THE WOLF STREET
Journal
Vol. VIII No. 1/2025

THE WOLF STREET Journal
Vol. VIII No. 01/2025
Sept 2025

The Wolf Street Journal *Vol. VIII, No. 01/2025* is here! In this edition you will find articles written by students from Arkansas State University Campus Queretaro (ASUCQ), the first article written by a student from an external university, Autonomous University of Queretaro, and the first article written by the director and editor of this journal.

The first article shows *"The impact of ai automation on employee morale and job security in businesses"* written by **León López Cortés**. The author conducts a literature review to analyze how artificial intelligence and technological automation affect the workforce, particularly in terms of employee morale, psychological contracts, and job security. The study highlights both opportunities and risks: while AI can improve productivity and reduce repetitive tasks, it also raises ethical concerns such as privacy, surveillance, and potential job displacement. He emphasizes the need for ethical AI implementation, continuous employee training, and inclusive workplace policies to ensure that technological progress aligns with workers' well-being and long-term job stability.

In the second article, written in Spanish, we will explore the findings of *"Equidad sin productividad: el desafío de conciliar redistribución de ingresos y crecimiento económico"* written by **Andrea Xiadani Cisneros Jaramillo**, an undergraduate student at the Universidad Autónoma de Querétaro. The author analyzes the Mexican economy between the administrations of Enrique Peña Nieto (2012–2018) and Andrés Manuel López Obrador (2018–2024), comparing how different policy approaches affected both income distribution and economic efficiency. The study concludes that while redistributive policies, including higher minimum wages and social transfers, reduced inequality, they did not translate into significant improvements in productivity, leaving the equity–efficiency dilemma unresolved.

Next, "a soup without a spoon" is a discussion based on Max Steuer's book "*Dangerous Guesswork in Economic Policy*", written by **Nadyra Rodríguez Arias**. The author examines how policies are often based on intuition, guesswork, and political motives instead of evidence-based analysis. Focusing on Steuer's argument, the article highlights how good economic advisors must balance theory with practical judgment, combining their knowledge with honesty and responsibility to avoid harmful consequences within their policies. It concludes by calling for greater economic literacy among policymakers and citizens in order to move away from guesswork and encourage society to think like economists.

Then, you can read about the "*Impact of the COVID-19 pandemic in women labor outcomes in Mexico"* written by **María Gabriela Saenz Vargas and Carmen Lorena Ornelas Gutiérrez**. The authors utilize data from the Encuesta Nacional de Ocupación y Empleo (ENOE) to analyze how the COVID-19 pandemic and the resulting lockdown measures affected Mexican women's wages and working hours.

The following article contains information about *"The effects on the gender wage gap due to the COVID-19 pandemic".* The research, conducted by **Ángela Becerra and Alan Trejo,** examines how the COVID-19 pandemic impacted this pre-existing gender disparity in Mexico by analyzing data from ENOE (Encuesta Nacional de Ocupación y Empleo) and estimating regressions both before and after the implementation of lockdown measures.

Presentation

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The next paper, written by **Vallerin Ventura**, focuses on "*Revisiting the Phillips Curve: a non-linear analysis of inflation and unemployment (1990–2022)"*. The author examines data from ten countries using panel regression methods to analyze whether the Phillips Curve, which describes the relationship between inflation and unemployment, still holds in the modern economy. The study finds that unemployment continues to reduce inflation, but in a nonlinear way where the trade-off becomes weaker at higher levels of unemployment, suggesting that the Phillips Curve remains relevant but should be applied with flexibility in today's policy context.

The seventh article of this edition explores the findings of *"Behind the scenes of Mexico's financial interventions: analyzing the recent events involving Intercam, Ci Banco, and Vector"* written by **Ana Sofía Randall Navarro**. The author examines the 2025 sanctions imposed by the U.S. financial authority FinCEN, which accused these three Mexican financial institutions of facilitating money laundering linked to drug trafficking. Drawing on reports of regulatory interventions, credit downgrades, and client withdrawals, the study highlights how these events shook investor confidence and revealed weaknesses in Mexico's financial oversight. The article concludes by stressing the ethical and systemic risks of such scandals, as well as the importance of regulatory transparency and investor vigilance.

Finally, **Adrian Benoni Martínez Burgos and Alejandro Cabrera Martínez** analyze the *"Changes in labor hours during the pandemic"*. They explore how the COVID-19 crisis impacted the working hours of Mexican workers during the early stages (April–July 2020), utilizing the "Encuesta Telefónica sobre COVID-19 y Mercado Laboral (ECOVID-ML)" to quantify these shifts across various demographic and employment variables.

The Wolf Street Journal is a business journal edited at the Department of Business, Arkansas State University Campus Queretaro. Published twice a year, the journal aims to share theoretical and empirical research in the area of business, including but not limited to accounting, business administration, communication for business, economics, finance, global supply chain management, international business, marketing, and quantitative tools for business.

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Leon Lopez Cortes

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Abstract

In the digital age of accelerated technological advances and innovations, the employment and technology relationship has become a complicated issue. This piece of writing explains the intricacies of the workforce around technology disruption.

This study employs various articles to evaluate the impact of internet infrastructure growth, AI integration, and technology import on employment trends.

The findings of different studies offer nuanced views. Some emphasize the positive influence of technological progress on productivity and employment, while others voice alarm regarding the emerging ethical dilemmas and job displacement. Discussions go deeper into the relationship between employers and employees in the digital age and what shifts in expectations and power gamut have arisen.

Discussing AI's ethical aspects, such as privacy issues and workforce autonomy, is the main part of the conversation. Although AI can increase productivity, integrating AI raises several questions about job security and employee happiness.

It points out the requirement for proactive steps and underlines the policies that will give way to ethical AI implementation, employee engagement, and continuous learning. It indicates the need for a culture of inclusion and transparency, to successfully guide an organization through the complexity of technology integration at work.

Using a comprehensive appraisal of existing literature, the present research provides a more refined picture of this complicated relationship between technology and employment. It invokes a harmonious approach that utilizes technological innovation to ensure the well-being and rights of workers in society.

The goal of this paper is to add to the existing discussion on technological disruption and its consequences on workforce dynamics and provide clues for informed future study and policy directions.

Introduction

The conversation surrounding how innovation and technology transform employment has taken a feverish tone during an era when there is more technology than at any other time before. Workforce scholars and pundits alike have been mired in heated debates trying to reveal the difficult connection between technology and labor dynamics. This article views the relationship between the two factors and examines the different dimensions of it based on a deep analysis of scholarly works.

Jin, Ma, and Zhang's (2023) research reveals the transformation power of broadband access, especially while China is extending its broadband network. The authors show the rigorous empirical analyses that internet infrastructure is one of the most determinant factors in employment dynamics which demonstrates the complicated relationship between connectivity and the workforce which is both content and autofocused.

However, Huang and Rust (2018) switch to Artificial Intelligence (AI), a domain that is evolving service industries. This work illustrates how AI has a significant role to play in terms of service delivery and this is very helpful because it provides invaluable insights into the dynamic nature of the labor market and the opportunities and challenges of technological innovation.

When digitalization emerged and became part of various aspects of society, Balsmeiere and Woerter (2019) ask the question if this time is indeed different. Through their research, they challenge narratives that are currently dominating the employment dynamics in the digital era, and they try to redefine the common wisdom regarding the role of technology in job creation, and destruction.

On the other hand, Borland & Coelli, in their 2017 study, scrutinized the rhetoric that portrayed robots as job-stealers. By providing counter-intuitive evidence, they disprove the more pessimistic scenarios and expose a more complicated image of the technological change's influence on the labor market.

Finally, the authors Bouattour, Kalai, and Helali highlight the results of the non-linear impacts of technology imports on employment in the industrial sector in their article. By employing the panel threshold regression method, the researchers reveal the complex interdependence between technology progress and labor force dynamics and reveal the importance of economic development level for understanding these dynamics.

In light of scholarly disagreements and real-world evidence, this paper synthesizes views from different sides, giving the reader a clear understanding of how technology has affected employment. By engaging with cutting-edge research and grappling with nuanced analyses, this study aims to contribute to the ongoing discourse surrounding one of the defining challenges of our time: dealing with the challenges of technological disruption which at the same time aims at inclusive and sustainable growth.

This paper utilizes a literature review method to examine the relationship between Artificial Intelligence automation, employee morale, and job security in businesses. Various scholarly articles and studies were reviewed to gather insights into how technological innovation impacts workforce dynamics. Specifically, the methodology deeply reviewed existing literature that focused on ethical considerations of AI implementation, shifts in employee expectations and trust, and impacts on employee morale and job security.

The analysis centered on identifying common themes and contrasting perspectives within the selected studies. Special emphasis was placed on exploring ethical concerns associated with AI, including privacy issues, autonomy, and potential job displacement. Moreover, the psychological contract, defined as the reciprocal trust and expectations between employers and employees, was examined to understand how it evolves with AI integration.

To ensure a complete understanding, the articles were chosen based on their relevance to the discussion of ethical implications, employee perception, shifts in employee expectations and trust, and policy responses associated with AI. The methodology specifically highlighted the necessity of proactive employee engagement in AI system design, implementation, and the importance of training to mitigate the adverse effects of automation on morale and job security.

Finally, the methodology identified gaps in existing research, pinpointing unexplored areas such as sector specific impacts and future employment scenarios, suggesting directions for further research. By bringing together insights from various academic discussions, this approach provided clarity and balance, allowing for a deeper understanding of AI's complicated impact on employment.

Analysis

One of the most prominent ways Artificial Intelligence (AI) Transformed the arena of employment during the fourth industrial revolution and revolutionized the traditional Work-related relationship between employers and employees. Here the literature review explores the ethics of AI deployment in the workplace, its impact on staff morale and job security, and how their psychological contract with their employer is affected by the digital era. Building on the ideas gained through the review of recent scholarly works, the examination focuses on the multiple levels of the impact of AI on society, lists the areas still unaccounted for, and makes recommendations for future studies.

The applied AI brings about a new cycle of revising ethical norms and labor commitments Bankins & Formosa (2021). By way of AI techniques, systems that used to be performed by a human, not only increase productivity but also cover some of the challenges such as privacy, autonomy, and job automation. Humanities and Social Sciences Communications an article by Shen and Zhang (2024) points up the peculiar artificially intelligent situation, whereby it might contribute to employment yet, at the same time, pose ethical issues about mass surveillance and robots' prejudice. There is a sort of ambiguity concerning the study conducted by an unnamed source which suggests that people develop anxiety and job insecurity in relation to AI, making

training and development platforms are a necessity for someone to avoid the negative outcomes of AI.

The accepted psychological contract meaning, the reciprocity of the trust, and the expectations held between the employer and the employee undergo a transition in a digital era. According to the Bankins and Formosa (2021) study, AI introduces two roles: an AI worker complementing

the human labor force and an AI-induced supply shock that makes AI a substitute for human labor. It, as a consequence, changes human perspectives about employment rights. The ethical ramifications arising from the involvement of AI in settling doubts and monitoring performance rates represent as the key items in the list of necessary “ingredients” for perceiving and managing these dynamic considerations.

The role of AI in employee mood and job security is multi-layered and diversified. Although AI has been thought to augment existing tasks and eliminate mundane jobs, on the other hand, it could ease drudgery and increase job satisfaction. Alongside it, the job elimination threat is a major concern which highlights the need for strong policy actions to bring equality between different groups regarding migration of jobs. The literature showcases a common theme regarding AI proactive approaches that employees should take part in system design and implementation. The idea of training and fair handling of employees to protect them from the negative impact of AI is emphasized.

Although many jobs have already been made redundant by AI, workers and employers generally remain positive, according to market studies. However, some important questions regarding the

future position of employees and job security are yet to be answered. The areas that require to be equally explored as the system-wide impact in the future are the implications on different sectors, with the emphasis on the obstacles and opportunities raised by AI automation in various industries. Also, the developing character of the psychological contract in the digital times calls for thorough consideration, covering the development and formulation of the ethical conducts regarding AI implementation that go together with employees' expectations and requirements.

The question of ethics, psychological well-being, and socioeconomic structures gets deeply intertwined with the role of AI in the workplace due to the fact that AI is potentially changing the framework of employment. Whilst organizations and policy developers move through this new territory, a fair balance that concerns the ethical aspect, employee participation, and flexible learning techniques is essential. Through the filling of the gaps the current research has, implications for future studies emerge that would lead to the creation of a more elaborate blueprint following the role of Artificial Intelligence in workplaces, hence implementing this technology for the benefit of both organizations and their employees.

The question of concern in this article is all about the role of AI automation on employee morale and job security in businesses. Through a comprehensive review of existing literature, the major findings can be synthesized as follows.

One major ethical implication of AI deployment is that it leads to problems of privacy issues, individual autonomy, and human worker displacement Bankins & Formosa (2021). AI is estimated to create high productivity levels, even though the issues of prejudice, discrimination, and mass surveillance under AI may become apparent Shen & Zhang (2024b). The article by Corvite et al. (2023) adds to this discussion the desire to cautiously take into account data subjects' emotional AI offers as they may be a source of risks such as low employee morale, poor health, and job automation that is not subject to attention.

A key one is a transformation of the psychological contract, built on mutual expectations (between the employer and the employee), which undergoes a dramatic change driven by AI, a new employment dynamic Bankins & Formosa (2021). With AI assuming the roles of both fractions and replacements for human labor, the

performance of power dynamics and the extension of employment relationships are also influenced, and that affects employee perceptions and expectations Shen & Zhang (2024b). Bankins and Formosa (2021) stress in their paper the ethics of AI development and the equality imperative of implementation, covering all to keep the psychological contract based on mutual trust and reciprocity.

The impacts of AI on workers' morale and job security are similar, but they also vary in some cases. Whether it is the upside or the downside of technology is a question that also bothers me. Job replacement is a source of job satisfaction for many, but for others, it may endanger their contracts and rights as employees. Therefore, the rise of AI

automation has both positive and negative connotations Shen and Zhang (2024b). The work was conducted by Corvite and the team. The recent shocking case of 2023 has proven that AI not only threatens the mental well-being of employees but also becomes the source of biased surveillance, which in turn creates a sense of constant fear and supervision among the employees.

The results of these surveys present a picture of a complicated relationship between AI automation and employee sentiment and job security. On the other hand, AI creates the prospects for higher effectiveness and innovation, which may result in more efficient workers and better business results. This raises AI deployment issues like privacy infringement and bias, which have created plenty of job insecurity and employee well-being concerns.

The ethical perspective requires businesses to emphasize fairness and transparency in AI implementation to protect their employees from any harm, as well as the violation of rights. The workforce members participating in the process of AI system design and implementation, being adequately trained, and establishing clear policies and practices are the fundamental actions aimed at creating trust and reciprocity between parties in the psychological contract.

This study extends the overall literature by shining light on the complex interactions between AI automation, workforce morale, and job security in businesses. Through the amalgamation of opinions and research from different scholarly resources, this review provides information on the ethical debates and practical ramifications of AI integration in the workplace.

Readers of this paper may consider several actions and considerations:

1. Ethical AI Implementation: Ethical AI is an indispensable dimension that should be emphasized by firms to guarantee employment rights and welfare by applying the rules of transparency, fairness, and responsibility Banks, Nessa, & Formosa (2021). Through neutralizing prejudices and offering confidentiality, ecological systems have enough confidence to build trust in their workforce and yet maintain a good psychological contract.

2. Employee Engagement and Training: The AI systems' design and implementation processes should involve employees as much as possible, supported by relevant training as well, which will help workers adapt to

changing work environments and minimize job insecurity. Through cultivating a learning and innovative culture within the organization, leaders can boost employee morale and contentment with their jobs.

3. Policy Development and Regulation: Policymakers are the intermediaries in the design of regulations and laws to guide AI utilization in the workplace OECD (2022). Governments will guarantee the ethical use of AI through the creation of clear frameworks in the same manner that they will protect the rights of workers. This will be done to promote a fair and equal transition to the future, which will be dominated by artificial intelligence.

Arguments supporting the working thesis:

1. Human-Centric Approach: My working thesis highlights the need for an employee-involved approach to AI automation in which the ones who carry out the processes are consulted in the design and implementation of the system. By safeguarding employees' welfare and ensuring job security, companies will buffer the AI-related destruction of morale and reduce retention rates Bankins & Formosa (2021).

2. Fair and Transparent Practices: Fairness and transparency can be emphasized as important principles of AI implementation, according to Shen and Zhang (2024b). Organizations' ability to deal with biases and be held accountable can result in the creation of trust and employee relations, ultimately improving job satisfaction and organizational performance.

3. Continuous Learning and Adaptation: Training and development of employees is, no doubt, among the main success factors of integrating AI into the work lives of employees Corvite et al. (2023). Through the financing of continuing education programs and offering progression training, businesses can help employees negotiate technology changes and participate in a robot-integrated world so that they can survive in an AI-dominated environment.

Integrating AI automation in the work environment is akin to a balancing act where technological progress and human-oriented principles have to be coordinated. Through the consideration of ethics, the focus on employee involvement and training, and the advocacy of impartial and transparent practices, organizations will be capable not only of making the most of AI but also of maintaining the welfare and job security of their employees. With AI advancements speeding up daily, organizations should stay dedicated to promoting a culture of inclusivity, continuous education, and moral accountability. The implementation of these initiatives contributes to the creation of a long-term and fair workplace, which will benefit both employees and the organization.

