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Economic Freedom and Economic Development in the Mexican States

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Abstract. In this paper we describe the methodology for the Economic Freedom of Mexico index published by the Fraser Institute. We will present the scores and rankings for the thirty-two Mexican states which have been calculated for the years 2003 to 2009. The relationship between economic freedom and wages is discussed. There is a significant positive relationship between economic freedom and real wages in Mexico.

1. Introduction

Since the introduction of country-level measures of economic freedom in the 1990s by the Fraser Institute (Gwartney, Lawson, Block, 1997) and the Heritage Foundation (Miller, Holmes, Feulner, 2012), much research has analyzed the relationship between economic freedom and economic development. The majority of studies have found that economic freedom has a positive relationship with economic growth (Easton and Walker, 1997) and other measures of economic development (Ayal and Karras, 1998; Norton, 1998; Ashby, 2009).

In recent years scholars have begun to analyze the impact of differences in economic freedom at subnational levels. One of the most widely-used indicators is the *Economic Freedom of North America* index constructed by the Fraser Institute (Ashby, Bueno, McMahon, 2011), which measures economic freedom in the U.S. states and Canadian provinces.[1] Studies using this index have also found a generally positive relationship between economic freedom and economic development (Karabegovic et al., 2003; Kreft and Sobel, 2005; Campbell and Rogers, 2007; Ashby, 2007; Ashby and Sobel, 2008; Sobel, 2008). Regional measures of economic freedom at the subnational level have been constructed for Argentina (Pirovano et al., 2012), India (Debroy, Bhandary, Aijar, 2011), and The European Union and Italy (Guggiola and Viroglio, 2011).

Due to the difficulty in gathering the necessary data, Mexico was not included with its North American counterparts in the original *Economic Freedom of North America* index. In 2008, enough data were gathered to construct a measure for the Mexican states, and this index has been updated in 2010 and 2011 (Ashby, 2008; Ashby, Bueno, and Martinez, 2010). Although this measure cannot be compared to U.S. and Canadian states and provinces, it does provide valuable information about variation in economic freedom in Mexico. This paper will discuss the construction and shortcomings of the Economic Freedom of Mexico index. The relationship between economic freedom and various measures of economic development will also be discussed.

2. Measuring economic freedom in Mexico

In recent years, significant efforts have been made to create an index of economic freedom in the Mexican states comparable to that constructed for

[1] The original measures were constructed by Karabegovic et al. (2002).

the U.S. states and Canadian provinces. In 2008, we published a preliminary measure of economic freedom for Mexican states (Ashby, 2008). Needless to say, this project has been rife with challenges, some of which have been resolved, while others continue to be worked out. The long-term goal is to construct an integrated index for the United States, Canada, and Mexico. Unfortunately, such an informative index is not immediately feasible because we have not yet been able to gather the necessary data. This year's index includes measures of economic freedom for all 32 Mexican states between 2003 and 2009.

The most significant concern is how to measure heterogeneity within the three countries with respect to property rights and legal structure. It is essential that additional measures be used in order for Mexico to be comparable to the United States and Canada. At the very least, measures of property rights would need to be included. There are national indexes constructed for the index published in *Economic Freedom of the World* (Gwartney, Lawson, and Hall, 2012) that could be included for the subnational jurisdictions corresponding to each country. This would capture cross-country variation but would fail to pick up variation within countries. The United States and Canada currently do not have a measure for this characteristic at the state or provincial level. This does not appear to be a significant problem for constructing the index for these countries since there is very little heterogeneity when it comes to property rights and legal structure across U.S. states and Canadian provinces.

Mexico, on the other hand, has significant heterogeneity across states. Some reasonable measures are available at the state level for Mexico but there is an apparent trade-off between determining how to deal with heterogeneity within Mexico and the heterogeneity among the three countries. It is possible to include the national score for each subnational jurisdiction within a given country, in which case heterogeneity within Mexico would be ignored. Another option is to hold this measure constant for the U.S. states and Canadian provinces while allowing the Mexican index to vary with the mean normalized around its national score. At issue here is how the distribution in Mexico relates to the scores in the United States and Canada. In other words, how do the states in the right tail of the distribution in Mexico relate to the scores in the United States and Canada? Although prior sentiment might be that the Mexican states should be lower, it remains unclear how to determine objectively what the distribution should be. Clearly, this issue needs much more thought.

A lesser problem is that the data for Mexico do not extend as far back as they do for the U.S. and Canada, at least at the state level. Much of the older data available are not trustworthy in that they demonstrate inconsistencies throughout the years.[2] In addition, some of the data that are available in Canada and the United States are difficult to obtain at the state level in Mexico.[3] Many of these problems have been overcome, and we have been able to find data for nine of the ten measures currently included in the index of economic freedom in Canada and the United States. However, given the problems discussed above, it is premature to present an integrated index, and the analysis in this article will focus on an index specific to the Mexican states.[4]

This article will describe an updated economic freedom index for the Mexican states from 2003 to 2009 using nine of the ten components currently used to calculate economic freedom in the United States and Canada. The new data improve upon the initial data calculated in 2008 by adding two variables that were previously not included, union density and government employment. The calculations of many of the components that were included in the 2008 index have also been improved using more complete data sources from the Mexican government. The 2011 measure also demonstrates a positive relationship with wellbeing which is illustrated graphically. In addition, this article demonstrates positive relationships using basic regression analysis. Perhaps the greatest contribution is that the index is now available for multiple years and can be used for analyzing the Mexican economy through time, as the seven years that are measured are sufficient for empirical analyses.

