Economic impacts of the Vale-cultura (culture voucher): a computable general equilibrium model

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June, 2016

Abstract

Restricted access to the consumption of cultural goods and services is one of the major problems faced by this sector in Brazil, for individual, social or economic reasons. To address this issue, the federal government launched the Vale-cultura, a voucher system in which individuals eligible for the program receive an income transfer to be used exclusively for the purchase of goods and services predefined in a list. The aim of this study is to analyze the impacts of the Vale-cultura in the cultural sector and in the economy in general. The methodology applied is the general equilibrium model (CGE), BRIDGE. Among the main results of the simulations, GDP growth is estimated, driven mainly by the increase in household consumption, on the side of the absorption. There is a positive variation in well-being, assessed by the equivalent and compensating variation in income, for beneficiaries of the vouchers. The collection of indirect and production taxes is also affected positively because of the various effects on the economy, which partly makes up for the government transfers to companies via tax waiver. Finally, in sectoral terms, positive growth is projected at the level of activity of cultural sectors and negative growth in others, showing a reallocation of productive factors. The results suggest, therefore, that the Vale-cultura has great potential for economic overflow effects.

Keywords: Culture, Vale-cultura, Computable General Equilibrium, Impacts, Consumption, Well-being, Sectoral Analysis.

Introduction

The importance of the cultural sector to the socio-economic development is a recurring theme in economic literature, mainly in regional economy studies and public policy analysis. A particularly relevant discussion is the issue of transversality of the

cultural sector, which is associated with diversity in terms of production and distribution methods.

It is understood that, due to this transversality, growth in the cultural sector could generate spillover benefits into other productive chains, which would bring a virtuous effect for the economy. In that way, consumption of cultural goods and services should be encouraged, as one of the alternatives to promoting public policies.

In Brazil, the incipient access to consumption of these goods and services is one of the major problems faced by this sector[1] , due to individual, social or economic constraints. The government is aware of this problem and it tries, through public policies, to reduce this gap between the potential consumers and the cultural sector. One of the most recent policies in this regard is the Programa Cultura do Trabalhador (Worker's Culture Program), which creates a voucher system known as Vale-Cultura, in which individuals eligible for the program receive an income transfer to be used exclusively for the purchase of cultural goods and services, from a previously government-defined list.

The purpose of this study is to analyze the impacts of the Programa Cultura do Trabalhador on the economy, addressing both aggregated and sectoral effects. To this end, we use simulations with an applied general equilibrium model (CGE) suitable for this case, since it considers the interaction among the various markets in the economy. This makes it possible to assess the impact of the voucher system in all productive sectors.

1 Policies to encourage access to culture

1.1 Cultural sector and regional development

The cultural sector is defined herein as a set of goods and services that includes artistic creativity in its production[2]. Examples of activities in this sector can include crafts, theatre plays, video games, films released on DVD or projected in cinemas, among others.

The cycles of creation, production, distribution and consumption of various cultural goods and services have significant differences and include activities from manufacturing industry, commerce and services. The distribution process of a piece of handicraft, for example, depends basically on the logistics of the transport system chosen. Regarding movies and music in digital format, the speed of the broadband

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[1]This subject is discussed in Diniz and Machado (2011), Paglioto and Machado (2012) and Silva et al. (2007).

[2]There are other definitions to the term culture that permeate the economic context, which are dealt with in this article. This discussion can be seen in detail in Throsby (2001) and Bille and Schulze (2006).

connection is the major factor affecting distribution efficiency until it reaches the final consumer. This heterogeneity is also reflected in the competitive market, with its various coexisting structures, from large oligopolies such as those in the film industry, to a competitive market centered around small autonomous production, as seen in artisanal production.

According to Bille and Schulze (2006), the impacts of the cultural sector on regional development can be divided into short-term and long-term. In the short term, the power of attraction of visitors has great importance, both from the local and non-local perspective; whereas long-term effects would be related to attracting people, companies and investments.

The production process is usually concentrated in major urban centers due to the advantages of the process of urban agglomeration. The proximity of both the consumer market as well as other producers reflects the positive externalities of production and consumption in economies of scale and scope (Bille and Schulze, 2006). According to Santagata (2006), cultural districts are a good example of economic development based on industrial location and local culture, and this aspect is positive in several ways: job creation, income generation, intergenerational transmission of creativity, among others.

