



Real price and affordability as challenges for effective tobacco control policies: an analysis for Argentina

Germán Rodríguez-Iglesias,¹ Martín González-Rozada,²
Beatriz Marcet Champagne,³ and Verónica Schoj¹

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ABSTRACT **Objective.** To describe the evolution of cigarettes' real price and affordability during the last decade in Argentina.

Methods. To analyze the real price of cigarettes, the weighted average monthly price of a pack of 20 cigarettes was divided by the consumer price index (CPI) from 2004 to 2014. The relative income price (RIP) was evaluated for the same period, defining RIP as the percentage of the income required to buy 100 packs of 20-per-pack cigarettes. The RIP was calculated for first-quartile, median, and third-quartile income groups. The lower the RIP, the higher the affordability.

Results. The nominal price of a pack of 20 cigarettes sold in Argentina increased from AR\$ 2.24 in March 2004 to AR\$ 14.36 in June 2014 (nominal price increase of about 19.7% per year). The real price fell from AR\$ 2.24 in March 2004 to AR\$ 2.11 in June 2014 (real price drop of about 0.6% per year). Between June 2004 and June 2014, the RIP decreased about 39% for the 3rd quartile income group (from 31.3% to 19.2%), about 42% for the median (from 55.7% to 32.0%), and about 50% for the 1st quartile (from 104.4% to 51.8%).

Conclusions. In Argentina, inflation and rising income were greater than growth in cigarette prices. Cigarette affordability increased for each income group, with the highest shifts occurring among the poorest and most vulnerable income earners. The increased affordability of cigarettes might reduce the impact of implemented tobacco control policies.

Key words Tobacco products; taxation of the tobacco-derived products; taxes; income; health public policy; economics; indicators; Argentina.

A growing number of published studies show that the overall demand for tobacco products is significantly reduced by increases in tobacco products prices (1–3). Increasing the tobacco excise tax, a central policy of the Framework Con-

vention on Tobacco Control (FCTC), is the most effective and cost-efficient single method for increasing price and reducing tobacco consumption (4, 5).

Argentina is the only country in South America and one of the few countries in the world that has not ratified the FCTC. While the country has successfully implemented various tobacco control policies—such as 100% smoke-free environments; a comprehensive ban on advertising, promotion, and sponsorship of tobacco products; and pictorial warn-

ing labels on packaging—development and implementation of a tobacco tax policy has yet to be addressed. Several reports have shown that the cigarettes in Argentina are some of the cheapest and most affordable in the world, despite a tax equal to 70% of the final price (6–8). In addition, the tobacco epidemic is especially alarming in Argentina, where 25.1% of the population 18 years old and older smokes (9, 10).

The World Health Organization emphasizes that tobacco tax policies must

¹ Fundación InterAmericana del Corazón-Argentina, Buenos Aires, Argentina. Send correspondence to: Germán Rodríguez-Iglesias, german.iglesias@ficargentina.org

² Universidad Torcuato Di Tella, Buenos Aires, Argentina.

³ InterAmerican Heart Foundation, Dallas, Texas, United States of America.

ensure a reduction in tobacco products' affordability to protect public health effectively (11). Other published studies have recognized affordability as equal to or more relevant than absolute tax rate on final price as a benchmark indicator for evaluating the effectiveness of tobacco tax policies (12, 13).

The objective of this research was to describe the evolution of cigarettes' real price and affordability in Argentina in the last decade. Affordability was evaluated for average cigarette prices, considering median, lowest- (first-) quartile, and highest- (third-) quartile income groups to establish purchasing power at different socioeconomic levels. This research describes the case of Argentina but may be generalized to other countries with growing economies where cigarette affordability also represents an obstacle to effective tobacco control tax policies.

MATERIALS AND METHODS

Sources and variables definition

Affordability. Cigarette affordability has been evaluated in several studies (7, 8, 12–16). Various affordability indicators are reported in the literature. The most commonly described methods are the Big Mac index of cigarette affordability (16, 17) (i.e., the number of cigarettes that one can buy for the price of one Big Mac hamburger); the “minutes of labor” indicator, which expresses the time in minutes a person has to work to buy a pack of cigarettes (18); and the relative income price (RIP) (13), which is calculated as the gross domestic product (GDP) per capita required to buy 100 packs of cigarettes.