Conclusion

As the technological world has almost reached the point of unparalleled advancements, we are looking at the relationship between AI and labor from every area of society. By a synthesis of various academic perspectives and empirical findings, this paper has aimed to clear the complex landscape of how workers deal with technological disruption.

The study on high-speed internet access to employment in China Jin, Ma, & Zhang (2023) and the transformative ability of artificial intelligence in service industries Huang & Rust (2018) has brought to light the profound changes occurring in labor markets in different parts of the world. On the other hand, some studies analyze the non-linear connection between digitalization and job creation Balsmeier & Woerter (2019), as well as those that critically evaluate the robots depicted as job-takers Borland & Coelli (2017b). These have challenged the dominant arguments and emphasized the need for a nuanced comprehension.

Along this way, we have been struggling with ethical issues during AI deployment, the transformation of psychological contracts in the digital space, and the AI effects on the employee's spirit and work. As organizations and policymakers try to find their way, a human-based strategy that focuses on ethical AI implementation, employee engagement, and lifelong learning appears to be the only approach to it Bankins & Formosa (2021) Corvite et al., (2023) OECD (2022).

The results of this study demonstrate significant implications for the forthcoming research and policies. Through implementing fairness, transparency, and inclusivity, organizations can tap into the transforming power of AI against harming workers' welfare and rights. With the help of preventative actions to develop a climate for adaptability and empowerment, we will be able to deal with the intricacies of technological adoption in workplaces, co-authoring a future that is not only innovative but also fair.

The time to learn from what we find as we look towards the future is now as humanity is going collectively on an exploratory mission aimed at a future where technological growth goes hand in hand with the flourishing of human capability. It is by doing ethical AI, inviting the employees' participation, and leading to a culture of continuing learning that will help us to achieve our goal to have a more secure, equal, and sustainable society of work.

However, the final result is that we should not focus only on technological development while building societies, instead, we should use the technologies as a huge boost for us to prosper as humans facing change like never before.

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Resumen

Si bien, las discusiones e investigaciones sobre la disyuntiva entre eficiencia-equidad son extensas a nivel mundial, hay pocos estudios o artículos en que se abordan de manera comparativa los resultados de los enfoques, estrategias y políticas implementadas por sexenios recientes en México (2012-2024) y es aquí en dónde radica la importancia en la elaboración de este artículo, este permite visualizar una discusión clásica dentro del contexto reciente de México, y analizar cómo dichos enfoques se han visto reflejadas en el incremento, reducción o equilibrio de esta disyuntiva.

Mediante un análisis comparativo de indicadores claves, se examina si existe una complementariedad entre ambos objetivos. Se logró concluir que el aumento progresivo del salario mínimo y transferencias gubernamentales lograron reducir la desigualdad, sin embargo esto no se tradujo en mejoras significativas en la productividad.

Factores como la pandemia de COVID-19 significó un decrecimiento del PIB per cápita y productividad laboral.

Así pues, se afirma que la disyuntiva entre equidad y eficiencia en México representa un reto estructural que necesita de políticas integrales que incentiven y garanticen la distribución equitativa y la eficiencia productiva.

Introducción

La disyuntiva entre equidad y eficiencia es uno de los más grandes retos para los gobiernos contemporáneos. Desde la perspectiva de Jorgenson (2018), la equidad se produce y garantiza a través del sistema fiscal el cual mediante impuestos, leyes y mecanismos se compromete a una justa distribución de la riqueza entre la población. La eficiencia por su parte, se refiere a la capacidad de producir la mayor cantidad posible de bienes y servicios con los recursos disponibles. El debate consiste en si es posible la coexistencia de ambos a un mismo nivel o si por el contrario siempre habrá la necesidad de priorizar e impulsar uno por encima del otro.

La idea central de este trabajo es analizar cómo la búsqueda de equidad ha impactado la eficiencia económica en México durante el periodo 2012-2024, comparando los dos sexenios que abarca el periodo, el de Enrique Peña Nieto y el de Andrés Manuel López Obrador respectivamente. El objetivo es determinar en qué medida las políticas públicas implementadas durante el gobierno lograron mitigar o exacerbar esta disyuntiva. Se parte de la hipótesis de que la reciente reducción de la desigualdad se logró principalmente mediante políticas redistributivas sin que esto significara una mejora considerable en la eficiencia productiva.

Metodología

Como se mencionó anteriormente, este estudio realiza un análisis comparativo entre los sexenios de Enrique Peña Nieto (2012-2018) y Andrés Manuel López Obrador (2018-2024), ambos sexenios constaron de enfoques económicos y políticos contrastantes: el mandato de Peña Nieto (2012-2018) fue de carácter neoliberal y enfocado en maximizar la capacidad de productividad de los habitantes (Secretaría de Gobernación, s. f.),

mientras que el gobierno de López Obrador marcó una contundente intención de separarse del modelo antes mencionado y en su lugar dirigir su gobierno a instaurar una "Economía para el bienestar" con un modelo al que denominó Humanismo Mexicano con la prioridad de redistribución de la riqueza mediante a diversos programas sociales (Declaración de Principios de Humanismo Mexicano, 2024).

Se consultaron datos brindados por el INEGI, el CONEVAL y el Banco Mundial para medir la equidad y eficiencia en México en el periodo antes mencionado. Para fundamentar el análisis, se usa la perspectiva de Jorgenson (2018), quien define a la equidad como el reparto equitativo de los recursos disponibles, mientras que la eficiencia se refiere a la capacidad de maximizar el excedente social es decir, a la suma del excedente del consumidor y del productor, y la producción total, comúnmente medida con indicadores como el Producto Interno Bruto (PIB).

Con el fin de evaluar la equidad, se analizan dos indicadores clave para este proceso: el índice de Gini que mide la desigualdad en un territorio comparando los salarios recibidos por los habitantes. Esta herramienta representa la desigualdad máxima con un valor de 1, mientras que el 0 significa una igualdad total entre todos los habitantes (Índice de Gini, s. f.).

Asimismo, se emplea el índice de pobreza multidimensional, herramienta que contempla carencias en los aspectos económicos, educativos, de salud, al acceso a la seguridad social, al acceso a la alimentación, en la calidad y espacios de la vivienda, acceso a los servicios básicos y en la cohesión social. La elección de este índice es fundamentada en la comprensión que se tiene del concepto de equidad en este artículo, ya que se ve a la pobreza no solamente desde una perspectiva unidimensional que considere únicamente el ingreso y la capacidad de adquirir bienes y servicios de los habitantes, sino que se reconoce en diversos aspectos que determinan la vida de las personas, siendo que se mencionaron anteriormente (Pobreza | CONEVAL, s. f.).

En cuanto a la eficiencia, se consideran tres indicadores y la función de producción agregada. El PIB per cápita siendo el primer indicador posibilita visualizar el crecimiento económico del país respecto al crecimiento de la población, lo que permite discernir si existe un verdadero incremento en el bienestar de la población o si la generación de riqueza fue causada por un incremento poblacional, una marcada desigualdad en la distribución de la riqueza, entre otros. El segundo indicador es la productividad laboral, que permite calcular el aporte promedio de cada trabajador al PIB nacional, brinda información sobre la eficiencia en la generación de riqueza y permite evaluar los efectos de las políticas públicas implementadas en cada sexenio (Estadísticas Sobre la Productividad del Trabajo - ILOSTAT, 2025).

El análisis se llevó a cabo separando los datos por sexenio, con el fin de identificar variaciones o patrones y relacionarlas con los cambios en las políticas públicas.

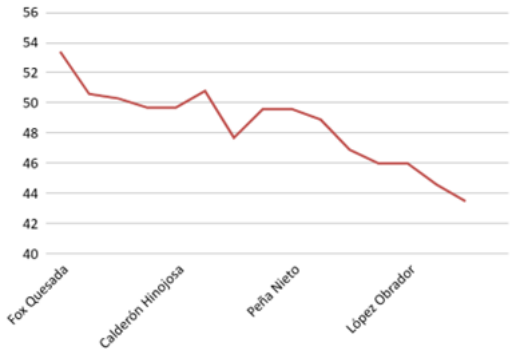
Resultados

Una vez identificados y definidas las herramientas e indicadores usados para este análisis comparativo entre equidad y eficiencia, a continuación, se presentan los

resultados obtenidos respecto a los sexenios de Peña Nieto y López Obrador dentro del periodo 2012-2024. Por medio de gráficas y tablas con el objetivo de facilitar su comprensión.

Figura 1

Índice de Gini 2006-2022



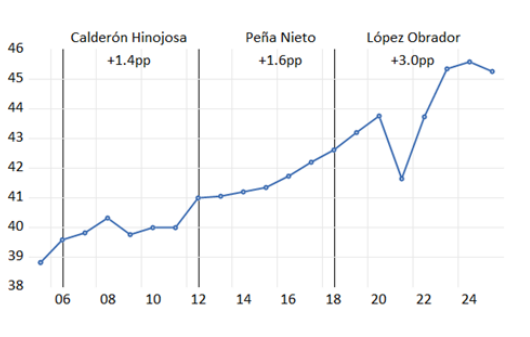
Nota. Índice de Gini en México (2006-2022), con datos de: ((World Bank Open Data, s. f.). Elaboración propia

La Figura 1 permite visualizar las fluctuaciones que ha tenido la distribución de ingresos en el periodo entre 2006 y 2022. Se observa que durante el 2016, en el periodo del gobierno de Peña Nieto el índice llegó a su punto más bajo (0.47) y durante los últimos dos años de su sexenio se observa un incremento. Por su parte el periodo atribuido a López obrador, mantuvo la tendencia decreciente después del 2018, alcanzando su punto más bajo en 2022 (0.46). Recordando que el Índice de Gini refleja la desigualdad en la distribución de ingresos, donde 1 es una desigualdad perfecta y 0 es la igualdad perfecta, los datos correspondientes al sexenio de Peña Nieto muestran una reducción en la concentración de ingresos comparado a las cifras registradas del sexenio anterior, inició su mandato con (0.496) en 2012 lo que sugiere un resultado positivo a las estrategias implementadas durante la administración, sin embargo sigue siendo indicador de una presenté desigualdad, al comparar el crecimiento de dicho indicador con el de pobreza multidimensional es posible distinguir un avance limitado en la disminución de personas bajo ciertas carencias sociales como el rezago educativo, aspecto en el que incluso hubo un aumento de 1,239,909.2 millones de personas al término de su mandato.

Por su parte López Obrador recibió el país con un índice de Gini de 0.49 en 2018 y de manera contradictoria, el indicador disminuyó en el periodo de la pandemia por COVID-19. Esto pudo ser causado por la pérdida de ingresos de la población más rica del país debido a la crisis en las inversiones y la paralización de actividades económicas. Sin embargo, un factor estructural que pudo facilitar este comportamiento fue el aumento progresico del salario mínimo, posible gracias a la desindexación de este mediante la implementación de la Unidad de Medida y Actualización (UMA) en 2016. Esta experiencia refleja claramente los retos que surgen en la búsqueda de equilibrar la equidad y eficiencia y como esta, puede entrar en conflicto, especialmente cuando una política enfocada en la eficiencia macroeconómica como la desindexación para evitar efectos inflacionarios, tiene consecuencias en la equidad al reducir el ingreso real de los trabajadores (Tavera & Plazola, 2024).

Figura 2.

Tasa bruta de empleo

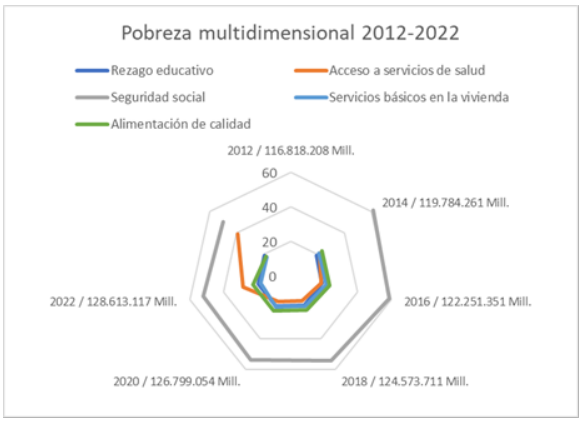


Asimismo, hubo un fuerte aumento de la tasa bruta de empleo [ver Figura 2.] la cual contribuyó a la reducción de la desigualdad. Entre 2018 y 2024 la tasa creció 3.0 porcentuales, a comparación de los sexenios pasados (Calderón +1,4pp y Peña Nieto +1.6pp) fue un incremento considerable. Esto significa que una mayor proporción de la población obtuvo ingresos laborales lo que junto con las transferencias gubernamentales e incrementos salariales pudo facilitar posterior variación, la cual alcanzó el punto más bajo de todo el periodo de tiempo expuesto en la figura 1 (0.46) en 2022.

Pese a eso, es importante señalar que aun con la disminución del índice de Gini durante la administración de López Obrador, carencias como el rezago educativo y el acceso a servicios de salud experimentaron un alarmante incremento, esto sugiere que, si bien la brecha entre los ingresos pudo disminuir, las políticas no fueron lo suficientemente robustas para garantizar el acceso efectivo a derechos sociales básicos a una proporción significativa de la población.

Figura 3.

Índice de Pobreza Multidimensional (2012-2022)



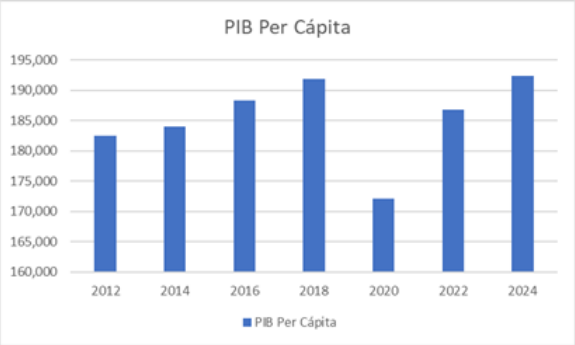
Nota. Información de («Informe de Pobreza En México 2012, 2014, 2016, 2020, 2022», s. f.). Elaboración propia.

No se incluyó "Calidad y espacios de vivienda" con el objetivo de facilitar la lectura de la figura

La Figura 3 expone la cantidad de personas que viven bajo cada carencia social, con el fin de presentar un análisis más completo contemplando el aumento poblacional, en la misma figura se muestra también el índice de personas bajo cada carencia social. Se observa que durante el sexenio de Peña Nieto los porcentajes se mantuvieron sin muchas variaciones, por su parte en el periodo de López Obrador se muestran cambios decrecientes como en el caso de alimentos de calidad y crecientes en carencias como el acceso a la salud.

Figura 4.

PIB per cápita (2012-2024)

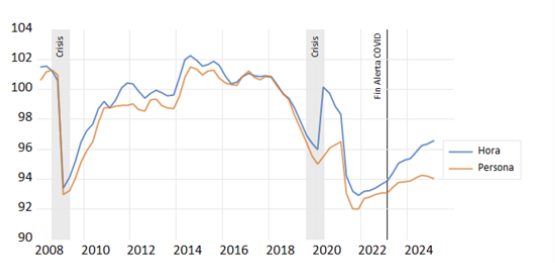


Nota. Información de (PIB Per Cápita, s. f.). Elaboración propia

En la Figura 4 se visualiza la fluctuación del PIB Per Cápita durante el tiempo señalado, durante el primer sexenio mantuvo una constante alza, en el segundo periodo se puede ver una drástica caída del indicador, aunque las razones se exploran en el apartado de discusiones, es importante señalar la pandemia de COVID-19 como un motivo fundamental para este evento. Al término del sexenio correspondiente a López Obrador y de la pandemia misma, existe una fuerte tendencia creciente.

Figura 5.

Productividad laboral en México (2012- 1T de 2024)



Nota. Información de (INEGI, s. f.). Elaboración propia.

La Figura 5 muestra la variación de la productividad laboral en México desde el primer trimestre de 2012 hasta el primer trimestre de 2024, se presentan dos marcadores, el primero (azul) con base en las horas trabajadas y el segundo (naranja) con base en la población ocupada, durante el sexenio de Peña Nieto se puede ver una tendencia moderada sin cambios drásticos, sin embargo es a partir del primer trimestre de 2018 cuando la tendencia se vuelve fuertemente decreciente. El periodo de López Obrador expone drásticos cambios en los primeros años de su gobierno, ocasionados de manera importante por la pandemia por COVID-19 alcanzando así los puntos más bajos (90-91), una vez superada esa etapa, se muestra una constante tendencia creciente aunque sin llegar otra vez a los puntos que antes de la pandemia.

Los datos sugieren que, a pesar de las reformas estructurales que buscaban impulsar la competitividad y la inversión implementadas en este periodo, no se vivió una mejora en la eficiencia con la que se producen bienes y servicios. La capacidad del país para aumentar su producción por trabajador permaneció limitada, indicando que los motores del crecimiento económico no lograron generar un impulso fuerte en la eficiencia. En el periodo de López Obrador, se observa una recuperación a partir de 2021, esta ha sido gradual y, hasta el primer trimestre de 2024, sin embargo, no ha logrado retornar a los niveles previos a la pandemia. La persistente caída de la productividad laboral y la recuperación incompleta del PIB per cápita después de un evento como la pandemia evidencia que la eficiencia de la economía mexicana ha enfrentado serios obstáculos además de que sugiere un desafío estructural en la capacidad del país para generar crecimiento de manera eficiente y sostenible.

