

SUBSIDIZING OR TAXING EDUCATION? A NOTE ON THE QUALITY GAP AND GOVERNMENT FINANCES *

Daniel Flores Curiel

Universidad Autónoma de Nuevo León

Resumen: En este artículo se estudian los efectos de un impuesto (o subsidio) a la educación en la brecha de calidad entre escuelas públicas y privadas y las finanzas gubernamentales. Para lo anterior, se desarrolla un modelo en el que una escuela privada elige precio y calidad con el fin de competir con una escuela pública. Entre otras cosas, se encuentra que un impuesto (o subsidio) unitario puede incrementar (reducir) la brecha de calidad y empeorar (mejorar) las finanzas gubernamentales.

Abstract: In this article, I study the effects of an education tax (or subsidy) on the quality gap between public and private education as well as on government finances. In order to do this, I model the behavior of a private school that chooses price and quality in order to compete for students with a public school. Among other things, I show that a per-unit tax (or subsidy) can increase (reduce) the quality gap and worsen (improve) government finances.

Clasificación JEL/JEL Classification: H2, I21, I22

Palabras clave/keywords: educación, calidad, impuestos, subsidios, education, quality, taxes, subsidies

Fecha de recepción: 22 V 2015

Fecha de aceptación: 23 IX 2015

* daniel.florescr@uanl.edu.mx

Estudios Económicos, vol. 31, núm. 2, julio-diciembre 2016, páginas 339-353

1. Introduction

Public basic education is mandatory, non-religious and free in Mexico by law. Article 3 in the Political Constitution establishes that all individuals in the country have the right to receive an education. In addition, it says that kindergarten, elementary and middle school education will be provided by the State and that these levels of education are mandatory. In order to fulfill this obligation, the government spent about \$385 000 million pesos during 2014. Given that there are about 23.4 million students in the public system at these education levels, the average direct cost of providing basic public education is about \$16 450 pesos per student per year.

Although every child in the country is supposed to have access to free public education, the demand for private education has been growing in the last years. According to data reported by the Ministry of Education (SEP, 2014), student enrollment in private schools grew by about 98% at the kindergarten level, by 12% for elementary schools, and by 37% for middle schools, respectively, during the last 15 years. Furthermore, private school enrollment has been growing faster than public school enrollment. Hence, the share of students in private schools increased from 8.1% to almost 9.8% during this period.

Several reasons explain why parents demand private education despite a free public alternative. One of the arguments is that private education is better than the available public education. For instance, private education usually offers longer school days, a lower student/teacher ratio or instruction in a second language, among other things. Another argument is that private education can offer certain characteristics that may be appreciated by some parents but not necessarily by others. For example, some private schools offer religious instruction or single-sex education. However, even if private and public education were identical, the differences in locations of schools and transportation costs may be sufficient to explain why some individuals are willing to pay for private education instead of using an alternative that is “free”.

The convenience of taxing or subsidizing private education has been debated in Mexico a couple of times during the last years. At the end of his term, President Calderon issued a decree that allowed individual tax deductions for tuition expenses from kindergarten through high school. This policy received mixed reviews in the media. A couple of years later, President Peña proposed a tax reform that considered eliminating the education value-added tax (VAT) exemption. In other words, the reform intended to tax private education. This

was one of the most controversial points in the proposal and was heavily criticized in the media. Indeed, the education tax was dropped in Congress almost immediately after the tax proposal became public.

There are several arguments in favor of taxing private education or equivalently against subsidizing it. For instance, some analysts in the media claim that the tax deduction (that is, a subsidy on private education): (a) worsens government finances, (b) increases the quality gap between private and public education and (c) worsens income distribution because it helps the rich.¹ Of course, other analysts in the media say in favor of the deduction that a subsidy is fair because parents who send their children to private schools are paying for education twice:² First they pay taxes to finance public education and then they pay to obtain education services in the private sector.