The cultural sector can also generate growth in other sectors through a chain reaction. The concepts of forward and backward linkage effects were developed by Hirschman (1961) in the so called Theory of Unbalanced Growth[3] and are related to the potential for promoting new productive investments. Backward effects occur from increased demand for inputs from other sectors. They express externalities from the implementation of industries that, when there is an increase in demand in the forward sector, would make possible a minimum viable scale of production in certain places. Therefore, they would encourage input suppliers to new productive investments. Forward effects are characterized by increased final demand in each of the productive sectors, which causes an increase in the production of a particular product, favoring forward sectors. The result is a strong generator of growth-inducing effects on the economy.

1.2 Cultural policies and the Programa Cultura do Trabalhador

Although classic economic authors already discussed the peculiarities of artistic cultural activities, including arguments about public funding (Martos and Quintero, 2011), it is the work by Baumol and Bowen (1969) which is regarded as the pioneer in studies of the economy of culture. In their book, Performing arts: the economic

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[3]Hirschman also discusses consumption linkage and tax linkage, but these will not be dealt with in this study.

dilemma, the authors support funding for the performing arts, such as theatre and dance. The main argument is that, as these activities are labor-intensive, high production costs would not decrease with technological development; in other words, there would be no big productivity gains. A theater play, for example, would be limited by actors' fatigue and the lack of profitability in short-season performances, given the construction of scenery and advertising costs.

Cwi (1980) and Frey (2003) summarize some of the reasons why the government should support the arts. The first one regards benefits generated to sectors not directly involved in the production process through linkage effects. Another reason is the implicit demand of the sector, which is linked to the fact that some people recognize the importance of artistic and cultural products, even if they have never actually spent money on them; they simply appreciate them. Therefore, the amount of goods consumed is not always that which is socially considered optimum.

Public policies can focus on the producer as well as on the consumer. The most commonly used model, as a direct stimulus to the consumer, is the voucher system which allows the recipient greater freedom to select the cultural goods and services that they want to consume (Peacock, 2006).

In the voucher distribution system[4] , a certain group of consumers receive a ticket or card to obtain a cultural product, or part of one. By increasing people's actual income, the voucher would stimulate consumption and enable the consumer to make more effective choices. Supporters of the system believe the voucher can help develop tastes and habits (Towse, 2010) which would represent changes in consumption, not only in the short term but also in the long term.

Concerning the issue of vouchers given directly to consumers, the work of Peacock (1994 [1969]) is seminal. Peacock is a proponent of this system, particularly for low-income individuals. West makes the same argument (1986), discussing providing subsidies to individuals with lower income and education, the most needy ones. According to Van der Ploeg (2006), the provision of vouchers, especially to young people, can be an efficient means of promoting demand for more sophisticated artistic products, or "high culture", among individuals who do not normally consume such goods and services.

It can be observed that most of these programs aim to use resources more efficiently, focusing on individuals more likely to consume cultural goods and who can cultivate the habit of demanding goods and services from the cultural industry. The most recent example of this kind of policy is the Vale-cultura, which, unlike most of

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[4]The voucher is a system that permeates culture when it comes to the issue of public policies which are not restricted to encouraging consumption, although this is the aspect that matters in the proposed discussion. A detailed analysis about the voucher concept and its variations in the scope of public policies can be seen in Valkama and Bailey (2001).

the cases presented, focuses on social inclusion by offering the benefit to individuals who cannot afford these items.

The Programa Cultura do Trabalhador was created by the federal government, (law n° 12,761/12) to provide the population access to products of the cultural industry and to stimulate the consumption of cultural products. This program is carried out through the so-called Vale-cultura, a personal, nontransferable voucher, valid throughout the country, which can be used to buy the products[5].

Employers' participation in the program is therefore optional, and they must register with the Ministry of Culture to participate in it. Companies that opt for participation in the program are exempt from social and labor charges on the amount of the benefit from the federal government. In addition, the government will grant a deduction of up to 1% of the actual profit from the income tax of these companies.

The monthly value stipulated is R\$50.00, and part of this amount may be deducted from the employee's salary. The benefit can be accumulated indefinitely or used in conjunction with other forms of payment at the time of purchase of the products. The program is provided for workers whose income is up to five minimum wages (monthly) and are regularly employed (Brazil, 2012).