Ambas figuras 4 y 5 muestran la dinámica de recuperación después del desplome ocasionado por la pandemia la cual no ha regresado a niveles antes del 2018. Esto revela que el crecimiento del empleo y los aumentos salariales no se tradujeron en un mayor rendimiento por trabajador.

Conclusiones

El presente estudio tuvo como objetivo analizar la relación entre equidad y eficiencia económica en México durante los sexenios de Enrique Peña Nieto (2012-2018) y Andrés Manuel López Obrador (2018-2024), buscando discernir si prevaleció una disyuntiva o una complementariedad entre ambos objetivos. La revisión y comparación de indicadores clave de equidad, como el Índice de Gini y la pobreza multidimensional, así como de eficiencia, como el PIB per cápita y la productividad laboral, permiten extraer varias conclusiones fundamentales. Además resalta la importancia de considerar a la pobreza no como un fenómeno unidimensional, sino como una cuestión que transversaliza todas las esferas de la vida de las personas.

A pesar de que en el sexenio de Peña Nieto hubo una mayor distribución de los ingresos reflejada en la disminución del Índice de Gini, lo que pudo haber sido el reflejo de un aumento estructural que facilitó una reducción sostenida de la desigualdad, fue el aumento progresivo del salario mínimo, posible debido a la desindexación de este mediante la creación de la UMA en 2016 (Tavera & Plazola, 2024).

Sin embargo, esto no significó un aumento proporcional en la equidad medida por carencias sociales como el rezago educativo, falta de acceso a servicios básicos o una alimentación de calidad, ya que dichas cifras se mantuvieron sin cambios importantes lo que sugiere una limitada capacidad para impactar en las principales carencias sociales.

Durante la administración de López Obrador la crisis provocada por la pandemia de COVID-19 ocasionó un desplome del PIB per cápita y productividad laboral, además se registró un incremento histórico en la tasa bruta de empleo, la cual pasó de 43.5% en 2018 a 46.5% en 2024, esto equivalente a +3.0 puntos porcentuales. Este aumento junto con el incremento salarial y transferencias gubernamentales, contribuyó a reducir la desigualdad en 2022 hasta un 0.46. Sin embargo, sigue existiendo un reto relacionado a la productividad laboral, ya que no se ha

recuperado a los niveles previos a 2018, lo que indica que la mayor equidad no estuvo acompañada de mejoras significativas en la eficiencia productividad.

Los resultados obtenidos demuestran que la disyuntiva entre equidad y eficiencia es un reto sumamente complejo que abarca esferas profundas, y en el contexto mexicano con una historia de desigualdad y corrupción hace más difícil el diseño y articulación de marcos legales que aseguren un crecimiento económico justo y para todos. Esto visibiliza la necesidad de la construcción de un conjunto de leyes que continúen fomentando las transferencias gubernamentales sin descuidar aspectos que promuevan el crecimiento económico como el acceso a financiamiento, bajos costos de transacción y el cumplimiento de las leyes lo cual podría generar un entorno propicio para lograr crecimiento económico sostenido, equitativo y eficiente.

Agradecimientos

Agradezco al Dr. Enrique Kato Vidal por su acompañamiento y orientación durante la elaboración de este trabajo.

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THE WOLF STREET Journal

Nadyra Rodriguez Arias

Vol. VIII No. 01/2025

A discussion based on Max Steuer's book: "Dangerous Guesswork in Economic Policy"

A nail without a hammer, a soup without a spoon.
A policymaker's[1] intuition may fail to choose.
If they have no clue on how society could improve,
economics they need soon.

Effective economic policies are built on more than just goodwill; they require insightful and strategic guidance, informed by empirical data and sound theoretical frameworks.

Rent controls' primary cost is a shortage of available housing, because fewer units are supplied than demanded, as they prevent prices from rising above a set limit determined by the government. First-year students learn about this and other unintended consequences in Economics 101. While the aim of this policy, known as a price ceiling, is to make housing more affordable for tenants, it often results in negative outcomes. Specifically, the undersupply of housing leads to long waiting lists and the emergence of informal or black markets. Additionally, the lack of incentives for landlords to invest in maintenance or upgrades results in a decline in the quality of housing. Consequently, the deterioration of buildings can further reduce the availability of homes.

Economic theory explains how market mechanisms effectively mitigate shortages by allocating resources, like housing, to those tenants who are willing to pay the highest price, reflecting the principle of Pareto efficiency. However, the proper functioning of this allocation process becomes challenging in scenarios characterized by undersupply. In such contexts, alternative mechanisms, like lotteries or queues, are often utilized to replace the price system, thereby complicating the efficiency of housing distribution, because the good may be assigned to a tenant who is first in line, not to the one who values it the most.

Following that idea, Glaeser and Luttmer (2003) find that the welfare losses resulting from misallocation exceed those from undersupply, and ignoring misallocation can lead to an underestimation of the costs associated with the rent control policy.

Rent control policy was first introduced in Europe after World War I and continued following World War II. During the latter period, the US government also sought to lessen the burden on soldiers and their families, who were being relocated across the country. The goal was to prevent landlords from taking advantage of the housing boom, in other words, *profiteering*.

A more recent example of an intended implementation of this policy is observed in Mexico City. Demonstrators are advocating for the government to implement a rent control policy, in response to the surging demand coupled with a relatively inelastic housing supply that explains the increment in prices. This issue is often linked to "gentrification" – a term that has historical roots dating back to Ancient Rome, but its

[1] The term "policymaker" is a neutral noun. I kindly ask the reader to interpret it without gender bias, as it refers to any individual involved in shaping policies intended to address urgent economic matters.

contemporary usage and conceptualization are largely attributed to the research of British sociologist, Ruth Glass in the 1960s, wherein she described the displacement of low-income residents by middle-class individuals in London's working-class districts.

Considering the economic theory alongside the issue of gentrification, should the government of Mexico City seriously consider the demonstrators' request to mitigate rising prices through the implementation of a price ceiling?

There is an *unusual*[2] consensus among economists regarding rent controls. A review of both, theoretical and empirical literature, reveals that rent controls are generally unfavorable when weighing all costs and benefits, since the losses experienced by the landlords, outweigh the gains received by the tenants. In other words, this policy tends to cause more damage than it resolves, resulting in a clear trade-off between efficiency and fairness.

As a result, the price ceiling initially intended to protect tenants may end up distorting the housing market and reducing long-term affordability, ultimately failing by disregarding how it diminishes landlords' incentives.

In summary, rent controls are not just a bad policy *per se*, they are a reminder that governments rise or fall on the quality of economic advice, which raise a broader question: how do the governments go about shaping policies aimed at tackling economic challenges and who should guide governments in making these economic decisions?

In his book, "Dangerous Guesswork in Economic Policy", Max Steuer, a Reader Emeritus in the Economics Department at the London School of Economics, argues that a lack of sound economic reasoning, and sensitivity to society's realities in policymaking, can lead to ineffective and negative outcomes.

In the following paragraphs, it is discussed that economic knowledge is not only essential for designing coherent and sustainable policies but also, for minimizing or preventing unintended consequences. These consequences often arise when intuition, *guesswork*, and political motives replace evidence-based analysis. Hence, the task of selecting a competent economic advisor is far from trivial.

But… What is an economic advisor? What kind of economist could have the role of an economic advisor? How do we exactly define an economist, and what essential knowledge does the field of economics entail? Let's use these questions to explore and uncover the role of economics in policymaking.

According to Jenkins (2009), an economist is defined as someone who holds a degree in economics. However, Keynes argues that economists are *thinkers with a method*, rather than merely a collection of answers. Similarly, Esther Duflo shares Keynes'

[2] Economists typically disagree on various topics, as George Bernard Shaw emphasized *"If all the economists were laid end to end, they would not reach a conclusion"*.

perspective by stating that economists use *rigorous, evidence-based methods,* such as experiments. Taking a slightly different approach, but one that certainly supports the discourse presented later in this paper, Deirdre McCloskey characterizes an economist as a *social scientist, storyteller, moral thinker, and historian*, rather than simply viewing them as a technician who manipulates equations.

For Steuer, anyone can claim to be an economist. Unlike professions such as dentistry, law, or architecture, which require some licensing, there are no formal requirements to practice economics. Then, if anyone can claim to be an economist, what entails such recognition or appointment? Perhaps this open definition has contributed to unfavorable outcomes in the design and implementation of economic policies.

Harry Johnson, a professor at the University of Chicago and the London School of Economics during the 1960s and 1970s, proposed that an economist need possess no knowledge beyond economics itself; a comprehensive understanding of economic principles enables the analysis of aggregate economies, competition, stability, and one can consider that, mathematics is inherently embedded within economic knowledge. On the other hand, Steuer challenges Johnson's assertion, particularly in the context of policymaking, he maintains that economic analysis must be combined with "an appreciation of relevant aspects of the society under investigation", therefore, not all economists would make good economic advisors.

From there on, Steuer defines an economist as someone who studies economies, focusing on systematic outcomes rather than individual interests. Given that economies are complex and dynamic systems, establishing simple cause-and-effect relationships when addressing problems can be challenging. This difficulty arises because the system evolves as people in society adapt their behavior over time, and a separation between one economy (or system) and another is unclear. Furthermore, the distinction between the economy and other aspects that could shape the society are ambiguous, adding another layer of complexity to economic analysis.

Therefore, a person with economic expertise should not be confused with someone who simply possesses common sense or business experience. While there may be excellent management consultants, who provide advice on improving efficiency in specific areas of a firm's operations, their focus is different from that of an economist, who analyzes the potential improvements for the entire system at once, by considering efficiency from multiple angles.

When it is known that society values fairness, economic policy plays a central role in promoting equitable outcomes, even if such efforts may come at the expense of efficiency. This posits another pertinent question: why should economists care about the priorities of society? When Steuer describes an economist as someone who studies economies, he implicitly includes *studying society* within that scope. Society and the economy are closely intertwined; society shapes the economic structures and outcomes, and the economy, in turn, influences conditions for society. In consequence, Steuer rejects what Keynes proposed, "the economy is unimportant", as it suggests that the society and the economy

are detached from one another.

Previous considerations lead us to the next critical point: should every economist be regarded as a policy advisor? Steuer says that this is not necessarily the case. While economists possess analytical skills, the role of a policy advisor requires direct involvement with moral and ethical issues, because they need to tackle challenges faced by the society every day. Hence, the government should seek an advisor with deep knowledge of both economic systems and real-world policy implications to avoid harmful advice that may result in risky unintended consequences, or solutions that are worse than the problems they aim to address.

Another important distinction among the various advisors a government may require is between economic advisors and financial advisors. While both types of advisors can contribute to the design and implementation of policies, they possess distinct skill sets suited to different objectives depending on their area of focus. An economist understands the overall system and how we make choices in it, given our limited resources. In contrast, a finance expert focuses on how money flows within that system. While the skills of a financial advisor are relevant to individual interests, the skills of an economic advisor are essential for the entire system – society or economy.

Then, there is no surprise that the main objective of economics is to improve the understanding of society… As a matter of fact, same as other major social sciences: sociology, anthropology, political science, and social psychology[3]. However, to develop theory is one thing and to derive a practical application is another one very different; yes, theory is essential, but so is the praxis.

Social scientists face a considerable challenge in their pursuit of understanding society, as their methods are often less effective than those used in the natural sciences. In natural sciences, many phenomena can be simplified to fundamental principles, such as Newton's laws. The ability to conduct experiments in controlled laboratory settings allows natural scientists to isolate variables and repeat experiments, reducing noise and enhancing precision in predictions. Then, establishing causality is simpler, and it contributes to the reliability of their findings, allowing for less abstraction since reality itself is more stable and testable.

The challenge with economics lies in its focus on instability, regulation, taxation, government actions, and individual behavior; factors where scientific approaches often clash with ideological views. The outcome of any policy intervention is shaped by the changing conditions of the system; in a society where constant change and context-dependency are key factors, abstraction helps identify recurring patterns, as causality is very difficult to test. Consequently, economists often rely on abstract theoretical models in lieu of a traditional laboratory setting.

Economists need to structure the

[3] In addition, I would include philosophy and history, as they are two other powerful disciplines that attempt to describe and understand humans and their role in society. But the focus is Steuer's argument, not mine.

understanding of society by using or developing theories, providing elegant insights, but the adaptation to real-life contexts should be considered. In practice, markets are imperfect, and agents are irrational; so, the existence of informality, inefficient institutions, political motives, and any other interference against economic principles cannot be ignored; even with the use of tools such as cost-benefit analysis, statistics and econometric methods it is necessary to consider the environment in which the phenomenon is occurring.

Steuer emphasizes that economic theory serves as a framework to understand the complex reality in simplified terms. However, it should be viewed as *a flexible guide rather than a rigid manual.* Good economic advisors need to bridge the gap between abstract reasoning and real-world applications; they must use their judgement, creativity, and even improvisation, when applying economics to policy. This requires a deep understanding of economic theory, testing assumptions against current circumstances, and adjusting proposals to fit social, institutional, and political settings, since no theory can capture every single detail of reality.

Ultimately[4], abstraction serves as a valuable tool for predicting trends not for determining exact outcomes. For example, it can be stated that "rent controls will lead to shortages" without specifying the extent of the shortage. To balance that duality, abstract economic thinking and concrete real-world applications, is to navigate complex economic issues effectively, and to avoid harmful results.

In that manner, selecting a competent economic advisor involves evaluating their ability to apply theoretical economic knowledge realistically, specifically and practically, rather than choosing them based on pure brilliance, fame or even ideology.

Additionally, a good economic advisor must have and keep in mind the excessive inequality that undermines the social cohesion and the stability of the economy, so it is essential to seek fairness and distribution of wealth as much as efficiency. Banerjee and Duflo emphasize this point clearly and loudly: "There is no trade-off between the quality of life today and in the future, since people are dying now".

Contemporary issues like climate change, technological disruption, globalization and social and violent conflicts demand policy responses grounded in science or good economics, not in common sense. Duflo stresses the importance of applying scientific methods rigorously to the study of social issues like poverty. When those on the left advocate for increased spending on aid, while those on the right argue that social programs lead to excessive reliance on government assistance, which can limit individuals' freedom to choose how to live their lives, she claims that without the use of science, it

[4] The discussion of abstraction in economics could be extended well beyond these few paragraphs, in fact, it could serve as the basis for another paper. At this point, pairing economics with art, if I may, I would argue that economics is not about abstractionism, but in fact, abstract impressionism

would be impossible to identify effective strategies for alleviating poverty.

Moreover, good economics should be combined with virtues like honesty, responsibility and modesty, so that a competent economic advisor contributes to effective and fair systems, where the policy recommendations consider long-term impacts that may require a holistic approach.

Good advisors must balance these virtues with knowledge and pragmatism when guiding governments toward better policies, even when their advice is politically inconvenient or unwelcome. In fact, McCloskey argues that sensible economic thought should include prudence, pricing, and profit, alongside solidarity, justice, and morality. In essence, it should combine technical clarity with humanistic wisdom, as she urges economists to embrace ethics, history, and qualitative understanding, rather than relying solely on mathematics. This perspective aligns with Steuer's argument that curiosity is an essential trait for economic advisors, as they should be eager to explore various aspects of the economy to effectively connect economic insights with social, historical, and political realities.

The call for better economic literacy

One of the most compelling points of Steuer's book is the urgent need to enhance economic literacy, not only among policymakers, but also among citizens and the political class. According to the author, policy failures often arise not from ill intentions but from a misunderstanding of basic economic principles, such as opportunity cost, incentives, trade-offs, and unintended consequences. When decision-makers lack this fundamental knowledge, they are more likely to rely on intuition, ideology, political pressures, or what Steuer refers to as "guesswork." Improving economic literacy requires a more thorough integration of economic thinking into education, journalism, and civic discourse. In fact, Steuer suggests that economic understanding should be part of the intellectual toolkit for every public servant, much like law or political science, which already is.

The main challenge in improving economic literacy is that economics is often viewed as technical, inaccessible, or politically biased. It is crucial for academic findings to be translated into practical solutions, another essential quality of a good economic advisor. Economists must recognize the importance of effective communication; they need to convey ideas more clearly and humbly. Additionally, educational institutions should prioritize economic reasoning as a core component of literate individuals. This involves fostering a culture where economic knowledge is valued and understood, so that societies can move away from reactive, guesswork-driven policies and toward more deliberate, well-informed solutions to complex social problems.

In summary, Max Steuer's text offers a critique of the failures in policy proposals and implementation. It also serves as a compelling call to action, emphasizing the significance of economics in public decision-making for both leaders and the voters who elect them. Steuer created a provocative guide that encourages society *to think like economists.*

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THE WOLF STREET Journal

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Vol. VIII No. 01/2025

Abstract

The aim of this study is to use the Encuesta Nacional de Ocupación y Empleo (ENOE) to compare differences in wages and working hours for female participants before and after the government-imposed lockdown measures due to COVID-19. We estimate two equations: one in which the dependent variable is wage and another in which the dependent variable is hours of work. The independent variables include education level, number of children, hours dedicated to caring for other household members, employment formality, employment sector, job position, and whether the woman had secondary employment. Specifically, this study compares data from the second semester of 2019 and the second semester of 2020 to determine whether significant differences emerged in these variables. We expect to find notable differences in both wages and hours worked by female labor participants before and after the lockdown measures. Understanding the impact of COVID-19 on wages and working hours is crucial for assessing how this health crisis affected female labor participants and for discussing potential solutions to the challenges they faced. To mitigate selection bias, this study focuses exclusively on female labor participants.

