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# THE REACTION OF MEXICAN INFLATION EXPECTATIONS TO UNITED STATES INFLATION EXPECTATIONS

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PRESENTA:

EMILIANO FABIÁN GARCÍA DE GORTARI

DIRECTOR DE LA TESINA: DR. MARCELO DELAJARA

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**Abstract**

*This dissertation examines the impact of U.S. inflation expectations on Mexican inflation expectations, differentiating in pre- and post-financial crisis periods. Using impulse-response functions and structural breaks testing the study finds that while short-run Mexican inflation expectations are responsive to U.S. shocks, long-run expectations remain robustly anchored, showing minimal responsiveness. Robustness checks, including analyses using only quarterly data, confirm these findings and suggest that after the financial crisis, short-run Mexican inflation expectations are more affected by shifts in US inflation expectations. These insights are crucial for policymaking, particularly for Banco de México, as they highlight the need to consider external economic influences in managing inflation expectations.*

*Key words: inflation expectations, local projections, structural breaks, monetary policy, anchorage of inflation expectations, inflationary shocks, impulse-response functions.*

**List of abbreviations**

1. Bank of Mexico (Banxico)
2. Bayesian Information Criterion (BIC)
3. Consumer Price Index (CPI)
4. Data Generating Process (DGP)
5. Direct Foreign Investment (DFI)
6. Expectations Survey of Specialists in the Private Sector (ESSPS)
7. Federal Reserve (Fed)
8. Global Indicator of Economic Activity (IGAE)
9. Global Supply Chain Index (GSCPI)
10. Gross Domestic Product (GDP)
11. Impulse Response Functions (IRF)
12. Liu-Wu-Zidek criterion (LWZ)
13. Local Lineal Projections (LP)
14. Mexican Stock Market (VMB)
15. National Institute of Statistics and Geography (INEGI)
16. North American Free Trade Agreement (NAFTA)
17. Office of the United States Trade Representative (OUSTR)
18. One-month interbank interest rates (TIIE)
19. Real Business Cycle (RBC)
20. Standard Deviation (SD)
21. Survey of Professional Forecasters (SPF)
22. United States (US)
23. United States-Mexico-Canada Agreement (USMCA)
24. Vector Autoregression (VAR)

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## 1. Introduction

The stability of the Mexican economy is influenced by various factors, among which the longstanding interdependence with the United States (US) is paramount. It is significant for policy makers in Mexico to understand how the Mexican economy will react tomorrow to shifts happening in the U.S economy today. Hence, expectations play a particularly important role, as they foreshadow changes for the coming periods of time. Given this context, understanding how shifts in US economic variables, particularly inflation expectations, affect Mexico becomes crucial.

On the one side, increments to inflation expectations in the US imply a response from the Federal Reserve (Fed) resulting in a higher interest rate. Theoretically, this raise should reduce the spread between the Mexican interest rate and the US one, causing a depreciation for the Mexican peso. Depreciation should cause higher national prices: inflation.[1] Therefore, if the Mexican inflation expectations survey correctly capture what theory suggests, we should expect to see a raise in inflation expectations when US forecasts are on the rise. Such mechanism operates mainly through the foreign exchange markets and capital flows between both economies.

On the other hand, it is crucial to consider the role of global political and trade events as they also shape economic expectations in both countries. Events like the Ukraine conflict demonstrate how international crises can simultaneously influence the US and Mexican markets. These effects manifest in Mexico not only through the direct impact on foreign exchange markets, as previously described, but also through broader international market dynamics, particularly given the substantial trade relations with the US, as of 2022, Mexico was the second largest purchaser of US goods, behind Canada (Office of the United States Trade Representative [OUSTR], n.d.), and the second largest supplier of US imports, behind only

[1] In the case of a decrement instead of increment in inflation expectations we would expect a fall in national prices for Mexico, yet as Mexico's path of inflation suggests there is not a historical example in the last decades of deflation. Part of this could possibly attributed to the Mexican inflation target never being in its lower bound as well as US inflation maintaining a stable path. This is illustrated in the Data Section.

China (OUSTR, n.d.). For the same year, the US was Mexico's foremost trading partner in both exports and imports.

This intricately woven trade relationship suggests that external economic shocks—originating from political upheavals or global market fluctuations—can ripple through both economies nearly simultaneously. Therefore, in modeling the impacts of US economic variables on Mexican inflation expectations, it is essential to include this effect so that it accounts for such international shocks. This approach will help isolate the true response of Mexican inflation expectations to US inflation expectations, mitigating the risk of spurious relationships caused by unobserved confounding factors.

It is also important to note that Mexico, US and Canada signed the North American Free Trade Agreement (NAFTA) in 1994. Even though such agreement has been renegotiated (most recently in 2018 and going into effect in 2020 as the United States-Mexico-Canada Agreement (USMCA)) it is a key element of the high integration the Mexican-US economies have. It is certain that after the NAFTA took effect shifts in US economy have a higher trespass rate to Mexico. Concerning the shift to the USMCA it appears that such treaty has not structurally shifted the conditions in which Mexico and the US interact. At most, it has given importance to factors that were not considered before, such as digital markets.

Such conditions are key for comprehending why there should be an empirical correlation or even causation between US and Mexican inflation expectations. Although it seems clear that shocks in the US economy will transmit to the Mexican economy, it is not clear the effect could go both ways. There is evidence that for border states Mexican inflation can have effect on their northern counterparts, as described by Gerber (2020). Still, there is no analysis for structural nationwide effects.

While existing literature has examined the influence of US economic variables on Mexico (Gerber, 2020; Sosa, 2008; Hernandez, 2004; Bank of Mexico, 2023), the specific relationship between inflation expectations across these nations has not been thoroughly explored. This study is pioneering in its revelation of these intricate dynamics, offering significant insights for monetary policy formulation and macroeconomic strategy in Mexico. Therefore, this research is of valuable to both policymakers and the academic community, as it

explores new ground in understanding the economic interdependencies between the United States and Mexico.

This study aims to estimate and discuss these dynamics, positing that fluctuations in US inflation expectations have a direct impact on Mexican inflation expectations, thereby influencing the overall inflationary landscape in Mexico. The research employs the local linear projections (LLP) method as proposed by Jordá (2005), leveraging its distinct advantages for this analysis, which will be discussed in the subsequent section. Considering the stabilization of the Mexican inflation by 2003 the analysis will begin from that year and consider inflation expectations until March 2024. As for the specific dynamics of inflation expectations, they were certainly affected by the pandemics and the 2008 housing market crisis. Although García (2023), reports that the pandemic did not significantly alter the anchoring of inflation expectations, findings from both García and Acosta (2017), suggest that post-2008 crisis Mexican inflation expectations are better anchored. This raises a critical question: How did Mexican inflation expectations differ before and after the 2008 housing market crisis?

The main contribution of this dissertation is the quantification of the effects of US inflation expectations on Mexican inflation expectations, distinctly analyzing both short-term and long-term scenarios. Specifically, this research examines how short-run US inflation expectations influence short-run Mexican inflation expectations, and similarly, how long-run expectations in the US affect those in Mexico over the same time horizon. This dual approach highlights the immediate and enduring impacts of US economic trends on Mexico's inflation stability, exposing the susceptibility of Mexican inflation anchorage to external shocks. Detailed discussions of these relationships and their broader implications will be explored in subsequent sections of this dissertation.

The rest of this dissertation will follow the next scheme: chapter two revises on existing literature concerning the topic; chapter three digs deeper onto the data; chapter four explains the econometric model that will be used; chapter five exposes the results of the LLP; chapter six evaluates different robustness checks; lastly, chapter seven discusses the results and their implications and opens up discussion for further works.

## 2. Literature Review

The interdependencies between the US and Mexican economies have been a focal point of diverse economic research streams. These studies range from analyses of trade and fiscal policies to examinations of monetary dynamics and macroeconomic responses. Despite the extensive coverage of these topics, the specific aspect of inflation expectations between these two economies has received comparatively less attention. This literature review seeks to map out the landscape of existing research, focusing particularly on the influence of US economic variables on Mexican economic outcomes, which has been explored mainly through the lens vector autoregression (VAR) and real business cycle (RBC) theory.

Villareal (2015), presents a comprehensive report to the US Congress Committees and Members, delineating the intricacies of the US–Mexico economic relationship. The report underscores the pivotal role of the Mexican economy in bilateral relations, noting that the US is Mexico's foremost trade partner for both imports and exports. Conversely, Mexico ranks as the US's third and second-largest partner in imports and exports, respectively. The robust integration of the two economies, significantly bolstered by NAFTA and various trade agreements, underscores their mutual interdependence. Furthermore, the report highlights that the United States is the principal source of Direct Foreign Investment (DFI) in Mexico. This interconnectedness is crucial, especially when evaluating the ramifications of economic shocks in the US on the Mexican economy.

Gerber (2020), provides a detailed analysis of the distinctive dynamics at the Mexico-US border, exploring the reasons behind the unique characteristics of border towns and states compared to their interior counterparts in both nations. The study identifies the significant impact of governed integration, such as the effects of NAFTA, which, while prominent in border regions, also extends to various states. Additionally, Gerber (2020), examines the role of ungoverned integration, given the role borders have in it. Ungoverned integration refers to integration in the instance where such integration is not regulated but caused by interaction between agents in both economies. Also, considering it can be driven by local rules as well as cultural and social similarities in such regions. A notable example cited is the substantial losses in retail sales experienced by US border states during the Mexican currency devaluations of the

1970s, 80s, and 90s, leading to local recessions. Gerber's research underscores the profound interconnection between the two economies, considering the substantial influence of economic variable changes in Mexico on the US, and vice versa. Such analysis must be considered for the comprehension of how economical phenomena in the US may affect Mexican economy.