The Vale-cultura, as a direct income transfer program based upon the use of specific goods and services hypothetically causes a positive income shock on individuals eligible to receive such benefit, as well as an impact on economic activity. In this study, we propose an ex-ante evaluation methodology of the effects of the program from a general equilibrium approach. The general equilibrium framework allows analysis of changes in household spending in the face of an income shock in which the consumption vector is considered.

2   Methology

2.1   BRIDGE Model

Computable general equilibrium (CGE) models are important instruments for building consistent simulations that take into account inter-sectoral and inter-regional factors. Compared to traditional models, such as input-output, one advantage of CGE models is the adoption of hypotheses involving the reallocation of resources and

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[5]The list of these products is determined by the Ministry of Culture and may be changed over time. Currently, the genres offered for the use of the voucher are: crafts and sculpture; movie tickets, art exhibitions, festivals, circuses, theatre, music and dance; visual arts equipment and musical instruments; audiovisual courses, arts, circuses, dance, photography, music, theater and literature; DVDs and CDs; newspapers, books, sheet music and magazines; photography, paintings and engravings.

flexible prices, both endogenously determined, as in this study.

Economic literature frequently uses CGE models in simulations on the impact of public policies in Brazil, as in the case of Minha Casa Minha Vida (a federal housing funding program for low income families) (Shimizu and Domingues, 2011) and Farmácia Popular (a prescription drug subsidy program) (Domingues et al., 2015), among others. In the cultural sector, however, studies are rare, not just in Brazil but around the world. This is caused by its/their complexity and the resulting difficulty in working with data collection and the lack of it. The model is effectively used in a report on the impacts of government funding on the cultural sector in Victoria, Australia's arts capital. The model used for this study was the TERM (The Enormous Regional Model), developed by Horridge (2006), which analyzes how changes in the cultural sector flow into other sectors in the long term. The results showed that, for every $1.00 spent annually by the government on arts and culture, $1.90 is generated for the economy of Victoria (KPMG, 2013).

The CGE model used here is the BRIDGE (Brazilian Recursive Dynamic General Equilibrium Model), developed from the theoretical structure of ORANI (Dixon et al., 1982) and MONASH (Dixon and Rimmer, 2002). Therefore, it is a Johansen type model whose mathematical structure is formed by a set of linearized equations, and the solutions are given by the growth rates, i.e. elasticities.

The theoretical structure of the BRIDGE model, indicated by Domingues et al. (2014), follows the pattern of the CGE[6] . A perfect competition scenario in all markets is considered, with the productive sectors acting to minimize production costs for given constant returns to scale technology. The combination of intermediate inputs and primary factors is established by fixed factors, i.e. the Leontief-type model. The composition of domestic and imported inputs follows a function of constant elasticity of substitution (CES). Although all sectors present the same theoretical specification, the substitution effect via prices differs according to the composition between imported and domestic raw materials. The hypothesis of a small country in international trade is adopted, wherein sectoral exports respond to demand curves negatively associated with the domestic costs of production and are positively affected by the exogenous expansion of international income. Investment and capital stock follow mechanisms of offset and inter-sectoral accumulation associated with depreciation and return rates.

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[6]More details about the model can be seen in Domingues et al. (2014) and Domingues et al. (2015). Such a model has been developed from research at the Center for Development and Regional Planning (CEDEPLAR) at the Federal University of Minas Gerais (UFMG), first used by Domingues et al. (2010) to analyze the effects of the economic slowdown caused by the economic crisis of 2009 in the Brazilian scenario. The model was later used by Souza and Domingues (2012) in a study on the economic impacts of changes in the domestic Brazilian services market between 2006 and 2011. Domingues et al. (2015), in simulations on the effect of the Programa Farmácia Popular in the reallocation of household spending; Cardoso et al. (2014), in evaluating the impacts of payroll relief according to policies adopted by the federal Government.

The calibration of the BRIDGE model is made based on the Brazilian input-output matrix (MIP) for the year 2005, the latest version released by IBGE. The MIP is constructed from the Brazilian System of National Accounts and corresponds to a matrix of direct technical coefficients indicating how much a specific economic activity needs to consume from others in order to produce an additional currency unit. It has a structure comprising 55 sectors, 110 products, five components of final demand (household consumption, government consumption, investment, exports and inventories), two primary factor elements (capital and labor), two margin sectors (trade and transport), imports by product for each of the 55 sectors and five components of final demand, an aggregate of indirect taxes and an aggregate of taxes on production (IBGE , 2008).

