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RESEARCH ARTICLE

Money, Interest Rates and Inflation in Mexico, 1985–2025: Extreme Bounds Analysis Within Clusters of Policy-Homogeneous Years

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Abstract

This paper estimates the Mexican money–inflation relationship three ways on annual data for 1985–2025. Log inflation y is the dependent variable, log broad-money growth x is the focus variable, and six doubtful variables — real output growth, unemployment, peso depreciation, terms-of-trade growth, the public sector borrowing requirement and the log policy interest rate — generate a model space of $K = 2^6 - 1 = 63$ specifications. The first exercise estimates that space over the whole sample with money growth entered contemporaneously; the second repeats it with money growth lagged one year; the third partitions the sample into three clusters of policy-homogeneous years and re-estimates within each.

The first two exercises agree completely and appear conclusive. Every one of the 63 specifications is positive and significant at the 5% level in both, so the robustness share Θ equals 1.000, and no estimate is wrong-signed. The mean coefficient is 0.618 contemporaneously and 0.552 at one lag, with Leamer extreme bounds of [0.005, 1.261] and [0.043, 1.238]. Both criteria return robust. On the conventions used throughout this research programme the Mexican relationship would be recorded as settled.

The clusters show that it is not. Over 1985–1994, when the peso was anchored and Banco de México was not autonomous, the share is 0.143 and the bounds are [−0.729, 1.548]. Over 1995–2009, spanning the float and the transition to targeting, the share is 1.000 with a mean of 0.886. Over 2010–2025, under mature inflation targeting, the share is 0.000, the mean coefficient is −0.094, one of seven estimates is wrong-signed and adjusted R^2 falls to between 0.09 and 0.26. The pooled result is produced almost entirely by the middle cluster.

Two methodological points follow. A pooled extreme bounds exercise reports an average across regimes that may correspond to no regime that existed, and the Mexican pooled coefficient of 0.618 lies between a cluster estimate of 0.886 and one of −0.094. And the model space must shrink with the sample: enumerating 63 specifications on a ten-year cluster would leave two residual degrees of freedom in the largest models, so the cluster exercise uses a three-variable doubtful set and K = 7. Section 5.3 sets out the arithmetic.

Keywords: *Mexico; extreme bounds analysis; specification uncertainty; quantity theory of money; policy clusters; regime pooling; degrees of freedom; Banco de México*

Data note. The empirical results below were computed from an annual series set assembled offline. The inflation, real output and unemployment series follow published INEGI and Banco de México aggregates; the broad-money, exchange-rate, terms-of-trade, fiscal and interest rate series are reconstructed approximations, and the 2025 observations are preliminary. The policy rate is the 28-day CETES rate to 2007 and the Banco de México target rate thereafter, log-transformed on the same basis as every other rate in the model. The exchange-rate series spans the 1993 removal of three zeros from the peso

1. Introduction

Mexico ran inflation of 131.8 per cent in 1987 and 2.7 per cent in 2015. Across those four decades the exchange rate moved from a crawling peg to a band to a free float, the central bank acquired constitutional autonomy, and the monetary framework moved from an incomes-policy pact through base-money targeting to a formal inflation target. An econometric relationship estimated across the whole of that period is estimated across at least three distinct monetary arrangements.

Leamer (1983) supplies a method for handling one kind of uncertainty about such an exercise. His argument is that disagreement about estimated coefficients is a property of non-experimental inference rather than a failure of individual researchers: investigators search across specifications, report the survivor, and publish standard errors that take no account of the search. The remedy developed in Leamer and Leonard (1983) and Leamer (1985) is to estimate the entire space of defensible specifications and report the extreme values the coefficient of interest can take.

That procedure addresses uncertainty about which variables to condition on. It says nothing about which observations to pool. This paper applies the procedure three times to the same Mexican data: over the whole sample with money growth entered contemporaneously, over the whole sample with money growth lagged one year, and separately within three clusters of years grouped by the homogeneity of the monetary arrangement in force.

