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Perspective for the future composition on the means of taxation control in Mexico

Perspectiva para la composición futura de los medios de fiscalización en México

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Abstract

The objective is to establish the future composition of control acts performed by the Tax Administration Service (SAT) using Markov Processes. Some previous applications of this type of methods are presented and later their application is explained to obtain the future composition of the federal control. The adjustment of the method is checked, comparing the estimates for the months of January to June 2017, of which the actual data were available; for the rest of the months, estimates were obtained according to the method, knowing the expectation for the methods in which the SAT would supervise throughout the year 2017.

The conclusions state that the form and number of acts performed will change, reducing traditional methods such as home visits, which is consistent according to the use of technology such as Digital Tax Receipts, Informative Statement and Payroll Stamps and others.

JEL code: M48, M42, C13

Keywords: Taxation; Markov chains; Audit

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Resumen
El objetivo es establecer la composición futura de actos de fiscalización realizados por el Servicio de Administración Tributaria (SAT) empleando Procesos de Markov. Se presentan algunas aplicaciones precedentes de este tipo de métodos y posteriormente se explica su aplicación para obtener la composición futura de la fiscalización federal. Se verifica el ajuste del método, contrastando los estimados para los meses de enero a junio del 2017 de los cuales se dispuso de los datos reales; para el resto de los meses se obtuvieron las estimaciones conforme al método, conociendo la expectativa para los métodos en que fiscalizaría el SAT durante todo el año 2017. En las conclusiones se deja constancia que la forma y en número de actos realizados sí cambiará, reduciendo los métodos tradicionales como las Visitas Domiciliarias, lo que es consistente de acuerdo al uso de la tecnología como los Comprobantes Fiscales Digitales, Declaraciones Informativas y Timbrado de Nómina, entre otros.

Código JEL: M48, M42, C13
Palabras clave: Fiscalización; Procesos de Markov; Auditoría

Introduction

In Mexico, audit acts have their origin in the constitutional principles, indicating that any contribution that is established in the country must be compulsory, proportional, and equal, as it contemplates the Political Constitution of the United Mexican States, in Article 31 Section IV, indicating the obligation of the Mexican people to contribute to the public expense of the Federation, States, and Municipalities, in a proportional and equitable way provided by the laws (Congreso de la Unión, 2017a).

Another of the legal systems that give rise to audit acts is the Federal Fiscal Code (CFF for its acronym in Spanish), which together with the laws and regulations for Income Tax (ISR for its acronym in Spanish), Value Added Tax (IVA for its acronym in Spanish), among others, contain norms that act as instruments of tax administration, which constitute a legal framework that integrates generic tax concepts, being receptacles for the rights and obligations of taxpayers, as well as for the authority (Congreso de la Unión, 2017b).

Within the General Provisions contained in the CFF, it is emphasized that both individuals and corporations are obligated to contribute to public expenditure in accordance with the respective tax laws, and that, in order to verify correct compliance with federal tax payments, the Ministry of Finance and Public Credit (SHCP for its acronym in Spanish), through the Tax Administration Service (SAT), has the authority to carry out the various analyses that allow it to evaluate compliance with payments. At the request of the SAT, the substantive relations that make possible the payment of taxes, the administrative procedures to also make effective

the fulfillment of the payment, as well as the adjudication of responsibilities and sanctions that derive from the exercise of its faculties are developed.

Notwithstanding the legal framework, the efforts to carry out audits in Mexico have been very diverse. To cite a brief summary, it can be said that from the 1980s and until the end of the 1990s, the usual audit acts carried out by the authority—in addition to the tax audit reports—were: a) Home Visits, carried out by the acting personnel of the authority in the fiscal addresses of the taxpayers; and b) Desk Inspections, in which the authority requested the taxpayer or their legal representative to come to its offices in order to provide documentation or information deemed necessary to verify the correct compliance with tax obligations.

