¡El Salario es de Quien Trabaja!
A Methodology for Living Wage Estimations in Mexico City

By

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Abstract

In September of 2018, a research team from the *Observatorio de Salarios* at the Iberoamerican University in Mexico City approached Dr. Amy Glasmeier to help systematize and scale living wage estimates in Mexico. The goal was to emulate the MIT Living Wage Calculator, which Dr. Glasmeier created as a source for living wage estimates across the U.S., in order to establish a similar calculator for Mexico, beginning with a pilot study in Mexico City.

This thesis pilots an integrated methodology for systematizing and scaling living wage estimates in Mexico City, using the MIT Living Wage Calculator and the Observatorio's work as bases. Results from this living wage estimation are comparable to the work already conducted by the University, but with greater efficiency and scalability. Overall, I find that only about 17 percent of three- and four-person households in Mexico City earn a living wage. Additionally, I find that most heads of living wage-earning households work in high-skill occupations and have high levels of educational attainment.

Thesis Supervisor: Dr. Amy Glasmeier
Title: Professor of Economic Geography and Regional Planning

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My life and accomplishments do not exist in a vacuum. This page is dedicated to those who've gone before me and made my pursuits possible and those who've toiled alongside me.

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In hopes of the city whose builder and founder is God.

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Chapter 1. Introduction and Motivation

"La tierra es de quien la trabaja con sus manos." – Emiliano Zapata

My maternal grandmother, *abuelita* Espi as we call her, was born in 1940s Mexico and grew up in the small town of San Gregorio, Michoacán. Her life was never an easy one, nor was her life one of privilege; she would never earn anything comparable to a decent wage. Before she had even completed the third grade, her stepmother pulled her out of school to tend to the household. That meant washing and ironing clothes by hand, feeding and tending to the livestock, and cooking for the household. When she grew older, she married my grandfather, a man who enjoyed a life detached from any sense of familial responsibility in spite of having eight children waiting for him at home.

Life was a continual struggle to meet material needs for my *abuelita*'s family. It wasn't uncommon for my *tíos* and *tías* to go to bed hungry or only have tortillas and salt to eat. When they lacked blankets on cold nights, they used my grandfather's coats to warm themselves.

My *abuelita* had no support system to lean on—no head householder to provide, no formal work, no formal education—and so she scraped a living by performing household work for others. She was and has always been an industrious woman; she cross-stitched, washed and ironed neighbors' laundry, and cared for others' children. And despite the struggle, she largely succeeded. My *tíos* and *tías* went to school, and though they never grew rich, they were able to pursue formal careers and attain a decent standard of life, some in the United States and others in Mexico. My own mom worked hard to bring my *abuelita* Espi to the United States and provide a better life for her, one free from worry about how her children would be fed or how a single mother without a formal education could afford to give her children a future.

Ironically, Mexico's Constitution of 1917 guarantees a minimum wage "sufficient enough to satisfy the normal necessities of a head of household, including material necessities, social and cultural necessities, and in order to provide the required schooling for their children." This is effectively a codified living wage; that is, a wage that allows a basic but decent standard of living. In spite of this promise, the minimum wage was either insufficient or inaccessible for my grandmother. But her case is not an isolated one, and Mexico's minimum wage has not kept

pace with its promise. In fact, the real value of the Mexican minimum wage has fallen by 75 percent since the mid-1970s.

In view of this decline, in 2014, the *Observatorio de Salarios*, a research team based out of the *Universidad Iberoamericana* in Puebla, began to estimate the "constitutional minimum wage" or the level the minimum wage would need to reach to meet its constitutional guarantee. This initial study focused on city and state of Puebla, where the university is located. In September 2018, the team approached Professor Dr. Amy Glasmeier of the Massachusetts Institute of Technology for help in systematizing and deploying living wage estimates for every major Mexican city. The goal was to emulate the MIT Living Wage Calculator, which Dr. Glasmeier created as a source for living wage estimates across the U.S., in order to establish a similar calculator for Mexico, beginning with a pilot study in Mexico City.

This thesis pilots a methodology for estimating living wages in Mexico based on the MIT Living Wage Calculator model using Mexico City as a case study. In the future, this methodology will be refined and replicated in order to estimate living wages for other major Mexican cities. Estimates reflect the cost of living in Mexico City and highlight the gap between the minimum wage and its constitutionally guaranteed level. Ideally, these living wage estimates will be used by organizations and firms in determining worker compensation, as living wages provide increased incentive for employees to be productive and allow for a decent standard of living, and by governance institutions to reform wage policy.

The rest of this thesis is organized as follows:

Chapter two reviews the literature surrounding the living wage, including its theoretical, ethical, and economic foundations. Chapter 2 also reviews the empirical minimum wage literature in Mexico. Based on this empirical literature, I find no negative employment or wage effects and evidence that minimum wages serve as a norm for setting wages in Mexico.

Chapter three reviews the general approach to living wage estimation as well as the *Observatorio de Salarios*' and MIT Living Wage Calculator methodologies. I integrate the two methodologies and outline the challenges in doing so, including the difficulty in continually reproducing the *Observatorio*'s living wage estimates, the lack of official sources offering

normative guidelines for defining a decent quality of life, and the possibility of capturing poverty norms in living wage estimates.

Chapter four presents a basic introduction to Mexico City, its boroughs, and its public markets and analyzes the results of 91 intercept survey interviews conducted at public markets in Mexico City. I find that the *Observatorio de Salarios*' food basket is generally representative of local and cultural consumption patterns, although a few minor adjustments are needed.

Chapter five presents a spatial analysis of cost and socioeconomic data in Mexico City, which reveals significant differences in access to resources and in the costs a consumer can expect to face. I find three cluster groups based on socioeconomic and cost indicators: high-, medium-, and low-cost boroughs, and high-, medium-, and low-access boroughs. Boroughs with greater access to transportation and greater stocks of quality housing also tend to have higher household incomes and educational attainment rates, although they face higher costs.

Chapter six provides a methodology for estimating living wage estimates in Mexico City using available data sources and details the normative assumptions made in doing so. Living wage estimates from the *Observatorio de Salarios*' forthcoming study on Mexico City are included alongside original live wage estimates. The chapter concludes with an analysis of three- and four-member households earning a living wage, where I find that roughly 17 percent of three- and four-member households earn a living wage in Mexico City, with most heads of household working in high-skill occupations that require higher educational attainment.

Chapter seven concludes with reflections on the process of estimating living wages and a set of recommendations for living wage researchers looking to emulate the MIT Living Wage Calculator.

Chapter 2. The Living Wage: Ethical and Economic Justifications

"For the Scripture says, 'You shall not muzzle an ox when it treads out the grain,' and, 'The laborer deserves his wages.'" - 1 Timothy 5:18

I. Introduction

Since the turn of the millennium, global dialogue and activism around the "living wage" have gained momentum—a "living wage" being defined as the level of remunerations to workers that would cover the fundamental necessities of everyday life and allow full inclusion and participation in society. This interest has been fomented by international job growth in low-skill, low-wage employment and in the number of workers in these sectors who are unable to support themselves and their households. For instance, in 2016, a family of two working adults and two children would need to work four full-time minimum wage jobs in the U.S. to earn a living wage (Glasmeier & Nadeau, 2017). Similarly, in the United Kingdom, more than one-fifth of all employees in 2017 were earning below a living wage (Chong & Khong, 2018). However, this issue is not limited to advanced western economies. In Kuala Lumpur, for instance, the Central Bank of Malaysia estimates that up to 27 percent of households earn below a wage that is able to supply their basic needs (Chong & Khong, 2018).

While workers in these low-skill industries are facing an inability to make ends meet, the highest-paid employees, in contrast, have experienced significant income growth in recent years. Across OECD countries, the average income of the richest decile of the population in 2016 was nine times that of the poorest decile. Moreover, the OECD estimates that this gap between the rich and poor is at the highest level of the past half-century (OECD, 2019b). In the face of robust economic growth, policymakers around the world are uneasy about growing inequality and inability of low-skill workers to make ends meet. The inadequacy of current policy instruments, namely the minimum wage and social security systems, and their inability to give citizens a basic standard of living further accentuate interest in living wage policies.

II. The Fragmented Global Movement

However, coordinating policy support for living wage laws is not so simple. For one, the impetus behind living wage policies differs by context. In the United States, for example, living wage policies have largely been initiated by the public sector. These laws require companies contracting or doing business with local governments to pay a wage that allows a decent standard of living. Since the beginning of the modern living wage movement in the U.S., more than 140 cities and counties have adopted a living wage ordinance (Luce, 2017). Similarly, several local governments in South Korea have also established living wage ordinances after the U.S. model. These types of ordinances, however, tend to apply only to certain segments of the workforce. In addition, because campaigns and policies vary city-by-city and state-by-state, there is a lack of consensus on wage policy at the federal level. This makes a systematic approach to living wages and national coordination of wage policy difficult.

In other cases, the fight for a livable wage begins with industry. In South Asia, The Asia Floor Wage (AFW) Alliance, an international association of trade unions and labor rights groups, has been fighting for a livable wage for garment manufacturing workers. Asia is home to a large proportion of world's unskilled workers, and the continent manufactures 60 percent of the world's clothing (Bhattacharjee & Roy, 2012). Given the importance and scale of the industry, the Alliance has advocated for living wages by quantitatively defining what is livable for workers using data from need-based surveys in India, China, Bangladesh, Sri Lanka, and Indonesia.

Since its creation, the Asia Floor Wage has become a reference for living wage debates in South Asia and has been adopted by a number of brands. In addition, in China, Vietnam, and Cambodia, the Asia Floor Wage's living wages estimates and process opened up dialogue for collective bargaining and improved wages (Living Wage Foundation, 2017). Despite these successes, however, the question remains as to when the focus will shift from textiles to other low-paying sectors in Asia.

In still other countries, the living wage movement is nascent. In Malaysia, the Central Bank, Bank Negara Malaysia, recently released a report on living wage estimates for Kuala Lumpur. Paired with the recent election of a new political party, Pakatan Harapan, there is a sense of optimism and expectation that the minimum wage will increase enough to support a

minimally acceptable standard of living. However, there is debate as to what the optimal wage level is and whether or not Malaysia is ready for a federal living wage (Xuan, 2018). In contrasts, discussions about the living wage are rare in Latin America. While a number of countries have statutory minimum wages in place, including Argentina, Bolivia, Brazil, Colombia, Honduras, Mexico, and Uruguay, increases in the minim wage tend to lag behind annual inflation (Living Wage Foundation, 2017).

III. Ethical Justifications for a Living Wage

But what is a living wage, and what constitutes its measurement? While the definition and estimates of a living wage differ across geographic spaces, discourse around the living wage has been about the search for a "just wage"—one that allows for self-sufficiency and freedom from material need. The Greek philosopher Aristotle, for instance, saw self-sufficiency as a requirement for happiness. Self-sufficiency meant that each worker could provide for themselves through earning a sustainable livelihood. Where workers were not able to sustain themselves, Aristotle held that it was the state's responsibility to provide the poor with the means to earn a livelihood. In this sense, concern for the common good moderated the acquisition of wealth (Werner & Lim, 2016).

Later on, in the middle ages, St. Thomas Aquinas argued that in money-based societies, prices needed to be agreed upon by fair bargaining and informed consent in order to ensure all members had access to necessities. In the same way, employers and employees arrived at a "just wage" via bargaining and consent. Any wage rate that denied workers a subsistence level and therefore, their opportunity to be virtuous, was "unjust" (Werner & Lim, 2016).

Although regarded as the father of the free market economy, Adam Smith, the 18th-century economist, also believed that paying workers enough to survive was an inherently moral concern. Smith writes:

> "what improves the circumstances of the greater part can never be regarded as a mere inconveniency to the whole. No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable. It is but equity, besides, that they who feed, cloath and lodge the whole body of the people, should have such a

> share of the produce of their own labour as to be themselves tolerably well fed, cloathed and lodged (Smith, 1904)."

Moreover, the wealth of a nation, Smith believed, was tied to and dependent upon rising real incomes for the majority of people. Paying workers a sufficient income that they may obtain their basic needs and experience social inclusion would ultimately benefit society in the form of increased productivity, wealth distribution, and economic growth (Clary, 2009).

Smith, however, emphasized that these necessities of life would vary between cultures and locales. To Smith, the measure of equity was relative and socially constructed, and that which was required was:

> "not only commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without (Smith, 1904)."

And yet, these calls for just wages have not been limited to philosophers in centuries past. John Ryan, a Catholic priest of the 20th Century, echoed the call for a livable wage, recognizing that a living wage was about more than material inflows. These calls were about morality and dignity, and about providing "a decent livelihood." He defined this as the "amount of the necessities and comforts of life that is in keeping with the dignity of the human being," that allows him to develop "within reasonable limits all his faculties, physical, intellectual, moral, and spiritual (Murphy, 2009)."

In his seminal work, "A Living Wage," Father Ryan argued that humans had an obligation to know and love God and their neighbor. In order for humans to do so, however, an individual needed access to material goods, social goods, and spiritual goods. This duty implied a right to the tools that would facilitate that duty. His belief in the equal right of every person to access these goods, according to God and "principles of natural morality and democracy" led him to activism.

By drawing on his Catholic understanding and traditions of anti-individualism and natural rights, Father Ryan influenced a diverse coalition of stakeholders. His 1909 publication, "A Programme of Social Reform by Legislation," advocated for a legal minimum wage and an eight-hour workday, in addition to protective legislation for unions, women, and children. Ryan

would go on to testify at legislative hearings on proposed minimum wage laws in Wisconsin and Pennsylvania, and his writings were influential in the passage of a minimum wage law in Ohio (Murphy, 2009).

In the case of Mexico, similar ethical and moral concerns guided the Mexican Revolution in the fight for the economic rights of the many against the exploitation by the few. Land and power were concentrated in the hands of elites, while a majority of the population lived in poverty. Wealth was not shared equally between those who worked the land and those who owned it. The *Zapatistas*' fight for land reform is summarized in their motto: "The land is for those who work it!" Moreover, although land reform discourse dominated the dialogue, enough Mexicans at the time were worried about earning a fair wage that the right to a wage that ensured a decent standard of living was included in Article 123 of the Constitution of 1917, guaranteeing a wage "sufficient enough to satisfy the normal necessities of a head of household, including material necessities, social and cultural necessities, and in order to provide the required schooling for their children" (Bortz & Aguila, 2006; "Constitución Política de los Estados Unidos Mexicanos - Ordenamiento - Legislación," 1917).

IV. Relationship to the Minimum Wage

As seen earlier, pressure for a wage affording a decent standard of living underlies many efforts to promulgate a federally set minimum wage. At its best, a minimum wage serves as an effective mechanism of economic policy if tied to productivity, and can also act as a means to redistribute and share the profits generated by firms (Observatorio de Salarios, 2014). In this vein, a minimum wage ensures that workers receive a fair income from their labor. Despite this, however, the minimum wage does not often reflect the costs of living in any given area. Instead, it serves as a price floor, setting the minimum level of income an employer must pay its employees.

V. Theoretical Economic Literature Review

In contrast to the minimum wage, the living wage aims to methodically set an hourly wage for an ordinary worker based on their actual costs of living. As mentioned earlier, the

living wage is the level of income needed to support a person and his/her family, given everyday needs like food, water, clothing, shelter, and transportation. As such, modern policy interventions have aimed to achieve a wage level sufficient to cover the costs of living. In the U.S., measures that estimate a living wage rate are created by non-governmental organizations and adherence to the payment of a living wage is voluntary (Cromwell, 2015). Additionally, there are specific groups of workers and jobs located in specific areas that require payment of a living wage including:

- Contractor Laws: These laws require businesses that contract with local governments to pay a higher wage.
- Targeting Laws: Targeted businesses in enterprise zones receiving government assistance are required to pay higher wages.
- Living wage laws applied directly to local governments themselves – public employees are paid living wages.
- Businesses and firms can elect into paying living wages directly.

However, from a theoretical perspective, economists are divided about the economic ramifications of minimum and living wage policies. Looking first at minimum wages (and thus price floors), the Neoclassical perspective argues that under perfect competition, firms will seek to minimize the costs of production. A mandated government policy that increases the cost of labor will cause firms to substitute one input for another, say physical capital for other inputs, like labor – whether that means hiring fewer workers, shifting to higher-skill labor, or automating work. Consequently, a wage floor will lead to lower levels of employment. This is called the employment effect (Cromwell, 2015).

The secondary effect of wage floors is the price effect. Because of the substitution away from low-skilled labor and toward other inputs, the costs of production for firms increase. The higher costs are passed on to consumers in the form of higher prices and if necessary, lower outputs. Depending on the elasticity of demand and the availability of substitutes, higher prices can lead to reductions in demand or shifts toward substitutes (Mincer, 1976; Cromwell, 2015).

In addition, wage laws might not apply to the entire labor market, creating an incomplete wage floor. That part of the labor market for which the wage floor applies is the covered labor market, while the labor market not under the wage floor is the uncovered market. In looking at incomplete wage floors, Mincer's empirical analysis concluded that in the aftermath of a minimum wage hike, employment in the covered sector would fall because of the higher costs of labor. Those workers who remain in the covered sector would receive higher wages, while displaced workers would move into the uncovered market, increasing the supply of low-skilled workers and depressing wages for all unskilled workers in the uncovered sector. Living wage laws in the U.S. act as this type of incomplete price floor because they only apply to certain segments of the labor market, usually municipal employees, government contracted workers, or the workers of firms who elect into paying higher wages (Mincer, 1976; Cromwell, 2015).

On the other hand, the contrasting theoretical perspective is the efficiency wage hypothesis, first developed by Akerlof (1982). When an employer pays above market-rate wages, an employee will provide greater effort (productivity) on the margin because a return to the labor pool and the job market is costlier than before. Because of this risk, workers will increase their effort in order to decrease the chances of being terminated.

Greater worker productivity also makes supervision less expensive for firms, and therefore makes it possible to hire more workers. Due to greater competition among firms paying a higher wage, profits for some firms in the long-run may fall below zero. However, even if these leave the industry, and market-wide employment is less than before the increase in the minimum wage, each individual firm will have increased its employment (Cromwell, 2015). Higher wages also improve worker morale, reduce worker resignations and labor turnover costs, and attract more applicants and increase hires (Salop, 1979; Weiss, 1980). Another effect of increasing the minimum wage is that workers receive a higher wage.

Under this perspective, living wages laws in the United States, Canada, and the United Kingdom allow firms to opt into or out of a living wage contract. Given that firms who can choose to pay a living wage will do so if they can maximize profits and not operate at a loss, those that do will reap the benefits of the higher wage predicted by the efficiency wage

hypothesis. These firms will see an increase in employment, but given the voluntary nature of living wage laws, uncovered firms will be unaffected by the law.

In contrast to these countries, where living wages are voluntary and incomplete price floors, in Mexico, the right to a living wage and a decent standard of living is guaranteed by the Constitution. Therefore, the living wage in Mexico is inherently tied to the Constitutional minimum wage. That is, the living wage will act as a price floor for the entire labor market. The ethical, moral, and economic reasoning for guaranteeing this wage is the same as for the historical and global living wage movement, but its market effects should be understood as that of a price floor.

VI. History of the Mexican Minimum Wage

While the initial concern over the welfare of the peasant class secured the legal promise of a wage capable of supporting workers and their families and sharing the profits generated by firms, the minimum wage in Mexico falls far short of its original noble goal. Minimum wages are set once a year by the National Commission for the Minimum Wage. The commission represents labor, employer, and state interests, and formerly set the minimum wage at different levels depending on region and occupation (Fairris, Popli, & Zepeda, 2008). Today, however, there is one minimum wage for the entire country. CONEVAL (2017) estimates that in order for the minimum wage to comply with the Constitution and provide a basic basket of goods for a family in poverty, today's minimum wage would need to grow by 4.7 times.

Since the mid-twentieth century, the minimum wage in Mexico has passed through three distinct stages. From the 1950s to the second half of 1970s, the minimum wage quadrupled in real terms. During the early post-war years, the Mexican economy experienced a golden age—real GDP expanded at an astounding average annual rate of 6 percent. During the second era, beginning in the early 1980s, Mexico faced a balance of payments crisis with a collapse of oil prices, followed by stagnation and high inflation. During this era the Mexican government allowed the minimum wage to deteriorate in order to stabilize the national currency and control runaway inflation.

In order to compress labor costs, government policy kept minimum wage increases below changes in the consumer price index. Even after inflationary pressures subsided, the minimum wage continued to stagnate instead of supporting labor and promoting inclusive wage growth. By 1995, the minimum wage had lost 66 percent of its purchasing power compared to levels just fifteen years prior (Moreno-Brid, Garry, & Krozer, 2016).

The third era, which began in the mid-1990s and continues to this day, reflects continued stagnation in real terms of the minimum wage. Highlighting this stagnation, Mexico is the only country in Latin America where the minimum wage is well below its poverty-level income. And even though real purchasing power has now stabilized, the minimum wage in Mexico continues to be the lowest in Latin America, despite a rate of labor productivity that is more than double the next most productive country. In short, the minimum wage in Mexico has become de-linked from changes in productivity and consequently, has lost most of its purchasing power (Moreno-Brid et al., 2016).

However, this loss of buying power has not been confined to those earning less than the minimum wage. Purchasing power has decreased along with real wages for all workers, regardless of their level of education. As such, labor's share of the national income in 2016 was only 26 percent, an all-time low (Moreno-Brid et al., 2016). Alongside the fall of real salaries and a stagnating minimum wage, the cost of living has continued to rise. Whereas it was once possible to support a family with one adult working, today it now requires two or three jobs to support the same family. Families are increasingly required to have older parents re-join the workforce, and even young adults (less than 18) are needed to enter the workforce in order to make ends meet (Observatorio de Salarios, 2014).

VII. Empirical Economic Literature

Based on these theoretical foundations and historical experiences, numerous studies document the effects of the minimum wage on employment, wages, and inequality in Mexico. Focusing on the 1980s, Bell (1997) found no evidence of minimum wage effects on labor income or formal employment. Examining urban workers, Bosch & Manacorda (2010) found that the erosion of the real value of the minimum wage in Mexico from 1989-2001 accounted

for almost all of the growth of inequality at the bottom end of the income distribution. Informal workers were not affected by changes in the minimum wage.

Using panel data from the National Urban Employment Survey from 1985-2001, Kaplan and Pérez-Arce (2006) analyzed the effects of the minimum wage on labor. They found that changes in the minimum wage had a proportional, positive effect on wages for other workers, regardless of whether they were formally or informally employed and regardless of their place on the income distribution (a positive wage effect means that the minimum wage law increased wages for workers). However, they did find that the effect dissipated rapidly further up the income distribution ladder and that the effect of minimum wages on labor income in the Mexican labor market was losing strength. The strengths of the effect were stronger for 1985–1993 than from 1994–2001. It's worth noting that after 1994, the minimum wage broadly stabilized, so it is unlikely that the minimum wage would affect the wage structure significantly (Campos Vázquez, Esquivel, & Lustig, 2012 and Appendix I).

Fairris, Popli, and Zepeda (2008) find striking evidence that minimum wages serve as a norm for setting wages both above and below the minimum wage. Looking at the Household Survey of Incomes and Expenditures (ENIGH), their analysis reveals that wages more generally across the labor pool are set at multiples of the minimum wage. In addition, minimum wage changes affect wages unevenly across the occupation distribution. This normative role of minimum wages has its greatest impact on the mid-to-lower tail of the income distribution.

The team also finds that wage dispersion (a measure of inequality) rises significantly when the value of the real minimum wage is falling, but levels off in the mid-1990s when the decline in minimum wages slows. During the decline of the minimum wage in the early 1990s, they find that among formal sector workers, the average real wage of affected workers declined 10–20 percent, whereas the wages of unaffected workers rose by 20–50 percent. This, they say, is precisely what we should expect to find if the minimum wage normatively shapes the wage distribution of affected workers. In particular, the normative function of the minimum wage is particularly strong for the bottom part of the income distribution. In sum, changes in the minimum wage penalizes workers at the lower income levels of those being paid a minimum wage.

Campos Vázquez et. al. (2018) analyzed the National Occupation and Employment Survey (ENOE) to find the effects of an increase in the minimum wages on employment in Mexico. Using an exogenous increase in minimum wages in one of three zones in Mexico in 2012, they find no negative effects on employment or income following the decision to increase the minimum wage. There is some evidence that in the zone with the minimum wage increase, wages rose between 1.6–2.6 percent for workers overall and 1.8–3.3 percent for wage workers.

The researchers also find that the rise in minimum wages may have shifted incentives for informal workers. Those who were originally informal wage workers and those who were self-employed showed a greater propensity to move into formal employment. However, they warn against extrapolating given that the increase in wages due to the minimum wage was relatively small and because the minimum wage in Mexico has fallen over 70 percent in real terms over the past three decades.

Looking at the same exogenous minimum wage increase in 2012, Bouchot (2018) uses unconditional quantile regressions and ENOE data from the 2012Q1-2013Q4 and finds no adverse effect on wages on any point of the wage distribution. Moreover, Bouchot finds evidence that the increase in the minimum wage in Zone B increased wages across the entire distribution of earnings, albeit to varying degrees. For incomes at the twentieth percentile and below, Bouchot finds a positive and statistically significant effect: a 2.9 percent increase in the minimum wage for Zone B increased real wages by 1 percent; however, there was no similar increase for informal workers. In comparison, for the median of the distribution, real wages grew by 3.4 percent, while for the top quartile, real wages increased by 5.6 percent. According to Bouchot's analysis, this signifies that the increase in Zone B's minimum wage increased wage dispersion.