Several studies have considered GDP per capita in building an RIP (12–14). Using GDP as an indicator of income allows for a simple computation of affordability values, facilitating comparison among different countries under study. However, for a longitudinal analysis of affordability within a particular country, survey-reported income is a better indicator of a population's purchasing power and has been used by other authors (18, 19). Kan (7) highlights the fact that average income is biased toward high earners. In countries where income inequality is observed, affordability should be analyzed by considering income quartiles instead of GDP per capita. In line with this observation,

Blecher & van Walbeek (20) estimated cigarette affordability using mean and median income data. Bandi et al. (19) also reported their affordability results using mean and median data, but added data for first-quartile income.

In this study, the RIP was defined as the percentage of income required to buy 100 packs of 20 cigarettes at an average price (i.e., the higher the RIP, the more difficult it is to buy cigarettes or the lower the affordability). The RIP was determined for median, first-quartile, and third-quartile income levels (the 50th percentile, second quartile, or median is the income level at which one-half of all individuals earn less and the other half of all individuals earn more; the 25th percentile, lowest quartile, or first quartile is the income level at which one-quarter of all individuals earn less; and the 75th percentile, highest quartile, or third quartile is the income level at which one-quarter of all individuals earn more).

Prices and income data sources. Cigarettes' real price was computed for the period March 2004 to June 2014, using the after-tax monthly weighted average price (WAP) for a pack of 20 cigarettes reported by the National Ministry of Agriculture (MINAGRI) (21). Price data were weighted based on brand market share in Argentina. As most smokers in Argentina consume premium brands, the WAP is biased toward higher prices.

To define real prices, the WAP was divided by a consumer price index (CPI). The selected CPI was computed by the National Statistics Agency (*Instituto Nacional de Estadística y Censos*, INDEC) for the period March 2004 (real price base for March 2004 = 100) to December 2006 and linked with the estimated monthly inflation rate computed by independent private consultants from January 2007 onward. The justification for using estimates from independent private consultants from January 2007 onward is that, starting that month, the INDEC had been manipulating prices, resulting in official inflation estimates that were half as high as the ones produced by independent economists. Regulatory authorities intervened in the INDEC, and the International Monetary Fund censured Argentina, threatening it with expulsion for manipulating official statistics (22). As a result of the crisis within INDEC, the National Congress compiled alternative inflation estimates using analyses

from independent private consultants and published them monthly as an alternative to the biased official figures. From January 2007 onward, the alternative inflation estimates published by the Argentine National Congress (“Congress”) became the legitimate indicator used by political decision-makers, in scientific studies, and even in drawing up agreements for various industries' collective bargaining that were automatically applied to all workers in the industry (23, 24). Therefore, all analyses in this study conducted after 7 January 2007 used the alternative CPI published by Congress (25).

Income was defined as estimated population income based on data from the quarterly Permanent Household Survey (*Encuesta Permanente de Hogares*, EPH) (26). The information reported here covers the first quarter of 2004 (January–March) through the second quarter of 2014 (April–June). The EPH survey is the main household survey in Argentina carried out by the INDEC. It covers all 31 urban areas with more than 100 000 inhabitants, which comprise 71% of Argentina's urban population.

The EPH sample is representative of about 62% of the total population of the country and the survey instrument gathers information on individual socio-demographic characteristics, employment status, hours of work per week, wages, income, type of job, education, and migration status.

RESULTS

Income evolution

In Argentina, during the last decade, there was a nominal and real increase in per capita monthly income (mean, median, and first- and third-quartile). Table 1 shows EPH data for the first quarter of 2004 through the second quarter of 2014 to show the evolution of mean, median, and first- and third-quartile income in Argentina. Table 1 also shows the quarterly exchange rate expressed in Argentine pesos (AR\$) per US\$ (27).

