Methodology for Union Density in Latin America

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Introduction

This paper describes the harmonization process used to estimate trade union density rates and median earnings for Latin America disaggregated by sex, age, and broad industry categories. The dashboard presents estimates based on publicly available microdata from national labor force and household surveys for Brazil, Colombia, Guatemala, Mexico, and Peru, which account for over two-thirds of the region's workforce. The International Labour Organization (ILO), through ILOSTAT, and the Organization for Economic Co-operation and Development (OECD), through the OECD/Amsterdam Institute for Advanced Labour Studies (AIAS) Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) also provide trade union density estimates at varying degrees of coverage for Latin America. This dashboard's advantages are that it relies solely on national surveys for a larger set of Latin American countries, provides disaggregated estimates by sex, age, and industry, and delivers earnings estimates.[2]

As shown in Table 1, the ILOSTAT series relies on data from a mix of national surveys and administrative records. Brazil, Mexico, and Guatemala's estimates were derived from national surveys, while Colombia and Peru's estimates were derived from administrative records. Deriving all estimates from national surveys is advantageous as it allows for greater comparability across countries. The OECD relies on survey data but does not provide estimates for Peru or Guatemala.

Table 1: Union Membership – Data Sources

Country	Dashboard Source	ILO Source	OECD/AIAS Source
Brazil	Pesquisa Nacional por Amostra de Domicílios Contínua, Visita 1 (PNADC)	PNADC	PNADC
Colombia	Gran Encuesta Integrada de Hogares (GEIH)	Administrative Data	GEIH
Guatemala	Encuesta Nacional de Empleo e Ingresos (ENEI) (2010-2022) Encuesta Nacional de Empleo e Ingresos Continua (ENEIC) (2024 onwards)	ENEI	N/A
Mexico	Encuesta Nacional de Ocupación y Empleo (ENOE)	ENOE	ENOE
Peru	Encuesta Nacional de Hogares (ENAHO)	Administrative Data	N/A

The rest of the document describes the harmonization process, including defining union membership and the target population, comparing earnings estimates with ILOSTAT, developing a consistent industry classification, and handling country-specific limitations.

Defining Target Population & Union Membership Comparison

The target population is employees, excluding members of the armed forces, aged 15 to 98 who reported positive earnings from their main job. Employees are wage and salary workers as identified by each survey's job-status variable, including domestic workers and day laborers; employers, own-account workers, and unpaid family workers are excluded. Members of the armed forces are excluded, as their right to unionize may be restricted, and they are identified

[1]Generative AI (Claude, Anthropic) assisted with improving the data pipeline, code debugging, building the dashboard, and quality checking. All methodological choices, interpretation, and conclusions are the author's own. For questions, contact: juan.m.campanario@gmail.com

[2]On the dashboard, estimates are suppressed for disaggregated groups too small to be reliable but are available in the accompanying Excel files. For union density, an estimate is suppressed if its effective sample size is below 50 or its coefficient of variation exceeds 35 percent, and flagged for caution between 15 and 35 percent; for median earnings, which do not have closed-form standard errors, an effective sample size floor of 200 is used. Effective sample size is determined using Kish's formula, to account for survey weights.

from each survey's occupation codes.[3] The same population is used for union density and median earnings, so both indicators describe the same workers. Estimates are produced only for survey periods in which the union membership question was asked. For example, Mexico's labor force survey typically has a question about union membership only in the first quarter of the year.

Union membership is defined as a binary variable for whether a respondent is a member of a trade union, based on the most relevant question in each survey, typically a question similar to "Are you a member of a union or similar workers' organization?" The exact question asked in each survey is shown in Table 2. In addition to the survey question itself, each survey has its own methodology and microdata processing practices that can affect estimation. For example, in all years except 2020, there are no null responses for union membership in Colombia's labor force survey. However, in Guatemala, only workers who responded yes to a related, preceding question were asked about union membership. Thus, the estimates provided represent a lower bound for union membership.

Table 2: Union Membership Survey Questions

Country	**Survey Question**	**English Translation**
Brazil	Na semana de referência era associado a algum sindicato?	During the reference week, were you a member of a trade union?
Colombia	¿Está afiliado o hace parte de una asociación gremial o sindical?	Are you affiliated with or a member of a trade union or workers' organization?
Guatemala	¿En la empresa o institución donde usted trabaja existe sindicato o comité de trabajadores? ¿Está afiliado?	At the company or institution where you work, is there a trade union or workers' committee? Are you affiliated?
Mexico	¿En su empleo ... pertenece a algún sindicato?	At your job, do you belong to a trade union?
Peru	¿Usted o algún miembro de su hogar pertenece o participa en algún grupo, organización y/o asociación: Asociación de trabajadores o sindicato?	Do you or any member of your household belong to or participate in any group, organization, or association: Workers' association or trade union?