Introduction

The COVID-19 pandemic, emerging in early 2020, initiated a global economic crisis with profound effects on labor markets. While workers across all demographics faced challenges, women bore a disproportionate share of the burden due to their pre-existing vulnerabilities within the labor force. Globally, women are overrepresented in service sectors such as hospitality, education, and healthcare, sectors that were severely affected by lockdowns and closures. Additionally, traditional gender roles, which position women as primary caregivers within households, were reinforced during the pandemic, further restricting their participation in paid labor.

In Mexico, the pandemic amplified structural inequalities that had long persisted within the labor market. The country already exhibited significant gender gaps in labor force participation, wages, and job security prior to the health crisis. Mexican women faced higher rates of informal employment compared to their male counterparts, had limited access to social protections, and were often engaged in occupations offering low wages and precarious working conditions. The enforcement of lockdown measures, school closures, and the contraction of economic activity intensified these challenges.

This paper seeks to analyze the impact of the COVID-19 lockdown on female labor outcomes in Mexico, focusing on critical dimensions: wages. Utilizing microdata from the Encuesta Nacional de Ocupación y Empleo (ENOE) for the second semesters of 2019 and 2020, this study employs econometric modeling to identify significant changes in these outcomes and to explore the influence of education, caregiving responsibilities, employment formality, sector of employment. By offering a detailed examination of this dynamic, the paper aims to contribute to the understanding of gendered labor market effects during crises and to inform policies that promote labor equity and resilience.

Research Objectives and Questions

The main objective of this research is to investigate how the COVID-19 pandemic, particularly the lockdown measures implemented in 2020, affected the labor market outcomes of female workers in Mexico. In doing so, the study aims to explore the extent to which individual and job-related characteristics either mitigated or exacerbated the impact on wages and working hours.

Specifically, this study seeks to answer the following research questions:

1. How did the COVID-19 lockdown measures influence the wages and working hours of economically active women in Mexico?

2. What roles did education level, caregiving responsibilities, employment formality, job sector, and secondary employment play in shaping these labor outcomes?

Through these questions, the study not only examines direct effects but also delves into the broader structural factors that condition female labor force participation and income generation in times of crisis.

Literature Review and Synthesis

The relationship between pandemics, gender, and labor outcomes has been the subject of considerable academic inquiry. Alon et al. (2020) argue that the COVID-19 pandemic reinforced and exacerbated existing gender disparities in labor markets worldwide. Their analysis reveals that women were more susceptible to job losses due to their concentration in service industries such as hospitality, education, and healthcare — that were heavily impacted by social distancing measures. Furthermore, the re-emergence of traditional caregiving roles during school closures and the increased care needs of family members disproportionately fell on women, thus limiting their availability for paid labor. Alon et al. caution that without policy interventions, the pandemic's effects could permanently widen gender wage gaps and slow women's career progress.

The findings of Del Boca et al. (2020) further emphasize the impact of the pandemic on women's labor outcomes, especially in the European context. Their study highlights the substantial increase in unpaid domestic and caregiving work among women during lockdowns, even among highly educated and professional women. They find that this surge in household responsibilities led to reductions in paid working hours, reflecting a complex trade-off between employment and caregiving obligations. Importantly, while remote work offered some women a means to maintain employment, those in informal or non-telecommuting jobs were often left without options, accentuating socioeconomic inequalities.

Focusing specifically on Mexico, González and Gutiérrez (2021) provide a crucial macroeconomic analysis of the pandemic's gendered labor market impacts. Their study indicates that women experienced higher unemployment rates than men, especially in sectors like education, retail, and domestic work, where female employment was traditionally concentrated. Informality — already a pervasive issue in Mexico — played a significant role in exacerbating

gender disparities, as informal female workers faced higher job losses and income insecurity during the pandemic. The authors also observe that many women who retained employment saw significant reductions in working hours, particularly those burdened with caregiving duties.

Similarly, Hupkau and Petrongolo (2020) offer insights from the United Kingdom, revealing that women, and mothers in particular, were more likely than men to experience reductions in working hours or job losses due to increased domestic responsibilities. Pre-existing gender norms contributed heavily to this outcome, reinforcing the idea that crises can serve as catalysts for deepening social inequalities. Although their findings are based on a developed economic context, they offer a useful framework for understanding similar dynamics in Mexico, albeit in a setting marked by higher informality and weaker labor protections.

Together, these studies illustrate that the impact of COVID-19 on women's labor outcomes is both significant and multidimensional, shaped by occupational segregation, caregiving expectations, and the structure of national labor markets. They provide a comprehensive theoretical and empirical foundation for the present study, highlighting the relevance of focusing on education, caregiving time, employment formality, sector, and job position when examining female labor market outcomes during the pandemic.

Methodology and Econometric Analysis

This study uses microdata from the Encuesta Nacional de Ocupación y Empleo (ENOE), a nationally representative labor force survey conducted by Mexico's National Institute of Statistics and Geography (INEGI). The analysis focuses on the second semester (July–December) of 2019 and the second semester of 2020, capturing labor market conditions before and after the implementation of COVID-19 lockdown measures.

The sample is restricted to economically active women aged 15 and older, excluding unpaid family workers to focus on wage-earning and hour-reporting labor participants. In total, the sample includes 65,218 observations for 2019 and 47,933 for 2020. Key variables of interest include monthly income (log-transformed to address skewness), weekly hours worked, education level (measured in years of schooling), hours dedicated to caregiving, employment formality (binary indicator for formal jobs), sector of employment (aggregated categories), job position (rank order of job status), and secondary jobholding.

The empirical strategy involves estimating the Ordinary Least Squares (OLS) regression model. The model uses the log of monthly income as the dependent variable; they include a dummy variable indicating the post-2020 lockdown period, along with control variables for education, caregiving time, formality, sector, job position, and, for the hours model.

Formally, the econometric model are specified as follows: Log(MonthlyIncome) = Post2020 + Educ + Hour_Care + Formal + Sector + Position + error

This model allows for the estimation of the direct impact of the COVID-19 pandemic, as captured by the Post2020 variable, while controlling for key personal and job characteristics that may mediate the relationship between the pandemic and labor market outcomes.

Results and Analysis

The descriptive statistics reveal notable shifts between 2019 and 2020. The mean log of monthly wages increased slightly from 8.31 to 8.37, a counterintuitive finding that likely reflects a composition effect: lower-wage women disproportionately exited the labor force during the pandemic, raising the average wage among those who remained employed. Conversely, the mean weekly hours worked decreased from 35.16 hours in 2019 to 33.43 hours in 2020, confirming that working hours contracted in the wake of the pandemic, particularly among women with caregiving responsibilities.

Regression results confirm that the Post2020 variable is statistically significant at the 1% level in the model, indicating that the pandemic had a substantial effect on wages. Education emerges as a protective factor: each additional year of schooling is associated with higher wages and a smaller reduction in working hours. Formal employment also mitigated negative outcomes, as women in formal jobs experienced less severe wage reductions and maintained more stable working hours compared to their informal counterparts.

Caregiving time plays a crucial role, with each additional hour of caregiving associated with lower wages and fewer working hours. This finding aligns with international evidence showing that increased household responsibilities during the pandemic disproportionately affected women's labor supply. Sectoral and positional effects are also significant, with women in higher-status sectors and job positions experiencing less adverse impacts.

Interestingly, the dispersion of working hours increased in 2020, as reflected by the higher standard deviation (17.0 compared to 15.92 in 2019). This suggests greater instability and heterogeneity in women's employment conditions during the pandemic, with some women shifting to part-time or highly irregular work arrangements.

Period	Wage	Mean Hours Worked	Care Index Hours	Care index if Informal Job	Care Index if Formal Job
2019 (Pre-Lockdown)	3,769.99 (0.72)	35.16 (15.92)	10.729 (4.32)	11.245 (4.37)	10.190 (4.20)
2020 (Post-Lockdown)	3,905.88 (0.71)	33.43 (17.0)	10.902 (4.63)	11.441 (4.77)	10.438 (4.47)

Table 1. Descriptive Statistics for Female Labor Participants: Before and After COVID-19 Lockdown *Standard Deviation displayed in parenthesis*

Discussion

The findings of this study resonate with the broader literature on the gendered impact of COVID-19 on labor markets. The contraction in working hours, the moderating effects of education and formality, and the exacerbating role of caregiving responsibilities all mirror trends observed in other countries, although the specific Mexican context of high informality and limited social protections adds a unique dimension.

The observed increase in average wages

despite the overall economic downturn highlights the importance of considering selection effects when interpreting labor market statistics during crises. The pandemic did not impact all women equally; those who remained employed were, on average, better educated, more likely to be formally employed, and less burdened by caregiving duties.

In line with the analysis by Alon et al. (2020), the present study finds that caregiving responsibilities significantly constrained women's ability to maintain paid work during the pandemic. Similar to Alon et al.'s argument that women exited the workforce or reduced hours due to intensified caregiving duties, this study finds that each additional hour of caregiving was associated with a measurable decline in working hours and wages. However, while Alon et al. focused primarily on developed economies with more robust social safety nets, the Mexican context highlights how the lack of formal childcare support and high levels of informality exacerbate these effects.

Moreover, Del Boca et al. (2020) emphasize that even highly educated women faced challenges balancing paid and unpaid work, though telecommuting offered partial relief. This study supports that conclusion, finding that education served as a partial protective factor for Mexican women. Women with higher educational attainment experienced smaller wage losses and fewer hour reductions, likely due to greater access to formal employment and remote work opportunities. Nevertheless, given Mexico's lower baseline levels of digital infrastructure and remote work penetration compared to Europe, the protective effect of education, while present, was relatively limited.

The study by González and Gutiérrez (2021) offers macro-level evidence for Mexico, noting that informal female workers faced the greatest labor market disruptions. The micro-level analysis presented here not only confirms these findings but provides more granular evidence: women in informal employment experienced larger declines in both wages and hours worked, even after controlling for education, caregiving time, and sector. This micro-level perspective thus strengthens the case that informality is a critical axis of vulnerability for women during economic crises in Mexico.

Finally, Hupkau and Petrongolo (2020) highlight the importance of pre-existing gender roles and the protective nature of job formality. The findings of this paper align closely with their conclusions. Formal employment in Mexico mitigated negative labor market outcomes for women, supporting the idea that job stability, access to labor rights, and the possibility of remote work played key roles in preserving women's employment during the pandemic. However, while Hupkau and Petrongolo emphasize the success of furlough schemes and formal interventions in the UK, the absence of widespread governmental labor support in Mexico meant that formal sector resilience was more a result of job characteristics than active public policy.

Thus, overall, the results of this paper are consistent with the international literature but also reveal distinctive features of the Mexican labor market, including the aggravating role of informality and the limited protective capacity of education and formal employment relative to developed economies. These distinctions emphasize the need for tailored policy responses that

address Mexico's unique labor market vulnerabilities.

Conclusion

The COVID-19 pandemic had profound effects on women's labor market outcomes in Mexico, reducing working hours and reshaping the wage distribution among female labor participants. Education and employment formality served as important buffers against these negative effects, while caregiving responsibilities and informal employment exacerbated vulnerabilities. These findings contribute to a growing body of evidence highlighting the gendered dimensions of economic crises and underscore the need for gender-responsive labor market policies.

Future research should aim to track the long-term labor market trajectories of women affected by the pandemic, exploring issues such as career recovery, wage scarring, and changes in occupational mobility. Additionally, a focus on intersectional analyses considering age, ethnicity, and regional disparities would provide a more nuanced understanding of the pandemic's labor market impacts.

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Abstract

This research paper seeks to study the impact of the Covid-19 pandemic on the gender wage gap in Mexico. Using data from ENOE (Encuesta Nacional de Ocupación y Empleo) And to observe the differences that arose due to the lockdown measures, regressions are estimated before and after the lockdown measures were implemented.

We estimate two sets of regressions, being pre-pandemic and post-pandemic for male and female workers. The before and after will allow us to measure the impact of the pandemic on the wage gap and the male and female estimations that will help us overcome the self-selection bias problem. We further break it down into formal and informal employment to measure any present differences.

Findings will provide insight into the already existing gender wage gap and how the pandemic reinforced this disparity. This research also opens a space for discussion on policies that could address the negative impact of the pandemic on wage inequality.

Introduction

This paper seeks to analyze one of the multiple effects the disruptions of the pandemic had in the Mexican labor market and how it evolved before and after the lockdown measures were implemented. The objective of this paper is to give visibility to the already existing social and economic inequalities. In this case, referring particularly to the gender wage gap that remains prominent in developing economies such as Mexico. According to World Bank, 2021, Latin America still suffers from the previously mentioned gender inequalities, which leads to the idea that the pandemic was expected to have a disproportionate effect on the female and male labor market. This, due to the fact that women tend to take responsibility for unpaid work such as caregiving and others that became more demanding because of the lockdown measures that represented leaving the workforce for some women.

Surveys implemented such as one conducted by the LACGIL presented results where women were 44% more likely to lose their jobs compared to men. Even after the crisis evolved and some workers began returning to work, job losses remained consistent.

All the changes brought by the lockdown not only altered the employment patterns but also had clear and lasting implications for income distribution across genders.

To further prove the extent to which Covid-19 influenced wage disparities, data from ENOE (Encuesta Nacional de Ocupación y Empleo) will offer us a clearer picture of this disparities by estimating wage regressions of the implementation of the lockdown measures. The findings of this research will help understand how global crises reshape labor markets and more. As well as discussing policies that promote labor recovery post- pandemic.

Literature review

Important amount of research has been conducted regarding this topic by different authors, investigating the intersection of gender and labor outcomes during the pandemic in Latin America. This provides a framework for evaluating Mexico's standing in this problem. Moreno and Cuellar (2021), stated that gender gaps persist in informal employment and specifically referring to female informal employment this gap faced a 6.4% point increase during the pandemic, meaning that women in informal jobs had a steeper decline in hours and wages compared to men and it was reported that women in Latin America were 30% more likely than men to leave the labor force due to the pandemic, dropping female employment by 10.1% in the first half of 2020, that would account almost 3% more than male employment that dropped only by 7.2% according to Acevedo (2022), that also mentions this drop was strongly correlated with school closures and increased unpaid domestic responsibilities. This was clearly represented in data provided by World Bank (2021) that showed how across Latin America women suffered a 70% job loss in sectors like hospitality, domestic services and retail, generally, female-dominated.

In *Unpacking Barriers to Mexican Women's Equal Participation in the Labor Market*, highlighted that almost 60% of women work in informal or unsettled jobs that offer no social security and other benefits and Hernandez-Ruiz & Wangchuk (2021) mentioned that women dedicate at least 24.2 hours per week to unpaid work, and this amount of hours basically triples the amount men dedicate to these activities with their average being 8.5 hours per week, which again, shows a limitation for women in their labor force participation. Finally, LACGIL (2021) noted that 56% of the women that remained employed accepted reducing their working hours, unlike men, with only 31% of acceptance. Accepting these part-time roles or jobs made a contribution in widening income inequality and presented more economic vulnerability for women.

Data Description and Model Specification

As previously mentioned, the data used to conduct this research was obtained from INEGI by ENOE, Encuesta Nacional de Ocupación y Empleo, using the quarterly labor force data for 2019 and 2020.

This survey constitutes a nationally representative random sample of individuals aged 15+. In this survey, individuals are asked about their socioeconomic status and their current employment characteristics including the type of contract, the size of the firm, the hours of work, their position within the firm, whether the employment is formal or informal and monthly earnings. To obtain the sample to work with, the following individuals were dropped from the total number of observations: participants classified as out of the labor force and unpaid workers. The final sample size is 11,035, out of which 9,700 are for 2019 and 1,335 are for 2020.

To understand the wage differences that arose before and after the lockdown measures were implemented, an econometric model was estimated, where the dependent variable is monthly income, and the independent variables are characteristics often associated to impact income. However, the presence of

selection bias is acknowledged, so a correction using a Heckman-type two-step correction model is implemented (Heckman, 1979), which involves modeling employment selection using a binary logit, calculating Inverse Mills Ratios to account for selection bias, and including them in wage regressions for different sectors and gender groups.

Step 1: Selection Equation

The first stage estimates the probability of being employed using a logistic regression (logit) model, specified as:

$$Employed_i = Age_i + Schooling_i + Marital\ status_i + Care\ Index_i + Gender_i + u_i$$

Where:

- Employed is a binary variable that captures if an individual is employed or unemployed.
- Age is a continuous variable that captures the age of the individual.
- Marital Status is a variable that captures if the individual is married or in free union or not.
- Care Index This is an index variable that was calculated using the variables that capture the number of hours spent caring for other members of the household, driving them to work, school or the hospital or cleaning.
- Gender is a binary variable that captures if the individual is male or female.

From this model, we calculate the Inverse Mills Ratio (IMR), which captures the expected value of the error term in the wage equation, conditional on being employed. Including the IMR as a regressor in the second stage helps correct for selection bias. A statistically significant IMR indicates the presence of such bias.