[2] For instance, union-density rates and government-employment rates prior to 2005 are very volatile over time at the state level. Further investigation revealed that the sample used to estimate these rates was not representative of actual state population distributions. Beginning in 2005, the Encuesta Nacional de Ocupaciones y Empleo (National Survey of Occupations and Employment) improved its survey methods substantially, and the data have been consistent across states since that time.

[3] The most notable are social security expenditures.

[4] It remains to be seen whether, when these problems are dealt with, integration of the indices can include data from past years or will only be feasible for data gathered in the future.

3. Mexican state-level data

The preliminary index of economic freedom in Mexican states (EFM) was included in the 2008 report, *Economic Freedom of North America* (Ashby, 2008). This index ranked the Mexican states using seven of the ten components included in the measurement of economic freedom in the United States and Canada for 2003. We were unable to find reasonable data for social security expenditures at the state level, government employment, and union density. Distrito Federal (Federal District or Mexico City) was excluded.

The methodology of the current EFM was introduced in 2010 (Ashby, Martinez, and Bueno, 2010) and is displayed in Figure 1.[5] This report improves upon the original index in two important ways. First, two additional components are included: 3B, Government employment as a percentage of total employment; and 3C, Union density. The component for union density is constructed as it is in the EFNA index, by controlling for the size of the government and manufacturing sectors.[6] With the exception of social-security expenditures, the measure includes all the components currently included in the index for the United States and Canada. The second improvement is that we calculate the score for additional years from 2003 to 2009 and include Distrito Federal in the current construction. However, one should consider it similar to District of Columbia in that it does not have as many levels of government and is atypical of Mexican states. Researchers should therefore use caution when conducting analyses that include Distrito Federal.

For instance, similar to Washington, D.C., Distrito Federal has a much higher percentage of government employment compared to other Mexican entities, and many taxes imposed across the country are centrally collected and reported. This would probably tend to bias the economic freedom estimate downward relative to its true level. Controlling for education and/or including a binary variable for Distrito Federal would be good practice for empiricists. However, given Distrito Federal's relative importance in the Mexican economy in terms of population and GDP, dropping it from empirical analyses would not be advisable. This is in contrast with the United States, where Washington, D.C., is often left out of state cross section or panel analyses.

Area 1 Size of Government
- Component 1A General Consumption Expenditures by Government as a Percentage of GDP
- Component 1B Transfers and Subsidies as a Percentage of GDP

Area 2 Takings and Discriminatory Taxation
- Component 2A Total Tax revenues at all levels of government as a percentage of Gross State Product
- Component 2B Top Marginal Income Tax Rate and the Income Threshold at Which It Applies
- Component 2C Indirect Tax Revenue as a Percentage of GDP
- Component 2D Total Value-Added Taxes as a Percentage of GDP

Area 3 Labor Market Freedom
- Component 3A Minimum Wage Legislation
- Component 3B Government Employment as a Percentage of Total State/Provincial Employment
- Component 3C Union Density

Area 4 Legal System and Property Rights
- Component 4A Impartiality of Judges
- Component 4B Institutional Quality of Judicial System
- Component 4C Trustworthiness and Agility of Public Property Registry

Notes: Area 4 and its components are included in the Mexican measurement of economic freedom but are not included in the index of economic freedom in the United States and Canada. Component 1C of the US and Canadian index is not included in the Mexican index.

Figure 1. Areas and components used in the Index of Economic Freedom in the Mexican states.

As is the case for the United States and Canada, measures are not available for every year in which the EFM is estimated. Since reasonable data are not available for 3B and 3C prior to 2005 (see footnote 2), the 2005 values are used for 2003 and 2004. The data for 4A, impartiality of judges, and 4B, quality of judicial system, are only available in 2003, 2006, and 2008. Component 4C, trustworthiness of property rights

[5] Data sources for these components are presented in an appended table.