Sosa (2008), investigates the complex relationship between US economic factors and their impact on Mexican output, shedding light on the synchronization of economic cycles between the two countries. By employing VAR models, Sosa reveals how the Mexican economy responds to shocks and shifts in the US economy, highlighting a dynamic interaction with prolonged effects. The study's insights are particularly pertinent in understanding how variables that may influence industrial production variables (such as inflation expectations) can trigger significant responses within the Mexican economy and, in turn, affect Mexican inflation expectations. Therefore, Sosa's comprehensive analysis provides crucial context for this work, offering a deeper understanding of the economic interdependencies between the United States and Mexico.

Following the same line of literature of relationship between economic cycles, Hernandez (2004), attempts to show how the Mexican and US economy share the same trend and cycles. To do so Hernandez uses time series techniques to prove the hypothesis of synchronization between the countries' economies. The main device of empirical modeling is proving cointegration between both time series and cycle testing. The results are not surprising, showing that US and Mexico share common trends and cycles. Still, it is valuable to notice that Mexico's economy overreacts to shocks and has a reduced growth when compared to that of the US. The analysis Hernandez provides is consistent with the proposed hypothesis that Mexico does react to shocks in American economy and therefore is valuable for this analysis.

Verma and Soydemir (2010), explore the potential influence of investor sentiment on foreign stock markets, incorporating a diverse set of countries including Mexico, the U.K., Brazil, and Chile in their analysis. Utilizing a VAR methodology to compute response functions, they specifically identify a notable impact of institutional investor sentiment on the Mexican Stock Market (VMB) index. This effect is underscored by their use of an economic expectations variable — the yield spread between the three-month Treasury bill and the ten-year Treasury bond. The implications of their findings are significant for this paper, highlighting the crucial

role of inflation expectations within economic variables in shaping investor sentiment and, consequently, affecting key Mexican economic indicators.

Considering the dynamics of the anchorage of Mexican inflation expectations, Garcia (2023), expands the analysis of Acosta (2017). The author finds results that corroborate those found by Acosta concerning the years before 2016. The results evidence the effect the 2008 financial crisis had in Mexican inflation expectations. The main result from that period is that anchorage became more stable after 2008 and maintained similar characteristics until 2020. Garcia's work provides a valuable insight to Mexican inflation expectations, showing that the pandemics certainly had an effect in short term inflation expectations, but the anchorage remains when expanding the expectations horizon.

The Bank of Mexico (Banxico, 2023), consistently provides analysis on US economic variables, highlighting their impact on Mexican economic indicators. In its fourth quarterly report for 2023, Banxico details the response of Mexican financial markets to US monetary policy shifts. This analysis shows significant medium and long-term horizon reactions in Mexican interest rates, underlining the direct consequences of US policy changes on Mexico's financial market dynamics. Moreover, in the third quarterly report of 2023, Banxico (2023), examines the relationship between long-term interest rates in the US and Mexico, identifying a strong and growing correlation since January 2020. This correlation emphasizes the close economic integration between the two nations and indicates that US inflation expectations might significantly influence Mexican interest rates and inflation expectations.

In the fourth quarterly report of 2022, Banxico (2022), discusses how US inflation expectations could affect wage equilibrium in the United States. This analysis is crucial for this study, demonstrating the potential impact of US inflation expectations on wages, which in turn could influence Mexican price levels through the previously discussed mechanisms (inflation expectations in the US affect interest rates, which in turn affect the exchange rate, causing shifts in inflation expectations in Mexico). The inclusion of this analysis in Banxico's report highlights the importance of US inflation expectations for Mexican policymakers, underscoring the interconnectedness of the two economies.

Jordà (2005), introduces LLP as a novel method for estimating impulse response functions (IRF), offering distinct benefits over traditional VAR estimations. Central to Jordà's

proposition is the methodological simplicity, as local projections involve straightforward linear regressions, making them more accessible for estimation. A significant advantage, particularly pertinent to this study, is the robustness of local projections against misspecifications in the Data Generating Process (DGP). Considering the intricate nature of the DGP underlying the relationship between US inflation expectations and various economic variables, local projections emerge as a particularly apt analytical tool for addressing such complexities.

Recently, Hernández, Ventosa-Santaulària, and Valencia (2024), conducted an analysis of how stress in global supply chains affects the capacity of Banxico's monetary policy to regulate inflation. Their findings show that during high-stress regimes, interest rate monetary policy has a smaller effect on controlling shifts in inflation dynamics. This results in higher increases in the interest rate in Mexico to adequately control inflation. This study is relevant as they estimate the IRF through LP, giving precedent to the use this methodology for analysis of inflation dynamics in Mexico. It is also useful because it validates the use of a global supply chain index as an exogenous control, demonstrating that different periods of stress in global market conditions significantly affect inflation and, consequently, inflation expectations in Mexico.

Beechey, Johannsen, and Levin (2011), conduct a comparative analysis of how US and Euro area inflation expectations respond to external news and shocks, including fluctuations in oil prices. Their study reveals that US inflation expectations exhibit higher volatility and a more pronounced responsiveness to shocks compared to those in the Euro area. The authors attribute this disparity primarily to the Feds's lack of an explicit inflation target, in contrast to the European Central Bank's policy framework. This insight is particularly relevant to my research, as such volatility in US inflation expectations might manifest in my analysis, representing a significant factor to consider. Furthermore, the pandemic's role in altering inflation patterns globally is likely to have impacted inflation expectations, raising questions about the potential effects of the absence of a clear inflation target on Mexican inflation expectations.

Thus far, the broader economic interdependencies between the US and Mexico have been extensively studied, yet prior research has largely overlooked the specific dynamics of inflation expectations between these two nations. Previous studies have primarily focused on the impacts of trade, fiscal policies, and real business cycle fluctuations, often neglecting the

nuanced effects of inflation expectations on economic stability and policy formulation. This lack of research concerning Mexican or other economies' inflation expectations response to external shocks may be due to the prioritization of classical RBC modeling over the analysis of inflation expectations. Additionally, accurately using adequate counterparts of inflation expectations between different countries represents a significant challenge to this type of analysis. This issue is addressed thoroughly in the data section of the dissertation.

This dissertation advances the existing body of knowledge by employing local projections to investigate how short-run US inflation expectations influence Mexican inflation expectations. The findings from this study not only fill a significant gap in the academic literature but also provide practical insights that could guide economic policymaking in both countries. By identifying and quantifying these effects, this research contributes a new perspective to our understanding of cross-border economic influences, emphasizing the responsiveness of Mexican inflation expectations to changes in the US economy.

## 3. Data

The main data variables considered for the analysis done here are inflation expectations in the short and long run. The short run refers to one year inflation expectation, while the long range refers to average inflation expectation for the next five to eight years for Mexico and expected inflation in 10 years for the US variable counterpart. Other exogenous variables will be used as controls for external effects on the variables and for robustness tests. Such variables include Mexican consumer price index (CPI) inflation, one-month interbank interest rates (TIIE), nominal exchange rate, a global supply chain pressure index (GSCPI) and monthly gross domestic product (GDP) indicators for both the US and Mexico.

García (2023), explains the stability of Mexican inflation expectations after 2003, attributing it to the stabilization of the Mexican monetary system and price stabilization. The author utilizes Mexican inflation expectations data collected by Banxico in the Expectations Survey of Specialists in the Private Sector (ESSPS). This survey gathers monthly data from various private sector agents and includes not only information on inflation expectations but also on topics such as GDP growth perspectives. The variable used from the survey is the median response to the question of expected inflation over different horizons. Using the median, as opposed to the average, helps avoid biases caused by outliers, which is a common practice in analyzing inflation expectations surveys. Following García's analysis, this study will use inflation expectations measured by the ESSPS and will only consider data collected after December 2002.[2] The last data point considered will be January 2024, based on the availability of the variables.[3]

When considering specific properties of Mexican inflation expectations, short-run inflation expectations have a higher response to current inflation (García, 2023; Acosta, 2017). This results in a higher volatility in short-run expectations than long-run inflation expectations, which may be more stable because there is no actual evidence that supports there will be an inflationary crisis various year from today. In this sense, Short-run inflation expectations may be measured in different ways, e.g. the Federal Reserve of Cleveland uses different variables to create a daily

[2] Garcia (2023) also conducts Dickey-Fuller tests for Mexican inflation expectations and CPI inflation, finding results of stationarity giving validity to linear inference in such variables. In this sense,

[3] Specifically, monthly GDP indicators are usually only available three months after the period of interest.

estimate of the inflation expectations. Such variable considers inflationary swaps, treasury yields, inflation data and survey-measures of inflation expectations. For Mexico, such inflation expectations indexes are not generated for daily data and therefore the more reliable data is the ESSPS. For this reason, this dissertation will focus only on survey inflation expectations.