Bouchot notes that the 2012 minimum wage increase of real wages for the whole earnings distribution, including the most vulnerable workers, means that the minimum wage reform is still accomplishing its goal of increasing real remunerations for those at the lowest levels of employment. He also suggests that the increase in wage dispersion may be due to the former institution-setting framework, in which fees and wages are linked to the minimum wage.

The framework was removed in 2016. Bouchot also caveats his analysis, noting that he did not observe top-earners in the distribution.

To summarize, within the literature, there is a consensus that the minimum wage law has not had a negative employment or wage effects. Moreover, the literature is in broad agreement that minimum wages have increased labor income across the wage distribution, albeit to varying degrees for different segments of the wage distribution. Kaplan & Pérez Arce Novaro (2006) find that the further you are from a minimum level of income the less effect changes have on your level of compensation. Similarly, Fairris, Popli, & Zepeda (2008) find that the pay of low-skilled workers is more likely to be influenced by minimum wage norms than that of high-skilled workers. On the other hand, while Bouchot's (2018) findings corroborate that the minimum increased wages across the distribution, he finds that the strength of the wage effect is highest for the top quartile of the wage distribution. The increase in the minimum wage law may have increased inequality, at least in the short-run, in contrast to Fairris, Popli, and Zepeda (2008) and Bosch and Manacorda (2010).

However, these all have in common consistent evidence that, within Mexico, minimum wages serve as a norm for setting wages across the entirety of the income distribution, most notably by Fairris, Popli, and Zepeda (2008). Moreover, minimum wages do increase wages for workers, including those at the bottom of the wage distribution. The evidence also points to a non-binding minimum wage in Mexico, meaning the minimum wage is not set above the equilibrium rate and has significant room to grow. Given these effects, indexing the minimum wage to estimated costs of living could have the effect of allowing average workers a decent standard of living, increasing their wages and those of other workers, and potentially reducing inequality in Mexico.

VIII. Conclusion

As Bhattacharjee and Roy (2012) write, paying decent wages is “an essential measure for a stable capitalism.” Moreover, in Mexico, as in other places, the inclusion of a minimum wage into the Constitution of 1917 introduced a moral component into wage setting. It was and is *just* to pay a worker a high enough wage to allow for self-sufficiency and full inclusion

into society. As we have seen, however, the minimum wage in Mexico remains far below its constitutional promise, in spite of evidence demonstrating the absence of negative employment affects. The question remains, what constitutes a living wage in Mexico, and how can it be measured?

Chapter 3. Methodological Discussion: Calculating a Living Wage

"Yo sé que a mi lado tu te sientes pero mucho muy feliz /
Y sé que al decirte que soy pobre, no vuelves a sonreír /
Qué va, yo quisiera tener todo y ponerlo a tus pies /
Pero yo nací pobre y es por eso que no me puedes querer"
- Juan Gabriel, "No Tengo Dinero"

I. Introduction

Estimating the living wage requires defining what constitutes a basic but decent standard of living. This notion of pay is not based on what constitutes a "fair wage" but rather, what constitutes "a livable wage," one that is both tied to the cost of living and reflective of geographic differences in cost. This chapter reviews the general approach to living wage estimation in addition to the *Observatorio de Salarios*' and MIT Living Wage Calculator methodologies. In estimating living wages for Mexico City, this thesis will integrate the two methodologies but faces a number of challenges in doing so, including the difficulty in continually reproducing the *Observatorio*'s living wage estimates, the lack of official sources offering normative guidelines for defining a decent quality of life (e.g., the use of U.S. Department of Agriculture's food budgets in MIT's Living Wage Calculator), as well as the possibility of capturing poverty norms in living wage estimates. Section VI concludes with a basic outline of the integrated methodology proposed by this thesis.

II. General Approach to Estimating a Living Wage

Living wage estimations require judgement on the part of the researcher on several counts. First is understanding the availability of data and the ability to model current living situations. Second is the question of geographic scale: at what level is data available and how do prices and people's living standards vary across locations? But the most fundamental question the researcher faces is determining what is so necessary that its absence denies one a dignified life. Living wage estimations thus follow a four-step approach. The first is establishing the level and extent of variation in prices and living standards across locations and household compositions. Household and price typologies can be built using an analysis of national price statistics, household expenditure surveys and census data, and first-hand,

qualitative research. In cases where households are too dissimilar to generalize about or prices vary significantly across geographies, multiple living wage estimates are warranted. (Chong & Khong, 2018).

The second step is deriving the basket (or baskets) of goods and services that is representative of the population's cultural, dietary, and social needs and that represents a basic but dignified standard of living. Simply speaking, a basket of goods is a grouping of products, items, or services with physical quantities. For example, the food basket contains the items that an average household might eat and tends to serve as a primary element of many living wage studies. In the case of Mexico, this basket might include items such as rice, beans, tortillas, and salt. Living wage estimates are essentially the sum of a collection of individual "use" baskets reflecting the component costs of everyday life: for instance, transportation, housing, healthcare, and miscellaneous needs. These component baskets are often produced in consultation with sector experts (e.g., nutritionists), refined through feedback from citizens, validated against household expenditure data, and in some cases, filled in using household expenditure data. In crafting the component baskets, researchers need to confer with households of different sizes and types to differentiate between *necessities* and *aspirations* (Chong & Khong, 2018).

Third, the basket (or baskets) of goods is priced. This is usually done using official government price statistics but can be also be done using first-hand price collection at markets and stores if official price statistics are unavailable or unreliable. Last, the estimates are periodically updated to account for inflation, changes in consumption patterns, and living standards (Chong & Khong, 2018).

Within this general estimation framework, approaches to calculating a living wage vary significantly. While some living wage estimates include housing, clothing, and transportation as their own specific cost components, others only calculate a food basket and extrapolate the other costs of daily needs based off household expenditure and national statistics. The types of goods in a basket may also vary with the country's level of development (Shelburne, 1999).

Moreover, the data required to develop the component baskets of a living wage depends on the level of local development and the degree of sophistication and precision

evident in the local statistical system. In cases where detailed data sources are scarce, researchers utilize an approach that makes assumptions about baskets of goods and then multiplies a weekly food budget by a unit of time. For instance, if the average citizen spends 25% of their income on food, then the living wage would equal four times the food basket. Living wages can also be calculated based on national statistics, either based on unit labor costs, historical comparisons of prevailing wages, or based on relative incomes (Shelburne, 1999)

III. IBERO's Living Wage Observatory: Methodology

Given this framework and the right to a living wage in Mexico, a number of institutions have developed their own localized methodologies to estimate the constitutional minimum wage that would allow a decent standard of living. One such organization is the *Universidad Iberoamericana*, or the Ibero-American University (IBERO), a private Jesuit institution with locations in Puebla, Mexico City, and Tijuana. The *Observatorio de Salarios,* or the Wage Observatory, is a research center within IBERO headed by Dr. Miguel Santiago Reyes Hernández. This multi-disciplinary and multi-institutional research center was established as a primary information source on wages, inequality, and quality of life issues in Mexico, given that "the work situation of millions of Mexicans becomes more precarious every day" due to the loss of purchasing power of their wages and increasing labor insecurity (Observatorio de Salarios, n.d.).

One of the *Observatorio*'s first studies was an estimation of the "constitutional minimum wage," first piloted in 2014 in the city and state of Puebla. In piloting the study, the team's goal was to define a minimum standard of living the general population and define the dollar amount needed to guarantee that living standard—essentially constructing living wage estimates. Given that in the *Observatorio*'s view, the right to a decent standard of living is both an economic right and a human right guaranteed by the Constitution, they constructed goods baskets that were normative—that is, aspirational—as opposed to strictly designing a living wage calculation using observed consumption from national household surveys (Observatorio de Salarios, 2014).

However, the team did identify that they would use observed consumption *patterns* as a basis for their estimates, highlighting that "necessities…in a given society… are a product of social and historical interactions," while noting a need to be careful given that these can capture how citizens have adapted to poverty. Therefore, the quantities and elements in the food basket, for instance, reflected cultural and social consumption habits, but were included in quantities or amounts that were considered aspirational. The team also sought to comply with the legal norms of the Constitution of 1917, which guarantees a wage high enough for a head of household to provide for everyday needs, including "material necessities, social and cultural necessities, and in order to provide the required schooling for their children" (Observatorio de Salarios, 2014; Constitución Política de los Estados Unidos Mexicanos - Ordenamiento - Legislación," 1917).

For this pilot study, the *Observatorio*'s living wage estimates were focused on the city and state of Puebla, where their main campus is located, and were composed of a food basket and a non-food basket. The food basket was crafted using three primary considerations: biological needs—that the basket provide for the minimum consumption of calories, vitamins, and proteins needed; socioemotional needs—that the foods provided for in the basket are varied and can meet the tastes of different people; and social and cultural needs—that the basket reflect cultural expressions and foster social inclusion.

To determine the composition of the pilot food basket, the team conducted surveys at five municipal, public, and wholesale markets in Puebla. These surveys were validated by experts in clinical nutrition and were used to determine both the composition of the baskets as well as the median household composition in Puebla (three adults and one child less than 12). Following the survey capture, the *Observatorio* team defined the nutritional requirements needed for each constituent member of the family using a previously established methodology and the Secretary of Health's Dietary Recommendations (*Sistema de Equivalentes*), subsequently calculating the weight of each food item to satisfy those dietary needs. Prices for the food basket were retrieved using the National Institute of Statistics and Geography's Mean Price Index data. Nutritional requirements for the median family in Puebla and component food items are presented in Tables 3.1 and 3.2.

Table 3.1. Nutritional Requirements for Median Family, Puebla

Age Group	Nutritional Requirement	Number of People Per Household	Total Requirement
Less than 12 years old	1,548 kcal	1	1,548 kcal
12-64 years old	2,735 kcal	3	8,205 kcal
Total			9,753 kcal

Source: Observatorio de Salarios, 2014.
Note: The macronutrient breakdown is 15% proteins, 25% lipids, and 60% carbohydrates.

Table 3.2. Components of Daily Food Basket

Item	Food Group	Daily Cost, Puebla City (2014 pesos)
Tomato (Roma) Onion (White) Green Beans Tomatillos Dried Árbol Chiles Serrano Chiles Carrots Squash (Italian)	Vegetables	$30.00
Bananas (Tabasco) Oranges (Valencia) Apples (Golden Delicious) Papaya Cantaloupe	Fruit	$48.00
Pasta for soup Potato (White) Tortilla	Grains/Tubers	$12.80
Black Beans	Legumes	$8.00
Sweet Bread (Concha)	Sweets	$12.00
Thin Beef Steaks (Bistec) Ground Beef Think Pork Steaks (Bistec) Skirt Steak Chicken Leg Chicken Breast Chicken Wing Chicken Thigh	Animal Products (low fat)	$22.56
Eggs (White)	Animal Products (medium fat)	$4.00
Milk	Milk	$20.80
Vegetable Oil Avocado (Hass)	Oils and Fats	$2.64
Sugar	Sugars	$1.20
Salt	Salt	$.31
Water	Water	$7.73
Total		$192.80 ($6,025.20 monthly)

Source: Observatorio de Salarios, 2014.

In addition to the component food items, the *Observatorio* also introduced the cost of food preparation into the food basket as a specifically defined element called the "consumption, preparation, and food conservation basket." This basket included the cost of utensils, kitchen items, dining furniture, kitchen appliances, bags, and the energy needed in order to cook. The electricity and gas estimates were generated from the Secretary of Energy and the National Institute of Ecology and Climate Change (INECC), who estimate that 41 percent of all electric energy and 40-50 percent of gas energy is consumed in satisfying food-related needs (Observatorio de Salarios, 2014).

In constructing the non-food basket, the team from IBERO included component items that would satisfy the basic needs guaranteed constitutionally: social, material, cultural, and educational needs. The researchers also included items and services required by these heads of households to work (e.g., transportation). Non-food expenditure was then split into twelve categories based on the consumer price index: cleaning and home care; personal care; housing/rent and maintenance services; glassware and household utensils (these were not re-included but rather highlighted as a category of goods); household goods and maintenance items; items for entertainment; education, culture, and recreation needs; communications; clothing, footwear, and accessories; festivities; transportation; and healthcare.

In determining the cost of housing**,** the researchers also sought to comply with Article Four of the Mexican Constitution of 1917, which declares that every family has the right to "enjoy dignified and decent housing" (Constitución Política de los Estados Unidos Mexicanos - Ordenamiento - Legislación," 1917). Using CONEVAL's (the National Council for the Evaluation of Social Development Policy) indicator of quality and spaces in housing, the *Observatorio* determined that housing must have:

- a firm floor of cement or otherwise covered (laminate, wood, etc.)
- a roof made of a concrete slab or beams of wood, terrace with veneer, sheet metal, asbestos, palm, tile or of a high quality
- that the material of the walls be brick, block, stone, concrete, wood, adobe, or of a superior quality
- that there be less than 2.5 people per room, including the kitchen but excluding hallways and bathrooms

As such, the cost of housing in their living wage estimates reflects this basic level of quality.

Similarly, under Article Three of the Mexican Constitution, every individual has the right to receive a free education; further, education until the ninth grade is compulsory. In consideration of this constitutional right, the education, culture, and recreation component did not include tuition or quotas, but only included the costs of school expenses (e.g., writing utensils, paper, school uniforms) and the costs of miscellaneous expenses that "foster children's educational development" (Observatorio de Salarios, 2014).

For the component healthcare costs, Article Four of the Mexican Constitution also guarantees every person's right to "health protection" (Constitución Política de los Estados Unidos Mexicanos - Ordenamiento - Legislación," 1917). This right has been crystallized in the form of a public healthcare system, where expenses are either fully or partially subsidized by the government for all citizens, depending on employment status. In light of this, the healthcare component only considers emergency costs, the costs of medications in commercial pharmacies, and occasional medical attention in private doctor's offices.

For these component costs, the researchers chose products of a "decent quality" and at the median price as defined by a study of product quality based on consumer opinion surveys conducted by PROFECO, the Federal Consumer Protection Bureau. The price of these items was multiplied by a shelf-life weight, or how long items were expected to last. In this way, some goods purchased by households were not expected to be monthly costs. Shelf life data was similarly sourced from consumer surveys and studies from PROFECO. This weight was defined as:

$$Weight = \left(\frac{Price}{Shelf\ Life}\right) * Q,$$

Where:

Q is the quantity consumed,

P is the Price of the item,

and the *Shelf Life* is the use life of the item in months.

Price data was obtained from three official sources: the National Consumer Price Index (INPC), PROFECO's online price query system named *Quién es Quién en los Precios* ("Who is Who in Prices?"), and in public wholesale markets. In public markets, the team collected the prices of specific items in their defined baskets, usually choosing those with the lowest price. As such, these prices do not necessarily reflect the mean of these prices, given that public markets in Mexico are composed of various stands and sellers, meaning that there is variation in the prices even within markets. At these markets, the team tended to choose items with the lowest cost and with a longer shelf-life. The sum of each component basket is the living wage ("constitutional minimum wage") estimate for the selected geography—in this case, for Puebla.

Table 3.3. Consumption, Preparation, and Food Conservation Components

Variables
Glassware and household utensils
Cookware
Energy
Kitchen utensils and items
Wood Furniture
Stove
Electric Appliances
Bags
Plastic utensils for the household
Total Daily Cost: 17.93
Source: *Observatorio de Salarios*, 2014.

Table 3.4. Non-Food Basket Composition

Variable	Monthly Cost
Cleaning and Home Care	$556.71
Personal Care	$624.86
Housing/Rent and Maintenance Services	$3,771.00
Glassware and Household Utensils	$187.63
Household Goods and Maintenance	$255.86
Items for Entertainment	$114.60
Education, Culture, and Recreation	$181.90
Communications	$777.62
Clothing, Footwear, and Accessories	$1,793.66
Festivities	$586.90
Transportation	$406.01
Healthcare	$624.86
Total	$9,881.62
Source: Observatorio de Salarios, 2014.	

Table 3.5. Living Wage Estimates ("Constitutional Minimum Wage"), Puebla

Concept	Monthly Cost
Food Basket	$6,563.14
Food Elements	$6,025.20
Preparation	$537.94
Non-Food Basket	$9,881.62
Total	$16,444.76
Source: *Observatorio de Salarios*, 2014.	

IV. MIT Living Wage Calculator

A. Background

In September 2018, the *Observatorio de Salarios* research team approached Professor Amy Glasmeier of the Massachusetts Institute of Technology to compare methodologies with MIT's Living Wage Calculator (LWC), first created by Dr. Glasmeier in the early 2000s, and to brainstorm how to systematize their living wage estimates for the entire country. When the Living Wage Calculator was first constructed, the U.S. was just emerging from an economic recession that had disproportionately affected rural employers. According to Dr. Glasmeier, the purpose of creating the calculator was to show that "the minimum wage was insufficient to raise a family," adding that "wages are 20 years out of date, and the people who babysit your children or wash your car or mow your grass are not making enough money to make ends meet" (Brown, 2015).

Since its inception, the usage of the Living Wage Calculator has dramatically expanded. Corporate, municipal, and civic partners who share a common conviction to paying a living wage use it to set their wage rates. Current corporate partners include IKEA, who uses it to "estimate the appropriate wage required to meet a person's basic needs including food, housing, and transportation," and Patagonia (Shulman, 2018). Other organizations include the City of Dallas, who approved a living wage ordinance for city contract employees in 2015 based on the Living Wage Calculator's estimates. A year later, the city found that while city contracts were more expensive, temporary employees had increased morale, were available more often, and stayed with the city long enough to transition to full-time employment (Young, 2017). According to these partners, the calculator provides a durable and precise calculation that would otherwise be difficult to construct without an expertise in data (Shulman, 2018).

B. MIT's Living Wage Calculator: Methodology

The MIT Living Wage Calculator's methodology for the construction of a living wage utilizes the market basket approach and is based on a basic needs budget (Glasmeier & Nadeau, 2017). A basic needs budget is defined as:

$$Basic\ Needs\ Budget = Food\ Cost + Childcare\ Cost + Healthcare\ Cost + Housing\ Cost + Transportation\ Cost + Cost\ of\ Other\ Necessitites$$

while the living wage is:

$$Living\ Wage = Basic\ Needs\ Budget + (Basic\ Needs\ Budget\ \ Rate \times\ Tax\ Rate)$$

Each component of the basic needs budget is constructed using the following data sources (Glasmeier & Nadeau, 2017):

Food Costs: The food cost component of the MIT Living Wage Calculator is sourced from the U.S. Department of Agriculture (USDA)'s food plans. The USDA details four plans that are nutritionally adequate at different price points. The food costs within the living wage calculator are based on the low-cost plan, which is the second least expensive option and assumes that families will select lower food costs and cook all meals at home. This component cost varies by family size and by age. Adult consumption costs are estimated by averaging the low-cost plan food costs for males and females between 19 and 50, while child food costs are estimated using various categories in the low-cost food plan. Food costs are then adjusted using weights based on regional price differences.

Childcare: The childcare component of the basic needs budget is constructed from state-level cost estimates, which are published by the National Association of Child Care Resource and Referral Agencies. The LWC assumes that low-income families will select the lowest cost childcare option available, which is the family childcare or childcare center option.

Healthcare: The health component of the basic needs budget includes health insurance costs for employer-sponsored plans, medical services, drugs, and medical supplies.

The costs for medical services, drugs, and medical supplies are derived from 2015 national expenditure estimates (by household size) provided in the 2015 Bureau of Labor Statistics Consumer Expenditure Survey. As with the food costs component, these estimates are further adjusted for regional differences using annual income expenditure shares reported by region.

Health insurance costs were separately calculated using the Agency for Healthcare Research and Quality's Health Insurance Component Analytical Tool (MEPSnet/IC), which provides state-level estimates derived from the insurance component of the 2015 Medical Expenditure Panel Survey. Households are matched to insurance plans and costs depending on their size (single household to single plans, two-adult families to employee-plus-one plans, and all other families to "Family Plans").

Housing: The housing component estimates the cost of rental housing in a given geography based on the Department of Housing and Urban Development (HUD)'s Fair Market Rents (FMR) estimates. County FMRs are obtained by aggregating sub-county estimates (where sub-county estimates existed) using a population-weighted average based on estimates from the Census Bureau's American Community Survey 5-year Estimates. One-adult families are assumed to rent a single occupancy unit (no bedrooms), two-adult families are assumed to rent a one bedroom apartment, and two-adult families with one or two children are assumed to rent a two bedroom apartment. Families with three children are assumed to rent a three bedroom apartment.

Transportation: The transportation component is estimated using 2015 national expenditure data by household size from the 2015 Bureau of Labor Statistics Consumer Expenditure Survey. Transportation costs cover operational expenses such as fuel and routine maintenance, as well as vehicle financing and vehicle insurance, but do not include the costs of purchasing a new automobile. These costs were further adjusted for regional differences using annual expenditure shares reported by region.

Other Necessities: The basic needs budget includes cost estimates for other miscellaneous essentials not otherwise included in the major budget components, including clothing, personal care items and services, reading, housekeeping supplies, and other miscellaneous expenses. Expenditure for these necessities is based on data by household size

from the Bureau of Labor Statistics Consumer Expenditure Survey. These costs are then adjusted to account for regional differences in price using the annual expenditure shares reported by region.

Taxes: Estimates for federal and state taxes are included in the calculation of a living wage. Property taxes and sales taxes are already represented in the budget estimates through the cost of rent and other necessities. Federal taxes are taken from the Urban-Brookings Tax Policy Center Microsimulation Mode and include: individual income taxes, payroll taxes, corporate income taxes, 25 estate taxes, and excise taxes. The state tax rate is taken from the CCH State Tax Handbook; the pre-living wage estimate determines the tax rate tier applied and includes deductions.

Sample living wage estimates and calculations for Boston-Cambridge-Newton, MA for 2018 are presented in Tables 3.6 and 3.7.

Table 3.6. Typical Living Expenses in Boston-Cambridge-Newton, MA, 2018

Annual Expenses	1 Adult	2 Adults (1 Working)	2 Adults (1 Working) 1 Child
Food	$3,477	$6,374	$7,933
Childcare	$0	$0	$0
Medical	$2,660	$5,895	$6,851
Housing	$14,019	$15,789	$19,491
Transportation	$3,893	$7,094	$8,341
Other	$2,785	$4,633	$5,030
Required annual income after taxes	$26,834	$39,784	$47,647
Annual taxes	$3,743	$5,550	$6,647
Required annual income before taxes	$30,577	$45,334	$54,294

Source: ("Living Wage Calculator - Living Wage Calculation for Boston-Cambridge-Newton, MA," 2019)

Table 3.7. Living Wage Estimates for Boston-Cambridge-Newton, MA, 2018

Hourly Wages	1 Adult	2 Adults (1 Working)	2 Adults (1 Working) 1 Child
Living Wage	$14.70	$21.80	$26.10
Poverty Wage	$5.84	$7.91	$9.99
Minimum Wage	$11.00	$11.00	$11.00
Source: ("Living Wage Calculator - Living Wage Calculation for Boston-Cambridge-Newton, MA," 2019)			

V. Methodological Challenges

Given these different and established methodologies of calculating the Living Wage, the goal of this thesis is to replicate the Living Wage Calculator model in a way that is easily comprehensible, calculatable, replicable and easily communicated, using the *Observatorio de Salario*'s well-developed work as a base. The purpose of doing so is to systematize living wage estimates in Mexico (with the aim of having living wage estimates for every major city in the country) and creating a source for quickly calculable and replicable living wage estimates. However, there are conceptual, ethical, and practical concerns in adopting MIT's Living Wage Calculator Method with the *Observatorio de Salarios*' methodology as a base.

The first challenge is reproducibility. MIT's Living Wage Calculator largely relies on observed consumption data, as revealed by household expenditure surveys and well-developed cost estimation datasets. In contrast, the *Observatorio de Salarios*' methodology does not include the national household expenditure survey, the ENIGH (*Encuesta Nacional de Ingresos y Gastos en los Hogares)*, or any other expenditure analysis as a basis for its cost estimates. One reason for this is that the household expenditure survey was only statistically representative of the national population until 2016. At that time, the household expenditure survey was re-designed to achieve statistically representative samples of state populations (National Institute of Statistics, Geography, and Informatics (INEGI), 2016). For this reason, the social science researchers were not able to use this important data source in 2014 when constructing living wage estimates for Puebla City.

Moreover, while researchers in Mexico have solid access to data and professional statistics, which are provided by INEGI and other institutions, these are not as robust as they are in the United States. While there are guidelines for healthy diets provided by the Mexican Department of Health, they do not have an FDA-like organization providing estimates of these baskets at varying price points or that offers *normative* guidelines. Similarly, what constitutes "fair" rent is not defined by a third party (relative to the researcher) as in the U.S. which is defined by the Department of Housing and Urban Development. In other words, what constitutes "fair," "just," or even "feasible" is left to the discretion of the social science researcher. For instance, in the selection of household items for cleaning, 2017 living wage estimates for Mexico City are created using single items, line by line, including the brand and exact specification of the item. The reproducibility of living wage estimation is consequently hampered because what is chosen to remain in the basket can be deemed "arbitrary." Each line item can become a point of contention in the future.

From the other perspective, using national household expenditure survey statistics to define a minimum standard of well-being presents an ethical problem when the median household is barely living above poverty. According to the World Bank, in 2016, 43.6 percent of Mexican citizens lived below the national poverty line, which is calculated by combining income poverty with six indicators of social deprivation. Similarly, 32.8 percent of Mexican citizens lived below the international middle-income poverty line of $5.50 USD a day in 2016 (2011 PPP; World Bank, 2018). Therefore, one fundamental concern around using household expenditure surveys in the estimation of a *living* wage is that these instruments and surveys may capture how households have adjusted to poverty—whether that means monetary poverty or a lack of access to transportation, employment, and adequate housing—rather than what is actually a decent standard of living. Including cost estimates based on household expenditure surveys can mean perpetuating poverty based on survival norms if their usage is not well-defined.