[6] In constructing the EFNA index, the measure of union density takes into consideration the extent to which government employment or manufacturing drives unionization rates in the United States and Canada. To control for this, union density by state was regressed on the size of the manufacturing and government sectors. Manufacturing was found to be insignificant so it was dropped from the regression. The union density score was calculated by taking the residuals from the latter regression to determine the actual level of union-friendly policies by state. When constructing the EFM index, we could not take it for granted that manufacturing would also be insignificant for Mexico. In fact, it turns out that it is very significant and, for this reason, we calculate the score by controlling for manufacturing and government employment in Mexico.

registry, is only available in 2003 and 2006. The component measuring Piracy of Software, which was included in the 2008 report, has been omitted due to significant discrepancies in the data through time. For instance, Distrito Federal had a value of 9.65 out of 100 in 2006 and a score of 93.6 on the same scale in 2003, while Chiapas had a score of 3.8 in 2003 and a score of 22.7 in 2006. We use trending to calculate the values for 4A, 4B, and 4C between 2004 and 2005. We also use trending to calculate the values for 2007 for 4A and 4B while using the actual values in 2008 for 2009. We hold the 2006 scores for area 4C constant through 2009 due to the unavailability of the measure in recent years. Also, federal tax data were not available in 2009. These measures were estimated using 2009 data for state and local taxes and 2008 data for federal taxes.[7]

The rankings for economic freedom in 2009 for the 32 Mexican states and federal entities are displayed in Figure 2. Guanajuato ranked the highest, followed by Chihuahua and Baja California. The states with the least economic freedom were Colima, Tamaulipas, and Chiapas. The overall scores and rankings between 2003 and 2009 as well as the component scores and rankings in 2009 are displayed in Table 1, Table 2, and Table 3. Guanajuato ranked well due to its relatively low government employment, relatively strong judicial institutions, and lower dependence on transfers and subsidies. A more trustworthy property rights registry, lower unionization, lower government consumption and employment helped Chihuahua to rank second. Colima scored poorly mostly because of the significant amount of the tax burden that it bears relative to the rest of the country, and Tamaulipas' penultimate position was due to its judicial system, unionization, and value-added taxes. Distrito Federal ranked 16th in 2007 due to its high tax burden and government employment. Nuevo León dropped from second in last year's estimate to eighth in this year's estimates.

There is a clear discrepancy between rankings in the 2008 report and those in the subsequent indices. To some extent, this would be expected given the improvements made in the updated index construction, but there would be differences without the improvements for Components 1A, 1B, 2A, 2B, and 2D, all of which are estimated using state GDP in the denominator. Mexico significantly changed its methodology in computing GDP for states beginning in 2003 and up to 2007 (Instituto Nacional de Estadística, y Geografía [INEGI], 2010). Presumably, INEGI will use the same methodology in the future, and therefore it was necessary to update the scores with the new GDP measures. It should be noted that the changes in GDP are not trivial. For instance, the improvement in Campeche's ranking from 4th to first in 2003 can be explained to some extent by the new GDP measure, which in this case results in much lower government expenditures and tax revenues as a percentage of GDP.

These measures are imperfect for many reasons. First of all, it is difficult to determine which expenditures should be included in transfers and subsidies. Mexican government accounts include a category called "Transfers, Subsidies, and Assistance" in the state and local public finance reports. However, since most of the expenditures originate from the central government, it is quite likely that some other expenditures should be included as well. This requires further investigation. Another problem has to do with the way in which payroll taxes for social security are reported. Despite our best efforts, we have been unable to obtain these amounts at the state level. We do have national social-security tax revenues but are unable to get these by state. We calculate national social-security expenditures as a percentage of national GDP and assume these to be constant across all states.

Another problem is the fact that many federal taxes are collected in specific locations, which tends to unfairly bias the ranking of some states downward. For example, the value-added tax paid by all Telmex customers is consolidated in Distrito Federal even though consumption of this service is taking place throughout the country.[8] Tamaulipas, Colima, and Distrito Federal are all casualties of this issue. Finally, a problem that we discovered this year is that Distrito Federal had negative tax receipts for some tax categories in recent years. These were actually subsidies.[9]

The concept of economic freedom does not suggest that negative taxes enhance economic freedom. The fact that transfers and subsidies count against states indicates that they actually have the opposite impact. We deal with these cases by replacing the negative values with zeroes in the instances in which they occur. We assume that these subsidies

[7] More specifically, the formula for calculating 2A, 2C, and 2D in state i was as follows: $[(\text{State and Local Taxes}_{2009,i})/(\text{GDP}_{2009,i}) + (\text{Federal Taxes}_{2008,i})/(\text{GDP}_{2008,i})] \times 100$.

[8] We would like to thank Adolfo Gutiérrez for pointing this out to us.

[9] Adolfo Gutiérrez explained this to us as well, for which we are grateful.

are included in the transfers and subsidies reported by the government. The problem is whether or not some of the positive numbers include some of these subsidies. We have no way of knowing, and therefore the level of taxation may be underestimated in some cases. We hope to obtain a better understanding of these accounts in order to better calculate these measures in the future.