In this article, I study the effects of an education tax (or subsidy) on enrollment at private and public schools, on the quality gap between public and private schools, and on government finances. In order to achieve these goals, I model the behavior of a private school that competes for students with a public school. The private school has to choose the quality and price of its service in order to attract students who can choose to attend a public school of given quality at price zero. It turns out that a per-unit tax (or subsidy, respectively) on private education reduces (increases) enrollment in the private school, increases (reduces) the quality gap between private and public education and has an ambiguous effect on government finances. Therefore, contrary to the common belief, a tax (or subsidy) on private education can increase (reduce) the quality gap between private and public education and worsen (improve) government finances.

There are several articles in the economic literature that study the choice between public and private education from a theoretical point of view. Stiglitz (1974), Sonstelie (1979), Hoyt and Lee (1998), and Epple and Romano (1998) develop models where quality is a key variable in the education choice problem. Each of these articles focuses on particular aspects of education. The most recent articles concentrate on the effects of voucher programs in the US. For example, Hoyt and Lee (1998) study whether a voucher program has political support considering its potential effect on taxes and the quality of public education. On the other hand, Epple and Romano (1998)

¹ An example of this point of view can be found in an article by Murayama (2011).

² This point is expressed by Sarmiento (2011). However, Sarmiento like Murayama asserts that the tax deduction worsens government finances.

study the effect of vouchers on the quality of public and private education.

There is another area of literature not directly related to education that studies the impact of taxes on quality. Some of the most notable theoretical articles in this literature include Barzel (1976), Leffler (1982) and Krishna (1990). While Barzel (1976) theorizes that a per-unit tax increases quality, Leffler (1982) builds a model that shows that this type of tax has an ambiguous effect on quality in the context of monopoly. On the other hand, Krishna (1990) models the behavior of a monopolist in the context of international trade and finds that specific taxes increase average quality. In a sense, the model that I build in this article links the theoretical literature on the choice of public and private schools with the literature that studies the impact of taxes on quality.

The rest of the article is organized as follows. In section 2, I develop the model where a private school chooses price and quality to compete with a “free” public school. In section 3, I study the effects of a per-unit tax or subsidy on enrollment at public and private schools, on the quality gap between them and on government finances. I present conclusions in the last section.

2. Model

There is a group of children that must receive basic education. I normalize the size of this group to be one. Their parents choose between private and public schools. In the absence of transportation costs, peer effects or religious considerations, quality is the key to determine parents’ choice.³ Assume that the public school provides education of quality s^o normalized to be zero, while the private school provides education of quality $s > s^o \geq 0$. Therefore, variable s represents the quality gap between private and public schools. Assume that the inverse of the demand function for private education is $p(q, s)$. The variable $q \leq 1$ represents students who attend the private school. Willingness to pay for private education depends crucially on the private school providing higher quality education than that of the available public school (i.e., $p(q, s^o) = 0$). This assumption is not

³ There is empirical evidence that supports this assumption. Chumacero, Gomez and Paredes (2011) use data from Chilean households to show that parents take into account prices, quality and location when choosing schools. More interestingly, they show that parents are willing to pay for quality either directly (by paying higher tuition) or indirectly (by traveling longer distances).

really necessary to obtain the main results of this article but is relatively standard in the literature. For instance, similar considerations are made by Stiglitz (1974), Sonstelie (1979), Hoyt and Lee (1998), and Epple and Romano (1998).⁴

Next, I will formalize some notations and assumptions about the form of the demand for private education. Hereafter, I will use subscripts to denote partial derivatives. The basic assumptions with regard to the demand function are the following. First, demand has negative slope (A1: $p_q \equiv \frac{\partial p}{\partial q} < 0$). Second, willingness to pay for private education increases with the quality gap between the private and the public school (A2: $p_s \equiv \frac{\partial p}{\partial s} > 0$). Third, parents who are willing to pay more for private education are also willing to pay more for a marginal increase in quality (A3: $p_{qs} = p_{sq} \equiv \frac{\partial^2 p}{\partial q \partial s} = \frac{\partial^2 p}{\partial s \partial q} < 0$). It is important to note that some of these assumptions are fairly standard. Furthermore, these assumptions allow for a wide variety of demand functions.