As shown in Figure 1, I compare the values published by the OECD and ILOSTAT to the Harmonized estimates.[4] For Brazil, the Harmonized estimates are nearly identical to the OECD estimates and on average 0.3 percentage points below ILOSTAT.[5] For Mexico, the Harmonized estimates are on average 0.3 and 0.4 percentage points below the ILOSTAT and OECD estimates, respectively.[6] For Guatemala, the Harmonized estimates match ILOSTAT. For Colombia and Peru, ILOSTAT relies on administrative records, but the trends are similar, and both data sources show that the countries have consistently low union membership rates.

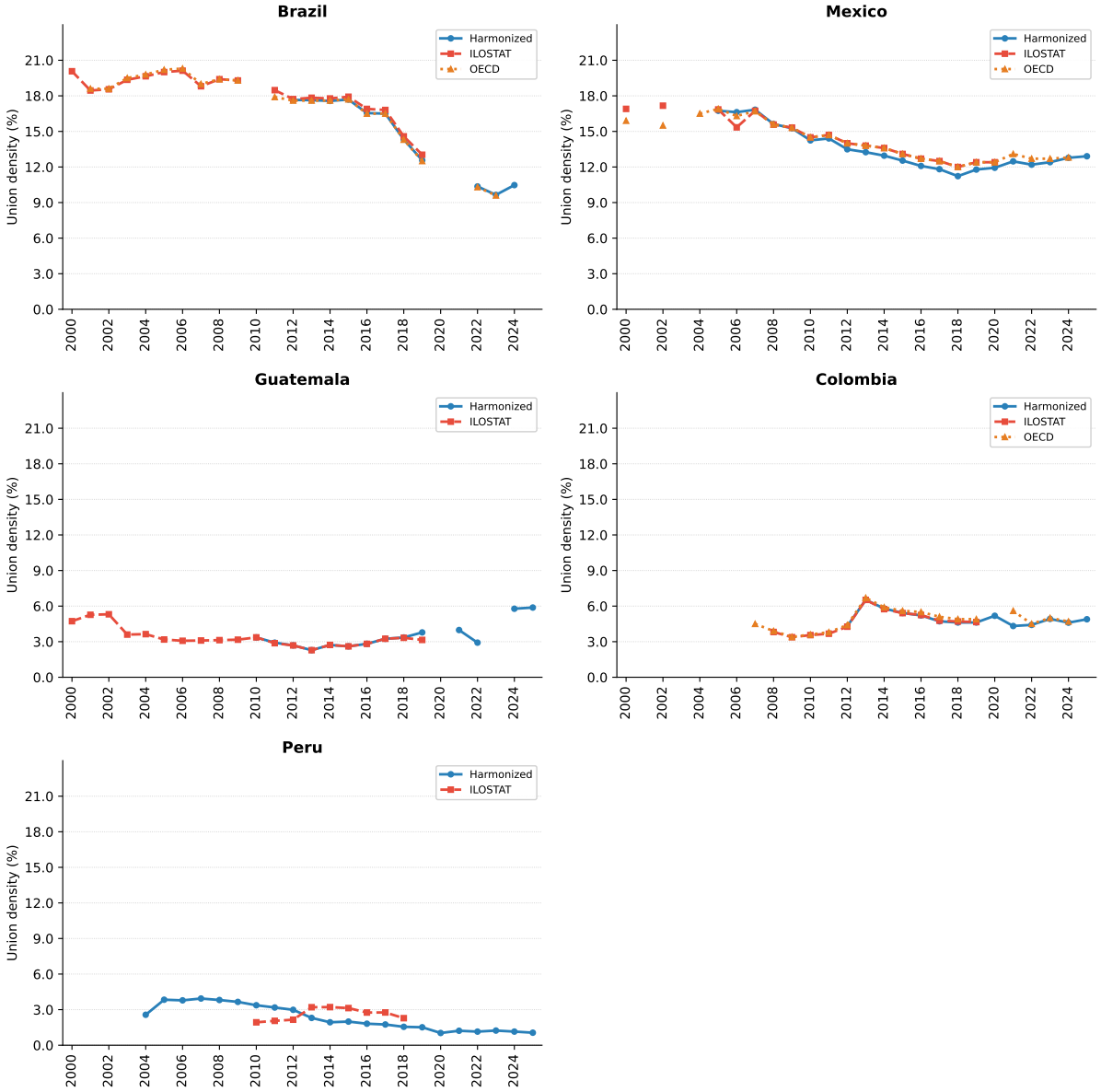
[3]In Brazil, the PNADC military category also includes military police and military fire brigades. In Colombia, the GEIH identifies the armed forces only from 2022 onward, so they are not excluded in 2012–2021; their share of employees from 2022 onward is below 0.2 percent.