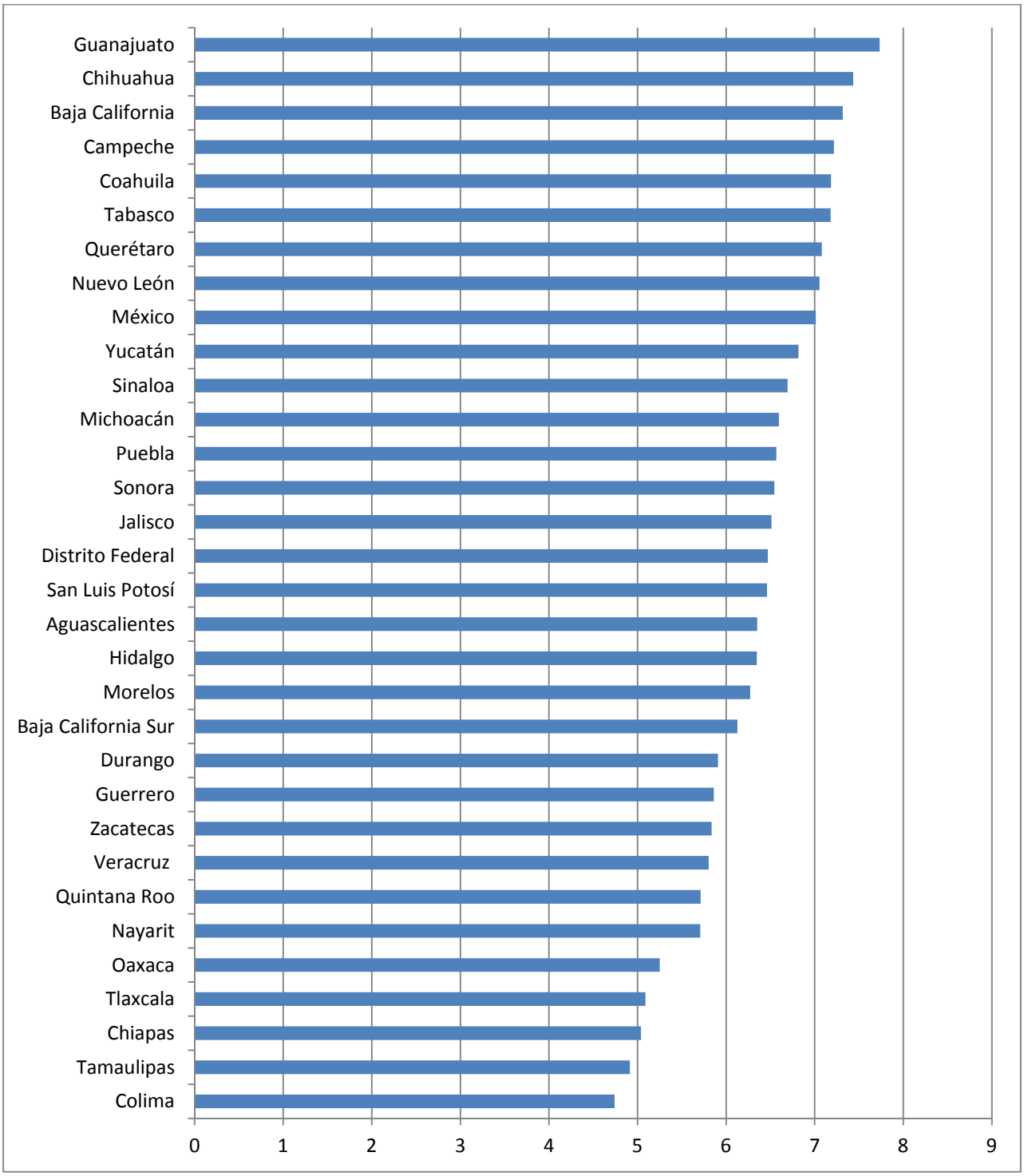

Figure 2. Summary of economic freedom ratings for Mexico, 2009.

Table 1. Economic freedom in the Mexican states, overall scores and ranks, 2003-2009.