The Family Budget Survey (FBS), a sample survey conducted by the Brazilian Institute of Geography and Statistics (IBGE) for the period 2008/2009, was used to construct the vectors of household consumption and the income shock value resulting from the implementation of the Vale-cultura.

Finally, it is worth mentioning that the absence of any specific satellite study for cultural goods and services prevents a more careful analysis of this sector. This is because it does not allow a greater degree of detail in the CGE model, as well as because it establishes a dependency of the studied period of the FBS data that, in this case, are somewhat delayed in relation to the Programa Cultura do Trabalhador. It is assumed, therefore, that the structure of expenditures does not vary widely between periods in the FBS sampling and the implantation of the Vale-cultura, which is a plausible hypothesis.

2.2   Simulation Strategies

The proposed analysis performs an income shock, proportional to that of the program voucher, with the restriction that the consumption of these products only may be modified by the eligible families. Since the simulations presuppose almost complete participation on the part of the eligible individuals[7] , the consideration of only that portion of the Brazilian population is an option more consistent with the experiment proposed here.

This study organizes information according to the household framework. This choice was made because FBS expenditure values cannot be computed individually in their entirety, as would be desirable. Spending with some of the goods and ser-

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[7]Participation in Vale-cultura, in January 2016, counted 465 thousand workers. The goal initially discussed by the Government was to reach 12 million beneficiaries by 2020. Such a goal, however, was revised to 3 million due to lower participation than expected in the program. Source: <http://oglobo.globo.com/cultura/vale-cultura-minc-propoe-diminuir-meta-de-beneficiados-18580294>. Accessed: 21 March 2016.

vices of the sample are based on individual information provided through a specific questionnaire. However, not all items have this level of stratification, making it impossible to break down spending to the individual level. In addition, CGE methods use the concept of representative families, and not that of persons. Based on this assumption, the cut of the households is based on the figure of the family head as the representation of each family, so that individuals who are not heads of family are removed from the sample. Such households are divided into two groups: those families that are eligible for the program, and those families that are not eligible for the program. Eligible families are those in which the respective heads receive up to five minimum wages and are regularly employed. Ineligible households are those in which the heads earn more than five minimum wages and all those who are not registered under the Consolidated Labor Laws (CLT), regardless of the value of the salary.

The monthly minimum wage considered herein is R\$415.00 (four hundred and fifty reals), based on data from 15, January 2009. This study uses an FBS sample of 7,533 households, in which 1,771 comprise the eligible group and 5,762 the ineligible group. Using the expansion factor of the sample, the total is 3,916,420 eligible households and 13,787,427 ineligible households.

Each FBS consumption item was associated with one of the 110 MIP products, and seven of these offer goods and services that may be purchased using the Vale-cultura: market education; newspapers, magazines, disks and other recorded products; services oriented toward families; furniture and products from different industries; wood products, furniture made-to-order; manufacture of other textile products; and, other non-metallic, mineral products. In order to make the analysis more practical, the other FBS consumption items have been reaggregated according to the similarity of their characteristics and their association with the respective MIP products, comprising 35 products[8] . The consumption vector of eligible and ineligible households was constructed from these spending data.

The number of individuals eligible for the program is necessary, in order to calculate the income shock value of the program. The FBS is also the starting point to find such values, with the selection of heads of households as the FBS variable that is closest to this concept.

Using only the FBS to obtain the number of individuals eligible for the program is

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[8]The 35 products are: farming and cattle raising; mining; food, beverages and tobacco; textiles, clothing and footwear; other textiles; leather; wood; cellulose; paper; newspapers, magazines and disks; chemicals and fuel; pharmaceutical products, perfumes, pesticides and rubber products; paints; various chemicals; plastic; cement and steel; other non-metallic minerals; metal products; machinery, automobiles and trucks; home appliances; office and informatics; electronics; furniture; SIUP; construction; commerce; transportation; services; information services; real estate services; repair and maintenance services; lodging services; market education; family services; public administration.

problematic, since it is only possible to construct the spending vector by considering the of the head of household figure as the beneficiary. Vale-cultura is individual and, thus, allows more than one member of the household to receive the benefit, provided they follow the rules laid down by the government. There is, therefore, a limitation in the identification of the number of eligible individuals and, thus, in the possible income shock value. PNAD information was used as a way to alleviate this data limitation, since it offers the possibility of working with a more stratified sample. The idea is to create an index from the PNAD, that represents the number of individuals eligible for the program in each household, and thus to associate them with the FBS.