Considering US inflation expectations, a criterion had to be met so that they matched survey inflation expectations to a group of specialists such as the one collected by the ESSPS. The dataset used comes from the Bank of Philadelphia, which conducts the quarterly Survey of Professional Forecasters (SPF). The SPF includes data from 1970 and contains information of different variables such as GDP growth or growth in prices in the housing market. For these reasons, I consider it to contain similar information to the one from the SSPS.

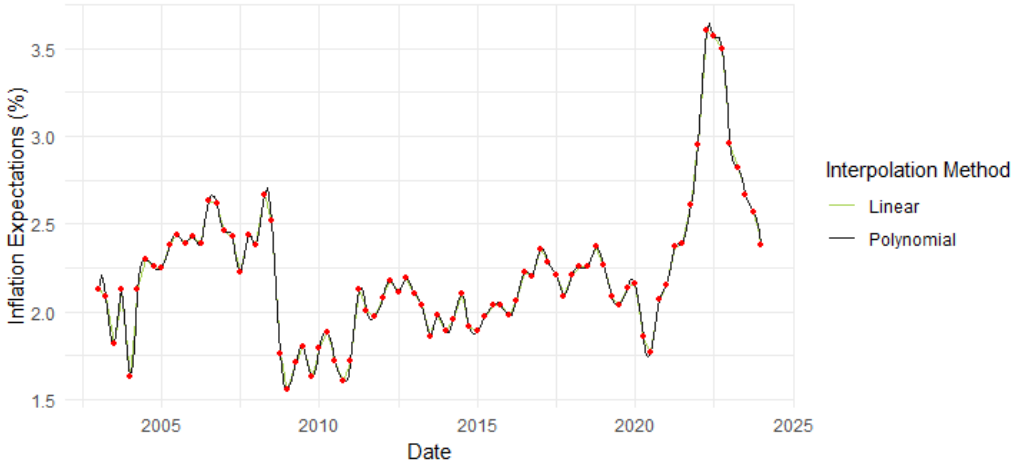
The main issue when using the SPF as a counter part for the ESSPS is the availability of the data. As previously mentioned, the SPF contains quarterly data while the ESSPS gathers monthly data. To deal with this data availability disparity I interpolated the quarterly data to obtain monthly data. I used different interpolation techniques for such issue, Figure 1 and Figure 2 show the polynomial and lineal method of interpolation for short-run and long-run inflation expectations respectively. Nevertheless, when conducting proper data analysis, I confirm the results using both the quarterly data and the monthly data to assure interpolation does not create bias.

Considering the dynamics shown in Figures 1 and 2, there is not much difference between the interpolation techniques, either polynomial or linear. However, polynomial interpolation may create non-existent dynamics when there are no real shifts in the variables. This is clearly observable in Figure 2, where stable long-run inflation expectations interpolated through the polynomial approach show artificial peaks where there are none. Therefore, to avoid potential induced bias, I use the linear data interpolation method.

Another difference to consider from both data sets is the time-horizon of the long-run inflation expectations horizon. As previously mentioned, while the ESSPS includes inflation in the next five to eight years, the SPF only includes a variable for ten years. Nevertheless, considering that both economies have an autonomous central bank and an advanced monetary economy, long run inflation expectations should be the same for both time-lengths. Basically, there should be no significant difference between inflation expectations in 8 years and inflation

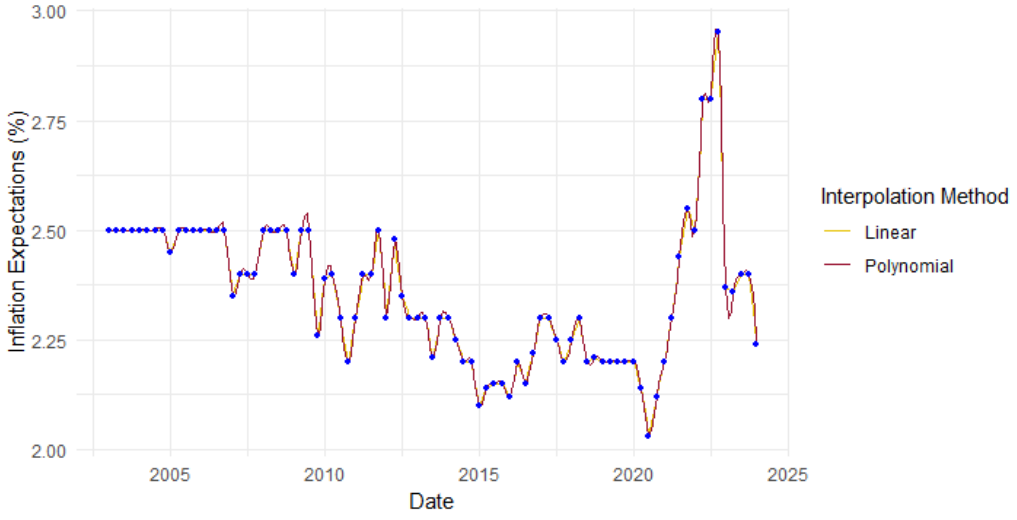
expectations in 10 years, as they are both long run inflation expectations. Even if an actual difference existed between the 8 years and 10 years horizons, this work attempts to verify the effect US inflation expectations for the long run have on Mexican ones, with no specifical need for both variables to be for the same time length, only the same *long-run* horizon.

***Figure 1:*** *Different interpolation methods for short-run SPF inflation expectations.*




*Source: Own estimation with information from the SPF.*
*Note: Red dots represent the quarterly value obtained from the SPF.*

***Figure 2:*** *Different interpolation methods for long-run SPF inflation expectations.*




*Source: Own estimation with information from the SPF.*
*Note: Red dots represent the quarterly value obtained from the SPF.*

### 3.1 Short-run expectations

A one-year inflation expectation variable is included in the ESSPS, and data has been collected for it even before January 2003, the beginning of the period of analysis. Short-run inflation expectations have a higher volatility than long-run inflation expectations as they are more reactive to shifts and shocks to the inflation dynamics of the economy. As figure 2 shows Mexican inflation expectations have a stable dynamic except for shocks during pandemics and a small effect during 2008 financial crisis. [4]

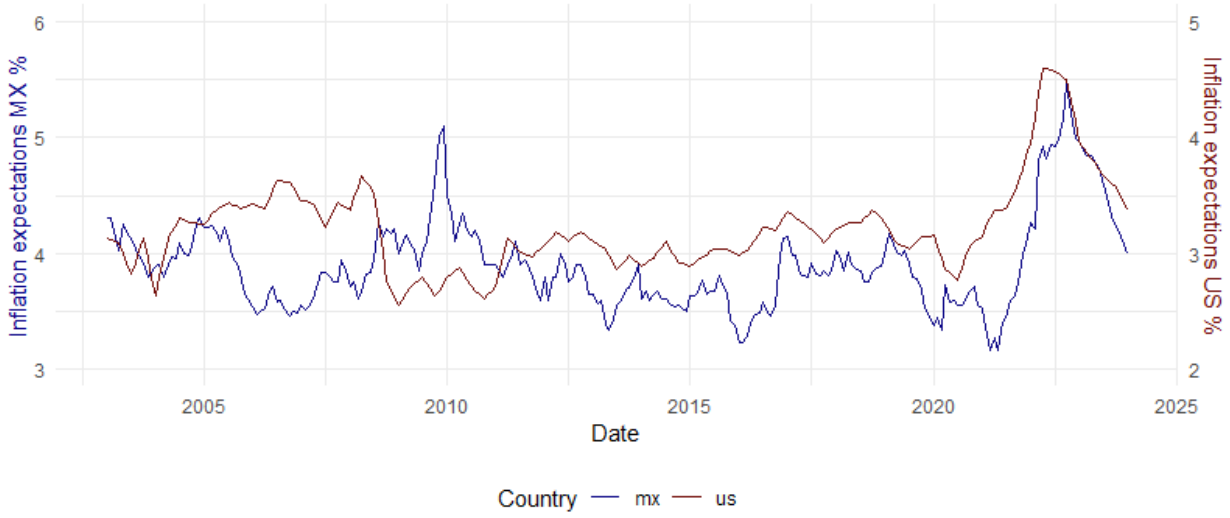
As for US short-run inflation expectations, they appear to have a more stable dynamic compared to the Mexican short-run inflation expectations. As well as with Mexican inflation expectations, they react to the 2008 financial crisis and the pandemics. Figure 3 poses an interesting relationship as movements in inflation expectations seem to go in the same direction at similar times.

Figure 3 shows that specifically after 2011 the relationship between Mexican inflation expectations and US inflation expectations appears to be positive. Considering the period for pandemics and Ukraine war inflation crisis, US inflation expectations seem to be adjusting quicker than the Mexican ones. Such observation is valuable for the posed trespass mechanism proposed in the introduction.

That said, a method to show the existence of multiple structural breaks in the dynamics of the US-Mexican inflation expectations is to perform Bai-Perron (1998), structural break testing. The variable to perform such structural break testing is the difference between the US and Mexican short run inflation expectations, positing to be at least one structural break around 2011. The results of the Bai-Perron Structural break testing show that there is a structural break in said variable in August 2008. Such date is close to the peak of the financial crisis: same variable after which Garcia (2023), and Acosta (2017), find a change in inflation expectations dynamics in Mexico. Figure 4 shows the difference of Mexican and US short-run inflation expectations, and the Bai-Perron results are included in the appendix.

