table 4

ARGENTINA: STOCK OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density per thousand inhabitants		
1955	336 229	17.80	265 453	601 682
1956	346 895	18.02	277 237	624 132
1957	364 490	18.98	306 526	670 988
1958	389 684	19.90	327 689	717 313
1959	430 754	21.19	357 708	788 362
1960	473 517	22.91	392 089	865 606
1961	534 960	25.66	437 819	972 799
1962	624 328	25.24	485 601	1 109 989
1963	696 868	32.13	519 291	1 216 159
1964	805 694	36.99	572 502	1 378 196
1965	934 578	40.98	598 088	1 506 666
1966	1 032 349	45.45	623 029	1 654 378
1967	1 066 200	46.28	631 300	1 697 500

Source: ADEFA.

/Table 5

Table 5 and figure I summarize the evolution of the production, imports and apparent consumption of motor vehicles in Argentina between 1955 and 1967.

In the early years, the Argentine motor-vehicle industry was devoted to the sporadic production of freight and passenger vehicles. Passenger-car assembly began later and was still of little importance in 1955. But from that year, the proportion of national parts and components used in the assembly of vehicles increased gradually, concurrently with the increase in the number of vehicles produced, which amounted to about 60,000 passenger cars and 50,000 commercial vehicles in 1960. In the following five-year period the number of passenger cars manufactured grew rapidly reaching 133,000 units in 1965, while production of commercial vehicles increased at a slower and uneven rate. In 1966 and 1967 there was a contraction of demand, with the result that passenger car production remained fairly stable, and 15,000 fewer commercial vehicles were produced then in 1964. However, trends are expected to improve during the next few years, since 1968 saw the first signs of an increase in sales compared with the previous year.

Between 1955 and 1958, imports of motor vehicles were restricted to below market needs. The last large-scale imports took place in 1957, when 71 per cent of the total were commercial vehicles. In 1958, imports were cut back by 50 per cent, and in the following years they showed a marked downward trend - coinciding with the growth of national production which was heavily protected by exchange surcharges and import duties - until in 1967 they reached an almost insignificant level (460 passenger cars and 1,[illegible]2 commercial vehicles).

/Table 5

Table 5

ARGENTINA: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Production			Imports			Apparent consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	235	6 156	6 391	6 630	4 504	11 134	6 865	10 660	17 525
1956	326	5 617	5 943	8 552	8 801	17 753	9 278	14 418	23 696
1957	5 401	10 184	15 585	11 462	36 067	47 529	16 863	46 251	63 114
1958	14 310	13 524	27 834	15 381	4 205	19 586	29 691	17 729	47 420
1959	18 290	14 662	33 352	6 190	825	7 015	24 880	15 487	40 367
1960	41 418	49 194	90 612	3 251	1 856	5 107	44 669	51 050	95 719
1961	78 274	57 914	136 188	2 876	2 071	4 947	81 150	59 985	141 135
1962	90 648	39 562	130 210	2 145	3 884	6 029	92 793	43 446	136 239
1963	75 338	29 561	104 899	863	823	1 686	76 201	30 384	106 585
1964	114 619	51 654	166 273	544	742	1 286	115 163	52 396	167 559
1965	133 734	60 802	194 536	503	614	1 117	134 237	61 416	195 653
1966	133 812	45 641	179 453	462	1 054	1 516	134 274	46 695	180 969
1967	131 038	44 280	175 318	460	1 442	1 902	131 498	45 722	177 220

Source: ADEFA.

/Figure 1

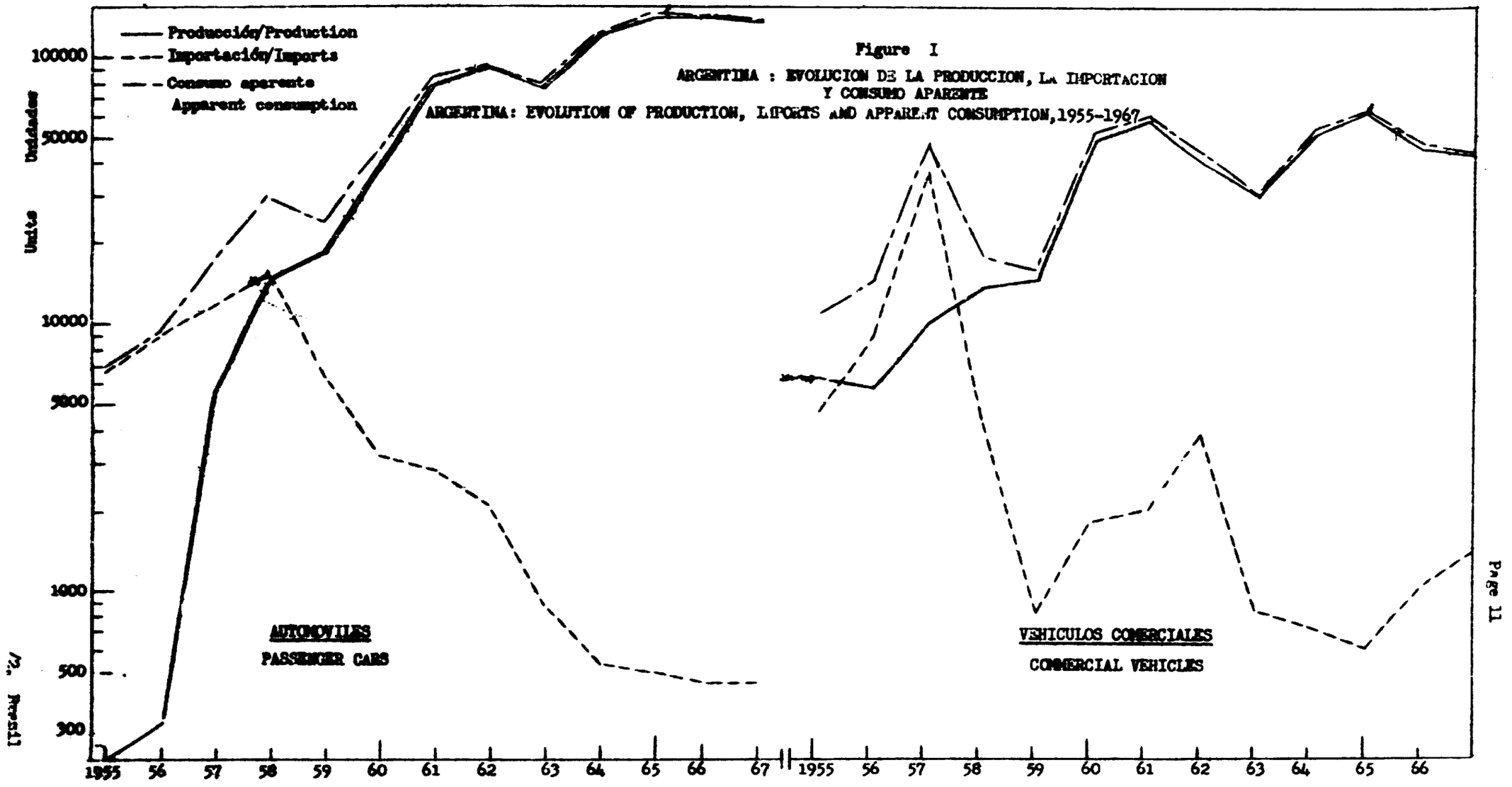


Figure I

ARGENTINA : EVOLUCION DE LA PRODUCCION, LA IMPORTACION Y CONSUMO APARENTE

ARGENTINA: EVOLUTION OF PRODUCTION, IMPORTS AND APPARENT CONSUMPTION, 1955-1967

2. Brazil

Up to 1950 the principal means of transport in Brazil had been the railways and the coastal trading fleet, but as these traditional means became inadequate in relation to the economic expansion of the country, there was a shift towards road transport, which was greatly facilitated by the extension and paving of the highway network. However, the motor-vehicle park grew very little between 1950 and 1955, since the restriction on import capacity made it impossible to maintain a park that was more adapted to the requirements of the development process.

The introduction of the motor-vehicle industry and the resulting increase in the supply of the domestic market greatly facilitated the increase in the total stock, which grew at an annual average rate of 9.1 per cent between 1955 and 1960 and by 11.9 per cent in the following five-year period. The growth of the stock was not uniform in respect of commercial vehicles and passenger cars: in the first five-year period, commercial vehicles increased more than passenger cars, by 10.6 per cent as opposed to 7.1 per cent; between 1960 and 1966 the situation was reversed with growth rates of 16.4 per cent for passenger cars and 7 per cent for commercial vehicles (see table 6).

Despite the expansion of production and the increased supply, Brazil's motor-vehicle park is still rather old. Depreciation rates were low - particularly on passenger cars - throughout the period under consideration: no doubt owing to the uneven distribution of income and to the fact that the relatively low maintenance and repair costs encouraged owners to keep their vehicles in operation longer. At the present time, only half the total stock can be considered modern, and the average life of each vehicle is around twenty years.

Table 7 and figure II show the evolution of the production, imports and apparent consumption of vehicles in Brazil between 1955 and 1966.

/Table 6

Table 4

[illegible] STOCK OF MOTOR VEHICLES, 1955-1966

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density per thousand inhabitants		
1955	378 498	6.19	[illegible]	[illegible]
956	389 491	6.25	371 548	761 039
1957	395 909	6.16	389 197	785 106
1958	437 807	6.60	438 360	876 167
1959	481 866	7.08	514 000	995 865
1960	537 781	7.71	599 130	1 136 911
1961	674 805	9.39	634 [illegible]	1 309 725
1962	738 600	9.88	673 007	1 405 607
1963	867 486	11.35	728 408	1 595 894
1964	906 434	11.50	761 473	1 667 907
1965	1 140 820	14.08	829 032	1 979 852
1966	1 336 958	15.98	899 020	2 235 978

Source: ANPA/UNA.

/Table 9

Table 7

BRAZIL: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Production			Imports			Apparent consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	-	-	-	1 424	12 596	14 020	1 424	12 596	14 0
1956	-	6 700	6 700	885	17 839	18 724	885	24 539	25 4
1957	-	30 700	30 700	1 915	42 164	44 079	1 915	72 864	74 7
1958	2 369	58 940	61 129	4 955	68 659	73 614	7 144	127 599	134 7
1959	11 963	84 242	96 205	12 303	79 546	91 849	24 266	163 788	188 0
1960	57 818	95 235	153 053	6 601	14 181	20 782	64 419	109 416	153 8
1961	54 978	90 609	145 587	707	176	883	55 685	90 785	146 4
1962	74 557	116 307	191 194	133	174	307	75 020	116 481	191 5
1963	86 024	88 103	174 127	914	100	1 014	86 938	88 203	175 1
1964	97 763	85 980	183 748	819	62	881	98 587	86 042	184 6
1965	103 415	81 086	184 501	142	11	153	103 557	81 057	184 6
1966	120 119	104 455	224 574	1080	100	118	120 219	104 465	224 6
1967	132 027	93 335	225 362	-	-	-	132 027	93 335	225 3

Source: ANFAVEA.

* Provisional figures.

/Figure II

Gráfico 2
Figure II

BRASIL: EVOLUCION DE LA PRODUCCION, LA IMPORTACION Y EL CONSUMO APARENTE

BRAZIL: EVOLUTION OF PRODUCTION, IMPORTS AND APPARENT CONSUMPTION, 1955-1967

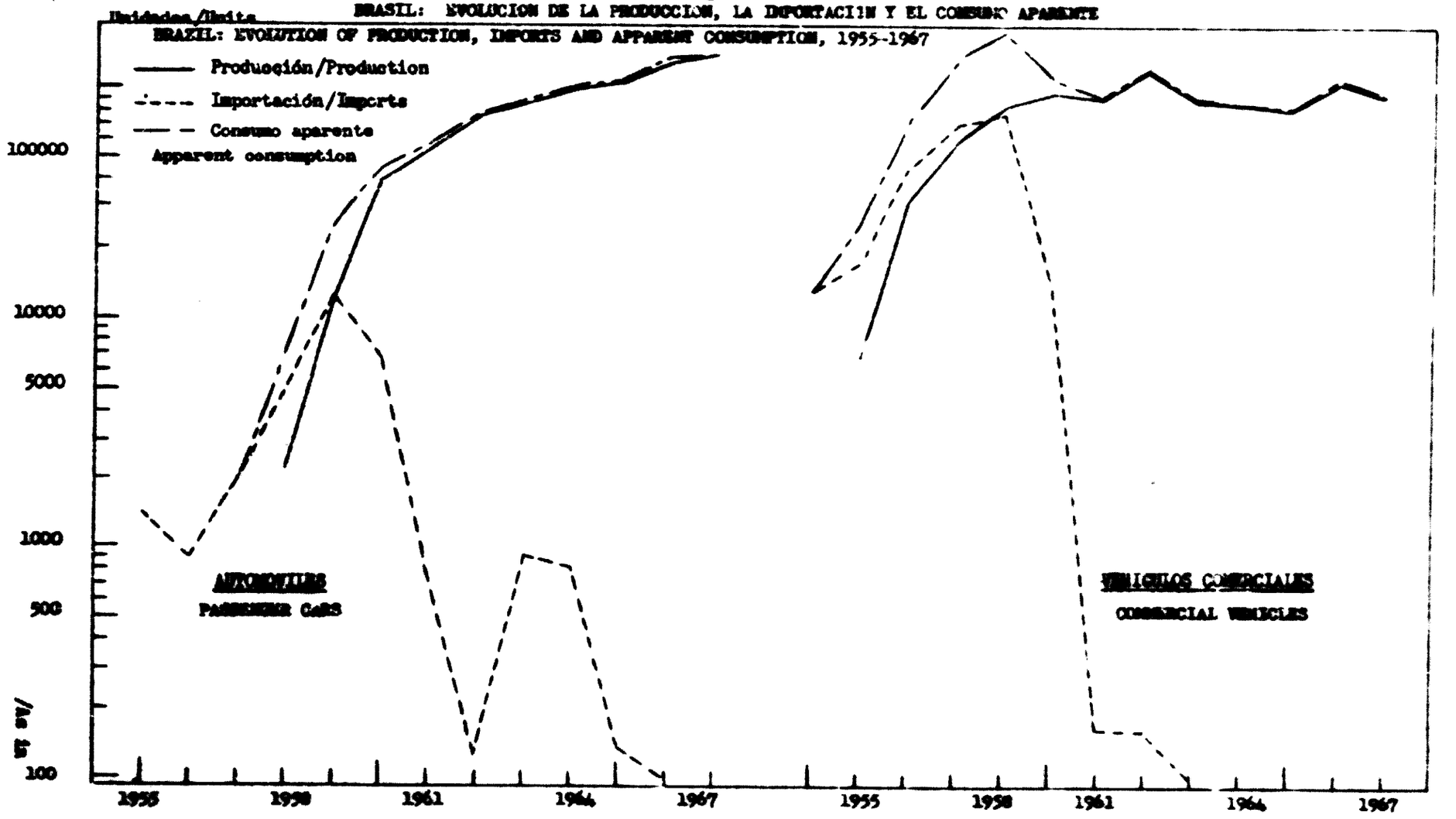


Table 7

BRAZIL: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Production			Imports			Apparent consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	-	-	-	1 424	12 596	14 020	1 424	12 596	14 020
1956	-	6 700	6 700	885	17 839	18 724	885	24 539	25 424
1957	-	30 700	30 700	1 915	42 164	44 079	1 915	72 864	74 779
1958	2 169	58 940	61 129	4 955	68 659	73 614	7 144	127 599	134 743
1959	11 963	84 242	96 205	12 303	79 546	91 849	24 266	163 788	188 054
1960	37 818	95 235	133 053	6 601	14 181	20 782	44 419	109 416	153 835
1961	54 978	90 609	145 587	707	176	883	55 685	90 785	146 470
1962	74 457	116 307	191 194	133	174	307	75 020	116 481	191 501
1963	86 038	88 103	174 127	914	100	1 014	86 538	88 203	175 141
1964	97 763	85 980	183 748	819	62	881	98 587	86 042	184 629
1965	103 415	81 086	184 501	142	11	153	103 557	81 097	184 654
1966	180 119	104 455	284 574	1080	100	110	180 219	104 465	284 684
1967	132 027	93 535	225 562	-	-	-	132 027	93 335	225 362

SOURCE: ANFAVEA.

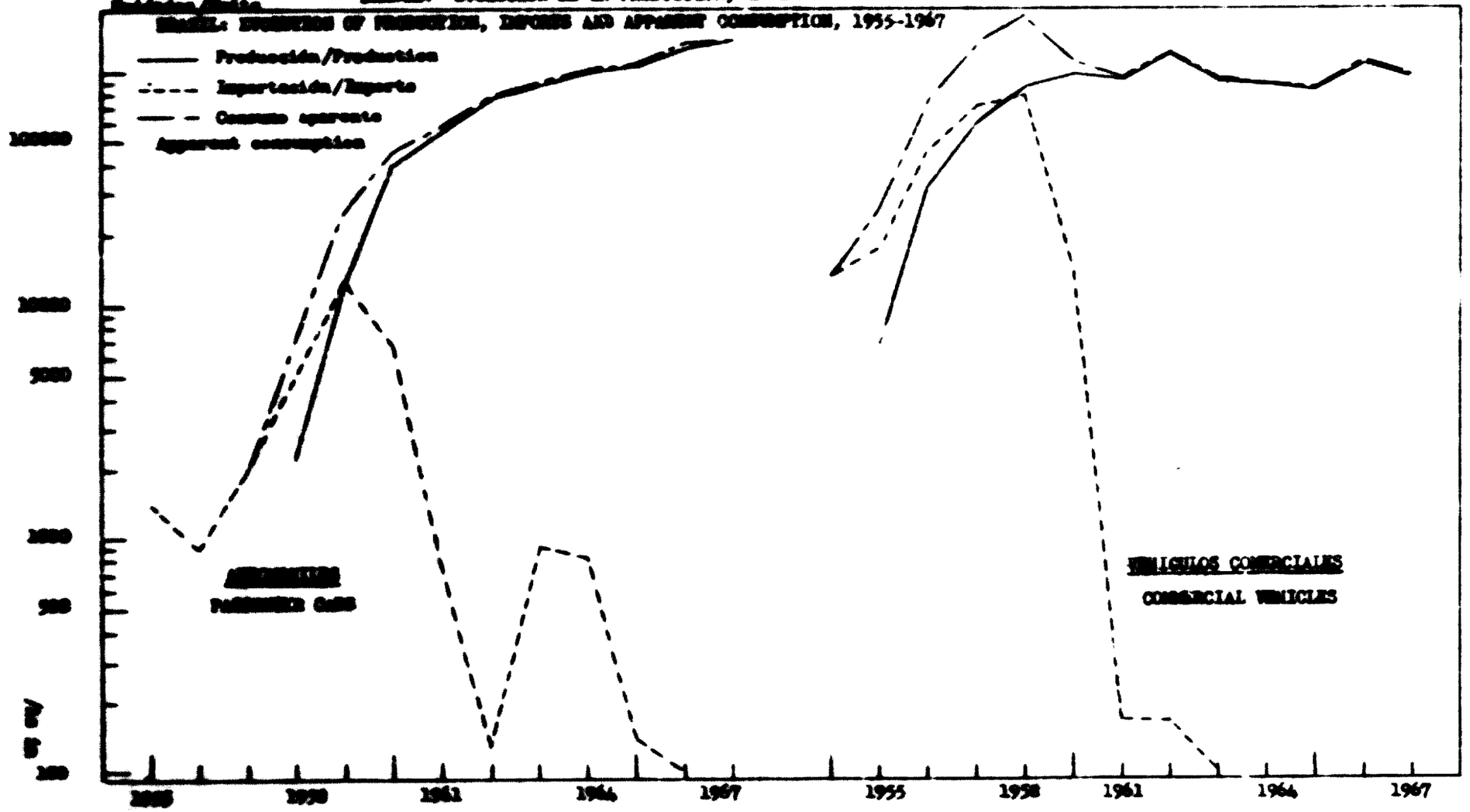
* Provisional figures.

/Figure II

Gráfico 4
Figure II

BRASIL: EVOLUCION DE LA PRODUCCION, LA IMPORTACION Y EL CONSUMO APARENTE

BRAZIL: EVOLUTION OF PRODUCTION, IMPORTS AND APPARENT CONSUMPTION, 1955-1967



As in the case of Argentina, the production of vehicles expanded rapidly in Brazil, a natural development in view of the fact that in the years preceding the institution of the vehicle industry in the country there were severe restrictions on vehicle imports, which led to the building up of a fairly large demand. However, there was a wide difference between the development of passenger car and commercial vehicle production: the former grew fairly evenly at a high average annual rate (22 per cent in the last five-year period); the latter grew fairly steadily up to 1960, and from that year production more or less levelled off, with an annual average of about 95,000 units.

Imports of passenger cars decreased rapidly between 1955 and 1966, as national production grew, and by 1965 were at the very low level of 142 units. Imports of commercial vehicles were of more importance up to 1959 but, as from that year, they fell sharply and in 1964 were negligible.

3. Colombia

Colombia's motor-vehicle park has grown fairly slowly during the last ten years. Between 1958 and 1966 the average annual growth rate was 5.8 per cent, the corresponding rates for passenger cars and commercial vehicles being 4.4 and 6.8 per cent, respectively. Depreciation has also been low, since not more than 1,000 vehicles have been taken off the road every year (see table 8).

Table 9 shows the evolution of the production, imports and apparent consumption of vehicles in Colombia between 1958 and 1967. During this period the demand for motor vehicles was satisfied almost entirely by imports, since the few existing vehicle assembly plants were very small, and up to 1965 they assembled only about 2,000 commercial vehicles a year. Passenger-car assembly was initiated in 1966, with the assembly of 300 units in that year.

There was a fairly free flow of imports up to 1959, but they were restricted in the years that followed. Imports - particularly of passenger cars - fluctuated widely during the period under consideration. Periods of severe restrictions - with imports of no more than 8,000 units, alternated with periods of greater freedom, with imports of up to 19,000 units.

/Table 8

Table 8

COLOMBIA: STOCK OF MOTOR VEHICLES, 1958-1967

(Units)

Year	Passenger cars		Commercial vehicles a/	Total
	Units	Density per thousand inhabitants		
1958	67 761	4.68	91 624	159 385
1959	68 808	4.61	102 668	171 476
1960	72 353	4.69	109 565	181 918
1961	84 605	5.32	109 996	194 601
1962	86 659	5.28	117 787	204 446
1963	85 273	5.03	132 057	217 330
1964	86 423	4.94	138 329	224 752
1965	87 977	4.87	144 914	232 891
1966	95 654	5.13	155 453	251 107
1967	115 000 b/	5.75	161 700 b/	276 700 b/

Source: FIAT and montly bulletin of statistics of the Colombian Administration.

a/ Including jeeps, light trucks, panel trucks, pick-ups, heavy lorries, buses and specialized vehicles.

b/ Preliminary figures.

/Table 9

Table 9

COLOMBIA: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1958-1967

(Units)

Year	Production			Imports			Apparent consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1958	-	-	-	...	...	...	...	...	...
1959	-	-	-	633	9 670	10 303	633	9 670	10 303
1960	-	-	-	4 958	10 696	15 654	4 958	10 696	15 654
1961	-	-	-	13 188	5 877	19 065	13 189	5 877	19 065
1962	-	2 439	2 439	2 101	6 168	8 269	2 101	8 999	10 700
1963	-	2 553	2 553	598	4 905	5 503	598	7 458	8 056
1964	-	2 827	2 827	1 561	4 288	5 849	1 561	7 095	8 656
1965	-	1 288	1 288	2 303	5 732	8 035	2 303	7 020	9 323
1966	500	1 900	2 400	11 636	6 665	18 301	11 936	8 565	20 501
1967	...	...	...	6 041	8 712	15 563	...	...	...

Source: FIAT and monthly bulletin of statistics of the Colombian Administration.

/...

4. Chile

The growth of the stock of motor vehicles in Chile has followed an uneven trend. Several years ago controls were imposed on imports of motor vehicles, particularly passenger cars, which prevented the park from growing in accordance with real needs, since, until quite recently, imports were the only means of satisfying demand. Thus, the average growth rate of the stock of passenger cars between 1955 and 1960 was only 3.6 per cent, the corresponding figure for commercial vehicles being rather more than 6.6 per cent. Between 1960 and 1966 the proportion of new vehicles increased, so that the average growth rate of the total stock was greater, 11 per cent for passenger cars and 8.4 per cent for commercial vehicles. Table 10 gives figures for the growth of the total stock of motor vehicles between 1955 and 1966.

Because of the difficulties of meeting normal market demand, it was necessary to prolong the useful life of vehicles excessively, with the result that Chile's motor-vehicle park is one of the oldest in Latin America. In 1960, more than half the passenger cars and nearly one-third of the commercial vehicles on the road were more than ten years old. Subsequently, as the country began to produce its own motor vehicles, an average of 3,000 vehicles were scrapped annually - a small number, but one which has helped considerably to reduce the average age of the park.

Table 11 shows the production, imports and apparent consumption of motor vehicles in Chile during the period 1955-1967. Up to 1960, the demand for motor vehicles in Chile was met by imports of assembled units. The first vehicle assembly plants were established in 1959, but production remained at an insignificant level until 1962, when about 5,000 passenger cars and 1,500 commercial vehicles were assembled. Production of passenger cars remained fairly steady between 1962 and 1966, an average of 5,700 units being assembled annually, while production of commercial vehicles grew by 12.8 per cent, although fewer units were assembled. The available statistics show a sharp increase in production in 1967 and 1968.

/Table 10

Table 10

CHILE: STOCK OF MOTOR VEHICLES, 1958-1967

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density per thousand inhabitants		
1955	48 263	7.1	49 906	98 169
1956	52 306	7.5	52 302	104 608
1957	53 913	7.6	59 247	113 160
1958	53 772	7.4	61 731	115 503
1959	56 163	7.5	67 464	123 627
1960	57 578	7.5	68 753	126 331
1961	58 804	7.5	76 230	135 034
1962	72 573	9.0	95 361	167 934
1963	83 454	10.2	96 748	180 202
1964	89 098	10.6	98 869	187 967
1965	97 690	11.4	105 380	203 070
1966	108 248	12.3	111 488	219 736

Source: Development Corporation (Corporación de Fomento de la Producción - CORFO).