To identify the potential net value of transfers from Vale-cultura, the number of eligible individuals is multiplied by the net value of the monthly benefit, specific for each salary level, and by the number of months of the year. The total transfer of the Vale-cultura calculated for the eligible families is R$4,664,000,000. However, as the values used in the simulations are those of the MIP, such an amount needs to be deflated for the year 2005. Using the Consumer Price Index (IPCA) at 1.14, the total value of transfers is calculated as R$4,088,000,000. It is worth mentioning that there are still individuals who could receive the benefit, but are not considered in this paper.

Some hypotheses are assumed for the simulation. The first one relates to the number of individuals receiving the benefit. Participation was still weak at the time this study was being developed, which is justified by the fact of Vale-cultura being relatively recent and depending on the interest of companies to offer it to their employees. Thus, with the goal of trying to get the maximum effect of the program, the hypothesis of full participation by individuals from eligible households, totaling 8,346,947 people, is adopted herein. This value was found using FBS data and applying the index constructed from the PNAD. Although it is a strong hypothesis, it still does not include all possible beneficiaries. Ineligible households, for example, may contain eligible people. Table 1 presents all the possible scenarios. Another hypothesis is that the monetary value is fully spent by households, even though the voucher does not necessarily need to be used, and may be accumulated indefinitely.

The shock value of Vale-cultura is calculated as the ratio between the net value of the benefit and the total value of the consumption expenditure of a certain group of individuals. All these values were calculated in R$ in 2005, the base period of the MIP. Such shock would equal 3.26% in aggregate expenditure, in actual private consumption of eligible households (deflated value for the base year of the model, 2005). The transfer value would be R$4,088 million in 2005 values, corresponding to 0.118% of GDP and 0.288% of household consumption.

The expected result of the model with that kind of shock is a positive reallocation of the consumption vector, but only for the seven products related to cultural goods and services that can be purchased using the Vale-cultura, considering that this resource cannot be spent on products other than those determined by the program.

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Table 1: **Information on the determination of eligible and ineligible families in simulation exercises**

Eligible and ineligible specification
- Eligible: a head of household who earns up to five minimum wages and is regularly employed.   - Ineligible: a head of household who earns more than five minimum wages and/or is employed in the informal labor market.
Problems of the specification chosen
- Households whose head earns up to five minimum wages: it can include more than one beneficiary. Solution employed: use PNAD-FBS index in the eligible group.   - Households whose head earns more than five minimum wages: the head of household is ineligible, but other eligible individuals can reside in the household. These were then disregarded.
Individuals who could receive the benefit in large group settings, but are not considered eligible (part of the ineligible group)
- Individuals who earn over five minimum wages and are regularly employed.   - Public servants.
Limitations of the data base
- Distortions from using two different surveys (FBS and PNAD).   - Use of the social security contribution variable characterizing the formal market, due to the lack of information on regular employment in the FBS.   - Does not capture changes in the pattern of individuals moving from the informal to the formal market.

Source: Elaborated by the authors, based on the results of the 2012 PNAD.

Table 2: **Spending on items from Vale-Cultura in every MIP product according to FBS information 2008-2009 (%)**

Products	Eligible families		Ineligible families	
	Items on the list of Vale-cultura	Other items	Items on the list of Vale-cultura	Other items
Other textile	0.05	99.95	0.05	99.95
Wood	65.29	34.71	91.79	8.21
Newspapers, magazines and disks	70.11	29.89	83.49	16.51
Other non-metalic minerals	0.81	99.19	3.26	96.74
Furniture	1.01	98.99	3.79	96.21
Market education	1.17	98.83	1.17	98.83
Family services	7.01	92.99	5.76	94.24

Source: Elaboration based on information from FBS, 2008-2009.

That is, there is an offset to the right of the demand curve for those products to families who receive the Vale-cultura benefit.

In all seven sectors that receive the shock, however, there are goods and services that cannot be purchased using Vale-cultura, so that the group of items that receive the shock in the simulations is overrated. This percentage can be seen in Table 2. In turn, the effect generated in the more specific cultural product cannot be calculated directly, as the result of simulations performed here considers the application of the shock to the set of products.