[4]The OECD/AIAS ICTWSS database has survey-based union density for Brazil, Colombia, and Mexico, and there are no estimates for Guatemala or Peru.

[5]The gap likely arises due to differences in the chosen survey weight.

[6]The gap arises because the target population requires positive earnings: a growing share of ENOE employees do not report earnings, and these workers are more likely to belong to a union.

Figure 1: Union Rate Methodological Comparison



Note: The Harmonized series defines union membership as a binary variable, with missing values coded as non-members, and the sample is restricted to employees, excluding the armed forces, aged 15–98 with positive earnings. ILOSTAT refers to published ILO values. For Colombia and Peru, the ILO draws on administrative records rather than household surveys, but estimates are very similar in magnitude. OECD refers to the OECD/AIAS ICTWSS database's survey-based union density, which is not available for Guatemala or Peru.

Earnings Comparison

Earnings are defined as the monetary remuneration received by employees in their main job, as reported in each survey.[7] The measure excludes in-kind payments and annual bonuses, such as Brazil's *décimo terceiro salário* and Peru's *gratificación*. Earnings are estimated for the same population as union density so that both indicators describe the same workers.

The choice of target population and survey affects the comparability of earnings estimates with other sources; a source comparison between the Harmonized series and ILOSTAT is shown in Table 3. In Figure 2, I present the differences in earnings estimates. In the countries for which ILOSTAT calculates median earnings from the same data source, the series are similar in both trend and magnitude. The Harmonized estimates are lower than ILOSTAT in most years, largely because ILOSTAT includes in-kind payments.

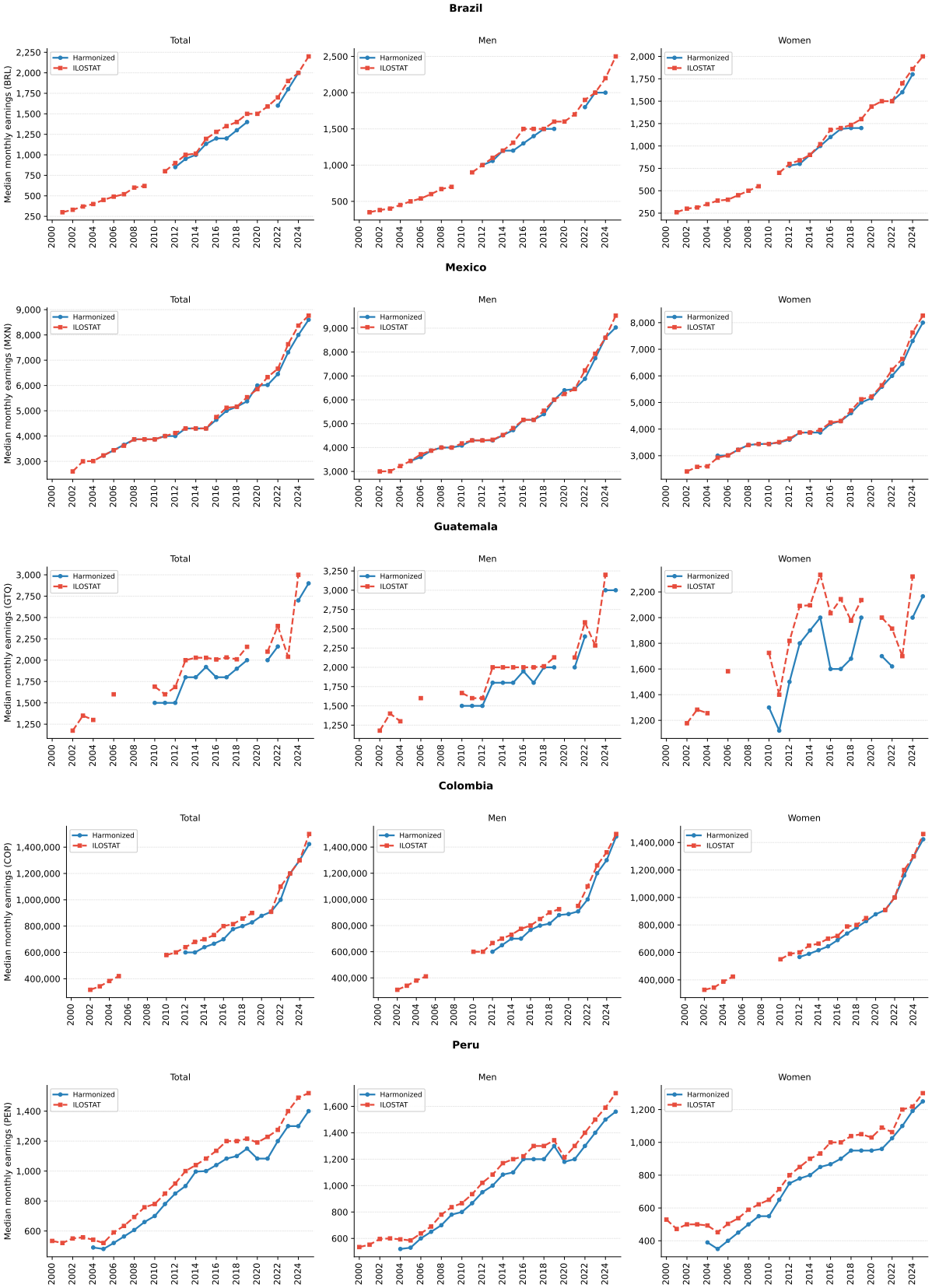
Table 3: Median Monthly Earnings – Data Sources