Figure 1 depicts demand for private education. The solid line is the demand for private education of quality s' , while the dotted line is the demand for private education of quality $s'' > s'$. Note that an increase in the quality of private education tilts demand to the right. However, enrollment in private and public education is bounded by the size of the group of students that attend school. The demand for public education is a residual demand of private education and vice versa. Given that the size of the group of students that attend school is normalized to be one, the demand for public education is $1 - q \geq 0$.

Providing either public or private education is costly. The cost of this service depends on the technical efficiency of schools as well as on the quality of education they provide. Assume that the public school provides education at constant marginal cost $c^o > 0$, while the private school provides it at constant marginal cost $c(s)$. I will assume that the marginal cost function of the private school is increasing (A4: $c_s > 0$) and convex (A5: $c_{ss} \geq 0$) in quality.

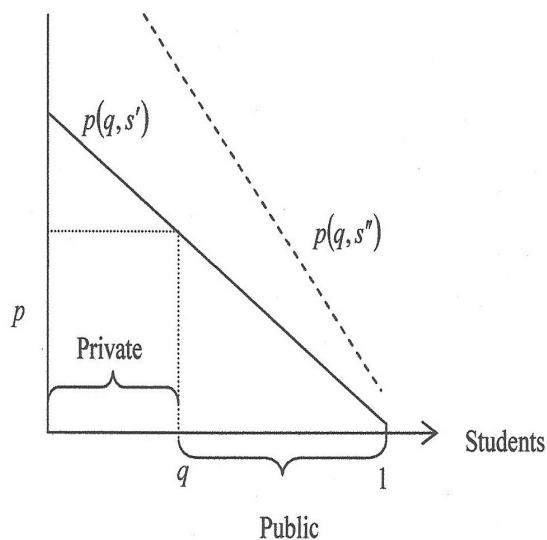
I should make a few additional comments about the costs of providing education. First, several articles in the literature, such as Stiglitz (1974), West (1985), and Hoyt and Lee (1998) explain that the marginal cost of education is approximately equal to the average cost from a policy perspective. The argument that supports this idea

⁴ In principle, Epple and Romano (1998) assume that public and private schools provide exactly the same education. However, differences in quality arise in equilibrium due to peer-effects and the fact that private schools are able to select students.

is the following. Public policy generates relatively large movements of students between private and public schools. Therefore, schools have to open new classrooms and hire teachers to serve students moving from one system to the other. Second, some articles, such as Stiglitz (1974) and Hoyt and Lee (1998), consider that the quality of education depends on expenditures. These comments are consistent with the assumption that the marginal cost of education is constant for a given quality but increases if the school decides to provide higher quality.

Figure 1

Demands for private and public education



Although some articles claim that private schools are more efficient than public schools, Ladd (2002) argues that this is not necessarily true. Among other things, Ladd (2002) explains that tuition does not necessarily reflect the cost of private education in the US because many private schools receive funding from their church. Therefore, I will not assume that either the public or the private school is necessarily more efficient than its counterpart. The model allows for both possibilities. On the one hand, if $c^o < c(s^o)$ then the public school is more efficient than the private one. That is, the marginal cost of

the public school is lower than the marginal cost of the private school when both provide equal quality (that is, at $s = s^o = 0$). On the other hand, if $c^o > c(s^o)$ then the private school is more efficient than the public one. That is, the marginal cost of the private school is lower than the marginal cost of the public school for the same quality. Alternatively, the private school can provide higher quality than the public school at the same marginal cost (that is, $c^o = c(s)$ at $s > s^o$).