The precedent of modern automated audit during the mid-1990s was the reception of information on operations between clients and suppliers as well as the wages and salaries that employers paid to their employees. This information was initially provided by means of magnetic disks (Secretaría de Hacienda y Crédito Público, 1998), to be used later as certified copies in the search of discrepancies between the parties, or to verify, in the case of the salary reports, the correct withholding and whole of the tax applied on the income of workers.

During the same period in the 1990s, other bodies empowered to collect contributions, such as the Mexican Social Security Institute (IMSS for its acronym in Spanish) and the Institute of the National Housing Fund for Workers (INFONAVIT for its acronym in Spanish), began the process of exchanging information, even including municipal governments, to find out the details of construction permits, allowing them to identify whether or not taxes on salaries were being levied and, in addition, relying substantially on the opinion of the Public Accountant in a Tax Audit Report (Instituto Mexicano del Seguro Social, 1992). However, this exchange of information was mostly contained in documentary form.

It was not until the end of the 20th century that it was made public that Mexico had one of the lowest collections among the countries of the Organization for Economic Cooperation and Development (Hurtado & Barret, 2014), pressuring tax authorities to start with what until now could be called the great implementation of automated systems, trying to obtain information for much more agile audits to those in the late 1990s. With the aforementioned a broad catalog of informative statements emerged, from which they reported a list of concepts involved in determining a tax (Instituto Mexicano de Contadores Públicos, 2009), as was the now repealed Single Rate Business Tax (IETU for its acronym in Spanish) but which at the time was considered with respect to constitutional principles (Comisión de Investigación Fiscal, 2010); and the still valid Informative Declaration of Operations with Third Parties (DIOT for its acronym in Spanish), to mention only these two examples, in which taxpayers would no longer present magnetic disks but would instead send attached files, by electronic means, containing the information required by the authority.

In this way, the audit acts for the beginning of the 21st century became a quasi-perfect pair with the automated systems (Servicio de Administración Tributaria, 2016), deriving until today in the immediate records of purchase and sale of goods and services consigned in a Digital Tax Receipt (CFDi for its acronym in Spanish), issued at the time when a commercial transaction occurs or even a labor transaction, with what is known as payroll stamp—this being nothing more than another digital voucher, but specific to the payment by product of a subordinate relationship.

Another important aspect to consider is that the mechanisms for the authority, specifically the SAT, to obtain a greater volume of information to evaluate taxpayer transactions were strengthened due to the international process for the exchange of information, a situation that was already being deepened in countries such as Spain, Argentina, Chile, etc. (García, Rodríguez, & León, 2012), and which became indispensable as a result of abuses committed in the past by invoicing between related companies (León & Lagunas, 2017). As a result, in addition to receiving information from companies with establishments in their countries or domiciled in them, audit authorities also had to present information with related parties abroad, information that, through agreements to exchange information (Instituto de Estudios Fiscales, 2010), could be verified by the authority.

In Mexico, audit acts have become agile and automated mechanisms, grouped by specific categories that the authority makes available to the general public, with the following being still in force: Home Visits, Desk Inspections, Report Inspections, Mass Inspections (which are performed automatically by the systems) and, Various Inspections (focused before the analysis of taxpayer files).

With this grouping, the authority presents, by months, the developed audit acts, which will be considered for this article for the January 2012 - July 2017 period (Servicio de Administración Tributaria, 2017). The following question arises, which will be answered at the end of this article:

Due to the application of the technology used by the SAT, the ways of auditing have changed in recent months, or better still, can we expect them to change in the short or medium term?

In order to answer the question above, the following sections present a model adapted to stochastic type audit acts (not considered in previous studies). This type of methods is adequate when future estimates will be based on the observed pattern of behavior, also considered as continuous time (Ordoñez, Lerma, & Ocampo, 2008).