Country	**Dashboard Source**	**ILOSTAT Source**
Brazil	Pesquisa Nacional por Amostra de Domicílios Contínua, Visita 1 (PNADC)	Pesquisa Nacional por Amostra de Domicílios (PNAD) (2000–2011); PNADC (2012 onwards)
Colombia	Gran Encuesta Integrada de Hogares (GEIH)	Encuesta Continua de Hogares (ECH) (2002–2005); GEIH (2010 onwards)
Guatemala	Encuesta Nacional de Empleo e Ingresos (ENEI) (2010–2022); Encuesta Nacional de Empleo e Ingresos Continua (ENEIC) (2024 onwards)	ENEI
Mexico	Encuesta Nacional de Ocupación y Empleo (ENOE)	ENOE
Peru	Encuesta Nacional de Hogares (ENAHO)	ENAHO (2000–2021); Encuesta Permanente de Empleo Nacional (EPEN) (2022 onwards)

Note: The Harmonized series for Brazil begins in 2012 (PNADC), so there is no overlap with the earlier PNAD period. For Peru, the Harmonized series continues to use ENAHO post-2022, while ILOSTAT switches to EPEN. For all other countries, the Harmonized series uses the same source as ILOSTAT.

[7] I restrict earnings to cash remuneration as it is the only component measured consistently across all five surveys.

Figure 2: Median Earnings Comparison



Note: The Harmonized series produces median monthly earnings in local currency for employees, excluding the armed forces, aged 15–98 with positive earnings from their main job, in survey periods in which union membership is asked, using survey weights. ILOSTAT reports median monthly earnings of employees, including payments in kind.