The simulations consider that the extra income that would be passed on to the families would come entirely from the government, because even if the value is passed on by the companies they receive compensation in the form of tax relief. The government, in turn, hypothetically does not pay this amount in its consumption of goods and does not change the tax burden to finance the program. This means that the implementation of the program would increase the public deficit marginally, and that it would have no real effect on the economy. Alternatively, a simulation hypothesis could be adopted in which the transfer would be compensated by either cutting government consumption or raising taxes. However, there is no information about the empirical validity of this hypothesis.

The closing of the model, which indicates the set of variables defined as exogenous and endogenous, is long-term. In a closing like this, the capital stock is variable and adjusts itself to maintain a fixed rate of return. In the market of factors, the supply of capital is endogenous in the aggregate and sectorally, with fixed rates of return. Employment is exogenous and real wages are endogenous. The number of households and their preferences are exogenous. Investment is endogenous by sector and in the

aggregate.

Income shock causes a reallocation of the consumption vector that, in turn, impacts the demand for both domestic and imported products. In the case of domestic supply, despite the possibility of reallocation of the work factor among the sectors, this reallocation is done imperfectly, which generates an impact on production costs and relative prices. Thus, price and activity effects generate changes in the levels of export, import and investment. Real consumption adjusts itself endogenously, responding to the income shock. In the case of households that receive the extra income from the Vale-cultura, only the consumption of the seven products of the program is adjusted; if the family is not part of the group that receives the income shock, all products can be changed. Finally, real consumption of goods and services of the government is exogenous.

The results concerning the impact adopting the Vale-cultura, presented in comparative statistics, always refer to the deviation caused by the shock relative to a situation in which this shock does not occur. The GEMPACK software[9] was used to implement the simulations.

3   Results

Table 3 presents the impact on family consumption of eligible and ineligible households. The demand for the seven products containing the items in the Vale-cultura list would change, for the eligible families, around 60%. The demand by these families for other products would not change, since individuals could not spend the extra income on other items, except those on the program list. The families of ineligible households do not receive the shock and, consequently, a change in the consumption of all products would be seen for these individuals, including a negative variation in most cultural products. This is due to the increase in price of the items of these products, forced by the increased demand in the other group. In the aggregate of families, there is a reallocation of the consumption vector of these individuals for the other products as they become relatively cheaper. Consequently, Vale-cultura redistributes the consumption of cultural goods and services from ineligible to eligible individuals. Among those products that showed a negative variation, and not belonging to the cultural sector, are maintenance and repair services (-0.011%); farming and cattle raising (-0.012%) and services (-0.013%).

An analysis of the impacts on well-being can be done, in monetary terms, through two measures: compensating variation (CV) and equivalent variation (EV). They are especially useful when the shocks affect relative prices and the basket of goods con-

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[9]The simulations were done with GEMPACK version 11. More details about the implementation of the CGE models in this software may be examined in Harrison and Pearson (1994). More details about the software itself may be seen in <http://www.monash.edu.au/policy/gempack.htm>.

Table 3: **Impact of Vale-Cultura on household consumption (real var. %)**

Products	Eligible families	Ineligible families	Aggregate variation
Farming and cattle raising	0	-0.012	-0.01
Mining	0	0.012	0.01
Food, beverages and tobacco	0	-0.006	-0.005
Textile, clothing and footwear	0	-0.01	-0.009
Other textiles	60.505	0.003	4.631
Leather	0	0.017	0.016
Wood	60.895	-0.009	0.846
Cellulose	0	0.019	0.01
Paper	0	0.004	0.003
Newspapers, magazines and disks	59.38	0.001	3.217
Chemicals and fuel	0	0.028	0.024
Pharmaceuticals, perfumes, pesticides and rubber products	0	0.046	0.04
Paint	0	0.024	0.022
Various chemicals	0	0.088	0.052
Plastic	0	0.057	0.053
Cement and steel	0	0.021	0.018
Other non-metalic minerals	59.723	0.025	3.562
Metal products	0	0.032	0.028
Machinery, automobiles and trucks	0	0.029	0.028
Home appliances	0	0.011	0.009
Office and informatics	0	0.064	0.059
Electronics	0	0.051	0.043
Furniture	60.914	0.003	5.546
Industrial Services of Public Utilities	0	0.012	0.011
Construction	0	0.025	0.013
Commerce	0	0.022	0.011
Transportation	0	0.013	0.011
Services	0	-0.013	-0.013
Information services	0	0	0
Real estate services	0	0.016	0.015
Maintenance and repair services	0	-0.011	-0.01
Lodging services	0	0.014	0.012
Market education	60.718	-0.056	1.611
Services for the family	60.692	-0.04	2.721
Public administration	0	0.017	0.008

Source: Elaboration based on simulation results.