The *Observatorio de Salarios*' estimation method also lacks simplicity and an ease of understanding. As mentioned earlier, their estimation of the non-food basket includes calculating price estimates of items using shelf-life weights. These weights also vary by particular item and component basket. Moreover, while the inclusion of specific cooking costs

into the food basket is normatively good, the energetic and household costs of cooking food can be difficult to measure and distinguish from other usages. Although living wage estimates can function to reveal the gaps in social policy, most notably in the minimum wage, these also function as bargaining tools for labor (as in the case of the Wage Floor in Asia), and therefore ought to be easily communicable to those who would most benefit from them.

Several conceptual adjustments are also needed to adapt Professor Glasmeier's methodology to the Mexican context given that the Mexican government provides access to services that significantly reduce living costs for households. For instance, since 2007, the Mexican government has been subsidizing childcare centers through the Estancias Infantiles para Apoyar a Madres Trabajadores (EI). The EI program covers approximately 90 percent of childcare costs for women with children aged 1-4 who earned less than six times the minimum wage and are working, actively looking for a job, or studying. This program is also intended for children whose mothers worked in a job not covered by the Mexican Social Security System (IMSS), which already provides childcare subsidies (Calderón, 2014). In other cases, when either daycare availability is scarce or childcare is otherwise unaffordable, this service is provided by grandparents. According to estimates from the 2014 National Employment and Social Security Survey, 61 percent of all childcare in Mexico is provided by grandparents (Sánchez, 2018).

Similarly, the Constitution of 1917 guarantees every Mexican citizen access to healthcare. A part of each worker's paycheck is deducted every month to pay for health insurance to contribute to a mandatory federal program. If the employer has not signed up for the federal insurance program, then citizens have the option of applying for *Seguro Popular*. In the end, most every citizen has healthcare costs either partially or completely subsidized, depending on economic and employment status.

In addition, applying Glasmeier's methodology requires defining normative parameters. If living wage estimates use household expenditure data to determine the cost of component baskets, the line of "minimum well-being" and its place within the distribution of Mexican households will need to be defined. The housing cost component will need to be sufficiently large enough to provide for "basic and dignified housing," as guaranteed in the Constitution. Regarding the previous discussion on childcare, given that the majority of childcare is provided

for by grandparents, should the baseline assumption assume that childcare will be provided by grandparents? Or should we make a normative judgement and assume that families should use daycare centers? Moreover, the question of worker formality also has implications for living wage estimates. Transportation costs, for instance, have been demonstrated to be lower for informal workers because they travel shorter distances compared to formal workers (Suárez, Murata, & Delgado Campos, 2016).

VI. Integrated Methodology

A methodology to systematize living wage estimates across Mexico exists at the intersection of the LWC method and the *Observatorio de Salario*'s method. The Living Wage Calculator's method for estimating living wages, while systematic, relies on median expenditure estimates. In the case of Mexico, this would normalize poverty norms and deny the minimum standard of well-being and dignity that a living wage should supply. The *Observatorio*'s Living Wage methodology, in contrast, succeeds in defining a minimum baseline of well-being, but the vast discretion given to the social science researcher in defining basket components and the complexity of the non-food basket price calculations means their estimates are difficult to replicate quickly and to systematize.

Considering the amount of work and study already conducted, I will simplify and streamline the *Observatorio*'s estimates using MIT's Living Wage Calculator method. First, I determined whether or not there was sufficient variation in prices, living standards, and household composition to justify creation of multiple living wage estimates using intercensal household survey data (2015), household expenditure survey data (2016), the Mexico City Trip Origin/Destination Survey (2017), and primary data collected by the author. From January 22-29, 2019, I collected price data for the pre-defined food basket at 13 public markets across Mexico City to fact-check price estimates and determine whether or not public markets demonstrated geographic variations in price. Markets were chosen due to their proximity to a public transit station (less than 100 meters), their size (number of locales), and how well-attended they were by the public. As noted earlier, within a public market, there can exist a number of different vendors and stands, and as such, there can be significant price variation

even within the market itself. I tended to choose the lowest available price for items in the food basket, while noting that the price collected does not necessarily reflect the median or lowest price.

Following the qualitative data collection, I also used a variety of public and private sources to determine whether other costs of living and quality of life indicators vary by geography and the degree to which these do. Based on socioeconomic indicators and cost data, I cluster the boroughs into three groups by cost and socioeconomic access variables using a k-means clustering algorithm, creating three groups for each set of variables: high-cost, medium-cost, and low-cost boroughs, and high-access, medium-access, and low-access boroughs. The number of clusters was selected using the elbow method. I also ran a series of Moran's I for each variable to determine whether there was a statistically significant autocorrelation across the geography of Mexico City.

Following the categorization of boroughs into clusters, I built living wage estimates for three- and four-member households using the *Observatorio*'s food basket as a base (excluding the costs of food preparation). The contents of the food basket were adjusted based on the results of 91 intercept surveys of average Mexican citizens, gathered from January 22-29, 2019 at the same 12 public markets across Mexico City. Surveys were conducted from the late morning to early afternoon (10AM-4PM). Survey respondents were asked how many times a week their household consumed items in the food basket and whether household members regularly consumed any items not included in the basket. The basket was then readjusted to match local consumption patterns, re-validated by nutritional experts, categorized into food groups, and priced by food group using INEGI's Mean Price Index (*Índice de Precios Promedios*).

Other component costs were determined using a variety of data sources. The costs of the healthcare, utility, transportation, and miscellaneous components were calculated using the 75th percentile of household expenditure by household size, drawn from the 2016 ENIGH (*Encuesta Nacional de Gastos en los Hogares*). Based on previous living wage research conducted by the *Salario de Observatorios*, the 75th percentile represents the households who earn a living wage. This choice was also validated using a number of benchmarks, which varied based on cost component. Rental costs were calculated using population-weighted medians for data

from a private sector database, Propiedades.com. I do not estimate the costs of childcare for families, a decision that is explained in further detail in Chapter 6.

Last, I estimate living wage estimates for boroughs based on their cost cluster assignment. I only estimate borough-level differences in cost components for the food, transportation, and housing components. For the food and transportation components, these differences are calculated using a series of adjustment factors. Stated simply, the adjustment factor is the average cost of a basket (e.g. the transportation component) for a cost cluster group divided by city-wide average cost. Differences in rents by cost cluster were estimated using population-weighted medians by cost cluster.

Mexico City was chosen as the pilot city for the systematization of living wage estimates for a number of reasons. First, the *Observatorio de Salarios* has already developed living wage estimates using their methodology for the city and these serve as a useful benchmark for new estimates. The *Universidad Iberoamericana*, which hosts the *Observatorio de Salarios*. also has a campus in Mexico City, which means they have local knowledge and the capacity to provide resources for the study. Second, Mexico City is the capital of the country and serves as a representative test case. Given its size and population, Mexico City displays patterns that reflect those found in other large metros in Mexico—such as higher cost of living, higher rents, population diversity (race, educational attainment, income, etc.), and even patterns of spatial segregation. Third, larger cities, especially political capitals, are more likely to set policy examples for other cities to follow suit. Therefore, the adoption of living wages in Mexico City could have reverberations in other cities in Mexico. Fourth, it is likely that living wage estimates will be highest in Mexico City, given its size, importance to the Mexican economy, and its concentrations of high-skilled employment. Living wage estimates in Mexico City will likely be the furthest from the minimum wage and will demonstrate just how far policy needs to catch up.

Chapter 4 presents the results of the qualitative surveys.

Table 3.8. Data Sources for Living Wage Estimates

Cost Component	Data Source
Food	*Observatorio de Salarios* Constitutional Living Wage Study (2014 and *forthcoming*) Mean Price Index (*Índice de Precios Promedios*, INEGI)
Childcare	No data. Assumed to be 0.
Medical	2016 National Household Expenditure Survey (*Encuesta Nacional de Gastos en los Hogares*, INEGI)
Housing	March 2019, Propiedades.com Online Database
Utilities	2016 National Household Expenditure Survey (*Encuesta Nacional de Gastos en los Hogares*, INEGI)
Transportation	2016 National Household Expenditure Survey (*Encuesta Nacional de Gastos en los Hogares*, INEGI) 2017 Mexico Valley Metropolitan Area Household Travel Survey (*Encuesta Origne Destino en los Hogares de la Zona Metropolitana del Valle de México*, INEGI)
Other	2016 National Household Expenditure Survey (*Encuesta Nacional de Gastos en los Hogares*, INEGI)

Chapter 4. Survey Results

"A falta de pan, tortillas." – Mexican Proverb

I. Introduction

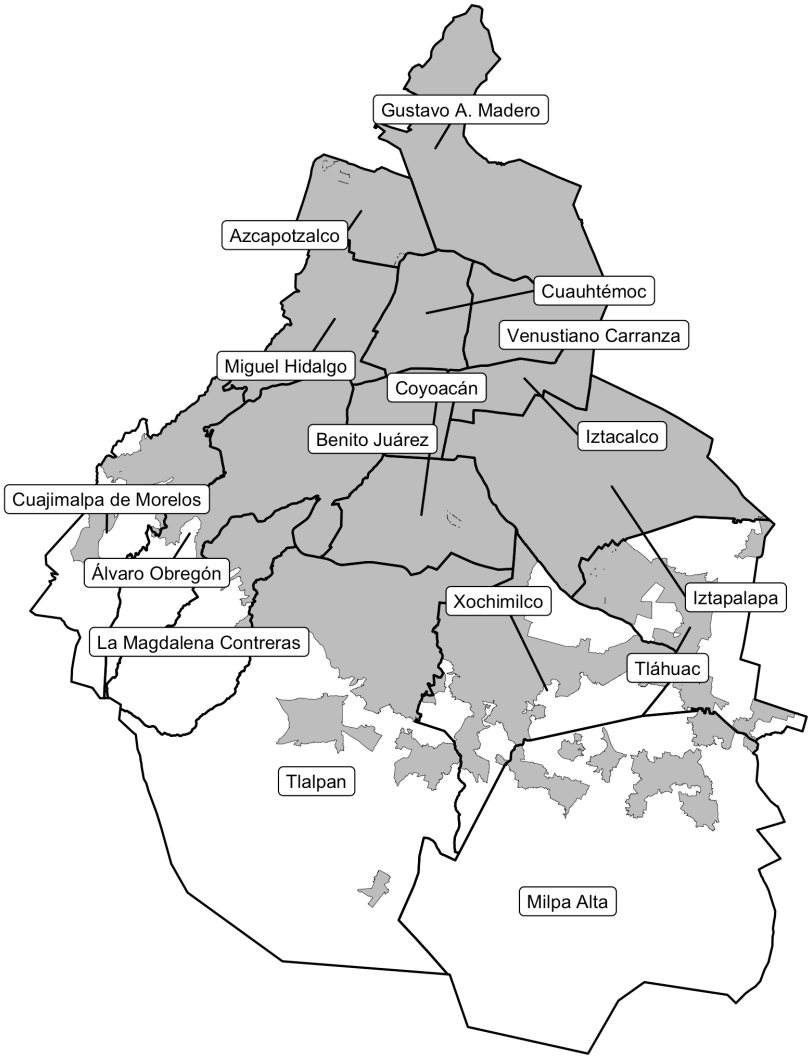
This chapter presents the results of the market surveys and price collection conducted in Mexico City as described in Chapter 3. It begins with a basic introduction to Mexico City, its boroughs, and its public markets. Section III of this chapter presents the results of 91 intercept surveys conducted at public markets in Mexico City in January 2019. I find that the *Observatorio de Salarios*' food basket is generally representative of local and cultural consumption patterns, although a few minor adjustments are needed. Section IV concludes.

II. Mexico City: Background

Mexico City, the capital of the United Mexican States, is one of 32 Mexican federal entities and the seat of federal power. Because of its status as the national capital, the Mexican Constitution explicitly prohibits it from becoming a state, but it remains both the most populous city in North America and the fifth largest economy in Latin America (Flannery, 2013). The city itself is composed of 16 boroughs or municipalities (*delegaciones*), each with its respective mayor and neighborhoods (*colonias*). The boroughs of Cuahutémoc, Miguel Hidalgo, and Cuajimalpa host the central business districts. At the same time, Cuahutémoc is also home to the historic city center, the former Mexica capital of *Tenochitlan*. In contrast, the population centers of the city are in the boroughs of Iztapalapa on the east side of the city, Gustavo A. Madero in the northern borders of the city, and La Magdalena Contreras and Tlalpan on the southern edges of the city.

Surveys were conducted in 12 public markets in 12 of the city's boroughs. These public markets are city-established *mercados públicos*, established initially by the government to regulate and better organize retail commerce and that have their origin in the pre-Hispanic street markets (*tianguis*). Because of these traditions and because Mexican locals continue to shop at these markets today, *mercados* are indicative of the true costs of a food basket for average citizens and a useful place to capture consumption patterns.

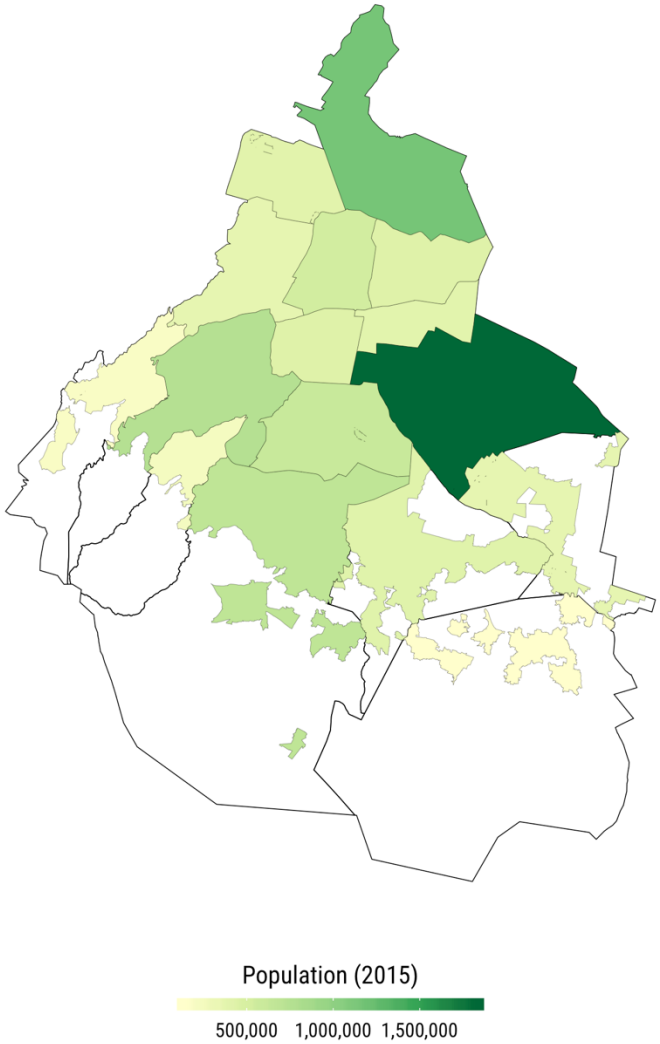
Figure 4.1. Mexico City: Boroughs



Source: Instituto Nacional de Estadística y Geografía (INEGI), 2015.

Figure 4.2. Mexico City: Population, 2015

Population by Borough



Source: Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.

III. Qualitative Survey Results

From January 22-29, 2019, I conducted 91 intercept survey interviews at 12 public markets across 12 boroughs of Mexico City, averaging 7 surveys per *mercado*. Interviews were conducted between the hours of 11AM and 4PM. The goal of the intercept surveys was two-fold: to better understand both the consumption and shopping patterns of average citizens of Mexico City and to determine how the food basket, as designed by the *Observatorio de Salarios*, needed to be adjusted to match these local and cultural patterns.

Any given borough in Mexico City is home to a wide variety of public markets. As such, *mercados* were chosen based on their representativeness within their respective borough. More representative markets had a higher number of vendors (locales), proximity to a public transit station (either a bus stop, Metrobus stop, or a metro station), and were identified as "traditional" markets (as opposed to a specialty or tourist market, where prices would likely be higher). For the most part, markets were within 100 meters of a public transit stop, although in the cases of *Mercado Tacubaya*, *Mercado Xochimilco Zona*, and *Mercado Lazaro Cardenas*, distances to public transit exceeded 100m, but were otherwise the most representative among my possible choices.

Table 4.1. Characteristics of Selected Markets

Market	Borough	Locales	Type	Distance to Transit
Mercado Tacubaya	Miguel Hidalgo	512	Traditional	290m
Mercado Xochimilco Zona	Xochimilco	968	Traditional	750m
Mercado Lazaro Cardenas	Tlalpan	72	Traditional	900m
Mercado Coyoácan	Coyoacán	464	Traditional	57m
Mercado Jamaica Zona	Venustiano Carranza	562	Traditional	82m
Mercado Melchor Mosquiz	Alvaro Obregón	327	Traditional	56m
Mercado Cuajimalpa	Cuajimalpa	128	Traditional	5m
Mercado Mixcoac	Benito Juárez	476	Traditional	35m
Mercado Culhuacán	Iztapalapa	109	Traditional	82m
Mercado Río Blanco	Gustavo A. Madero	454	Traditional	84m
Mercado Juárez	Cuahutémoc	454	Traditional	34m
Mercado Azcapotzalco	Azcapotzalco	546	Traditional	200m

Source: Secretaría de Desarollo Económico, CDMX (n.d.) and Author's calculations.

On average, intercept survey respondents were female and members of a four-person household (Table 4.2). Respondents were asked how often members of their household consumed the foods in the *Observatorio's* food basket in any given week. To order to determine a numeric average for these "consumption frequencies," responses were coded as follows: if interviewees replied that their household consumed a food basket item daily, their response was coded as a seven, for seven days a week. If interviewees indicated that their household consumed a product more than three times per week, their response was coded as a four. If respondents indicated they consumed a product three times a week, their response was

coded as a three, if they replied once or twice a week, their response was recorded as 1.5; and, if they replied never their answer was coded as a zero. In some cases, interview respondents mentioned that they consumed a food item once every two weeks or once a month, which was coded as .5 and .25 respectively.

Table 4.3 presents the results of the intercept surveys. Of the foods in the established basket, on average, the following foods were consumed the least frequently: skirt steak (*arrachera*; consumed .69 times a week); ground beef (consumed 1.3 times a week); pork steak (consumed 1.4 times a week); green beans (1.4 times per week); and cantaloupe (1.7 times per week). Three out of the five least frequently eaten items were red meat products, which tended to be more expensive to purchase relative to chicken and fish. It was also not uncommon to hear a respondent reply informally that one of these meat items was too expensive before noting that they did not consume it often.

In contrast, the most frequently consumed items (except for water, which was consumed daily) included items used for cooking and seasoning, for instance, vegetable oil (6.5), salt (5.9), and sugar (4.9), in addition to other everyday staples of Mexican food and cooking: corn tortillas (6.5), onion (5.6), tomato (5.2), and bananas (4.6).

Table 4.2. Descriptive Statistics for Survey Respondents

Variable	Value
Interviews	91
Mean Interviews per Market	7.58
Average Household Size	3.99
Female Respondents	80 (87.9%)
Male Respondents	11 (22.1%)
Markets Visited	12
Boroughs Visited	12
Source: Author's calculations based on surveys.	

Table 4.3. Average Consumption Frequency of Food Basket Items per Household

Item	Consumption Frequency (Days per Week)
Tomato	5.18
Onion	5.62
Green Beans	1.41
Tomatillos	3.44
Dried Chile de Árbol	2.01
Serrano Chiles	3.11
Carrots	3.57
Squash	2.56
Bananas	4.57
Oranges	3.19
Apples	3.57
Papaya	2.93
Cantaloupe	1.70
Pasta	3.69
Potato	3.29
Tortilla	6.48
Beans	4.20
Sweet Bread	3.73
Beef Steak (Thin)	1.83
Ground Beef	1.31
Pork Steak (Thin)	1.37
Skirt Steak	0.69
Leg (Chicken)	2.65
Breast (Chicken)	2.81
Wing (Chicken)	1.97
Thigh (Chicken)	2.60
Eggs	3.99
Milk	4.75
Vegetable Oil	6.48
Avocado	3.09
Sugar	4.87
Salt	5.86
Water	7.00

Source: Author's calculations based on 91 surveys.
Note: Survey interviewees were asked "How often does your household consume [item] in any given week?"

In addition to their weekly consumption patterns, respondents were also asked whether their household regularly consumed any foodstuffs not included in the survey list. The items excluded from the food basket but mentioned by more than 10 respondents included rice (16 people, 17.6 percent of respondents), cheese (15 people, 16.5. percent), lunch meat (14 people, 15.4 percent), cactus leaf (*nopal*; 14 people, 15.4 percent), limes (11 people, 12 percent), and chorizo (10 people, 11 percent). The top 15 most commonly mentioned items are presented in Table 4.4.

Table 4.4. Top 15 Frequently Consumed Foods Not Included in Food Basket

Food	Number of Respondents	Percent of Total
Rice	16	17.6
Cheese	15	16.5
Lunch Meat	14	15.4
Cactus Leaf (*nopal*)	14	15.4
Limes	11	12.1
Chorizo	10	11.0
Broccoli	8	8.8
Chayote Squash	8	8.8
Fish	8	8.8
Jalapeño	7	7.7
Sausage	7	7.7
Coffee	6	6.6
Cauliflower	6	6.6
Lettuce	6	6.6
Yogurt	6	6.6
Source: Author's calculations based on 91 surveys.		

Last, interviewees were asked to rank their preferred grocery shopping locations: the supermarket, corner stores (akin to *bodegas* in the U.S.), public markets, the *tianguis* (open air markets that occur once a week), and any other location. This data was useful both to inform the pricing estimates of the food basket and to better understand shopping patterns. Locations where respondents preferred to shop first were assigned a 1. Conversely, a 5 for any given location meant it was the least preferred place for grocery shopping. Some respondents chose not to give a score to certain locations because they didn't regularly shop there. Even so,

on average, respondents tended to shop at public markets first (score of 1.34), then at the *tianguis* (2.2), supermarkets (2.45), other store locations (3.75), and last, at corner stores (3.76).

Table 4.5. Shopping Location Preferences

Location	Average Rank (1=First, 5=Last)
Public Markets	1.3
Tianguis	2.2
Supermarket	2.5
Other	3.8
Corner Store	3.8
Source: Author's calculations based on 91 surveys.	

In the case a survey respondent answered that they preferred to shop at a supermarket or another location, they were then also asked to provide the specific name of the store. The most frequented specific shopping locations were Wal-Mart (33 respondents, 36.2 percent), followed by Bodega Aurrerá (19 people, 20.9 percent), which is also owned by Wal-Mart, and Soriana stores (15 respondents, 16.5 percent). The most frequented "other" shopping location was the wholesale public market, the *central de abastos.*

Table 4.6. Most Frequented Stores and Markets

Store Name	Number of Respondents	Percent of Total
Wal-Mart	33	36.3
Bodega Aurrerá	22	24.2
Soriana	15	16.5
Wholesale Public Market *(Central de Abastos)*	8	8.8
Source: Author's calculations based on 91 surveys.		

IV. Conclusion

This chapter analyzed the results of 91 intercept survey interviews at 12 public markets across 12 of Mexico City's 16 boroughs, conducted from January 22-29, 2019. I found that the food basket was generally representative of the stated consumption patterns of average Mexican citizens, although three out of the five least frequently eaten items were red meat

products. More than 10 percent of all respondents also noted their household consumed rice, cheese, lunch meat, cactus leaf, limes, and chorizo regularly. Lastly, survey respondents indicated a preference for shopping at *mercados* by a significant margin, and though this stated preference might be the result of a self-selection bias, at a minimum, it functions to highlight the usefulness of the public markets in better understanding household consumption patterns and geographic variation in prices.

Chapter 5. Borough-Level Spatial Analysis

"Dos linajes sólo hay en el mundo: como decía una abuela mía, que son el tener y el no tener, aunque ella al de tener se atenía." – *Miguel de Cervantes*

I. Introduction

While intercept surveys conducted at *mercados* served a useful purpose in revealing local and cultural patterns of consumption, this data alone is insufficient in allowing us to determine if cost and quality of life vary by geography and whether any differences in costs and quality of life warrant the creation of multiple living wage estimates. To this end, I also collected price data for the food items in the *Observatorio de Salarios'* food basket at the 12 *mercados públicos*. Following the estimation of these food basket costs, I then use publicly available data to determine the extent of cost and quality of life differences by borough.

II. Borough-Level Cost Estimates

A. Food Basket Costs

As mentioned, in addition to collecting consumer feedback on the food basket at the public markets, I also collected price data for the food items listed in the *Observatorio de Salarios'* food basket. The point of this exercise in data collection was to determine whether or not there was significant price variation by borough and to have an unofficial estimate of prices to check official estimates against. In general, I attempted to collect the lowest available price for any given items. However, each market varied in both its selection of products, the quality of said products, and in the number of locales. Therefore, price variation also existed within the markets themselves, whether based on vendor or based on food quality. Price data collected for food basket items are most likely to reflect the 25th percentile of prices, given that in my attempts to collect these costs, I may have missed a lower available price and most other estimates for similar food items tended to be higher.