/Table 11

Table 11

CHILE: PRODUCTION, IMPORTS AND TOTAL CONSUMPTION OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Production			Imports			Apparent Consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	-	-	-	2 497	4 911	7 408	2 497	4 911	7 408
1956	-	-	-	2 699	6 910	9 609	2 699	6 910	9 609
1957	-	-	-	2 614	13 180	15 794	2 614	13 180	15 794
1958	-	-	-	2 281	4 289	6 570	2 281	4 289	6 570
1959	-	74	74	2 604	3 900	6 504	2 604	3 974	6 578
1960	2 008	148	2 156	5 671	11 558	17 229	7 679	11 706	19 385
1961	3 117	967	4 084	7 625	13 516	21 141	10 742	14 483	25 225
1962	5 159	1 456	6 615	3 820	5 436	9 256	8 979	6 892	15 871
1963	6 275	1 664	7 939	2 343	2 714	5 057	8 618	4 378	12 996
1964	6 277	1 520	7 797	1 741	2 024	3 765	8 018	3 544	11 562
1965	6 141	2 429	8 570	2 084	2 072	4 156	8 225	4 501	12 726
1966	4 437	2 662	7 099	2 490	2 364	4 854	6 927	5 026	11 559
1967	9 552	3 605	13 157	...	...	...	...	...	...

Sources: Production - Comisión Automotriz, Research Department.
Imports - Customs statistics and ACCIA circulars.

/Imports of

Imports of vehicles have been controlled for many years, which has severely restricted consumption. From 1955 to 1959, an average of 2,500 passenger cars were imported annually; this figure was doubled in 1960 and nearly quadrupled in 1961, but imports again fell off in subsequent years, remaining steady at around the 1955-1959 level. Up to 1962, imports of commercial vehicles greatly exceeded those of passenger cars. However, this situation was artificially created, mainly by the high level of imports of light trucks, which were subject to fewer import restrictions and were therefore brought into the country to replace passenger cars. Imports of commercial vehicles declined considerably from 1963 and levelled off at about 2,000 units annually.

5. Mexico

The stock of motor vehicles in Mexico increased considerably and steadily during the period under consideration, doubling in size between 1957 and 1967 (see table 12). The average annual growth rate was 7.8 per cent between 1955 and 1960 and 7.5 per cent in the seven following years; the park comprised about 1.3 million units in 1967, making it the third largest in Latin America. The greatest increase was in the stock of passenger cars, which, in the two periods referred to, grew by 9.4 and 9.2 per cent, respectively. This is a significant increase, even in the light of the population growth rate, which is one of the highest in Latin America, since passenger car density grew from 10 units per thousand inhabitants in 1955 to 19.5 units per thousand in 1967.

The average age of the total stock showed an improvement between 1960 and 1965, which is reflected in the increase in the number of passenger cars between 0 and 5 years old. On average, 10,500 passenger cars and 12,900 commercial vehicles have been taken off the road annually for the last few years.

Table 13 and figure III show the evolution of the production, imports and apparent consumption of motor vehicles in Mexico from 1955 to 1966.

/Table 12

Table 12

MEXICO: STOCK OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density per thousand inhabitants		
1955	308 079	10.04	242 549	550 628
1956	320 429	10.11	261 083	581 512
1957	365 796	11.19	294 944	660 740
1958	378 886	11.22	296 421	675 307
1959	437 567	12.55	326 777	764 344
1960	483 101	13.40	319 549	802 650
1961	520 691	13.97	333 601	854 292
1962	548 151	14.22	354 052	902 203
1963	617 690	15.50	380 254	997 944
1964	686 897	16.65	393 600	1 080 497
1965	742 097	17.38	419 366	1 161 463
1966	812 415	18.39	436 017	1 248 432
1967	889 515	19.45	443 000	1 332 515

Source: ALTA.

/Table 13

Table 13

MEXICO: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1966

(Units)

Year	Production			Imports			Apparent Consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	17 255	19 169	36 424	18 209	12 298	30 507	35 464	31 467	66 931
1956	13 594	26 680	40 274	18 515	6 392	24 907	32 109	33 072	65 181
1957	18 020	23 150	41 150	18 997	5 352	24 349	37 017	28 482	65 499
1958	22 040	19 928	41 968	16 058	5 361	21 419	38 098	25 289	63 387
1959	23 683	23 720	52 403	21 547	3 103	24 650	50 230	26 823	77 053
1960	31 003	23 102	54 105	32 666	5 702	38 368	63 669	28 804	92 473
1961	38 789	23 376	62 165	17 857	6 823	24 680	56 646	32 199	86 845
1962	39 930	23 995	63 925	15 335	5 942	21 277	55 265	29 937	85 202
1963	47 689	26 913	74 602	20 064	6 334	26 398	67 753	33 247	101 000
1964	58 754	32 866	91 620	26 250	9 017	35 267	85 004	41 883	126 887
1965	66 900	30 148	97 048	22 929	8 142	31 071	89 829	38 290	128 119
1966	81 132	32 675	113 807	20 000 a/	8 000 a/	28 000 a/	101 132 a/	40 675 a/	141 807

Source: AMIA.

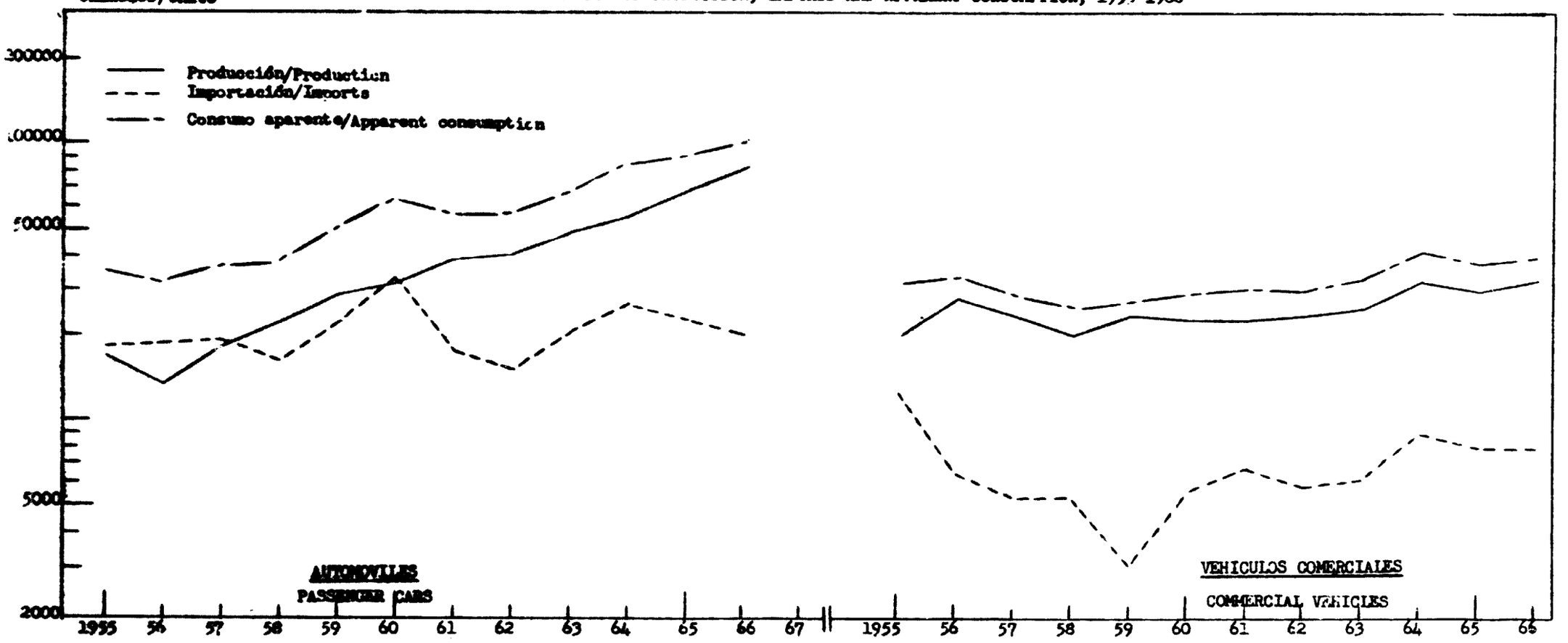
a/ Provisional figures.

/Figure III

Gráfico 3
Figure III

MEXICO: EVOLUCION DE LA PRODUCCION, LA IMPORTACION Y EL CONSUMO APARENTE

MEXICO: EVOLUTION OF PRODUCTION, IMPORTS AND APPARENT CONSUMPTION, 1955-1966



The long-established car industry in Mexico is the largest and most important in Latin America. The development of the industry can really be said to date from 1950, and for a long time it had to compete with imports of assembled units. The greatest upswing in national production has been in passenger cars, which showed an average cumulative growth rate of 12.4 per cent in the period 1955-1960 and of 17.4 per cent in the following six years. In 1966, 81,100 units were produced. Commercial vehicles followed a different trend: production remained virtually stable from 1955 to 1960, at about 23,000 units a year, and grew at an average of only 5.9 per cent between 1960 and 1966.

Imports of assembled units fluctuated widely during the period 1955-1966, reaching a peak of 38,400 units in 1960, as can be seen from table 13 and figure III. The volume of imports declined fairly sharply in the years that followed, but even so it cannot be said that the average trend was towards a decline, but rather that there were fluctuations from one year to another, owing to the adoption from time to time of government restrictions protecting the balance of payments.

During the period under consideration, passenger cars accounted for about two-thirds of total imports. Much of the remaining one-third was made up of light vehicles (vans, light trucks, pick-ups, etc.,) and buses. Imports of lorries have declined the number in recent years, but the new imports are larger.

6. Peru

Although imports have been the only means of satisfying domestic demand, the stock of passenger cars in Peru has grown rapidly over the last twelve years, with an average growth rate of 11.4 per cent between 1955 and 1967. Passenger car density more than doubled during the same period, from six cars per thousand inhabitants in 1955 to 14.5 cars per thousand in 1967. The increase in the stock of commercial vehicles from 1955 to 1967 was much smaller, only 6.8 per cent. Table 14 gives statistical data on the evolution of the stock of motor vehicles between 1955 and 1967.

/Table 14

Table 14

PERU: STOCK OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density per thousand inhabitants		
1955	54 400	6.19	49 146	103 546
1956	54 600	6.06	49 825	104 425
1957	62 100	6.72	54 488	116 588
1958	69 700	7.35	59 255	128 955
1959	73 200	7.51	62 500	135 700
1960	79 431	7.92	67 892	147 323
1961	88 894	8.61	71 778	160 672
1962	100 018	9.41	79 033	179 051
1963	110 814	10.11	82 378	193 192
1964	124 273	11.00	96 789	221 062
1965	155 038	13.31	98 700	253 738
1966	178 052	14.82	103 250	281 302
1967	185 000 a/	14.49	107 800	292 800

Source: ADEFA and statistical bulletin of the Traffic Department (Dirección General del Tránsito).

a/ Provisional figure.

/The trend

The trend in imports has closely followed the evolution of the total stock, but in the latter case there were wide fluctuations, particularly in the first five years.

National production is still in the very early stages. Table 15 shows the evolution of the production, imports and apparent consumption of motor vehicles from 1955 to 1966.

7. Venezuela

In Venezuela, the situation is not at all the same as in the other Latin American countries. Its high per capita income and ample foreign exchange resources have enabled Venezuela to import all kinds of motor vehicles without restrictions. As a result, the country has a large stock of motor vehicles, which is one of the newest in Latin America. Over the last twelve years, the annual depreciation rate has exceeded 6 per cent for passenger cars and 11 per cent for commercial vehicles, which in practical terms means that an average of 26,000 vehicles have been taken off the road every year. The average age of the total stock is estimated at about ten years, and at times it has been even less. Table 16 shows the evolution of the stock of motor vehicles between 1955 and 1967.

On analyzing the evolution of the stock of passenger cars, it can be seen that the growth rate fell, mainly owing to the levelling off of production in the vehicle assembly industry between 1960 and 1963 and the ban imposed on imports of luxury passenger cars in 1959. Thus, the average growth rate was 12.9 per cent from 1955 to 1960, falling to 3.8 per cent in the following five-year period.

The stock of commercial vehicles has increased at a much slower and more uneven pace, with an average growth rate of only 2.5 per cent between 1955 and 1966.

/Table 1

Table 15

PERU: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1966

(Units)

Year	Production			Imports			Apparent consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total
1955	-	-	-	3 243	3 352	6 595	3 243	3 352	6 595
1956	-	-	-	4 291	4 278	8 569	4 291	4 278	8 569
1957	-	-	-	5 334	5 477	10 811	5 334	5 477	10 811
1958	-	-	-	4 163	3 658	7 821	4 163	3 658	7 821
1959	-	-	-	2 388	2 380	4 768	2 388	2 380	4 768
1960	-	-	-	4 914	5 211	10 125	4 914	5 211	10 125
1961	-	-	-	8 763	6 658	15 421	8 763	6 658	15 421
1962	-	-	-	10 179	6 517	16 696	10 179	6 517	16 696
1963	-	-	-	12 353	6 441	18 794	12 353	6 441	18 794
1964	-	-	-	12 715	6 410	19 125	12 715	6 410	19 125
1965	1 716	1 108	2 824	17 226	9 619	26 845	18 942	10 727	29 669
1966	7 789	5 444	13 233	21 553	13 000	34 553	29 342	18 444	47 786
1967	...	...	...	...	...	...	...	...	...

Source: Asociación de Plantas de Ensamblaje Automotriz, Peru.

/Table 16

Table 16

VENEZUELA: STOCK OF MOTOR VEHICLES, 1955-1967

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density per thousand inhabitants		
1955	146 207	24.17	96 016	242 223
1956	159 922	25.35	86 952	246 874
1957	186 038	28.32	92 100	278 138
1958	186 036	27.24	85 384	271 420
1959	238 995	33.76	96 306	335 301
1960	268 696	36.56	100 781	369 477
1961	269 575	35.41	104 605	374 180
1962	279 905	35.56	113 315	393 220
1963	289 362	35.53	108 835	398 197
1964	298 819	35.46	112 841	411 660
1965	324 026	37.15	119 833	443 859
1966	347 400	38.47	125 683	473 083
1967	376 400	40.25	140 000 a/	516 400 a/

Source: Ministry of Development, Venezuela.

a/ Provisional figure.

/The assembly

The assembly of motor vehicles in Venezuela began in 1948, but the car industry is still in its infancy and the proportion of locally made components used in the assembly of vehicles is low. There was a steady increase in production from 1948 to 1955, reaching a total - in the latter year - of 18,000 units, of which two-thirds were passenger cars. Production fell off in 1956 because of competition from the unrestricted imports of vehicles on favourable terms with respect to both price and quality; there followed a period of stagnation which lasted until 1962, when the introduction of protective measures by the Government enabled the industry to re-organize. Between 1962 and 1967, production of passenger cars increased from 9,000 to 40,000 units and that of commercial vehicles from 3,000 to 16,000. This situation is reflected in consumption, as can be seen from table 17 and figure IV.

Imports of motor vehicles were absolutely unrestricted up to 1959, accounting for 77 per cent of total consumption in that year. With a view to protecting the national industry, imports of passenger cars with a value of more than 3,000 dollars were banned in 1959, and in 1963 the ban was extended to all other passenger cars, with certain special exceptions. Thus, imports of both passenger cars and commercial vehicles have become insignificant in the last four years.

8. Bolivia, Central America, Ecuador, Paraguay and Uruguay

At the present time, production of motor vehicles in these countries is negligible and, in practice the satisfaction of demand is dependent on imports, which have remained fairly stable, with some fluctuations. The vehicle assembly industry was introduced into Central America and Uruguay a few years ago, but production is still very small compared with imports.

/Table 17

Table 17

VENEZUELA: PRODUCTION, IMPORTS AND APPARENT CONSUMPTION OF MOTOR VEHICLES, 1955-1967

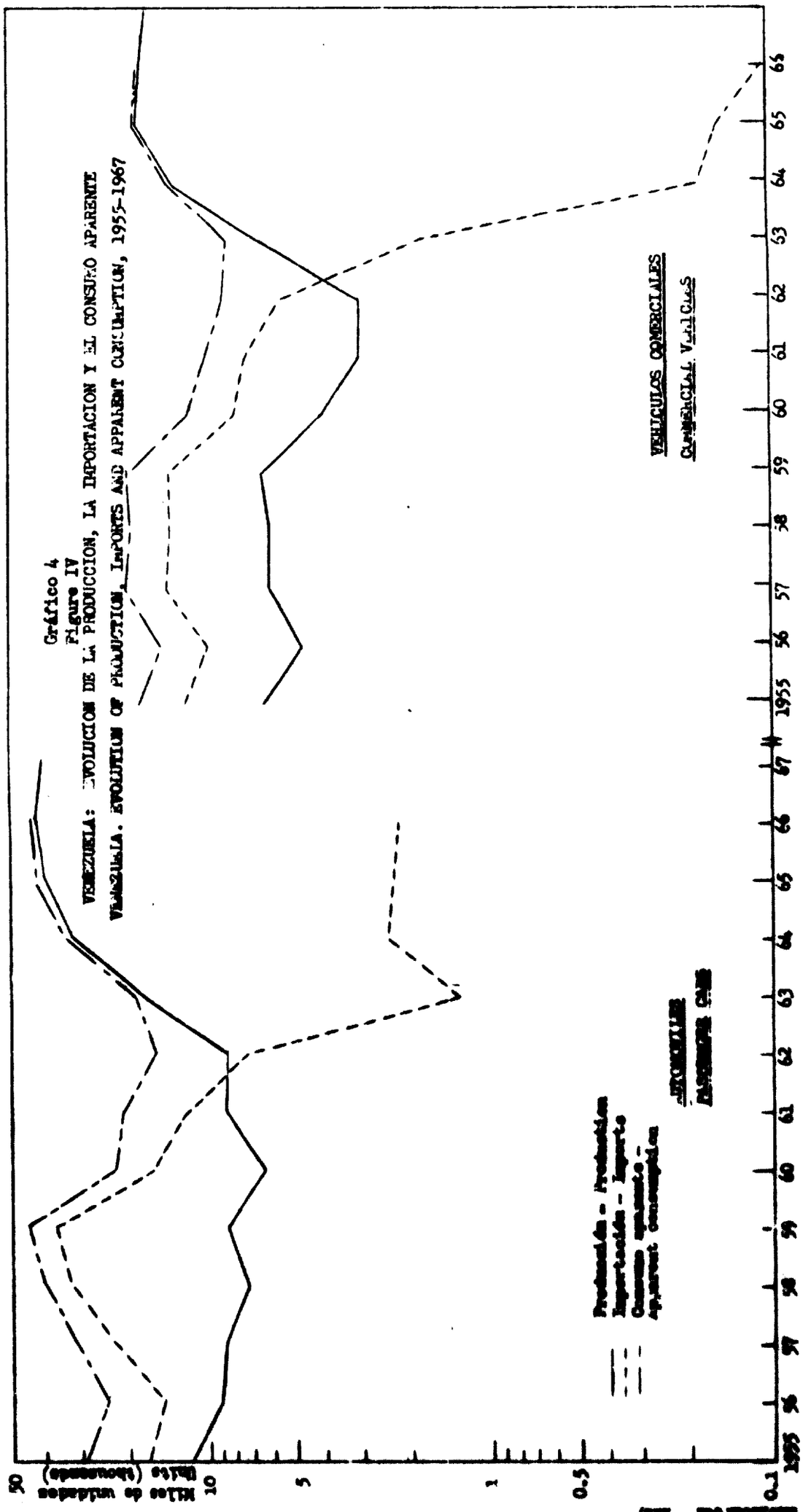
(Units)

Year	Production			Imports			Apparent Consumption		
	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Total	Passenger cars	Commercial vehicles	Tota
1955	11 958	6 139	18 097	17 042	12 061	29 103	29 008	18 200	47 2
1956	9 214	4 616	13 830	15 186	9 884	25 060	24 400	14 500	38 9
1957	8 884	5 928	14 812	22 616	13 972	36 588	31 500	19 900	51 4
1958	7 549	5 894	13 443	32 571	13 306	45 877	40 120	19 200	59 3
1959	8 726	6 222	14 948	36 744	13 578	50 322	45 470	19 800	65 2
1960	6 452	3 882	10 334	16 498	7 764	24 262	22 950	11 646	34 5
1961	8 042	2 945	11 787	12 606	7 057	19 663	21 448	10 002	31 4
1962	8 768	2 898	11 666	7 432	5 442	12 874	16 200	8 340	24 5
1963	18 034	6 356	24 390	1 342	1 829	3 171	19 376	8 185	27 5
1964	32 321	12 620	44 941	2 468	174	2 642	34 789	12 794	47 5
1965	40 700	17 580	58 280	2 370	150	2 520	43 070	17 730	60 8
1966	43 351	17 151	60 502	2 300	100	2 400	45 651	17 251	62 9
1967	41 795	16 074	57 872	...	...	...	...	...	...

Source: Ministry of Development, Venezuela.

/Figure IV

Gráfico 4
Figure IV
VENEZUELA: EVOLUCION DE LA PRODUCCION, LA IMPORTACION Y EL CONSUMO APARENTE
VENEZUELA. EVOLUTION OF PRODUCTION, IMPORTS AND APPARENT CONSUMPTION, 1955-1967



III. PROJECTIONS OF MOTOR VEHICLE DEMAND

1. General remarks

This chapter will consider the probable development of the market for motor vehicles in a large number of Latin American countries, Central America and for the region as a whole up to 1985. Demand figures will also be computed for the intermediate years 1975 and 1980. The projections of demand will thus be covering a fairly long period, during which there may occur structural changes in the economies of some countries. Moreover, these projections cover, not a single country but, a group of countries which although they share characteristics common to the region, are at different levels of development. There are also great differences in their economic structures and, hence, differences will be found regarding their economic growth potential, structure of their existing motor-vehicle industries and the size of their markets. Furthermore, since the demand for motor vehicles has been met from imports in most of the countries of the region, the marked variations noticeable in the statistical series are due less to variations in actual demand than to changes in supply, which has frequently been limited owing to shortages of foreign exchange.

Given the above, the greatest difficulty in projecting the demand for motor vehicles in Latin America lies in selecting a method of projection that can be applied to all the countries of the region and yet at the same time is compatible with the coverage of the basic statistics available.

For this purpose, it is necessary to make a distinction between the market for passenger cars and that for commercial vehicles, which have different features. The market for passenger cars depends on such variables as real income, the distribution of income, the relative price of cars, conditions of sale, and many other factors which are less important but do exert an influence on demand. The market for commercial vehicles basically depends on the development of road transport in each country which face competition from other means of transport, such as railways and coastal shipping, and is greatly influenced by the load capacity of vehicles.

/Both markets

both markets are extremely sensitive to the economic situation. In the event of an economic depression, for example, sales may contract considerably. Furthermore, since future requirements for passenger cars encompass a variety of different models and makes, certain distinctions must be made; in this case, cars have been broken down into three categories, depending on the displacement capacity of the engine, i.e., small cars (up to 1,100 cm^3), medium-sized cars (1,101 to 1,500 cm^3), and large cars (over 1,500 cm^3).

2. Methodology

Most of the projection methods proposed in the current literature, consider separately two main components of annual demand, i.e., the number of vehicles added to the total stock or ownership level of a country within a year and the number used to replace vehicles becoming obsolete during the same period. Thus, one of the stages of the projection is to determine the annual increase in the stock of vehicles. Virtually all the methods used for this purpose can be classified under one of the three types described below.

The first method is basically a linear extrapolation of past trends. For this to be applicable, a trend must be clearly recognizable from the available data, and there must be a reasonable likelihood that this trend will continue in the future.

The second method consists in correlating the stock of vehicles or the vehicles density, expressed as the ratio of the vehicle stock to inhabitants, with one or more macroeconomic variables, for example the gross domestic product or its per capita value. In this case, the method requires that the values of the explicit variables be determined for the period of projection. The correlation can be established either on the basis of historical series of values relating to the country whose vehicle demand is to be forecast, or on the basis of international comparisons, in which case the regression line is obtained using a set of values representing vehicle density and income levels prevailing in different countries in a given year. In its simplest form the regression line is a straight line, and in general its form depends on the mathematical function which it represents and the scale of co-ordinates which is adopted.

/It should

It should be noted that, in the present case, the regression lines of the charts used for projecting the vehicle stock or density of the various countries are straight lines.

It still has to be explained how the vehicle stock of a country can be projected once the regression line has been obtained. It should be recalled that the point representing the current situation of a country in the system of co-ordinates is in general not on the regression line. If that were the case, then the simplest assumption relating to the projection would be that the future evolution of the vehicle stock or density of the particular country is represented by the regression line. Consequently, after having determined the values of the gross national product corresponding to different future years, the respective vehicle ownership figures can be easily derived from the position of the regression line.

As formerly stated, the point representing the current situation of a particular country does not usually coincide with the regression line. Even if it does, it might be simple, but not entirely justifiable on the basis of the particular national circumstances, to admit that the future evolution of vehicle ownership follow the regression line. If it is admitted that the future evolution of vehicle ownership of a country can be adequately represented by a straight line on the chart containing the regression line, it follows that, in general terms, the future evolution will tend either to join, diverse from, or run parallel to the regression line. The trend of this future evolution corresponding to a certain country can in some cases be derived from historical sets of values plotted in the same chart. In any case, considering that the basic hypothesis is the existance of a universal causal relationship between vehicle ownership and income, represented by the regression line, it is consistant to state that the evolution of vehicle ownership of a country could not indefinitely tend to diverse from it. As a matter of fact, if the points projected with the help of the historical trend fall too far away from the regression line, it would be necessary to correct the projection by introducing an additional hypothesis, such as the concept of saturation of ownership, which will be discussed subsequently.