	Score							Rank						
	2003	2004	2005	2006	2007	2008	2009	2003	2004	2005	2006	2007	2008	2009
Aguascalientes	7.2	7.3	7.4	7.4	7.0	6.6	6.4	7	7	7	7	11	19	18
Baja California	7.7	7.8	7.9	7.8	7.6	7.6	7.3	2	2	2	2	3	3	3
Baja California Sur	6.0	6.0	5.9	5.6	5.8	6.4	6.1	24	26	29	29	27	21	21
Campeche	7.7	7.8	7.8	7.7	7.4	7.3	7.2	1	1	3	4	4	6	4
Coahuila	7.2	7.4	7.4	7.5	7.4	7.4	7.2	6	6	6	6	5	5	5
Colima	5.2	5.2	5.3	5.1	5.0	4.8	4.7	32	32	32	32	32	32	32
Chiapas	5.6	5.5	5.6	5.6	5.3	5.4	5.0	29	30	30	30	31	29	30
Chihuahua	7.5	7.7	7.8	7.7	7.7	7.8	7.4	3	4	4	5	2	2	2
Distrito Federal	5.9	6.2	6.5	6.6	6.3	6.7	6.5	26	24	21	20	21	17	16
Durango	6.1	6.3	6.4	6.3	6.3	6.2	5.9	23	23	23	23	24	22	22
Guanajuato	7.5	7.7	7.9	8.0	7.9	7.9	7.7	4	3	1	1	1	1	1
Guerrero	6.3	6.3	6.4	6.0	6.3	6.1	5.9	21	22	24	25	23	23	23
Hidalgo	6.4	6.6	6.5	6.4	6.3	6.6	6.3	19	18	20	22	20	18	19
Jalisco	7.0	7.0	7.1	7.0	6.9	6.8	6.5	10	11	11	12	14	16	15
México	7.0	7.2	7.3	7.3	7.2	7.2	7.0	9	8	9	9	8	9	9
Michoacán	6.5	6.7	6.8	6.7	6.6	6.9	6.6	16	15	17	19	16	12	12
Morelos	6.9	6.9	6.9	6.7	6.6	6.4	6.3	11	12	14	18	18	20	20
Nayarit	5.4	5.9	6.4	6.9	6.4	6.0	5.7	30	27	22	14	19	24	27
Nuevo León	7.3	7.5	7.7	7.7	7.3	7.3	7.1	5	5	5	3	7	8	8
Oaxaca	6.0	6.0	6.1	5.9	5.7	5.6	5.3	25	25	26	26	28	28	28
Puebla	6.7	6.7	6.8	6.7	6.6	6.8	6.6	14	14	16	17	17	14	13
Querétaro	6.9	7.2	7.4	7.4	7.3	7.3	7.1	12	9	8	8	6	7	7
Quintana Roo	6.6	6.6	6.6	6.6	6.3	6.0	5.7	15	19	19	21	22	26	26
San Luis Potosí	6.3	6.5	6.6	6.7	6.7	6.8	6.5	20	20	18	16	15	15	17
Sinaloa	6.5	6.7	6.8	6.8	6.9	7.0	6.7	17	16	15	15	13	11	11
Sonora	6.4	6.6	6.9	7.1	7.0	6.9	6.5	18	17	13	10	12	13	14
Tabasco	6.7	6.9	7.0	7.1	7.1	7.4	7.2	13	13	12	11	9	4	6
Tamaulipas	5.8	5.9	6.0	5.8	5.4	5.2	4.9	28	28	27	28	30	30	31
Tlaxcala	5.2	5.4	5.6	5.5	5.4	5.2	5.1	31	31	31	31	29	31	29
Veracruz	5.9	5.8	5.9	5.9	6.0	6.0	5.8	27	29	28	27	25	25	25
Yucatán	7.0	7.1	7.1	6.9	7.1	7.1	6.8	8	10	10	13	10	10	10
Zacatecas	6.3	6.3	6.3	6.2	6.0	5.9	5.8	22	21	25	24	26	27	24

Table 2. Economic Freedom in the Mexican States, Scores for Components, 2009.

	1A	1B	2A	2B	2C	2D	3A	3B	3C	4A	4B	4C
Aguascalientes	7.0	6.4	8.5	9.0	9.3	8.9	6.2	2.5	8.0	4.9	1.9	6.0
Baja California	7.4	7.3	8.1	9.0	8.8	8.9	7.2	7.3	7.0	7.7	4.0	6.4
Baja California Sur	6.7	3.8	8.5	9.0	8.6	9.6	6.4	0.0	5.6	8.4	4.2	6.4
Campeche	9.8	9.8	9.9	9.0	9.9	9.9	9.2	0.5	7.4	4.6	2.8	3.7
Coahuila	6.4	8.6	9.1	9.0	9.2	9.7	6.9	5.6	4.8	6.9	4.9	7.0
Colima	6.9	4.2	0.2	9.0	0.9	0.2	6.1	2.4	6.2	8.2	4.4	5.2
Chiapas	1.4	1.3	9.5	9.0	9.4	9.9	3.8	6.2	7.0	6.4	3.8	0.7
Chihuahua	7.4	5.7	8.9	9.0	9.0	9.5	6.7	7.7	7.3	7.7	3.0	10.0
Distrito Federal	8.4	9.0	4.4	9.0	9.4	5.8	10.0	1.3	6.7	6.9	3.7	1.3
Durango	5.6	5.0	9.6	9.0	9.5	10.0	3.9	3.3	5.8	8.2	4.8	0.4
Guanajuato	5.9	7.5	9.2	9.0	9.3	9.7	5.6	8.9	6.8	10.0	8.0	5.3
Guerrero	4.9	0.2	9.5	9.0	9.3	9.7	5.4	6.5	7.6	5.4	3.4	6.4
Hidalgo	6.5	3.8	9.4	9.0	9.4	9.8	5.7	5.8	6.7	7.1	4.8	2.3
Jalisco	6.3	7.4	8.5	9.0	8.8	9.4	6.6	8.3	4.9	4.3	2.5	4.3
México	5.5	5.4	8.7	9.0	9.0	9.5	7.6	6.4	5.7	9.7	6.2	5.0
Michoacán	3.4	7.6	8.5	9.0	8.7	9.1	6.0	6.5	6.1	9.1	5.5	3.0
Morelos	5.6	4.8	8.9	9.0	9.2	9.6	7.4	5.9	6.5	4.5	2.6	5.2
Nayarit	3.6	2.1	9.2	9.0	9.2	9.7	4.4	2.1	5.0	8.3	5.2	7.2
Nuevo León	8.4	8.3	7.5	9.0	8.3	8.9	8.8	7.9	4.1	5.3	3.6	4.6
Oaxaca	0.0	1.4	9.4	9.0	9.1	9.8	5.3	6.6	7.0	8.6	3.9	1.5
Puebla	5.0	7.4	9.4	9.0	9.4	9.9	6.7	9.8	6.4	3.0	0.9	5.2
Querétaro	7.0	6.7	8.9	9.0	8.9	9.9	9.1	7.5	6.0	4.9	4.0	5.3
Quintana Roo	5.9	6.2	8.7	9.0	8.7	9.6	5.2	3.6	5.2	4.8	2.9	1.6
San Luis Potosí	7.0	4.9	9.4	9.0	9.7	9.9	6.2	5.4	4.9	9.2	4.4	0.9
Sinaloa	7.4	4.1	8.9	9.0	9.2	9.6	3.7	6.0	6.7	8.1	6.1	4.9
Sonora	6.5	5.8	8.9	9.0	9.1	9.5	5.1	6.2	5.2	5.9	5.4	4.7
Tabasco	7.4	7.6	9.8	9.0	9.8	9.8	6.4	1.2	7.1	8.1	6.8	5.3
Tamaulipas	5.9	7.0	4.7	9.0	8.4	3.0	6.7	4.2	2.0	2.4	1.6	4.1
Tlaxcala	3.8	1.2	9.5	9.0	9.6	9.8	5.5	6.6	6.1	4.6	2.0	0.1
Veracruz	3.6	7.6	8.2	9.0	9.2	8.3	6.1	5.3	5.2	4.4	1.2	4.7
Yucatán	5.5	6.7	9.0	9.0	9.2	9.5	4.0	6.0	7.3	8.8	4.8	5.1
Zacatecas	2.2	4.5	8.7	9.0	7.9	9.6	5.2	3.4	5.7	8.4	3.4	7.7