[4] As mentioned before, Garcia (2023) performs unit-root testing and finds no unit roots for a sample that does not include the pandemic, evidencing the stability of Mexican inflation expectations.

***Figure 3:*** *Short-run inflation expectations of the US and Mexico.*




*Source: Own work with data from the SPF and the ESSPS.*

***Figure 4***: *Difference between Mexican and US short-run inflation expectations.*

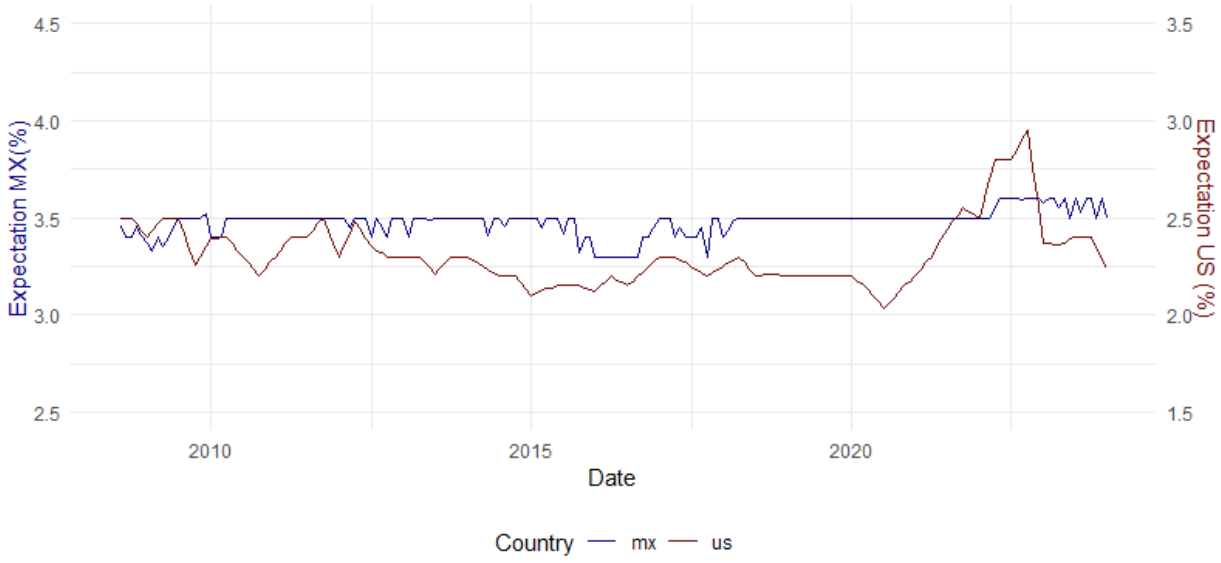

*Source: Own estimation with data from the SPF and the ESSPS.*
*Note: vertical dashed lines are placed in the dates where Bai-Perron testing finds structural breaks for the time series. That is, August 2008 and November 2020.*

### 3.2 Long-run expectations

For the long run expectations variable, the ESSPS includes information only after 2007. Hence, there is considerably less data available than for short-run inflation expectations. Figure 5 shows the specific behavior of the Mexican and US inflation perspectives for the long run. It appears as if Mexican inflation expectations have a more stable development, as they are constant for prolonged periods of time while there appears to be higher variations in the US ones.

That said, there only appears to be a real rise of US long-run inflation expectations when compared to Mexican US inflation expectations during the pandemics. To illustrate this, Figure 6 poses the difference between the Mexican and US long-run inflation expectations. There does not appear to be a significant structural break in this series as there appeared to be in short-run inflation expectations. This absence of a notable break might be attributed either to stable dynamics in long-run inflation expectations or to the unavailability of Mexican inflation data prior to August 2008, which coincides with the identified structural break in short-run inflation expectations.

***Figure 5:*** *Long-run US and Mexican inflation expectations.*




*Source: Own work with information from the ESSPS and the SPF.*

***Figure 6:*** *Difference between Mexican and US long-run inflation expectations.*


*Source: Own estimation with information from the ESSPS and the SPF.*
*Note: the vertical dashed line is placed in the dates where Bai-Perron testing finds structural breaks for the short-run inflation expectations difference. That is, November 2020.*

### 3.3 Other endogenous variables and exogenous variables

In the introduction, I outlined a causal mechanism where a positive shock to U.S. inflation expectations leads to an increase in U.S. interest rates, thus altering the interest rate parity between U.S. and Mexican treasury yields. This adjustment is expected to cause a depreciation of the Mexican peso, subsequently impacting Mexican inflation expectations. Therefore, the analysis will treat U.S. and Mexican inflation expectations, U.S. treasury yield rates, and the nominal exchange rate as endogenous variables. Previous sections have detailed the discussion on inflation expectations; for U.S. treasury yield rates, the effective rate provided by the Federal Reserve will be utilized; for the nominal exchange rate, data provided by Banxico will be utilized.

Regarding exogenous variables, the analysis will include information on monthly GDP to control for economic shifts potentially impacting inflation expectations. In Mexico, the National Institute of Statistics and Geography (INEGI) compiles this data through the Global Indicator of Economic Activity (IGAE). In the U.S., Standard and Poor's constructs a monthly GDP indicator consistent with real GDP. Furthermore, to account for shifts in international

supply chains that may influence inflation expectations in both countries, this dissertation will employ the Global Supply Chain Pressure Index (GSCPI) developed by the Federal Reserve Bank of New York's Applied Macroeconomics & Econometrics Centre using principal component analysis. Additionally, recognizing that Mexican interest rates (provided by Banxico) can significantly impact Mexican inflation expectations, they are also included as an exogenous variable in this analysis. Descriptive statistics for all variables used are provided in Appendix 2.

As part of the robustness checks to validate the results, the analysis will include inflation rates as a variable, specifically focusing on the Consumer Price Index (CPI) monthly annualized inflation, with data provided by Banxico. These checks will help ascertain whether changes in inflation dynamics are driven by actual inflation changes rather than merely shifts in U.S. expectations

## 4. Econometric Model

As previously outlined, the main objective of this work is to quantify the impact that shifts in U.S. inflation expectations have on Mexican inflation expectations. Therefore, an estimation of IRF is necessary. Jordá (2005), provides a linear method to estimate such functions, LLP. Compared to using VAR modelling, such method provides advantages which have been previously discussed in the literature review. As for this work, the main advantages may be the robustness for errors when there are specification errors for the DGP. Such errors may arise from the difficulty to properly capture the different variables that may affect the trespass from US inflation expectations to Mexican inflation expectations.

Considering this, we can provide the equations that will be estimated:

$$\pi^{e^{mx}}_{t+h+s|t+s} = \alpha^{c} + \sum_{i=1}^{p} B_i^{s+1}\, y_{t-i} + \sum_{i=1}^{n} \gamma_i^{s+1}\, w_{t-i} + u^{s}_{t+s} \qquad s = 0, 1, 2, \dots j$$

*(1)*

In this model, $\pi^{e^{mx}}_{t+h+s|t+s}$ represents the Mexican inflation expectation for the horizon $t+h+s$, with $h$ denoting the horizon (either short or long run) given the fact that the period is $t+s$. $\alpha^{c}$ represents the constant for the ordinary least squares regressions; $y_{t-i}$ is a vector which contains the endogenous variables as previously discussed in the data section: US and Mexican inflation expectations for the same $t+h$ horizon, US interest rate, and nominal exchange rate. Additionally, $w_{t-i}$ refers to the exogenous variables that have been previously identified, such as monthly GDP and shifts due to changes in the global supply chain. $u^{s}_{t+s}$ refers to the error term for the $t+s$ estimate. $B_i^{s+1}$ and $\gamma_i^{s+1}$ are the coefficient vectors for endogenous and exogenous variables respectively, with $p$ and $n$ indicating their lags. In this case, there are $j$ regressions which are denoted as the local projections.

The IRF provided by Jordá (2005) is given by $B_i^{s}$ in the form of:

$$\widehat{IR}(t, s, d_i) = \widehat{B_i^{s}} d_i \qquad s = 0, 1, 2, \dots j$$

*(2)*

Here, $d_i$ represents the external shock at period $t$ used to project the variables at $t+s$. The model incorporates the shock through a $VAR(p)$ model for the endogenous variables $y_t$, applying Cholesky´s decomposition to introduce a triangular structure into the accommodation

of the matrix of the variables. In this sense, the accommodation of the endogenous variables is important to comprehend the way the shock takes place. The accommodation of the variables is defined by the next vector:

$$y_t = (\pi^{e^*}_{t+h|t}, i^*, e, \pi^{e^{mx}}_{t+h|t})$$

*(3)*

Where $\pi^{e^*}_{t+h|t}$ and $\pi^{e^{mx}}_{t+h|t}$ refer to the US and Mexican inflation expectation, respectively, for horizon $t+h$ at time $t$; $i^*$ refers the effective US rate; $e$ refers to the exchange rate. Since we consider the shock not to affect the exogenous variables, the order is not important as with the endogenous. Concurrently, the vector of exogenous variables is defined as follows:

$$w_t = (gscpi_t, i^{mx}, {gdp_t}^{mx}, {gdp_t}^*)$$

*(4)*

Where $gscpi_t$ refers to index with the same initials (global supply chain pressure index); $i^{mx}$ refers to the Mexican interest rate; ${gdp_t}^{mx}$ and ${gdp_t}^*$ refer to the monthly GDP of Mexico and the US, respectively. Opposed to the endogenous variables, the order of the exogenous variables is not significant as the shock does not affect such variables.