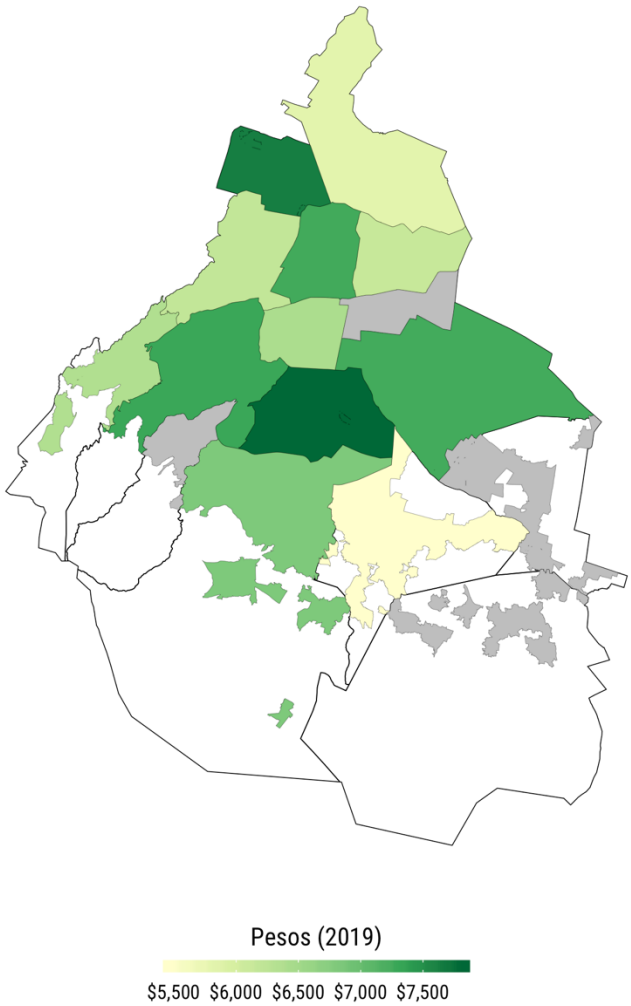
Based on the foodstuffs presented in the *Observatorio de Salarios'* food basket, I collected the lowest available price at each respective public market for each item. If unable to determine the price or find an item, I supplemented the dataset using *Quién es Quién en los Precios,* a website where the National Institute for Statistics, Geography, and Informatics (INEGI)

lists the average price for food items by borough with the specific location where the price of that item was gathered. Once each borough's food basket had a price for every item, I calculated the average price of each item per gram, and then the average price per gram per food group (for instance, vegetables, fruits, etc.). This average price was then multiplied by the suggested daily consumption amount to arrive at the cost for a food group. The sum total of all food group costs is the total daily food basket cost for one person.

For a household of four persons, to estimate the cost of a monthly food basket, the food basket was multiplied by 28 to arrive at the monthly food basket cost (seven days by four weeks), and then again by four to derive the monthly cost of food for a four-person household. Based on these estimates, a definitive geospatial pattern is difficult to discern. Nonetheless, food basket costs display a fair bit of variation. On average, the monthly food basket cost $6,709. The minimum price for the monthly food basket of a household of four was $5,473, captured in Xochimilco, while the maximum price was $7,817, captured in Coyoacán. The range of the estimated prices was roughly $2,000, which is slightly less than the amount of the monthly minimum wage. This variation in costs may indicate a need for multiple living wage estimates, as the cost of a food basket for one family in the most expensive borough could be about a month's (minimum wage) salary more than another household in another borough.

Figure 5.1. Mexico City: Monthly Food Basket Cost

Mean Cost of Food Basket for Family of Four, 2019



Sources: Data was collected in January 2019 at public markets.
Note: Missing values were filled in using Quién es Quién en los Precios? (2019).
No data was collected for Iztacalco, La Magdalena Contreras, Milpa Alta, or Tláhuac.

B. Median Monthly Rents

Following the estimation of the average food basket cost for a four-person household, an analysis of median monthly rents using data provided by Propidades.com revealed significant variation in prices based on location. On average, the median rent for Mexico City was $19,675 in March 2019. Of the 16 boroughs, Tlahuác had the lowest median rents at $4,426 per month, while Miguel Hidalgo had the highest median rents at $35,171. Generally

speaking, rents closest to the historic city center, located in Cuahutémoc, and those nearest to the central business districts (*Paseo de la Reforma* in both Cuahutémoc and Miguel Hidalgo, Santa Fe in Cuajimalpa, and Polanco in Miguel Hidalgo) are the highest, while boroughs further away from these districts tend to have cheaper rents. Additionally, boroughs with better access to transportation infrastructure, namely bus rapid transit and metro lines, also displayed higher rents. This makes sense, given what we'd expect based on the monocentric city model and the theory of land rents (Brueckner, 1987). However, the difference in price is sizeable, especially when talking about the minimum wage. From the cheapest to the most expensive borough, the price difference is about $30,475 Pesos, or about 12.5 times the monthly minimum wage.

Private sector data sources were chosen to analyze and estimate the cost of rental housing because official sources proved unreliable. An analysis of both the *Encuesta Nacional en Los Hogares* (ENH) and the *Índice de Precios Promedio* (IPP) revealed an estimated average housing expenditure of $2,750 pesos a month. In contrast, the lowest rent for a 2BR apartment on the Propiedades.com database was $4,426, more than double either official data source, even after adjusting for inflation. Moreover, according to LaMudi, the average cost of rental housing in Mexico City was $29,800 in 2018, an order of magnitude higher than official estimates ("¿Cuánto Cuesta Rentar un Departamento en México?," 2018). Although, this likely overestimates the median rent because it only takes its own listings into account, which tend to be in the more highly demanded sections of the city. Informal conversations about the housing expenditure estimates confirmed this data discrepancy. Because of these data concerns, private sector data was chosen as the most reliable estimates of rents in Mexico City. Besides, other sources did not have as much geographically disaggregated data as Propiedades.com.

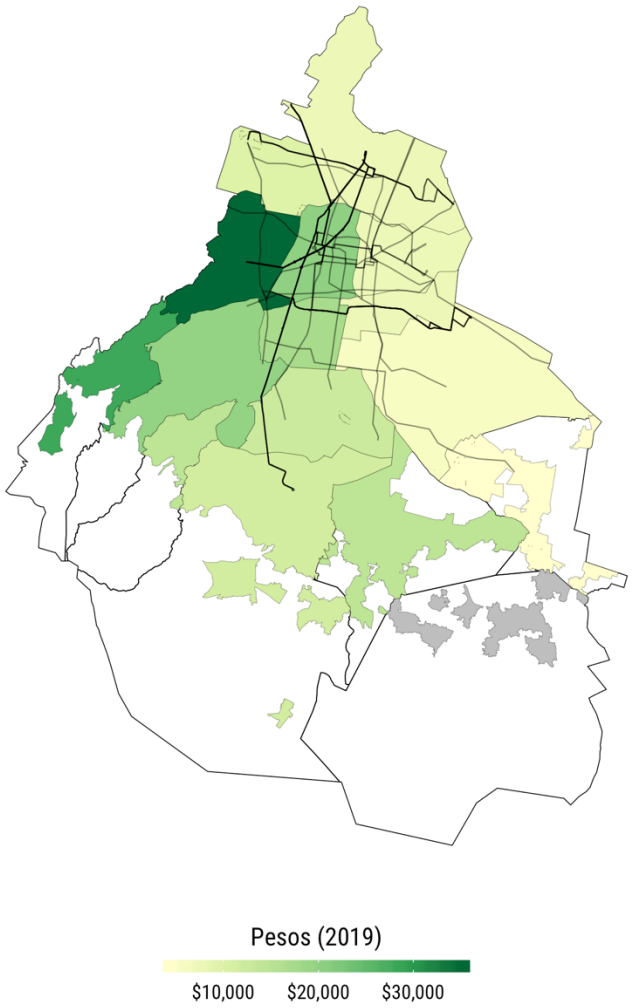
Table 5.1. Median Monthly Rents, 2BR Apartment

Source	Rent (2019 Pesos)
National Household Survey on Housing (ENH)	$2,948
Mean Price Index (IPP)	$2,765
La Mudi	$29,800
Propiedades.com	$19,675

Sources: Author's calculations based on the INEGI's *Encuesta Nacional en los Hogares* and *Índice de Precios Promedio* (2017), *La* Mudi, and Propiedades.com (March 2019).

Figure 5.2. Mexico City: Median Monthly Rent

Median Monthly Rent for a 2BR Apartment, 2019



Source: Propiedades.com Database, March 2019.
Note: No data was available for Milpa Alta.
Dark lines represent the extent of the metrobus and metro lines.

C. Transportation Costs, Commute Length, and Commute Mode

Transportation Costs were estimated using the 2017 *Encuesta Origen Destino en Hogares en la Zona Metropolitana del Valle de México*. The household travel survey was designed to improve the understanding of resident mobility in Mexico City's metropolitan area, the types of trips they took, their modes of transportation, the time of their trip, the length of their trip, their costs, and the number of trips taken. Data was filtered to include only trips originating in one of the 16 boroughs of Mexico City.

The cost of a one-way commute was determined by filtering for trips beginning from a commuter's home in one the 16 boroughs and ending at their work. On average, the city-wide one-way commute from home to work cost $12.85 (Table 5.2), which is greater than the simple cost of a one-way trip on any of the public transportation modes. In addition, the difference between transportation costs for the cheapest and the most expensive borough is about $20 pesos, or about one-fifth of the current hourly minimum wage. With the exception of Milpa Alta in the extreme southeastern periphery, the boroughs with the highest one-way commute expenditure were located closest to the city center (Figure 5.3), which is surprising given the availability of transit. This data may indicate that residents of the city are combining multiple forms of public transportation in order to get to their place of work, given that most citizens of Mexico City use public transportation (Figure 5.4).

Table 5.2. One-Way Commute Costs

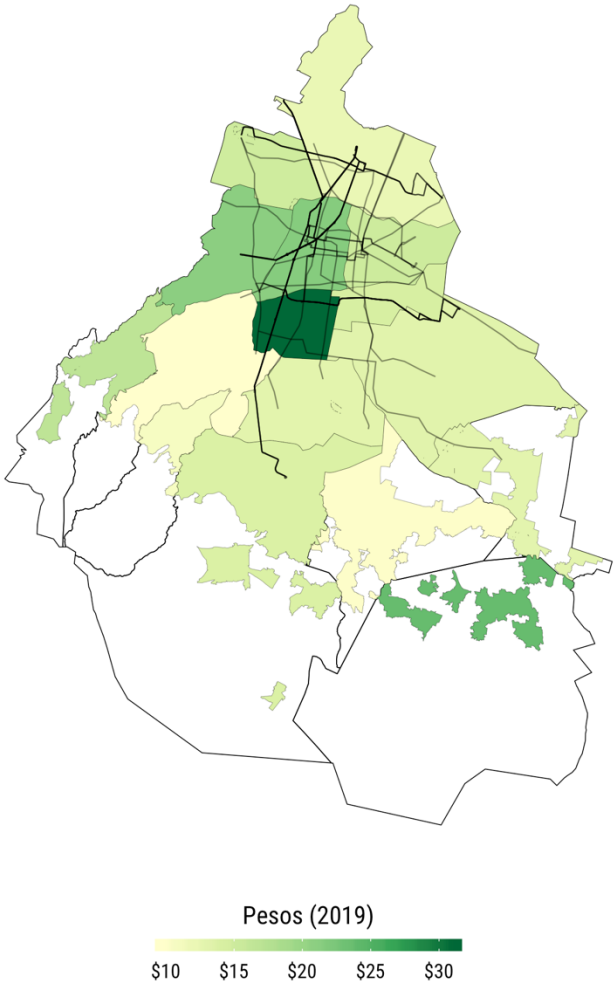
Commute Mode	2019 Pesos
Light rail	$3
Metro (Subway)	$5
Metrobús (Bus rapid transit)	$6
Colectivo bus or Suburban Train	$6.50
Average One-way Commute	$12.85

Sources: INEGI's *Índice de Precios Promedio* (2017), Mexicometro.org (2019), and Author's calculations based on *Encuesta Origen-Destino en Hogares en la Zona Metropolitana del Valle de México*.

However, another possibility is that differences in one-way commute expenditure may be reflecting differences in transportation mode. The western and southern boroughs adjacent to the city center closer tend to have the lowest rates of public transportation use for daily commutes, with the exception of Cuahutémoc (Figure 5.4). Commute time also appears to be a function of distance to the city center. The *closer* a borough is to the city center, the *shorter* the average commute time (albeit with higher costs). In contrast, the *further* a borough is from the city center, the *longer* the average commute time, although with lower costs (Figure 5.5). To summarize, residents who live closer to the city face higher commuting costs but can expect to commute for shorter periods of time.

Figure 5.3. Mexico City: One-Way Commute Expenditure

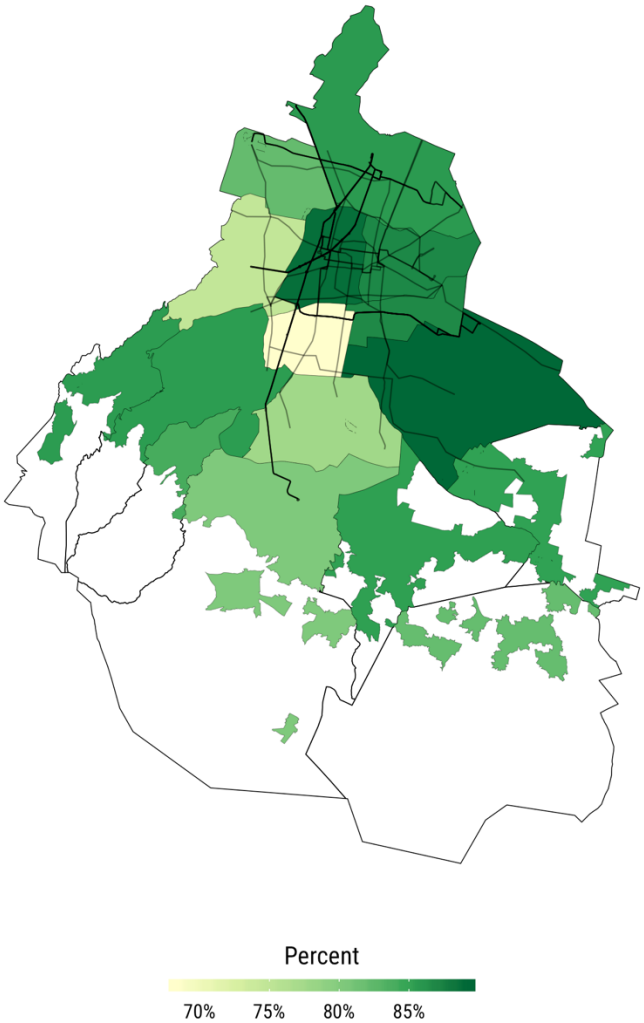
Average Cost of Trip from Home to Work



Source: Encuesta Origen-Destino ZMVM, 2017.
Note: The average is the simple mean of the cost of all trips originating from home in that borough and heading to work.
Dark lines represent the extent of the metrobus and metro lines.

Figure 5.4. Mexico City: Commutes by Public Means

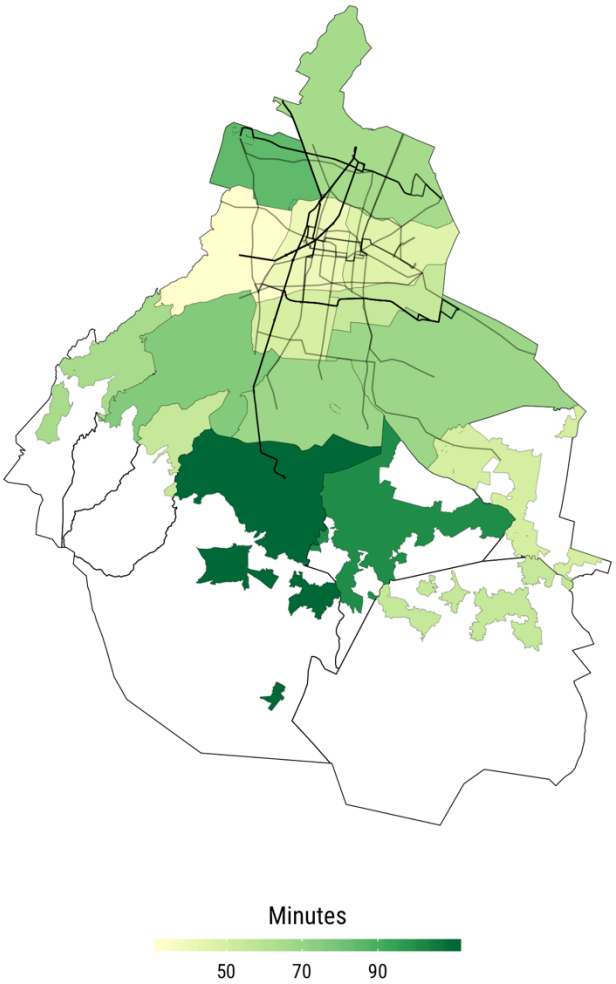
Percent of One-Way Trips Made by Public Transit or Active Transportation



Source: Encuesta Origen-Destino ZMVM, 2017.
Dark lines represent the extent of the metrobus and metro lines.

Figure 5.5. Mexico City: One-Way Commute Times

Average Travel Time From Home to Work

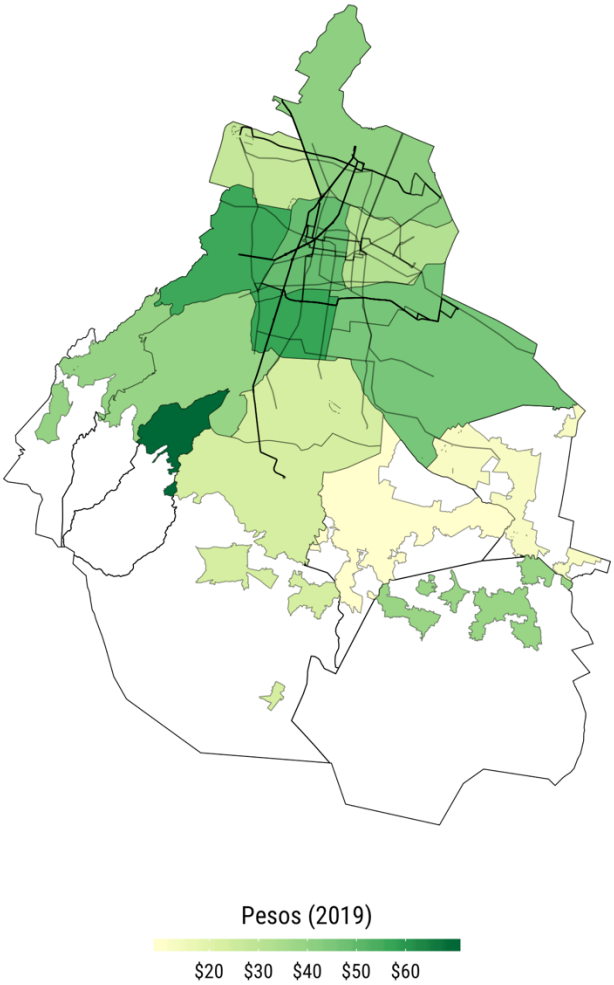


Source: Encuesta Origen-Destino ZMVM, 2017.
Note: The average is the simple mean of the commute time for all trips originating from home in that borough and heading to work. Dark Lines represent the extent of the Mexico City metro.

Following this analysis of commuting costs, time spent commuting, and transportation mode, I also investigated the cost of a one-way leisure trip. A leisure trip is defined as a trip to visit friends, family, play sports, or attend another recreational activity. In contrast to what we might think, given the amenities and access usually associated with center cities, it appears that central city residents pay more in transportation expenses to visit family, friends, or to attend a recreational activity.

Figure 5.6. Mexico City: Leisure Trip Expenditure

Average Cost of Trip from Home to Leisure Activity



Source: Encuesta Origen-Destino ZMVM, 2017.
Note: A trip is considered leisure if its purpose was to visit friends or family, to play sports, or attend another recreational activity.
Dark lines represent the extent of the metrobus and metro lines.

III. Borough-Level Analysis of Quality of Life Indicators

A. Socioeconomic Indicators

Having demonstrated the geographic variation in costs, I now turn to highlight spatial differences in socioeconomic outcomes and access. For one, median household income is the highest in Benito Juárez, at levels of $15,000 pesos a month (Figure 5.7). The next wealthiest borough, Cuiajimalpa, earns $9,000 Pesos a month, a full 40 percent less than Benito Juárez (Table 5.3). Three boroughs are tied for the lowest median household income at $6,000 pesos monthly: Azcapotzalco, Xochilmilco, and Milpa Alta. Xochimilco and Milpa Alta both consistently stand out for their low performance on various socioeconomic indicators and for their high degree of marginality. In addition to having the lowest levels of median household income, both boroughs display the lowest rates of secondary education completion (33.4 percent and 23.5 percent respectively) and some of the lowest levels of labor force participation (58.2 and 56.8 percent respectively). These boroughs also tend to house larger families with more children and are home to the most significant concentrations of the indigenous population of the city.

Benito Juaréz is in stark contrast to Xochimilco and Milpa Alta. In addition to having far and away the highest level of median household income, Benito Juaréz also has the highest rates of secondary education completion (69.7 percent), the highest level of labor force participation (64.2 percent), the smallest average household size (2.8 persons), the fewest number of children per household (.9), and the lowest proportion of the indigenous population (5.2 percent). Boroughs in the top 25 percent of income also tend to be closer to (or at) the city center. Cuahutémoc, Miguel Hidalgo, and to a lesser extent, Cuajimalpa, are all relatively close to the city center and display high levels of household income, in addition to secondary completion rates upwards of 50 percent.

In general, it appears that as you move away from the city center, median household incomes and educational attainment drop proportionately (Figure 5.8); as such, the extremities of the city display the lowest incomes and educational attainment. These extremities include Milpa Alta, Tlahuác, and Xochimilco, all of which demonstrate low levels of household income. These facts point to a persistent social inequity also evident in other Latin American cities:

economic resources and opportunity are tied to access to the city center. The urban poor and indigenous populations, however, are increasingly relegated to the peripheries, where commutes are long, access to formal employment and schooling is low, and necessary infrastructure often does not exist (Patel & Gutman, 2018; Muggah, 2018). This also gives credence to the hypothesis that relatively wealthier residents are located in central city boroughs and spend more money, spend less time, and travel further distances for their jobs, which is due to greater access to the formal job market and other public resources (Suárez et al., 2016).

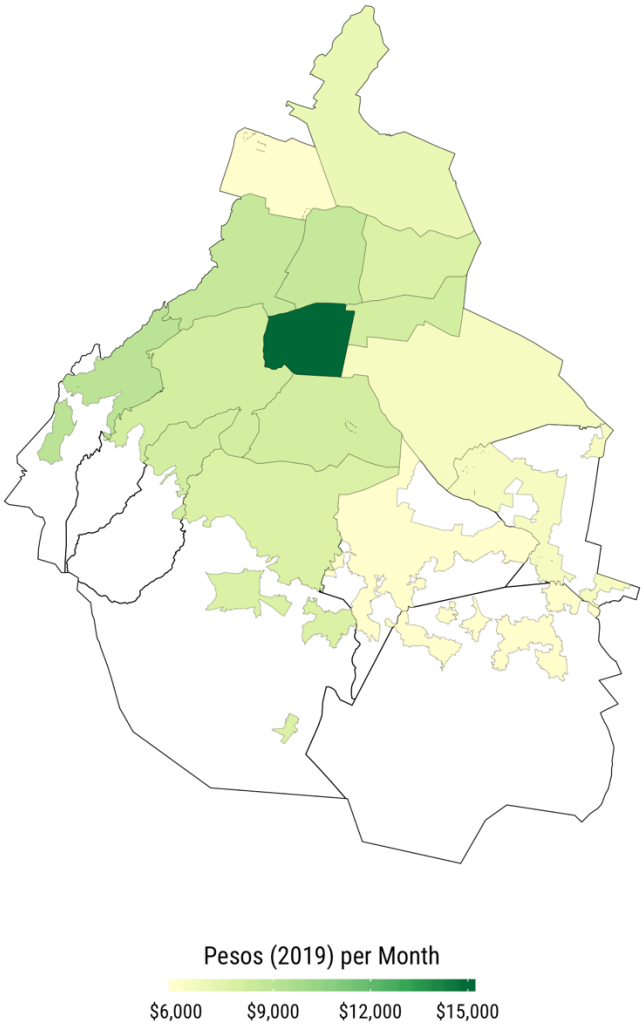
Table 5.3. Mexico City: Socioeconomic Indicators by Borough, 2015

Borough	Median Household Income (2019 Pesos)	Average Household Size	Average Children Per Household	Secondary Education Completion Rate	Labor Force Participation Rate	Indigenous Population
Azcapotzalco	$6,000	3.4	1.2	44.1%	57.7%	8.1%
Coyoacán	$8,000	3.3	1.1	53.5%	58.1%	9.2%
Cuajimalpa	$9,000	3.5	1.3	42.5%	59.6%	10.0%
Gustavo A. Madero	$7,000	3.6	1.3	39.9%	56.1%	6.9%
Iztacalco	$8,000	3.6	1.3	46.2%	57.6%	6.9%
Iztapalapa	$6,429	3.7	1.4	33.7%	58.0%	8.1%
La Magdalena Contreras	$8,000	3.6	1.4	34.0%	59.2%	9.3%
Milpa Alta	$6,000	4.1	1.7	23.5%	56.8%	21.5%
Alvaro Obregón	$8,000	3.5	1.3	38.6%	60.7%	9.3%
Tláhuac	$6,429	3.8	1.5	32.9%	56.6%	15.1%
Tlalapan	$7,726	3.6	1.3	42.1%	59.9%	11.9%
Xochimilco	$6,000	3.9	1.5	33.4%	58.2%	12.4%
Benito Juárez	$15,000	2.7	0.7	69.7%	64.2%	9.0%
Cuahutémoc	$8,571	2.9	0.9	51.3%	63.7%	9.0%
Miguel Hidalgo	$8,571	2.8	0.9	59.6%	63.1%	5.2%
Venustiano Carranza	$7,715	3.4	1.2	44.4%	59.2%	6.0%

Sources: Integrated Public Use Microdata Series using Intercensal Household Survey (2015).