Between the first quarter of 2004 and the second quarter of 2014, the mean income in nominal terms increased eight times (706.50%, from AR\$ 669.17 to AR\$ 5 397.05) and the mean real income increased 1.2 times (20.49%, from AR\$ 466.06 to AR\$ 561.07). In the same period, nominal median income rose

TABLE 1. Mean, median, and first- and third-quartile monthly income in nominal and real terms (in AR\$) and the pesos-to-dollar quarterly exchange rate, Argentina, 2004–2014

Year	Quarter	Mean monthly income		First-quartile monthly income		Median monthly income		Third-quartile monthly income		Exchange rate per US\$ 1
		Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	
2004	1	669.17	466.06	240	167.15	450	313.41	800	557.18	2.92
	2	642.70	438.96	240	163.92	450	307.34	800	546.39	2.92
	3	713.80	480.19	250	168.18	500	336.36	900	605.45	3.02
	4	689.21	458.09	288	191.42	500	332.33	800	531.73	2.97
2005	1	777.15	500.40	300	193.17	550	354.14	940	605.25	2.93
	2	739.56	464.31	300	188.35	500	313.91	900	565.04	2.89
	3	867.99	531.59	300	183.73	600	367.46	1 000	612.43	2.89
	4	829.41	493.62	350	208.30	600	357.09	1 000	595.14	3.00
2006	1	953.34	550.24	380	219.32	700	404.02	1 200	692.60	3.07
	2	919.10	518.05	390	219.83	700	394.56	1 100	620.02	3.07
	3	1 064.53	589.53	400	221.52	800	443.03	1 340	742.08	3.09
	4	1 048.98	566.95	420	227.00	800	432.39	1 200	648.58	3.07
2007	1	1 170.93	611.49	470	245.45	800	417.78	1 500	783.34	3.10
	2	1 120.50	552.44	500	246.52	800	394.42	1 400	690.24	3.09
	3	— ^a	—	—	—	—	—	—	—	3.14
	4	1 304.68	566.97	520	225.98	1 000	434.57	1 550	673.58	3.15
2008	1	1 467.94	601.12	600	245.70	1 000	409.50	1 800	737.10	3.16
	2	1 439.04	552.47	600	230.35	1 050	403.11	1 800	691.05	3.10
	3	1 659.77	601.46	650	235.54	1 200	434.85	2 000	724.75	3.07
	4	1 599.02	559.49	650	227.43	1 200	419.88	2 000	699.79	3.40
2009	1	1 794.26	606.54	700	236.63	1 300	439.46	2 300	777.50	3.59
	2	1 726.05	566.53	700	229.75	1 300	426.69	2 000	656.44	3.75
	3	1 920.80	611.28	750	238.68	1 500	477.37	2 500	795.61	3.84
	4	1 852.45	568.23	780	239.26	1 450	444.78	2 400	736.19	3.81
2010	1	2 099.15	602.75	833	239.19	1 560	447.94	2 644	759.20	3.86
	2	2 032.08	551.57	800	217.15	1 500	407.15	2 540	689.44	3.92
	3	2 343.52	606.33	900	232.85	1 800	465.71	3 000	776.18	3.95
	4	2 328.56	571.84	1 000	245.58	1 800	442.04	3 000	736.73	3.97
2011	1	2 659.33	620.64	1 100	256.72	2 000	466.77	3 400	793.51	4.03
	2	2 660.13	588.70	1 195	264.46	2 000	442.61	3 500	774.56	4.09
	3	3 092.07	655.24	1 200	254.29	2 300	487.39	4 000	847.64	4.18
	4	3 022.21	607.96	1 350	271.57	2 400	482.79	4 000	804.66	4.27
2012	1	3 447.33	655.35	1 500	285.16	2 650	503.78	4 500	855.47	4.36
	2	3 314.56	593.99	1 500	268.81	2 600	465.94	4 000	716.83	4.47
	3	3 832.38	651.40	1 600	271.96	3 000	509.92	5 000	849.87	4.64
	4	3 685.57	592.35	1 800	289.30	3 000	482.16	5 000	803.60	4.82
2013	1	4 277.60	648.44	1 900	288.02	3 300	500.25	5 500	833.74	5.06
	2	4 137.32	598.89	2 000	289.51	3 200	463.21	5 200	752.72	5.29
	3	4 905.46	666.03	2 100	285.13	3 900	529.52	6 000	814.64	5.65
	4	4 758.22	603.75	2 300	291.84	4 000	507.54	6 000	761.32	6.20
2014	1	5 501.13	622.68	2 500	282.98	4 200	475.40	7 000	792.33	7.97
	2	5 397.05	561.07	2 600	270.29	4 200	436.63	7 000	727.71	8.08

Source: Authors' calculations using national data (25, 27).