The public school is passive in a sense. That is, the quality of the public school is given by the budget and the price is set to zero by law. In contrast, the private school chooses price and quality to maximize profits given a per-unit tax $t \geq 0$ imposed by the government. Alternatively, the private school chooses q and s in order to maximize

$$\pi = p(q, s) \cdot q - (c(s) + t) \cdot q \tag{1}$$

The necessary conditions for profit maximization are

$$\pi_q = p + qp_q - c(s) - t = 0 \tag{2}$$

and

$$\pi_s = q(p_s - c_s) = 0 \tag{3}$$

Let $q^*(t) > 0$ and $s^*(t) > 0$ be the pair that solves equations (2) and (3) as a function of the tax. Now suppose that the profit function is strictly concave. Hence, the following conditions are satisfied:

$$\pi_{qq} = (2p_q + qp_{qq}) < 0 \tag{4}$$

$$\pi_{ss} = q(p_{ss} - c_{ss}) < 0 \text{ and} \tag{5}$$

$$\pi_{qq} \cdot \pi_{ss} - \pi_{sq}^2 > 0 \tag{6}$$

Conditions (4), (5) and (6) ensure that the solution pair $(q^*(t), s^*(t))$ is unique. Note that condition (4) is met as long as the demand function is not very convex (that is, the condition is met even if p_{qq} is positive but not very large). Similarly, condition (5) is met as long

as marginal costs increase with quality faster than willingness to pay (that is, as long as $p_{ss} < c_{ss}$). Note also that (2), (3) and A3 imply that

$$\pi_{sq} = \pi_{qs} = p_s - c_s + qp_{sq} = qp_{sq} < 0 \quad (7)$$

Finally, I will follow the approach of West (1985) and Hoyt and Lee (1998) to evaluate the effects of a tax (or subsidy) from the perspective of government finances. Therefore, let EB denote the education budget of the government. This budget has three components: (a) resources initially assigned to public education ($RIAE$), (b) revenues from the tax on private education ($RTPE$) and (c) the cost of providing public education (CPE).⁵ Formally, for a given tax we can write the following:

$$EB(t) \equiv RIAE + RTPE(t) - CPE(t) = RIAE + t \cdot q + c^o \cdot (1 - q) \quad (8)$$

3. Analysis

In this section, I analyze the impact of a per-unit tax (or subsidy) on the choice between private and public schools, on the quality gap between them and on government finances.

3.1. Enrollment at private schools and quality

In order to evaluate the impact of a per-unit tax on student enrollment at the private school and the quality gap, differentiate (2) and (3) implicitly with respect to t in order to find

$$(2p_q + qp_{qq}) \cdot q_t^* + (p_s - qp_{qs} - c_s) \cdot s_t^* - 1 = 0 \quad (9)$$

⁵ Hoyt and Lee (1998) consider that public education is financed by income taxes at the district level. A voucher program subsidizes private education but reduces the cost of providing public education. One of the most interesting results of the article is that a voucher program may actually benefit students that remain in public schools. The point is that households gain indirectly from the program if it reduces taxes.

and

$$(qp_{sq} + p_s - c_s) \cdot q_t^* + (qp_{ss} - qc_{ss}) \cdot s_t^* = 0 \quad (10)$$

It follows from (3), (4), (5) and (7), that I can write these conditions as

$$\pi_{qq} \cdot q_t^* + \pi_{qs} \cdot s_t^* = 1 \quad (11)$$

and

$$\pi_{sq} \cdot q_t^* + \pi_{ss} \cdot s_t^* = 0 \quad (12)$$

Finally, the solution of this system of equations implies that

$$q_t^* = \frac{\pi_{ss}}{\pi_{qq}\pi_{ss} - \pi_{sq}^2} < 0 \quad (13)$$

and

$$s_t^* = \frac{-\pi_{sq}}{\pi_{qq}\pi_{ss} - \pi_{sq}^2} > 0 \quad (14)$$

The derivatives (13) and (14) imply that a per-unit tax (or subsidy) reduces (increases) enrollment in the private school and increases (reduces) the quality gap between private and public education. It is important to emphasize that these results hold for a wide variety of demand and cost functions. The intuition behind them is the following. A per-unit tax on private education increases the marginal cost of the private school. This motivates the school to increase the price and, consequently, reduce enrollment. However, willingness to pay for a marginal increase in quality increases as student enrollment decreases. Therefore, the private school finds it profitable to increase education quality. The following proposition summarizes these results.