Figure 5.7. Mexico City: Median Household Income

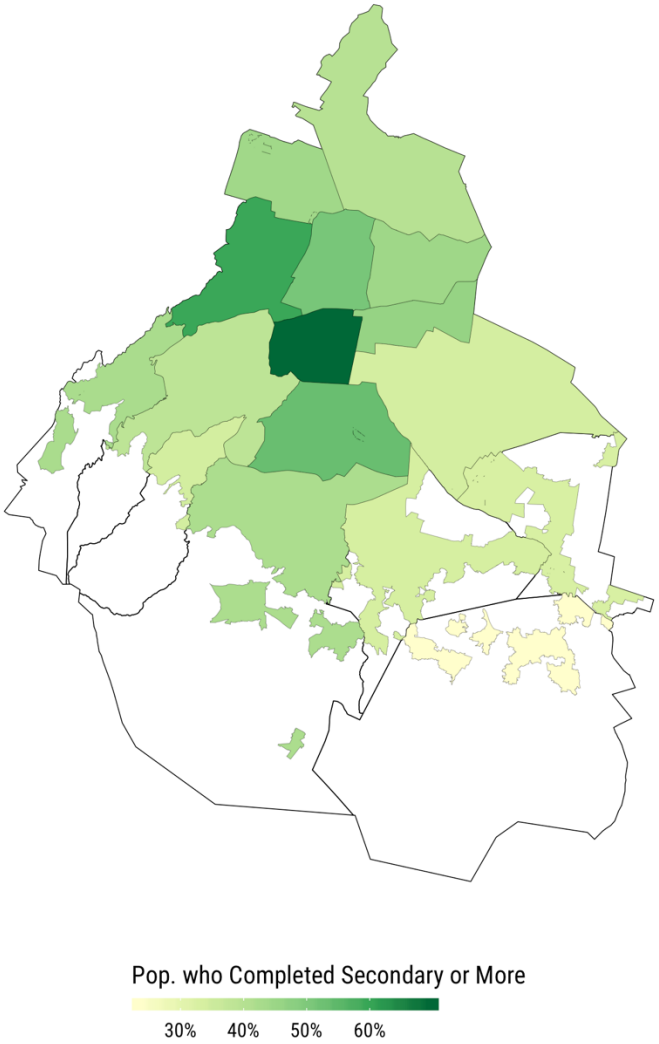
Monthly Median Household Income



Source: Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.
Note: Income inflated to 2019 pesos.

Figure 5.8. Mexico City: Educational Attainment

Secondary+ Completion Rate



Source: Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.

B. Housing Quality Differences

Looking at indicators of housing quality, we see a familiar story. The boroughs on the fringes, namely Milpa Alta and Xochimilco, demonstrate high levels of overcrowding—1 in 10 households is overcrowded—in addition to the lowest levels of internet access (27.7 and 46.9 percent respectively) and poor quality roofing (6.2 and 5 percent respectively). These housing quality and access indicators were chosen because they displayed the greatest amount of

variation in the data and because they have the most direct bearing on the quality of life concerns. Not surprisingly, Benito Juárez has the lowest overcrowding rates (.9 percent) and the highest proportion of households with internet access (81.3 percent). Other central city boroughs rank similarly. Interestingly, although Cuajimalpa had the second-highest median household income, it also has a relatively high rate of overcrowding when compared to other relatively high-income boroughs.

Table 5.4. Mexico City: Housing Indicators by Borough, 2015

Borough	Overcrowding Rate	Percent of Units Lacking Adequate Roofing	Households with Internet Access
Azcapotzalco	3.0%	0.3%	58.8%
Coyoacán	3.0%	0.4%	70.8%
Cuajimalpa	6.3%	2.0%	64.5%
Gustavo A. Madero	4.4%	0.4%	53.6%
Iztacalco	2.6%	0.2%	58.4%
Iztapalapa	6.7%	0.9%	47.6%
La Magdalena Contreras	6.6%	2.3%	53.3%
Milpa Alta	11.7%	6.2%	27.7%
Alvaro Obregón	5.0%	0.6%	61.5%
Tláhuac	6.7%	1.5%	46.4%
Tlalapan	6.3%	2.3%	60.0%
Xochimilco	9.8%	5.0%	46.9%
Benito Juárez	0.9%	0.4%	81.3%
Cuahutémoc	2.9%	0.2%	66.0%
Miguel Hidalgo	1.7%	0.1%	75.6%
Venustiano Carranza	3.0%	0.4%	57.3%

Sources: Integrated Public Use Microdata Series using Intercensal Household Survey (2015).
Note: The overcrowding rate is defined as the percentage of households with more than 2.5 people per room, including the kitchen but excluding hallways and bathrooms.

C. Health Access

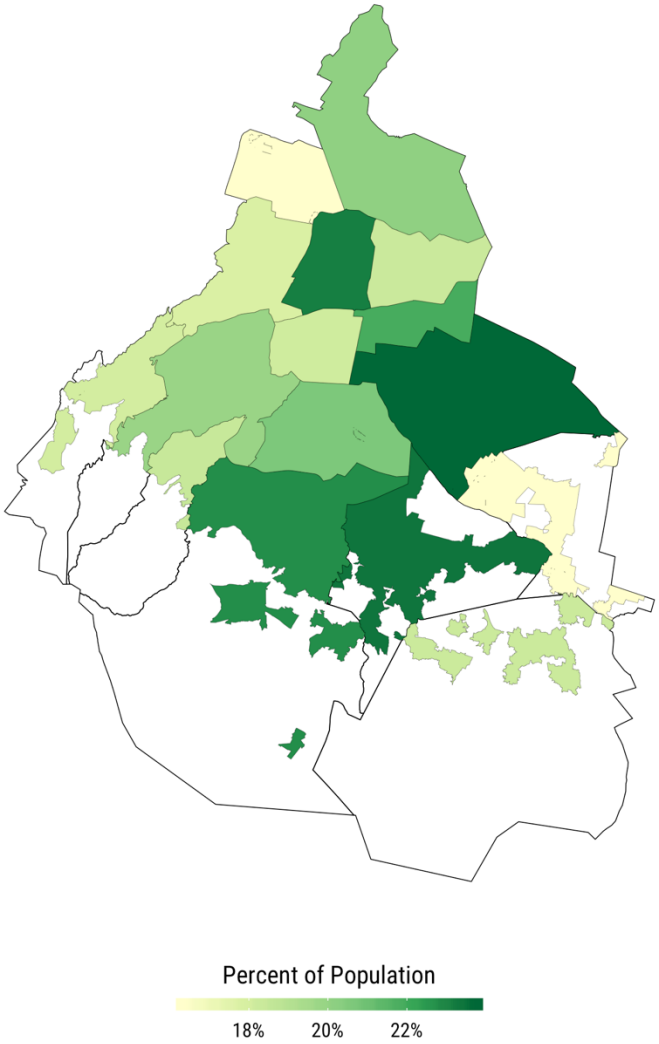
Lastly, I looked at the geographic distribution of the uninsured population. From Figure 5.9, it's difficult to discern a consistent or specific spatial pattern. However, a few features stand out. First, Cuahutémoc, the city center and one of the relatively wealthier boroughs, has a high proportion of people without access to any health coverage. At the same time, some of the less affluent boroughs like Xochimilco also have low levels of health coverage. Given that Mexico has a public healthcare system, complete with general insurance options through employers and the government, in addition to private insurance options, it may seem odd that there are large proportions of the population that are uninsured.

However, there is a clear logic to the uninsured populations, of which there are likely two. The first segment is the well-off and well-educated. Generally speaking, private healthcare providers in Mexico are more highly rated than public healthcare providers in measures of care quality, willingness of patients to return to a care facility, and patient improvement in health. Some studies estimate that as much as 50 percent of total health expenditures in Mexico come from private sources, and more than 90 percent of these are paid out of pocket. Owing partially to their higher quality of service, the population with higher educational achievement and the income to pay for these services is more likely to use private providers (Puig, Pagán, & Wong, 2009).

The second population likely to be uninsured is the rural poor and the fringe urban poor. Because of their location in the extremities and margins of major cities, lack of health insurance for the fringe urban poor may be a feature of a lack of access to healthcare and social security facilities, in spite of qualifying for public insurance. Lack of health insurance can also be related to a lack of understanding of the need for preventative health. Studies have shown that residents in Mexico with relatively fewer years of education, lower income, and with fewer assets are more likely to self-medicate instead of seeking formal professional healthcare (Pagán, Ross, Yau, & Polsky, 2006).

Figure 5.9. Mexico City: Uninsured Population

Percent of Population Without Any Health Coverage



Source: Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.

IV. Clustering

Based on the previously described socioeconomic and price data, observations were clustered using a simple k-means clustering algorithm. The optimal number of clusters was estimated using the elbow method (see Appendix 2). Three clusters were identified for each set of variables: high, medium, and low access clusters and high-, medium-, and low-cost clusters. Given that I was unable to conduct surveys in each of the 16 boroughs, the cost clustering algorithm was run twice, once without the priced food basket to determine clusters for each of the 16 boroughs and once with the priced food basket for the 12 boroughs where market data was collected. For Milpa Alta, median rent was set using a simple log-level regression using the log of median rent as the dependent variable and the number of listings on Propiedades.com as the independent variable. In the case in which cluster assignment changed from running the algorithm without the food basket and with the food basket, I used the assignment from the clustering process that included the food basket.

Generally speaking, the boroughs closest to the city center (Cuauhtémoc, Miguel Hidalgo, Benito Juárez) demonstrated a higher degree of socioeconomic access. Perhaps not surprisingly, these clusters also displayed higher prices than the rest of the boroughs, with the notable exceptions of Cuajimalpa de Morelos and Milpa Alta. These had medium and low levels of socioeconomic access respectively but high costs, likely due to their distance from the city center and lack of access to transit. Santa Fe in Cuajimalpa has also been redeveloped relatively recently into a middle and upper-middle class suburb complete with a business district for corporations. Medium price boroughs tended to form a ring around the central boroughs, while low price boroughs tended to be clustered at the edges of the city boundaries. Similarly, medium access clusters generally formed a ring around the central boroughs and the public transit network, while the three low access clusters, Milpa Alta, Tlahuác, and Xochimilco, were at the southeastern periphery of the city.

The granularity of the living wage can be observed at a more disaggregated level, based on the three price clusters. Household expenditure data is not robust enough yet to determine differences and variation in expenditure based on sociodemographic factors like access to healthcare or access to utilities. Additionally, I also estimated global Moran's I

statistics for a number of the socioeconomic and price variables to better understand how socioeconomic and price factors interact across the geography of Mexico City.

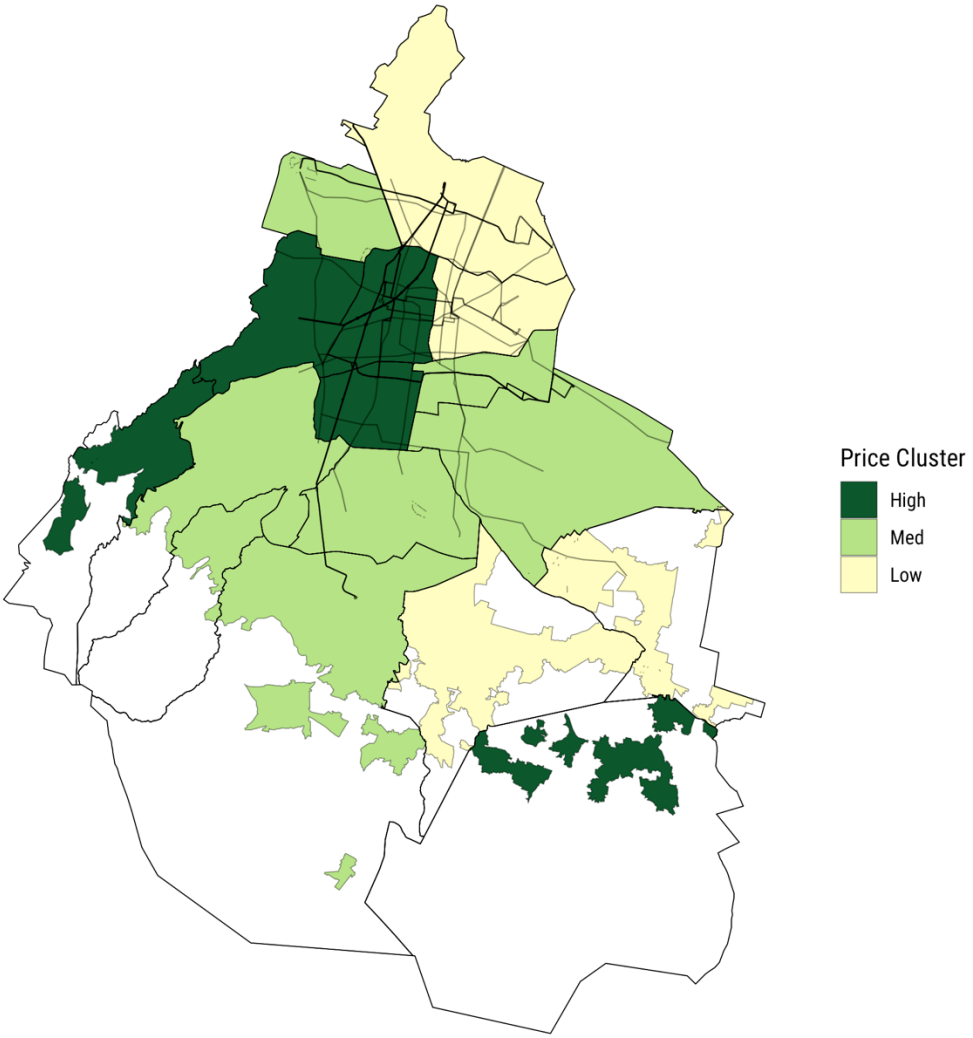
The variables with statistically significant Moran's I statistics were related to housing and socioeconomic access (Table 5.5). Interestingly, none of the transportation variables had a statistically significant Moran's I statistics. The variables with statistically Moran's I statistics included the overcrowding rate (Moran's I of .473), the share of the indigenous population (.443), median rents (.378), household internet access (.355), educational attainment (.297), and median household income (.121). In short: places with lack of socioeconomic access tend to be clustered together, and areas with high socioeconomic access also tend to be grouped together. The same can be said of median rents: those boroughs with high rents tend to be co-located, while median boroughs with low rents tend to be co-located.

Table 5.5. Global Moran's I Using Municipal Boundaries

Category	Variable	Moran's I Statistic	P-Value
Income	Median Household Income	0.121	0.038*
Education	Secondary Completion Rate	0.297	0.007*
Race	Indigenous Population	0.443	0.000*
Housing	Overcrowding Rate	0.473	0.000*
Housing	Lack of Quality Roofing	0.388	0.001*
Housing	Household Internet Access	0.355	0.002*
Housing	Median Rent	0.378	0.002*
Healthcare	Population without Health Coverage	-0.113	0.615
Transportation	Commute Costs	-0.010	0.346
Transportation	Commute Time	0.039	0.241
Transportation	Leisure Trip Costs	0.094	0.148
Transportation	Proportion of Commutes by Public or Active Transportation	-0.029	0.395
Food	Average Food Basket Cost	-0.278	0.841

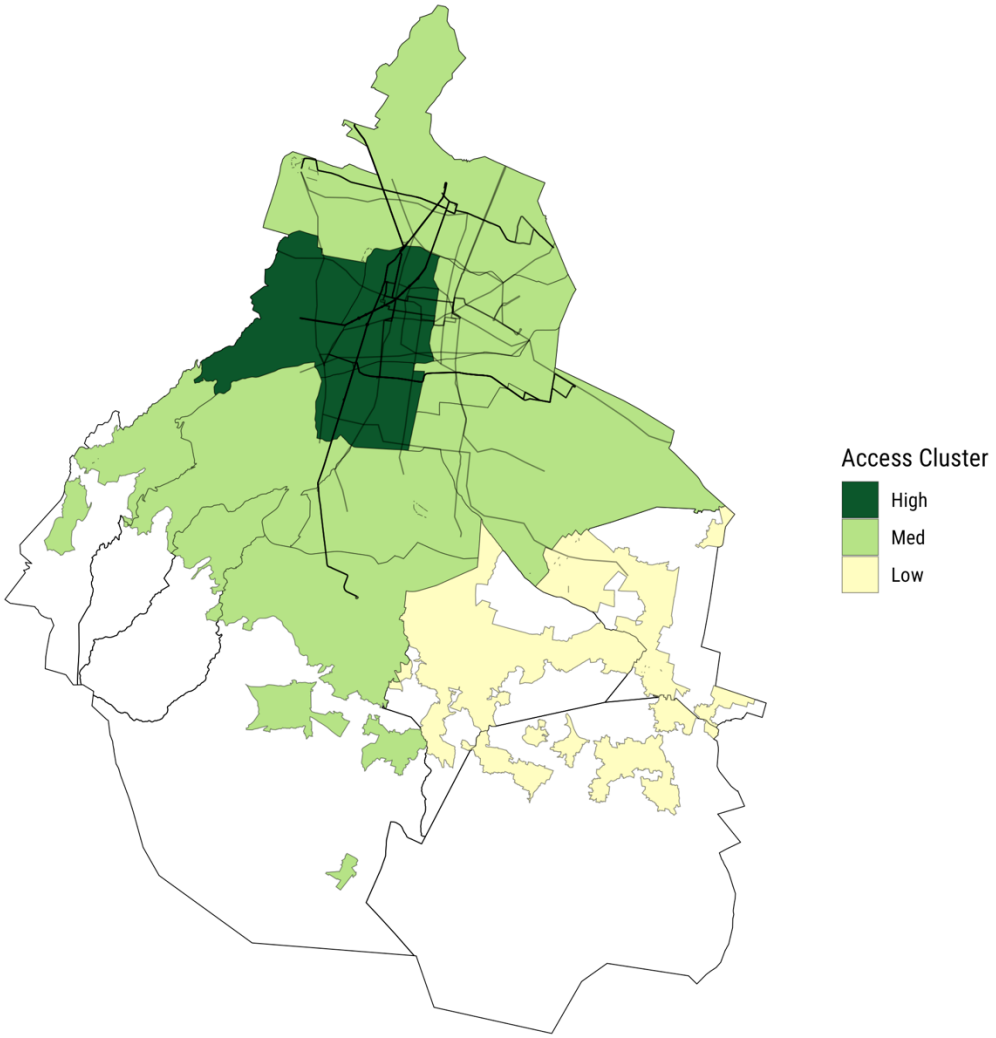
Source: Author's calculations.
Note: * indicates statistical significance at the 5 percent level.

Figure 5.10. Mexico City: Cost Clusters



Source: Author's estimations based on a K-Means Algorithm using Euclidean distances.
Note: Lines represent the extent of the metro and metrobus transit lines.

Figure 5.11. Mexico City: Social Access Clusters



Source: Author's estimations based on a K-Means Algorithm using Euclidean distances.
Note: Lines represent the extent of the metro and metrobus transit lines.

V. Conclusion

A spatial analysis of cost and socioeconomic data reveals significant differences in access to resources and in the costs a consumer can expect to face within Mexico City. I find three cluster groups based on socioeconomic and cost indicators: high-, medium-, and low-cost boroughs, and high-, medium-, and low-access boroughs. Boroughs with greater access to transportation and greater stocks of quality housing also tend to have higher household incomes and educational attainment rates, although they face higher costs. Additionally, I find that Milpa Alta, a borough with low access, faces elevated costs in contrast to boroughs with similar levels of access. This is largely due to its high degree of physical and social separation from the rest of the city. Perhaps most importantly, I find that the further one moves away from the city center, the more that measures of socioeconomic access drop. Access to economic resources and opportunity is tied to accessing the affluent city center. While this pattern is evident here in Mexico City, it is also a persistent feature of spatial and social inequalities in urban Latin America.

Chapter 6. Living Wage Estimation Framework and Provisional Estimates

"The greatest country, the richest country, is...the land in which...wealth does not show such contrasts high and low, where all men have enough — a modest living — and no man is made possessor beyond the sane and beautiful necessities." – Walt Whitman

I. Introduction

This chapter provides a methodology for estimating living wage estimates in Mexico City using available data sources and details the normative assumptions made in doing so. As a basis of comparison, living wage estimates from the *Observatorio de Salarios'* forthcoming study on Mexico City are included alongside original live wage estimates. In order to compare to estimates generated by the *Observatorio de Salarios,* component good basket and living wage estimates provided below are for a four-person household, given that the *Observatorio* has only provided living wage estimates for a four-person household. This chapter concludes with an analysis of three- and four-member households earning a living wage.

II. Estimation Framework

A. Key Assumptions: Family Size and Consumer Expenditure

According to the 2015 Intercensal Survey, the median household in Mexico City was composed of three members, two adults and one child aged 19. The next group of households was a four-person household, composed of two adults and two children, aged 19 and 14. Living wage estimates provided therefore reflect the cost of living for two types of families: three member households of two adults and one adult child, and four member households, composed of two adults and two adult children (for the purposes of caloric intake – see Appendix 2). In these households, only one adult is assumed to work, in keeping with the guarantee of Mexico's constitutional minimum wage. In addition, given that children are above the age of 12, childcare care costs are expected to be zero. If childcare were needed, because only one adult in the household is assumed to work, the other adult would be assumed to provide care for the children.

For a number of the component good baskets in this analysis, costs were estimated using the 75th percentile of consumer expenditure from the 2016 consumer expenditure

survey, the *Encuesta Nacional de Ingreso y Gasto en los Hogares* (ENIGH; National Institute of Statistics, Geography, and Informatics (INEGI), 2016). As mentioned in Chapter 3, the 75th percentile was chosen as the standard for a minimum quality of life based on the previous living wage work conducted by the *Observatorio de Salarios* (Observatorio de Salarios, 2014). Generally speaking, households that earned a living wage per the *Observatorio's* estimations and analysis were at 75th percentile of income. The usage of the 75th percentile was also validated using a number of benchmarks, which varied based on cost component.

B. Food Costs

In the absence of a normative food basket like the USDA's food plans that allows for a nutritionally adequate and affordable consumption bundle, estimates for the food component of the living wage were based on IBERO's methodology with some key adjustments. Basket items were first adjusted to better match cultural and local patterns of consumption, and then a team of nutritionists working with the *Observatorio de Salarios* validated each food group's (i.e. fruits, vegetables, meats) suggested daily consumption amount and nutritional content (see Appendix 3 for more detail). Any basket items consumed less than 1.5 times a week were removed from the food basket, while food items mentioned by more than 10 people were added to the basket (Table 6.1).

Table 6.1. Food Basket Adjustments

Food Group	Items Dropped	Items Added
Vegetables	Green Beans	Cactus Leaf (*nopal*)
Fruits		Lemon
Grains		Rice
Low-Fat Animal Products	Skirt Steak (*arrachera*) Ground beef Pork Steak	 Cheese Deli Meat (Turkey)
Medium-Fat Animal Products		Chorizo
Source: Author's calculations using 91 intercept surveys.		

The average price per food group (in grams) was then calculated by taking the mean price of the food items per gram using the mean price for each item in 2017 from INEGI's Mean Price Index (National Institute of Statistics, Geography, and Informatics (INEGI), 2019a) for the Valley of Mexico Metropolitan Region. This price is multiplied by the consumption amount to determine the daily price for the food group. The total daily cost of the food basket is the sum of each food group basket cost. To arrive at the monthly cost, this amount is multiplied by 28 (7 days, 4 weeks). The monthly cost is then multiplied by the number of household members to determine the total monthly cost for the household. Using this estimation method, I arrived at a food basket cost of $10,370 per four-person household.

However, this methodology estimate overprices the total basket based on the prices of some items that cost significantly more per gram (for instance, dried *chile de árbol*) relative to other food basket benchmarks. This overestimation problem is a feature of the mean as a measure of central tendency, which tend to overvalue outliers. This estimation may also reflect the volatility in prices of certain items because the average price is the mean cost of an item over the course of year (2017 in this case). As a point of reference, comparing the estimated cost of the basket to my own data collection at markets using the same methodology, the average basket cost $6,709, about $3,000 less than when using official price data. Given that the majority of interviewees stated a preference to shop at public markets, these estimates may better reflect the true cost of a food basket. I also decided to look at the 75th percentile of household expenditure as a second benchmark. Interestingly, the cost of food expenditure for a four-person household, including the cost of eating outside the home, was not exceptionally different from the estimates based on data collected at the public markets.

A difference of $3,000 Pesos is extremely meaningful because the monthly minimum wage adds up to about $2,464 monthly. It's therefore important for estimates to be as conservative as possible in order to have a chance at influencing policy decisions. Given these concerns, I decided to rethink the methodology. Although the methodology does seem to overestimate the true cost of purchasing a food basket, its transparency is a welcomed feature: both its calculation and nutritional adequacy are clear. Moral values are also imbued to the

food basket, as it reflects a *normative* standard that each person *ought* to have, which is a critical piece of establishing a living wage.