Step 2: Wage Equation

In the second stage, we estimate the determinants of log monthly income using the following specification:

$$log\ (Monthy\ Income)_i = Schoolingcat_i + Agecat_i + Marital\ Status_i + Informal\ Employment_i + Size\ of\ the\ firm_i + IMR_i + u_i$$

Where:

- Log(Monthly income) is the natural logarithm of the monthly income.
- Schoolingcat is a categorical variable that captures the schooling level completed.
- Agecat is a categorical variable that measures age by different cohorts.
- Marital status is a variable that captures if the individual is married or in free union or not.
- Informal Employment is a binary variable that captures if the worker is categorized as formal or informal.
- Size of the firm is a categorical variable that captures the size of the firm.
- IMR is the Inverse Mills Ratio

This model assumes normally distributed error terms in both stages and linearity in parameters in the wage equation.

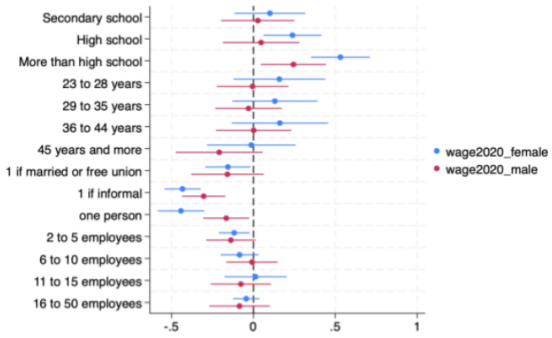
Descriptive Statistics

Variable	2019	2020
	M(SD) / n(%)	M(SD) / n(%)
Monthly income	4,370.69 (3,444.89)	4,595.48 (3,633.61)
Male	4,136.86	4,068.79
Female	3,597.44	3,669.02
1 if married or free union	0.76 (0.43)	0.74 (0.44)
Hours spent on average caring for others	11.42 (4.70)	9.45 (4.90)
Male	11.91835	6.737673
Female	10.82799	11.00354
1 if female	0.45 (0.50)	0.64 (0.48)
Schooling category		
Elementary school	1,900 (14.9%)	150 (8.4%)
Secondary school	3,938 (30.8%)	443 (24.9%)
High school	3,185 (24.9%)	484 (27.2%)
More than high school	3,753 (29.4%)	703 (39.5%)
Age categories		
18 to 22 years	798 (6.2%)	95 (5.3%)
23 to 28 years	2,333 (18.3%)	280 (15.7%)
29 to 35 years	3,752 (29.4%)	487 (27.4%)
36 to 44 years	3,528 (27.6%)	495 (27.8%)
45 years and more	2,365 (18.5%)	423 (23.8%)
1 if informal	0.47 (0.50)	0.40 (0.49)
Size of the firm		
one person	2,457 (19.2%)	356 (20.0%)
2 to 5 employees	3,172 (24.8%)	387 (21.7%)
6 to 10 employees	1,084 (8.5%)	145 (8.1%)
11 to 15 employees	500 (3.9%)	65 (3.7%)
16 to 50 employees	1,491 (11.7%)	216 (12.1%)
51 and more employees	3,547 (27.8%)	495 (27.8%)
Number of observations	9,700	1,335
Total number of observations	11,035	

In the graph shown above, we present descriptive statistics of the research and it presents monthly income and care hours as continuous variables, binary variables as employment status, marital status, gender and informal or formal employment. Finally it presents 3 groups of categorical variables (meaning the results are represented by multiple discrete categories), which are schooling level, age group and firm size.

Highlighted in grey, we have the total number of observations at the bottom and at the top we have two statistically significant variables, being monthly income and hours spent caring for others, where we can confirm that while the average monthly income increased in data from 2020 for women, men still reduced their income which is reflected on why the wage gap apparently went down, but it was only a result of men earning less in a specific and only temporary period of time.

The same phenomenon occurs with the "hours spent caring for others" variable, where again it was reduced on average but only because men reduced the hours they spent by nearly 50% while women increased their hours by about 1.6%, even if it was not that significant (in women) these 2 percentages explain why the caring time appeared to reduce, when it did not for women.



The previous graph shows the results of the 2020 wages regression, but only a few of the variables shown are statistically significant. In summary, meaning that informal employment is associated with significantly lower wages , more for women compared to men. Also, education after highschool increases wages for women and men but this effect remains larger for men. Finally self-employed women earn considerably less, again with a gender disadvantage in the informal and self-employment sectors.

Methodology

The methodology we used to conduct this study was the Heckman selection model in STATA. Firstly, using the logit model for employment to identify the probability that an individual is employed using relevant covariates, capturing the labor market entry decision. Based on the predicted probabilities, to account for the non-random sample selection we calculated the Inverse Mills Ratio.

Ordinary least squares regressions are run separately for 2019 and 2020, incorporating the IMR, and these regressions are satisfied by gender to detect disparities. Errors are clustered at state level to control for unobserved heterogeneity across regions. And finally, we use Coefficient plots to visually compare the effect of gender across time and employment characteristics.

Results

The results obtained from the regressions offer a picture of how the gender wage gap changed before and after the pandemic hit.

Year	*Female coefficient*	*p-value*	*Wage gap (%)*
2019	-0.283	0.000	~28.3% less
2020	-0.144	0.001	~14.4% less

Women are earning about 28.3% less compared to their male counterparts in 2019 and in 2020 earning about 14.4% less.

It is important to mention that this information is merely a descriptive analysis and by no means should be taken as a sharp reduction in wage inequality, for this to take place in a longer time frame and more variables should be analyzed.

The results above show a significant gender wage gap in both years. The reduction in the gap post pandemic could be interpreted as a cause of the labor force composition changes or job losses for men.

Gender-specific regressions

Year	*Informal coefficient (Female)*	*Informal coefficient (Male)*	*IMR coefficient (Female)*	*IMR coefficient (Male)*
2019	-0.379	-0.171	-0.931	-1.150
2020	-0.433	-0.304	-2.785	-5.936

From these results, we can observe that women faced higher penalties for informal employment, as well as highlighting that the gap widened in 2020. Also the IMR coefficients are significant, which remarks the importance of correcting for selection bias. And as observed, women and men showed stronger IMR effects in 2020, meaning that there was a 'stricter' employment selection process in the pandemic.

Something noted was that the wage penalty for women persisted even when selection bias was already adjusted.

Robustness Checks

To obtain stability in our results we used separate models for women and men to account for specific gender labor dynamics, reducing the risk of not specifying interaction effects. All models were re-estimated excluding the IMR to be able to see how much selection bias was affecting the wage estimates, and this gave us as a result an increased penalty on women's wages.

Interaction terms were included such as i.e. female x formal or female x informal which again, showed a consistent result were wage penalties persisted in the informal sector, which we can also relate to the subsample analysis of the formal and informal labor sectors to observe the variation of wage gaps across these two different sectors in the labor market. And regional fixed effects were also implemented at state level that ended up suggesting that regional heterogeneity does not drive the wage gap trends.

These robustness checks confirm that the main findings are not driven by model misspecification or omitted bias across variables.

Discussion

The findings and results mentioned above support one of the previously proposed hypotheses, being that, H1, that stated the COVID-19 pandemic exacerbated the existing gender disparities in the Mexican labor market. The gap that we observed in 2020 which was a little smaller may reflect withdrawals in the labor force in lower-earning women and men in higher paying sectors.

Also regarding the unpaid domestic responsibilities and care previously mentioned with a big number of hours worked by women uncompensated contributes to the declines in wages for women. With the higher IMR coefficients after the pandemic it was clear that employment excluded more vulnerable populations such as women with a bigger burden in uncompensated domestic labor, also showing the stricter selection in employment.

It is crucial to mention that even if these regressions showed a clear part of the economic impact of the pandemic, structural disparities are not necessarily included such as institutional support and others, which also helps sustain the persistence of the wage gap.

Conclusion

It is clear that COVID-19 did not create the gender wage gap, but it did deepen the structural disparities in the Mexican labor market, which lead us to spark conversation about policies that should be aimed at narrowing until closing the gender wage gap, by addressing the problem from the roots. These roots include the high informality faced in Mexico, social structure and beliefs that lead to unequal care responsibilities, limited access to quality jobs for women, deficient childcare support and gender-focused labor policies. Addressing these issues would represent an essential increase for long-term equality.

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Abstract

This study examines the contemporary applicability of the Phillips Curve by exploring the empirical relationship between inflation and unemployment across ten countries representing a range of economic development levels, categorized by national gross income. Rooted in one of the most influential macroeconomic theories of the 20th century, the Phillips Curve posits an inverse relationship between inflation and unemployment. However, in light of evolving global economic dynamics—including financial integration, technological advancement, shifting labour markets, and unconventional monetary policy—there is growing debate regarding the validity and consistency of this relationship in the modern context.

Using macroeconomic data from 1990 to 2022 sourced from the World Bank, the study employs a non-linear regression framework to test whether the Phillips Curve holds in diverse national settings. Inflation is treated as the dependent variable, while unemployment, GDP growth, and interest rates are introduced as independent regressors to control for broader macroeconomic influences. By incorporating these control variables, the analysis isolates the specific relationship between inflation and unemployment within a more realistic and dynamic environment. The study does not presume the continued validity of the Phillips Curve; rather, it seeks to rigorously assess whether such a relationship remains statistically and economically significant in the current global landscape.

The results of this model analysis aim to contribute to the ongoing discourse on inflation dynamics, labour market interactions, and monetary policy effectiveness. In doing so, the study offers valuable insights seeking to understand the complexities of inflation targeting and employment stability in both advanced and developing economies.

Literature Review

The Phillips Curve has arguably been the most debated and investigated relation in macroeconomic theory. Originally suggested by A.W. Phillips in 1958, the curve proposed a stable inverse relationship between unemployment and wage inflation in the United Kingdom (Phillips, 1958). This empirical observation quickly became a cornerstone of Keynesian macroeconomics and later was used to explain the connection between price inflation and unemployment across countries. Its popularity arose from its simplicity and apparent policy implications: governments could theoretically choose a point on the curve to balance an inflation-unemployment trade-off, ceteris paribus. This concept provided economists and policymakers with a tangible paradigm with which to orchestrate the macroeconomy for most of the mid-20th century.

However, the stability of the Phillips Curve was put to test in the 1970s. The global economic experience of stagflation—high unemployment and high inflation simultaneously—tried the postulates of the curve. Milton Friedman and Edmund Phelps were among the first to question the traditional Phillips Curve, introducing the theory of adaptive expectations (Friedman, 1968; Phelps, 1967). They argued that in the

long run, the inflation-unemployment trade-off is not sustainable, as economic agents shift their expectations, hence the curve becomes vertical at the natural rate of unemployment. This perception resulted in the creation of the expectations-augmented Phillips Curve, which completely transformed how economists perceived inflation dynamics.

Over time, the empirical relevance of the Phillips Curve seemed to diminish further, particularly in advanced economies where inflation was low and stable regardless of increasing or decreasing unemployment rates (Stock & Watson, 2010). The recent resurgence of inflation after the COVID-19 pandemic, supply chain disruptions, and geopolitical conflicts has incited renewed interest in inflation modelling (Blanchard, 2016). These observations have prompted economists to reexamine whether the Phillips Curve, perhaps in a nonlinear or context-dependent formulation, retains any explanatory power for contemporary economies.

Phillips Curve Evolution and Empirical Dispute

Throughout the decades since its initial development, the Phillips Curve went through different theoretical modifications to accommodate empirical violations. Friedman and Phelps's expectations-augmented Phillips Curve introduced the effect of inflation expectations, which shifted over time through adaptive or rational mechanisms. In this modification, the curve could accommodate the collapse of the original trade-off that occurred under stagflation.

Later, the development of the New Keynesian Phillips Curve (NKPC) further explained the relationship by grounding it in microeconomic foundations. The NKPC contends that current inflation is not only a function of real marginal costs and unemployment, but also of forward-looking expectations (Gordon, 2013). Despite these advances, empirical applications of both the traditional and New Keynesian specifications have yielded mixed results, especially when applied to different countries and time periods.

A significant econometric literature has also attempted to consider the limitations of strictly linear model forms in modelling the true dynamics of the inflation-unemployment relationship. Others posit that the Phillips Curve must be nonlinear or even respond differently to the state of the economy (Ball & Mazumder, 2011; Turner & Artus, 2008). This has led to an increased interest in more flexible estimation methods and model forms in order to be able to trace out the structural properties of the curve more effectively.

Understanding Cross-Country Variations

Another key aspect of Phillips Curve research is the heterogeneity of inflation-unemployment relationships between countries. Independence of central banks, labour market flexibility, inflation targeting regimes, and credibility of monetary policy institutions can strongly affect the way in which inflation responds to unemployment changes. For example, highly credible central banks—like Germany or the United States—have less volatile inflation expectations and hence a more flat Phillips Curve. In contrast, poorly institutional countries that have a history of inflation volatility—like Turkey or

Brazil—will have steeper and nonlinear Phillips relationships.

In addition, demographic change, globalization, and technological change have been mentioned as long-run structural forces that are able to flatten or shift the Phillips Curve. Foreign competition and international supply chains can moderate domestic wage pressures, whereas aging populations can suppress demand-side inflationary pressures. These structural changes make it increasingly difficult to take for granted one Phillips Curve model to fit economies or even a single country through time. Therefore, empirical modeling must account for institutional, structural, and historical contexts to generate meaningful results (Stock & Watson, 2010; Blanchard, 2016).

Empirical Evidence from Diverse Economies

Understanding how the Phillips Curve operates in various economic settings entails looking at it through a broad cross-sample of countries. For instance, in the U.S. and the U.K., empirical evidence is likely to see flattening of the Phillips Curve in recent decades due to well-anchored inflation expectations and effective monetary policy institutions. Ball and Mazumder (2011) show that in the U.S., while the relationship remains, its slope has declined sharply since the 1990s.

Conversely, in countries like Turkey and Brazil, which have experienced periods of macroeconomic instability and high inflation, the Phillips Curve is steeper. In these locations, inflation responds more vigorously to unemployment changes, particularly when central bank credibility is in question or inflation targeting frameworks are not well established. Mexico is a special case: its adoption of inflation targeting in the early 2000s has made inflation volatility more subdued, but structural labour market problems continue to press on the inflation-unemployment trade-off.

The cases of India and South Korea, emerging economies, are even more complex. In India, supply shocks such as food and energy prices can conceal the traditional Phillips relation, while in South Korea, a highly export-oriented economy, global demand conditions have a tendency to influence inflation as much as domestic slack. And in older advanced economies such as Japan and Germany, which are faced with low inflation and an ageing population, the Phillips Curves are flat or statistically insignificant (Blanchard, 2016).

These cross-country nuances underscore the importance of employing panel data techniques that allow for heterogeneity in the inflation-unemployment relationship across countries and over time. The inclusion of these heterogeneous countries adds robustness and policy relevance to any findings regarding the Phillips Curve.

Econometric Modelling Accounting for Changing Variables

Recent studies have increasingly made use of panel data econometric methods to rethink the Phillips Curve. Panel data models allow researchers to control for unobserved heterogeneity across and within countries, improving the accuracy of estimations and external validity of estimates (Lucas, 1976).

These models are particularly useful when faced with macroeconomic data that cut across different countries with differences in institutional arrangements and economic structures.

The present research employs a panel data regression model to examine the empirical relevance of the Phillips Curve for ten economies that were chosen because of differences in their economic structure, inflation history, and stage of development. They are the United States, United Kingdom, Turkey, Brazil, Mexico, India, Germany, France, Japan, and South Korea. By estimating inflation to regress on unemployment and other control variables, this study hopes to determine whether there is a statistically significant link between the two, ceteris paribus.

Differing from existing research, which has primarily relied on linear specifications or structural models, this paper will focus on empirical estimation of the Phillips Curve using panel regression methods based on macroeconomic time series data from 1990 through to 2022. Other related subjects like inflation expectations, central bank independence, and labour market behaviour are touched on but are not seen as the focal point of the regression specification. The aim is to present empirical evidence on whether or not the Phillips Curve continues to hold today in the very heterogeneous economic environments and under what general conditions the relationship can be stronger or weaker.

Insights into the Literature Review

Even though the Phillips Curve has endured rigorous theoretical and empirical scrutiny, it remains at the centre of macroeconomic debate. Even if its initial promise as a tool of policy may have waned, the underlying question—whether inflation and unemployment are systematically correlated—is still germane. This study contributes to the literature by reassessing the Phillips Curve through a panel data econometric framework for a group of countries with varying economic histories. In doing so, it aims to cast further illumination on the curve's relevance today and suggests how best to embed this curve in future economic models and policy assessment.

If the Phillips Curve is discovered to hold in some circumstances but not in others, this can indicate the way forward: rather than rejecting the Phillips Curve altogether, economists and policymakers may need to embark on more flexible, empirically driven inflation-unemployment modelling. The results of this study will help clarify whether the Phillips Curve continues to have empirical applicability today—or whether it is, as some contend, a beast of the past.

Data Description

Data gathering in this paper entailed manual preparation of the utilized dataset by the author through publicly available macroeconomic data from multiple reputable sources, predominantly through the World Bank's World Development Indicators (WDI) database. Additional data were accessed from international economic organizations and government statistical agencies for involved countries if needed, including the International Monetary Fund (IMF) and OECD databases to supplement and ensure global coverage and

representativeness across countries. The last dataset is a ten-country United States, United Kingdom, Turkey, Brazil, Mexico, India, Germany, France, Japan, and South Korea macroeconomic panel data covering the period from 1990-2022.