PROPOSITION 1. *A per-unit tax (or subsidy, respectively) on private education: (a) reduces (increases) enrollment in the private school and (b) increases (decreases) the quality gap between private and public education.*

PROOF. The signs of (13) and (14) follow straightforward from (5), (6) and (7). ■

The first part of this proposition is consistent with previous models of competition between private and public schools. For example, the models of Hoyt and Lee (1998) and Epple and Romano (1998) find that parents shift their children from the public to the private system in response to a voucher (subsidy) on private education. However, the scarce empirical literature that attempts to estimate the price elasticity of private education presents mixed results. On the one hand, Lankford and Wyckoff (1992) estimate relatively elastic demands for private elementary and secondary education (that is, they report elasticity estimates of -0.87 and -3.35, respectively). On the other hand, several other articles, including Buddin, Cordes and Kirby (1998), find that tuition has no statistically significant effect on the choice between private and public schools.

The second part of the proposition is in line with the theories developed by Barzel (1976) and Krishna (1990) in a different context. That is, a per-unit tax increases quality. However, this part of the proposition depends critically on the assumption that parents who are willing to pay more for private education are also willing to pay more for a marginal increase in quality (that is, assumption A3). If this assumption is relaxed, then the conclusion is that a per-unit tax has an ambiguous effect on quality as pointed out by Leffler (1982). It is important to mention that Leffler (1982) considers consumers with identical preferences rather than an aggregate demand function in her analysis. Therefore, the results are not exactly equivalent.

I believe that it is reasonable to assume that parents who are willing to pay more for private education are also willing to pay more for a marginal increase in quality. Therefore, I would expect to find that a per-unit tax (subsidy) on private education increases (reduces) the quality gap; but ultimately this is an empirical issue. In this sense, I can say that the findings of empirical articles are mixed. Although early empirical work such as Sumner and Ward (1981) reject Barzel's theory, more recent works such as Sobel and Garrett (1997) and Nesbit (2007) find that a per-unit tax increases quality in the markets for cigarettes and gasoline, respectively.

3.2. *Government finances*

As West (1985) and Hoyt and Lee (1998) point out, some students attending the private (public, respectively) school will switch to the

public (private) school due to the tax (subsidy) on private education. Therefore, although a tax (subsidy) generates revenues (costs) for the government from students that attend the private school, it also generates costs (savings) because some students switch from the private (public) to the public (private) school. Formally, I can use (8) to calculate the effect of a marginal tax increase (or subsidy decrease) on government finances. That is,

$$EB_t = q + t \cdot q_t + c^o \cdot q_t \tag{15}$$

Note that a small tax increase has several effects. The first two terms at the RHS of (15) are marginal tax revenues. The first term is positive and the second one is negative. The first term represents tax revenues collected by the government from students who stay in the private school in spite of the tax increase. The second term represents forgone tax revenues from students who transfer from the private to the public school. Note that the second term is zero at $t = 0$. However, even if this is the case, the government still faces a financial trade-off. The third term at the RHS of (15) represents the cost of providing education to students who transfer from the private to the public school. Therefore, the effect of imposing a small initial per-unit tax (or subsidy) on government finances depends on which of the effects dominate.

PROPOSITION 2. For any given $q_t < 0$, there exists a critical $c' > 0$ such that a small initial per-unit tax (or subsidy, respectively) on private education: (a) improves (worsens) government finances if $0 < c^o < c'$, (b) keeps government finances unchanged if $c^o = c'$ and (c) worsens (improves) government finances if $c^o > c'$.