The first two exercises produce the strongest possible verdict. All 63 specifications are significant and correctly signed in both, the robustness share is 1.000, and both the share criterion and Leamer's own criterion return robust. The mean coefficient is 0.618 contemporaneously and 0.552 at a one-year lag. A reader given only those results would conclude that the Mexican money–inflation elasticity is settled at roughly six tenths.

The cluster exercise shows that no such elasticity exists. Under the anchored regime of 1985–1994 the share is 0.143 and the bounds run from −0.729 to 1.548. Under the float and transition of 1995–2009 the share is 1.000 and the mean is 0.886. Under mature inflation targeting from 2010 the share is 0.000, the mean is −0.094, and the model explains between nine and twenty-six per cent of the variance. The pooled figure of 0.618 is an average of 0.886 and −0.094 weighted by the variance each cluster contributes, and it describes neither.

Two methodological consequences are developed. The first is that extreme bounds analysis conditions on a sample as well as on a specification, and the sample is a researcher choice as arbitrary as the conditioning set. The second is arithmetic: a model space cannot be enumerated without regard to the observations available, since 63 specifications on a ten-year cluster would leave two residual degrees of freedom in the largest models. Section 5.3 sets out the rule used here, which is that the doubtful set must shrink as the sample does.

2. The Mexican Framework and Its Regimes

The forty-one years examined here contain three monetary arrangements that differ in every dimension that matters for estimation: the exchange rate regime, the operating instrument, and the legal status of the central bank.

From 1985 to 1994 the peso was managed, first under a crawling peg and from late 1991 within a widening band. The Pacto de Solidaridad Económica of December 1987 added an incomes policy to the exchange rate anchor, and inflation fell from 131.8 per cent in 1987 to 7.0 per cent in 1994. Banco de México received constitutional autonomy only in April 1994, eight months before the arrangement collapsed.

From December 1994 the peso floated. The Bank operated base-money targets under an International Monetary Fund programme, inflation returned to 35 per cent in 1995, and disinflation resumed. A formal inflation target was adopted in 2001 and a three per cent objective from 2003, so the period to 2009 spans the construction of the current framework rather than its operation.

From 2010 the framework has been stable: a floating peso, an autonomous central bank, an announced target of three per cent with a variability interval of one point either side, and the overnight interbank rate as the instrument. Inflation has averaged 4.3 per cent with a standard deviation of 1.3 in log-transformed terms, against 36.1 and 28.8 in the first cluster.

Table 1

Mexican Studies of Money, Stabilisation and the Policy Framework

Study	Period / focus	Principal finding
Ortiz (1983)	1970s–80s; currency substitution	Dollarisation destabilises money demand and weakens the domestic aggregate
Aspe (1993)	1982–1992; reform	Insider account of the stabilisation and the Pacto
Dornbusch & Werner (1994)	1988–1994	Warns that the anchored peso had become overvalued
Taylor (1993)	Policy rules	Specifies the reaction function that makes the instrument a function of inflation
Calvo & Mendoza (1996)	1994–95	Reserve losses and dollar-indexed debt made the collapse foreseeable
Kamin & Rogers (1996)	1988–1994	Analyses the terminal dynamics of an exchange-rate-based stabilisation
Santaella & Vela (1996)	1987–1994; the Pacto	Classifies the disinflation as exchange-rate-based with an incomes-policy component
Clarida, Galí & Gertler (2000)	Reaction functions	Estimating rules requires instrumenting because the rate responds to the target variable
Ramos-Francia & Torres (2005)	1999–2004	Official assessment of the transition to a formal inflation target
Capistrán & Ramos-Francia (2009)	1980s–2000s	Inflation persistence falls after targeting adoption
Chiquiar, Noriega & Ramos-Francia (2010)	1995–2008	Statistical break in inflation persistence dated to the targeting framework
Cortés Espada (2013)	2000s	Exchange rate pass-through declines substantially under the target
Romer & Romer (2004)	Narrative shocks	Constructs policy shocks from the record to avoid an endogenous instrument
Leamer (1983, 1985)	Specification search	The framework applied here
Leamer & Leonard (1983)	Fragility	Introduces the extreme bounds computation used throughout
Sala-i-Martin (1997)	Specification search	Demonstrates the instability of coefficients across large model spaces

Note. Compiled by the author from the cited sources.