The dataset includes the following key variables:

- Inflation rate (annual %)
- Unemployment rate (annual % of labour force)
- Interest rate (short-term, %)
- GDP per capita (current USD)
- Lagged values of all above indicators (first-order lags)

All the variables were collected over an annual basis and structured in balanced panel design form to enable fixed-effects, random-effects, and dynamic panel regression models. Particular attention was given to keep units standardized and constant over countries and time periods. In the event of two different sources being available for one variable, precedence was given to the World Bank to enable comparisons.

It was gathered and organized for the first time in Microsoft Excel, where initial structuring and cleaning were conducted. These included renaming and aligning variable names, time-series observation formatting, and missing and inconsistent value checks. Outliers and visible anomalies were identified and verified manually on the basis of economic plausibility and comparison of sources.

Once the entire dataset was duly formatted, the dataset was further imported into Stata 18 to carry out econometric work. Further steps of processing, including within Stata, panel structure definition using the xtset command, more checks for missing values, as well as construction of interaction terms and quadratic terms for nonlinear regresses, took place. The final dataset is consequently longitudinal and multivariate in character, enabling high panel data procedures to analyze the inflation-unemployment dynamics over periods and between countries.

The data preparation stage prioritized replicability, transparency, and reliability in order to ensure that all the subsequent regression outputs rely on a methodologically robust and uniform empirical basis.

Model Specification

Econometric Approach

This study uses a panel data regression analysis to examine how well the Phillips Curve can be applied to modern economies. The sample consists of ten countries for the years 1990-2022, which allows both for cross-country heterogeneity and time series variation. The main goal is to see whether inflation is systematically related to unemployment and whether this relationship still holds after controlling for other main macroeconomic variables.

A fixed-effects panel regression is used as the baseline specification to control for unobserved, time-invariant heterogeneity across countries—institutional arrangements, labour market institutions, or monetary policy regimes, for instance—that would otherwise distort results. This approach prioritises within-country variation over time, which is central to capturing the short-

and medium-term dynamics of inflation.

Functional Form and Variables

The basic structure of the model can be written as:

$$Inflation_{it} = \alpha_i + \beta_1 Unemployment_{it} + \beta_2 InterestRate_{it} + \beta_3 GPDpc_{it} + \epsilon_{it}$$

Where:

- $Inflation_{it}$ is the annual inflation rate
- $Unemployment_{it}$ is the unemployment rate
- $InterestRate_{it}$ is the short-term interest rate
- $GPDpc_{it}$ is GDP per capita
- α_i represents the fixed effect for each country
- and ϵ_{it} is the error term

To extend the dynamics, additional models include lagged variables, such as past unemployment and inflation values, to account for delayed effects. $Unemployment^2$ is also employed in certain models to account for possible nonlinearities in the relationship— an idea aligned with recent studies that suggest the Phillips Curve may be shallower at low inflation rates and steeper during periods of rapid inflation.

Model Assumptions

This panel data model is based on a set of standard econometric assumptions that help ensure the estimates are valid and meaningful.

First, the model assumes a linear relationship between inflation and the main explanatory variables: unemployment, interest rate, and GDP per capita. In other words, it expects that changes in these variables will have a consistent and measurable impact on inflation across countries and over time.

It also assumes that there is no perfect multicollinearity among the independent variables. This means that the model can distinguish the individual effect of each variable without confusion from overly strong correlations between them.

Another important assumption is strict exogeneity. This implies that the independent variables are not influenced by unobserved factors that affect inflation—especially those captured in the error term.

Finally, the model relies on the assumption that country-specific characteristics—such as institutional quality, labour market policies, or inflation history—remain constant over time and may be correlated with the explanatory variables. The fixed effects approach accounts for these unobserved factors by allowing each country to have its own intercept, which controls for its unique, time-invariant traits.

To support the choice of a fixed effects model over a random effects alternative, a Hausman test is conducted. A significant result from this test suggests that fixed effects provide more reliable estimates because the country-level differences are likely related to the regressors in the model.

Methodology

This research relies on panel data analysis to explore how inflation responds to key economic variables across ten countries from 1990 to 2022. The analysis was carried out

using Stata 18, a statistical software chosen for its robust capabilities in handling time-series and cross-sectional data.

The main estimation method is a fixed effects model, which is well-suited for controlling country-specific characteristics that don't change over time—things like legal institutions, labour market design, or central bank credibility. These underlying traits, while unobservable, could impact both inflation and the explanatory variables, so accounting for them is essential to avoid biased results.

To make sure fixed effects are appropriate, the model is compared to a random effects version using the Hausman test. A significant result from the test indicates that fixed effects are the better fit, as it suggests that country-specific differences are likely related to the variables being analysed.

The dependent variable in all models is the annual inflation rate. The key independent variables include the unemployment rate, the interest rate, and GDP per capita. Additional versions of the model incorporate lagged variables to test whether the effects of unemployment or inflation persist over time, and a squared unemployment term is added in some specifications to examine whether the relationship between inflation and unemployment is nonlinear. Before running the regressions, the dataset was properly formatted into panel structure using country and year as the identifying dimensions. This approach ensures the findings remain valid even if some of the more technical assumptions of the model are not perfectly met.

The methods used in this study are chosen to reflect both the structure of the data and the economic theory being tested. By focusing on within-country changes and controlling for differences across nations, this approach offers a clear and consistent way to evaluate whether the Phillips Curve continues to hold in today's global economy.

Results

This part presents the findings of eight panel regressions that estimate the interaction between inflation and unemployment in fixed and random effects specifications. Four fixed effects models (Models 1–4) and four random effects models (Models 5–8) were run. In all the models, inflation (INFLATIONR) is placed as the dependent variable, and control variables are combinations of unemployment (UNEMPRATE), its square (UNEMPRATE2), lagged unemployment (LUNEMPRATE), interest rate (INTERESTR), and GDP per capita (GDPPERC).

	(1)	(2)	(3)	(4)
	INFLATIONR	INFLATIONR	INFLATIONR	INFLATIONR
UNEMPRATE	-0.201**	-0.991***		
	(-3.09)	(-3.68)		
INTERESTR	0.136***			
	(5.82)			
GDPPERC	0.0734			
	(1.68)			
UNEMPRATE_		0.0553**	-0.00865	0.00230
		(3.06)	(-1.85)	(0.29)
L.UNEMPRAT_				-0.198
				(-1.62)
_cons	3.698***	7.461***	4.177***	4.790***
	(5.32)	(6.46)	(5.97)	(5.64)
N	300	300	300	288

Table 1. Fixed Effects Regression Results —

Phillips Curve Models. Standard errors in parentheses. Statistical significance is indicated as follows: $p < 0.10$ (), $p < 0.05$ (), $p < 0.01$ ().

Fixed Effects Models

Model 1: Baseline Phillips Curve

The unemployment rate is negatively associated with inflation (−0.201), and this relationship is statistically significant at the 1% level. This result supports the classic Phillips Curve theory, which suggests that higher unemployment is associated with lower inflation. The interest rate is also positively and significantly associated with inflation (0.136, $p < 0.001$), likely reflecting the fact that monetary tightening tends to follow inflationary pressures. Lastly, the coefficient on GDP per capita is positive (0.0734), but not statistically significant.

Model 2: Adding Non-Linearity

This model extends the baseline by adding a squared term for unemployment to capture potential nonlinearity. The linear unemployment rate remains negative and highly significant (−0.991, $p < 0.001$), while the squared term is positive and statistically significant (0.0553, $p < 0.01$). This pattern indicates a concave Phillips Curve, meaning that inflation decreases with rising unemployment but at a diminishing rate. This model supports the idea that the trade-off between inflation and unemployment weakens as unemployment rises over time.

Model 3: Squared Term

Model 3 contains the quadratic term by itself, excluding the linear term. The coefficient on the unemployment squared term is negative (−0.00865), but barely significant ($t = -1.85$). Without a linear term, the interpretation of this model is potentially incomplete. The results here suggest that using an inflation modelled only with the quadratic term is not necessarily indicative of the relationship, more specifically, the negative relationship between inflation and unemployment.

Model 4: Lagged and Non-Linear Terms

The last (fixed effects) model includes the unemployment squared term plus a one-period lag in unemployment to test for dynamic impacts. The lagged unemployment coefficient is negative (-0.198) and indicates that higher past-year unemployment may lower current inflation, though the statistical significance of this effect ($t = -1.62$) is not met. The squared unemployment term is close to zero (0.00230) and also insignificant, which suggests weak evidence for either nonlinearity or lagged dynamics in this specification.

Random Effects Models

	(1)	(2)	(3)	(4)
	INFLATIONR	INFLATIONR	INFLATIONR	INFLATIONR
UNEMPRATE	-0.201**	-0.991***		
	(-3.09)	(-3.68)		
INTERESTR	0.136***			
	(5.82)			
GDPPERC	0.0734			
	(1.68)			
UNEMPRATE		0.0553**	-0.00865	0.00230
		(3.06)	(-1.85)	(0.29)
L.UNEMPRAT E				-0.198
				(-1.62)
_cons	3.698***	7.461***	4.177***	4.790***
	(5.32)	(6.46)	(5.97)	(5.64)
N	300	300	300	288

Table 2. Random Effects Regression Results — Phillips Curve Models. Standard errors in parentheses. Statistical significance is indicated as follows: $p < 0.10$ (), $p < 0.05$ (), $p < 0.01$ ()

Model 5: Baseline Phillips Curve

Model 5 (n.1) sets inflation against unemployment, interest rate, and per capita GDP with a random effects specification. The unemployment coefficient is −0.201 and statistically significant at the 1% level ($p < 0.01$), as hypothesized by the Phillips Curve hypothesis. This implies that a one-percentage-point higher average unemployment rate reduces inflation by 0.201 percentage points. The interest rate is also strongly and positively related to inflation (0.136, *$p < 0.001$), and GDP per capita indicates a very slight positive impact (0.0734), though not statistically significant.

Model 6: Adding Non-Linearity

Unemployment remains strongly negative (−0.991, *$p < 0.001$), while the squared term is positive and significant (0.0553, $p < 0.01$), confirming a concave (nonlinear) relationship.

Model 7: Squared Term

Including only the squared unemployment term yields a negative coefficient (−0.00865), marginally significant. Interpretation is limited without the linear term.

Model 8: Lagged and Non-Linear Terms

Lagged unemployment is negative (−0.198) but not significant. The squared term is near zero and insignificant, showing poor evidence of either dynamic or nonlinear influences of this form.

A Deeper Comparison Between Effects

The results are virtually the same in the fixed and random effects specifications (Models 1–4 and 5–8) in terms of coefficient magnitudes, signs, and significance levels. For example, the coefficient on unemployment in both Model 1 (FE) and Model 5 (RE) is −0.201 and significant, and interest rate and GDP per capita have identical estimates and significance levels. This holds for the nonlinear and lagged specifications throughout.

Despite this numerical equality, a Hausman test was conducted to check statistically if the assumptions of random effects are fulfilled—i.e., if the unobserved individual (country-specific) effects are uncorrelated with the regressors.

$Chi^2(0) = 0.00$

This outcome means that the variance-covariance matrix required for the test could not be derived because the coefficients under FE and RE were functionally the same. In such a case, conventional econometric practice is to rely on theory rather than the statistical outcome alone. As country-specific characteristics are most likely to be associated with other factors such as unemployment or interest rate, the conditions on which the random effects model rests are not fully met. Therefore, in this econometric estimation, fixed effects specification was preferable.

Discussion

The findings of this study validate the primary research question: the Phillips Curve relationship between inflation and unemployment remains valid in the modern-day economic setting, but in a more nuanced way. In fixed effects and random effects models, unemployment consistently has a negative effect on inflation, particularly in the base linear specifications. This is what is expected with the traditional Phillips Curve hypothesis that higher unemployment would reduce inflation, ceteris paribus.

But the existence of a squared unemployment term reveals substantial nonlinearity in the relationship. The estimates suggest a concave curve, meaning that unemployment has its maximum effect on inflation when unemployment is low and gradually less as unemployment rises. This is consistent with contemporary evidence suggesting that the Phillips Curve has been flatter during recent decades as a result of factors like inflation targeting, expectations, and shifts in labour markets.

Although fixed and random effects models gave essentially the same results, fixed effects specification was used on grounds of theory as well as the inability of the Hausman test to provide a categorical statistical preference. Country-specific issues are more likely to affect inflation and unemployment simultaneously, and fixed effects are, therefore, more reliable.

That apart, the research has some flaws. The sample, though homogenous and balanced, consists of just ten countries and may not accurately represent the changes in inflation behaviour. The annual observations limit the ability to detect short-run fluctuations, and variables such as inflation expectations, wage mechanisms, or external shocks were not included in an explicit way. Despite these constraints, the analysis provides strong empirical support for a modern, nonlinear conception of the Phillips Curve in various economic environments.

Conclusion

This study is evidence that a Phillips Curve model, where unemployment has a broadly negative relationship with inflation, could still be present in economies. However, its impact is not invariably strong across all model specifications, and statistical significance varies. The evidence of a non-linear relationship, reflected in the presence of the significant squared unemployment variable, suggests that the trade-off between inflation and unemployment reduces at higher unemployment rates. Lagged unemployment also has some influence, although the effect is not significant.

These results imply that while conceptually

the Phillips Curve remains valid, strict use in policy contexts should not be recommended. Inflation's impact is more reliable through interest rates, and therefore, there is still a relevant role for monetary policy in maintaining price stability. Policymaking should be a flexible, evidence-based approach weighing both labour market conditions as well as broader macroeconomic factors that might be affecting a countries' economy. Overall, this analysis reaffirms the need for nuanced interpretation and cautious application of the Phillips Curve in modern economic decision-making.

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Introduction

Mexico's financial system is characterized by a bank-centered structure in which commercial banks play a crucial role as well as other entities, such as pension and investment funds. The financial entities within Mexico's financial system are supervised and regulated by the Comisión Nacional Bancaria y de Valores (CNBV) with the aim for stability and proper functioning. (Secretaría de Haciendo y Crédito Público, n.d.)

As of June, 2025, Mexico's financial system was suddenly affected by the joint actions by financial regulators and international bodies involving Intercam Banco, CI Banco, and Vector Casa de Bolsa. These three financial institutions were targeted by the United States' regulatory authority FinCEN and charged with money laundering related to drug trafficking. These events have led to operational shifts and market turbulence, as well as many distressed clients wondering whether their money is safe. Additionally, the CNBV "decreed an intervention that does not imply the suspension of operations, but rather direct supervision and control over the key administrative decisions of the previously financial institutions through the aforementioned intervention." (Abdo, 2025)

In today's financial systems, trust is one of the most important aspects banks and other financial institutions must preserve in order to be a successful business. Although Intercam, CI Banco, and Vector were not declared bankrupt or criminally convicted in Mexico, the damage to their reputation triggered quick repercussions, including client withdrawals, severed institutional relationships, and credit downgrades.

This article intends to present an in-depth analysis of the recent regulatory interventions involving Intercam Banco, CI Banco, and Vector Casa de Bolsa, while also examining the ethical implications of their alleged actions. The overall aim of this article is to inform readers about the current events regarding these three financial institutions, as well as to provide valuable insight into Mexico's financial system, its regulatory government agencies, and investor takeaways and lessons from these events.

Timeline of Events

The following timeline of events takes into account the incidents occurring since the initial sanctions imposed by FinCEN in June 2025, to the broader financial and reputational consequences observed throughout July 2025. This timeline aims to provide a clear chronological understanding of how these incidents unfolded, offering context to the escalating impact on the institutions involved and the financial sector as a whole.

June 25, 2025

- FinCEN sanctions Intercam, CI Banco, and Vector as "primary money laundering concerns" linked to fentanyl precursor transactions (Ritch Mueller, 2025)
- The CNBV intervenes in the management of all three institutions to protect depositors and prevent instability (Peralta et al., 2025)

June 26, 2025

- Clients begin withdrawing funds
- Credit rating agencies downgrade Intercam and CI Banco (Suárez et al., 2025)
- The CNBV and Hacienda transfer fiduciary operations from Intercam
- [1] (Raziel et al., 2025)

July 4, 2025

- Mexico's Ministry of Finance and Public Credit (SHCP) stated that "a process has been initiated to split the trust business of both institutions [Intercam and CI Banco]" (Secretaría de Hacienda y Crédito Público, n.d.)