^a Data from Argentina's Permanent Household Survey (*Encuesta Permanente de Hogares*, EPH) were not available for the third quarter of 2007.

about 833% and real median income increased 39.31%. First-quartile nominal income increased about 983% and third-quartile nominal income increased about 775% (61.70% and 30.61% in real terms respectively). The official exchange rate increased from US\$ 1 = AR\$ 2.92 in the first quarter of 2004 to US\$ 1 = AR\$ 8.08 in the second quarter of 2014, corresponding to an increase in US\$ nominal mean income from US\$ 229.30 to US\$ 668.00 and in increase in US\$

median income from US\$ 154.20 to US\$ 520.03 for the same period.

Cigarette price evolution

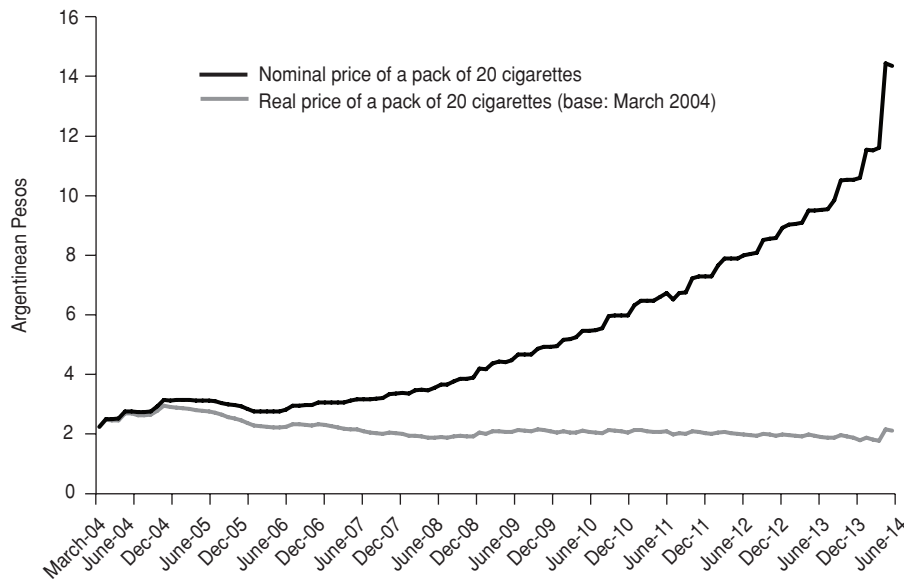
The weighted average nominal price of a 20-cigarette pack sold in Argentina increased from AR\$ 2.24 in March 2004 to AR\$ 14.36 in June 2014, corresponding to an annual increase of about 19.7%. However, adjusted for inflation, the real weighted average

price fell AR\$ 0.13 during that period, from AR\$ 2.24 to AR\$ 2.11. The real price of a pack of cigarettes fell about 0.6% per year between March 2004 and June 2014. Figure 1 shows the evolution of both nominal and real cigarette prices.

Affordability trend

The trend in the RIP indicates growing affordability of cigarettes. Between

FIGURE 1. Evolution of the weighted average nominal and real price of a pack of 20 cigarettes, Argentina, 2004–2014^a