Industry Harmonization

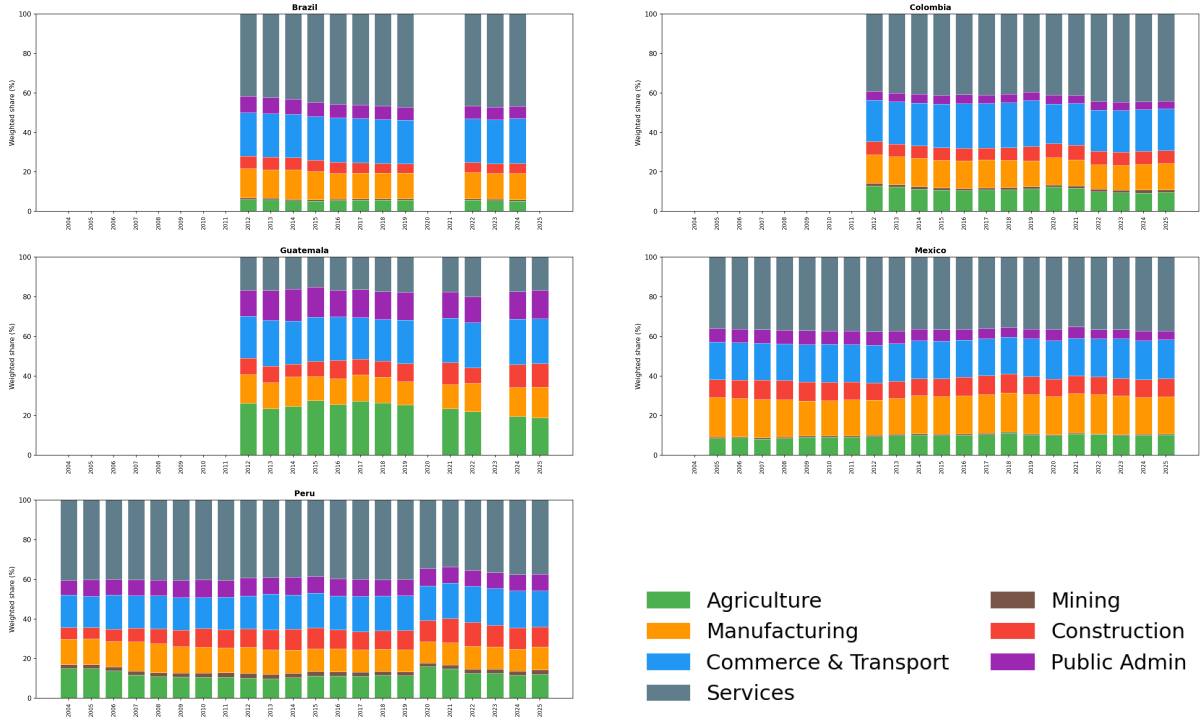
This section documents the construction of a harmonized industry classification for the dashboard. Each country's native survey industry classification is mapped to a common target classification based on the International Standard Industrial Classification of All Economic Activities (ISIC) Rev. 4, aggregated to seven broad sectors. Table 4 contains the sector codes, labels, and the corresponding ISIC sections and division ranges.

Table 4: 7-Sector Classification (ISIC Rev. 4)

Code	Sector	ISIC Section	Divisions
1	Agriculture	A	01–03
2	Mining	B	05–09
3	Manufacturing	C	10–33
4	Construction	F	41–43
5	Commerce & Transport	G–H	45–53
6	Public Administration	O	84
7	Services	All remaining	—

Division 9 (*mining support activities*) is included as part of the mining sector in all countries where ISIC Rev. 4 or an equivalent is used. The services sector absorbs all divisions not explicitly assigned to other sectors, including financial services, education, health, and real estate. In Figure 3, the weighted share of in-sample workers by sector for each country and year is plotted to confirm a consistent classification.

Figure 3: Industry Composition



Note: Each bar represents the share of in-sample workers (employees, excluding the armed forces, aged 15–98 with positive earnings), based on available survey weights, in each sector annually. Guatemala reports no mining employment, as ENEI lumps mining and manufacturing into a single category.

Data Idiosyncrasies and Crosswalk Notes

Table 5: Country Crosswalk Notes

Country	**Notes**
Brazil	Industry codes are provided using 5-digit ISIC Rev. 4, which are aggregated to the division level.
Colombia	Industry codes are provided for 4-digit ISIC; ISIC Rev. 4 was implemented in 2020, with prior years using ISIC Rev. 3.
Guatemala	Industry codes are provided as pre-aggregated 1-digit sector codes, with mining and manufacturing lumped into a single category (assigned as manufacturing), and public administration lumped with education and health; therefore Guatemala's public administration and manufacturing sectors are broader than those of other countries. Industry codes are not available in 2010–2011. There is a large increase ($\sim$3 percentage points) in trade union density coinciding with the transition from ENEI to ENEIC. Data were handled consistently across both surveys, and demographic factors appear stable across the transition; nonetheless, additional caution may be warranted.
Mexico	Industry codes are provided at the 2- and 4-digit North American Industry Classification System (NAICS); the 2-digit codes are mapped to ISIC. A small percentage of workers (0.3 percent of the sample) carry an "unspecified" activity code; these workers are overwhelmingly engaged in paid domestic work in private households.
Peru	Industries are coded to ISIC Rev. 4 for all years, through the updated ENAHO.