In the field of economics and finance these methods have sometimes been suggested over deterministic models (Hernández-Lerma & Venegas-Martínez, 2012), being that this recommendation, for example, applies to replace them instead of linear models, subject to one variable behaving in one way or another conditioned to the influence of other related variables.

Some applications through Markov models

Originally proposed by the Russian scientist Andrei Markov, the stochastic models bearing his surname have proved to be of great use, recognizing the contribution of chained probabilities (Markov Chains), which refer to the succession of probabilities where a future value will depend on previous probabilities, most commonly known as "Markov Chains" (Bell, 2012; University of St Andrews, 2017; Norris, 1998). This feature of obtaining future estimates based on past events has been shared by other researchers, all of whom recognize that Markov models are appropriate for establishing future scenarios based on the probabilities that have occurred or are present (Ching, Huang, Ng, & Siu, 2013; Hernández-Lerma & Venegas-Martínez, Toma de decisiones de agentes racionales con procesos markovianos, 2012).

Beyond a general appreciation, Markov methods have served to establish the transition from one state to another within finite possibilities (Baum, Petrie, Soules, & Weiss, 2014; Levin, Peres, & Wilmert, 2007), such as, for example, what is applied to obtain future scenarios in the distribution of income in a society, obtaining interesting findings such as the affirmation of the almost permanent inequity in the distribution of wealth, as is the case of Colombia (Galvis, 2015; Quah, 1996).

An interesting suggestion for Markov models is to use them as an alternative to other more common models, such as regressions, as stated by Hernandez del Valle (2009), who proposes and develops an interesting analysis assessing the contraction or growth that could be expected in economies such as those of Mexico and the United States. The author, using a Markov model, answers the question of what would be the expectation for stationary growth in Mexico and the United States of America. The author finds that, unfortunately, in the case of Mexico, a stagnation in growth of less than 2% should be expected, and establishes that the contractions to be registered in the United States would not be more than 3%.

In the financial field, Markov models have proved to be efficient. A study applied to credit ratings made it possible to integrate a model with data from credit ratings and, based on these, the manner in which to establish the probability matrices that, together with current ratings or statements, would lead to establish future credit ratings. This study is considered to be of great value, as it describes the development and application of the models presented in a mathematically clear manner. Furthermore, section 4 presents specific examples applied to the financial sphere (Israel, Rosenthal, & Wei, 2001).

It is also possible to appreciate the great value that Markov models have when it is observed that their use not only reaches economic or financial applications, but also conjunctural issues of life, such is the case of work applied to the demand for drinking water that will be required by the population in the short and medium term. Authors Gagliardi, Alvisi, Kapelan, and Franchini (2017) present an approach that emphasizes in two ways the manner of using

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Markov models: the first is represented by homogeneous models (Darling & Siegert, 1953), where the probability matrix and its data remain constant (continuous) in order to obtain close scenarios, the only variant being the values of a given current state; the second way is to vary the probability matrix as new values are obtained (Aziz, Sanwal, Shingal, & Brayton, 2000).

Other authors (Gagliardi, Alvisi, Kapelan, & Franchini, 2017; Ching, Huang, Ng, & Siu, 2013) specify that a non-homogeneous model is one in which the current state varies, as well as the values of the probability matrices (also referred to as transition matrices), where the data are adjusted in different periods of time. The authors conclude that both types of Markov models can be applied to specific cases of real life, as was the case for their study applied to water demand (Gagliardi, Alvisi, Kapelan, & Franchini, 2017).

Another interesting example was applied to the forecast of winds for short and medium term. In this approach the authors decided to use non-homogeneous probability matrices, that is to say, matrices with variants in the values of probability for different periods of time. They concluded that a Markov model, discrete and with variable probability matrices, allows predicting in a clear and relatively simple way the future scenarios for wind speeds (Carpinone, Langella, & Testa, 2015).