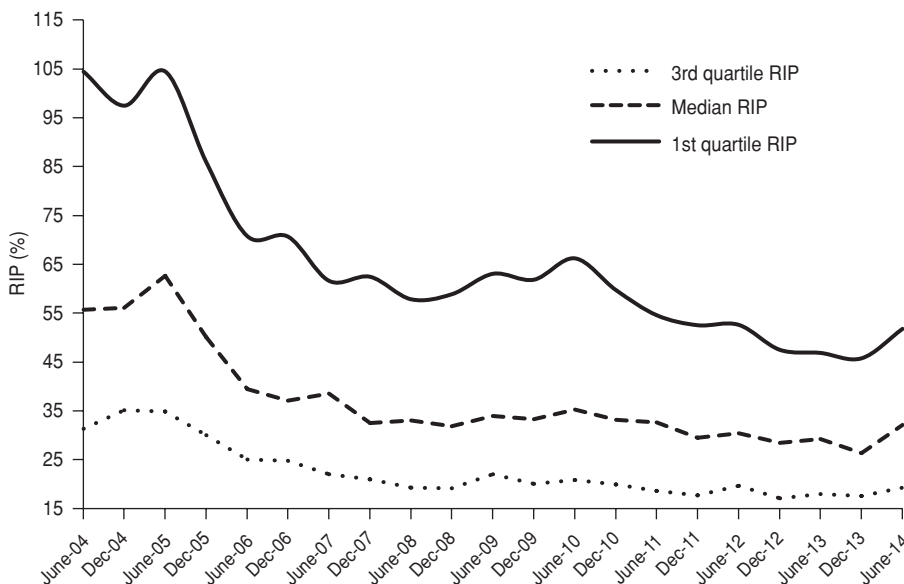


Source: Authors' calculations using national data (21, 25).
^a Real price base for March 2004 = 100.

June 2004 and June 2014, the RIP decreased about 39% for third-quartile income (from 31.33% to 19.23%), about 42% for median income (from 55.70% to 32.06%), and about 50% for first-quartile income (from 104.44% to 51.78%). Figure 2 shows the evolution of the RIP for one pack of cigarettes, by income group.

For the period under analysis, cigarettes became 7.78 times more expensive, while first-quartile income in nominal terms increased 10.83 times, median income increased 9.33 times, and third-quartile income increased 8.75 times. The increase in the cigarette prices did not offset the increase in the income for each income group.

FIGURE 2. Evolution of affordability of cigarettes by income quartile (first, median, and third): relative income price (RIP), Argentina, 2004–2014



Source: Authors' calculations using national data (21, 26).

In June 2004, smokers with first-quartile income could buy 96 packs of cigarettes. In June 2014, the number of packs that could be purchased with this level of income increased to 193 (about 102% more).

In June 2004, smokers with median income could buy 180 packs of cigarettes. In June 2014, the number of packs that could be purchased with this level of income increased to 312 (about 74% more).

In June 2004, smokers with third-quartile income could buy 319 packs of cigarettes. In June 2014, the number of packs that could be purchased with this level of income increased to 520 (about 63% more).

DISCUSSION

Cigarettes in Argentina are normal goods (positive income elasticity of demand = 0.4), which means that as real income increases, tobacco consumption also increases (28, 29). For a consumption reduction policy to be successful, cigarettes must be less affordable.

Argentina is a middle-income country that experienced growth in its economy after a deep economic crisis in 2001. This growth has led to an increase in population income. At the same time, during the last decade, Argentina has experienced an inflationary period. This research describes the evolution of cigarettes' real price and affordability in the last decade in Argentina. During this period, cigarette nominal prices increased at an average annual rate of about 19.7%, whereas the real price decreased. In Argentina, nominal price increases are set by agreement between the Ministry of Finance and the tobacco industry to reach particular tax collection objectives. However, neither tax nor price increases have ever been programmed based on a public health objective. This situation has given latitude to the tobacco industry to maintain its market even within a framework of increased tobacco control regulation. Several effective tobacco control policies have been implemented in Argentina in the last year, generating a slow but sustained drop in smoking prevalence (10). Yet per capita consumption has remained stable at 70 packs/year in the population more than 15 years old from 2000 to date (30). The progressive increase in affordability seems to be the main cause, which may explain the stability of per capita

consumption despite the progress in tobacco control measurements. Growing affordability could be neutralizing or at least undermining the potential impact of the tobacco control policies already implemented in Argentina.

This research shows the progressive increase of affordability in the last decade in Argentina, similar to that seen in other similar middle-income countries (13, 14, 31).

Affordability increased significantly in all income quartiles, but the highest rise was observed in the first quartile, which means that purchasing power grew more among the poorest sectors. This situation constitutes a significant public health problem because it increases social inequities, generating greater tobacco consumption among the most vulnerable sectors in the population. As it is precisely these sectors that are most harmed by the tobacco epidemic, this perpetuates a cycle of poverty and disease and creates additional obstacles to social and economic development (32).