PROOF. It follows from (15) that $EB_t = q + c^o \cdot q_t$ at $t = 0$ (that is, for a small initial tax or subsidy). Note that $q > 0$ and $q_t < 0$ do not depend on the marginal cost of public education c^o because public education is provided for “free”. Define $c' \equiv -\frac{q}{q_t} > 0$. (a) follows from the fact that $EB_t > 0$ if $0 < c^o < c'$, (b) from the fact that $EB_t = 0$ if $c^o = c'$ and (c) from the fact that $EB_t < 0$ if $c^o > c'$. ■

This proposition deserves some comments. Although a small initial per-unit tax (or subsidy) has an ambiguous effect on government finances, two elements are crucial to determine the net effect of this policy: the marginal cost of public education and the degree of

sensitivity of demand for private education to the tax. For a given sensitivity of the demand for private education, a per-unit tax (subsidy) tends to improve (worsen) government finances if the marginal cost of providing public education is relatively low. Analogously, for a given marginal cost of public education, a per-unit tax (subsidy) tends to worsen (improve) government finances if demand for private education is very sensitive to the tax (subsidy).

It is worth presenting some rough estimates of the impact of an education tax (or subsidy) with Mexican data to illustrate the proposition. There are about 2.6 million students in the basic education private system and each student costs about \$16 450 in the public system. Although it is possible to accommodate a large set of students in the public system without increasing expenditures, this would require reducing the quality of public education. For instance, instead of hiring teachers and opening new classrooms the education authority can just reduce the education journey in public schools. Therefore, the government would actually require about \$42 777 million pesos to provide education to these students keeping the quality of public education constant.

Suppose that the government imposes a \$1 000 pesos tax per student in the private education system. As an extreme case, suppose also that demand for private education is perfectly inelastic. If this is the case, the government would collect \$2 600 million pesos because students stay in the private system and their parents pay the tax. In contrast, suppose now that demand for private education is (almost) perfectly elastic.⁶ In this case, the government would collect no taxes because all students in the private system transfer to the public system. Moreover, the government would have to pay \$42 777 million pesos to provide them with education while keeping the quality of public education constant.

Consider now that the government offers a subsidy of \$1 000 pesos per student in the private system. However, suppose that demand for private education is unitary elastic. Assume for the purpose of illustration that private tuition for basic education is \$16 450 pesos. That is, the price of private education equals the average cost of public education in the country. The subsidy reduces tuition about 6.08 per cent. Given that demand is unitary elastic, a total of 158 080 students transfer from the public to the private education system. Although in principle the government has to pay \$2 600 million

⁶ Alternatively, suppose that the tax is sufficiently large to expel all students from the private system.

pesos in subsidies to students initially enrolled in the private system, it saves \$2 442 million pesos because it no longer pays the full cost of educating students who transfer from the public to the private system keeping the quality of public education constant.⁷ Hence, the overall cost of this subsidy would actually be only \$158 million pesos. Of course, the overall cost of this subsidy can become negative if demand is a little bit more elastic or the cost of public education a little bit higher.

4. Conclusions

This article presents a relatively simple model of choice between private and public schools. This model brings together the theory of education choice with the theory that studies the effects of taxes on quality. Among other things, the results of the model indicate that a per-unit tax (or subsidy) on education can increase (reduce) the quality gap between private and public education and worsen (improve) government finances. It is important to mention that the main results of the model hold for fairly general demand and cost functions.

Rather than claiming that a particular education tax policy -like the VAT proposal or the tax deduction discussed in Mexico- affects the quality gap or government finances in a given direction, the main message of this article is that the theoretical effects of education tax policies are not straightforward. An appropriate analysis of the VAT proposal or the tax deduction would have to take into account the different theoretical effects of the tax policy explained in this article as well as the practical complexities of the Mexican tax system.

A couple of aspects that are usually neglected in the analysis of education tax policy are the elasticity of demand for private education and the cost of public education. As I show in this article, the impact of a per-unit education tax on government finances depends crucially on these two variables. A tax on education tends to improve government finances if demand for private education is relatively inelastic, or if the cost of public education is low. Alternatively, a subsidy tends to improve government finances if demand for private education is relatively elastic, or if the cost of public education is high.

