Music to My Ears: The (Many) Socio-Economic Benefits of Music Training Programs

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July 2008

Abstract: A simple cost-benefit framework is used to estimate substantive social benefits associated with a universal music training program in Venezuela (B/C ratio of 1.68). Those social benefits accrue from both reduced school drop-out and declining community victimization. This evidence of important social benefits adds to the abundant evidence of individual gains reported by the developmental psychology literature.

Key words: Music, Social Benefits, Cost-Benefit, Venezuela.

JEL codes: Z11, I38

Acknowledgements. This paper does not represent necessarily the views of the Inter-American Development Bank or its Board of Directors but only those of the author. The author thanks Maestro José Antonio Abreu, Gabriel Castillo, Rafael del Cid, Juan Carlos Guevara, Michael Jacobs, Eva Martinez, Marco Moncada, Jorge Lamas, Igor Lanz, Eliezer Sánchez, Ana Maria Sanjuan, Walter Soto for their involment in specific parts of the analysis and comments to earlier versions. Without their work, commitment and suggestions this analysis would have not been possible. Usual disclaimers apply.

Word Count: 1,987

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I. Introduction

Economists' increasing interest in early child development (ECD) comes from the accumulated evidence of life-cycle links between cognitive, social skills, nutrition and health status at young ages and future educational attainment, earnings and employment outcomes (Behrman et al 2004, Armecina et al 2006). Promoting ECD becomes a potentially effective way to tackle long term poverty alleviation. These social returns in the form of human capital accumulation and poverty reduction have been typically estimated in the ECD economic literature as aggregated impacts accruing from participation in pre-school nutritional, public health or specific ECD programs versus non-participation. Such aggregate estimates provide little knowledge on individualized effects of specific components in those programs and much less on how music, in particular, may contribute to such benefits. In contrast, developmental psychologists have long provided evidence on important *individual* benefits that music provides on child cognitive development, satisfaction of their emotional needs, socialization and helping behavior among infants, children and teenagers (Hargreaves 1986, Bilhartz et al 2000, North et al 2004).

Filling a knowledge gap on social –rather than individual– benefits of music programs, this study provides an estimate of the social benefits associated with an unparalleled music training program through music in Venezuela. The Venezuela's National System of Youth and Children's Orchestras (the "System") constitutes a pioneering pedagogic initiative that, for more than 30 years, has provided musical training to over two million Venezuelan boys and girls ages 3 to 19. A Caracas-based headquarters, 126 community-based centers across all the states of the country, and 326 orchestras and choirs make up the System. Its teaching method simultaneously integrates theoretical, instrumental and orchestral practices around a predominant orchestral execution component from the start. This ensures a strong teamwork ethos. Also, the Venezuelan method stresses a continuous contact between the beneficiary and the community–through frequent community performances– seeking to instill high levels of motivation in participants. There are currently 250,000 beneficiaries enrolled in the program, of whom approximately 67% reportedly come from the country's two poorest social strata (81% if the medium-low stratum is included – ULA 2004) [1]. This pro-poor profile is achieved despite the System is a universal program that does not include explicit mechanisms for targeting of its beneficiaries. Rather, it is based on a process of self-selection across communities and demand-driven provision of services by the System.

A program of these characteristics has gained the attention not only of the music world but also of policy-makers. In assessing the developmental potential of this program, the present study proposes a simple cost-benefit approach to estimate the magnitude of the System's social benefits.

II. Data and Methodology

A baseline survey was conducted from October to December 2006 in 15 community centers (12% of all centers that composed the System at that time) in six states across the country; Distrito

[1] According to the 2006 Social Report by the National Statistics Institute (INE), in the first half of 2006 poverty affected, according to official sources, 33.9% of Venezuelan households and extreme poverty, 10.6% in 2006. An estimated 74% of children ages 0 to 9 and 71% of children ages 10 to 15 live in poor households

Capital, Aragua, Carabobo, Lara, Sucre, Yaracuy. The sample consisted of 840 boys, girls, and young people, ages 3 to 17, as well as 500 parents and guardians. They were organized into two groups of equal size: the intervention group and the control group, based on whether or not they participated in the System. In order to keep the characteristics of the two groups as similar as possible –except for their participation in the System–, the survey was composed of school class-mates. Information was collected on a total of 26 indicators grouped in categories such as academic achievement, employability, conflict management and social capital, family relations, exposure to the intervention and socioeconomic profile. Table 1 below provides the average values of selected indicators:

Table 1: Baseline indicators

Measure	**Indicator**	**Treatment group**	**Control group**
Academic achievement	Class attendance (primary and secondary)	95.5%	87.6%
	School dropout rate (primary and secondary education)	6.9%	26.4%
Employability	Participation in formal employment of youth aged 14 and up: participation in social security system and/or written contract	40.7%	12.5%
Conflict management/ social capital	Participation in community activities	60.1%	37.9%
	Percentage of beneficiaries whose parents or guardians are notified of behavior problems at school	12.4%	22.5%
Socioeconomic profile of the beneficiary	Persons living in poverty	59.9%	69.8%