Growing economies and inflation contexts represent a challenge for tobacco control tax policies. It is crucial that policy-makers review the potential effects of rising incomes and prices with a focus on reducing affordability, and increasing the effectiveness of tobacco tax policies.

Argentina is a paradigmatic case where cigarette consumption tax as a share of the price by itself is not a good indicator of tax policies' effectiveness in reducing the tobacco epidemic. While consumption taxes represent about 70%

of the final price, affordability is high and growing and the prices are among the lowest in the world (6, 33). A tax as a percentage of price benchmark is not enough to evaluate the success of a tobacco control tax policy. An alternative index must be considered to evaluate the effectiveness of tobacco tax policies, focusing on the affordability of cigarettes and how excise taxes reduce it (19). The methodology described in this report may be generalized to other countries with growing economies, including those in Latin America and the Caribbean, where cigarette affordability represents a challenge for implementing effective tobacco control tax policies.

It is important to design tax policies that consider not only the tax burden on the total price of tobacco products, but also the progressive growth of the real price of cigarettes over the income growth, to effectively reduce affordability in the long term.

The methodology presented here can be applied in other regions and may be useful for determining suitable real price and affordability indicators that could be easily adapted to other developing country contexts to provide a means of assessing tobacco control policies.

Limitations

This study had some limitations. First, the analysis only considered price and income aggregate data, which allowed for evaluation of general indicators but precluded analysis of the particularities of certain groups by gender, education, or geographic area—variables that could

be relevant defining cigarette affordability. Second, the evolution of Argentine income was computed by quartile using the EPH, Argentina's Permanent Household Survey. The EPH does not include information on rural populations and only considers monetary earnings (i.e., it excludes other factors that might be better indicators of income). Finally, MINAGRI, the study's source for the WAP for one cigarette pack, provides cigarette data only; it does not contain information on any other tobacco products.

Conclusions

In Argentina, inflation and rising income were greater than growth in cigarette prices. Cigarette affordability increased for each income group, with the highest shifts occurring among the poorest and most vulnerable income earners. The increased affordability of cigarettes might reduce the impact of implemented tobacco control policies.

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Conflicts of interest. None.

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RESUMEN

El precio real y la asequibilidad como obstáculos para las políticas de control del tabaquismo: análisis de la situación en la Argentina

Objetivo. Describir la evolución del precio real y la asequibilidad de los cigarrillos durante la última década en la Argentina.

Métodos. Para analizar el precio real de los cigarrillos, se dividió todos los meses el promedio ponderado del precio de un paquete de 20 cigarrillos por el índice de precios al consumidor entre el 2004 y el 2014. Se calculó durante el mismo período el precio relativo a los ingresos, definido como el porcentaje de los ingresos necesario para adquirir 100 paquetes de 20 cigarrillos. Se calculó el precio relativo a los ingresos en los cuartiles primero, segundo y tercero de los grupos de ingresos. Cuanto más bajo es el precio relativo a los ingresos, mayor es la asequibilidad.

Resultados. El precio nominal en la Argentina de un paquete de 20 cigarrillos pasó de los 2,24 pesos de marzo del 2004 a los 14,36 pesos de junio del 2014 (un aumento próximo a 19,7% por año). El precio real pasó de 2,24 pesos en marzo del 2004 a 2,11 pesos en junio del 2014 (reducción real de cerca de 0,6% por año). Entre junio del 2004 y junio del 2014, el precio relativo a los ingresos se redujo cerca de 39% en el tercer cuartil de ingresos (de 31,3% a 19,2%), 42% en la mediana (de 55,7% a 32,0%) y cerca de 50% en el primer cuartil (de 104,4% a 51,8%).

Conclusiones. En la Argentina, la inflación y el aumento de los ingresos fueron mayores que el crecimiento de los precios de los cigarrillos. La asequibilidad de los cigarrillos aumentó en todos los grupos de ingresos y las variaciones más acusadas se produjeron en los grupos más pobres y más vulnerables. La mayor asequibilidad de los cigarrillos puede reducir la repercusión de las políticas de control del tabaquismo llevadas a cabo.

Palabras clave

Productos de tabaco; tributación de los productos derivados del tabaco; impuestos; renta; políticas públicas de salud; economía; indicadores; Argentina.