/The third

The third method of projection is the most satisfactory from the theoretical standpoint. It is based on the empirical observation of how ownership of consumer durables varies over a relatively long period of time. In this context, ownership is defined as the ratio between consumer durables owned or used and the population of individuals or families inhabitating a certain country or buying on a certain market. As it has been shown, during an initial period following the introduction of a particular product into the market, ownership grows more than proportionally with respect to time. During the subsequent interval, ownership grows about proportionally, and thereafter less than proportionally until reaching a saturation level. Graphically this behaviour of ownership over time can be represented by an S-shaped curve. The observations of ownership behaviour relate to consumer durables. Consequently, the method of projection developed on the basis of this behaviour can only be used for passenger cars.

The complexity of this method becomes evident when determining the parametres of the equation for the growth curve. They can be derived from the saturation level and from the co-ordinates of the inflection point on the growth curve. The saturation level, which equals the number of families with an income sufficient to purchase and maintain a car, can be determined by studying the distribution of family income and the cost of living in a country. What complicates the situation, however, is the fact that the saturation level does not remain constant over time but varies in accordance with over-all national economic growth and changes in income distribution. Thus, the determination of the saturation level requires an a priori statement of the time interval during which car density is expected to rise from its current level to virtually the saturation level. It has to be born in mind that the saturation level constitutes an asymptote to the S-shaped or logistic curve, and consequently in strict mathematical terms the ownership variable does not reach the saturation level within a finite period of time. However this formal problem can be easily solved by stating that at the end of the defined period, the car ownership variable will represent a certain proportion, close to one, of the saturation level. The inflection point on the logistic curve represents the year after which

/the ownership,

the ownership begins to grow under-proportionally. In the case of countries in which the past evolution is clearly defined over a reasonable length of time and where there is evidence that the ownership has risen high enough with respect to the saturation level, it is easy to locate the inflection point. With the co-ordinates of this point, it is then possible to compute the parametres in the projection equation. However, there are few Latin American countries, apparently, that fulfil this requirement.

These then, are the three basic methods for estimating that component of vehicle demand which relates to the annual increase of the total stock. It is now appropriate to consider the methods for determining the other component of demand, which relates to the replacement of worn out vehicles. Depreciation of the total stock is measured by the number of vehicles withdrawn from circulation in a given year. The rate of depreciation therefore, is the percentage ratio of this figure to the total stock of the preceding year.

Published statistics show depreciation as the difference between the number of new vehicles registered and the increase in the total stock in a given year. Generally speaking, there exists evidence that the published figures are not always exact, and this obviously contributes to sharp fluctuations between one year and the next, in the depreciation rate constructed from the available statistics. Moreover, it is well known that in many countries the new vehicles entering the stock are not directly registered, and sales or the apparent consumption of vehicles are taken as an equivalent. Consequently, to gain a reasonably accurate idea of the actual rate of depreciation in a given country, it is necessary to compute an average of the annual rates over a number of years.

Many factors affect the actual rate of depreciation. With respect to passenger cars, they include such factors as per capita income and the living standard; the relative cost of new and used cars and the saving accruing from maintaining a new rather than a used car; considerations of social prestige; and eventually the existance of artificial constraints on the supply side.

/With respect

With respect to lorries and buses, the factors affecting the depreciation rate are similar, but with the following exceptions: the economic situation of the road transport sector must be considered, rather than per capita income and the level of living; and prestige considerations are not applicable, or play a very minor role.

Again, it should be noted with respect to some Latin American countries, that supply of both passenger cars and commercial vehicles, is artificially restricted through direct or indirect controls on vehicle imports and in some cases also on parts and components for local vehicle production. In such countries, it is obvious that the trend will be to extend the useful life of vehicles, and hence, the rate of depreciation will be relatively low.

3. Selection of the forecasting method

It is now appropriate to decide which of the three methods described above should be used for projecting the stock of vehicles. Having in mind the terms of the present study, the criteria adopted were the following: First, for reasons of equity, preference had to be given to the method that could be applied to all the Latin American countries, taking into account the availability of data. Secondly, the method selected had to make it possible to obtain the desired results within the time limit and the resources which were available according to the programme and the budget of the project.

As regards the first method described - namely extrapolating the past growth trends of the stock plotted over time - apart from the fact that extrapolations over such a length of time as covered by the projection are inherently unrealiable, it was found that past trends are not clearly recognizable in a number of Latin American countries. Hence, it was not thought very advisable to use this method.

The third method of projection also takes account of past trends in the total stock and includes in addition the application of the concept of ownership saturation. While this may provide a more faithful picture of the long range evolution, the possibilities of applying it to the different Latin American countries at the present stage of ownership levels

/appear to

appear to be limited. It was also judged that it would be impossible to gather and analyse within the established time schedule, the data required to construct the projection assumptions correctly. In any case, on the ground of the theoretical reasons mentioned before, the method would be only applicable to passenger cars.

There then remains the second method, based on a correlation between the vehicle stock or density and one or more macroeconomic variables. It was found that this method would meet satisfactorily the criteria noted above if only one macroeconomic variable were chosen as independent variable and if linear or linear logarithmic correlations were used.

The per capita income and the gross domestic product have been adopted as independent variables for projecting, respectively, the passenger car density and the stock of commercial vehicles. Both of the above-mentioned variations of the projection method adopted were used: the forecast of passenger car densities was based on an international comparison, whereas the stock of commercial vehicles was projected by correlating historical pairs of values corresponding to the same country.

However, in connexion with the forecast of passenger car density, it should be noted that in the end the concept of ownership saturation was introduced, not in a strictly mathematical form, but in a qualitative way. As was stated above in connexion with the second projection method, the projection line representing the evolution of car ownership of a country on the chart way, in some instances, diverged from the regression line, but it could not do so indefinitely. Consequently, it is arguable that, after a certain number of years or when reaching a certain ownership level, the evolution of ownership will change its direction to a position parallel to the regression line and subsequently even tend towards it. In the chart, the path of such an evolution would be described by a polygon and it will be recognized that the saturation concept is implicit in such a path.

This variation of the second projection method was used for making the forecasts relating to Argentina, Bolivia and Brazil. In Argentina the evolution of car ownership was expected to continue to diverge, however slightly, from the regression line during the period 1967-75 and

/to run

to run parallel to it during the subsequent periods. In Bolivia and Brazil, whose current positions in the chart lie far away from the regression line, it was admitted that car ownership would run parallel to the regression line during the first period and subsequently include towards it. A more detailed account of the projections made and their underlying assumptions will be given later.

4. Projection of the passenger car stock and demand

The method of international comparisons used to project the total stock of passenger cars is based on a space-time correlation between car density, i.e., the number of cars per 1,000 inhabitants, and the per capita gross domestic product. In the model, elasticity is constant: it is assumed that the elasticities corresponding to the curves showing car density in each country will tend, sooner or later, to approach the constant elasticity of the international curve or model. This assumption is based on the following observation: as countries have developed economically, demand has passed through a number of stages which are very similar in all countries, although their nature and precise scale have depended in each case on the particular features of the individual country. In general, it is found that in the early stages of development the car is a luxury article owned by a small high-income group. At a later stage, as countries gradually develop and highway systems become better and more extensive, car ownership becomes more widespread and the number of new car-owners increases rapidly. At the final stage, which is the stage in which the developed countries are at present, virtually all families own at least one car, and the growth of demand depends almost exclusively on population increase and the replacement of cars on the road.

The method of projection selected comprises a number of phases. During the first phase, the constant elasticity curve to be used as the model for the country projections was calculated. This curve was obtained by establishing a functional relationship of the type $y = bx^a$ for a given year between car density and the per capita gross domestic product in a number of countries at different levels of economic development, for the

/most part

most part countries at a higher level of development than the countries being studied. To ensure that the constant elasticity model was applicable, it was necessary to make a careful selection of the countries on which it was based, eliminating those whose per capita income was too high compared with that of the countries being studied.

During the second phase, the probable growth of car density was estimated in each country under study by comparing trends over the past six or eight years with the path of the model curve. The results of this comparison showed three different cases: the trends either ran parallel to the model curve, or approached it or moved away from it. In each case, the reason for the difference had to be examined, and it had to be determined whether the factors causing it would persist in the future. It then sufficed to construct an assumption, based on the data available, of the future path of the curve for each country studied, and to estimate the per capita gross domestic product for the year in question in order to obtain a point on the projected curve. Car density was then projected by interpolating a line between a known point in the present and the estimated point, generally fairly far in the future. In order to calculate the total stock of cars, it sufficed to multiply the density coefficients for each year of the projection by the total estimated population in each year.

During the third stage, demand was projected by country and for the region as a whole. It was noted earlier that the demand for cars has two main components: the first of these was obtained directly from the annual increase in the total stock, but for the second, namely the component relating to the replacement of depreciated vehicles, it was necessary to look into depreciation rates and their movement over time. It was found that in the Latin American countries, and in other countries, depreciation rates fluctuate a great deal between one year and the next, sometimes because governments have found themselves obliged to implement policies to restrict demand in certain years, sometimes because the published statistics are not very precise. An analysis was made in graphic form to find out whether there was any relation between the average rate of depreciation and per capita income or the degree of motorization, on

/the basis

the basis of data for a certain number of countries. Since no significant relationship was found between these variables, and also since a more searching analysis would have required more time than was available for the present study, it was decided to estimate rates of depreciation on the basis of average trends in selected countries in the world. This trend fluctuates around 3 per cent in the countries considered.[2/] For the Latin American countries, a gradually rising rate was selected which would reach the 3 per cent mark by 1985.

In order to calculate the demand for replacements in a given year, the estimated depreciation rates were applied to the total stock in the previous year. Final demand was obtained by adding the demand for replacements to the annual increase in the total stock.

During the fourth and final phase, the demand projections were broken down by categories of vehicles. For Latin America, three categories were selected, based on cubic capacity: small (less than 1,100 cm^3); medium-sized (between 1,101 and 1,500 cm^3); and large (over 1,500 cm^3). In order to break down demand into these categories, account had to be taken of changes in the structure of sales in recent years and also of the fact that all countries tend to approach an equilibrium structure as they develop.

The method described above, also shows the size of repressed demand, depending on the position of a country vis-à-vis the model curve. Whatever path the projection follows, whether parallel to the curve or gradually approaching it, it must include repressed demand. This method also has the advantage that, within the limitations of all projection methods, it is fairly precise as regards the orders of magnitude obtained, since each phase has its own rationale.

In order to calculate the curve to be used as the international model, a selection was made of the twenty-eight countries considered to be most representative for purposes of comparison with Latin America.[3/]

2/ The countries considered were: Austria, Australia, the Federal Republic of Germany, Italy, Japan, Portugal, the Republic of South Africa and Spain.

3/ Initially five countries were excluded from this group: Czechoslovakia, Hungary, Poland, USSR and Yugoslavia, since it was found that they did not follow the general rule that higher income means a higher car density. Subsequently, Canada, New Zealand and the United States were excluded since it was considered that their income levels and car densities exceeded those that the Latin American countries would be able to attain in the near future.

/Data were

Data were available for these countries for the year 1963 relating to the number of cars per 1,000 inhabitants, and the per capita gross domestic product, expressed in dollars. The regression between these two variables was calculated using the function $y = bx^a$. The curve obtained was:

$$\log y = 1.71402 \qquad \log x = 3.42334$$

with a high coefficient of correlation (0.94), which indicates its acceptability. This was the model curve used in the country analyses which follow.

(a) Argentina

Between 1955 and 1967, car density increased steadily at an average annual rate of 8.3 per cent, fairly independently of the per capita gross domestic product, whose growth rate fluctuated sharply over the same period. Up to 1962, the points showing car density fall below the model curve, indicating some degree of repressed demand, but from 1962 onwards they fall above this curve and attain an average figure higher than corresponds to the level of income on the basis of the model curve (see figure V). This phenomenon is very common in countries in which a motor-vehicle industry has been established after a fairly lengthy period during which supply has been limited, since in its early stages the industry has a rapidly expanding market which may shrink considerably once repressed demand is saturated.

At present, the Argentine motor-vehicle industry is completely integrated and hence its development is not affected by balance-of-payments problems. It is a relatively young industry and it is most probable that the market is not yet saturated, especially in the lower income groups where there may be a relatively large number of potential car-owners, since the recovery that occurred in 1968 shows that the market recession of 1966 and 1967 was only temporary. All this leads to the conclusion that in the near future, up to 197[illegible] for example, car density will increase in line with recent trends, although the pace of growth may slacken somewhat. Given the estimated car density in Argentina in 1975, it may be assumed that growth will decelerate after 1975 since the market will to some extent be saturated. The probability is, then, that the curve of car density in Argentina will tend to stabilize parallel to the model curve up to 1985 and beyond, and will take up a position similar to that of some countries which at present have higher incomes, such as France.4/

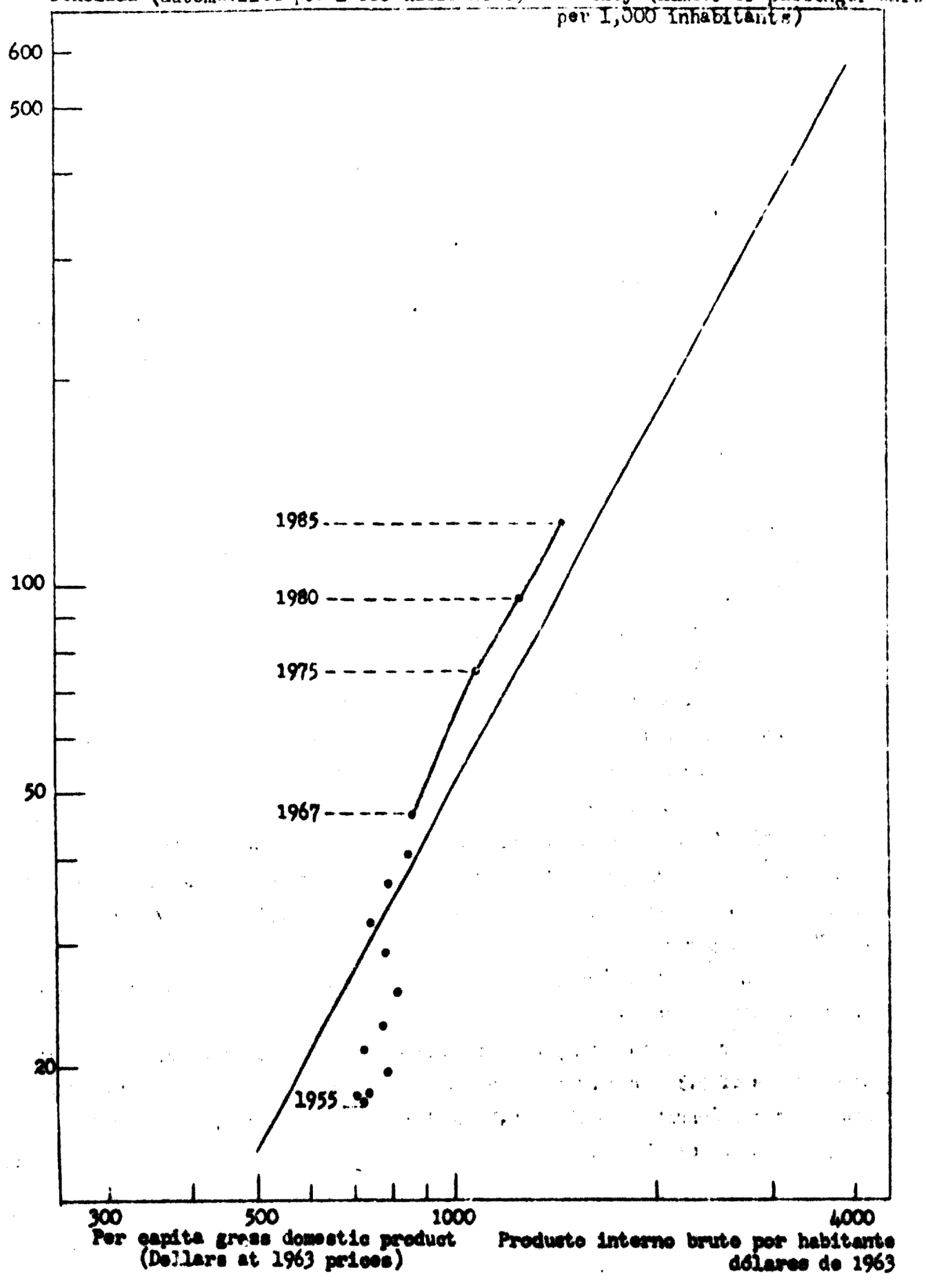
4/ See annex figure AI, showing the model curve.

/Figure V

Gráfico 5

Figure V

ARGENTINA : PROYECCION DE LA DENSIDAD DE AUTOMOVILES
ARGENTINA: PROJECTED PASSENGER CAR DENSITY



The following assumptions were used in the projections:

(i) It was assumed that up to 1975 car density would grow at an average rate of 6.5 per cent, and that from 1975 to 1985 and beyond it would parallel the model curve, i.e., the average annual growth rate would be 5.1 per cent for the period 1975-1985.

(ii) Although during the period 1950-1967 the average annual rate of growth of the per capita gross domestic product did not exceed 1.5 per cent, a rate of 3 per cent was used for the projection, based on Argentina's development plans which provide for stepping up the rate of growth.

(iii) With regard to the rate of depreciation of passenger cars, an analysis was made of trends between 1953 and 1967, and it was found that only from 1960 onwards was there some degree of increase in the number of cars taken off the road, with sizable variations from year to year. The average rate of depreciation during 1960-1967 was found to be 1.5 per cent; however, in view of the fact that the average life of vehicles is still very high in Argentina and that approximately half the total stock is fairly old, it was estimated that the depreciation rate would rise gradually from its present level to 3 per cent by 1985.

(iv) Upon considering annual car sales, it was found that on the average there was some degree of stagnation in the demand for large cars, perhaps because their price and maintenance costs restricts the market to a certain income level and increases in demand come mainly from changes and replacements. The largest increases in demand were for small and medium-sized cars, especially the latter. In breaking down demand into the various categories, it was estimated that the share of small cars in total demand would remain constant at around 42 per cent; that of medium-sized cars would rise gradually from 31 to 33 per cent; and that of large cars would fall from 27 per cent in 1975 to 25 per cent in 1985.

Tables 18 and 19 show the results of the projections of the total stock of and demand for cars.

These projections indicate that demand will grow at a cumulative average annual rate of 5.3 per cent between 1967 and 1985, and that the corresponding rates for car density and the total stock of cars will be 5.7 and 7.6 per cent respectively.

/Table 18

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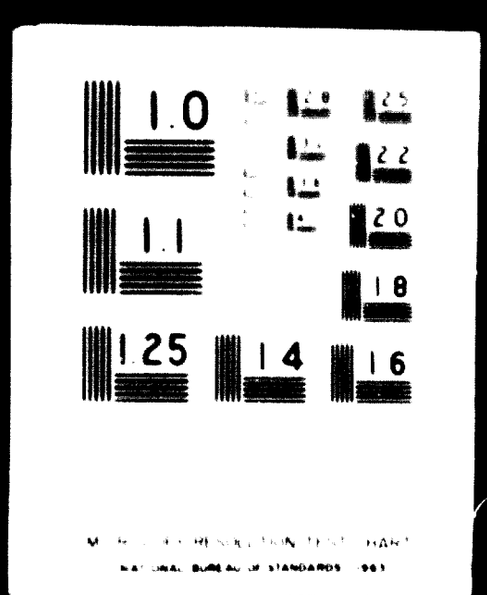


Table 18

ARGENTINA: PROJECTED PASSENGER CARS STOCK AND DEMAND

(Units)

Year	Density (cars per 1 000 inhabitants)	Stock	Annual increase in stock	Annual depreciation	Final demand
1967 a/	46	1 066 200	34 851	-	131 498
1975 b/	75	1 969 650	140 290	36 580	176 870
1980 b/	96	2 708 920	151 920	63 925	215 845
1985 b/	124	3 733 260	227 130	105 180	332 310

Source: ECLA estimates.

a/ Actual figures.

b/ Estimates.

Table 19

ARGENTINA: PROJECTED DEMAND FOR PASSENGER CARS, BY SIZE OF CAR

(Units)

Year	Small	Medium-sized	Large	Total
1975	74 285	54 830	47 755	176 870
1980	90 655	69 070	56 120	215 845
1985	139 570	109 662	83 078	332 310

Source: ECLA estimates based on data supplied by ADEFA.

(b) Brazil

Before the establishment of the Brazilian motor-vehicle industry, passenger car density followed roughly the same trend as the model curve, but from 1961 onwards it increased more rapidly than the per capita gross domestic product. Brazil's car density curve lies above the model curve and in recent years has exhibited a marked tendency to move away from it (see figure VI).

Various factors may have contributed to this sustained growth. First, demand was restricted for a long period, and the establishment of the motor-vehicle industry coincided with a period of economic boom which raised incomes in some urban sectors. Later, the industry became completely integrated and this facilitated supply, since it was no longer dependent on the availability of foreign exchange. Furthermore, persistent inflation and limited investment opportunities may have led small investors to purchase cars in order to maintain the real value of their money. Recently, two other factors have also promoted growth: the facilities granted by the development banks for car purchases, and a tendency for the relative price of cars to decrease.

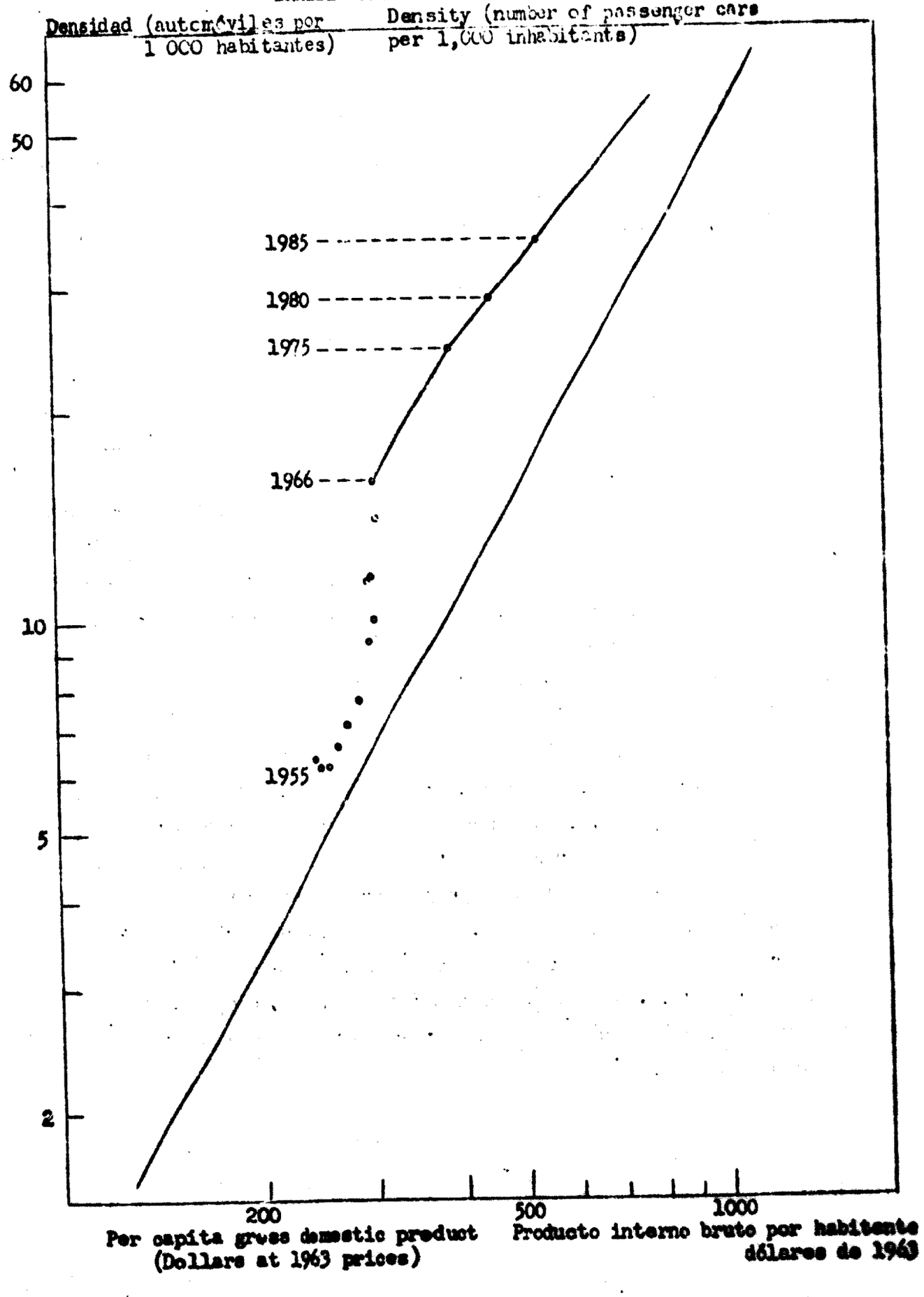
Nonetheless, it is very probable that in the future car density will grow less rapidly than in the past, and that the general trend of the curve will not be to move away from the model curve, since several of the factors promoting growth are disappearing. For example, since the motor-vehicle industry became integrated, demand has not been restricted; the rate of inflation has tended to drop in recent years; there are new investment possibilities for the small investor and hence the tendendy to purchase cars as a means of investment will probably decline; and lastly, the market already appears to have reached a certain level of saturation, demonstrated by slow car sales.

The following assumptions were used in the projections:

(i) It was assumed that the curve representing car density would run parallel to the model curve until 1975 and then begin to approach it and occupy a position similar to that of such countries as Venezuela or Italy (see annex, figure A-I). This assumes that car density will grow at an average annual rate of 4.9 per cent until 1975 and 3.6 per cent between 1975 and 1985.

/Figure VI

Gráfico 6
Figure VI
BRASIL : PROYECCION DE LA DENSIDAD DE AUTOMOVILES
BRAZIL: PROJECTED PASSENGER CAR DENSITY



/(ii) R

(ii) It was assumed that the per capita gross domestic product would expand at a rate of 7 per cent, slightly higher than the average achieved during the period 1950-1966. It was considered that this rate was representative of the economy's long-term growth trends, and it is also close to the average rate in Brazil's plans for the future.