⁷ That is, the government saves \$15 450 pesos per student that transfers from the public to the private system. Given that 158 080 students shift from one system to the other, savings are about \$2 442 million pesos

Finally, it is important to note that this article does not address the effect of education taxes or subsidies on the distribution of income. It is reasonable to assume, as do Epple and Romano (1998), that willingness to pay for private education increases with income. This would lead me to conclude that an education tax improves the distribution of income while a subsidy worsens it. However, this approach would neglect the fact that only a relatively small fraction of low-, middle- and high-income households spend on private education.⁸ On the other hand, a well-known result in the public finance literature is that education subsidies help to reduce the distortions in human capital accumulation caused by progressive income taxation. In particular, Bovenberg and Jacobs (2005) explain that the optimal policy in terms of efficiency is to make all education expenditures completely tax deductible. Therefore, a tax on private education might be a costly way to redistribute income.

References

- Barzel, Y. 1976. An alternative approach to the analysis of taxation, *Journal of Political Economy*, 84: 1177-1197.
- Bovenberg, A.L. and B. Jacobs. 2005. Redistribution and learning subsidies are Siamese twins, *Journal of Public Economics*, 89: 2005-2035.
- Buddin, R.J., J.J. Cordes and S.N. Kirby. 1998. School choice in California: Who chooses private schools, *Journal of Urban Economics*, 44: 110-134.
- Chumacero, R.A., D. Gómez and R.D. Paredes. 2011. I would walk 599 miles (if it paid): Vouchers and school choice in Chile, *Economics of Education Review*, 30: 1103-1114.
- Epple, D. and R.E. Romano. 1998. Competition between private and public schools, vouchers and peer-group effects, *American Economic Review*, 88: 32-62.
- Hoyt, W.H. and K. Lee. 1998. Educational vouchers, welfare effects, and voting, *Journal of Public Economics*, 69: 211-228.
- Krishna, K. 1990. Protection and the product line: Monopoly and product quality, *International Economic Review*, 31: 87-102.

⁸ According to Sales (2013), the percent of households that spend on tuition and school supplies goes from 16.6% in the lowest income group to 43.5% in the highest income group.

- Lankford, H. and J. Wyckoff. 1992. Primary and secondary school choice among public and religious alternatives, *Economics of Education Review*, 11: 317-333.
- Leffler, K.B. 1982. Ambiguous changes in product quality, *American Economic Review*, 72: 956-967.
- Ladd, H.L. 2002. School vouchers: A critical view, *Journal of Economic Perspectives*, 16: 3-24.
- Murayama, C. 2011. Subsidiar la educación privada, *El Universal* (15/02/2011).
- Nesbit, T. 2007. Excise taxation and product quality: The gasoline market, *Economic Issues*, 12: 1-14.
- Sales, F.J. 2013. Gasto corriente monetario trimestral promedio por hogar y porcentaje de gasto por rubro, *En Contexto*, 37: 1-9.
- Sarmiento, S. 2011. Jaque Mate Colegiaturas, *Reforma* (15/02/2011).
- Secretaría de Educación Pública (SEP). 2014. 2do. *Informe de Gobierno, 2013-2014*.
- Sobel, R.S. and T.A. Garrett. 1997. Taxation and product quality: New evidence from generic cigarettes, *Journal of Political Economy*, 105: 880-887.
- Sonstelie, J. 1979. Public school quality and private school enrollments, *National Tax Journal*, 32: 343-354.
- Sumner, M.T. and R. Ward. 1981. Tax changes and cigarette prices, *Journal of Political Economy*, 89: 1261-1265.
- Stiglitz, J.E. 1974. The demand for education in public and private school systems, *Journal of Public Economics*, 3: 349-385.
- West, E.G. 1985. The real cost of tuition tax credits, *Public Choice*, 46: 61-70.