Form to estimate audit acts using the Markov model

The categorization of the audit acts performed by the Tax Administration Service (SAT) is considered, distinguishing the five methods in which it groups them: Home Visits, Desk Inspections, Report Inspection, Mass Inspections, and Various Inspections (Servicio de Administración Tributaria, 2017).

With the information available from January 2012 until December 2016, to analyze the expectations that integrate the disaggregation of audit acts, the method known as Transition Matrices is applied (Render, Stair, & Hanna, 2012; Anderson, Sweeney, Williams, Camm, & Martin, 2011). This method needs previous information of the variables to be analyzed that will integrate what is known as Stochastic or Transition Matrices, whose general form is represented below.

Transition matrix *(1)*

$$P = \begin{pmatrix} P_{11} & P_{12} & P_{13} & \cdots & P_{1n} \\ P_{21} & P_{22} & P_{23} & \cdots & P_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ P_{m1} & \cdots & \cdots & \cdots & P_{mn} \end{pmatrix}$$

As well as the current state of the condition of the variables of interest.

Probability vector for a current or present state 0 *(2)*

$$\pi(0) = (\pi_1, \pi_2, \pi_3, \ldots, \pi_n)$$

So that, from these two elements, what is known as future states or expectations for the variable can be obtained.

Probability vector for a future state i *(3)*

$$\pi(i) = (\pi_1, \pi_2, \pi_3, \ldots, \pi_n)$$

For the specific application in control methods, a probability vector to express conformation at a moment in time would be represented as follows:

Representation of a future period *(4)*[1]

$$\pi(i) = \pi_{\gamma_i}, \pi_{\vartheta_i}, \pi_{\varphi_i}, \pi_{\omega_i}, \pi_{\delta_i}$$

Where

$\pi(i) = probability\ vector\ for\ a\ future\ period$

$\pi_{\gamma_i} = probability\ of\ home\ visits\ in\ a\ future\ period$

$\pi_{\vartheta_i} = probability\ of\ desk\ inspections\ in\ a\ future\ period$

$\pi_{\varphi_i} = probability\ of\ report\ inspection\ in\ a\ future\ period$

$\pi_{\omega_i} = probability\ of\ mass\ inspections\ in\ a\ future\ period$

$\pi_{\tau_i} = probability\ of\ various\ inspections\ in\ a\ future\ period$

Representation of a present period *(5)*[2]

$$\pi(0) = \pi_{\gamma_0}, \pi_{\vartheta_0}, \pi_{\varphi_0}, \pi_{\omega_0}, \pi_{\delta_0}$$

[1] For this work, sub-index *i* will be substituted by the month of the year 2017 that will be estimated.
[2] For this work, sub-index 0 will be substituted by the corresponding month of the year 2016 that will serve as the present period.

Where

$$\pi(0) = probability\ vector\ for\ a\ present\ period$$
$$\pi_{\gamma_0} = probability\ of\ home\ visits\ in\ a\ present\ period$$
$$\pi_{\vartheta_0} = probability\ of\ desk\ inspections\ in\ a\ present\ period$$
$$\pi_{\varphi_0} = probability\ of\ report\ inspection\ in\ a\ present\ period$$
$$\pi_{\omega_0} = probability\ of\ mass\ inspections\ in\ a\ present\ period$$
$$\pi_{\tau_o} = probability\ of\ various\ inspections\ in\ a\ present\ period$$

To obtain expectations, matrices are constructed that will have to meet specific characteristics. The first is that for all moments and probabilities, values must adopt the characteristic of being non-negative ; *P month,audit method* > 0 another characteristic is that for each moment and its conformation according to the types of audit acts, organized by lines, will be equal to 100% also expressed as . The foregoing was fulfilled for each of the five lines representing the states in different periods.