(iii) The average rate of depreciation in the period 1952-1966 was virtually nil and exhibited sizable anomalies which rule out the possibility of using it as a basis for estimating rates in the future. By analogy with the rates estimated for other countries, it was estimated that the depreciation rate would rise gradually to 2 per cent in 1975, 4.5 per cent in 1980 and 7 per cent in 1991.

(iv) Owing to the fact that in the past a single model has accounted for both the small and the medium-sized categories of cars, it was then decided to break projected demand down into only two groups, namely large cars on the one hand, and small- and medium-sized cars on the other.

Tables 20 and 21 give the projections for the total stock of passenger cars and total demand, and also break down demand into the categories of car size.

The figures obtained indicate that the total stock will grow at an average annual rate of 7.2 per cent, and demand at a rate of 6.0 per cent over the period 1967-1975. Car density is expected to grow somewhat more slowly - at a rate of 6.2 per cent - the difference being attributable to population increase and an average per capita income that will remain low. The number of vehicles per 1,000 inhabitants projected for 1991 can be considered small if compared with the levels achieved by the developed countries, or even those of some Latin American countries where population increase is less rapid and incomes are higher, for instance Argentina.

/Table 20

Table 20

BRAZIL: PROJECTED PASSENGER CARS STOCK AND DEMAND

(Units)

Year	Density (Cars per 1 000 inhabitants	Stock	Annual increase in stock	Annual depreciation	Final demand
1966 a/	16.0	1 336 952	-	-	120 219
1975 b/	24.6	2 644 740	189 390	49 100	238 490
1980 b/	29.0	3 596 000	198 100	84 840	282 940
1985 b/	35.0	5 001 290	222 000	143 300	365 300

Source: ECLA estimates.

a/ Actual figures.

b/ Estimates.

Table 21

BRAZIL: PROJECTED DEMAND FOR PASSENGER CARS, BY SIZE OF CAR

(Units)

Year	Small and medium-sized	Large	Total
1975	174 140	64 350	238 490
1980	195 230	87 710	282 940
1985	237 445	127 855	365 300

Source: ECLA estimates, based on data supplied by the Brasilian motor-vehicle industry.

/(c) Colombia

(c) Colombia

As a result of Government policies relating to car imports, there have been sizable fluctuations in the domestic supply of cars in Colombia, and as a consequence the growth of car density has been slow and irregular. The curve representing its growth over the period 1958-1967 is below the model curve, demonstrating the existence of a substantial repressed demand (see figure VII).

The Colombian motor-vehicle industry has not been in existence for very long, and only began to assemble vehicles in 1966. Judging by the experience of other countries, the establishment of a motor-vehicle industry brings with it a sharp rise in demand, particularly if demand has been restricted over a long period, as it has been the case in Colombia. Hence, in the near future it is probable that the total stock of passenger cars will grow rapidly. However, its growth may to some extent be limited by balance-of-payments problems, since Colombia is still weak in the production of parts and component; those not produced domestically will for the moment have to be imported, since sizable investment in machinery is required to bring the parts and components industry up to a suitable level.

The following assumptions were used in the projections:

(i) It was estimated that the total stock of passenger cars would grow at an average annual rate of 10 per cent, and consequently that car density would increase at an average rate of 6.5 per cent. It is expected that the car density curve will gradually approach the model curve and meet it around 1985.

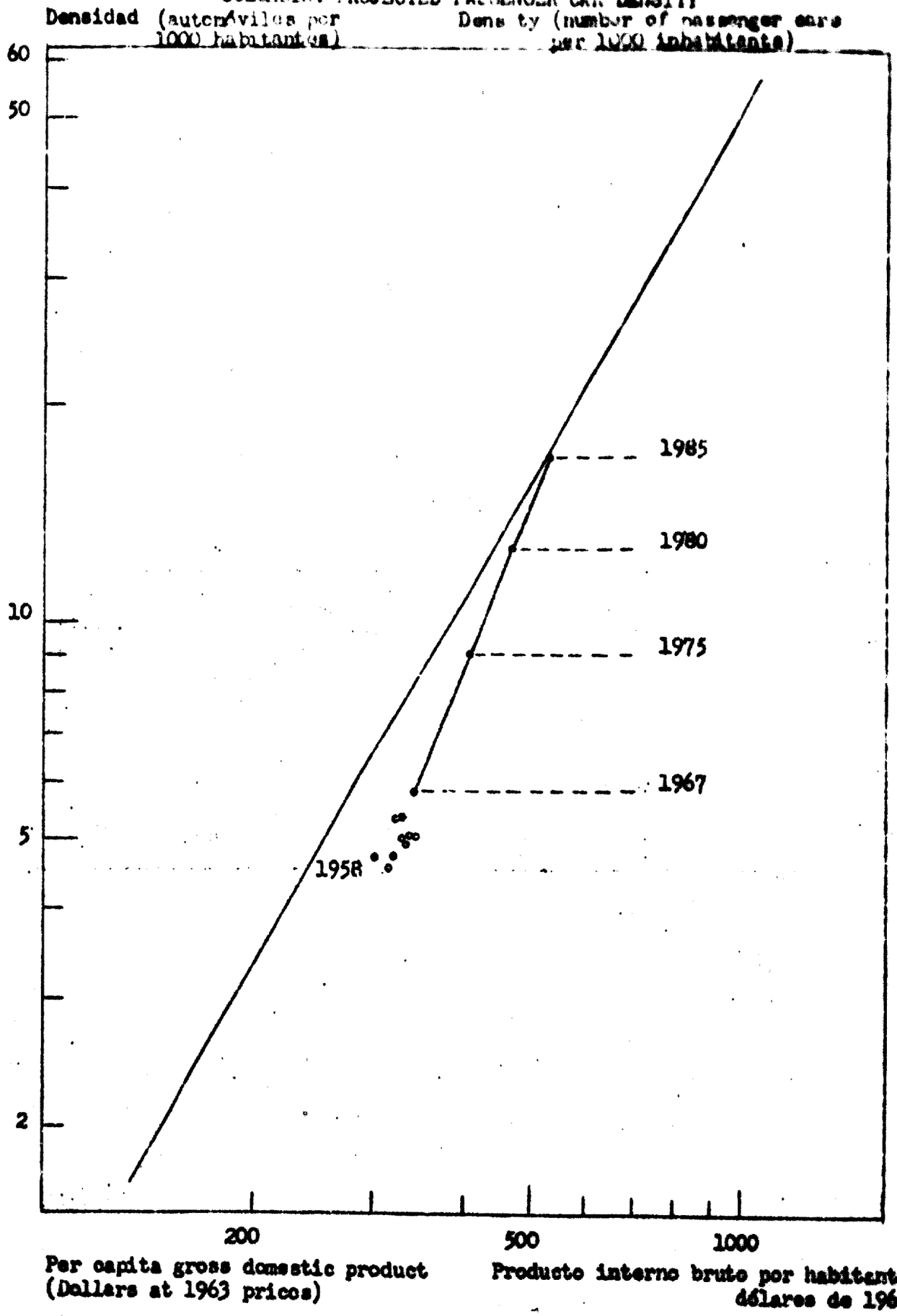
(ii) It was assumed that the per capita gross domestic product would grow at an average annual rate of 2.5 per cent, which is slightly higher than the average rate achieved over the period 1950-1966 but is considered representative of the long-term trends of the Colombian economy.

(iii) The rate of depreciation for passenger cars has, like the volume of imports, fluctuated considerably from year to year, with considerable increases in years when the volume of imports was greatest. The average rate was 1.3 per cent over the period 1959-1966, and 1.9 per cent during the period 1963-1966. For purposes of this study, it was assumed that the rate would rise gradually to 2.4 per cent in 1975, 2.6 per cent in 1980 and 3.0 per cent in 1985.

/Figure VII

Gráfico 7
Figure VII

COLOMBIA: PROYECCION DE LA DENSIDAD DE AUTOMOVILES
COLOMBIA: PROJECTED PASSENGER CAR DENSITY



/Table 22

Table 10 gives the results of the projection.

The figures obtained indicate that the total stock of cars is expected to grow at an average annual rate of 10 per cent, car density at a rate of 6.1 per cent, and demand at a rate of 9.9 per cent during the period 1966-1980. These figures can be considered acceptable provided the Colombian motor vehicle industry is able to develop to a reasonable extent.

Table 10

COLOMBIA: PROJECTED POPULATION, CAR STOCK AND DEMAND

(Units)

Year	Density (cars per 1 000 inhab.)	Stock	Annual increase in stock	Annual depreciation	Final demand
1966 a/	9.1	71 454	7 877	4 [illegible]	11 [illegible]
1975 a/	9.8	[illegible] 850	[illegible] 000	5 100	[illegible] 100
1980 b/	12.7	190 340	39 [illegible]	8 970	48 [illegible]
1985 b/	17.3	439 650	35 [illegible]	16 [illegible]	78 [illegible]

Source: ECLA estimates.

a/ Actual figures.

b/ Estimates.

/[illegible]

(4) Chile

The curve for car density in Chile runs some distance below the model curve, which shows that there is a large amount of repressed demand (see figure VIII).

In recent years, the car density curve has shown a marked tendency to approach the model curve and it is very likely that this trend will become more accentuated in the future. The Chilean motor-vehicle industry is relatively new and is therefore going through a period of growth. The new government measures authorizing the establishment of assembly plants in central Chile may provide it with further impetus, for approximately 90 per cent of the plants producing parts and components are situated in this area, which is the most highly industrialized in the country. In addition, the Chilean motor vehicle industry has been tending in recent years to become concentrated in fewer but larger plants, with a view to reducing production costs and expanding the market. As in Colombia, however, growth may be limited because of the lack of a part and components industry that is adequate for the development of the motor-vehicle industry. At present, vehicle-assembly plants in Chile import 45 per cent of the components used from the place of origin, i.e., the United States, Europe or Japan, and between 15 and 20 per cent from Argentina.

The following assumptions were used in the projections:

(i) It was estimated that the total stock of and demand for passenger cars will grow at an average annual rate of 10 per cent and 7.7 per cent respectively. This would mean that the curve for car density would gradually approach the model curve and meet it at a point around 1995.

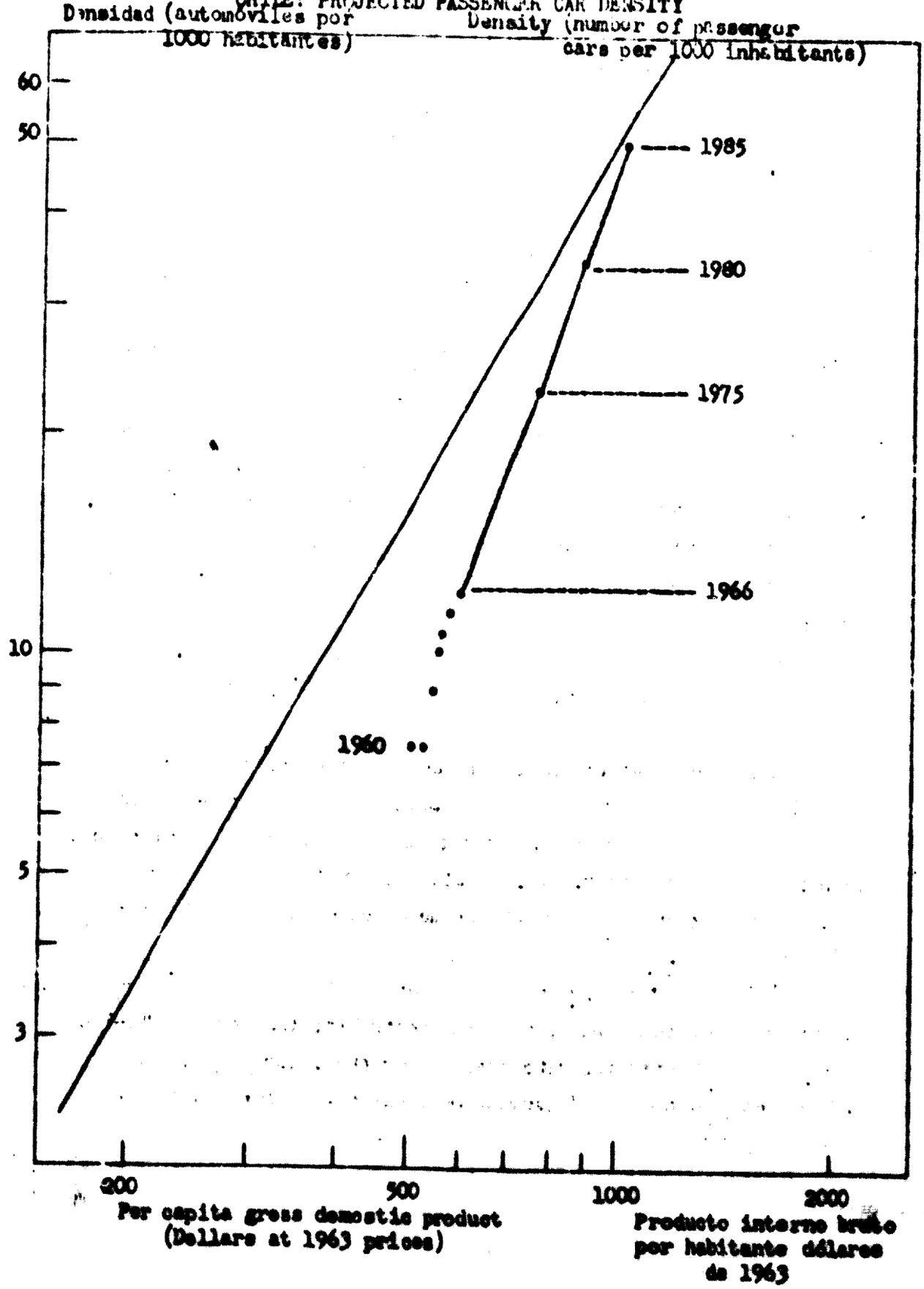
(ii) Although the growth of the per capita product has been very uneven in recent years, and the average for the period 1950-1966 was below 2 per cent, the rate assumed for the future was an average of 3 per cent since Chile's development plans call for rates of growth of this magnitude.

/Figure VIII

Gráfico 8

Figure VIII

CHILE: PROYECCION DE LA DENSIDAD DE AUTOMOVILES
CHILE: PROJECTED PASSENGER CAR DENSITY



/(iii) Ae

(iii) As in other Latin American countries, the rate of depreciation in Chile varies a great deal from one year to the next. During the period 1952-1967 the average rate was below 2 per cent, but the rate for the period 1960-1967 was an average of over 3 per cent. It was estimated that the rate would move to 2.4 per cent in 1975, 2.6 per cent in 1980 and 3 per cent in 1985.

(iv) An analysis of the structure of sales shows that the share of small cars in the total declined by 12 per cent between 1962 and 1966, while the share of medium-sized cars gradually rose. It was estimated that in future the share of small cars will stabilize around 62 per cent, and that the share of medium-sized cars will rise slightly, from 21 per cent in 1966 to 25 per cent in 1985.

Tables 23 and 24 show the projected total stock of and demand for passenger cars, indicating an average annual increase of 10 per cent in the total stock, 7.7 per cent in car density and 13 per cent in demand during the period 1966-1985.

(e) Mexico

The growth of car density in Mexico has been fairly even, and the car density curve is slightly below the model curve and tending to draw closer to it (see figure IX). Since the Mexican economy has grown steadily and there has been exchange stability for a number of years, it is not likely that the growth trend of car density will change very much. The following assumptions were used in the projections:

(i) It was anticipated that car density would follow previous trends and join the model curve in 1985.

(ii) It was estimated that the per capita gross domestic product would expand at an average annual rate of 3 per cent. This rate is slightly higher than the average for the period 1950-1966, but is a reasonable figure in view of the trends of the Mexican economy.

(iii) The rate of depreciation shows the same year-to-year fluctuations as are found in other Latin American countries. When there has been depreciation, the rate has ranged between 2 and 4 per cent, with a very few exceptions. It is estimated that the rate of depreciation will rise gradually to 2.4 per cent in 1975, 2.7 per cent in 1980 and 3 per cent in 1985.

/Table 23

Table 23

CHILE: PROJECTED PASSENGER CAR STOCK AND DEMAND

(Units)

Year	Density (cars per 1 000 inhabitants)	Stock	Annual increase in stock	Annual depreciation	Final demand
1966 a/	12.3	108 248	-	-	6 927
1975 b/	23.0	251 550	23 700	5 400	29 100
1980 b/	34.8	425 000	40 820	9 980	50 800
1985 b/	50.0	680 000	56 000	18 700	74 700

Source: ECLA estimates.

a/ Actual figures.

b/ Estimates.

Table 24

CHILE: PROJECTED DEMAND FOR PASSENGER CARS, BY SIZE OF CAR

(Units)

Year	Small	Medium-sized	Large	Total
1975	18 000	6 700	4 400	29 100
1980	31 500	12 150	7 150	50 800
1985	43 300	18 675	9 725	74 700

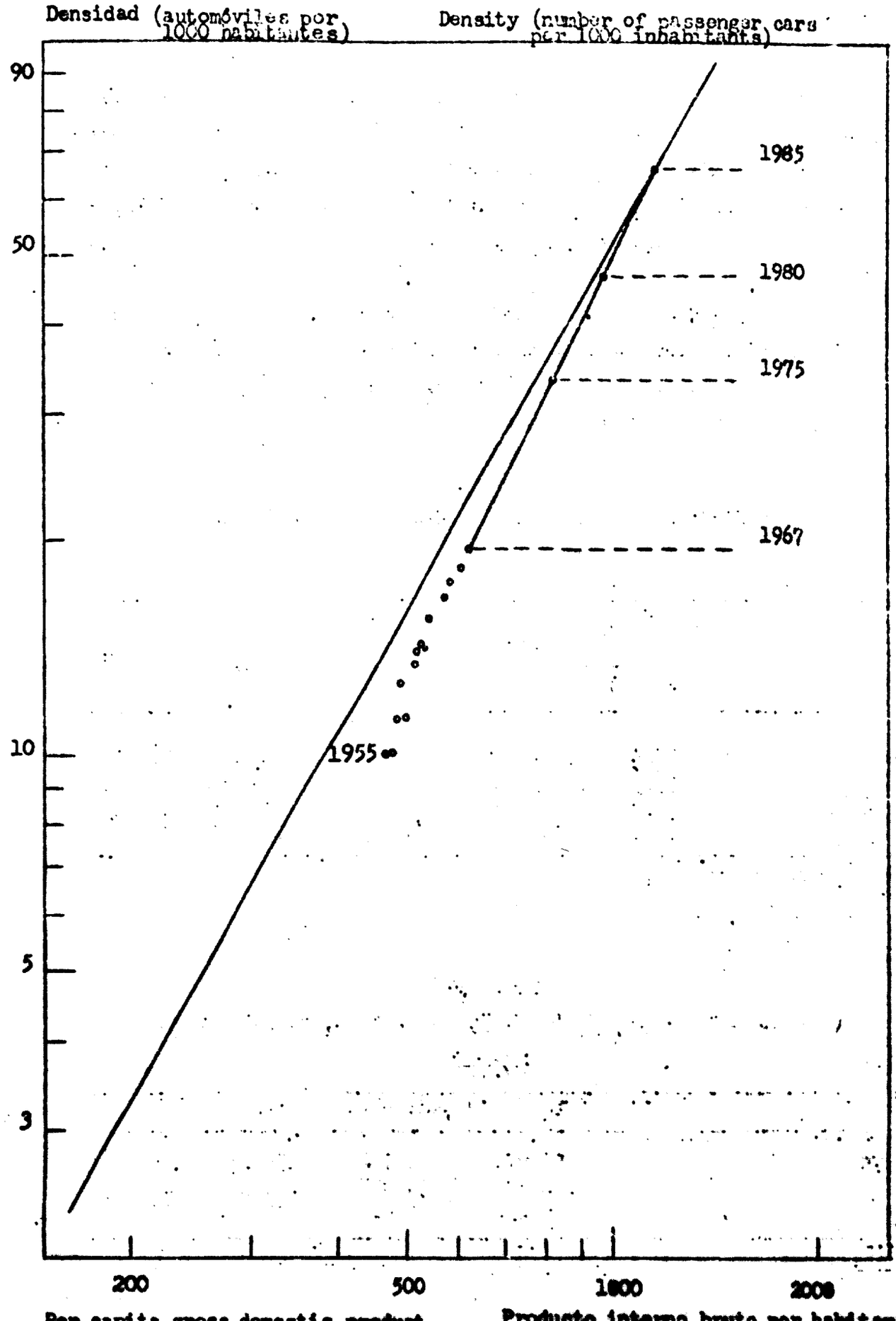
Source: ECLA estimates, based on data supplied by the Chilean Development Corporation (Corporación de Fomento-CORFO).

/Figure IX

Gráfico 9
Figure IX

MEXICO: PROYECCION DE LA DENSIDAD DE AUTOMOVILES

MEXICO: PROJECTED PASSENGER CAR DENSITY



/(iv) The

(iv) The structure of car sales did not change appreciably during the period considered, except for the fact that the share of intermediate cars tended to fall. It was estimated that in the future the share of medium-sized cars will remain at about 12 per cent, while that of large cars will fall slightly, moving from 66 per cent in 1966 to 59 per cent in 1985.

Tables 25 and 26 show the projections of the total stock of and demand for cars. They indicate that car density will increase at an annual average rate of 6.9 per cent, total stock at a rate of 10.6 per cent and demand at a rate of 10.8 per cent.

Table 25

MEXICO: PROJECTED PASSENGER CAR STOCK AND DEMAND

(Units)

Year	Density (cars per 1 000 inhabitants)	Stock	Annual increase in stock	Annual depreciation	Final demand
1966 a/	18.4	812 415	70 318	30 814	101 132
1975 b/	33.5	2 018 270	196 170	43 730	239 900
1980 b/	47.0	3 355 510	343 840	81 310	425 150
1985 b/	66.0	5 573 370	557 900	150 460	708 360

Source: ECLA estimates.

a/ Actual figures.

b/ Estimates.

Table 26

MEXICO: PROJECTED DEMAND FOR PASSENGER CARS, BY SIZE OF CAR

(Units)

Year	Small	Medium-sized	Large	Total
1975	59 975	28 790	151 135	239 900
1980	114 790	51 018	259 342	425 150
1985	205 430	85 000	417 930	708 360

Source: ECLA estimates, based on data supplied by AMIA.

/(f) Peru

(f) Peru

In Peru, the demand for passenger cars has not been repressed. Although its motor-vehicle industry was established very recently, in general Peru has not had major balance-of-payments problems and supply was normal throughout the period considered. Before the establishment of the motor-vehicle industry, car density was fairly close to the model curve, but over the period 1962-1966 it has moved above the curve (see figure X).

It is likely that in the reasonably near future car density will increase comparatively more slowly than it did during 1962-1966 since the Peruvian market for cars is not very extensive and as yet there is no clear policy for the integration of the motor-vehicle industry. In years to come, as the motor-vehicle industry becomes stronger and increases its degree of integration with the other countries of the Andean Group, the market may expand considerably. In the projections, it was assumed that, the car density curve would parallel the model curve at least until 1985.

It was also assumed that the per capita gross domestic product would grow at an average annual rate of 2.9 per cent, slightly above the average for the period 1950-1967.

Over the period considered, the rate of depreciation has been very low or nil. As with the other Latin American countries considered, it was assumed that the rate of depreciation would rise gradually, and the rates estimated were 2 per cent in 1975, 2.5 per cent in 1980 and 3 per cent in 1985.

Table 27 gives the projections for the years 1975, 1980 and 1985. They indicate that car density will grow at an annual rate of 4.6 per cent, the total stock of cars at a rate of 7.8 per cent and demand at a rate of 5.4 per cent.

Table 27

PERU: PROJECTED PASSENGER CAR STOCK AND DEMAND

(Units)

Year	Density (cars per 1 000 inhabitants)	Stock	Annual increase in stock	Annual depreciation	Final demand
1966 a/	14.8	178 052	-	-	29 342
1975 b/	21.3	332 000	25 725	6 245	31 970
1980 b/	27.2	503 930	39 540	11 600	51 140
1985 b/	34.7	749 930	58 600	20 740	79 340

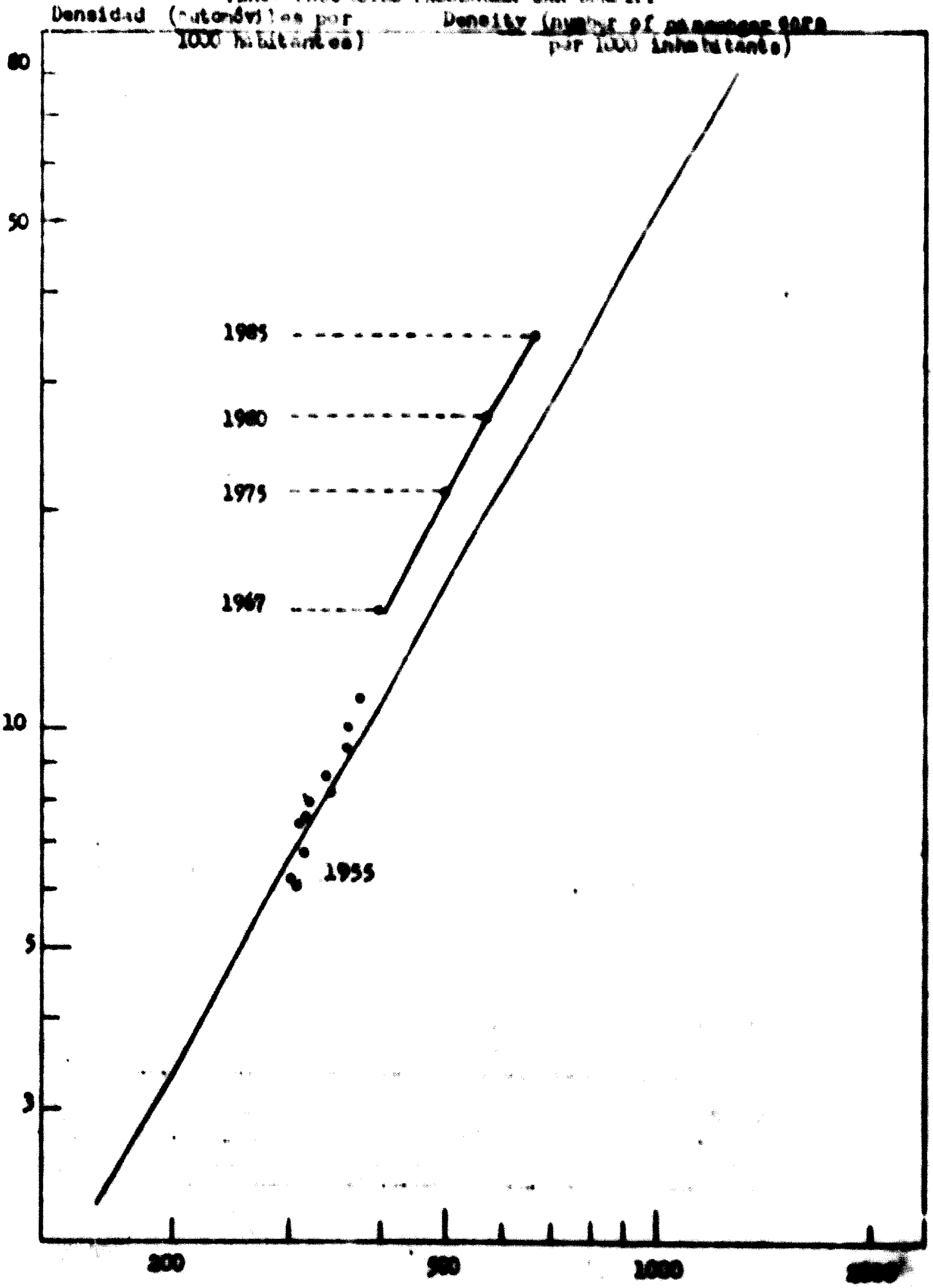
Source: ECLA estimates.
a/ Actual figures.
b/ Estimates.