July 5, 2025

- Finance Ministry announces continued transfer of fiduciary services to state banks and outlines plans for eventual private takeover (*Mexico Temporarily Hands CIBanco, Intercam Trust Businesses to Development Banks*, 2025)

July 9, 2025

- U.S. Treasury grants a 45-day delay on full enforcement of sanctions until September 4, 2025, following cooperation by Mexican regulators and CI Banco to development banks like Nafin and Banobras (Suárez et al., 2025b)

July 2, 2025

- Media exposes Vector's 2017 link to over 100 million pesos directed through cartel shell companies

  (*US Extends Deadline for Fentanyl Sanctions on Three Mexican Financial Institutions*, 2025)

- ABM and CNBV reiterate confidence in the stability of the Mexican financial system, stating no systemic risk (Peralta et al., 2025b)

July 15, 2025

- Fitch Ratings downgraded the long- and short-term counterparty risk ratings of Intercam Banco, CI Banco, and Vector Casa de Bolsa from 'B' to 'CCC' for long-term and from 'B' to 'C' for short-term. At the same time, Fitch withdrew these ratings, as it "will no longer monitor the ratings of Vector CB, CIBanco, Intercam Banco". (FitchRatings, 2025)

Intercam Banco, CI Banco, and Vector Casa de Bolsa

Firstly, **Intercam** is a Mexican financial group made up of three financial institutions

[1] A cartel shell company is a business entity that exists mainly on paper. It usually has no real operations or assets, but is used to hide illegal activities like money laundering or to move illicit funds through the financial system. (Ughade, 2025)

(Intercam Banco, Intercam Casa de Bolsa y Intercam Clearing) focused on serving companies and individuals involved in international trade and tourism. It operates in four main areas: foreign exchange and international payments, asset and wealth management, hedging products, and foreign trade financing. It also provides insurance and surety consulting services. (*Anuario Financiero De La Banca De México: Interbanco*, 2012) However, after the recent discoveries made by FinCEN, Intercam Banco was linked to the money laundering of more than one million U.S. dollars. As stated by Santangelo (2025), "From 2021 to 2024, a Chinese company associated with precursor chemical shipments reportedly received more than $1.5 million via Intercam from Mexican counterparties."

Secondly**, CI Banco** is a Mexican financial institution that offers a wide range of banking and investment services. It focuses on both personal and corporate banking, with services that include traditional banking products, investment services and corporate services. (CI Banco, n.d.) This financial institution was also linked to the transfer of illegal funds; for example, in 2023, a CI Banco employee helped set up an account to launder $10 million for a Gulf Cartel member, and between 2021 and 2024, the bank processed over $2.1 million in payments from Mexican companies to Chinese suppliers of precursor chemicals for illicit activities. (*Treasury Issues Historic Orders Under Powerful New Authority to Counter Fentanyl*, 2025)

Lastly, **Vector Casa de Bolsa** is a Mexican financial institution described as a "full-service broker dealer and wealth manager with specialized products and services designed for individual investors, companies, institutional funds, government and foreign investors." (Vector, 2025) Vector was also linked to the transfer of illegal funds, amounting to over an astonishing $40 million U.S. dollars which likely facilitated illicit opioid trafficking by the Sinaloa Cartel. "FinCEN has further determined that between 2013 and 2019, a business controlled by Garcia Luna conducted transactions with Vector totaling more than USD 40 million." (*Imposition of Special Measure Prohibiting Certain Transmittals of Funds Involving Vector Casa De Bolsa, S.A. De C.V.*, 2025)

FinCEN determined that all three financial institutions have "a history of suspected ties to international DTOs and facilitation of transactions on their behalf". (FinCEN, 2025) As stated in the timeline above, the consequences faced by Intercam, CI Banco, and Vector include the prohibition of transmittals of funds, millions of pesos in fines imposed, and the downgrading of their ratings. Additionally, as stated by El

	Intercam Banco	CI Banco	Vector Casa de Bolsa
Primary Cartel Ties	Cartel Jalisco Nueva Generación (CJNG)	Gulf Cartel, CJNG, Beltrán Leyva Organization (BLO)	Sinaloa Cartel, Gulf Cartel
Known Transactions	> US$1.5 million	US$12.1 million + total identified	> US$41 million
FinCEN Description of Involvement	Provided financial services "instrumental" to DTOs; executives met with CJNG to discuss laundering	Known facilitation of DTO transactions; multiple cartel-linked clients; internal staff complicit	Repeatedly facilitated suspicious transactions; ranked among Mexico's top 10 in illicit transaction volume
Fines Imposed	$92.15 million pesos	$66.61 million pesos	$26.46 million pesos
FinCEN Sanction (2313a Order)	U.S. financial institutions prohibited from sending or receiving funds involving these three financial institutions.		

Table 1. Summary of FinCEN sanctions and alleged criminal ties of Intercam Banco, CI Banco, and Vector Casa de Bolsa.

The fines imposed on these institutions were filed by the CNBV on due to "irregularities in anti-money laundering controls and other

violations of the law". (Gutiérrez, 2025) The U.S. Department of Treasury has stated that U.S. financial institutions have until September 4, 2025 to fully block or stop any transactions related to these three institutions. (*Treasury Issues Historic Orders Under Powerful New Authority to Counter Fentanyl*, 2025)

This means that the banks are cut off from the U.S. financial system and they can no longer process payments through U.S. banks or settle in U.S. dollars. This isolation can severely affect their ability to operate internationally, damage client trust, and limit their capacity to handle foreign transactions. And though investors are not legally prevented from withdrawing funds after that date, practical barriers may make withdrawals slower, riskier, or more limited, especially across borders.

Regulatory Action in Mexico

In Mexico, regulatory actions by authorities such as the CNBV or Banxico are typically triggered by factors such as financial instability or liquidity issues, breach of regulations or compliance failures, operational risks, reputational or legal risks, or external sanctions or international compliance issues. (*Class Actions in Mexico*, 2018)

For Intercam Banco, CI Banco, and Vector Casa de Bolsa, the regulatory action in June 2025 was primarily triggered by (1) **external sanctions:** FinCEN labeled them as "primary money laundering concerns," alleging links to transactions tied to fentanyl precursors, and (2) **reputational and compliance risk:** these allegations raised serious concerns about their AML and KYC controls[2], prompting the CNBV to intervene to protect clients and prevent financial instability.

It is crucial to understand concepts such as credit ratings, reserve requirements, and fund protections in order to fully understand the aftermath of these events. Firstly, credit ratings are one of the primary tools investors use to measure the financial health and reliability of a bank or brokerage. A downgrade, as seen recently with Intercam, CI Banco, and Vector, signals increased financial and operational risk, encouraging investors and clients to reconsider their exposure. Furthermore, reserve requirements serve as a safety margin to ensure banks maintain enough liquidity to withstand sudden withdrawals. However, when institutions are linked to illicit activities, such as in this situation, no level of reserves can fully lessen the reputational risk that triggers bank runs, as was seen after FinCEN's 2313a Orders. Finally, fund protections, like the IPAB coverage in Mexico (up to 400,000 UDIs), provide a safety net for depositors if a bank fails. However, this protection has limits and does not cover all types of investments or accounts, such as those managed by Vector Casa de Bolsa since it is a brokerage institution rather than a bank. (*Condusef Contenido*, n.d.) This means that while traditional savers might be protected, investors could face losses if such institutions collapse under regulatory or reputational pressure.

[2] AML: Anti-Money Laundering. KYC: Know Your Customer. (IDnow, 2024)

Market Reactions and Ethical Implications

A survey conducted by *Mexico News Daily* shares the amount of clients that were affected by each of these three institutions after the money laundering scandal. Based on their results, Intercam had the highest percentage of impacted clients (75.5%), while Vector had the lowest percentage of affected clients (0.49%). Around 10% of Intercam customers said they were closing their accounts, while only 7% of CI Banco customers said that they were closing their accounts. As for Vector, only one survey respondent said they were a client of Vector, and they said they were keeping their account with Vector. (MND Staff, 2025)

Although this survey provides some insight into customers' reactions to the recent events, its sampling bias makes it unlikely to reflect the true proportions of all clients, as only 204 people responded. Since there is no available data on the total number of clients for Intercam, CI Banco, and Vector, a better survey would require several thousand responses to provide more representative results. Small samples may create misleading results which lead to misinformation and biased interpretations, so it is crucial for all individuals to conduct thorough investigations before reaching conclusions or making decisions. Due to the novelty of this situation, obtaining a greater sample will take time, but based on this survey we can appreciate how investor confidence was not greatly affected, for the majority of clients intend on keeping their accounts open or remain unsure on what to do.

The recent allegations regarding Intercam Banco, CI Banco, and Vector Casa de Bolsa raise serious doubts about the integrity, oversight, and accountability of Mexican financial institutions. When banks and brokerages are linked to money laundering schemes associated with drug cartels, questions emerge about whether they prioritize growth over integrity.

Clients and investors trust that financial institutions operate within ethical and legal boundaries. This trust is reinforced by regulatory frameworks and the expectation that banks will protect their funds. These events not only destroy public trust in the institutions involved, but also defy the effectiveness of regulatory entities. Moreover, they highlight the greater risks to the financial system, for reputational damage, sanctions, and operational restrictions can impact the credibility of Mexico's financial system as a whole.

The ethical implications are significant: betrayal of the trust of clients who expect transparent and lawful financial management, enablement of criminal activity by providing financial pathways, and the creation of systemic risks. The main questions arising about Mexico's financial system include: *Will these cases change how regulators supervise the sector?* and *Should more transparency be required from financial institutions?*

The CNBV's intervention raises a key debate on whether it was a show of regulatory strength or a reactive move brought on by U.S. pressure. Although the rapid response could be seen as crucial action to protect clients and maintain financial stability, the timing raises questions. Enforcement came immediately after U.S. authorities publicly labeled Intercam, CI Banco, and Vector as

"primary money laundering concerns." This leads to criticism over whether domestic regulators were already aware of the risks but failed to act until international pressure made inaction unjustifiable. This tension highlights a bigger question about Mexico's financial oversight: *Are regulators consistently proactive, or are they simply reacting to outside pressure?*

Investor Takeaways

This case study demonstrates a lesson and an opportunity for investors to evaluate the financial institutions they invest their money in. As previously established, there is no way to fully guarantee that an institution will be completely ethical, compliant, and ____. However, assessing the safety of your financial institution can prove to be an effective way to obtain an idea of its long-term future, as well as that of your investments. Some methods to assess the safety of such institutions include the following:

1. Checking the institution's credit rating: ratings such as AAA(mex) represent a strong level of financial health, whereas ratings such as CCC(mex) signal high vulnerability.

2. Reviewing financial strength indicators, such as capital adequacy, liquidity ratios, and regulatory compliance history, which are often published in public reports or available via the CNBV.

3. Confirming whether the institution is backed by protections like IPAB for banks (though it does not cover brokerages like Vector).

4. Looking into media reports and regulatory alerts such as those issued by FinCEN.

There are a few red flags that an investor can look for in order to spot warning signs before it is too late. One major red flag is a lack of transparency, especially in how an institution reports on its financials, governance structure, or internal controls. Investors should also be cautious of institutions that promise high returns with little risk. Lastly, another red flag is frequent management turnover, which can indicate instability or deeper internal issues.

Despite being able to assess the safety of a financial institution and being cautious of potential red flags, an investor is never fully safe from the potential downfall of their bank or brokerage institution. In this case, all three institutions had a AAA(mex) rating and managed to end up in this multinational offense leading to sanctions, rating removal, and other consequences. That is why, in situations such as this one, it is important for all individuals to remain informed regarding their investments and the institutions that are managing their money. It is crucial for any investor, not only to be informed, but also diversify their assets. Everybody knows about the importance of diversification but its reasoning might not be fully understood until one faces a situation such as this one.

Although investors' funds were not directly lost or seized as a result of the sanctions, the reputational damage surrounding Intercam, CI Banco, and Vector induced widespread fear and uncertainty, leading many clients to

withdraw their money. These sudden and large numbers of withdrawals triggered bank runs and placed additional pressure on the institutions' liquidity and operations. In any case, quick action stands as any investor's best defense against the loss of capital, whether due to regulatory sanctions, reputational crises, or market volatility.

Conclusion

As of June 2025, Intercam Banco, CI Banco, and Vector Casa de Bolsa were all linked to the transfer of illegal funds associated with money laundering. This unexpected situation was first flagged by the U.S. financial intelligence unit as it imposed sanctions on all three financial institutions. These sanctions were then subsequently acknowledged by the CNBV by initiating investigations and imposing regulatory penalties.

Regulatory action in Mexico is typically triggered by issues such as financial instability, compliance failures, or external sanctions. In the case of Intercam, CI Banco, and Vector Casa de Bolsa, the CNBV intervened after U.S. authorities labeled them as major money laundering concerns, raising alarms over their compliance and reputational risks. Understanding the implications requires knowledge of credit ratings, reserve requirements, and fund protections.

A recent survey revealed that only the minority of the respondents are planning to close their accounts with their respective institution, whereas the majority would be keeping their account or are unsure as to how to proceed. These events cast doubt on the integrity and oversight of Mexico's financial system, especially given that domestic regulators seemed to react only when prompted by U.S. pressure. When institutions are linked to cartel-related money laundering, it undermines public trust and exposes systemic vulnerabilities. The recent events serve as a reminder that even regulated financial institutions can become implicated in illicit activity. That is why it is important for investors to remain informed about their financial institutions and look out for potential red flags.

Due to the ongoing nature of the investigations and regulatory actions involving Intercam, CI Banco, and Vector Casa de Bolsa, this article reflects the most accurate and latest information available as of August 05, 2025. However, given that new findings and consequences may continue to emerge, future developments may portray parts of this analysis as incomplete.

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Abstract

This paper examines empirical studies on the impact of the COVID-19 pandemic on the labor market outcomes of Mexican workers, using data from the "Encuesta Telefónica sobre COVID-19 y Mercado Laboral (ECOVID-ML)" during April to July 2020. The review aims to quantify the evidence on how working hours have been affected across multiple variables, including gender, age, sector, company size, home office status, labor market formality, education, employment status, and work experience. Preliminary estimates indicate that during the months of the survey, Mexicans worked on average twenty-two hours less per week. The effect is different across sectors and conditional on personal characteristics. Keywords: COVID-19, labor market outcomes, Mexican workers, ECOVID-ML, working hours, wages, policy implications.

Introduction

The COVID-19 pandemic caused changes in labor markets worldwide, and Mexico was no exception. This study investigates how the pandemic impacted working hours in Mexico, focusing on the early stages of the crisis (April–July 2020). Specifically, this paper quantifies the change in weekly working hours during Mexico's April–July 2020 lockdown and examines heterogeneity by gender, age, employment formality, education level, job status, and month. We aim to quantify changes in hours worked during the pandemic's lockdown and identify which factors are associated with these changes. Specifically, how these effects may have differed for men vs. women, formal vs. informal workers; those with secondary or less, and tertiary school level; those that are employers, employees and self-employed; and compare these differences across these months and analyze the recovery of June and July compared to the lockdown season, April and May.

Objectives and Scope of Analysis

The scope of the analysis is limited to the period of April through July 2020, using microdata from Mexico's *Encuesta Telefónica sobre COVID-19 y Mercado Laboral (ECOVID-ML)*, a nationally representative telephone survey implemented when the regular labor force survey was suspended. By analyzing this dataset, we seek to analyze in short term the labor market adjustments in Mexico during the pandemic and provide evidence to inform for future economic recovery policies.

Literature Review

Global Labor Market Impact of COVID-19

A World Bank policy note documented that at the onset of the pandemic, nearly 48% of Latin American workers ceased working, at least temporarily, and that average labor income in the region declined by around 10% (World Bank, n.d. The International Labor Organization (2020) reported that global working hours in Latin America and the Caribbean fell sharply during 2020, with second-quarter hours estimated to be 16% lower than those of the previous year, an effect equated to approximately 39 million full-time job losses. A World Bank policy note showed that 48% of Latin American workers stopped working, at least temporarily, and that the average labor income in the region fell by around 10% (World Bank, n.d. According to estimates from Statista (n.d.), South America

lost over one-third of total labor hours in Q2 2020 due to COVID-19 restrictions. Collectively, these findings underscore the magnitude of the aggregate shocks that disrupted labor markets during the early stages of the pandemic.

The Mexican Labor Market: Differential Impacts

Research focusing on Mexico reveals that the COVID-19 "Great Lockdown" resulted in an immediate and steep decline in employment and working hours. Balmori de la Miyar et al. (2022) found that in April 2020 when strict confinement measures were first imposed nationwide employment in Mexico dropped by approximately 17 percentage points, while average weekly hours decreased by nearly 13 hours relative to pre-pandemic levels. Although a partial rebound occurred by mid-2020, recovery remained uneven; by the second quarter of 2021, men's employment nearly returned to pre-pandemic levels, whereas women's employment continued to lag.

Gender disparities are a prominent feature of the pandemic's impact in Mexico. Evidence from other countries suggests that pandemic recessions have disproportionate effects on women, in a phenomenon sometimes labeled a "she-cession" (Alon & Tertilt, 2020). Using ECOVID-ML data, Castañeda-Navarrete et al. (2020) demonstrated that women in Mexico suffered declines in both employment and working hours compared to men. Their analysis indicates that female labor force participation dropped significantly and recovered more slowly due to increased childcare and domestic responsibilities during school closures. Complementing these findings, García and Badillo (2021) noted a surge in the burden of unpaid care work among Mexican women, further hindering their capacity to maintain paid work (see Bidegain, Scuro, & Vaca Trigo, 2020, as cited in García & Badillo, 2021).

Another important dimension is the distinction between formal and informal employment. During the pandemic, the International Monetary Fund (n.d.) has highlighted that informal and self-employed workers were the primary drivers of employment losses in Latin America. In Mexico, approximately 85% of net jobs lost in Q2 2020 occurred in the informal or non-salaried sector, underscoring the increased vulnerability of workers lacking job security and adequate social protection.