An important remark to make, is that due to endogeneity, Jordá (2005) proposes the use of instrumental variables as double causation may reflect in the estimation of the impulse response function. Nevertheless, there is no theoretical proof of Mexican inflation expectations directly affecting US inflation expectations. Therefore, the use of instrumental variables is omitted for this analysis. In this same sense, it is also important to consider that lags in both exogenous and endogenous variable are considered to incorporate the existing autocorrelation of the data into the analysis and estimation. For this, the confidence intervals are estimated considering Newey-West standard errors.

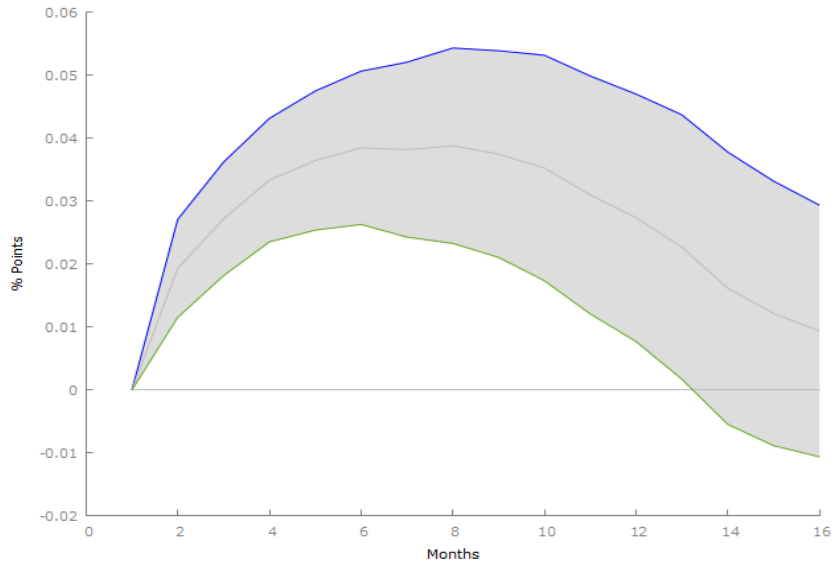
## 5. Results

This section presents the results according to the following structure: Initially, I will examine the short-run Mexican inflation expectations, analyzing both the sampled data, which includes only information post the initial structural break in August 2008 as identified by the Bai-Perron tests, and the entire dataset spanning the previously defined period. Subsequently, I will review the long-run inflation expectations, which are based solely on data starting from August 2008, as no earlier records are available.

### 5.1 Full sample short-run inflation expectations.

As explained in the data section, and mentioned in the introduction, part of this work is to find a difference between how the Mexican inflation expectations reacted before and after the 2008 financial crisis. I propose using LLP and the described model for the full sample data, then comparing it to sampled data to search for differences. This analysis considers the structural break caused by the 2008 financial crisis, with the break coinciding with the one identified by the Bai-Perron algorithm. Figure 7 shows this relationship.

***Figure 7:*** *IRF of short-run Mexican inflation expectations to a Standard Deviation (SD) shock (.38 p.p.) in US short-run inflation expectations.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method. The IRFs included in this dissertation were estimated using GRETL. Specifically, using the Local Projection function package created by Gerardo Sebastian Diaz-Muro.*

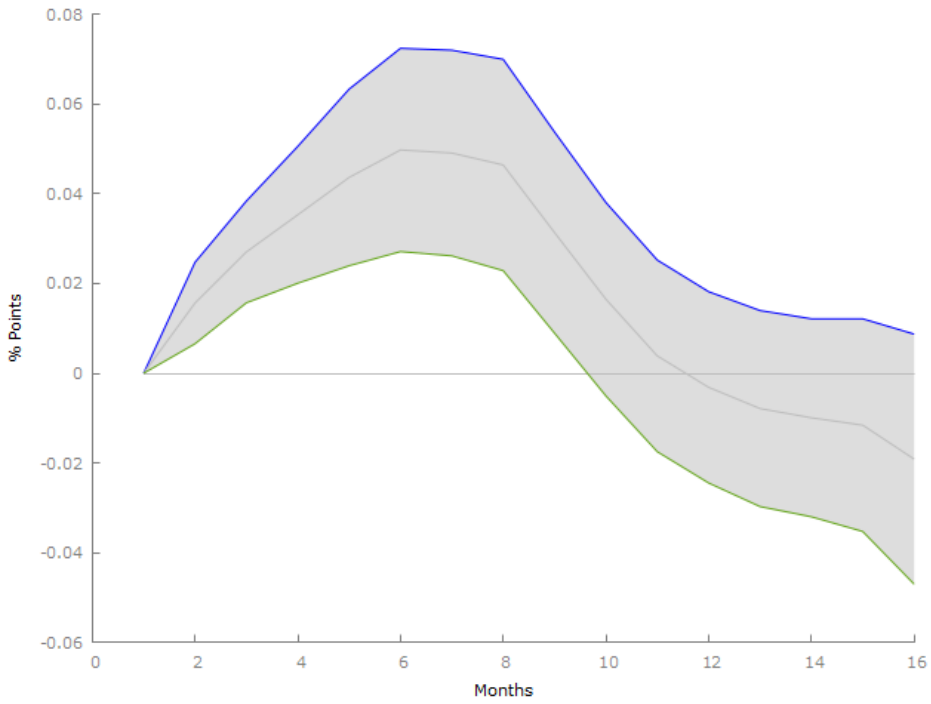
Figure 7 displays the IRF of short-run Mexican inflation expectations following a 0.38 percentage point (p.p.) shock in short-run U.S. inflation expectations. Remarkably, this moderate U.S. shock influences Mexican inflation expectations for up to 13 months, illustrating a robust and prolonged cross-border impact. The graph indicates that the most pronounced effects occur between the fourth and tenth months, during which Mexican inflation expectations increase by as much as 0.05 p.p. before they begin to gradually diminish. Extrapolating from this data, a one p.p. shock in U.S. inflation expectations could potentially lead to an almost .15 p.p. increase in Mexican inflation expectations. Which represents around 5% of the Mexican short inflation expectation mean. This extended reaction corroborates the previously discussed causal mechanism, where U.S. economic indicators—especially inflation expectations—play a pivotal role in shaping Mexico's economic prospects, underscoring the deep economic interconnections between the two nations.

### 5.2 August 2008 sample partition short-run inflation expectations

Figure 8 presents the IRF for short-run Mexican inflation expectations, segmented by the structural break in August 2008. Compared to Figure 6, which reflects the broader period, the 90% confidence interval in Figure 8 reaches a higher upper bound of nearly 0.08 percentage points. This indicates a marked increase in the volatility and magnitude of Mexico's response to U.S. inflation shocks in the years following the housing market crisis. Nevertheless, it appears as if such reaction had a less prolonged effect, as it touches the confidence interval intersects the x-axis around the $10^{th}$ month, compared to the last result, which appeared to last longer than one year.

While direct causation by the 2008 crisis cannot be definitively established from this IRF alone, the timing and nature of these changes align with alterations in economic policies and market conditions post-crisis. This observation is supported by García (2023) and Acosta (2017), who noted modifications in inflation expectations dynamics post-financial crisis, potentially due to better anchorage conditions.

***Figure 8:*** *IRF of post financial crisis short-run Mexican inflation expectations to a SD shock (.44 p.p.) in US short-run inflation expectations.*



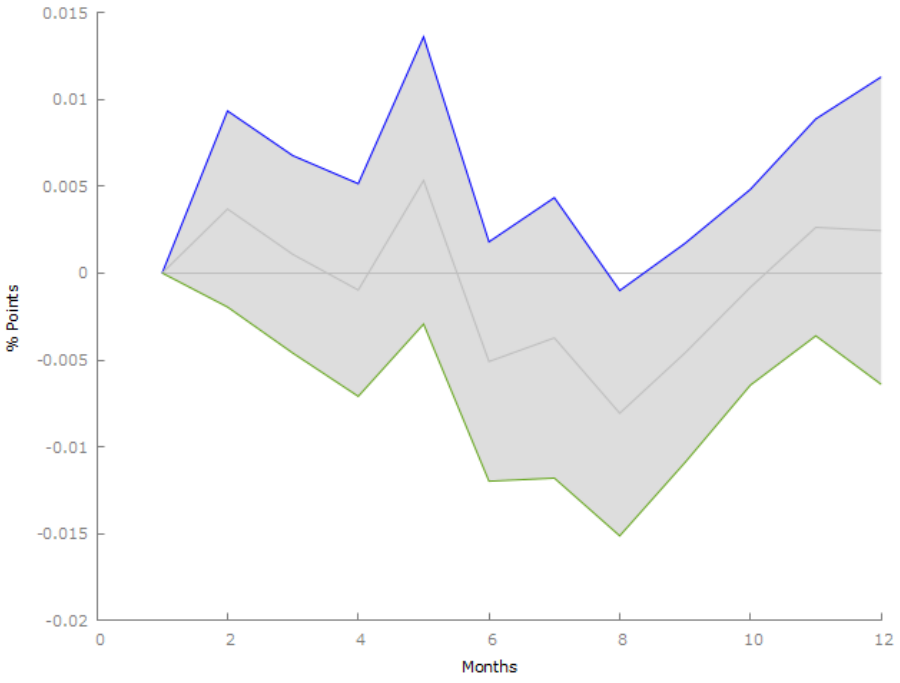

*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

### 5.3 Long-run inflation expectations

Figure 9 illustrates the IRF of Mexican long-run inflation expectations in response to a SD shock (.06 percentage points) in U.S. long-run inflation expectations. Contrary to short-run expectations where a clear positive response was evident, the long-run responses depicted here do not show significant changes within the 90% confidence interval at any of the observed periods. This stability supports the hypothesis that Mexican long-run inflation expectations are well-anchored, despite fluctuations in U.S. inflation expectations. Such anchorage, previously detailed in findings by García (2023), underscores the effectiveness of Mexico's monetary policy framework in isolating its long-term inflation expectations from external shocks. Given the close economic ties between Mexico and the U.S., this finding of long-run stability is particularly noteworthy. It suggests that, despite the high level of integration between the two economies, Mexico maintains a robust autonomy in its long-term economic planning. A possible intuition for this result is that for the long run there is no credible reason to believe that an inflationary shock could possibly affect either economy, shifting their long-term levels. Or that in case of