With these considerations in mind, I adopted the *Observatorio de Salarios'* methodology using the median. Using data from the Mean Price Index for all of 2017, I determined the average price for each item by first taking the median of every food item during that 12-month period. Then, to calculate the average price per food group, instead of taking an arithmetic mean per gram, I again took the median. This average cost per gram was multiplied by the daily consumption amount to get the average cost per food group. The food group prices were added up to get the daily basket cost per person. This was multiplied by 28 to get the monthly cost (7 days, 4 weeks) and then by the number of household members. A comparison of each estimation method's food basket costs is presented in Table 6.2.

Table 6.2. Food Basket Benchmarks, Family of 4 (2019)

Source	Cost (2019 Pesos)
75th Percentile of Household Expenditure	$6,998
Author's Data Collection at Markets	$6,709
Observatorio's Methodology (Mean)	$10,370
Observatorio's Methodology (Median)	$7,146

Sources: Author's calculations based on INEGI's *Encuesta Nacional de Ingresos y Gastos en los Hogares* (2016), own data collection, and INEGI's *Índice de Precios Promedios* (2017).

In order to determine the cost of geographic variation in prices, adjustment factors were calculated using the data gathered at public markets in January. The average price of the food basket at the high, medium, and low price clusters is divided by the city-wide average food basket cost to get the adjustment factor. The cost of the food basket, provided by the estimation method detailed above, is then multiplied by each adjustment factor to determine prices for each cluster. However, the calculation of adjustment factors posed a challenge in this analysis. In the case of the medium price cluster, the adjustment factor was higher than both the high price and low price clusters. This is probably due to a lack of data robustness

and because the biggest drivers of the clustering algorithm are the price of rent and transportation, which remain highest in the high price cluster.

Table 6.3. Mean Food Basket Costs and Adjustment Factors

Location	Cost for Family of 4 (2019 Pesos)	Adjustment Factor
Mexico City	$6,709	N/A
High Price Cluster	$6,560	0.98
Medium Price	$7,367	1.10
Low Price	$4,357	0.65
Source: Author's calculations using price data gathered at public markets in January 2019.		

In any case, these adjustment factors were used to estimate regional variations in pricing. The hope is that in the future, with greater data collection and greater data robustness, this piloted methodology could be used to more accurately capture and estimate price variations and geographically disaggregated living wages.

Table 6.4. Estimated Food Costs for Four-Person Household, March 2019

Source	Monthly Estimate
Observatorios' Estimate	$9,910
Author's Calculation: Mexico City	$7,146
High Price Cluster	$6,988
Medium Price Cluster	$7,847
Low Price Cluster	$4,642
Sources: *Observatorio de Salarios* (*forthcoming*) and author's calculations based on own data collection and INEGI's *Índice de Precios Promedios* (2017). Note: Estimates provided here for the *Observatorio* differ from the estimate in Table 13 because they have not been adjusted to match survey results.	

C. Housing

One of the biggest sources of geographic variation and of variation between the *Observatorio's* living wage estimates and those provided here is the cost of rent. This difference in the expected costs is partially due to the use of different data sources. The *Observatorio de Salarios* retrieved mean rent estimates using INEGI's Mean Price Index for the Mexico City Metropolitan Area (*Zona Metropolitana del Valle de México*). The author's living wage estimates utilize private sector data provided by Propiedades.com ("Precios Medio y Estadísticas: Inmobiliarias por Zona," 2019), an apartment and housing listing website and database.

As noted in Chapter 5, official housing price estimates are likely underestimating the true cost of renting an apartment within the boundaries of Mexico City. An analysis of both the *Encuesta Nacional en los Hogares* and of the 75th percentile of expenditure based on the *Encuesta Nacional de Ingresos y Gastos en los Hogares* revealed that these other sources of official data may underestimate the cost of rent by about five times at a minimum, similar to the magnitude of difference between the *Observatorio's* rent estimates and those provided below in Table 6.5.

In contrast, the median rent data provided by the Propiedades.com online database for Mexico City seems to more generally agree with estimates of median rents in Mexico City provided by third-party estimates ("¿Cuánto Cuesta Rentar un Departamento en México?," 2018) and with informal conversations about these official statistics. While it may very well be true that the average rent in the broader metropolitan area is $2,765 (as per INEGI's Median Price Index and the *Observatorio's* methodology), this figure will significantly understate the rents closer to the city center and business districts, where land rents tend to be highest. According *La Mudí's* estimates, average rents near the central business district of Miguel Hidalgo may be as high as $41,700 pesos ("¿Cuánto Cuesta Rentar un Departamento en México?," 2018).

City-level rents therefore incorporate data from Propiedades.com's database, using a population-weighted median of the rents in the 16 boroughs. Rents for the sub-clusters (high, medium, and low price clusters) were determined using population weighted medians for each data subset. Both three- and four-person households are assumed to rent a two-bedroom

apartment. In addition, given that these apartments are listed on formal channels, they are more likely to be of the quality deemed "dignified" in Chapter 3 as compared to apartments rented out through informal means. These median rents do not include utilities and are from March 2019.

In keeping with both the *Observatorio de Salarios'* previous methodology and the inclusion of utility costs in the Living Wage Calculator through HUD's Fair Market Rent estimates, the costs of utilities are included here and defined as the cost of water services, electricity, and combustibles. These are estimated using the 75th percentile of expenditure by household size from the 2016 *Encuesta Nacional de Ingresos y Gastos en los Hogares* (National Institute of Statistics, Geography, and Informatics (INEGI), 2016) and inflated to 2019 Pesos using the Consumer Price Index provided by INEGI (National Institute of Statistics, Geography, and Informatics (INEGI), 2019b). Utility costs were not further disaggregated to a cluster level due to a lack of sufficiently granular data.

For the purposes of comparison, the *Observatorio's* estimates presented here include the energetic costs of preparing food included in their food basket. Even when accounting for the energetic costs of food preparation, the estimates provided by the 75th percentile of expenditure are greater those estimated by the *Observatorio de Salarios*.

Table 6.5. Estimated Monthly Housing Costs for Four-Person Household (2019)

Source	Monthly Rent	Utilities	Total Monthly Cost
Observatorio's Living Wage	$2,765	$431	$3,196
Author's Calculation: Mexico City	$9,658	$949	$10,607
High Price Cluster	$20,205	$949	$21,154
Medium Price Cluster	$9,929	$949	$10,878
Low Price Cluster	$7,410	$949	$8,359

Source: *Observatorio de Salarios* (forthcoming), INEGI's *Encuesta Nacional de Ingresos y Gastos en los Hogares* (2016), and author's calculations using Propiedades.com (2019).
Note: The *Observatorio de Salarios'* estimates were inflated to 2019 Pesos using INEGI's Consumer Price Index. Utility costs include the component cost of cooking food.

D. Transportation

Household transportation expenditure was estimated using the 2016 *Encuesta Nacional de Ingresos y Gastos en Los Hogares*. Households are assumed to only use public transportation and therefore, the cost of transportation does *not* include the cost of owning a car, gasoline or fuel, taxis, or any form of transit other than public transportation. The estimated costs are based on the 75th percentile of consumer expenditure by household size and are inflated to 2019 Pesos using Consumer Price Index data from INEGI.

Estimations provided by the Household Expenditure Survey were benchmarked against data from the 2017 Household Travel Survey in the metropolitan region, the *Encuesta Origen-Destino en Hogares en la Zona Metropolitana del Valle de México* (National Institute of Statistics, Geography, and Informatics (INEGI), 2017). For this benchmark comparison, each household is assumed to have one adult worker who works six days a week for 4 weeks, in line with the Constitutional maximum. Trips were then filtered by their location, home origin, and destination. One-way commuting costs were estimated by filtering for trips originating from home in one of Mexico City's 16 boroughs and heading to work. I then took a weighted average of the trip cost based on the number of trips originating in each borough. This cost was then doubled to estimate the daily roundtrip cost of a work commute and multiplied by 24 to arrive at a monthly commute cost estimate.

Households were also assumed to make 2 leisure trips per month per household member, defined as a trip to visit family, travel to a park or other location for recreation, or to play sports. I assume two leisure trips in order to compare with transportation component estimates from the *Observatorio de Salarios'* forthcoming work. Leisure trip costs were estimated using the mean one-way cost of a trip from home to a place of recreation, weighted by the number of trips originating from each borough. This one-way cost was then doubled to determine the roundtrip cost, and then multiplied by the number of household members times two. The total benchmark cost was the sum of the monthly commuting and leisure trip costs. In the end, this benchmark was about 50 Pesos more than the 75th percentile– for a family of four, the benchmark costs were estimated at $1,277 compared to $1,213 for the 75th percentile of expenditure for the public transportation category. Given these relatively minor

differences, the 75th percentile of public transportation expenditure was used for its ease of estimation.

Disaggregated transportation costs were also used to estimate price variation by cluster. The roundtrip commute cost for each of the three clusters was divided by the average city-wide commuting cost to get the adjustment factor relative to the mean. The 75th percentile was then multiplied by this factor to arrive at regionally adjusted price estimates (Table 6.6).

Table 6.6. Mean Commute Costs and Adjustment Factors

Variable	Cost	Adjustment Factor
Mexico City: Roundtrip Commute Cost	$26.99	N/A
High Price Cluster	$42.27	1.57
Medium Price Cluster	$24.22	.90
Low Price Cluster	$23.54	.80

Sources: Author's calculations using *Encuesta Origen-Destino en Hogares en la Zona Metropolitana del Valle de México* (2017).

Estimated monthly transportation costs for a four-person household are provided in Table 6.7. These estimates, generated using the 75th percentile of household expenditure, are more than double the *Observatorio de Salarios*' estimates for the transportation basket. While both estimates assume one worker per household, that households will only use public transportation, and will take two leisure trips per family member per month, the *Observatorio de Salarios*' estimates are based on the cost of a one-way trip on a *colectivo* bus ($6.40 in 2017), one of the most common means of public transportation. In contrast, the transportation basket provided by the author are based on actual expenditure by households. As noted in Section III, households likely require more than one *colectivo* trip in order to arrive to their place of work or leisure. Therefore, real costs may be significantly higher than the estimates provided by the *Observatorio de Salarios*. The analysis of commuting costs in Mexico City seems to confirm this fact – the cost of an average one-way commute in Mexico City was $26.99 in 2017, while the average one-way leisure trip in Mexico City cost $70.67.

Table 6.7. Estimated Monthly Transportation Costs for Four-Person Household (2019)

Source	Monthly Cost
Observatorio's Living Wage Estimate	$482
Author's Calculation: City-wide Benchmark	$1,277
Author's Calculation: Mexico City (75th Percentile)	$1,213
High Price Cluster	$1,788
Medium Price Cluster	$1,145
Low Price Cluster	$1,002

Sources: *Observatorio de Salarios* (forthcoming) and author's calculations using *Encuesta Origen-Destino en Hogares en la Zona Metropolitana del Valle de México* (2017) and *Encuesta Nacional de Ingresos y Gastos en los Hogares* (2016).
Note: The *Observatorio de Salarios'* estimates were inflated to 2019 Pesos using the CPI Index.

E. Healthcare

Healthcare costs were also estimated using the 75th percentile of expenditure. Data is derived from the 2016 *Encuesta Nacional de Ingresos y Gastos en los Hogares* (2016) and inflated to 2019 using the CPI inflator. Healthcare costs include expenditure on: (1) primary care and emergency care, (2) hospital care and medical services, (3) medications during pregnancy and childbirth, (4) orthopedic instruments, (5) therapeutic instruments, (6) health insurance premiums, and (7) over the counter medicine. Healthcare costs were not adjusted for variations by price cluster due to a lack of sufficiently granular data.

Living wage estimates for healthcare reveal yet another concern. When spending is broken up by household size, expenditure at 75th percentile for three-person households is greater than expenditure for four-person households. It's not evident to the author whether this discrepancy and decrease in expenditure by household size is a problem with the data source, a feature of the Mexican healthcare system, or a product of the three- and four-member households being categorically distinct populations. Perhaps further complicating the discussion, health expenditure is greatest for two-member households and continually decreases as household size grows. For now, healthcare expenditure for households have been set to the 75th percentile of expenditure based on their household size. Future reproductions of this study should further investigate this question.

Table 6.8. Estimated Healthcare Costs for Four-Person Household (2019)

Source	Monthly Cost
Observatorio's Living Wage Estimate	$243
Author's Calculation: Mexico City	$206
Sources: *Observatorio de Salarios* (forthcoming) and author's calculations.	

F. Other Costs

The other biggest source of difference in living wages estimated here and in the *Observatorio*'s estimates is the category of miscellaneous expenses. While the *Observatorio de Salarios* generally includes the same categories of spending within the miscellaneous, the items included in their estimates are more expansive and include uncommon expenses like the cost of planning for events like weddings and funerals, spending on holidays and special occasions, and entertainment expenses like DVDs and televisions. In addition, in order to accurately capture the monthly cost, this basket features the "shelf-life" weights detailed in Chapter 3.

For the purposes of the author's living wage estimates, miscellaneous costs are composed of expenditure on several items, including (1) clothing, (2) household care and maintenance, (3) communications, which includes spending on cellphones, internet services, and other communication services, (4) materials needed for school and other educational services and fees, and (5) personal care items. The estimates are captured using the 75th percentile of expenditure by household size from the 2016 *Encuesta Nacional de Ingresos y Gastos en los Hogares* (National Institute of Statistics, Geography, and Informatics (INEGI), 2016) and inflated to 2019 Pesos using Consumer Price Index data. This basket was not adjusted for variations by price cluster due to a lack of sufficiently granular data.

Table 6.9. Estimated Miscellaneous Costs for Four-Person Household (2019)

Category	Source	Total Monthly Cost
Clothing	*Observatorio* Living Wage Estimate	$2,404
	Author's Calculation: Mexico City	$956
Household Maintenance	*Observatorio* Living Wage Estimate	$735
	Author's Calculation: Mexico City	$548
Personal Care	*Observatorio* Living Wage Estimate	$1,262
	Author's Calculation: Mexico City	$1,164
Communications	*Observatorio* Living Wage Estimate	$904
	Author's Calculation: Mexico City	$1073
Education	*Observatorio* Living Wage Estimate	$278
	Author's Calculation: Mexico City	$1,757
Other costs	*Observatorio* Living Wage Estimate	$1,776
	Author's Calculation: Mexico City	$0
Total	*Observatorio* Living Wage Estimate	$7,359
	Author's Calculation: Mexico City	$5,498

Sources: *Observatorio de Salarios* (forthcoming) and author's calculations using the *Encuesta Nacional de Ingresos y Gastos en los Hogares* (2016).
Note: The *Observatorio de Salarios'* estimates were inflated to 2019 Pesos using the CPI Index from INEGI.

III. Provisional Living Wage Estimates

Provisional living wage estimates for Mexico City are provided in Table 6.10, with comparisons to both the minimum wage and the *Observatorio de Salarios'* living wage estimates. Estimates for three-member households are also provided. A comparison of these estimates highlights how far short the minimum wage falls of its Constitutional promise. In order to meet the material needs of the median family in Mexico City (three members), the minimum wage would need to increase by over 750 percent. As it stands, it is currently not sufficient enough to cover the monthly cost of rent or the monthly cost of a food basket in any borough.

Estimates in Table 6.10 also demonstrate that differences between the *Observatorio de Salarios'* estimates and the author's using data lead to similar results. Living wage estimates provided here for four-member households are only $3,527 more than the *Observatorios'*, even

when including a difference of roughly $7,000 in rent. In addition, the estimates provided here have the advantage of being both easily reproducible, given the availability of consumer expenditure data for every Mexican State, in addition to being less dependent on the subjectivity of the researcher. Both of these features are critically important to the reproducibility of any statistical methodology. However, it should be noted that this analysis was only possible because of the work previously done by the social science researchers at the *Observatorio de Salarios*, which was extremely vital as a benchmark and point of departure.

Table 6.10. Living Wage Estimates in Mexico City, March 2019

Source	Monthly Estimate
Minimum Wage	$2,464
Observatorio de Salarios' Living Wage Estimate (4 members)	$21,145
Author's Calculation: Mexico City (4 members)	$24,672
High Price Cluster	$35,748
Medium Price Cluster	$25,520
Low Price Cluster	$19,764
Author's Calculation: Mexico City (3 members)	$21,038
High Price Cluster	$32,069
Medium Price Cluster	$21,726
Low Price Cluster	$16,775

Sources: *Secretaría del Trabajo y Previsión Social* (2018), *Observatorio de Salarios* (forthcoming), and author's calculations.
Note: Estimates of the monthly minimum wage are based on working 6 days a week for 8 hours a day.

IV. Households Earning a Living Wage

This chapter now concludes with a brief analysis of the three- and four-member households earning a living wage in Mexico City, using income data from the Integrated Public Use Microdata Series based on the 2015 Intercensal Household Survey. I attempted to use newer income data from the 2018 *Encuesta Nacional de Ocupación y Empleo* (ENOE); however, the number of respondents who reported a numeric value for their wages was extremely low.

In addition, the ENOE dataset does not have nearly as many observations when compared to the Intercensal Survey.

As such, income data is from 2015 and is inflated to 2019 Pesos using INEGI's Consumer Price Index. This analysis of the characteristics of households earning a living wage has at least two caveats: first, given the lack of updated income data, median household incomes are assumed to be the same as their 2015 level, only adjusted for inflation. Evidence from the OECD suggests that average wages in Mexico did not grow significantly between 2015 and 2017 (OECD, 2019a), so it is possible that household incomes are more or less the same in 2019 as in 2015. Second, prices have increased demonstrably in Mexico since 2015 (Harrup, 2019). Because these living wage estimates assume 2019 prices (which are greater than 2015 prices), if household incomes have grown at a faster rate than prices have, these results will underestimate the number of households earning a living wage. On the other hand, if household incomes have fallen or grown at a rate slower than prices, the figures below will overestimate the number of households earning a living wage.

A. Household Analysis

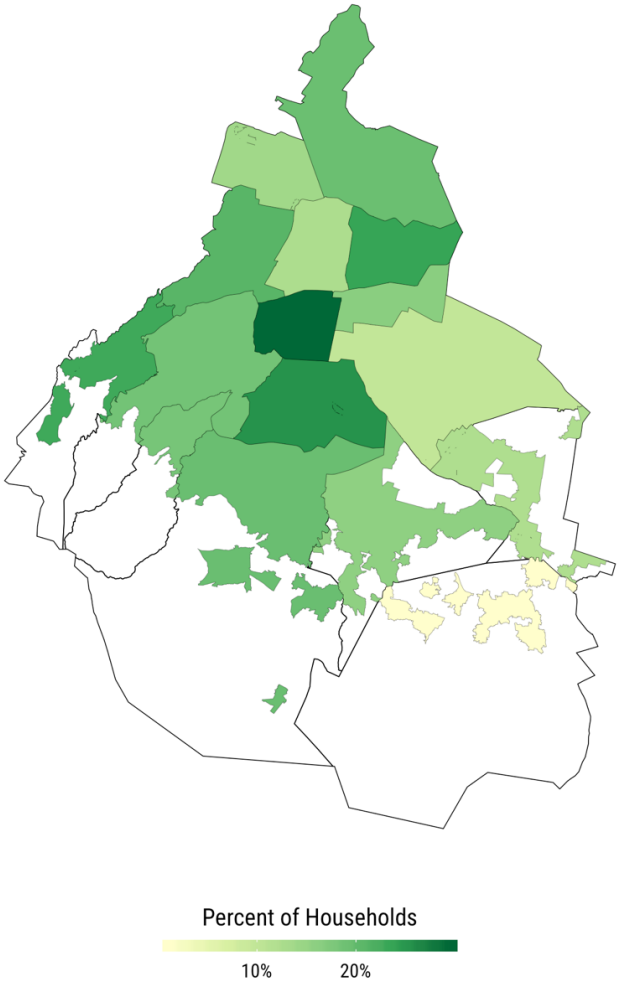
Using cost cluster living wage estimates, I find that 17 percent of three- and four-member households earn a living wage in Mexico City (5,903 households out of 34,762 total). On average, three-member households are more likely to earn a living wage compared to four-member households, albeit only slightly—18.1 percent of three-member households earn a living wage compared to 15.9 percent of four-member households. Looking at this analysis by borough, places with greater levels of median household income tend to also have greater proportions of living wage-earning households (Figure 6.1). Nearly a third of three- and four-member households earn a living wage in Benito Juárez, the borough with the highest median household income in 2015. Similarly, roughly a fifth of three- and four-person households in Miguel Hidalgo and Cuajimalpa earn a living wage.

This borough-level living wage analysis also reveals some surprises. Medium-cost, medium-access boroughs have similar proportions of living wage-earning households as some of the more affluent boroughs: a fourth of three- and four-member households in Coyoácan

earn a living wage, compared to a fifth of households in Tlalpan and Alvaro Obregón. One of the most promising findings, however, is the proportion of three- and four-member households earning a living wage in two of the low-cost, medium-access clusters. In Gustavo A. Madero and Venustiano Carranza, 19.3 percent and 23.5 percent of three- and four-member households earn a living wage respectively, a rate similar to that of the more affluent boroughs. These two boroughs may be places of economic opportunity for lower-income and less-educated households, given their level of socioeconomic access and lower costs relative to the rest of the city.

Figure 6.1. Mexico City: Households Earning a Living Wage

Percent of Three- and Four-Person Households Earning a Living Wage



Source: Author's calculations using own estimates and Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.

Turning to look at the characteristics of living-wage earning households, household heads tend to have relatively high levels of educational attainment, work in high-skill occupations, and are less likely to be indigenous (Table 6.1). On average, over half of these household heads work in a professional, legislative, managerial, or technical occupation. These results are broadly in-line with the analysis previously conducted by the *Observatorio de Salarios*, who found that only workers with a graduate level education or higher earned a wage higher than their estimated living wage (Observatorio de Salarios, 2014).

One surprising fact revealed in the profile is the number of employed household members. Given that the dataset contains many "not available" answers due to a lack of response from households, caution is urged in drawing hard conclusions from these findings. Nonetheless, it appears that on average, there are multiple people working in living-wage earning households. This calls into question the previously established assumption that only one household member is employed. In addition, given that the average household tends to have a child aged 19, this finding seems to imply that adult children may also be working to help support their parents' household. Future living wage work in Mexico City, then, should investigate the number of workers per household and also produce estimates based on the assumption that two adult householders are working full-time.

Table 6.11. Profile of Households Earning a Living Wage

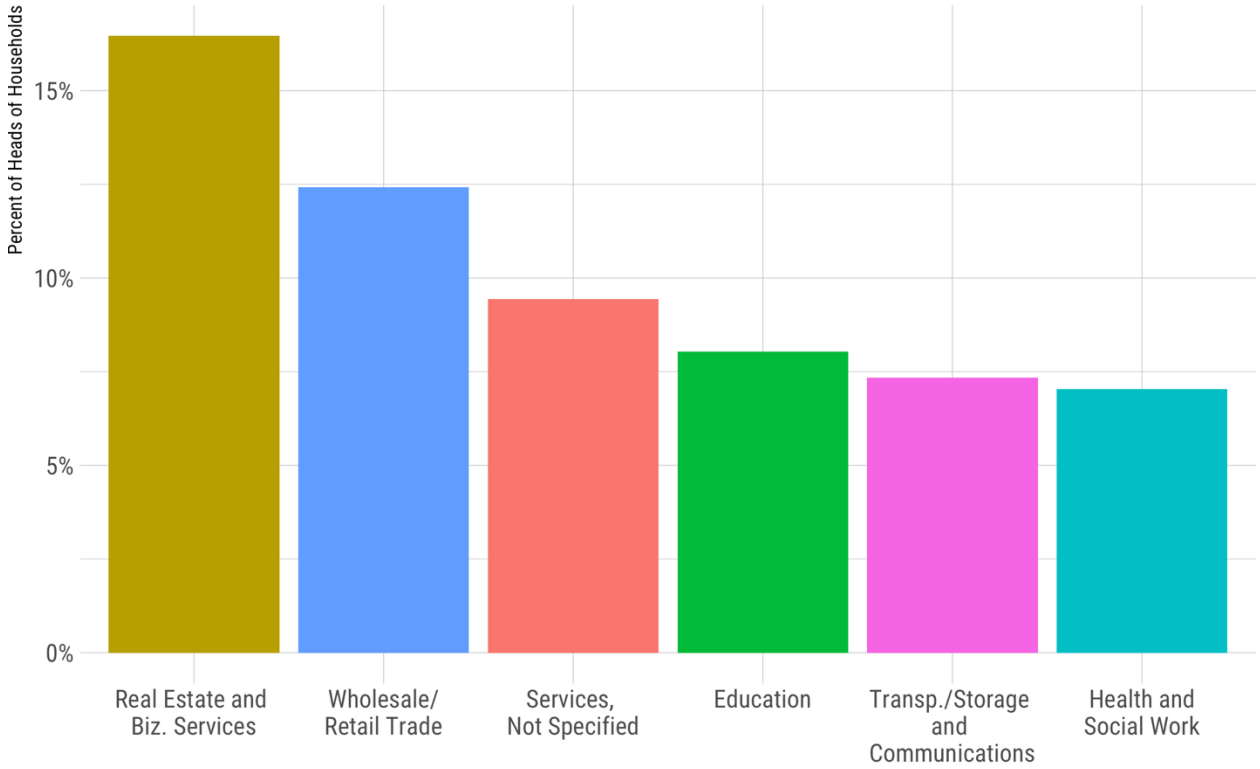
Variable	3-Member Households	4-Member Households
Heads of Household Working in Professional, Legislative, Managerial, Technical, or Associate Professional Jobs (Percent)	57.9%	55.3%
Heads of Household Working in Service or Clerical Jobs (Percent)	24.1%	24.8%
Heads of Household Working in a Skilled Trade Jobs (Percent)	9.3%	9.5%
Indigenous Heads of Household (Percent)	7.6%	7.1%
Average Years of Schooling, Head of Household	13.5	13.4
Secondary Completion Rate (*bachillerato*), Head of Household	85.2%	81.8%
Median Number of Children	1	2
Number of Employed Household Members	2.1	2.6

Sources: Author's calculations using own estimates and Integrated Public Use Microdata Series using Intercensal Household Survey (2015).