The representation of a stochastic or transition matrix x for audit methods is as follows:

Transition matrix by audit method *(6)*

$$P = \begin{pmatrix} p_{\gamma\ month\ 2012} & p_{\vartheta month\ 2012} & p_{\varphi month\ 2012} & p_{\omega month\ 2012} & p_{\tau month\ 2012} \\ p_{\gamma month\ 2013} & p_{\vartheta month\ 2013} & p_{\varphi month\ 2013} & p_{\omega month\ 2013} & p_{\tau month\ 2013} \\ p_{\gamma month\ 2014} & p_{\vartheta month\ 2014} & p_{\varphi month\ 2014} & p_{\omega month\ 2014} & p_{\tau month\ 2014} \\ p_{\gamma month\ 2015} & p_{\vartheta month\ 2015} & p_{\varphi month\ 2015} & p_{\omega month\ 2015} & p_{\tau month\ 2015} \\ p_{\gamma month\ 2016} & p_{\vartheta month\ 2016} & p_{\varphi May\ 2016} & p_{\omega month\ 2016} & p_{\tau month\ 2016} \end{pmatrix}$$

The components of the previous transition matrix *P* in each of the lines represent the percentage (initial probability) conformation of the number of audits by each method with respect to the total number of audits for the month and year indicated, using this information as one of the elements to estimate what could be expected for all months of 2017[3] (future states). Matrices will be formed for each month to be estimated, for example, to obtain the expectation of January 2017 (future state), the matrix will be integrated with the conformation of audit acts of the months of January 2012 and until January 2016.

[3] The results obtained from January to June will be used to evaluate the error of the proposed model, since at the date of this document the conformation of audits by method for the month of June 2017 is available.

The present periods will start with the conformation of the corresponding month but for the year 2016 ; $\pi(0)_{\text{January 2016}}$: therefore, the result of the expectation for that month but for 2017 will be denoted by $\pi(i)_{\text{January 2017}} = \pi(0)_{\text{January 2016}} P$ and so on, until meeting the expectation for the month of December

Given the aforementioned, expectations may be obtained by identifying whether the new automated mechanisms of the SAT, from the issuance of Digital Tax Receipts (CFDi) to payroll stamping, and even to the information on operations with third parties (DIOT), among others, have contributed to any change in the composition of the total number of audit acts (Servicio de Administración Tributaria, 2017).

Notation to obtain future monthly expectations *(7)*

$$\pi(i)_{month\ 2017} = \pi(0)_{month\ 2016} P$$

$$\pi(i)_{month\ 2017} = [\pi_{\gamma}(0)_{month\ 2016}, \pi_{\vartheta}(0)_{month\ 2016}, \pi_{\varphi}(0)_{month\ 2016}, \pi_{\omega}(0)_{month\ 2016}, \pi_{\delta}(0)_{month\ 2016}] P$$

Future estimates by audit method

Table 1, which expresses the official data to establish the values of the transition matrix corresponding to the month of January[4], is presented below.

Table 1
Number of audits by audit method
Months of January

Method / Year	Home Visits	Desk Inspections	Report Inspections	Mass Inspections	Various Inspections
2012	1,569	787	267	1,885	1,156
2013	1,335	601	295	3,127	1,183
2014	1,240	615	187	1,681	237
2015	1,245	532	114	2,884	528
2016	1,059	398	81	707	2,089

Source: own elaboration with data from the SAT (2017)

[4] The values corresponding to 2016 will represent the initial state , which, together with the matrix, will serve to estimate the future state of the same month, but in the year 2017

Therefore, when structuring the values according to notation (3), the transition matrix and its graph are established as follows:

$$P_{January} = \begin{pmatrix} 0.2770 & 0.1389 & 0.0471 & 0.3328 & 0.2041 \\ 0.2041 & 0.0919 & 0.0451 & 0.4781 & 0.1809 \\ 0.3131 & 0.1553 & 0.0472 & 0.4245 & 0.0598 \\ 0.2348 & 0.1003 & 0.0215 & 0.5438 & 0.0996 \\ 0.2443 & 0.0918 & 0.0187 & 0.1631 & 0.4820 \end{pmatrix}$$