Source: Project's Baseline

These indicators are used to calculate the socioeconomic benefits of the program. They are estimated as the net present value of the net benefits associated with an expansion of the program from its current 250,000 annual beneficiaries to half a million by 2015. In doing so, we first estimate gross unitary benefits per dollar invested in the System. Unitary benefits are estimated as the projected monetized benefits accruing from two sources of social gains associated with the program: public school drop-out rate reductions and reductions in the victimization rates of communities with presence of System centers – see Equation [1]:

$$\text{Social NPV} = \sum_{t=0}^{N} \sum_{i=s,v} \frac{[(\bar{y}_c - \bar{y}_{tr})_t \cdot n_t \cdot b_t] - C_t}{(1+d)^t} \qquad [1]$$

where $\bar{y}_c$ and $\bar{y}_{tr}$ represent the average incidence of school drop out (i=s) and victimization (i=v) proxied by baseline differentials between control and treatment groups (c, tr respectively); b_t is the unitary monetized benefit; n_t is the projected number of additional beneficiaries in each year, C_t is the expected annual total cost (according to Inter-American Development Bank, IDB, (2007)'s disbursement schedule), and d is the discount factor, assumed conservatively to be 12%. All conversion factors are considered to be 1 for simplicity. The time span considered is 2007 (t=0) and 2015 (N=8).

Both $\bar{y}_c$ and $\bar{y}_{tr}$ values come from the baseline survey. Monetized benefits are estimated as public savings from avoiding a school drop-out. School drop out implies a lost of investment in

human capital (investment in national public education), loss of future employment earnings (based on the returns from one additional year of education), and a reduction in demand for goods and services associated with a loss of future employment earnings. Regarding victimization, the unitary benefit is composed of health-related treatment, judicial and police costs and the value of lost property saved as a result of an averted theft and crime-related injury. See Table 2 below. In addition, those estimated benefits are compared with the opportunity costs of the System, which are defined as the cost of the closest alternative from a social standpoint to investing in the System. This alternative is believed to be the provision by the public education system of the same amount of tuition hours that the System would render to their projected new beneficiaries until 2015. Here, the total cost of providing education per student per hour in the future is estimated by including all current and capital expenditures incurred by public education providers.

Target rates of school drop out and victimization by 2015 are also set conservatively. Drop out rates are expected to decline from the current 6.9% observed among the treatment group to 3% in 2015. Injuries and thefts are expected to decline from 120 to 112 and from 191 to 184 cases per 100,000 people respectively. These national averages projected by 2015 mimic current differentials in the incidence of victimization among communities with System centers *vis a vis* communities with no presence of the program. These projections are compared, respectively, to a counterfactual of no additional drop outs and no changes in current victimization rates

Considered costs are those calculated by the IADB (2007) in order to double the annual enrolment of beneficiaries up to 500,000 by 2015. They amounted to 2007 US$ 210 million. The components of the IADB project (institutional strengthening, infrastructure, instrument purchase, monitoring and evaluation), their itemized costs and schedule are considered as given in this study.

III. Results

The present value of the program's benefits was estimated at US$259 million, while the present value of its costs is US$154 million. As a result, the program's net present benefit is US$105 million. This means that the program's ratio of benefits to total costs in net present value for 2007 is 1.68. The estimated net present value of the program opportunity costs indicates that the present value of the benefits exceed their costs by US$56 million. In other words, for each dollar invested in the program, there is a savings of 36 cents with respect to the next best investment alternative considered for this program.

Table 2 Program benefits

	Incidence (%) $\bar{y}_i$		Projected impact through 2015 (number of cases) Σn_t	Unitary benefit per beneficiary (US$2007) b_t	Total benefit (US$ million 2007)	Counterfactual Analyzed
	Intervention group	Control group				
Direct measurement of benefits						
Savings due to reduction in school dropout rate	Dropout rate: 6.9%	Dropout rate: 26.4%	30,133 dropouts prevented	US$16,018	US$16,018 US$244.65 million (*)	Without the program, there is no additional increase in enrollment without reducing the quality, and therefore no additional dropouts could be prevented in the educational system in the future
Savings due to reduction in crime	Thefts per 100,000 inhabitants: 112 Injuries per 100,000 inhabitants: 184	Thefts per 100,000 inhabitants: 120 Injuries per 100,000 inhabitants: 191	3,036 thefts prevented 2,657 injuries prevented	US$4,886 per theft prevented US$2,442 per injury prevented	US$14.65 million	There is no expansion of the System, and the current rates of victimization do not change.
Opportunity cost of the System						
Total savings with respect to the next best alternative to the System	n.a.	n.a.	254,647 additional beneficiaries	US$241 in savings per System beneficiary with respect to participation in the public school system (**)	US$56.16 million (***)	The increase in System enrollment is absorbed by the public school system, which will provide these individuals with the same number of class hours (710 per year).

Notes: (*) Out of the total estimated cost, 10% corresponds to the disinvestment in human capital; 64% to the loss of future employment earnings; and 26% to the drop in demand.
(**) The cost of participating in the public education system is US$459 per year, while participating in the System costs an average of US$218, for the same number of class hours.
(***) The opportunity cost calculation includes the cost of the program.

IV. Final remarks

Albeit developmental psychology studies have already shown substantive *individual* benefits of music ECD programs, no study has previously attempted to estimate their *social* benefits. A simple conservative cost-benefit framework shows how the social gains from reduced school drop out and victimization are also substantive in a universal music training program in Venezuela. More research is required to improve the precision of our estimates as well as to include additional social benefits such as the increase of social capital or the improvement in the employability of beneficiaries, suggested as relevant by our baseline indicators. From a policy point of view, it is worth noting the scale and maturity of the Venezuelan project before substantive social benefits may be generated.

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