/Figure X

Gráfico 10

Figure X

PERU: PROYECCION DE LA DENSIDAD DE AUTOMOVILES
PERU: PROJECTED PASSENGER CAR DENSITY



Per capita gross domestic product (Dollars at 1963 prices)

Producto interno bruto por habitante dólares de 1963

/(a) Venezuela

(g) Venezuela

Car density in Venezuela follows a path slightly above the model curve, owing to Venezuelan income levels. The curve is above the model curve throughout the period 1955-1967 and parallels it fairly closely (see figure XI). This trend is not expected to change appreciably in the future, since demand has not been repressed in the past, and, although the parts and components industry has not developed to the extent required for increased integration, Venezuela has an ample supply of foreign exchange. This means that it can import the parts and components that are not produced domestically and thus ensure that its motor-vehicle industry develops normally.

The overall growth rate of the gross domestic product of Venezuela has been very high in the past, chiefly owing to investment in the petroleum industry. In 1950, Venezuela began to develop its industry and stepped up agricultural activities, and as a result the petroleum industry's share in total economic activity declined. The average growth rate of the gross domestic product fell to 6.5 per cent during the period 1950-66, and it is expected that, now that the agro-industrial structure of the economy is a reality, it will stabilize in the future around this level. For the projections of car density, it was considered that a rate of 6.5 per cent (3.1 per cent per capita) would be representative of the probable growth of the Venezuelan economy in the future.

The depreciation rate for cars in Venezuela has been the highest in Latin America, fluctuating around the 6 per cent mark during the period 1952-1966. It is probable that, as a result of the increase in the cost of cars stemming from the establishment of the motor-vehicle industry, this rate will fall in the future. For purposes of the present paper, it was estimated that the rate would stabilise around 3 per cent. The rates estimated for 1975, 1980 and 1985 were 4.3 per cent, 3.6 per cent and 3 per cent respectively.

The structure of car sales has changed very little in recent years, with large cars continuing to dominate the market. It is estimated that the share of large cars in the total will fall from 58 per cent in 1966 to 50 per cent in 1985, while that of small cars will rise from 18 to 29 per cent over the same period.

Tables 28 and 29 show the projections for the total stock of and demand for cars. These indicate that car density will grow at a rate of 5.4 per cent, the total stock of cars at a rate of 9 per cent, and demand at a rate of 7.9 per cent. These rates are perhaps high if compared with the actual rates for the period 1960-1965, but it should be remembered that this was a period with special features, since imports were restricted at a time when domestic production was going through a critical period, a situation that is not likely to recur in the future.

/Figure XI

Gráfico 11

VENEZUELA : PROYECCION DE LA DENSIDAD DE AUTOMOVILES

Densidad (automóviles por 1000 habitantes)

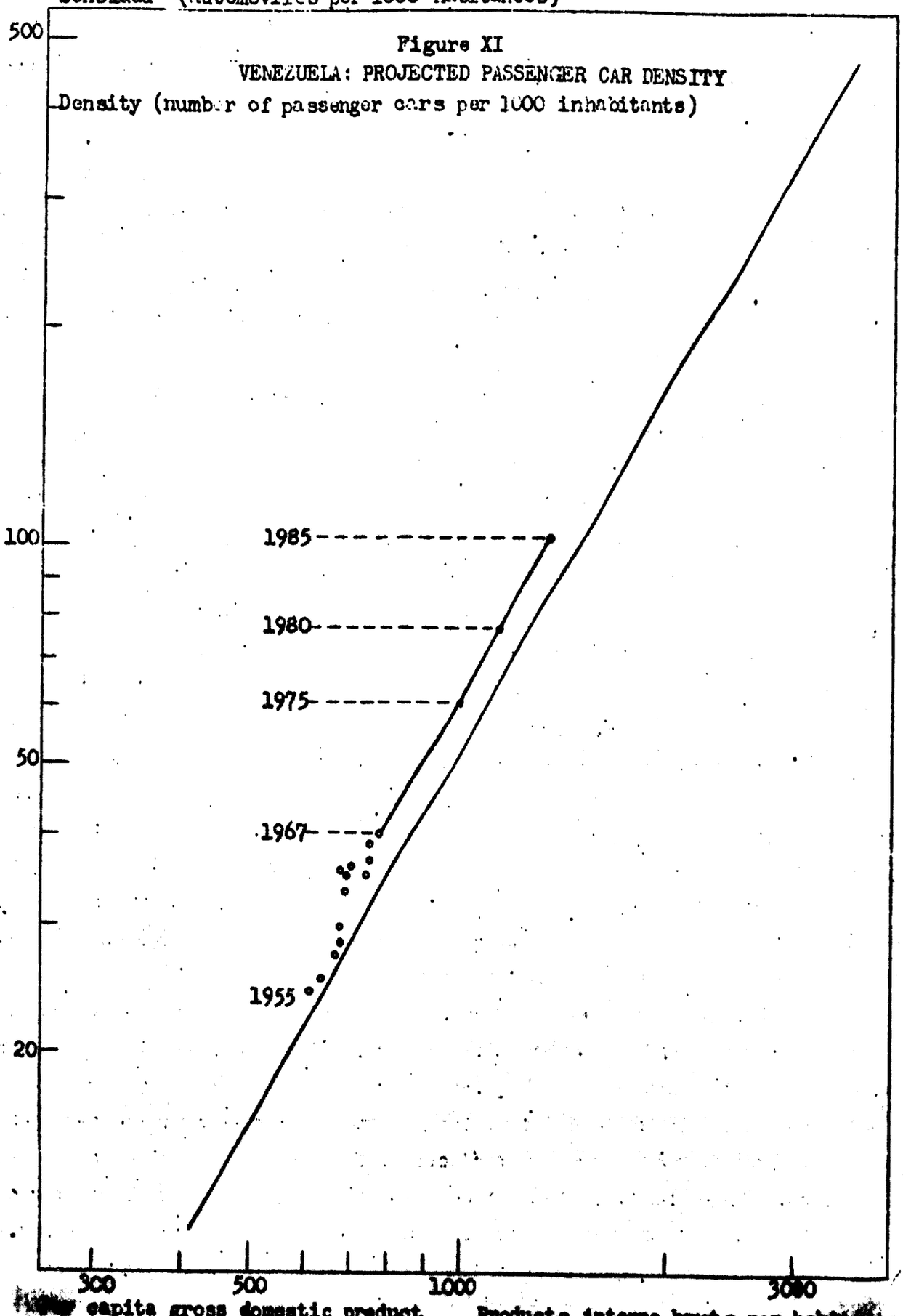


Figure XI

VENEZUELA: PROJECTED PASSENGER CAR DENSITY

Density (number of passenger cars per 1000 inhabitants)

capita gross domestic product (Dollars at 1963 prices)

Producto interno bruto por habitante dólares de 1963

/Table 28

Table 28

VENEZUELA: PROJECTED PASSENGER CARS STOCK AND DEMAND

(Units)

Year	Density (cars per 1 000 inhabitants)	Stock	Annual increase in stock	Annual depreciation	Final demand
1966 a/	38.0	347 400	23 374	22 277	45 651
1975 b/	61.1	778 170	64 950	30 660	95 610
1980 b/	79.1	1 184 839	95 610	39 270	134 820
1985 b/	103.0	1 787 000	144 645	49 270	193 915

Source: ECLA estimates.

a/ Actual figures.

b/ Estimates.

Table 29

VENEZUELA: PROJECTED DEMAND FOR PASSENGER CARS, BY SIZE OF CAR

(Units)

Year	Small	Medium-sized	Large	Total
1975	25 815	18 165	51 630	95 610
1980	37 750	26 964	70 106	134 820
1985	56 235	40 722	96 958	193 915

Source: ECLA estimates, based on data supplied by the Ministry of Development.

/(b) Bolivia

(h) Bolivia, Central America, Ecuador, Paraguay and Uruguay

The data available for these areas in the region is incomplete or inadequate. In all of them demand was met solely from imports, the level of which fluctuated sharply from year to year because the capacity to import was limited. Hence, it is difficult to project the way demand will move in the future, since any change in import policy would affect demand and thus nullify the projection. Accordingly, the projections made of the total stock of and demand for cars, although worked out with the methods used for the other countries must be considered as preliminary orders of magnitude only.

In Bolivia the growth of car density is not proportional to the level of income. Its car density curve lies above the model curve and has virtually paralleled it over the period 1955-1967 (see annex figure A-II). The projections were based on the following assumptions: that car density would continue to parallel the model curve until 1975 and then move towards it; that the depreciation rate, which was extremely low during the period considered, would rise gradually to 3 per cent by 1985; and that the per capita gross domestic product would continue to grow at the same rate as in the period 1962-1967, i.e., 3.4 per cent.

In Central America, there is a close correlation between car density and the per capita gross domestic product, although car density increases more rapidly. The car density curve is above the model curve but very close and virtually parallel to it. (See annex, figure A-III.) It is expected that it will continue to parallel the model curve at least until 1985. The rate taken for the average growth of the per capita gross domestic product was 3.1 per cent, slightly higher than that achieved in the period 1950-1967, which can be considered to be representative of the future development of the region since it was during this period that the region began to industrialize and diversify its exports as a result of the creation of the Central American Common Market. It was also estimated that the depreciation rate, which has been fairly high in the past, will stabilize around the 3 per cent mark by 1985.

/In Ecuador

In Ecuador, the car density curve is below the model curve but tending to approach it. It was estimated that the total stock will grow by 10 per cent annually, i.e., that the car density curve will continue to approach the model curve (see annex, figure A-IV).

In Paraguay, car density increased more rapidly than the per capita gross domestic product. In the period 1948-1967 the car density curve was above the model curve. It is estimated that car density will stabilise in a position parallel to the model curve, at least until 1985 (see annex, figure A-V).

Uruguay is the country which exhibits the greatest anomalies. There is not a very close correlation between car density and the per capita gross domestic product, since the latter contracted in some of the years considered, and hence it cannot be used as a sound basis for the projection. It was estimated that the car density curve would continue to parallel the model curve in the future (see annex, figure A-VI).

Table 30 gives the projections of the total stock of and demand for passenger cars in these countries.

(i) Latin America

The projections of the total stock of and demand for passenger cars in the region as a whole were obtained by adding together the country projections. The total stock in the region is expected to amount to 8.8 million units in 1975 and 19.3 million in 1985. This indicates an average annual rate of growth of 8.6 per cent over the period 1967-1985. Total regional demand over the same period is expected to grow at an annual rate of 8.2 per cent, and to amount to 891,950 units in 1975 and 1,947,320 units in 1985. Table 31 gives the projections in detail.

/Table 30

Table 30

PROJECTED PASSENGER CAR STOCK AND DEMAND IN BOLIVIA, CENTRAL AMERICA, ECUADOR, PARAGUAY AND URUGUAY

(Units)

		1975	1980	1985
	Density	9.6	11.5	13.6
Bolivia	Stock	50 610	69 050	92 920
	Demand	4 535	6 065	7 920
	Density	14.0	18.2	23.5
Central America	Stock	247 560	361 217	583 575
	Demand	29 340	46 575	70 300
	Density	6.3	8.7	12.0
Ecuador	Stock	44 920	73 420	119 770
	Demand	5 825	8 850	14 930
	Density	8.9	11.0	13.5
Paraguay	Stock	25 700	38 000	55 630
	Demand	2 370	3 760	5 365
	Density	57.1	67.6	87.2
Uruguay	Stock	175 100	229 190	300 580
	Demand	11 840	16 140	22 710

Source: ECLA estimates.

/Table 31

Table 31

LATIN AMERICA: PROJECTED PASSENGER CAR STOCK AND DEMAND

(Units)

Country	1975				1980				1985			
	Stock	Increase in stock	Depre-ciation	Final demand	Stock	Increase in stock	Depre-ciation	Final demand	Stock	Increase in stock	Depre-ciation	Final demand
Argentina	1 969 650	140 230	36 580	176 870	2 708 820	151 920	63 425	215 845	3 773 260	227 130	105 150	332 280
Bolivia	50 610	3 835	700	4 535	69 050	4 765	1 280	6 065	92 920	5 740	2 100	7 920
Brazil	2 648 740	189 390	49 100	238 490	3 596 600	138 100	84 840	282 940	5 001 280	221 000	143 300	365 300
Central American	247 560	21 660	7 680	29 340	381 217	35 575	11 000	46 575	583 575	54 430	15 870	70 300
Colombia	242 850	21 000	5 100	26 100	398 340	39 240	8 970	48 210	639 650	55 230	16 940	72 170
Chile	251 550	23 700	5 400	29 100	425 000	40 820	9 980	50 800	680 000	56 000	18 700	74 700
Ecuador	44 920	4 245	1 580	5 825	73 420	6 590	2 270	8 860	120 770	11 690	3 240	14 930
Mexico	2 018 270	196 170	43 730	239 900	3 355 540	343 840	81 310	425 150	5 573 370	557 900	150 460	708 360
Paraguay	25 700	2 020	350	2 370	38 000	3 070	690	3 760	55 300	4 085	1 200	5 285
Peru	338 000	25 725	6 245	31 970	503 930	39 540	11 600	51 140	749 930	58 600	17 740	79 340
Uruguay	175 100	9 360	2 480	11 840	229 190	11 790	4 950	16 140	300 580	15 590	7 120	22 710
Venezuela	778 170	64 950	30 660	95 610	1 104 839	95 610	39 210	134 820	1 787 000	144 945	49 270	193 915
Latin America	8 787 180	702 345	189 605	891 950	12 963 426	970 280	319 425	1 [illegible] 325	19 316 645	1 413 040	534 260	1 947 320

Source: ECLA estimates.

1/ Footnotes

5. Projections of the commercial vehicle stock and demand

Since demand, in this context, is dependent upon the volume of transport and the stage of development it has reached in each country, it can best be calculated by establishing a relationship between the total amount of transport and some indicator of the level of economic activity, on the basis of which it should be possible to discover what part of this over-all volume actually corresponds to road transport. In the case of Latin American countries, however, calculations of this order are made somewhat more problematic by the fact that for most of them the necessary basic statistics are simply not available.

The projections relating to commercial vehicles were done in two stages: projection of total stock, and projection of demand. Prior to this, however, assumptions had to be made as to the future trend of the growth rates of the total gross domestic product and of the rate of depreciation. These assumptions appear in table 32.

As in the case of passenger cars and for the same reasons, the projections of the total stock of commercial vehicles were established by relating the stock to a macroeconomic variable, though here the relationship was based on historical series for the same country rather than on comparisons between different countries. The reasons for this was the following: where commercial vehicles are concerned, estimates based on total stock have to take their carrying capacity into account, since a fleet comprising mainly three to five ton vehicles can obviously not be compared with a fleet comprising on the average ten or twelve vehicles. It is therefore necessary to use statistics which break down the total stock by carrying capacity or categories of carrying capacities; the number of vehicles in each category can then be weighted according to their carrying capacity. In other words, what is in fact being projected is the carrying capacity of the vehicle park rather than the park itself. Unfortunately, it has proved impossible to compile a statistical series weighted according to carrying capacity, and it would thus be useless to attempt to make comparisons between countries since the composition of the stock of commercial vehicles varies widely from one country to another in terms of load capacity.

/Table 32

Table 32

ASSUMPTIONS USED IN PROJECTIONS FOR COMMERCIAL VEHICLES

(Percentages)

	Growth rates of the gross domestic product up to 1985	Rates of depreciation		
		1975	1985	1985
Argentina	6.0	3.6	4.3	5.0
Bolivia	6.0	5.3	5.1	5.0
Brazil	6.5	5.3	5.1	5.0
Central America	6.5	6.7	5.8	5.0
Chile	6.0	3.1	4.0	5.0
Colombia	6.0	2.9	3.8	5.0
Ecuador	6.0	6.9	6.0	5.0
Mexico	7.0	4.6	4.8	5.0
Paraguay	6.0	5.0	5.0	5.0
Peru	6.0	3.3	4.1	5.0
Uruguay	6.0	2.2	3.6	5.0
Venezuela	6.5	7.7	6.2	5.0

Source: ECIA estimates.

Consequently, the projection of the total stock of commercial vehicles of each country was obtained by establishing a double logarithmic lineal ratio between the stock of commercial vehicles and the total gross domestic product - as expressed in the function $y = b\,x^a$, where y = total stock, x = gross domestic product (in dollars at 1960 prices) and a and b are two parameters. The base period selected for the projection was 1955-1967, since it was formed that during those years there was a close relationship between the two variables in all the countries in the area, apart from Bolivia and Uruguay. The corresponding figures appear in table 33, as do the growth rates obtained from the straight lines of regression for each country. The relevant graphs will be found in the annex to this paper.

/Table 33

Table 33

LATIN AMERICA: PROJECTION OF THE COMMERCIAL VEHICLES STOCK

(Units)

Country	1967	1975	1980	1985	Annual average growth rates (1975-1985 percentages)
Argentina	631 300	1 208 000	1 875 000	2 920 000	9.2
Bolivia	19 400	30 450	40 375	53 520	5.8
Brazil	950 000	1 975 000	3 185 000	5 140 000	10.0
Central America	65 700	102 500	141 100	194 600	6.6
Chile	113 000	282 400	471 100	776 700	10.7
Colombia	161 700	303 100	451 900	671 700	8.4
Ecuador	28 700	49 200	71 300	102 600	7.5
Mexico	443 000	743 000	1 040 000	1 462 000	7.0
Paraguay	6 200	12 720	19 400	29 500	8.7
Peru	107 800	200 700	285 800	408 000	7.4
Uruguay	104 700	145 700	182 200	227 600	4.6
Venezuela	140 000	231 700	317 450	434 930	6.5
Total	2 771 500	5 284 470	8 080 625	12 421 150	8.9

Source: ECLA estimates.

/Mexico and

Mexico and Venezuela are special cases. The figures for the total stock of commercial vehicles during the base period of the project - 1955-1967 - indicate an average annual growth of 4.9 per cent in Mexico and 2.2 per cent in Venezuela. On calculating the ratio between this variable and the gross domestic product, the resulting coefficient of elasticity was 0.82 for Mexico and 0.74 for Venezuela, which is too low if compared with those of the other Latin American countries, especially as they will most likely be higher in the future. For the purposes of this paper, therefore, the equations obtained from the above ratio were modified to give both these countries a future coefficient of elasticity of 1. The graph which appears in the annex shows both equations and the results obtained in each case.

The second stage involved a projection of demand. The first component of demand for a given year was obtained from the increase in total stock compared with the year before. The second component, the demand for replacement of commercial vehicles that are taken off the road each year, was based on an analysis of past rates of depreciation both in the Latin American countries covered by the study and in other countries at different stages of economic development. In the case of Latin America, previous rates of depreciation followed, generally speaking, the same irregular pattern as had already been observed in respect of passenger cars. However, the average rate of depreciation of commercial vehicles during the period in question was, quite naturally, notably higher, since this type of vehicle needs to be replaced more rapidly because of the hard wear it gets. The rates of depreciation fluctuated also from one year to the next in the other countries studied,[3/] but apart from Germany and France, where the rate of depreciation is somewhat

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3/ The countries whose rates of depreciation were analyzed were Austria, Australia, The Federal Republic of Germany, France, Italy, Japan, Portugal, South Africa and Spain.

/higher, the

higher, the general average tends to be around 5 per cent. It was therefore, decided to adopt a progressively increasing rate of depreciation for the Latin American countries which, starting from the past average for each country, would reach a uniform rate of 5 per cent by 1985. Once these assumptions as to rates of depreciation had been made, the demand for replacements in any given year was obtained by applying these rates to the figures for the total stock of the previous year. Final demand was equal to the sum of these two components. The figures for 1975, 1980 and 1985 are shown in table 34, along with the growth rates of over-all demand for the period 1975-1985.

The projections made assume an annual average growth rate of 8.8 per cent in the total stock of commercial vehicles in Latin America and of 9.5 per cent in over-all demand. Taken separately, the countries show different growth rates both of the stock of vehicles and of demand; these are highest in Argentina, Brazil, Chile, Colombia and Paraguay, where they range between 8 and 11 per cent, while in the remaining countries they fluctuate roughly between 5 and 9 per cent.

Table 34

LATIN AMERICA: PROJECTION OF DEMAND FOR COMMERCIAL VEHICLES

(Units)

Country	1975	1980	1985	Average annual growth rates between 1975 and 1985
Argentina	134 100	226 000	380 650	11.2
Bolivia	3 280	4 290	5 630	5.5
Brazil	265 660	434 350	694 000	10.1
Central America	12 150	15 530	21 100	5.7
Chile	32 680	58 200	101 000	11.9
Colombia	30 630	49 400	82 400	10.4
Ecuador	6 180	8 880	11 970	6.9
Mexico	77 100	110 850	160 500	7.6
Paraguay	1 580	2 420	3 375	7.9
Peru	19 960	29 740	40 730	7.4
Uruguay	9 460	14 270	20 690	8.1
Venezuela	30 890	37 830	46 970	4.4
Total	623 670	991 760	1 569 015	9.7

Source: ECLA estimates.

/6. Conclusions

6. Conclusions

If the demand for motor vehicles were to develop along the lines indicated in the projections, then, because it would mostly have to be met by domestic production in view of the unlikeliness of any fundamental short-term change in the region's limited import capacity, the contribution of the Latin American automobile industry would have to be substantial, since the projected figures assume an increase in total production of 150 per cent by 1975 and of a further 130 per cent over the following ten years. Despite the high production figures and extensive investment involved, a growth rate of this order would be perfectly feasible within a framework of a Latin American co-operation which would enable better use to be made of existing resources and production capacity. The effort required would in any case be smaller than that made over the past ten years, when the average annual growth rate of production was more than 20 per cent.

There is even cause for hope, moreover, that in the more distant future (by 1985 for example) the projections will be exceeded, since there is still a considerable margin of unsatisfied demand in Latin America and the existing parks of motor vehicles are undoubtedly very old in nearly every case - two factors that point to a huge potential market.

If this is to come about, however, motor-vehicle production will clearly have to be organized along more rational lines. It is well known that the production costs of such vehicles are currently much higher in Latin America than elsewhere and that they tend to rise even higher in certain countries, where locally manufactured parts are being increasingly used, particularly in the early stages, when the manufacturing industries involved are not sufficiently developed. Two reasons for these differences in production costs may be, on the one hand, that there are far too many small manufacturing plants with a very limited output in Latin America and, on the other, that every country in the region that possesses an automobile industry produces a great number of different makes and models of motor vehicles, and therefore has correspondingly short production series. The region is at present putting out about 200 different types

/and models,

and models, which, on the basis of the total production of recent years, represents an average output of no more than 3,500 units per model. Such a diversification of plants and models entails a poor utilization of available capital, and low productivity, both of which help to push cost up. Consequently, if costs are to be reduced to more reasonable levels, some sectors of the automobile industry may have to be reorganized, with the accent on greater plant concentration, and the number of makes and models cut down.

Another way in which the projections could be exceeded in the future would be if the Latin American economies developed faster than assumed here. The growth rates of the gross domestic product, though representative of the current trend in most countries in the region, might of course be higher over the coming years. A careful analysis of the situation in Latin America during the past decade, however, suggest that, particularly in certain countries, a number of obstacles to more rapid economic development have arisen, such as the present state of the agricultural sector, the fact that the industrialization process is still too slow and too costly, and the gap between the value of exports and that of imports, which causes chronic balance-of-payments deficits. In other words, the gross domestic product could only be made to increase at significantly higher and more stable rates than in the past by means of structural modifications to the economies of the countries concerned.

Finally, if certain technological improvements that have been introduced in the more highly industrialized countries were to be adopted by the Latin American countries, they might lead to marked increases in productivity and help to speed up and extend development in Latin America's automobile industry.