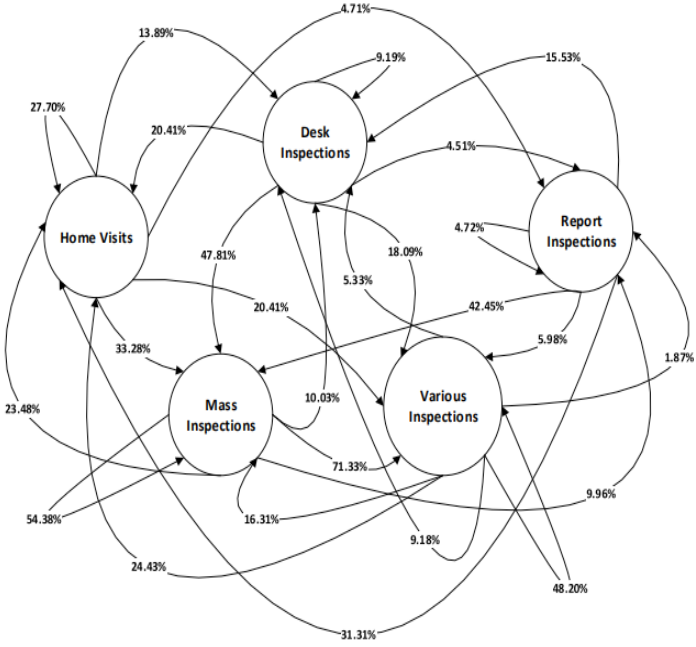

Figure 1 January . Representation of transition probabilities (January 2012, January 2013...January 2016) according to the matrix to estimate January 2017

Source: own elaboration

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Now, as indicated in the previous footnote, the disaggregated conformation of $\pi(0)_{\text{January 2016}}$ is the following:

$$\pi_{\gamma}(0)_{January\ 2016} = 0.2443\ \pi_{\vartheta}(0)_{January\ 2016} = 0.0918 \pi_{\varphi}(0)_{January\ 2016} = 0.0187$$

$$\pi_{\omega}(0)_{January\ 2016} = 0.1631 \qquad \pi_{\delta}(0)_{January\ 2016} = 0.4820$$

Therefore, using the notation to obtain future monthly expectations (3), the following is obtained:

$$:(i)_{January\ 2017}$$
$$= [\pi_{\gamma}(0)_{January\ 2016}, \pi_{\vartheta}(0)_{January\ 2016}, \pi_{\varphi}(0)_{January\ 2016}, \pi_{\omega}(0)_{January\ 2016}, \pi_{\delta}(0)_{January\ 2016}]P$$

$$:(i)_{January\ 2017}$$
$$= [\ 0.2443\ 0.0918\ 0.0187\ 0.1631\ 0.4820\ ] \begin{pmatrix} 0.2770 & 0.1389 & 0.0471 & 0.3328 & 0.2041 \\ 0.2041 & 0.0919 & 0.0451 & 0.4781 & 0.1809 \\ 0.3131 & 0.1553 & 0.0472 & 0.4245 & 0.0598 \\ 0.2348 & 0.1003 & 0.0215 & 0.5438 & 0.0996 \\ 0.2443 & 0.0918 & 0.0187 & 0.1631 & 0.4820 \end{pmatrix}$$

$$:_{\gamma}(i)_{\ January\ 2017} = 0.2484\ \pi_{\vartheta}(i)_{January\ 2017} = 0.1059\ \pi_{\varphi}(i)_{January\ 2017} = 0.0291$$

$$:_{\omega}(i)_{January\ 2017}) = 0.3005 \qquad \pi_{\delta}(i)_{January\ 2017} = 0.3162$$

According to the foregoing, it should be expected that in January 2017 of the total number of audit acts 24.84% will be Home Visits, 10.59% Desk Inspections, 2.91% Report Inspections, 30.05% Mass Inspections, and 31.62% Various Inspections.