Table 3. Economic Freedom in the Mexican States, Ranks for Components, 2009.

	1A	1B	2A	2B	2C	2D	3A	3B	3C	4A	4B	4C
Aguascalientes	9	15	23	1	11	28	16	26	1	24	29	8
Baja California	4	11	28	1	25	27	7	7	7	14	15	6
Baja California Sur	12	27	25	1	28	17	14	32	23	7	14	5
Campeche	1	1	1	1	1	5	2	31	3	26	25	23
Coahuila	15	3	13	1	13	13	8	19	30	18	8	4
Colima	11	24	32	1	32	32	17	27	16	10	13	14
Chiapas	31	30	4	1	7	6	31	14	8	19	18	30
Chihuahua	5	18	18	1	21	21	9	5	4	14	23	1
Distrito Federal	3	2	31	1	6	30	1	29	13	17	19	28
Durango	21	20	3	1	5	1	30	25	20	10	9	31
Guanajuato	19	8	11	1	10	11	21	2	10	1	1	9
Guerrero	25	32	6	1	12	12	23	11	2	21	21	6
Hidalgo	13	26	9	1	8	10	20	18	12	16	9	25
Jalisco	16	10	26	1	24	24	12	3	29	30	27	21
México	23	19	22	1	22	23	5	12	21	2	3	16
Michoacán	29	5	24	1	26	25	19	10	17	4	5	24
Morelos	20	22	16	1	17	15	6	17	14	28	26	12
Nayarit	28	28	12	1	16	14	28	28	27	9	7	3
Nuevo León	2	4	29	1	30	26	4	4	31	22	20	20
Oaxaca	32	29	8	1	19	9	24	9	9	6	17	27
Puebla	24	9	10	1	9	4	11	1	15	31	32	12
Querétaro	8	13	19	1	23	2	3	6	19	23	15	11
Quintana Roo	17	16	20	1	27	16	25	23	26	25	24	26
San Luis Potosí	10	21	7	1	3	3	15	20	28	3	12	29
Sinaloa	6	25	15	1	15	19	32	15	11	12	4	17
Sonora	14	17	17	1	20	22	27	13	25	20	6	18
Tabasco	7	6	2	1	2	7	13	30	6	12	2	9
Tamaulipas	18	12	30	1	29	31	10	22	32	32	30	22
Tlaxcala	26	31	5	1	4	8	22	8	18	26	28	32
Veracruz	27	7	27	1	18	29	18	21	24	29	31	19
Yucatán	22	14	14	1	14	20	29	16	5	5	11	15
Zacatecas	30	23	21	1	31	18	26	24	22	7	22	2

There are certainly other problems with the measures that will be discovered as individuals knowledgeable of the Mexican accounts become aware of our measures. This project is a work in process and we welcome constructive criticism on how we can improve the measure in the future. These calculations do pick up much of what we are trying to estimate for a comparison with the United States and Canada. Despite their imperfections, these data should be useful to researchers interested in investigating the impact of economic freedom on various economic factors within Mexico. We will continue to search for ways to improve our estimates in the future and discuss below some measures considered for a future index of economic freedom in Mexico.