/ANNEX

ANNEX

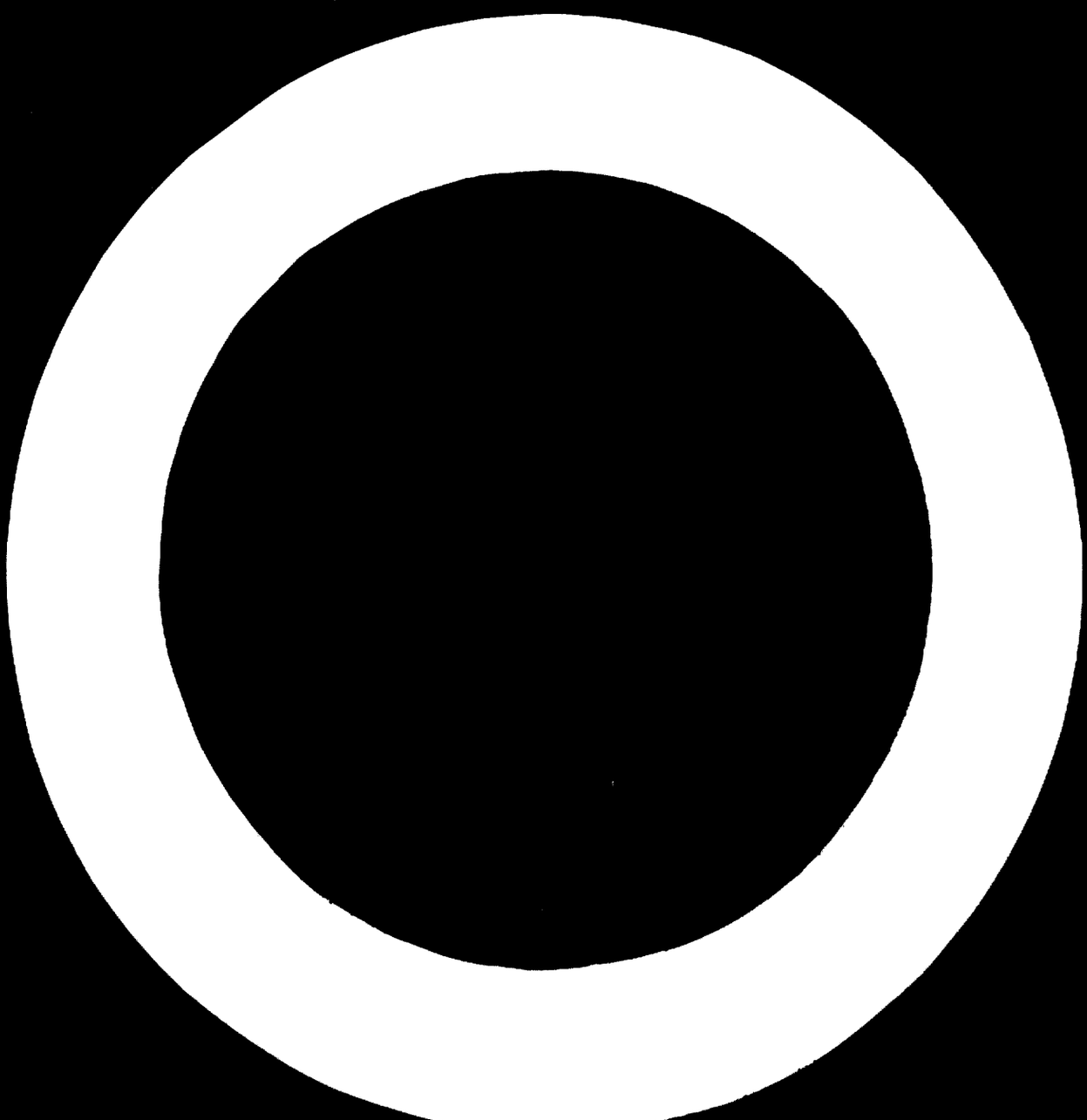


Table A-1

BOLIVIA: STOCK OF MOTOR VEHICLES

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density (cars per 1 000 inhabitants)		
1955	8 900	2.68	14 200	23 100
1956	10 300	3.03	15 898	26 198
1957	11 900	3.44	18 924	30 824
1958	12 700	3.30	21 711	34 411
1959	14 292	3.95	24 340	38 632
1960	15 000	4.06	24 700	39 700
1961	15 300	4.05	25 200	40 500
1962	15 600	4.03	15 078	30 678
1963	17 400	4.40	14 581	31 981
1964	19 200	4.75	15 225	34 425
1965	21 000	5.68	13 626	34 626
1966	21 900	5.90	16 884	38 784
1967	26 000	6.10	19 400	45 000

Source: FIAT and Automobile Facts and Figures, 1955-1968.

Table A-2

CENTRAL AMERICA: STOCK OF MOTOR VEHICLES

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density (cars per 1 000 inhabitants)		
1955	48 360	5.12	36 500	84 860
1956	57 315	5.86	37 137	94 952
1957	64 449	6.44	37 861	102 310
1958	72 576	7.04	36 242	108 818
1959	73 591	6.92	36 678	110 269
1960	78 756	7.18	42 374	121 130
1961	84 700	7.49	43 737	128 437
1962	88 266	7.56	45 782	134 048
1963	99 486	8.26	45 699	145 185
1964	105 900	8.51	50 136	156 036
1965	109 431	8.52	59 622	169 053
1966	117 800	8.90	64 910	182 710
1967	125 600	9.19	65 700	191 300

Source: Costa Rica: Ministry of Transport.
El Salvador: Statistical Office.
Guatemala: Highway Department.
Honduras: Statistical Office.
Nicaragua: Highway Planning Department.

Table A-3

ECUADOR: STOCK OF MOTOR VEHICLES

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density (cars per 1 000 inhabitants)		
1955	5 754	1.56	14 091	19 548
1956	6 296	1.66	14 740	21 036
1957	6 300	1.60	16 200	22 500
1958	7 300	1.80	16 500	23 800
1959	8 500	2.03	17 600	26 100
1960	9 300	2.15	19 131	28 431
1961	10 700	2.40	20 677	21 747
1962	11 087	2.40	20 870	31 957
1963	11 300	2.40	20 949	32 249
1964	14 607	2.96	22 200	36 807
1965	17 500	3.43	23 679	41 179
1966	20 213	3.83	25 400	45 613
1967	20 900	3.83	28 700	49 600

Source: FIAT, Motor-Vehicle Manufacturers Association (ADEFA) and Automobile International, 1967.

/Table A-4

Table A-4

PARAGUAY: STOCK OF MOTOR VEHICLES

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density (cars per 1 000 inhabitants)		
1955	3 809	2.50	2 488	6 297
1956	4 097	2.49	2 910	7 007
1957	4 623	2.86	3 013	7 636
1958	4 829	2.93	3 400	8 229
1959	5 324	3.15	3 700	9 024
1960	7 287	4.19	4 288	11 575
1961	9 250	5.19	4 500	13 750
1962	10 900	5.89	4 600	15 500
1963	12 050	6.31	5 120	17 170
1964	12 670	6.42	5 520	18 190
1965	13 195	6.46	5 600	18 795
1966	13 721	6.50	5 900	19 621
1967	14 000 a/	6.42	6 200	20 200

Source: Automobile Facts and Figures, 1955-1968.

a/ Provisional figure.

/Table A-5

Table A-5

URUGUAY: STOCK OF MOTOR VEHICLES

(Units)

Year	Passenger cars		Commercial vehicles	Total
	Units	Density (cars per 1 000 inhabitants)		
1955	83 000	35.35	40 623	123 623
1956	87 000	36.63	47 990	134 990
1957	92 000	38.33	58 500	150 500
1958	97 000	39.93	62 900	159 900
1959	102 000	41.48	67 200	169 200
1960	103 732	40.80	76 000	179 732
1961	105 000	40.75	79 200	184 200
1962	107 225	41.04	83 800	191 025
1963	109 850	41.48	84 600	194 450
1964	114 475	42.67	88 250	202 725
1965	120 000	44.15	91 900	211 900
1966	124 586	45.27	98 000	222 586
1967	135 000	48.46	104 700	239 700

Source: FIAT and Automobile International, 1967.

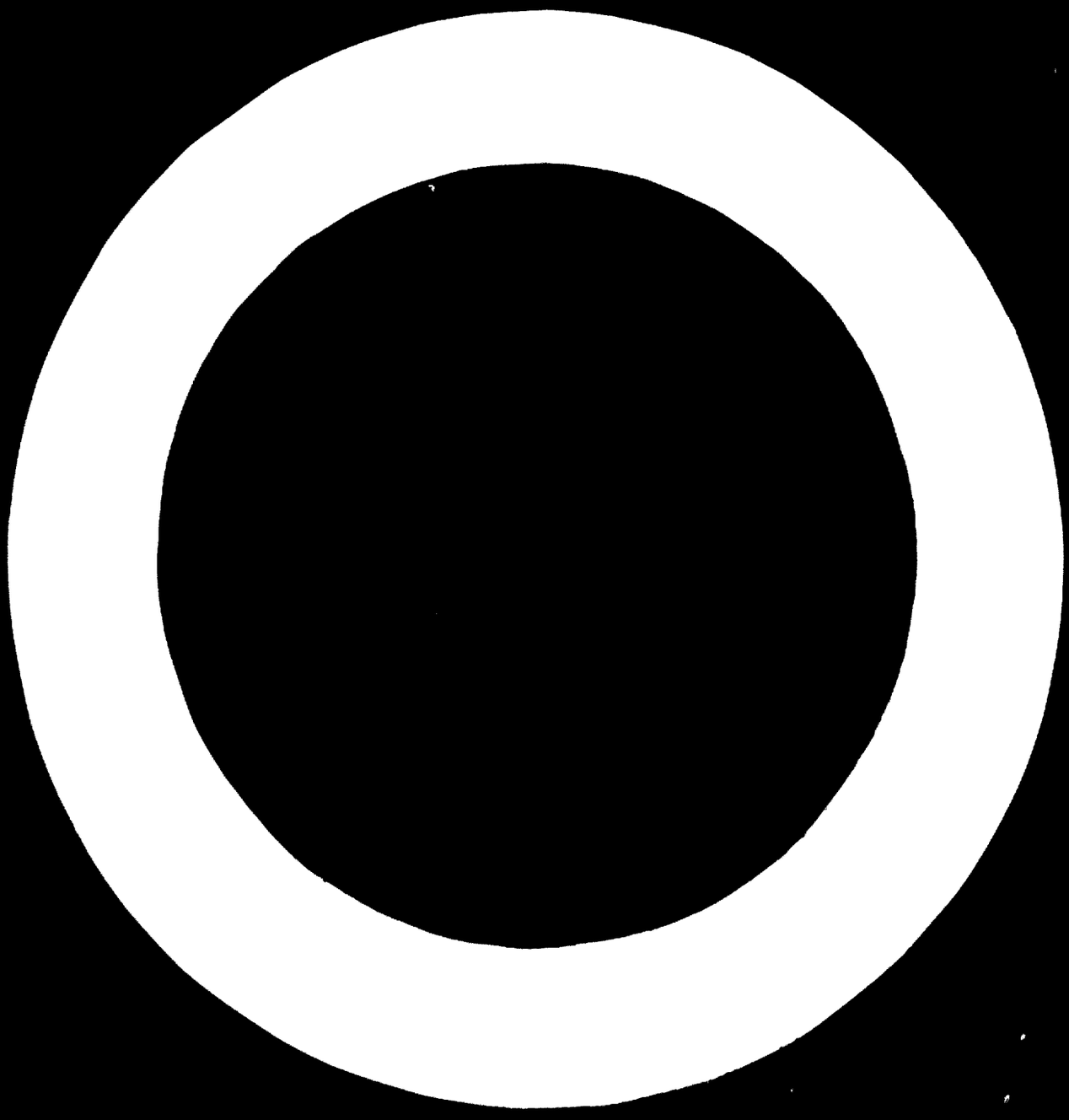
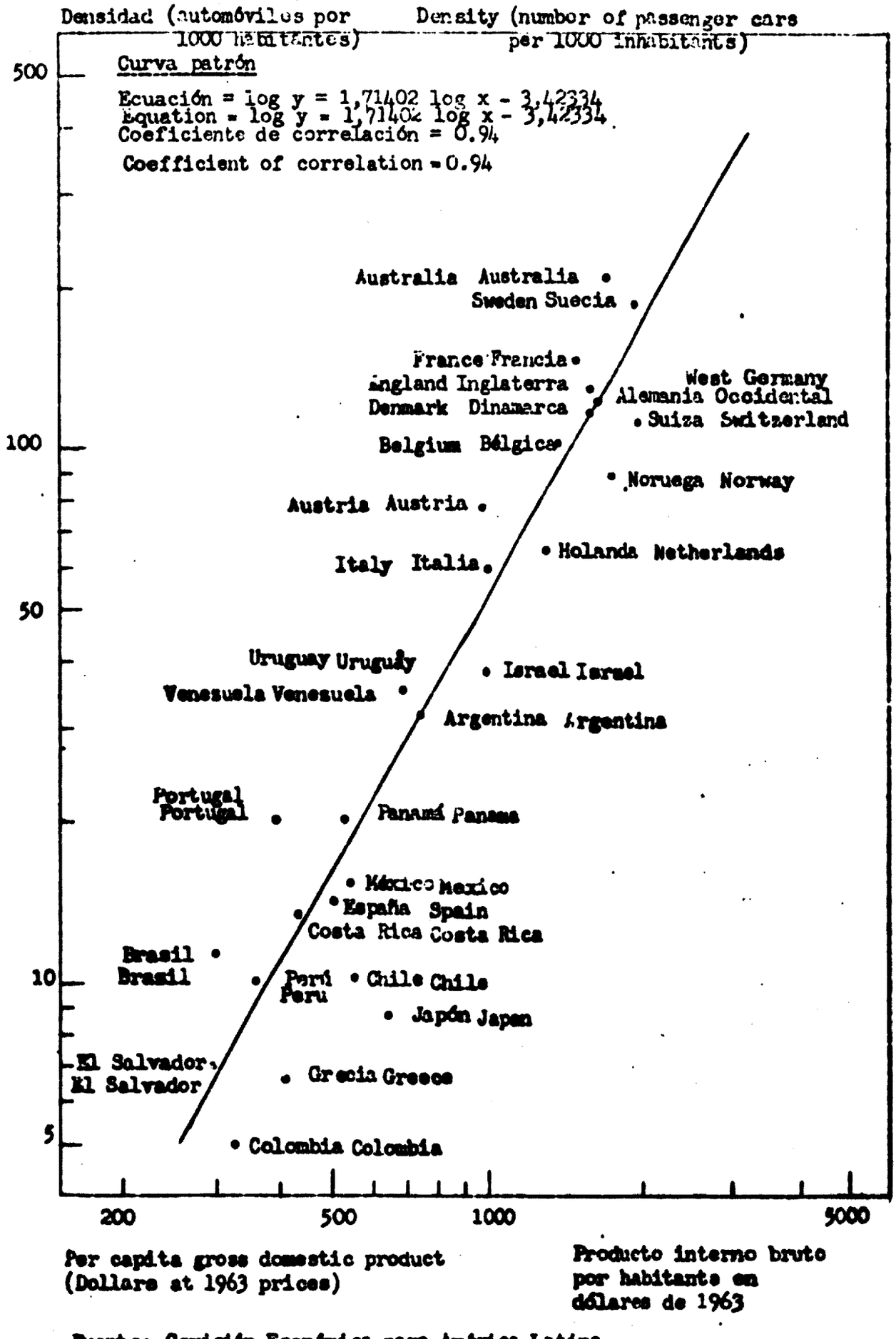


Gráfico I - Figure I



Fuente: Comisión Económica para América Latina.