An investigation of household head industries reveals a related pattern. Household heads in living-wage earning households tend to work in industries requiring higher levels of skill. Of the household heads reporting their industry, the largest proportion worked in real estate and business services (16.5 percent of household heads). Other major industries for head householders include wholesale and retail trade (12.4 percent), non-specified services (9.4 percent), and education (8 percent). However, 10 percent of living-wage earning household heads did not give an answer to their industry.

Figure 6.2. Top Industries for Households Earning a Living Wage

Head of Household's Industry, Households Earning a Living Wage, 2015



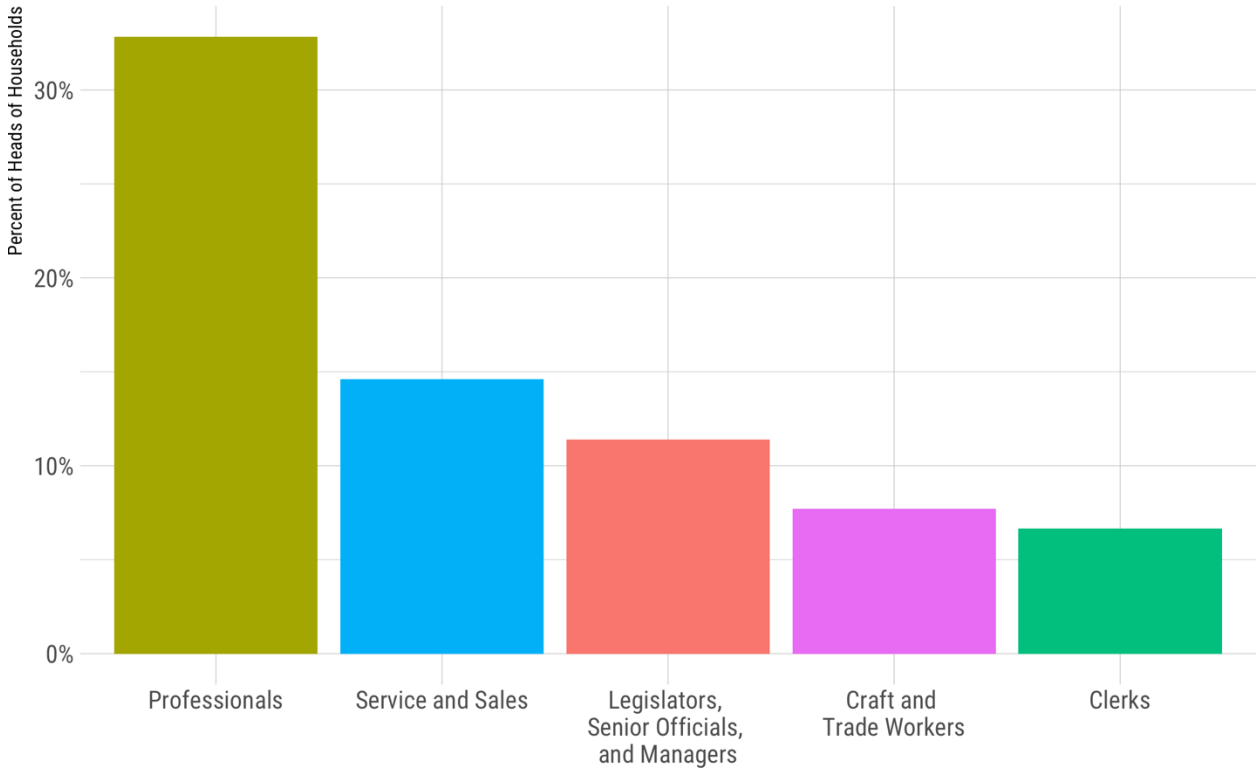
Source: Author's calculations using own estimates and Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.

Lastly, looking at the head householder's occupation at a more granular level, an overwhelming plurality of head householders work in professional occupations. These occupational descriptions are based on the International Standard Classification of

Occupations (ISCO) and are typically specialist roles that require high-level skills. They are in various industries (for instance, education, real estate, science and mathematics, etc.), and the types of activities performed in their roles can include conducting analysis and research; teaching; or providing business, legal, or health services. These jobs also tend to require tertiary education. Service and sales jobs form the second largest group; this category includes workers providing personal and protective services related to travel, housekeeping, catering, personal care, and selling goods in wholesale or retail shops. In contrast to professional roles, these occupations require less education—completion of the first stage of secondary education is necessary for some roles, but others require the full completion of secondary education (International Labour Office, 2012).

Figure 6.3. Top Occupations for Households Earnings a Living Wage

Head of Household's Occupation, Households Earning a Living Wage, 2015



Source: Author's calculations using own estimates and Integrated Public Use Microdata Series using Intercensal Household Survey, 2015.

B. Cost Cluster Estimates vs. City-Wide Estimates

The above household analysis is based on the usage of cost cluster living wage estimates instead of city-wide living wage estimates. One drawback of using the clustered living wage estimates is that Milpa Alta's assignment to the high cost cluster, largely based on the value of its imputed rent, means we are likely overestimating the amount needed to maintain a decent standard of living in Milpa Alta, and conversely, underestimating how many households attain to that standard. In any case, the difference in households earning a living wage based on the cost cluster assignment wage and on the city-wide living wage is minimal for Milpa Alta. When we use the city-wide living wage, an estimated 4.7 percent of households in the borough earn a living wage (Table 6.12). For comparison, when using the estimate generated for the high cost cluster, only 1.2 percent of households in the borough earn a living wage. While the choice of evaluative metric is therefore important, it doesn't change the reality of economic and social exclusion in Milpa Alta.

On the contrary, if living wage estimates are not defined at the cost cluster level, the resulting analysis only highlights the affluence of boroughs. If city-wide living wage estimates are used, the boroughs with the highest proportion of three- and four-member households earning a living wage are the same ones with the highest median household income levels: Benito Juárez, Cuajimalpa, Miguel Hidalgo, and Cuahutémoc. What we lose, however, is learning that low-cost, medium-access boroughs like Gustavo A. Madero and Venustiano Carranza could be places of economic opportunity for lower-income and less-educated households.

Future work should thus aim to better understand and collect finer-grained data for those places that lack it, most notably Milpa Alta. This will ensure that estimates are more atuned to reality and allow for a higher degree of granularity in estimates. Future work should also reevaluate the characteristics of households earning a living wage after the completion of the next Mexican Census in 2020.

Table 6.12. Three- and Four-Member Households Earning a Living Wage (Percent)

Borough	Cost Cluster Living Wage	City-Wide Living Wage
Azcapotzalco	13.9%	6.6%
Coyoacán	25.3%	12.0%
Cuajimalpa	22.9%	30.6%
Gustavo A. Madero	19.3%	12.8%
Iztacalco	16.3%	8.5%
Iztapalapa	9.9%	5.5%
La Magdalena Contreras	8.3%	9.3%
Milpa Alta	1.2%	4.7%
Alvaro Obregón	18.6%	9.8%
Tláhuac	12.2%	7.6%
Tlalpan	19.4%	10.7%
Xochimilco	15.8%	10.6%
Benito Juárez	29.5%	44.5%
Cuahutémoc	12.5%	22.4%
Miguel Hidalgo	20.9%	33.1%
Venustiano Carranza	23.5%	15.3%

Source: Author's estimates based on own calculations and Integrated Public Use Microdata Series using Intercensal Household Survey (2015).

Chapter 7. Conclusion and Reflections

"Our society is connecting workers with the products people consume and recognizing workers for their contributions. It is important to do that, and to have organized labor - a middle class - to preserve our democracy." – Dolores Huerta

I. Summary

This thesis has piloted a methodology for estimating living wages in Mexico, using Mexico City as a case study. In the future, this methodology will be refined and replicated in order to estimate living wages for other major Mexican cities. Estimates reflect the cost of living in Mexico City and highlight the gap between the minimum wage and its constitutionally guaranteed level. These living wage estimates will be used by organizations and firms in determining worker compensation, as living wages provide increased incentive for employees to be productive and allow for a decent standard of living, and by governance institutions to reform wage policy.

In order to estimate living wages in Mexico City, I first conducted a spatial analysis of socioeconomic and cost variables to determine whether quality of life and cost of living vary by location. Borough-level food basket cost estimates used first-hand qualitative data collected at public markets in Mexico City, while an analysis of rent and transportation costs by borough were conducted using private sector rent data and a household travel survey conducted at the metropolitan level. Socioeconomic data was largely sourced from the 2015 Intercensal Survey. Generally speaking, costs tend to be greater near the city center, although one borough, Milpa Alta, faced elevated costs in spite of its relative distance from the city center. In addition, measures of socioeconomic performance and access are also greatest nearer to the city center.

Following this analysis, I used a simple k-means clustering algorithm to group the boroughs into three clusters for the sets of socioeconomic and cost variables. The number of cluster means was selected using the elbow method. This resulted in three groups per variable: high-cost, medium-cost, and low-cost boroughs, and high-access, medium-access, and low-access boroughs. Cost clusters were used to develop more granular living wage estimates. I also estimated a Moran's I statistic for each variable used in the clustering process

to determine whether a statistically significant autocorrelation existed across the geography of Mexico City. This statistical analysis revealed that measures of housing cost, housing quality, and socioeconomic access (e.g., median household income, educational attainment) cluster in Mexico City.

Living wage estimates for Mexico were then constructed using three primary sources: the *Observatorio de Salarios*' food basket, the Propiedades.com median rent database, and the 2016 Household Expenditure Survey, broken down by household size. The contents of the food basket were adapted to match local eating patterns using the results of 91 intercept surveys at public markets. The cost of this food basket was then estimated using the median annual estimates by item from INEGI's *Índice de Precios Promedios* (2017). City-wide median rent estimates were based on a population-weighted median of the Propiedades.com data. For other expenditure categories, including transportation, I used the 75th percentile of household expenditure by household size from the 2016 ENIGH.

In order to validate component cost estimates, the resulting calculations were compared to a series of benchmarks, which varied by component group. Food basket costs, for instance, were benchmarked against the 75th percentile of consumer expenditure in addition to the *Observatorio*'s estimates of living wages in Mexico City. Housing component estimates based on Propiedades.com's median rent data were benchmarked against official household survey data and third-party sources. Transportation costs were benchmarked against a constructed indicator based on the 2017 Household Travel Survey in Mexico City and the *Observatorio de Salarios'* estimates. All other consumption expenditure estimates are benchmarked against the *Observatorio de Salarios*' estimated component basket costs.

The living wage estimates generated using this methodology were comparable with estimates from the *Observatorio de Salarios*. I estimate the 2019 living wage in Mexico City to $24,672 for a household of four, compared to the *Observatorio*'s estimates of $21,145. Despite relatively minor differences overall, estimations of housing and miscellaneous cost components varied significantly.

Following the city-wide estimation of living wages, living wage estimates were scaled to the cost cluster level. The three components scaled to this level included the food basket, rent,

and transportation costs. Food basket and transportation costs were scaled to the cluster group using an adjustment factor, calculated based on more granular data. For the food basket, I used the price data collected at public markets, while the transportation data used the cost of a roundtrip commute at the borough level. The adjustment factor was estimated as the cost of the component basket for a cluster group divided by the mean cost of the basket for the city. To estimate rents by cost cluster, I simply used the population weighted mean by borough to determine more granular rent estimates. In general, living in a high-cost borough requires about $10,000 Pesos in monthly income compared to the city-wide living wage, while living in low-cost boroughs requires about $5,000 less.

Finally, based on cost cluster living wage estimates, I find that roughly 17 percent of three- and four-member households earn a living wage in Mexico City. Heads of living wage-earning households tend to work in high-skill occupations, for instance professional and managerial roles, and have higher levels of educational attainment. The proportions of households earning a living wage also varies by borough; unsurprisingly, the most affluent borough, Benito Juárez, has the highest proportion of living wage-earning households at 29.5 percent. Surprisingly, in the low-cost boroughs of the north, Venustiano Carranza and Gustavo A. Madero, roughly a fifth of three- and four-person households earn a living wage. Given that these boroughs also have decent access to the city center, they are likely places of economic opportunity or stability for households with less educational attainment or income.

II. Reflections on the Living Wage Estimation Process

A. Data Limitations

In the process of estimating living wages using the methodology described above, I encountered several data limitations which posed direct obstacles to estimating living wages. These were the twin challenges of poor data quality and few data points. In some cases, official data sources proved unreliable or problematic due to quality concerns. For instance, official estimates of rent and housing expenditure underestimate rents in the city by at least five times when compared to third-party rent estimates. At other points in the estimation process, I was hindered by having too few data points. In the creation of the food adjustment factors for the

cost clusters, for example, the market data revealed that boroughs in the medium-cost cluster faced elevated costs relative to both the high-cost and low-cost borough. While it's within the realm of possibility that boroughs in the medium-cost cluster would spend more to purchase a food basket, a greater number of data points per borough would encourage greater certainty and confidence in the adjustment factors.

I also lacked the contextual information needed to inform my analysis of the quantitative data. This much was evident to me when estimating the cost of the healthcare component for households. An analysis of the household expenditure survey revealed that two-person households spent the greatest amount on healthcare. Whether this was an inherent feature of the Mexican health system (for instance, if costs were subsidized for larger families), a result of economies of scale, or a problem with the dataset was unclear. I could only learn so much about everyday life in Mexico in the course of six months.

B. Validity of Living Wage Estimates

In light of these challenges, understanding the limitations and constraints of my knowledge and of the data used was critical to the construction of the living wage indicator. The purpose of estimating living wages is to influence and inform policy decisions, and therefore, the political, social, and normative decisions made in collecting the underlying data must be clear. Otherwise, the validity of the indicator will be compromised.

For example, in the case of Milpa Alta, it is certainly true that the borough faces elevated transportation costs in comparison to its adjacent neighbors. The borough also consistently performs poorly on a variety of socioeconomic variables. However, I have doubts that the living wage estimate defined for the high-cost cluster reflects the reality of everyday life in the Milpa Alta. The reason for its assignment to the high-cost cluster is largely due to the lack of rent data. Because I did not have estimates of median rent within Milpa Alta, I imputed an estimate for the borough using a linear regression. The resulting imputed rent value led to Milpa Alta's assignment to the high-cost cluster, even though neighboring boroughs have much lower costs of rent relative to the rest of the city.

The lack of quality data for Milpa Alta is therefore a critical limitation of this study, and consequently means that living wage estimates will be least accurate in the borough facing the greatest degree of exclusion. This underrepresentation of Milpa Alta in datasets is also found in official data sources. Concerns about the validity of official rent estimates aside, the consumer expenditure survey had the fewest number of observations in Milpa Alta relative to the other 15 boroughs. In contrast, those boroughs with the greatest household incomes and populations tended to have the greatest number of observations.

C. The Importance of Benchmarks

Due to the constraints imposed by data usage and my lack of contextual knowledge, creating benchmark indicators to compare my estimates to was an essential component to establishing valid living wage estimates. The *Observatorio de Salarios*' living wage estimates were an extremely vital reference in determining whether the results of the new methodology were realistic and of the same magnitude. Moreover, the use of secondary or tertiary benchmarks allowed for greater transparency and clarity in the decision-making process. I am most confident in the component basket costs that were validated using two or three other data sources.

III. Recommendations for Systematizing Living Wage Estimates

In reflecting on the challenges faced in the estimation process, I have drafted a series of recommendations directed to the *Observatorio de Salarios* and other social science researchers seeking to emulate the Living Wage Calculator and create a national living wage calculator with estimates by city or county. These recommendations are meant as guidelines and not as strict rules, as contextual needs and challenges may require significant adaptation of the living wage estimation methodology.

1. Simplify Procedure Where Possible

In order for a process or methodology to be easily replicable, the possibility of human error needs to be minimized. At the same time, the methodology used should promote

opportunities for substantive debate over what constitutes a decent standard of living and allow for relatively quick modifications. One of the challenges in adapting and replicating the *Observatorio*'s living wage estimates was the discretion given to the researcher. Every item deemed necessary for a decent standard of living was defined by the researchers and included as a line item in the calculation of the component baskets, including the brand, size, and shelf-life of an item. Not only does this make updating the basket for a new city or region more time-consuming and increase the possibility of error, but each line item becomes a point of contention. A debate over the usage of the 75th percentile of household expenditure as a reference for a standard of well-being is a materially different argument in comparison to a debate over the brand or inclusion of a single item in a basket of goods.

Moreover, complex estimations or metrics don't necessarily capture reality more accurately. For instance, in the case of the transportation component basket, I could have used the constructed indicator as the basis for the living wage estimates. The differences between this indicator and the 75th percentile of expenditure were minimal. However, processing the household travel survey for Mexico City to determine the commuting and leisure trip costs took a greater amount of time in comparison to finding the 75th percentile of household expenditure on public transportation. In light of these considerations, I chose to use the 75th percentile. Therefore, methodologies used to generate living wage estimates need to be simplified wherever possible in order to facilitate their reproduction and deployment. A simpler estimation procedure will also enjoy greater communicability and function as a more effective tool in informing public policy.

2. Prioritize Transparency in the Estimation Process

In a similar vein, living wage methodologies also need to be transparent about their procedure, the choice of data sources, and shortcomings. Living wage estimates are generally constructed using external data sources, which carry their own biases, limitations, and imperfections, and as such, no living wage estimation will perfectly capture the monetary cost of a decent standard of life. In addition, living wage estimates gain credibility from acknowledging their limitations because it gives the data user a clear sense of where and how

they deviate from reality. Living wage estimation processes should therefore prioritize transparency. Researchers estimating living wages should clearly acknowledge the shortcomings and imperfections in the underlying data, their methodology, and estimates, and give a clear reasoning for data usage in spite of said shortcomings. Prioritizing transparency will also allow other parties to point out means of improving the estimation methodology.

3. Use Consistent and Widely-Available Data Sources

Third, if the end-goal of a living wage estimation process is to replicate estimates in other contexts, in this case, in other major Mexican cities, then foundational data sources need to be available in the other contexts to allow for both comparability and ease of calculation. Using the same data source will allow the researcher to "plug and chug." That is, the researcher can repeat the same workflow process for data cleaning and processing, and simply input new data to output estimates for another location. This is one benefit of using the National Household Expenditure Survey and Propiedades.com; the underlying data simply needs to be updated and the process can be replicated to generate living wage estimates for other cities with relative ease.

4. Augment Available Data with First-Hand Data Collection

Fourth, in light of the data constraints mentioned, official and secondary data sources need to be augmented with original data collection. There is room to increase the number of data points collected for this pilot study, first by visiting multiple *mercados* in each borough and second by collecting data in all 16 boroughs. In the author's opinion, the qualitative data gathered was not robust enough to solidify complete confidence in the conclusions derived from them. For one, the adjustment factors calculated for the food basket by cost cluster did not take into account each of the 16 boroughs. Moreover, while we attempted to define metrics to understand a market's representativeness, the markets chosen are not necessarily the most representative of food costs in a given borough, even if the data collected appears to reflect consumer expenditure more accurately.

Therefore, more data collection is necessary at public markets. Collecting multiple market data points per borough would be useful in understanding the range of food basket prices within a borough and in improving the accuracy of the adjustment factors. Additionally, it's also important to interview local consumers at various points in time, days of the week, and at different locations, to capture a more representative sampling of household consumption patterns.

5. Focus Data Collection on the Margins

Fifth, supplemental data collection should focus on the margins, the places with the largest data gaps and where data collection will bring the most value-added to the analysis. The geospatial analysis conducted in this thesis revealed the high degree of socioeconomic and spatial marginalization that a few boroughs in Mexico face. This spatial marginalization is only heightened by a lack of data, most notably for Milpa Alta. Official datasets, private datasets, and even the author's market data collection either had few or no observations for the borough. The same can be said of Tláhuac, another low-access borough in the peripheries of the city. Ironically, the boroughs that could most stand to benefit from public policy have the least amount of data available. Creating effective public policies to support and include economically challenge communities requires building a better understanding of the unique struggles that marginalized communities face. Given that official data has a tendency to focus on affluent or populous communities, supplemental data collection needs to focus on the marginalized communities within a society, as data collection in these communities will bring the most value-add to the analysis.

6. Recognize that Living Wage Estimates Cannot Capture Everything

Finally, it's important to recognize that living wage estimates will always be imperfect measures of reality. No matter how expansive the definition of a decent standard of living is or how diverse the team of researchers is, these estimates will inevitably deviate from reality, whether due to the uniqueness of a person or community's living conditions or due to data constraints. In recognition of this, living wage research requires humility and a desire to learn

from the communities for whom the analysis is conducted. One avenue for collaborative knowledge generation is the inclusion of open-ended questions in market surveys. Research teams will already be collecting qualitative data to verify the food basket. Amending survey design to include questions that facilitate a dialogue would be well worth their time. Sample questions can include "what are your household's biggest needs?" or "are there any goods or services you need for everyday life that are missed by government policy?" In this way, living wage estimates will continue to evolve, improve, and better reflect the challenges of everyday life.

Ceasar Chávez once said that "...we cannot seek achievement for ourselves and forget about progress and prosperity for our community. Our ambitions must be broad enough to include the aspirations and needs of others, for their sakes and for our own." While this thesis has argued that the living wage has an economic rationale and is economically viable, at its core, the living wage is most fundamentally about values. What kind of society do we want to be? What do we prioritize? Who and what matters most? The living wage is an understanding that we have a moral obligation to promote the latent productivity and potential within others. Our society will become more just and more productive as we advocate for the well-being and prosperity of those who suffer capitalism's losses.

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Appendix 1. Price Capture and Survey Instruments

Observatorio de SALARIOS

IBERO CIUDAD DE MÉXICO ® IBERO PUEBLA ®

Fecha _____ **Folio:** _____

Entrevistador: _____

Estado	Municipio	Ciudad o ZM	Punto de venta

		Presentación	Presentación Igual	Presentación Equiva-lente	Precio	Descripción si es equivalente
1	Jitomate	SALADETTE, A GRANEL				
2	Cebolla	BLANCA, A GRANEL				
3	Ejotes	A GRANEL				
4	Tomate verde	S/CASCARA, A GRANEL				
5	Chile Seco	CHILE DE ÁRBOL, A GRANEL				
6	Chile Serrano	A GRANEL				
7	Zanahoria	A GRANEL				
8	Calabacita	ITALIANA, A GRANEL				
9	Plátano	TABASCO, A GRANEL				
10	Naranja	VALENCIA, A GRANEL				
11	Manzana	GOLDEN DELICIOUS, A GRANEL				
12	Papaya	MARADOL, A GRANEL				
13	Melón	CHINO, A GRANEL				
14	Pasta para sopa	MP, ESPAGUETI, BOLSA DE 200 GR				
15	Papa	PAPA, BLANCA, A GRANEL				
16	Tortilla	MTH, PAQUETE DE 1 KG				
17	Frijol	MP NEGRO				

18	Pan dulce	CONCHA, POR PIEZA				
19	Bistec de Res	BISTEC, DEL SIETE, A GRANEL				
20	Carne molida	MOLIDA, POPULAR, A GRANEL				
21	Bistec de cerdo	PULPA, MILANESA, A GRANEL				
22	Arrachera	CORTES ESPECIALES, ARRACHERA, A GRANEL				
23	Pierna	EN PIEZAS, PIERNA Y MUSLO, A GRANEL				
24	Pechuga	EN PIEZAS, PECHUGA, C/HUESO, A GRANEL				
25	Ala	EN PIEZAS, ALAS, A GRANEL				
26	Muslo	EN PIEZAS, PIERNA Y MUSLO, A GRANEL				
27	Huevo	BLANCO, A GRANEL				
28	Leche	LALA, PASTEURIZADA, ENTERA, BOTE DE 1 LT				
29	Aceite vegetal	MP, ACEITE MIXTO, BOTELLA DE 900 ML				
30	Aguacate	HASS, A GRANEL				
31	Azúcar	ESTANDAR, A GRANEL				
32	Sal	ELEFANTE, SAL, DE COCINA, BOLSA DE 1 KG				
33	Agua	ELECTROPURA, NATURAL, GARRAFÓN DE 19 LT				

Observatorio de SALARIOS

IBERO CIUDAD DE MÉXICO ® IBERO PUEBLA ®

Fecha _____ **Folio:** _____

Entrevistador: _____

Estado	**Municipio**	**Ciudad o ZM**	**Punto de venta**

Sexo	**Edad**	**¿Cuántos miembros tiene su hogar (familia)?**

		¿Qué tan frecuentemente consumen estos productosa en su hogar				*Si respondió 1 o dos veces a la semana o nunca preguntar:*	
		Diario	**Más de tres veces a la semana**	**Tres veces a la semana**	**Una o dos veces a la semana**	**¿Qué usa en lugar de este producto?**	
1	Jitomate						
2	Cebolla						
3	Ejotes						
4	Tomate verde						
5	Chile Seco						
6	Chile Serrano						
7	Zanahoria						
8	Calabacita						
9	Plátano						
10	Naranja						
11	Manzana						
12	Papaya						
13	Melón						
14	Pasta para sopa						
15	Papa						

16	Tortilla						
17	Frijol						
18	Pan dulce						
19	Bistec de Res						
20	Carne molida						
21	Bistec de cerdo						
22	Arrachera						
23	Pierna						
24	Pechuga						
25	Ala						
26	Muslo						
27	Huevo						
28	Leche						
29	Aceite vegetal						
30	Aguacate						
31	Azúcar						
32	Sal						
33	Agua						

En orden de prioridad, ¿dónde prefiere comprar sus productos de su canasta alimentaria (1-5)?