4. The relationship between economic freedom and average wages in Mexico

The Ashby (2008) publication demonstrated the relationship between economic freedom and GDP per capita in Mexico in the year 2003. It exhibited a clear positive relationship between the two. As discussed above, the newly updated GDP measures are significantly different from the old measures. Although the same positive relationship holds, it is doubtful that GDP per capita can be considered a good measure for standard of living for the people of Mexico. It is still considered to be the best measure for the size of the economy but, due to significant dependence on the revenues of PEMEX, the state-owned oil company, which is transferred across the country, it is not as useful as a measure of income per capita. This results in GDP per capita as high as $61,000 per year ($US) in a state like Campeche. Since this is not considered to be a credible measure of the well-being of the people of Campeche, we have decided to look at a different measure, average daily wages (CONASAMI, various years).

Figure 3 demonstrates a positive relationship between the two variables by analyzing average salaries by economic freedom quintile. The states belonging to the highest quintile averaged a salary of $233 Mexican pesos while those belonging to the bottom quintile averaged only $197 pesos per day, a difference of 19%.

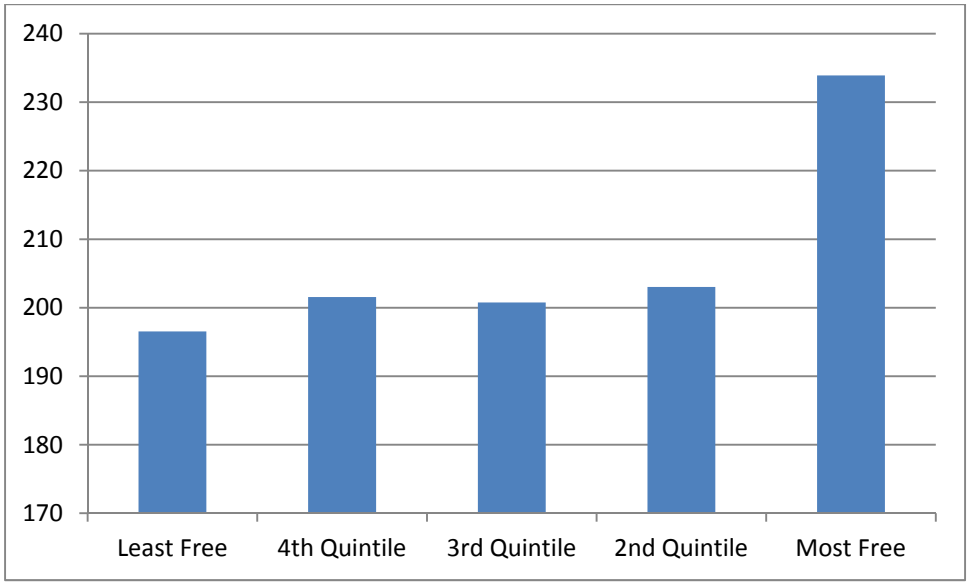

Figure 3. Relationship between economic freedom and wages in Mexico.

Keep in mind that these graphs are just for illustrative purposes and are not intended to claim strong statistical relationships. More sophisticated econometric analysis is necessary to determine the actual strength of the relationship between these variables in the case of Mexico. Similar to the United States and Canada we conducted regressions analyzing the relationship between economic freedom and wages and between the growth in economic freedom and the growth in wages. These analyses are displayed in Tables 4 and 5. We control for human capital using the average years of schooling by state and the growth in the average years of schooling. These regressions include data for various years from 2003 to 2009. This gave us 224 observations to work with. We used autoregressive methods which caused the sample to reduce to 192.

The results in Table 4, which analyze the impact of economic freedom levels on average wage levels, demonstrates a statistically significant relationship between economic freedom and average wages.[10] Schooling does not appear to be significant in this regression. The coefficient on economic freedom suggests that a one-point increase in economic

[10] Autoregressive (AR) techniques were used in estimating the regressions. To determine which AR process was most appropriate, we ran regressions until the lagged variables were no longer statistically significant and chose the previous regression as the best fit. For instance, if the AR(3) process yielded insignificant results for at least one of the lagged variables, we considered the AR(2) regression with two lags to be the best fit. For simplicity in reporting the results, we only report the results for the independent variables of interest. The complete results are available upon request. The results from Table 4 are from an AR(1), and the results from Table 5 do not account for any AR process.

freedom would increase average daily wages by 1.46 pesos. Assuming 350 working days a year, which is reasonable since the average employee works six days a week and employers are required to pay workers for the seventh day even when they don't work, and an exchange rate of 13.06 Mexican pesos per US dollar, this results in an increase of about $39 USD per year (Heston, Summers, and Aten, 2011). Although this may not seem like much, it is a substantial amount for many workers in Mexico.

Table 4. Level of economic freedom and GDP per capita.

Dependent Variable: Real 2009 Mexican Wages (2003-2009)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EFM	1.46	0.81	1.80	0.07
SCHOOL	0.21	0.42	0.51	0.61
Adjusted R^2	0.99	Observations:	192	

Note: School is the average number of years of schooling.

Table 5. Growth in economic freedom and GDP per capita.