It should be clarified that, for any of the periods, it is possible to graphically represent the transition matrices; however, for reasons of space, only the image that corresponds to a comparison between the values that conformed the matrix corresponding to the months of January and the values that corresponded to those of December (figures in red) will be presented below.

http://dx.doi.org/10.22201/fca.24488410e.2018.1867

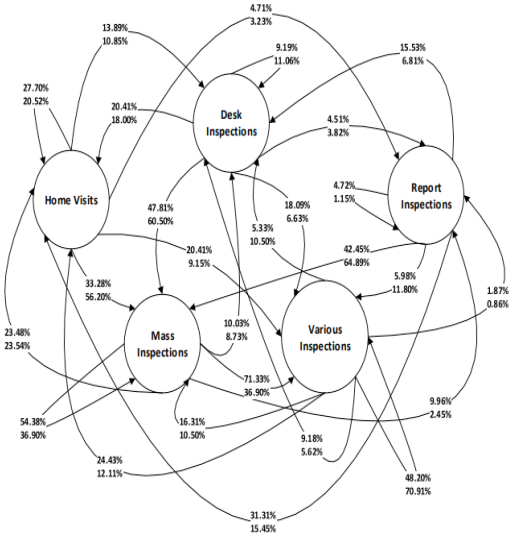

Figure 2.Representation of transition probabilities according to matrices: January (2012, 2013, ..., 2016) (black) – December (2012, 2013, ..., 2016) (below)

Source: own elaboration

When comparing the transitions used to obtain January 2017 with respect to December of the same year, it is appreciated that in two of the usual methods of audit, Home Visits and Report Inspections, one should indeed expect, for the following section of the work, a reduction. It turned out that for the case of Home Visits, a reduction of 27.70% of the total of audits in January 2017 to only 20.57% for the month of December is expected; for the case of Report Inspection, the reduction will be from 4.72% of the total of acts to only 1.15%, which can be interpreted as an opportunity to reduce the expense, and to take advantage of technological means.

Nevertheless, in the case of Mass Inspections, for which it could be considered logical that they be maintained in number, or even be increased by technology, the results indicate that they will be reduced, since of the 54.38% that they represented in January 2017, this percentage would be expected to reach only 36.90% at the end of the month of December of that same year.

http://dx.doi.org/10.22201/fca.24488410e.2018.1867

The methods that are expected to increase by the end of 2017 are Various Inspections, which represented 48.20% of total audit acts in the month of January, with this percentage reaching 70.91% for the month of December. Another method that is expected to be increased is Desk Inspections, going from 9.19% to 11.06% of total audit acts. From the transition matrices for all months of the year it was possible to obtain complete estimates for the months of 2017. The results are presented in the following section.

Results and conclusions

Initially, the estimates corresponding to the months from January to June 2017 are presented, which were then adopted as proof when confronted with the real values. The results are presented in Table 2.

Table 2
Confrontation of actual vs. estimated participation by Markov Model
January – June 2017

Audit Method	Notation		January	February	March	April	May	June
Home Visits		Real	24.43%	20.72%	21.01%	18.57%	19.73%	16.31%
		Estimated	24.84%	22.12%	22.38%	20.24%	21.00%	18.78%
		Absolute difference	0.41%	1.40%	1.37%	1.67%	1.27%	2.47%
Desk Inspections		Real	9.18%	7.15%	7.18%	7.23%	7.83%	6.42%
		Estimated	10.59%	8.73%	9.00%	8.48%	8.58%	7.68%
		Absolute difference	1.41%	1.58%	2.18%	1.25%	0.75%	1.26%
Report Inspections		Real	1.87%	1.76%	1.94%	1.52%	1.33%	1.38%
		Estimated	2.91%	2.61%	2.66%	2.33%	2.14%	2.06%
		Absolute difference	1.04%	0.85%	0.72%	0.81%	0.81%	0.68%
Mass Inspections		Real	16.31%	15.77%	18.14%	15.50%	16.55%	14.51%
		Estimated	30.05%	28.87%	28.77%	27.30%	29.27%	24.86%
		Absolute difference	13.74%	13.10%	10.63%	11.80%	12.72%	10.35%