any possible shock, either Banxico or the Fed could reestablish the long-term levels through their monetary policy tooling. Nevertheless, contrary to what would be expected of a rise in US inflation expectations, the shock seems to have a negative effect around the 8th month. Still, when considering units such shocks appear to be close to zero. It seems then, that the main takeaway from Figure 9 is that there appears to be no relationship, negative or positive of a shock in the US inflation expectations dynamics with Mexican long-run inflation expectations.

***Figure 9:*** *IRF of long-run Mexican inflation expectations to a SD shock (.06 p.p.) in US long-run inflation expectations.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

## 6. Robustness checks

This section will review the results discussed previously and conduct two distinct robustness checks to validate the findings. The first check involves incorporating inflation as an exogenous regressor. This step aims to control for potential inflation shocks that could influence the inflation expectations, thereby addressing possible missing variable bias. The second robustness check is designed to ensure that the results are not artifacts of data interpolation. For this purpose, LLP modeling will be re-executed using only the originally available quarterly data, thus testing the integrity of the interpolation process. Together, these robustness checks seek to confirm the reliability of our findings by examining both the potential omission of relevant variables and the methodological soundness of employing interpolated data.

### 6.1 Controlling for lagged inflation.

Controlling for inflation is crucial for understanding Mexican inflation expectations, particularly in the short run. Given that the LLP model incorporates lags of variables, the analyses by García (2023) and Acosta (2017), become particularly pertinent. These authors explore how lagged inflation influences inflation expectations, a key factor in assessing the anchorage level of these expectations. Well-anchored inflation expectations should ideally remain unaffected by variations in inflation. Post-financial crisis findings indicate that lagged inflation has a diminished impact on short-run expectations. In addition, García (2023), notes that during the pandemic, this variable significantly influenced short-run inflation expectations, yet it did not affect the long-run expectations, suggesting that long-term expectations in Mexico are robustly anchored, thereby showing minimal response to shifts in current and lagged inflation. To align with the analyses of these authors and to address endogeneity, lagged annualized inflation is considered as an exogenous regressor.

In this context, the robustness check of our findings should align with these observations. For short-run inflation expectations, controlling for lagged inflation is expected to reveal significant effects, particularly because this variable had a more pronounced impact prior to the 2008 housing market crisis. This suggests that the full sample results might show substantial changes with the inclusion of this exogenous variable, especially when compared to the post-financial crisis sample. In contrast, long-run inflation expectations are likely to exhibit little or

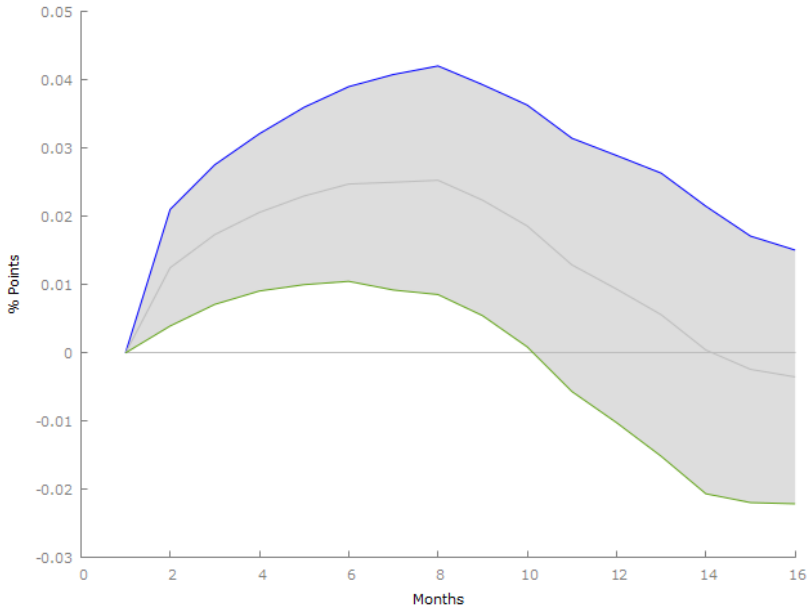
no change upon the addition of contemporary inflation, reflecting their strong anchorage and relative insensitivity to immediate inflationary shifts.

Figure 10 presents the IRF of short-run Mexican inflation expectations to a SD shock in U.S. short-run inflation expectations, now incorporating lagged Mexican inflation as an exogenous variable. This adjustment in the model specification leads to noticeable differences from the results depicted in Figure 7. Specifically, the peak response in Figure 10 is lower, and the statistical significance diminishes by the 10th month, in contrast to the 13th month in the initial estimation without controlling for Mexican inflation.

Furthermore, the confidence bands in Figure 10 do not extend as high as those in Figure 7, underscoring the significant influence that omitting contemporary inflation can have on the estimated impact of U.S. inflation shocks. This observation is consistent with findings from García (2023) and Acosta (2017), who noted that the inclusion of contemporary inflation metrics could mitigate perceived volatility in inflation expectations. Consequently, Figure 10 demonstrates that the earlier model estimations, particularly during the 2003-2008 period, may have been biased by an inadequate adjustment for inflationary pressures, suggesting a lack of anchorage in inflation expectations during that time.

Considering the sampled data, Figure 11 illustrates the IRF of post-financial crisis short-run Mexican inflation expectations in response to a SD shock in U.S. short-run inflation, now accounting for contemporary Mexican inflation as an exogenous variable. The graph displays minimal deviations from the results shown in Figure 8, suggesting that the inclusion of lagged inflation does not significantly alter the response pattern. This lack of notable change reinforces previous findings that post-financial crisis, the anchorage of Mexican inflation expectations has strengthened, rendering current and lagged inflation less influential on expectation formation. The comparison between this analysis and the one presented in Figure 10 further substantiates the robust anchorage of inflation expectations post-2008. Notably, the periods following the financial crisis appear to show minimal responsiveness to inflation, indicating a durable stability in inflation expectations despite potential external pressures.

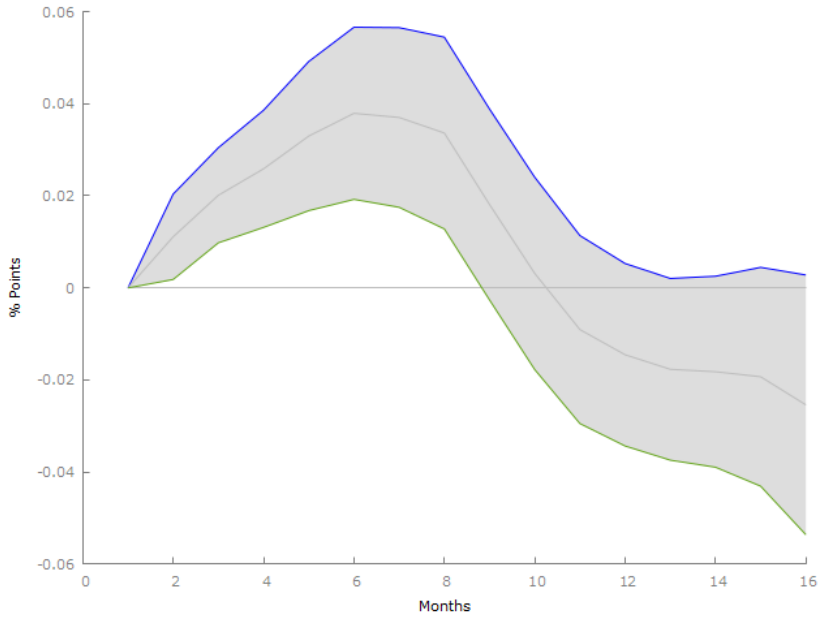
***Figure 10:*** *IRF of short-run Mexican inflation expectations to a SD shock (.38 p.p.) in US short-run inflation expectations considering Mexican inflation.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