Furthermore, remote work in Mexico has been limited, and the feasibility of remote work in Mexico has been limited. Estimates indicate that only approximately 10% of jobs in Mexico can realistically be performed remotely (Banxico, n.d.). Only 23.5% of employed individuals reported working from home in the ECOVID-ML April 2020 survey, which supports this limited telework capacity. By July 2020, however, 85% of the workforce still did not have the equipment or conditions necessary for telework (INEGI, n.d.; Global Health Sciences, n.d.). Many workers were forced to cease working temporarily or reduce their hours due to business closures and mobility restrictions.

Synthesis and Research Implications

Prior studies have concluded that COVID-19 induced an unprecedented contraction in labor market activity globally, and especially in Mexico. The impacts were heterogeneous, with pronounced effects on women, younger

workers, and those employed in informal sectors. The evidence suggests that the pandemic not only exacerbated existing labor market vulnerabilities, but also highlighted structural challenges such as limited telework capacity. Researchers should expect to see declines in working hours during the initial lockdown period (April–May 2020), followed by a partial and uneven recovery influenced by gender, sector, and the ability to work remotely.

Data Description

This study employs microdata from the Encuesta Telefónica sobre COVID-19 y Mercado Laboral (ECOVID-ML), a telephone-based labor force survey conducted by INEGI (Mexico's National Institute of Statistics and Geography) during the COVID-19 pandemic. The ECOVID-ML was developed as an alternative to the regular household labor survey (ENOE), which was suspended in April 2020 due to health contingencies. The dataset comprises four monthly cross sections, from April through July 2020. Each derived from a random sample of approximately 50,000 to 56,000 telephone numbers. The survey targeted adults aged 18 and older who have access to either landlines or mobile phones, making the data nationally representative of the population with telephone access (Journal of Public Governance, n.d.).

The survey asked respondents about their employment status, how many hours they worked in the reference week, income changes, and other work changes related to the COVID-19 crisis, such as working from home, closing businesses, or getting government help. Sampling weights were provided to adjust the estimates to national labor force totals. Although the survey may underestimate the very poorest households without telephone access, high phone penetration in Mexico ensures that the ECOVID-ML captures a large share of the labor force.

Time Frame and Context

The period from April to July 2020 is particularly significant because it covers the strictest phase of the lockdown (April–May) and the beginning of a gradual reopening (June–July). During April and May 2020, non-essential businesses were largely closed nationwide, and mobility was severely restricted, whereas some economic activities resumed by June and July. This timeline allows researchers to observe both the immediate shock to the labor market and the early signs of recovery.

Data Cleaning and Preparation

We started dropping observations for workers "without pay" (where PE3 equals "6") and those categorized as "unemployed" (where PC1_4 equals "4"). This step removes observations that do not meet the study's focus on active labor market participants.

Converting string representations of numeric values (for variables such as PE10_1 and PE12_1, representing hours worked last week and regular hours, respectively) into numeric values. Cases with missing values in these fields are dropped.

Identification and removal of outliers: Standardized (z-score) versions of the hours variables are created and observations more than 1.5 standard deviations from the mean are dropped.

Only the variables relevant to the analysis are kept. The initial dataset is then reduced to include variables such as PB1 (gender), PB2 (age), PB3 (schooling level), PE3 (position), PE15 (informality), and month. The variables are then recoded appropriately (for example, recoding gender so that "2" becomes "0", recoding firmsize into categories, and grouping schooling levels into a new variable called schoolvl). A new variable "hrsdiff" is generated to measure the difference in working hours (rhrswrk minus hrswrklw). Additionally, a quadratic term "age2" is generated as the square of the age variable to capture potential nonlinearity in the effect of age.

Observations with missing values in critical fields (such as hours worked, employment status, or gender) were dropped to ensure consistency for regression analysis. Item nonresponse was low; fewer than 2% of respondents omitted key information on hours or income. Outliers in the hours variable (e.g., reported work hours exceeding 100 per week) were removed, affecting only a few cases. After cleaning, the pooled dataset contains approximately 3,766 observations, averaging 942 observations per month which, when weighted, represent an estimated 32 to 36 million employed individuals.

Summary Table:

Variable	Obs	Mean	Std. dev.	Min	Max
gender	3766	0.551779	0.497378	0	1
age	3766	40.73712	12.5609	18	80
age2	3766	1817.247	1103.443	324	6400
informal	3766	0.514073	0.499868	0	1
schoolvl	3766	1.028147	0.863763	0	2
position	3766	0.564259	0.869728	0	2
month	3766	2.626394	1.010875	1	4
HrswrkIW	3766	21.01779	10.62018	1	46
hrswrk	3766	43.25146	8.539959	21	63

(Table 1, Summary table of all the variables of interest)

Gender, Age, Informal, Schoolvl, Position, and month are statistically significant, so we proceed with the formulation to create the quadratic equation for the estimations of hours prediction.

Model Specification

The analysis is built around estimating a quadratic regression model aimed at explaining the "change in working hours" (denoted by hrsdiff across age) as a function of various socio-demographic and employment characteristics. The model is specified as follows:

Estimation Method:

- The primary estimation is performed using Ordinary Least Squares (OLS) regression. In Stata, the command used is:

reg hrsdiff gender age age2 informal schoolvl position month, robust

Robust standard errors are employed to mitigate heteroskedasticity concerns. An alternative specification using factor variable notation (i.gender, i.age, etc.) is also estimated to check for robustness and to address any issues related to collinearity (especially with age and age2).

$$hrspredict_i = \beta_0 + \beta_1 \cdot gender_i + \beta_2 \cdot age_i + \beta_3 \cdot age2_i + \beta_4 \cdot informal_i + \beta_5 \cdot schoolvl_i + \beta_6 \cdot position_i + \beta_7 \cdot sector_i + \beta_{10} \cdot month_i + u_i$$

Key points in this specification include:

- Dependent Variable:

- hrsdiff: Defined as the difference between "regular hours worked per week" (rhrswrk) and "hours worked last week" (hrswrklw). This variable captures the change in working hours (for example, due to shifts in work patterns during a given period).

- hrspredict: Defined as the prediction of the hours difference for each individual. This variable captures the prediction change in working hours.

- Independent Variables:

  - gender: Originally coded as a numeric variable and then recoded (with the convention that 0 indicates "female" and 1 indicates "male"). This variable is used to assess differences in working hours between genders.

  - age: A continuous variable measuring the worker's age. A squared term (age2) is created to capture a nonlinear (curvilinear) effect, reflecting that the relationship between age and hrsdiff may not be strictly linear.

  - informal: An indicator variable (0 for formal and 1 for informal) that distinguishes between formal and informal employment arrangements.

  - schoolvl: A categorical variable recoded from the original schooling level indicator, grouping educational attainment into three levels (elementary, secondary, tertiary).

  - position: A categorical variable that differentiates job status (e.g., employees, employers, self-employed) after recoding the original variable.

  - month: A variable indicating the survey month (coded numerically for April, May, June, July) to capture potential time effects.

Functional Form & Assumptions:

- The model is linear in parameters. The inclusion of both age and age2 allows for a quadratic (nonlinear) relationship with hrsdiff.

- Standard OLS assumptions are assumed to hold for consistent estimation—linearity, correct specification (conditional mean independence), and, when using robust standard errors, allowance for heteroskedasticity.

- The null hypotheses for each coefficient are that the corresponding β is equal to zero, implying no effect on hrsdiff.

- The overarching research question is to determine which factors (demographic and job-related) are statistically significant determinants of changes in working hours.

Econometric Techniques and Tests:

- Standard hypothesis testing is conducted using t-statistics for each coefficient. For each independent variable, the null hypothesis tested is $H_0: \beta_i = 0$.

- The p-values indicate whether each variable's effect is statistically significant at conventional levels (typically 5%) except for wrkhome and sector.

- Overall model fit is reported via the R-squared statistic and the Root Mean Squared Error (RMSE). In this analysis, the R-squared is modest (around 5%), which is not unusual in cross-sectional micro-data where individual behavior is heterogeneous.

- Goodness-of-fit is assessed by comparing predicted versus actual values and via residual analysis

Software: The analysis is conducted using Stata. All data cleaning, transformation, and estimation commands (including generating new variables, recoding, graphical outputs) are performed within Stata.

- One graph plots hrsdiff against age (or the combination of age and age2) with a fitted OLS regression line. This graph is intended to visually confirm the quadratic (nonlinear) relationship indicated by the significant coefficients on age and age2. It shows the scatter of individual observations along with the smoothed fitted curve.

- A second graph is generated for another key regressor (for example, hrspredict against month or against informal employment status). This graph serves to illustrate the trend (e.g., a negative trend for the month variable, which indicates a decline in hrsdiff over time) and supports the numerical results from the regression.

Results

The primary results from the OLS regression are detailed as follows:

Regression for variables		
Variable	**Coefficient and Std. Dev**	
male	1.537	**
	(0.346)	
age of the worker	0.176	*
	(0.078)	
age2	-0.002	*
	(0.001)	
informal worker	1.862	**
	(0.443)	
Schooling level		
Secondary	-0.143	
	(0.458)	
Tertiary	-1.592	**
	(0.432)	
position in the job		
Employers	2.279	**
	(0.831)	
Self-employed	1.651	**
	(0.480)	
month of the year		
May	-0.825	
	(0.539)	
June	-1.617	**
	(0.530)	
July	-2.862	**
	(0.552)	
Intercept	18.203	**
	(1.772)	
Number of observations	3766	
Adjusted R-squared	0.05	

** p<.01, * p<.05

(Table 2, Regression analysis results from variables of interest)

All else equal, men experience an additional 1.54 hour reduction relative to women. Time lost also rises with age, each extra year brings about 0.176 more hours lost, but at a diminishing rate, so the incremental loss per year shrinks as workers get older. Informal workers lose 1.86 more hours than their formal-sector counterparts, while those with tertiary education see 1.59 more hours lost than workers whose schooling stops at the elementary level. In contrast, employers lose 2.28 fewer hours and the self-employed 1.65 fewer hours than do standard wage

employees. Seasonally, hours lost "recover" relative to April by 1.62 hours in June and by 2.86 hours in July, reflecting the familiar mid-year dip, and the model predicts a baseline reduction of about 18.2 hours for the reference group.

Summary table of the results according the prediction reduction in hours

Variable	N (%)	Regular hours worked	Hours worked last week	Change in hours
female	1,688 (44.8%)	41.573 (8.664)	20.483 (10.660)	21.089 (2.075)
male	2,078 (55.2%)	44.615 (8.190)	21.452 (10.571)	23.163 (2.106)
formal	1,830 (48.6%)	42.717 (7.703)	22.257 (10.770)	20.461 (1.454)
informal	1,936 (51.4%)	43.756 (9.235)	19.847 (10.343)	23.910 (1.674)
Elementary	1,353 (35.9%)	44.661 (8.559)	20.945 (10.254)	23.884 (1.890)
Secondary	954 (25.3%)	44.107 (8.240)	21.594 (10.771)	22.038 (1.984)
Tertiary	1,459 (38.7%)	41.385 (8.380)	20.709 (10.844)	20.832 (1.909)
Employees	2,602 (69.1%)	43.147 (7.907)	21.948 (10.542)	21.250 (1.922)
Employers	203 (5.4%)	46.650 (7.965)	21.581 (10.686)	23.766 (1.610)
Self-employed	961 (25.5%)	42.817 (10.030)	18.381 (10.384)	24.574 (1.475)
April	594 (15.8%)	43.734 (8.511)	20.072 (10.320)	23.759 (2.123)
May	1,108 (29.4%)	43.265 (8.511)	20.441 (10.839)	22.820 (2.135)
June	1,175 (31.2%)	43.016 (8.594)	21.105 (10.463)	21.771 (2.165)
July	889 (23.6%)	43.223 (8.524)	22.253 (10.646)	21.095 (2.147)

(Table 3, Change in hours according to the prediction variable)

According to the prediction variable we can observe a estimation of the hours depending on the demographic and how they are affected. As we can observe in this table, across the months we had a recovery of the hours.

Difference of hours across the months

Variable	April	May	June	July	Total
Female	0	0.722	1.115	0.603	2.44
Male	0	0.959	0.999	0.692	2.65
formal	0	1.015	0.962	0.904	2.881
informal	0	0.987	0.929	0.947	2.863
Elementary	0	0.88	1.045	0.857	2.782
Secondary	0	1.035	0.694	0.909	2.638
Tertiary	0	0.971	0.966	0.886	2.823
Employees	0	1.007	1.12	0.717	2.844
Employers	0	0.979	1.29	0.711	2.98
Self-employed	0	1.06	0.904	0.945	2.909

(Table 4, Summary Table across the months)

The table 4 represents how was the labor hours recovering across the multiple variables. This means that we obtained the hours of each month, and then we represent the first month (April) with 0 hours, for the second month we obtained the average hours lost for each variable in the first month and we subtracted the same amount we obtained from the second month, and so on. In this way, we were able to obtain the number of hours that were recovery over themonths of each demographic sector. We can notice that males had a faster recovery compared to women; the formal sector had a faster recovery than the informal; The tertiary level of education had a greater recovery than the elementary and the secondary levels; and employers had a greater recovery than employees and self-employed.

Overall Model Fit

The Rsquared is approximately 0.05 (5%), meaning that about 5% of the variation in hrsdiff is explained by the model. Although modest, this level of fit is common in cross-sectional micro-data where many unobserved factors may influence the dependent variable.

The RMSE (Root Mean Squared Error) is reported as around 10.38, which provides an indication of the average deviation of the predicted hrsdiff from the actual values.

Robustness Checks

The robustness of the findings is addressed through several methodological choices:

Data Cleaning and Outlier Removal:

A systematic process was followed to remove problematic observations (such as workers without pay, the unemployed, and those with missing or extreme values) from observations. This helps to make sure that the relationships are not driven by data entry errors or extreme outliers.

Robust standard errors:

The use of heteroscedasticity-robust standard errors in the Stata regression command (", robust") minimizes concerns that non-constant variance in the error term is biasing the standard error estimates. The t-tests for individual coefficients are more reliable.

Alternative Specification:

To test the sensitivity of the results to different model formulations, an additional regression was performed using factor variable notation (e.g., gender, age, etc.). Although the use of categorical indicators may lead to issues such as collinearity (especially with the quadratic term for age), the consistency of the signs and significance levels across specifications increases confidence in the robustness of the results.

Although no separate subsample or additional sensitivity analyses are explicitly reported in the log, the thoroughness of the data preparation and the use of robust standard errors provide additional reassurance that the key findings are not an artifact of the sample or a particular modeling choice.

Discussion

The detailed regression analysis provides several important insights regarding the determinants of changes in working hours:

Gender Differences:

The statistically significant positive coefficient on gender suggests that, ceteris paribus, male workers experience a greater change in working hours compared to female workers. This finding may reflect differences in labor market behavior, work-family balance, or other socio-cultural factors.

Nonlinear Age Effects:

The combination of a positive linear age term and a negative squared age term indicates that the relationship between age and hrsdiff is nonlinear. Practically, this implies that the effect of age increases up to a certain point before it begins to decline, a pattern that is common in studies of labor supply and productivity. It may suggest that younger workers gradually work longer hours as they gain experience, but that after a certain age the effect turns off or even reverses as workers approach retirement or prioritize work-life balance.

Informal Employment:

The positive and significant coefficient on the informal employment indicator suggests that workers engaged in informal work arrangements tend to have a larger change in working hours. This might be due to more irregular schedules or less formal work agreements, leading to greater variability in hours.

Education and Position:

A higher schooling level (as captured by the variable schoolvl) is associated with a reduction in hrsdiff. This might indicate that better-educated workers have more stable or predictable work arrangements.

The positive coefficient on position implies that the type of job (employee versus self-employed, for instance) matters for the variability in working hours, suggesting that

job status influences work patterns.

Model Fit:

Although the model explains only about 5% of the variation in hrsdiff, it is important to recognize that many unobserved factors (such as individual preferences, firm-specific policies, or unmeasured economic shocks) may affect working hours. The significance of the key variables nonetheless provides useful insights into which factors are most important for understanding the observed changes.

Comparison with Prior Research:

The results are consistent with established literature in labor economics and applied econometrics, which often find that demographics (age, gender, education) and job characteristic (employment type, informality) are significant determinants of labor supply decisions.

The nonlinear effect of age is particularly noteworthy and aligns with theories suggesting that work behavior changes as workers age.

Conclusion

In conclusion, is provided an extensive OLS regression analysis using Stata, which investigates the determinants of changes in working hours (hrsdiff). The model specification incorporates a range of independent variables; including gender, age (and its quadratic term), informal status, education level, job position, sector and month, to capture both linear and nonlinear effects.

A data cleaning process (involving destringing, outlier deletion, and variable recoding) ensures that the sample is appropriate for analysis. The estimation uses robust standard errors.

Robustness checks, such as alternative model specifications and the use of heteroskedasticity-robust standard errors, reinforce confidence in the results. Although the model explains a modest fraction of the total variation, the statistically significant coefficients indicate that demographic and work-related factors play an important role in determining changes in working hours.

These findings support theoretical expectations and echo previous research in labor market dynamics, thereby offering valuable insights for policy discussions and further academic investigation.

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(Additional data and analysis tables can be found in the Appendices, including a detailed breakdown of survey variables and extended regression results for alternative specifications.)