Various Inspections	Real	48.20%	54.60%	51.74%	57.18%	54.57%	61.39%
	Estimated	31.62%	37.49%	37.20%	41.65%	39.01%	46.61%
	Absolute difference	16.58%	17.11%	14.54%	15.53%	15.56%	14.78%

Source: own elaboration

The results for the months that were considered to test the model were, in all cases, consistent, because although they were expected to yield different values due to the use of technology (CFDi, DIOT, payroll stamping, among others), abrupt changes, such as an audit method varying by 60 or 70 percentage points, were also not expected.
The concentrates of the conformation of audit acts for all months of 2017 are shown in Table 3.

Table 3
Estimated number of audits according to method
January - December 2017

Months of the year 2017	Home Visits	Desk Inspections	Report Inspections	Mass Inspections	Various Inspections
January	24.84%	10.59%	2.91%	30.05%	31.62%
February	22.12%	8.73%	2.61%	28.87%	37.49%
March	22.38%	9.00%	2.66%	28.77%	37.20%
April	20.24%	8.48%	2.33%	27.30%	41.65%
May	21.00%	8.58%	2.14%	29.27%	39.01%
June	18.78%	7.68%	2.06%	24.86%	46.61%
July	16.43%	6.69%	1.73%	22.94%	52.20%
August	15.91%	6.49%	1.54%	24.04%	52.01%
September	14.86%	6.55%	1.64%	21.88%	55.07%
October	15.08%	6.21%	1.57%	21.45%	55.70%
November	15.75%	7.19%	1.59%	21.00%	54.47%
December	14.70%	6.89%	1.49%	21.19%	55.73%

Source: own elaboration

The model adopted to estimate scenarios yielded results attached to consistent margins. In all cases future figures were obtained without major distortions, preserving the trend shown in the last five years towards adherence to more

automated auditing, derived from the use of technology rather than traditional methods, such as Home Visits.

It is important to note that, if the audit methods—as suggested in this paper—are geared towards automation, then an adjustment should be made to the expenditure for the inspection of taxpayers, not only including salary, staff or fee expenditures of auditors, supervisors, or coordinators, but a reduction in travel expenses should also be expected. At the end of this work it was possible to identify that, according to the document "Evolution of collection activity, 2016; and Programs and budget, 2017", the budgetary resources of the SAT for 2017 suffered an 8% reduction, justifying this variation by the optimization achieved by technological implements related to the payment of taxes.

The results in this work were contrasted with the Tax and Management Reports published quarterly by the SAT, especially the document of the second quarter of 2017, resulting in significant findings, because when making a year to year comparison from 2012 to 2017, increases were identified. From 2012 to 2013, 19.18% was reached; and from 2013 to 2014 the increase recorded was of 34.06%. However, the comparison between 2014 and 2015 resulted in a much lower collection, equivalent to a fall of about 45 percentage points. Continuing the contrast of the results, it was identified that the collection in 2016 was not enough either, at least, to reach the amount reported in 2014. According to the above, it can be established, as a continuity hypothesis for other researches, that the use of technology does not necessarily guarantee a better efficiency in the generation of public resources.

It is important to point out that, although the collection through audit acts showed to be lower as of 2015, the collection in general also increased. For example, comparing the $916,538.8 million Mexican pesos collected in 2014 with the $1,222,128.5 million Mexican pesos collected in 2015, then a general increase of 33.34% is calculated. To this end, this is interpreted as the use of technology resulting in taxes being paid better in a voluntary manner than when it is done through audit acts.

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