Table 4: **Impact of Vale-cultura on consumption measurements and well-being of the families (in R\$ from 2005)**

Vector of elements	Eligible families	Ineligible families
Compensating Variation (R\$ million)	3962.88	-23.78
Equivalent Variation (R\$ million)	4143.82	0
Consumption/GDP (var. %)	3.1	-0.15
Consumer price index (var. %)	0.54	0.55
Utility (index % change)	8.2	0
Real consumption (var. %)	3.26	0

Source: Elaboration based on simulations results.

sumed by households. Compensating variation indicates monetary indexation that compensates any change in the well-being of the individual caused by change in the parameters of the budgetary constraint. In other words, the CV is the amount that leaves the individual in their original indifference curve; i.e., in the same initial basket of goods for a given price variation. Equivalent variation represents the variation in income that is equal to a variation of prices, in terms of variation of utility, which means a new basket of goods. Therefore, the EV represents the amount of currency that should be removed from the consumer to leave them as well off as after price variation (Varian, 1992).

Table 4 shows that families from eligible households would have compensating and equivalent positive variations, which is a sign of increased well-being. This means that price changes would involve income raises to compensate the consumer, so that they will need more income to increase their consumption of goods and services from the cultural sector. There is a negative response in the well-being of ineligible families due to the upward price variation in the economy. The index of household usefulness also shows upward value in the simulations for the eligible individuals, whereas the effect on prices can be inferred from the positive variation in the consumer price index (CPI).

A sectoral analysis is also important for understanding the interdependence and linkage effects. Table 5 presents the accumulated variations in production levels; that is, variations in the level of activity or Added Value. As expected, the products that would receive the shock from Vale-cultura would have a positive variation, showing greater reallocation of productive factors around these products in the two shocks and, consequently, proportionately larger production.

Table 5 shows the variation in production prices of locally produced goods. The numbers are consistent with the data analyzed so far, such as the increase in the price level, with greater pressure in the sectors of products that received the income shock. These values help in the understanding of the sectoral results and the increase in the final price to the consumer.

Table 5: **Impact of Vale-cultura on the Value Added and the general price of production of goods produced locally (var.%)**

Products	Variation on the value added	Price variation
Farming and cattle raising	-0.18	0.59
Mining	-0.23	0.51
Food, beverages and tobacco	-0.14	0.58
Textile, clothing and footwear	0.07	0.58
Other textiles	1.83	0.54
Leather	-0.13	0.59
Wood	0.28	0.59
Cellulose	-0.5	0.53
Paper	0.14	0.53
Newspapers, magazines and disks	0.93	0.55
Chemicals and fuel	-0.08	0.43
Pharmaceuticals, perfumes, pesticides and rubber products	-0.09	0.5
Paint	0.09	0.46
Various chemicals	-0.07	0.46
Plastic	-0.02	0.49
Cement and steel	-0.21	0.47
Other non-metalic minerals	0.03	0.56
Metal products	-0.09	0.53
Machinery, automobiles and trucks	-0.24	0.49
Home appliances	-0.05	0.52
Office and informatics	0.05	0.33
Electronics	-0.04	0.41
Furniture	2.98	0.54
Industrial Services of Public Utilities	0.02	0.52
Construction	0.11	0.55
Commerce	0.16	0.61
Transportation	-0.18	0.57
Services	-0.02	0.58
Information services	-0.01	0.55
Real estate services	-0.08	0.53
Maintenance and repair services	0.01	0.57
Lodging services	-0.17	0.6
Market education	1.54	0.69
Services for the family	2.32	0.66
Public administration	0	0.7

Source: Elaboration based on simulation results.

Table 6: **Impact of Vale-cultura on the collection of indirect and production taxes (in R\$ from 2005)**

Macroeconomic variables	Variation
Indirect taxes (R\$ million)	3397
Production taxes (R\$ million)	167
Program transfer (R\$ million)	4088
Tax revenues generated / Transfer (in %)	0.8718

Source: Elaboration based on the simulation results.