Gráfico II
Figure II

BOLIVIA: PROYECCION DE LA DENSIDAD DE AUTOMOVILES
BOLIVIA: PROJECTED PASSENGER CAR DENSITY

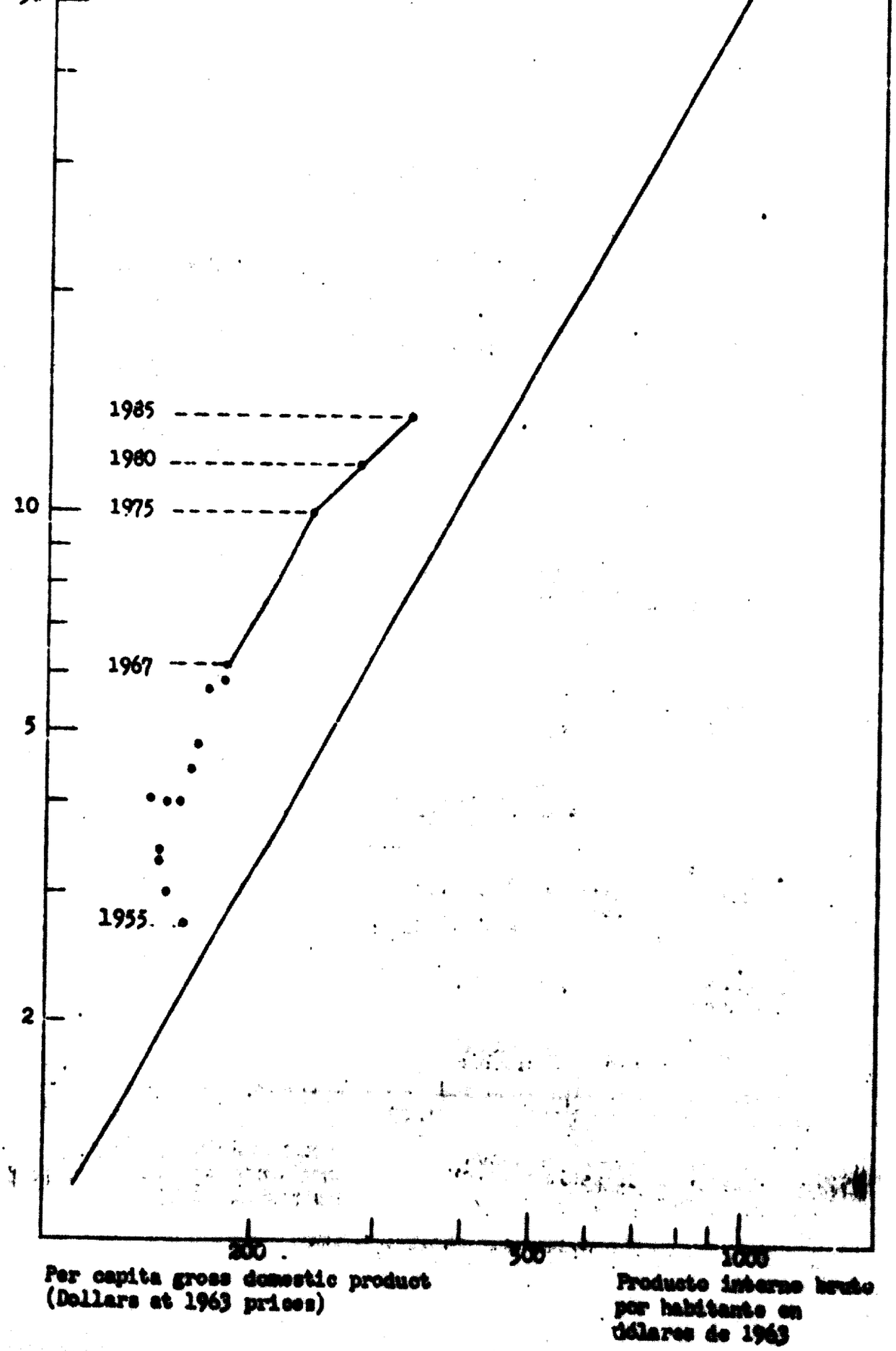


Gráfico III
Figure III

CENTROAMERICA: PROYECCION DE LA DENSIDAD DE AUTOMOVILES
CENTRAL AMERICA: PROJECTED PASSENGER CAR DENSITY

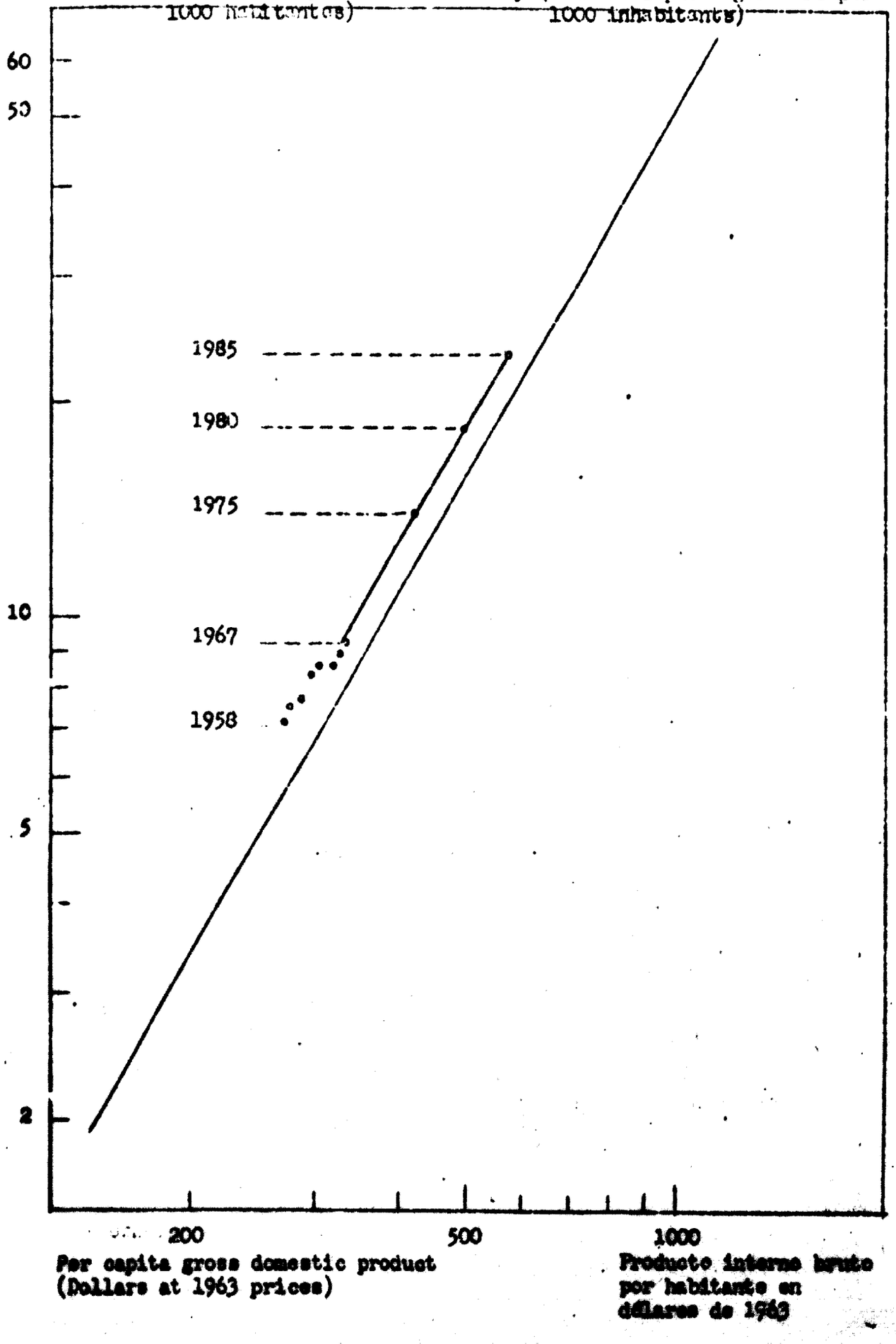


Gráfico IV
Figure IV

ECUADOR: PROYECCION DE LA DENSIDAD DE AUTOMOVILES
ECUADOR: PROJECTED PASSENGER CAR DENSITY

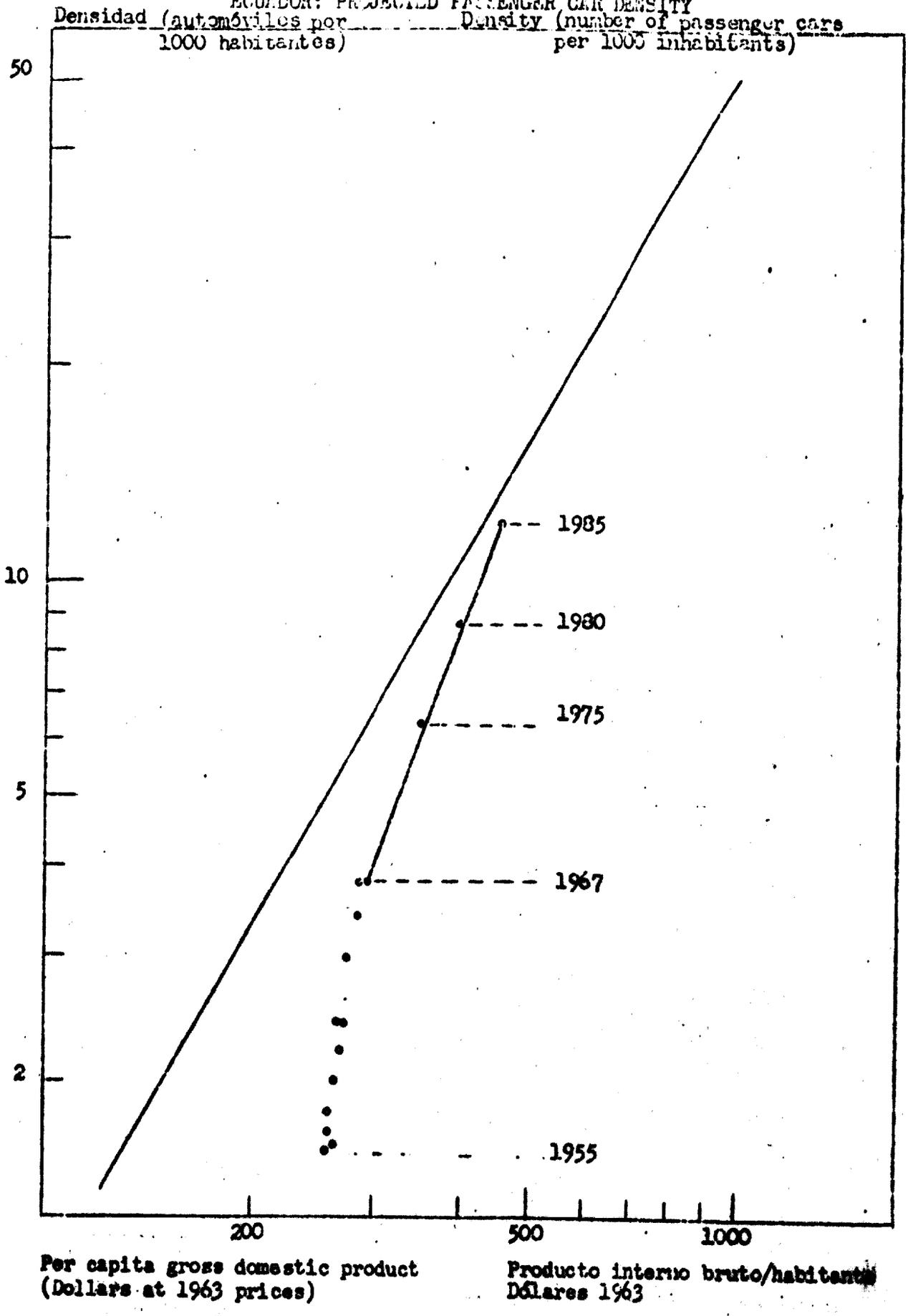


Gráfico V
Figure V

PARAGUAY: PROYECCION DE LA DENSIDAD DE AUTOMOVILES

PARAGUAY: PROJECTED PASSENGER CAR DENSITY

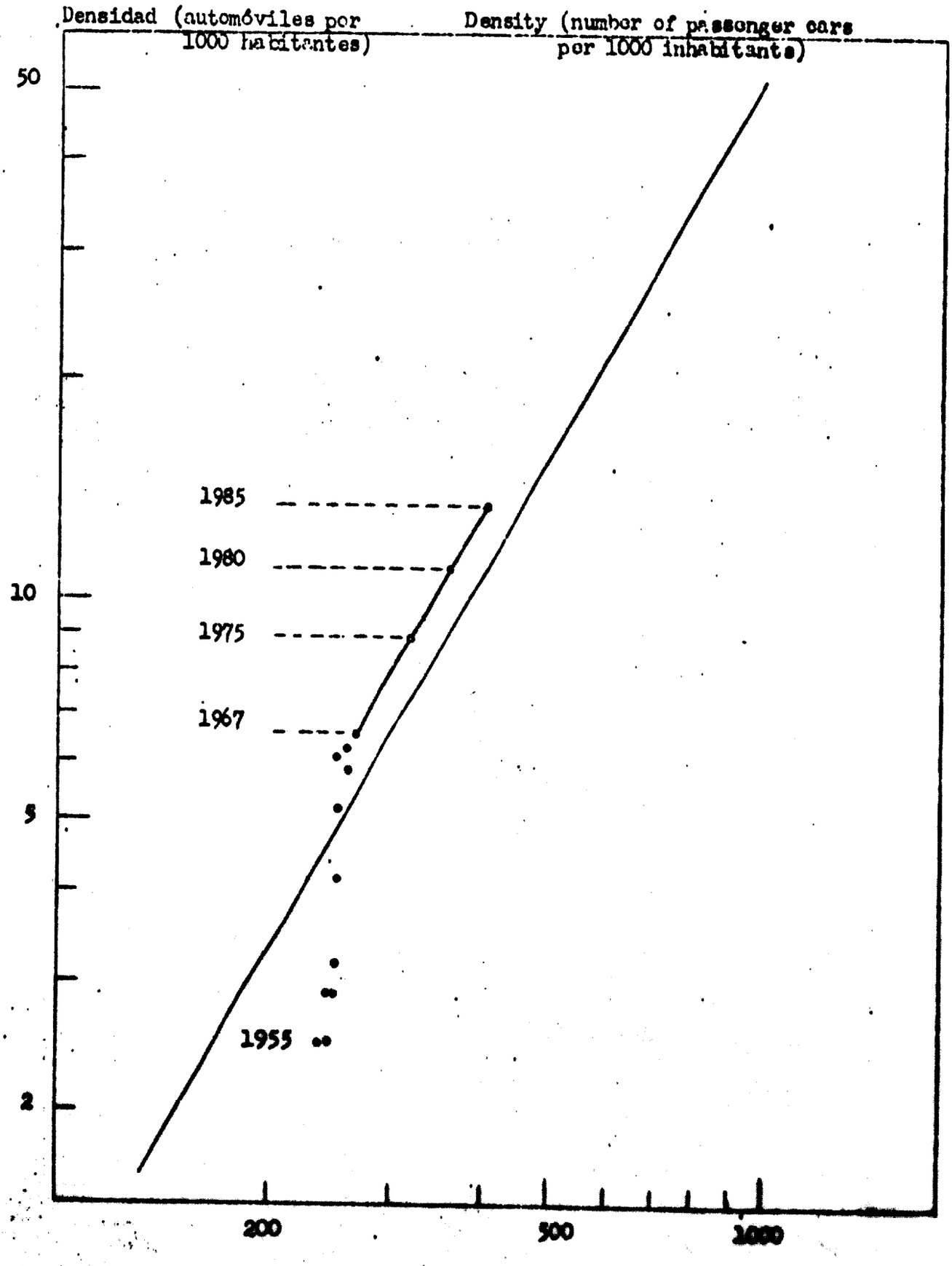


Figure VI
Gráfico VI

URUGUAY: PROJECTED PASSENGER CAR DENSITY
URUGUAY: PROYECCION DE LA DENSIDAD DE AUTOMOVILES

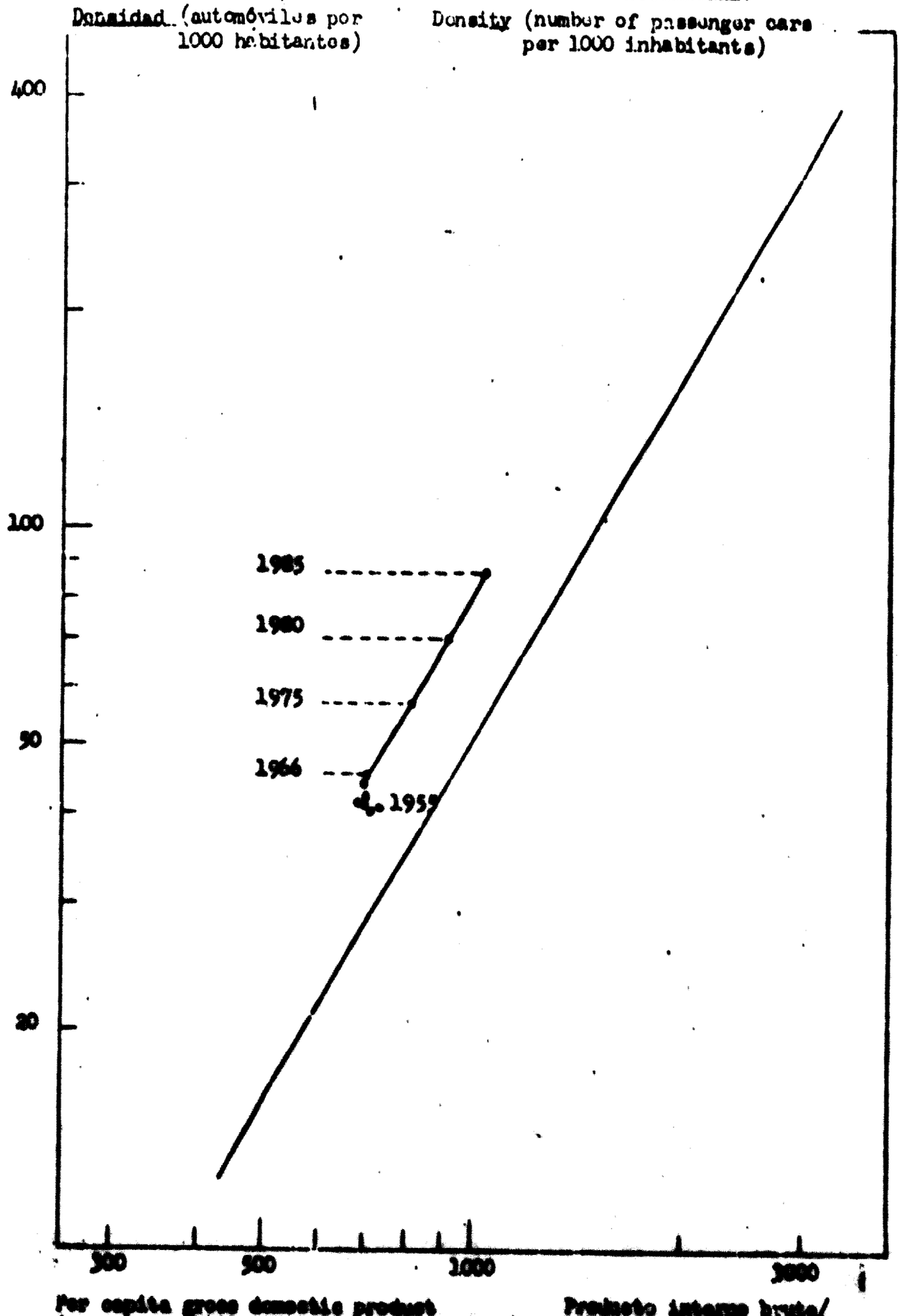


Gráfico VII
Figure VII

ARGENTINA: PROYECCION DE LA DEMANDA DE VEHICULOS COMERCIALES
ARGENTINA: PROJECTED DEMAND FOR COMMERCIAL VEHICLES

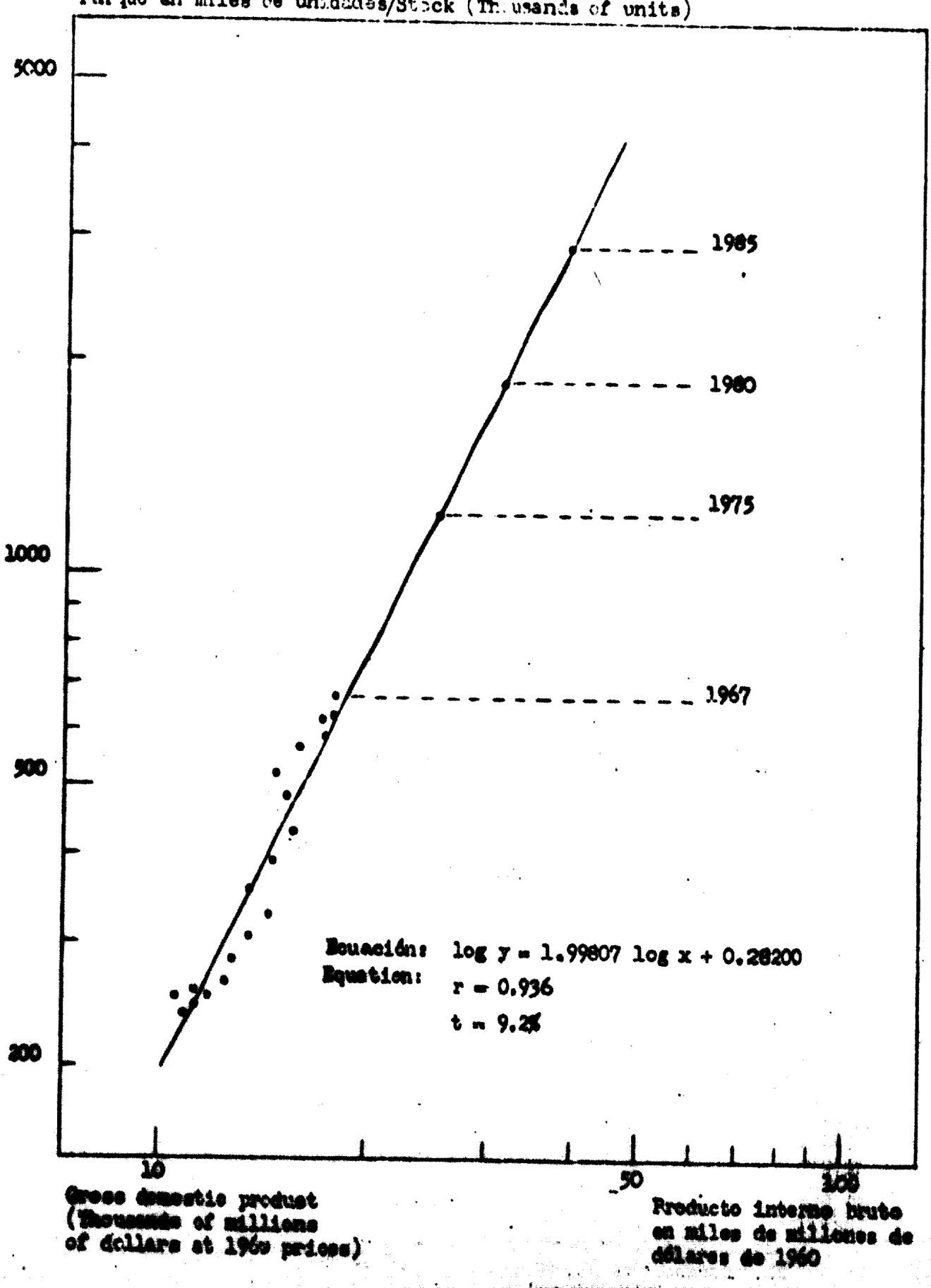


Gráfico VIII

Figure VIII

BRASIL: PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES

BRAZIL: PROJECTED STOCK OF COMMERCIAL VEHICLES

Parque en miles de unidades / (Thousands of units)

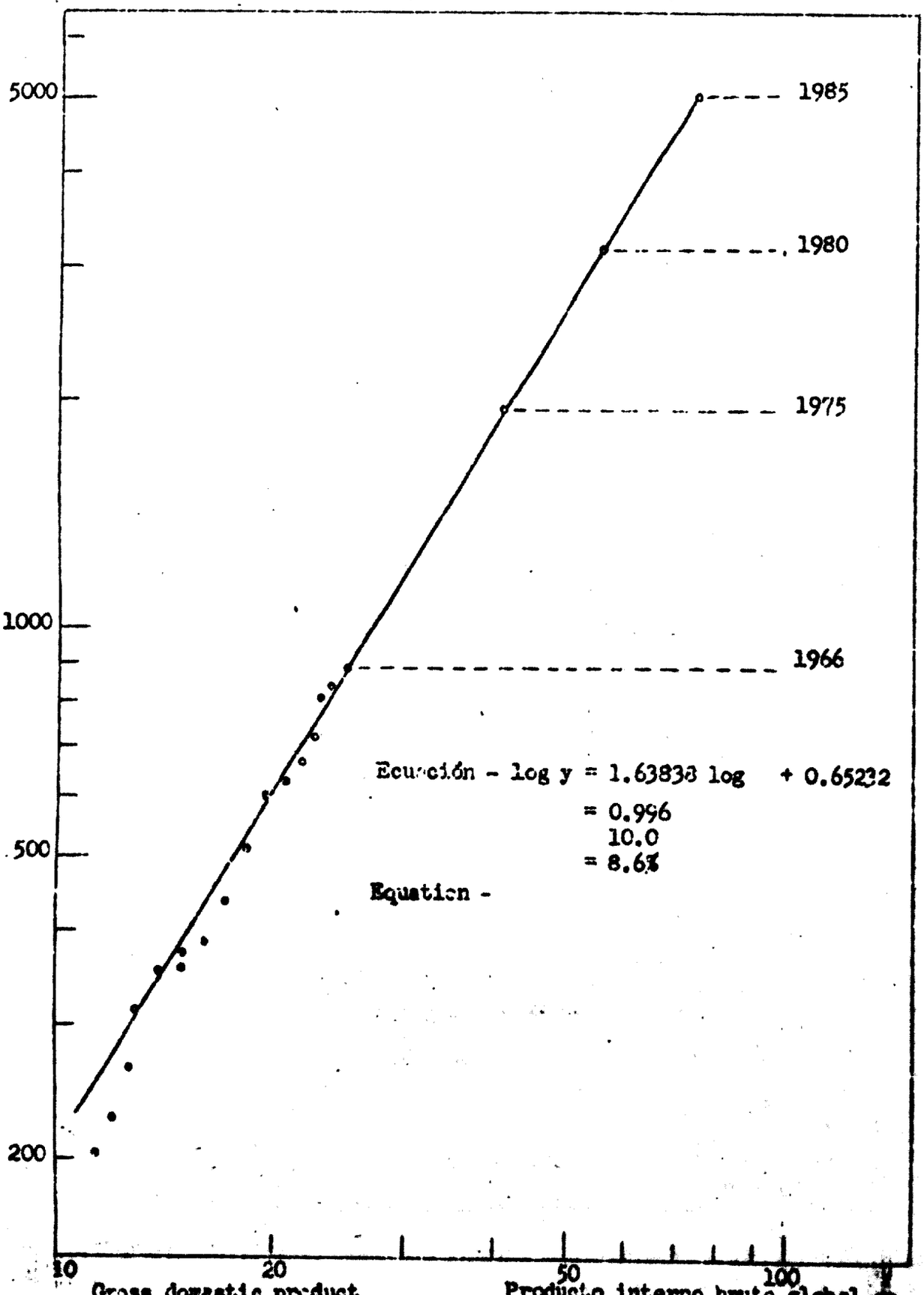


Gráfico IX
Figure IX

CENTROAMERICA: PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES
CENTRAL AMERICA: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

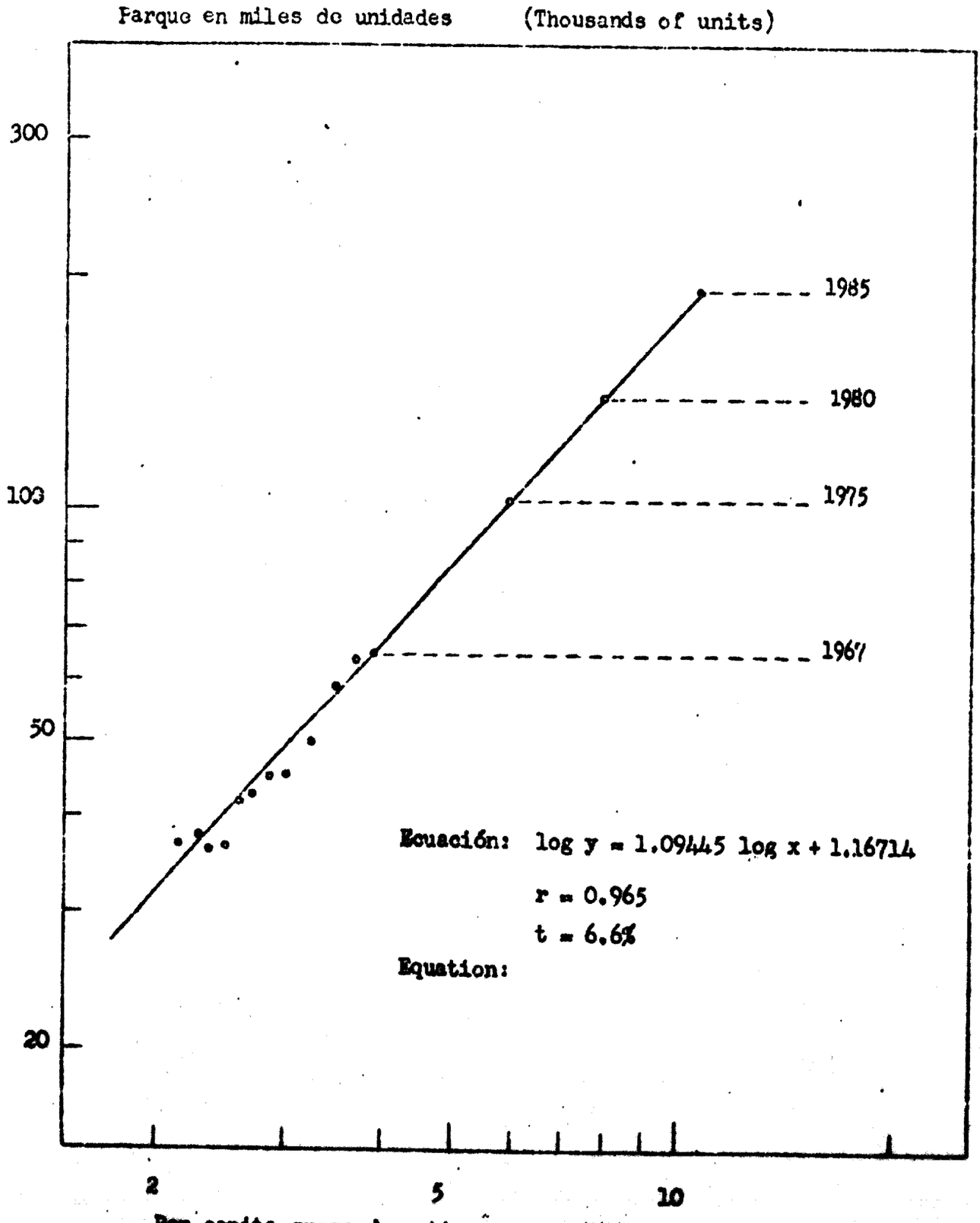


Gráfico X
Figure X
COLOMBIA: PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES
COLOMBIA: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

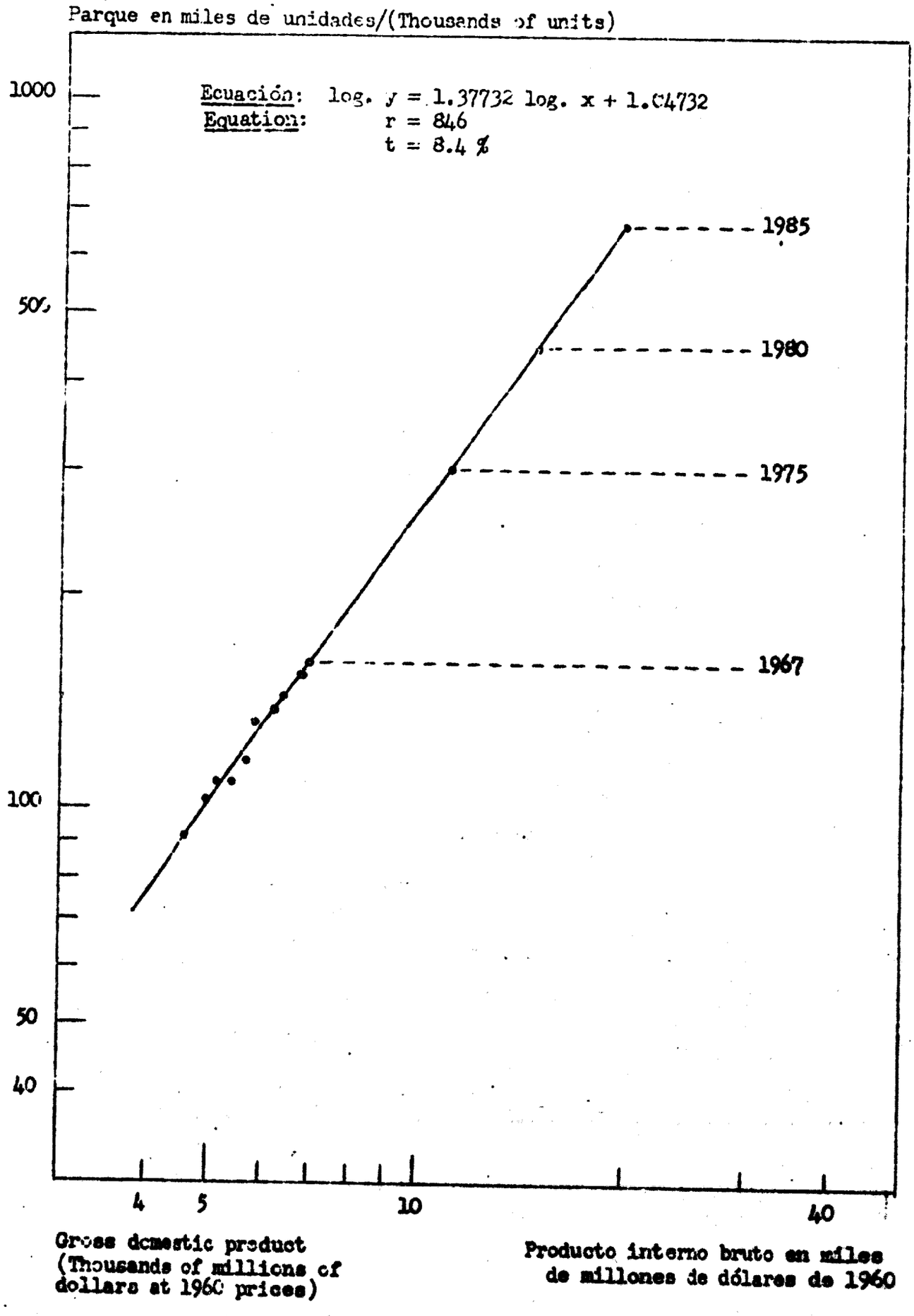


Gráfico XI

Figure XI

CHILE: PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES
CHILE: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