Dependent Variable: Growth in Real 2009 Mexican Wages (2003-2009)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EFMG	0.05	0.03	1.78	0.08
SCHOOLG	0.03	0.02	1.76	0.08
Adjusted R^2	0.26	Observations:	192	

Note: School is the growth in the average number of years of schooling.

There also appears to be a statistically significant relationship between growth in economic freedom and growth in wages, shown in Table 5. A one percent increase in economic freedom appears to increase average daily wages by 0.05 percent. Admittedly, the impact of growth in economic freedom in Mexican states seems to have a weaker impact than in the United States and Canada, which have coefficients of 1.02 and 0.60 respectively (Ashby, Bueno, and McMahon, 2011, p. 20). Also, an increase in years of schooling appears to have a statistically significant impact on wages in Mexico in this regression. The impact, however, appears to be even smaller than economic freedom, with a coefficient of 0.03 for every additional year of schooling.

5. Measures considered for a future index of economic freedom in Mexico

The methodology of the index of economic freedom in Mexican states (EFM) as currently constructed is consistent with the original index with the few minor adjustments that have already been discussed. There are various measures under consideration as components in future indexes.

The World Bank (2010), as part of its Doing Business project, publishes subnational indices for various countries, including Mexico. These reports include measures for all Mexican states of the cost of doing business, obtaining construction permits, registering property, and enforcing contracts.[11] Unfortunately, these measures do not extend back many years for all states and are constructed using major cities from each state rather than the states as a whole. However, beginning in 2007, there are measures for all states and we hope to update the index of economic freedom in Mexican states by including some of these measures.

Issues with the methodology that need to be sorted out are whether to consider additional areas of economic freedom for the index and how these components should be included in the future. Rather than construct an improvised index at this time, it would be better to wait for feedback in determining how to go forward on this issue. The biggest concern is that many of the years for which the economic freedom index has been constructed could no longer be estimated and there would be fewer measured years of economic freedom. The simplest way to deal with this would be similar to the solution used by Gwartney, Lawson, and Hall (2012) in constructing the world indices. They

[11] Component 4C of the current index is one of these measures.

impute missing values by analyzing correlations of the measures in the years when all the data are available. This, admittedly, is not the perfect solution, but would most likely be the best solution given the lack of data.

Another important issue for an index of economic freedom in Mexico is how one measures the impact of minimum wage controls in Mexico. The central government in Mexico mandates minimum daily wages for 84 professions. In the future, it may be better to measure the impact of the minimum wages by occupations based on the relative number of those working in an occupation in each state.[12]

6. Conclusion

This paper has presented the latest version of index of economic freedom in Mexico, for the years 2003 to 2009. These results are much improved from the initial version of the index published in 2008 (Ashby, 2008). However, the project is still developing and the methodology and results may change based on any shortcomings in the data that are discovered. Some of the components that are introduced in this paper may very well not be included in future construction of the index if they are deemed unreliable or more suitable substitutes are found. It is encouraging that the data have improved significantly in recent years, which suggests that the index will only get better through time. In the meantime, this index should serve as a valuable tool in analyzing the institutions of Mexican states.

In 2009, Guanajuato, Chihuahua, and Baja California ranked highest in economic freedom in Mexico, while Colima, Tamaulipas, and Chiapas experienced the lowest levels of economic freedom. Although the economic freedom scores for Mexican states are slightly different in this updated version, the overall correlation between economic freedom and well-being seems to hold, as demonstrated in Figure 3 and Tables 4 and 5. Individuals in the most-free states have higher wages than those in lower quintiles. We also provide some regressions that demonstrate a statistically positive relationship between economic freedom and wages and between economic freedom growth and wage growth. Unfortunately, due to the limited number of years available, we are unable to conduct moving average regressions to test the robustness of our results. As the economic freedom measure improves and as the number of years available increases, more reliable statistical analysis will be possible.

[12] We thank James Gwartney for this suggestion.

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Appendix.

Table A1. Economic freedom of Mexico component sources.

Area	Sources
Area 1A	INEGI (various years)
Area 1B	INEGI (various years)
Area 2A	CEFP (2009) and Special request from Secretaría de Hacienda y Crédito Público (various years)
Area 2B	OECD (2011) and Servicio de Administración Tributaria (various years)
Area 2C	CEFP (2009), INEGI (various years), and Secretaría de Hacienda y Crédito Público (various years)
Area 2D	CEFP (2009), INEGI (various years), Secretaría de Hacienda y Crédito Público (various years)
Area 3A	CONASAMI (various years)
Area 3B	INEGI (various years)
Area 3C	INEGI (2010)
Area 4A	Consejo Coordinador Financiero (2011a), Consejo Coordinador Financiero (2011b), Consejo Nacional de Población (2011), IMCO (2006), IMCO (2008), IMCO (2010)
Area 4B	Consejo Coordinador Financiero (2011a), Consejo Coordinador Financiero (2011b), Consejo Nacional de Población (2011), IMCO (2006), IMCO (2008), IMCO (2010)
Additional Regression Sources:	
Avg. Daily Wages	CONASAMI (various years)
Years of Schooling	INEGI (2005), INEGI (2010)