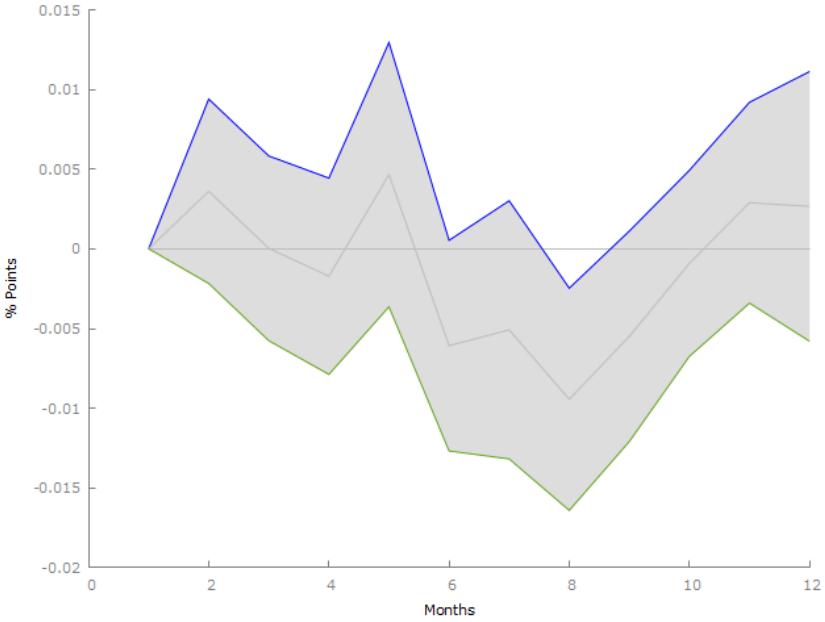
Figure 12 displays the IRF of long-run Mexican inflation expectations in response to a SD shock (.06 percentage points) in U.S. long-run inflation expectations, with lagged Mexican inflation included as an exogenous regressor. This figure extends the robustness checks previously illustrated in Figures 10 and 11 to long-run expectations. Like Figure 9, the results here show minimal variation from the baseline estimations, suggesting that the inclusion of lagged inflation does not significantly alter the long-run inflation expectation dynamics. However, there appears to be a negative effect around the 8th month, which aligns with the results from figure 9. This result seems contradictory, yet, as with Figure 9, the overall conclusion is that there is no substantial effect for long-run inflation expectations. This lack of a significant effect supports earlier findings regarding the strong anchorage of long-run Mexican inflation expectations. Despite the potential for external shocks from U.S. inflation, the long-run expectations remain largely stable, reaffirming the efficacy of Mexico's inflation management policies. Thus, Figure 12 serves as further evidence of the robust anchorage of Mexican inflation expectations in the face of external inflationary pressures.

***Figure 11:*** *IRF of post financial crisis short-run Mexican inflation expectations to a SD shock (.44 p.p.) in US short-run inflation expectations considering Mexican inflation.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

***Figure 12:*** *IRF of long-run Mexican inflation expectations to a SD shock (.06 p.p.) in US long-run inflation expectations considering Mexican inflation.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

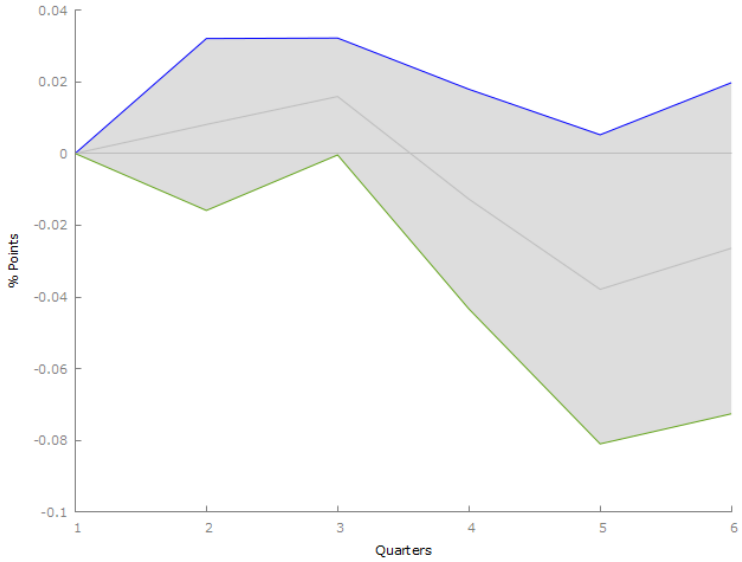
### 6.2 Quarterly Analysis

As outlined in the data section, the periodicity differences between U.S. and Mexican inflation expectations data necessitated the use of linear interpolation for U.S. inflation expectations across both short and long-run horizons. To evaluate potential biases introduced by this interpolation, I have re-estimated the IRFs for the robustness checks using only the original quarterly data. The aim is to determine whether the interpolation might have skewed the results, which should be consistent across both quarterly and monthly datasets if unbiased. However, using quarterly data could also introduce its own form of bias, especially since the endogenous variables for Mexico are monthly. This discrepancy may diminish the relevance of correlations and autocorrelations observed in the monthly data.

Figure 13 presents the IRF for the same model analyzed in Figure 10 (full sample, short-run Mexican inflation expectations considering inflation) but recalculated using only quarterly data. The results indicate that no period demonstrates a significant response, which differs markedly from the monthly data estimations. This discrepancy necessitates further analysis to ascertain which estimation might be biased—whether the quarterly data lacks sufficient granularity to capture the dynamics adequately, or if the monthly data is distorted by the interpolation process. Still, there is a similar pattern, as the point estimation shows a clear positive response which peaks around the 3rd quarter and is close to being statistically significant. This is consistent with the monthly analysis, where a positive response seems to be maintained up until the 9th to 10th month. Although data scarcity makes it difficult to prove a statistically significantly result, it is clear the point estimates show a positive response that persists for the same duration as monthly results.

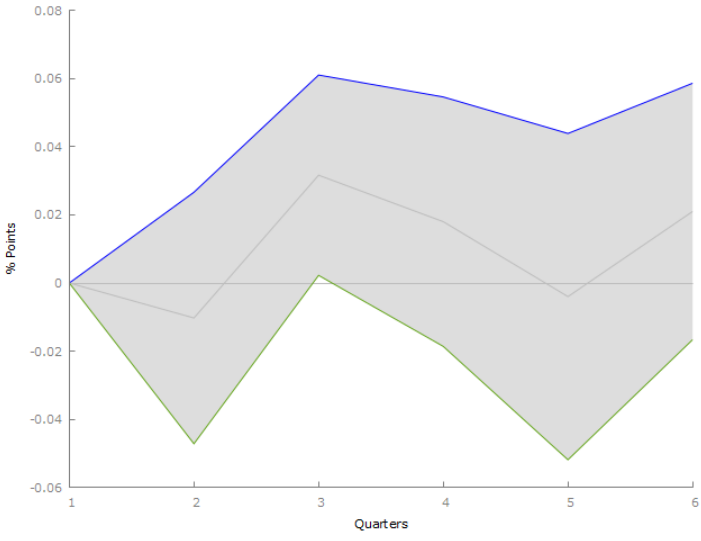
Figure 14 depicts the IRF of post-August 2008 short-run Mexican inflation expectations in response to a SD shock in U.S. inflation expectations, while incorporating contemporary Mexican inflation and using only quarterly data. This graph corresponds to the robustness check for the model used in Figure 11, which focused on the post-financial crisis period. Like the full-sample analysis, this figure appears to show a non-significant effect of US inflation expectations over the Mexican ones. Nevertheless, once again, there appears to be a marginal positive effect observed around the third quarter. This subtle response aligns with previous results of a positive relationship between shifts in US inflation expectations and Mexican ones.

***Figure 13:*** *IRF of short-run Mexican inflation expectations to a SD shock (.39 p.p.) in US short-run inflation expectations considering Mexican inflation and only quarterly data.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

***Figure 14:*** *IRF of post financial crisis short-run Mexican inflation expectations to a SD shock (.45 p.p.) in US short-run inflation expectations considering Mexican inflation and only using quarterly data.*

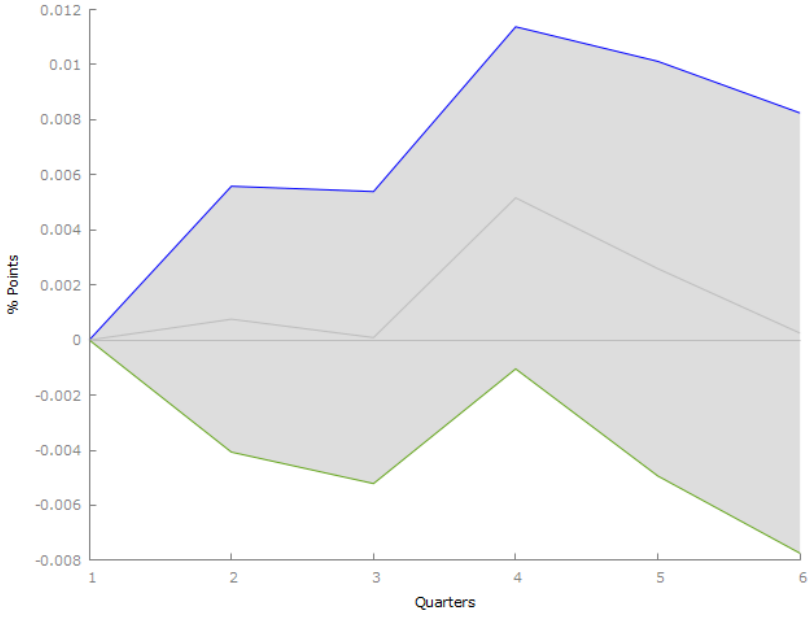



*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

Figure 15 presents the IRF of long-run Mexican inflation expectations in response to a SD shock in U.S. long-run inflation expectations, considering only quarterly data. This figure is

part of a robustness check that follows the analysis in Figure 13 and 14 for short-run expectations. Despite using sparser quarterly data, Figure 15 shows a pattern like what was observed in the long-run horizon analysis of previous figures, where U.S. inflation shocks did not significantly influence Mexican long-run inflation expectations. This consistency across different data frequencies reinforces the conclusion that Mexican long-run inflation expectations are well-anchored and relatively unaffected by external shocks from U.S. inflation. However, compared to Figure 12, a positive effect appears observable from Figure 15. It could be that higher frequency data may have biased initial results causing what appeared to be a negative effect from the external shock. In this sense, as long run inflation expectations are more stable than short-run inflation expectations, it could be that interpolating data added variations that generated an uncertain effect when compared to the clear positive one observed in Figure 15.