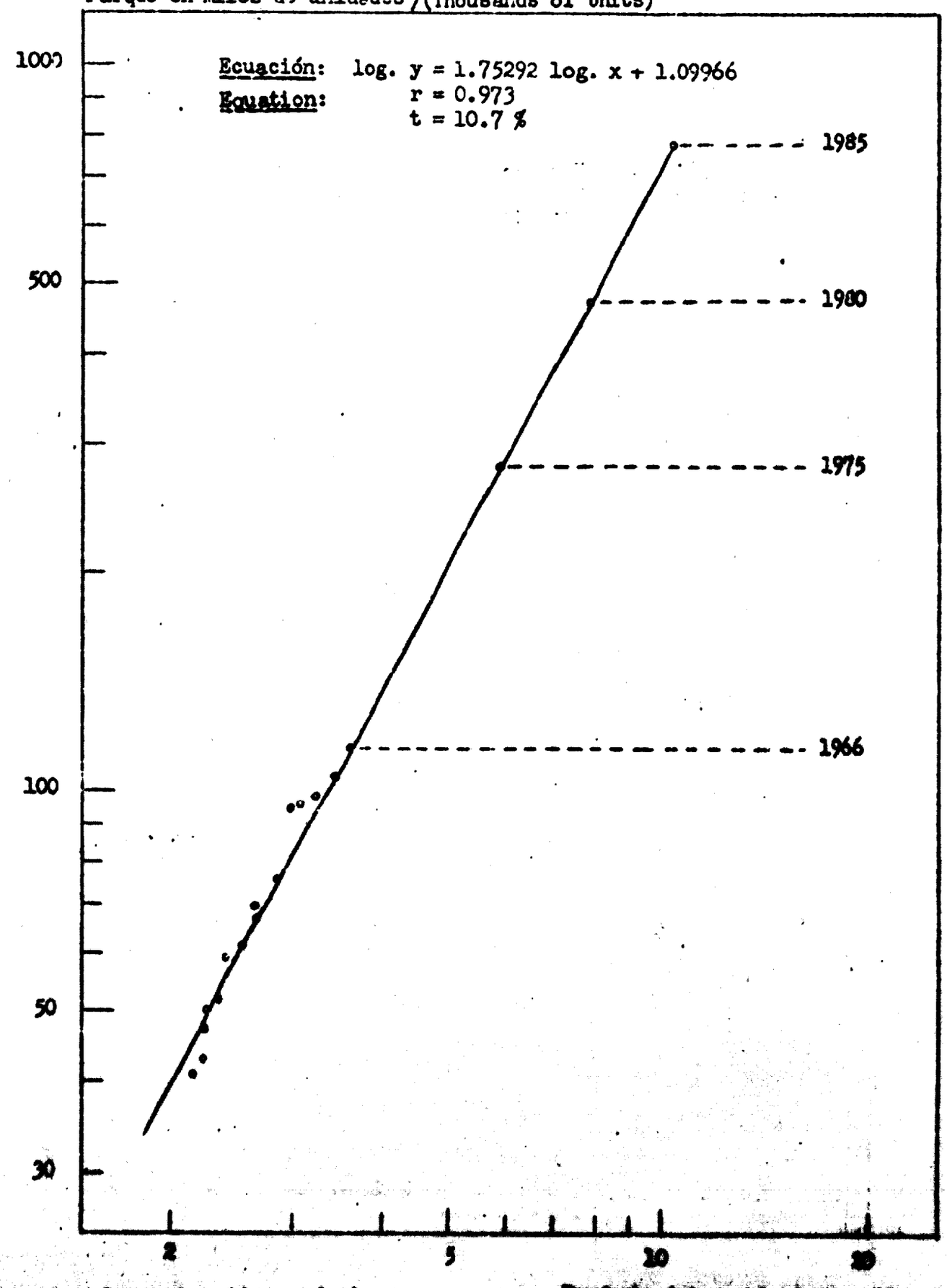


Gráfico XII

Figure XII

ECUADOR: PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES

ECUADOR: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

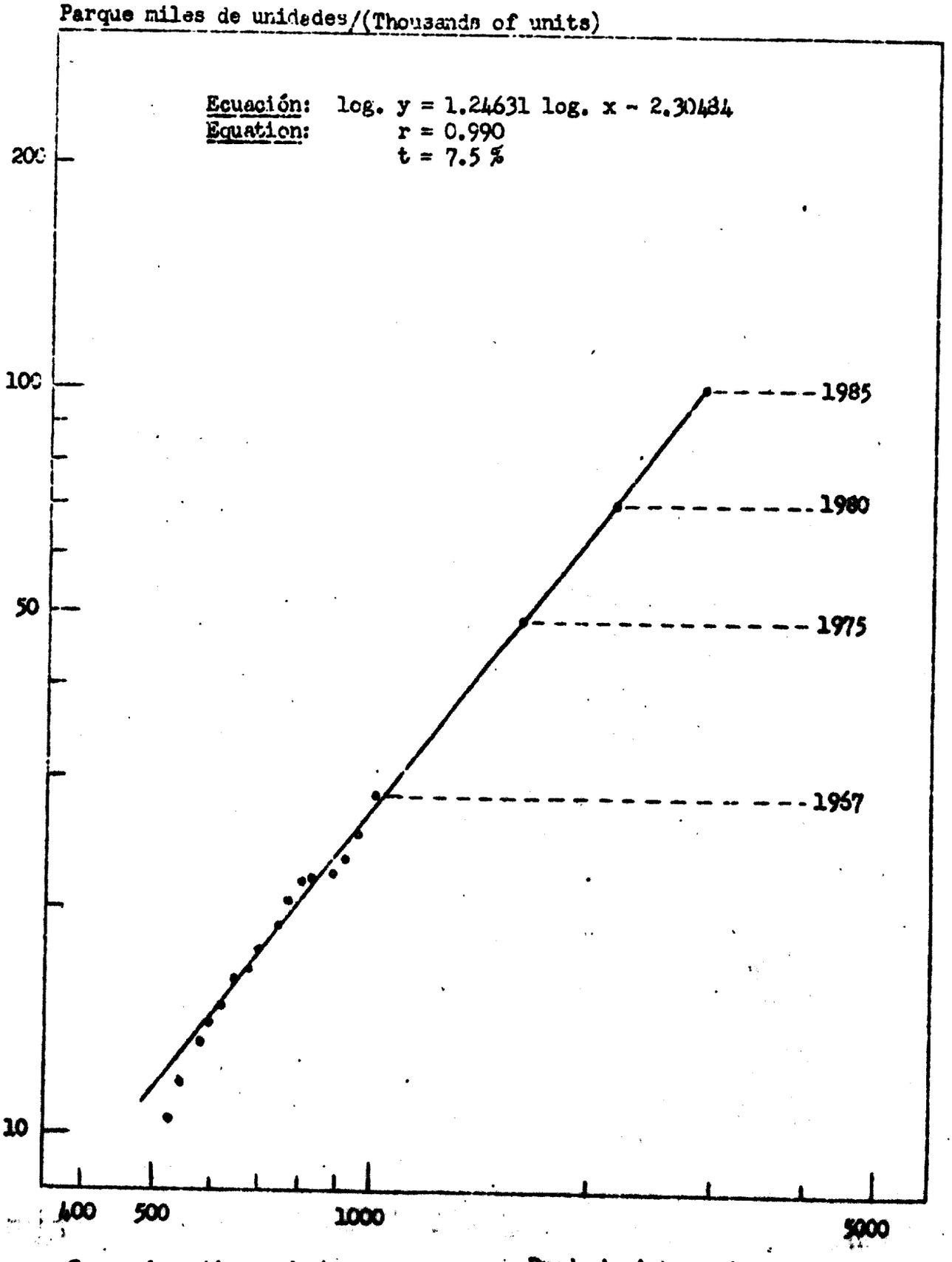


Gráfico XIII

Figure XIII

MEXICO: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

MEXICO: PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES

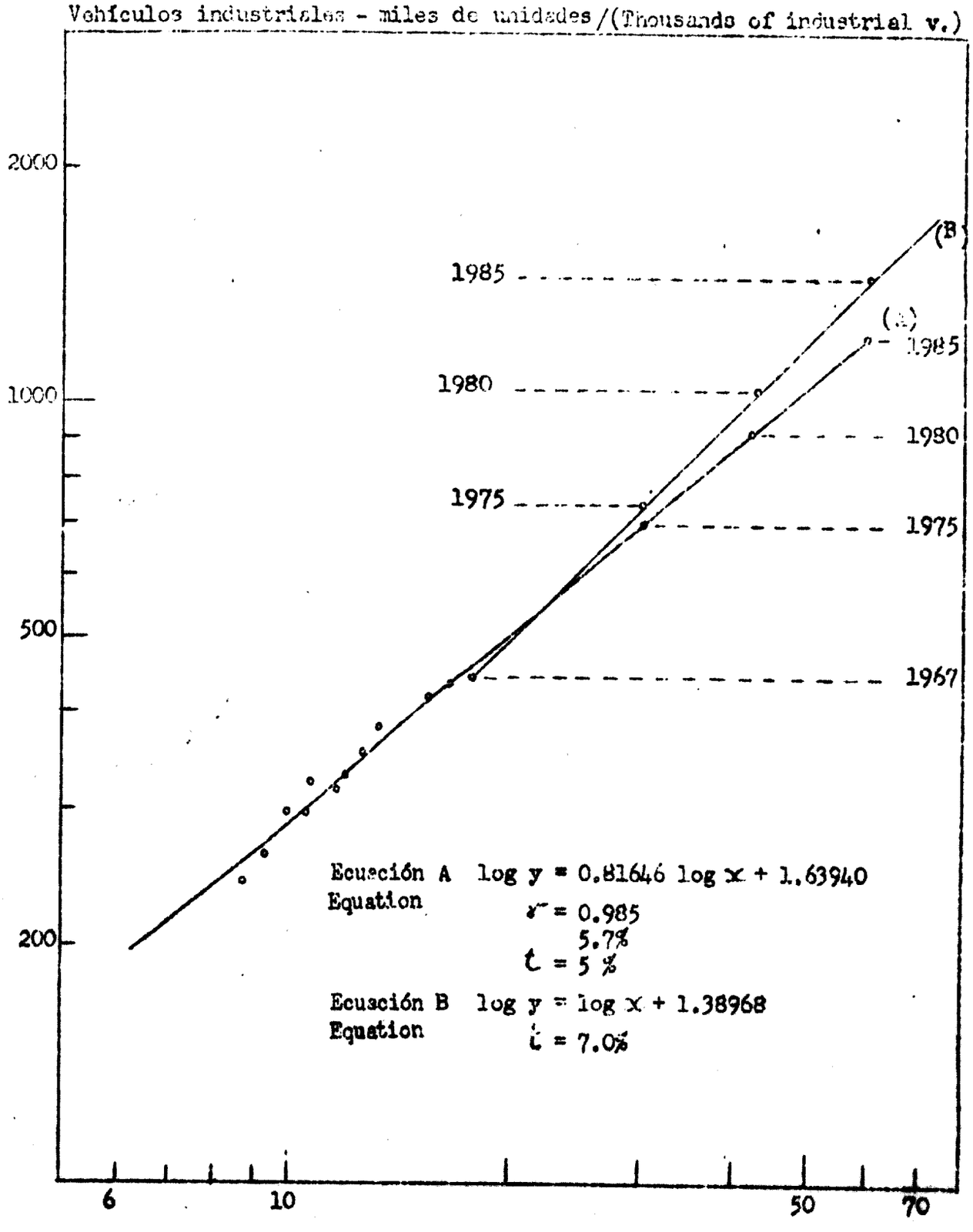


Gráfico XIV

Figure XIV

PARAGUAY: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

PARAGUAY : PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES

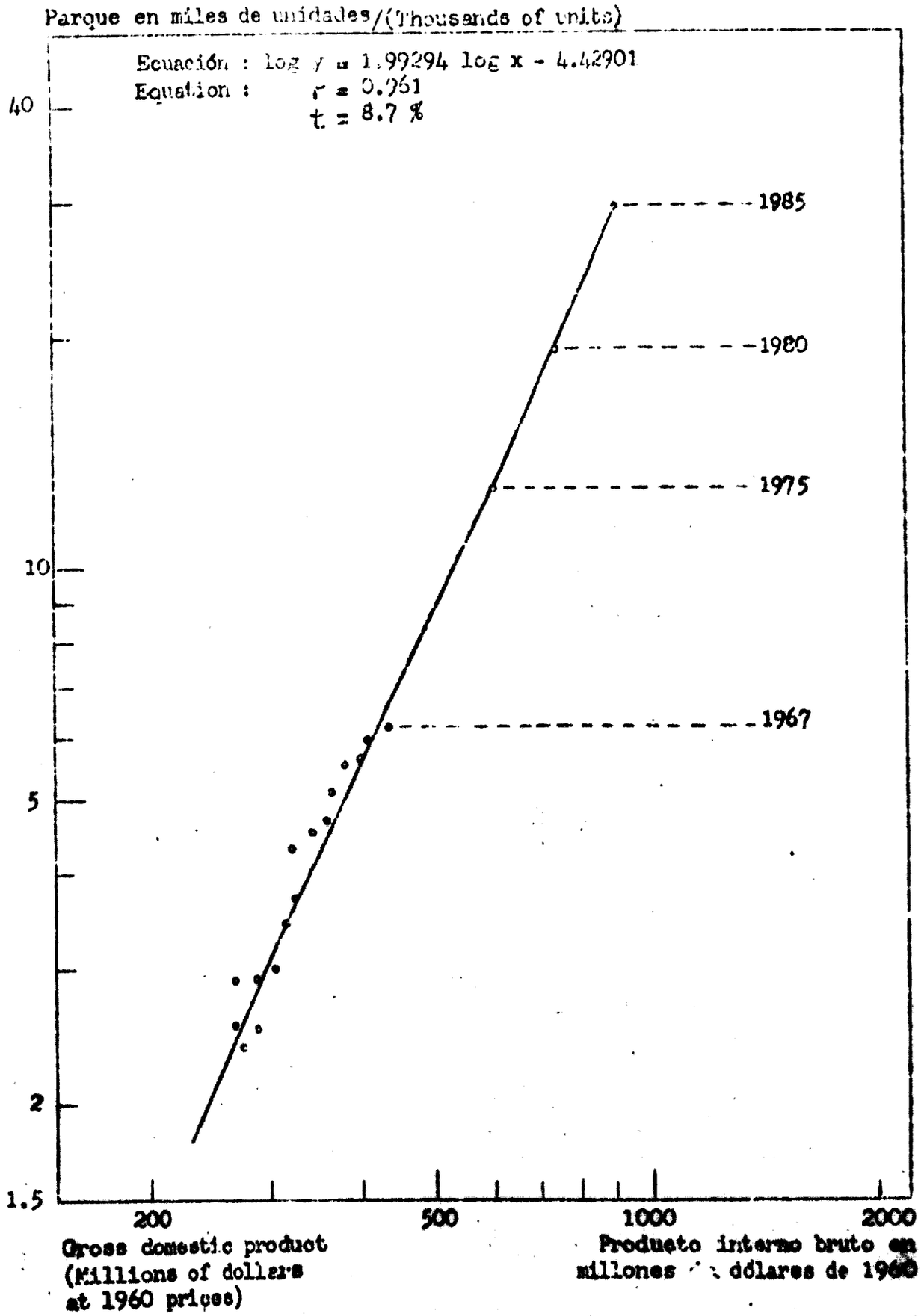


Gráfico XV
Figure XV

PERU: PROJECTED TOTAL STOCK OF COMMERCIAL VEHICLES

PERU : PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES

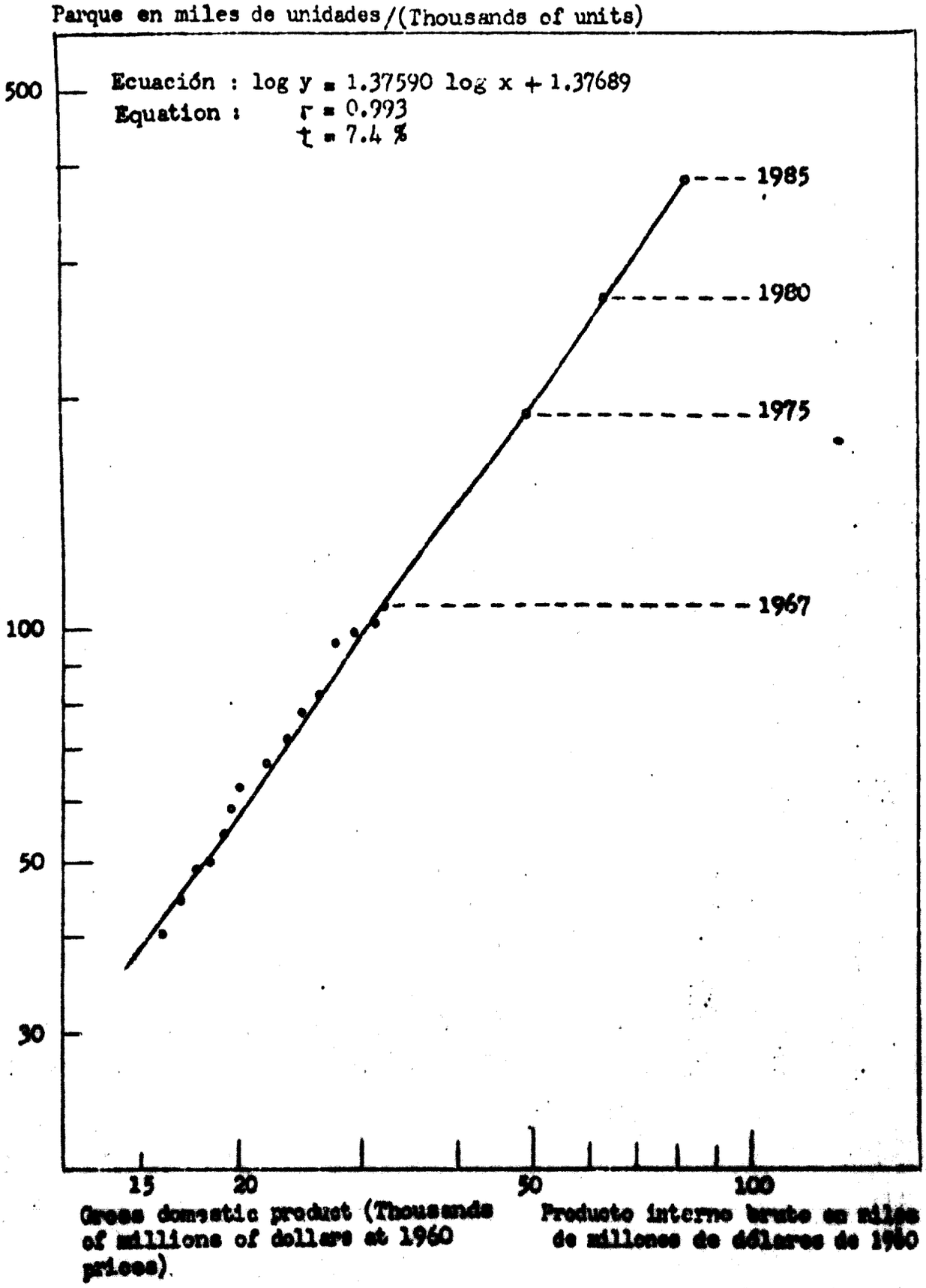


Gráfico XVI

Figure -XVI

URUGUAY : PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES
URUGUAY: PROJECTED STOCK OF COMMERCIAL VEHICLES

Parque en miles de unidades / Total stock (Thousands of units)

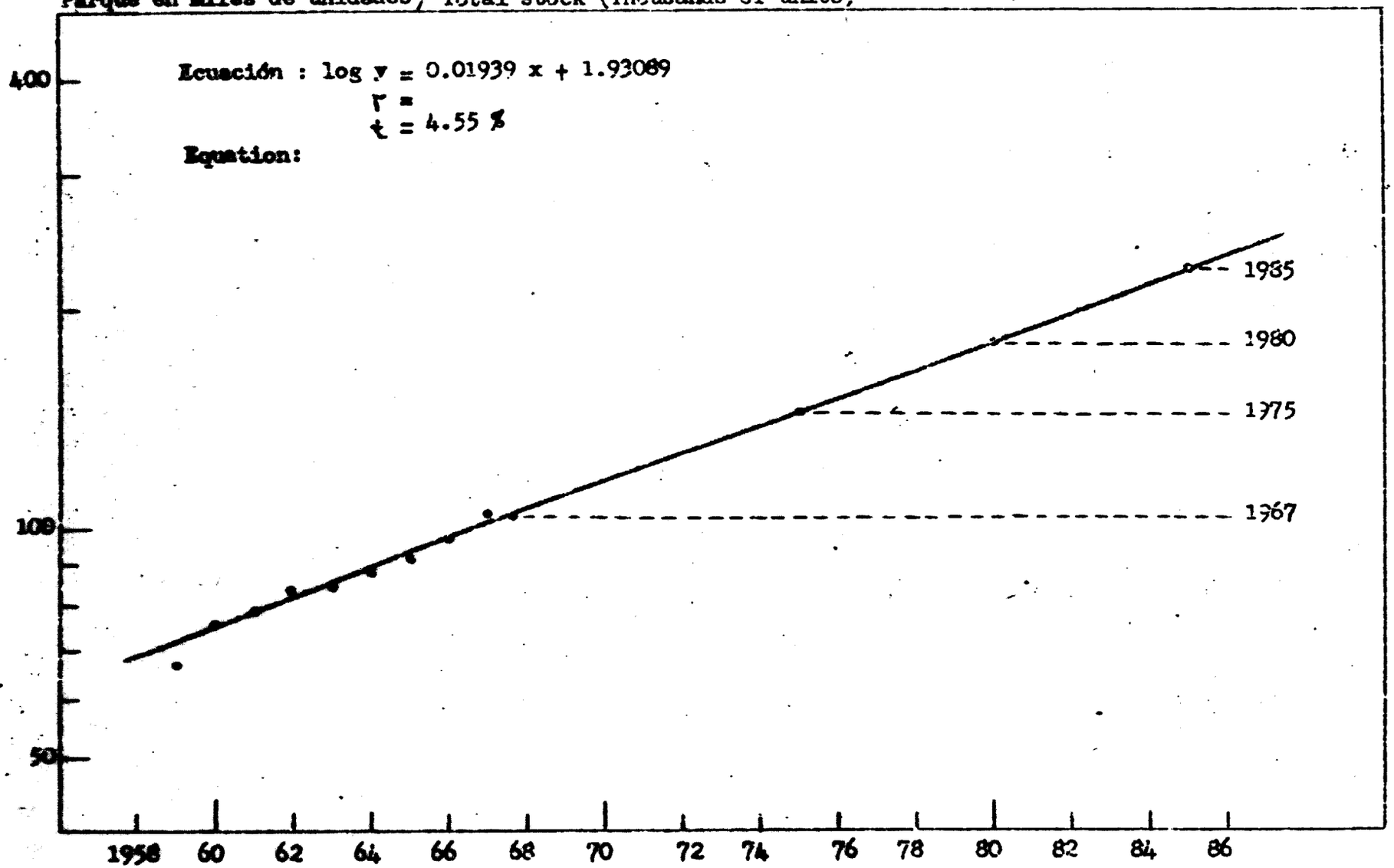
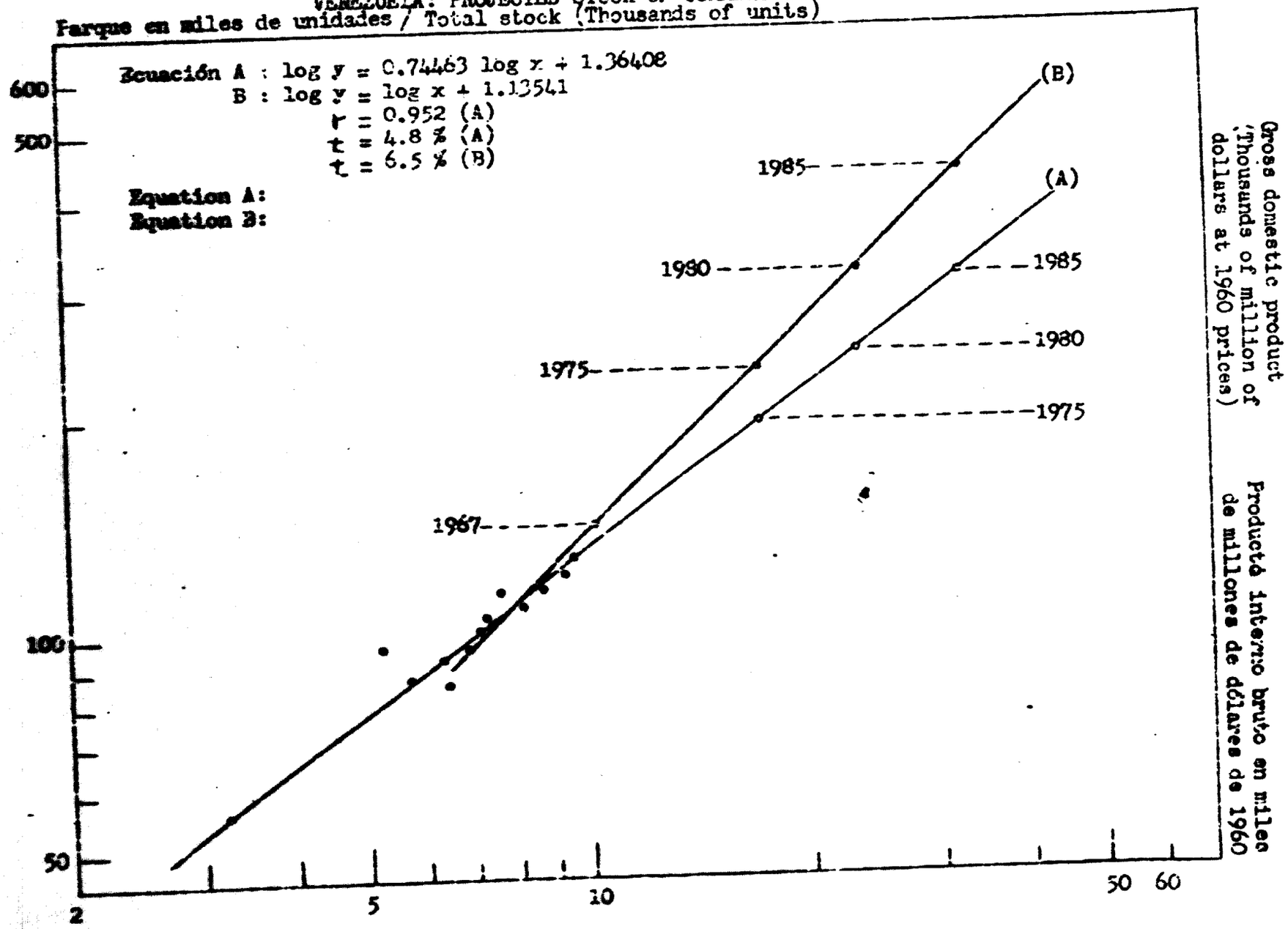


Gráfico XVII
Figure XVII

VENEZUELA : PROYECCION DEL PARQUE DE VEHICULOS COMERCIALES
VENEZUELA: PROJECTED STOCK OF COMMERCIAL VEHICLES



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