Tienda de Esquina	Supermercado	Tianguis	Mercado	Otro
_____	_____	_____	_____	_____

¿Cuál supermercado?

_____

¿Hay algún producto que consuman en su hogar muy frecuentemente y que no está en la lista?

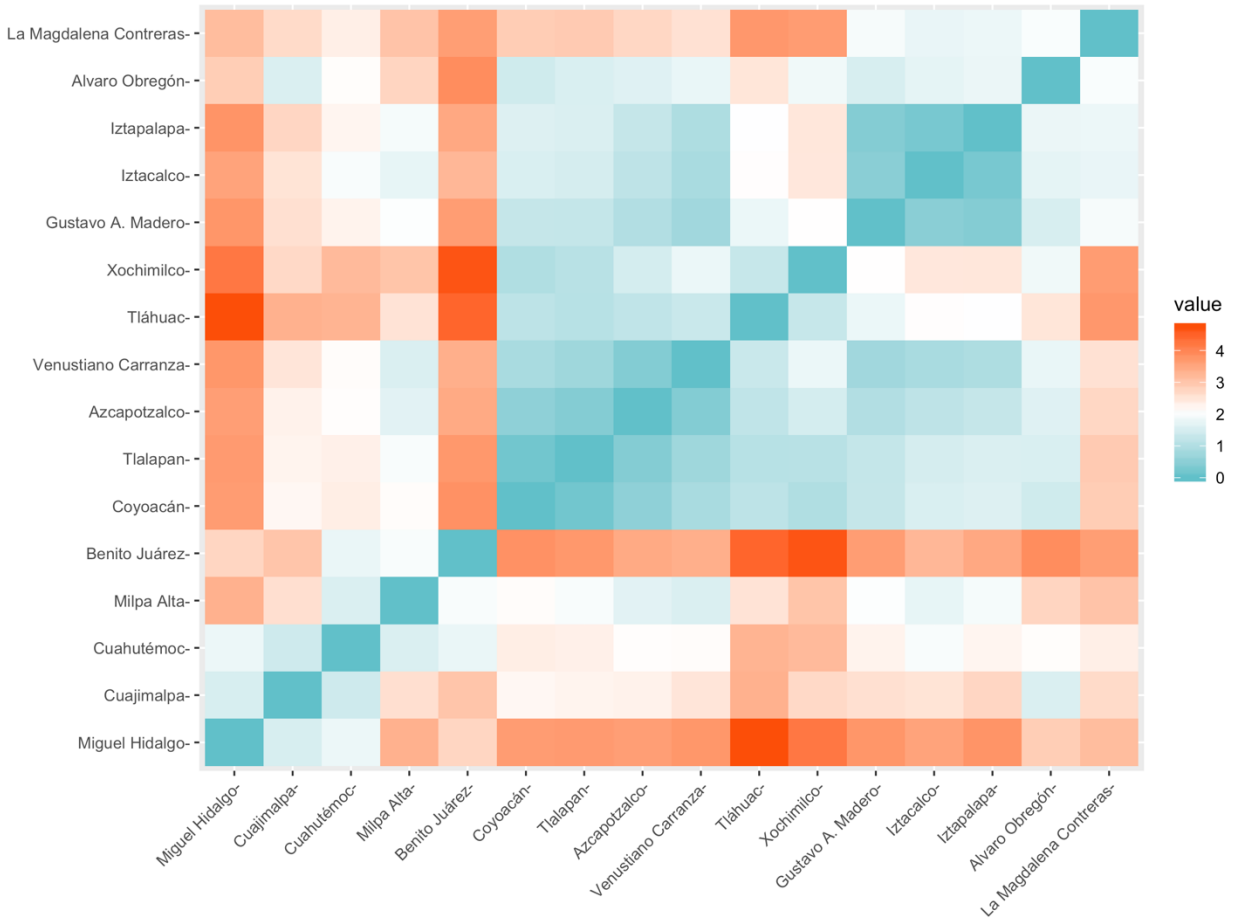
_____

Appendix 2. Clustering Algorithm

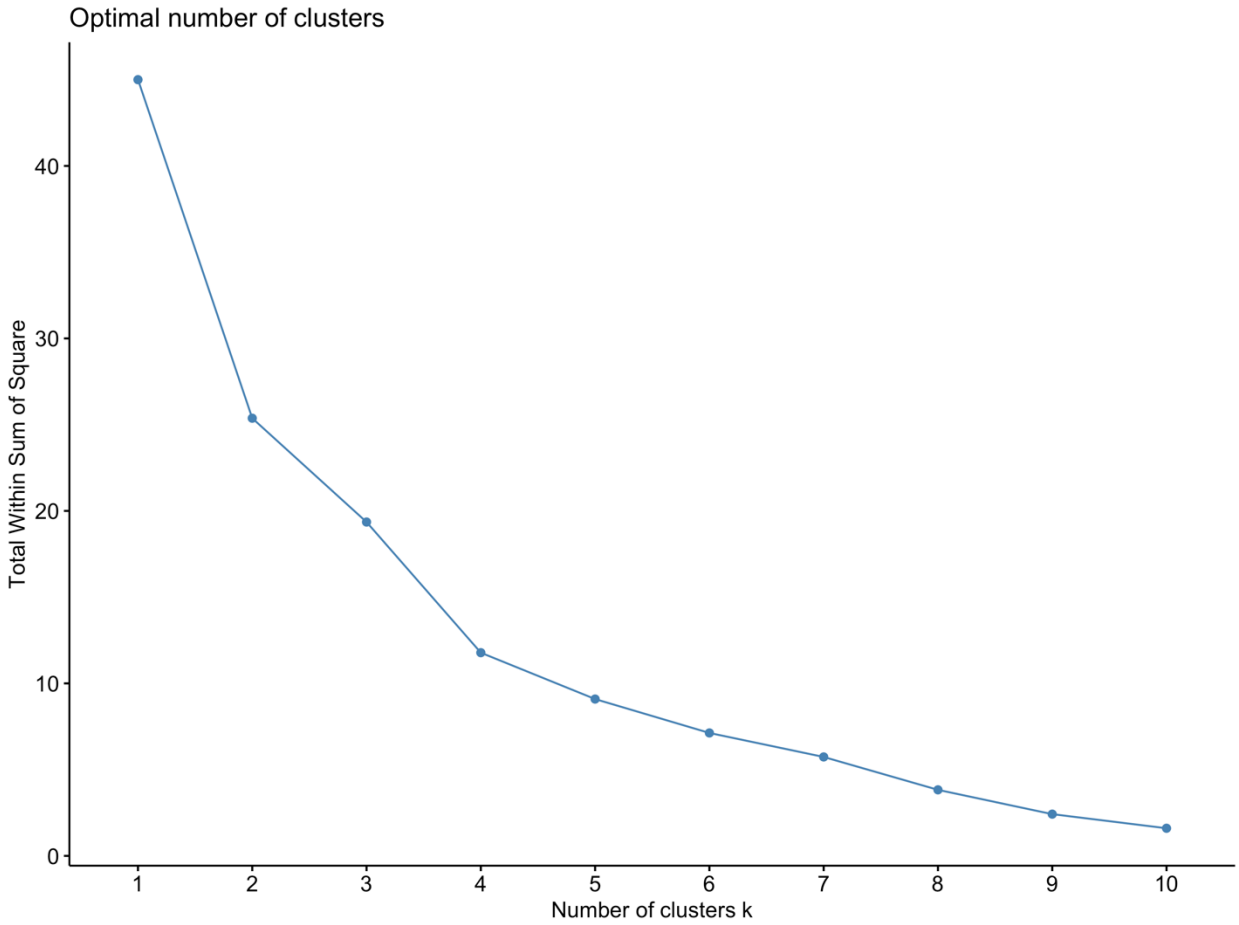
Appendix Table 2.1. Variables included in Clustering Algorithm

Cluster	Variables
Social Access	Household Size
	Overcrowding Rate
	Median Household Income
	Lack of Quality Roofing
	Household Internet Access
	Secondary Education Completion Rate
	Uninsured Population
	Labor Force Participation Rate
	Indigenous Population
	Commuting Time
	Commutes by Public Transit
	Commutes by Walking
	Commutes by Car
	Internet Access
	Average Number of Children per Household
Price Cluster	Commute Costs
	Leisure Trip Costs
	Food Basket Price
	Median Rent

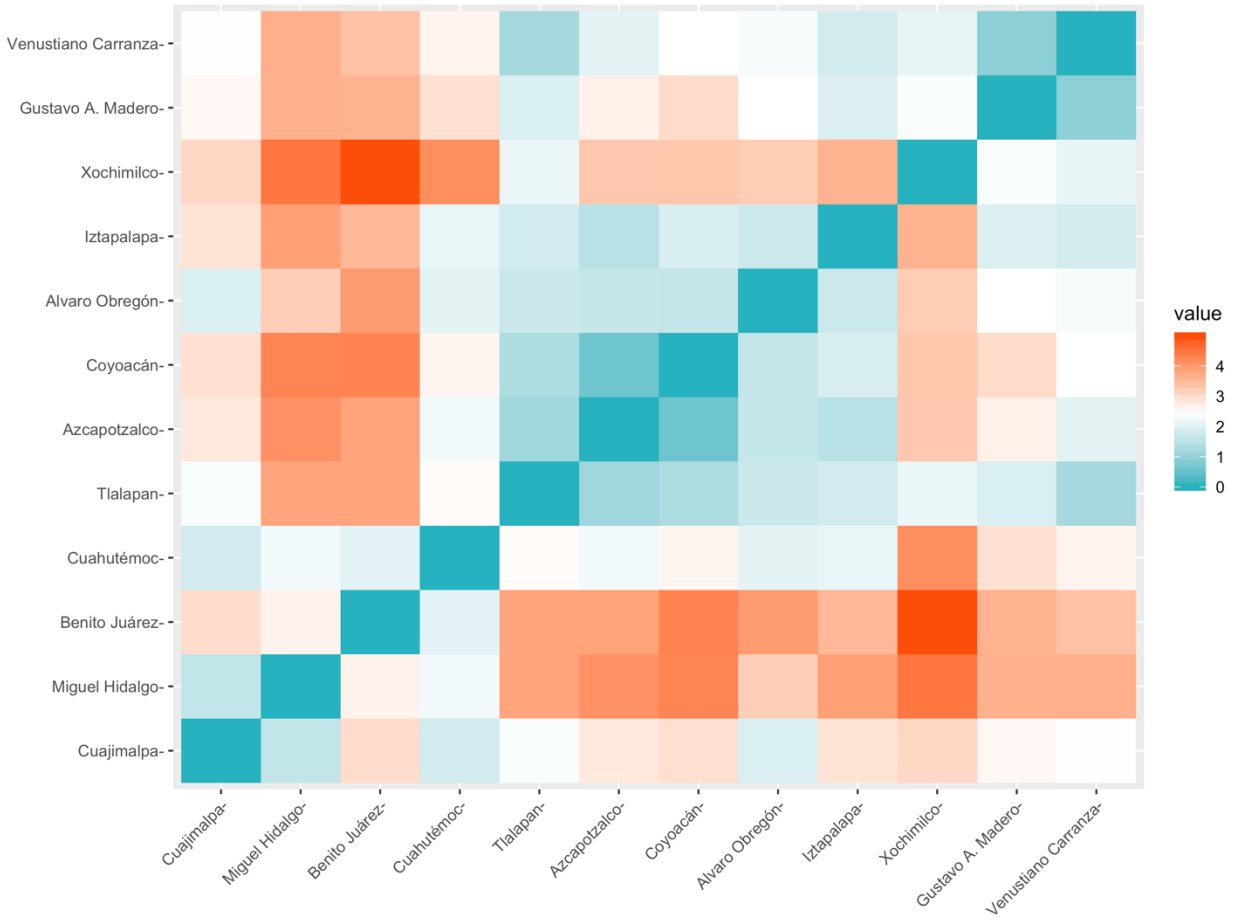
Appendix Figure 2.1. Distance Matrix: Cost Variables (Without Food Basket)



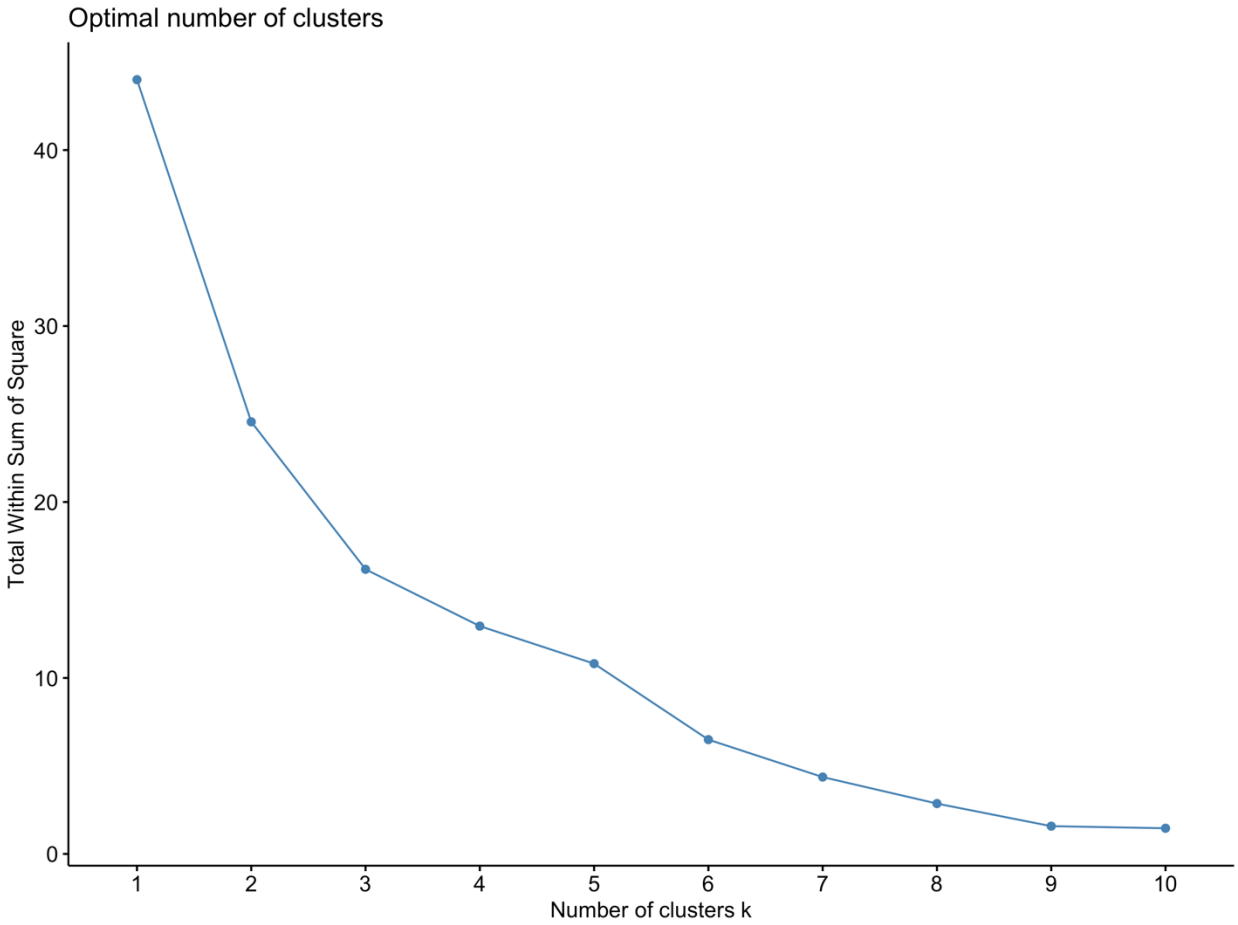
Appendix Figure 2.2. Cluster Optimality: Cost Clusters (Without Food Basket)



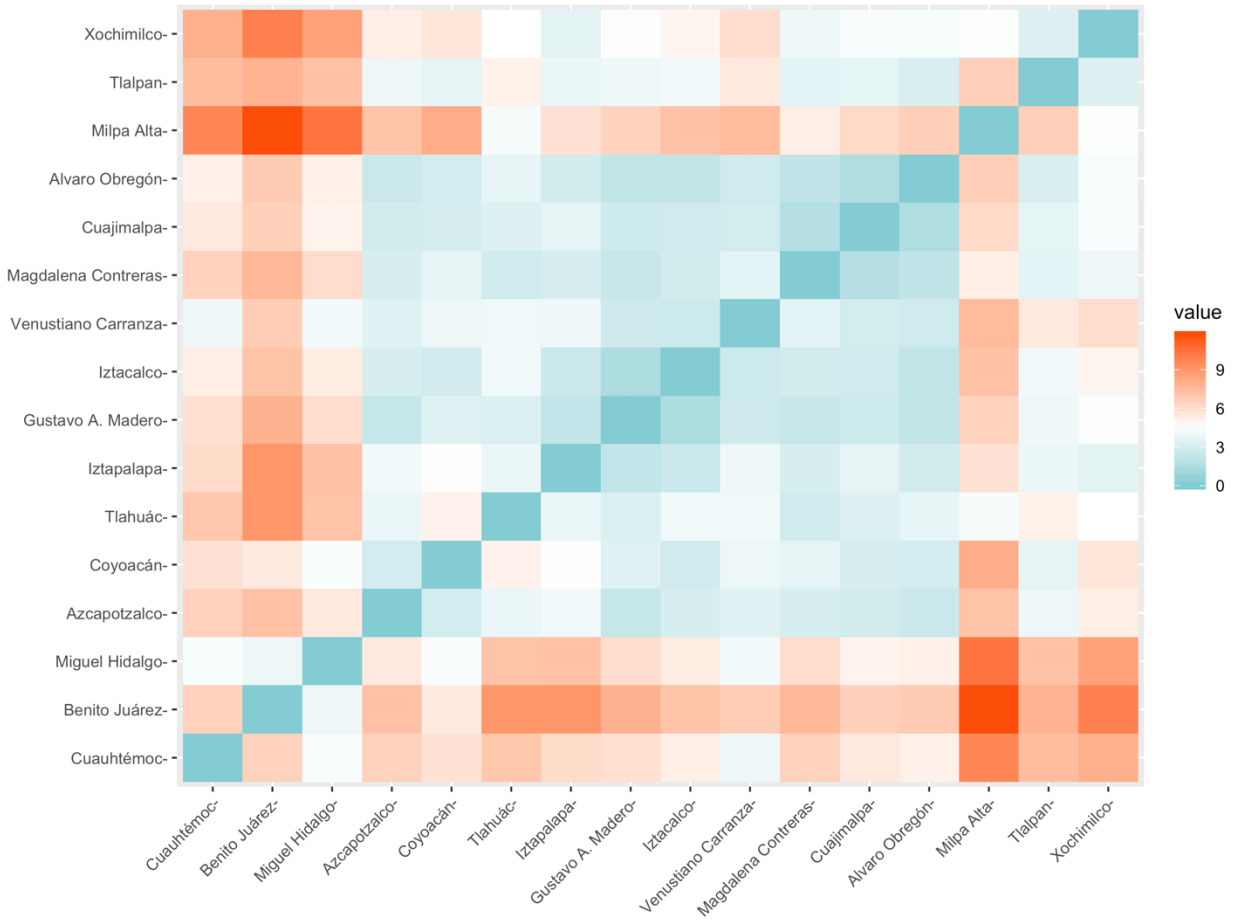
Appendix Figure 2.3. Distance Matrix: Cost Variables (With Food Basket)



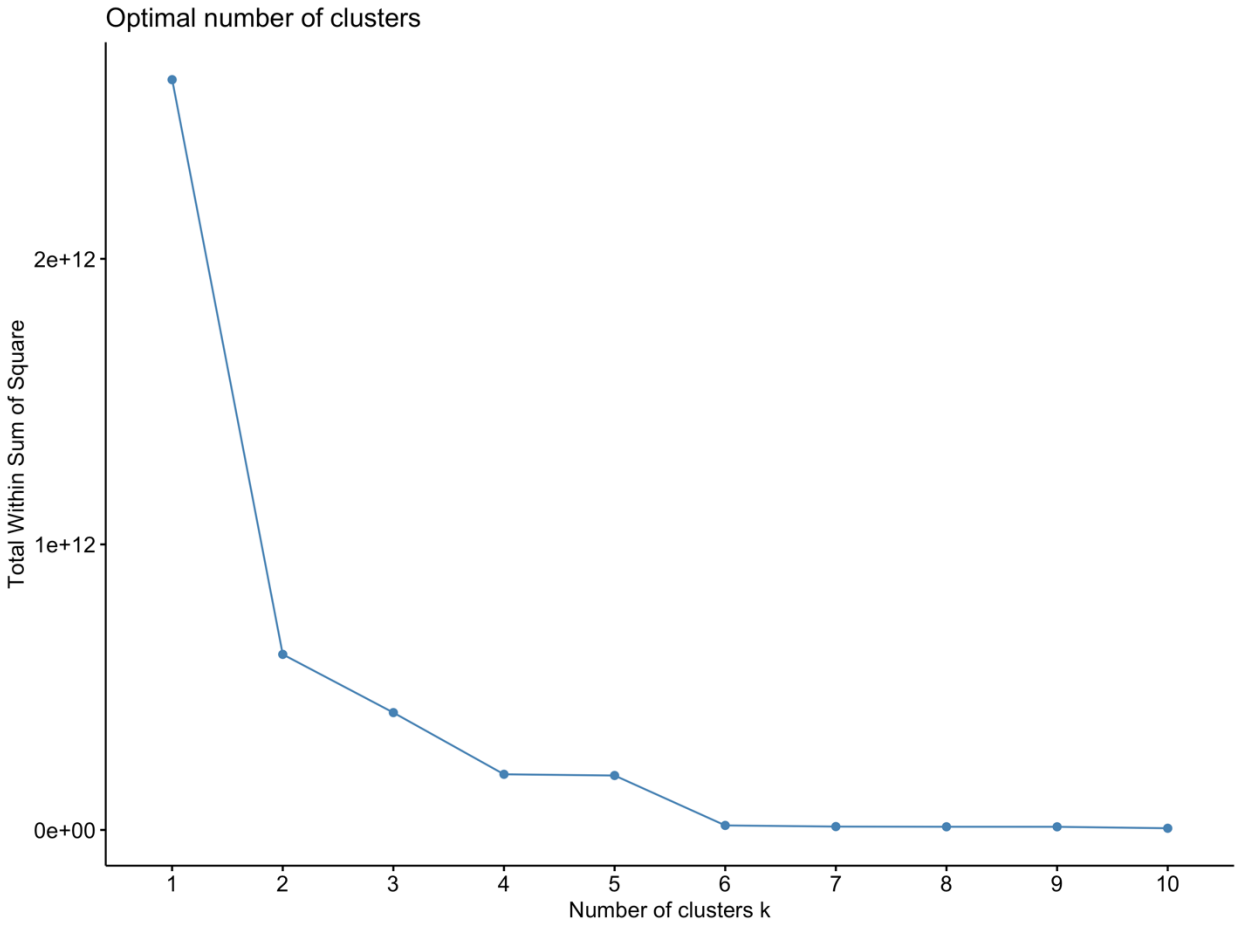
Appendix Figure 2.4. Cluster Optimality: Cost Clusters (With Food Basket)



Appendix Figure 2.5. Distance Matrix: Socioeconomic Access Variables



Appendix Figure 2.6. Cluster Optimality: Socioeconomic Access Variables



Appendix 3. Nutritional Requirements for the Median Family in Mexico City

Appendix Table 3.1. Nutritional Requirements for Household Members Aged 12-64

Age	Women (kcal)	Men (kcal)
12-13	2,276	2,548
13-14	2,379	2,770
14-15	2,449	2,990
15-16	2,491	3,178
16-17	2,503	3,322
17-18	2,503	3,410
19+	2,403	3,067
Mean	2,429 kcal	3,041 kcal
Total Mean	2,735 kcal	2,735 kcal

Appendix Table 3.2. Nutritional Requirements for the Median Household

Age Group	Nutritional Requirement	Number of Members per Household	Total Daily Requirement
12-64 Years Old	2,735 kcal	3	8,205 kcal
Daily Nutritional Requirement for Average Household			8, 205 kcal

Appendix Table 3.3. Macronutrients Needed per Day

Total kcal: 8205	Proteins (15%)	Lipids (25%)	Carbohydrates (60%)
Kilocalories	1,230.75	2051.25	4923
Grams	307.68	227.91	1230.75

Appendix Table 3.4. Distribution of Grams per Food Group for the Median Family

Food Group	Subgroups	Food Basket for Mexico City (g)	Nutritional Contributions of the Food Basket to Median Family in Mexico City			
			Energy (kcal)	Proteins (g)	Lipids (g)	Carbohydrates (g)
Vegetables		1, 088	425	34	0	68
Fruits		1656	720	0	0	180
Cereals and Tubers	a. Non-fat	900	2100	60	0	450
	b. With Fat	252	1380	24	60	180
Legumes		774	1080	72	9	180
Products of Animal Origin	a. Low in fat	315	343.8	43.8	18.8	0
	b. Moderate in Fat	150	225	21	15	0
Milk	a. Semi-skimmed	1470	570	54	12	72
Oils and Fats	a. Without Protein	112.5	1013	0	113	0
Sugars	a. Without Fat	120	400	0	0	100
Total			8256.8	308.8	227.8	1230