***Figure 15****:IRF of long-run Mexican inflation expectations to a SD shock (.07 p.p.) in US long-run inflation expectations considering Mexican inflation and only using quarterly data.*




*Source: Own estimation.*
*Note: Shaded area represents 90% confidence intervals. Standard errors estimated using Newey-West method.*

## 7. Discussion

Previous works concerning the effect U.S. economic variables had in Mexico mainly focused on the relationship of business cycles and economic activity. This dissertation pioneers in this area as it focuses on the effect that inflation expectations in the US have over inflation expectations in Mexico. Considering that well anchored inflation expectations must be resilient to shocks in US inflation expectations, this dissertation is also relevant for inflation expectations anchorage analysis in Mexico. In this sense, to attempt such analysis, the dissertation began by analyzing the data and conducting structural breaks testing for the short-run inflation expectations, to validate a difference between the US-Mexican inflation expectations dynamics post 2008 financial crisis.

The initial results show that post 2008 financial crisis, short-run Mexican inflation appear to react more to US short-run inflation expectations but for a smaller period. Nevertheless, robustness checks considering current inflation appear to make the periodicity of the effect almost the same, but with a smaller response in the full sample results. Such robustness checks provide and insightful result: considering inflation does not introduce the same IRF estimation difference for the post 2008 financial crisis sample as it does for the full sample. This result coincides with previous findings of inflation expectation dynamics in Mexico (García, 2023; Acosta, 2017), where it is shown that post 2008 financial crisis, inflation expectations are better anchored. In this sense, the evidence provided in the robustness checks complements previous analysis. Yet, it adds an important perspective: shocks in the US inflations expectations certainly have effects in Mexican inflation expectations. Moreover, Mexican inflation expectations appear to be more reactive to U.S. inflation expectations now than they were before the financial crisis. This result is significant specially when considering Banxico's policy making, as it must certainly react to increases in Mexican inflation expectations. Being capable to anticipate such increases through analysis of US inflation expectations and quickly responding to them could affect the effectiveness of monetary policy. In this sense, this work poses as evidence that must be considered for policymaking.

Following the short-run horizon inflation expectations analysis, long-run inflation expectations horizon analysis showed that such expectations seem to be unaffected by possible US shocks. This result is aligned with previous results (Garcia, 2023; Acosta, 2017) as the

anchorage is more noticeable when expanding the horizon of the expectations. As with short-run expectations, robustness checks for current inflation where considered. Such results provided not much difference from the original results, as long-run expectations are unrelated to current inflation (García 2023, Acosta 2017). In this sense, these robustness checks provided internal validity which confirmed the robustness of the initial results. Again, such results become important when considering anchorage and inflation dynamics, as they show that long-run inflation expectations in Mexico are clearly anchored.

Following these analyses, an additional robustness check was conducted to ensure that the results were not biased by the interpolated data. This check aimed to find consistent results when using only quarterly data. However, using sparser data may introduce its own bias. Future works could explore this robustness check further through different techniques or data sets to verify any potential bias. Despite these challenges, the short-run quarterly analysis provided results similar to the monthly ones, especially regarding the timing of the shock, where results aligned for both data frequencies. For the long run, the quarterly data indicated a positive yet non-statistically significant effect, differing in direction from the monthly results but confirming the probable mechanism not observed at lower data frequency. Still, it appears that for both frequencies, long-run Mexican inflation expectations remain unaffected by shocks in U.S. inflation expectations.

In this sense, the results provided in this dissertation provide two main insights:

1) Current short-run inflation expectations have a positive and higher response to shifts in US inflation expectations compared to pre-financial crisis Mexican inflation expectations.
2) Long-run Mexican inflation expectations are unaffected by shocks to US inflation expectations, evidencing a high level of anchorage.

Considering the intricate dynamics of the Mexican and US economy it would be valuable to revise if the dynamic described by the different IRFs is maintained for the future. It would be reasonable to think that as Mexican and US dynamics become more integrated the results described in this dissertation would be certainly affected by such international shifts.

## Appendix

### 1. Bai-Perron tests

The Bai-Perron test detects structural breaks in time series data by running multiple regressions to identify significant changes in regression coefficients over time. It segments the data into potentially multiple intervals, each with its own regression model, and tests for consistency in the coefficients across these models. A significant shift in coefficients suggests a structural break at that point in the data. The optimal number of breaks and their locations are determined by different statistics, for this model I focus on the Bayesian Information Criterion (BIC) or the Liu-Wu-Zidek criterion (LWZ), which balance the model's fit against its complexity. The test includes procedures to ensure robustness, such as trimming to avoid breaks too close to the ends of the data series.

For this specific case, the estimated regression is:

$$\pi^{e^{mx}}_{t+h|t} - \pi^{e^{*}}_{t+h|t} = \beta_0 + \beta_1 \pi^{e^{mx}}_{t+h|t} + \beta_2\, i^{mx} + \beta_3 gdp_t{}^{mx} + \beta_4 gdp_t{}^{*}$$

*(4)*

Where the variables maintain the same notation as described in the text. For the finding of the structural breaks, $\beta_0$ and $\beta_1$ are the coefficients which can vary, referring to the thoroughly described topic of change in the dynamics of inflation expectations in Mexico. Table 1 presents the results of the Bai-Perron testing as well as the information criteria considered for deciding the optimal number of breaks.

***Table 1**: Summary of identified breaks and information criteria.*

| Breaks | SSR | Dates | BIC | LWZ |
|---|---|---|---|---|
| 0 | - | - | -2.454 | -2.447 |
| 1 | 8.86409 | 68 (2008:08) | -3.286 | -3.203 |
| 2 | 6.12358 | 68 (2008:08), 215 (2020:11) | -3.590 | -3.431 |
| 3 | 5.86770 | 68 (2008:08), 123 (2013:03), 215 (2020:11) | -3.567 | -3.333 |

*Source: Own estimation.*
*Note: The number of breaks chosen by Bayesian Information Criterion (BIC) and Liu-Wu-Zidek (LWZ) criterion is 2. The Bai-Perron results were estimated using GRETL. Specifically, using the StrucBreak function package created by Riccardo "Jack" Lucchetti and Allin Cottrell.*

## 2. Descriptive statistics for endogenous and exogenous variables

***Table 2:*** *Descriptive statistics of the variables used.*

| Variable | N | Min | 1st Qu. | Median | Mean | 3rd Qu. | Max | $\sigma^2$ |
|---|---|---|---|---|---|---|---|---|
| Short-run Mx inf. exp. | 253 | 3.170 | 3.610 | 3.840 | 3.906 | 4.100 | 5.460 | 0.16 |
| Long-run Mx inf. exp. | 186 | 3.3 | 3.467 | 3.5 | 3.481 | 3.5 | 3.6 | 0.004 |
| MX inflation | 253 | 2.130 | 3.550 | 4.200 | 4.450 | 5.020 | 8.700 | 0.004 |
| IGAE | 253 | 73.25 | 82.11 | 89.71 | 89.33 | 97.33 | 104.47 | 78.7 |
| GDP | 253 | 72.22 | 82.03 | 88.08 | 90.63 | 99.87 | 113.12 | 115.73 |
| $TIIE_{28}$ | 253 | 3.29 | 4.79 | 6.40 | 6.50 | 7.97 | 11.54 | 4.85 |
| Short-run US inf. exp. | 253 | 1.560 | 1.980 | 2.150 | 2.214 | 2.380 | 3.600 | 0.14 |
| Long-run US inf. exp. | 186 | 2.030 | 2.220 | 2.360 | 2.357 | 2.500 | 2.950 | 0.02 |
| FIX | 253 | 10.11 | 11.39 | 13.34 | 15.03 | 18.89 | 24.27 | 14.34 |
| GSCPI | 253 | -1.56 | -0.51 | -0.13 | 0.14 | 0.39 | 4.36 | 1.13 |
| Effective rate | 253 | 0.050 | 0.120 | 0.770 | 1.494 | 2.280 | 5.330 | 3.05 |

*Source: Own estimation.*

**Declaration of Generative AI and AI-assisted technologies in the writing process:** During the preparation of this work the ChatGPT 4 was used to improve readability and language. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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