Table 6 shows that the adoption of the program would increase the indirect tax collection, such as ICMS and IPI, as well as taxes on production, such as PIS, COFINS and IRPJ significantly, which would offset much of the expense related to the implementation of the program. The ratio of total tax revenues generated by the value of the transfers is 0.8718. That is, for every R\$1.00 spent on the program, R\$0.87 is returned to the economy in the form of taxes. Therefore, the hypothesis of a small impact of the program on the public debt, and the lack of necessity to adjust government consumption or taxes to finance the program, appears reasonable.

Finally, in terms of macroeconomic aggregates shown in Table 7, there would be a 0.07% change in the actual GDP; i.e., it would 0.07% higher in the scenario with Vale-cultura than in a scenario without the voucher. GDP growth would be driven by the growth of the use of the capital factor on the factor side and household consumption on the absorption side. The investment, which depends on the return of capital and on the rate of return, has a positive variation.

Considering that cultural goods and services still have strong limitations in the shopping basket of part of the population, the result of Vale-cultura on the GDP is interesting. One indicator that shows the relevant effect of the shock is the ratio between the percentage change of the GDP as a function of the shock and the shock percentage on the GDP, indicating the generator effect of the shock. In the present study, the generator effect was of 0.593, which means that for every R\$1.00 invested in the program, the return generated for the economy would be R\$ 0.59. In comparative terms, the study carried out in the Australian city of Victoria, which used a TERM model having a long-term closing, resulted in a 1.9 generator effect (KPMG, 2013).

A possible marginal deficit may be seen in the balance of trade, regarding both the positive impact on imports that responds to the increase in relative prices (ratio between domestic and imported prices) and would have a positive variation of 0.12%, as well as the negative impact on exports that responds negatively to the increase in domestic prices. Exports would have a negative variation of 0.61%. Such a result can be understood as a way of absorbing the expansion of consumption by individuals who received the benefit. This indicates that this public policy, prioritizing domestic consumption, eventually deteriorates foreign trade.

Table 7: **Impact of Vale-cultura on the macroeconomic variables (in var.%)**

Macroeconomic variables	Variation real %
Real GDP	0.07
Family consumption	0.31
Investment	0.12
Exports	-0.61
Imports	0.37
Use of Work factor	0
Use of the Capital factor	0.12
Shock % of the GDP	0.118
Variation % of the GDP / Shock % of the GDP	0.593
Tax revenues generated / Transfer (in %)	0.872

Source: Own elaboration based on simulation results.

The high prices and internal costs of the economy (Table 4) associated with the growth of the GDP suggest that the adoption of Vale-cultura promotes both an activity-effect and a price-effect. The latter, however, although negatively affecting the commercial balance, is not sufficient to offset the positive effect of the activity-effect.

4   Final considerations

This paper aims to study the economic effects of the implementation of the Programa Cultura do Trabalhador, using a computable general equilibrium model.

The results indicate a growth in the real GDP of around 0.07%, driven mainly by the increase in household consumption on the absorption side. The generator effect was 0.59, which indicates that this GDP growth was significant. As for consumption, the implementation of Vale-cultura would generate a positive variation in demand, in the sectors of the economy that supply goods that may be purchased with the voucher. As for the ineligible group, that did not receive the shock, there are differences due to price variation. In this situation, cultural services and goods become relatively more expensive, which implies a reallocation of the consumption vector towards other goods.

Well-being, analyzed by the equivalent variation and compensating variation in income, presents positive variation for the beneficiaries of the voucher, and negative or zero for the others. The collection of indirect and production taxes is also positively affected due to various effects in the economy, like the price variation, which partly would make up for the transfer from the Government to the companies via

tax exemption. In terms of sector analysis, positive growth in the level of activity of the cultural sectors and negative in some others is seen, showing a reallocation of productive factors and an increase in the cost of production. Among the sectors that are not affected by the shock, paper, textile, and paint stand out. They are, intuitively, indirectly connected with some of the cultural products.

Such results are important and not only justify adoption of the program by the federal government, but also suggest that its expansion is interesting from an economic point of view.

Finally, the pioneering character of this study for the Brazilian case stands out. Such a line of research may generate information important to the understanding of the cultural sector in the economy of a country, such that it is an area of research that should be further explored and discussed.

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