Table 2

Mexican Monetary Regimes, the Policy Rate and Inflation, 1985–2025

Period	Regime	Inflation	Policy rate	Dominant mechanism
1985–1987	Crawling peg; post-crisis adjustment	57.7–131.8%	63–96%	Repeated devaluation with indexation; inflation accelerates
December 1987	Pacto de Solidaridad Económica	131.8%	96%	Coordinated reset of prices, wages and the exchange rate
1988–1993	Disinflation under the Pacto	9.8–114.2%	15–69%	Exchange rate anchor with incomes policy; inflation to single digits
April 1994	Banco de México granted autonomy	7.0%	14%	Constitutional independence with price stability as the mandate
December 1994	Tequila crisis; peso floats	7.0%	14%	Band abandoned; inflation returns to 35 per cent
1995–2000	Base-money targeting under the float	9.5–35.0%	15–48%	Quantitative framework; gradual disinflation
2001–2003	Inflation targeting adopted	4.5–6.4%	6.2–11%	Formal target; three per cent objective from 2003
2004–2009	Framework consolidating	3.6–5.3%	5.4–9.2%	Overnight rate becomes the operational instrument
2010–2019	Mature targeting	2.7–6.0%	3.0–8.0%	Inflation near target; pass-through declines
2020–2025	Pandemic and global inflation	3.4–7.9%	4.3–11.2%	Rate raised to 11.25 per cent then reduced

Note. Inflation figures are annual averages of the consumer price index. The policy rate is the 28-day CETES rate to 2007 and the Banco de México target rate thereafter, shown here in raw per cent. The 2025 figures are preliminary.

3. Framework

3.1 The estimating equation

The framework is the equation of exchange. The identity is

$$MV = PQ \quad (1)$$

with M the broad money stock, V its income velocity, P the price level and Q real output. In logarithms and first differences,

$$y = x + v - g \quad (2)$$

where y, x, v and g are the growth rates of prices, broad money, velocity and real output. The estimating equation conditions equation (2) on a set of doubtful variables:

$$y_t = a_0 + \beta\, x_{t-k} + \Sigma_i\, \delta_i\, w_{i,t} + e_t \quad (3)$$

3.2 What the pooled coefficient estimates

Suppose the sample contains C regimes, indexed c, with regime-specific coefficients β^c and durations T^c. Ordinary least squares applied to the pooled sample returns a variance-weighted average of the regime coefficients:

$$\hat{\beta} = \Sigma^c\, \omega^c\, \beta^c, \quad \omega^c = SS^c(x) \,/\, \Sigma_k\, SS_k(x) \quad (4)$$

Equation (4) is the standard result and is unobjectionable where the β^c are similar. Where they are not, the pooled estimate is an artefact of the weights, and the weights are determined by which regime happened to contain the most variation in the regressor. Section 6.4 reports β^c of 0.582, 0.886 and −0.094 for the three Mexican clusters, against a pooled estimate of 0.618. The pooled figure lies inside the range and corresponds to no arrangement that operated.

3.3 Why the regimes should differ

Three mechanisms make β regime-specific in the Mexican case. Under the anchored arrangement of 1985–1994 the price level was pinned by the exchange rate and by the Pacto, so money was largely accommodating and β measures whatever the accommodation produced. Under the float of 1995–2009 neither an external anchor nor a credible internal one operated, and money growth and inflation were free to move together. Under the target from 2010 Banco de México offsets forecastable inflationary impulses, so that

$$y_t = y^* + \varepsilon_t, \;\; E[\varepsilon_t \mid \Omega_{t-1}] = 0 \;\square\; plim\, \hat{\beta} \to 0 \quad (5)$$

Equation (5) predicts attenuation toward zero in the third cluster, which Section 6.4 confirms, and offers no reason to expect the three coefficients to coincide. The presumption behind a pooled estimate is therefore not merely unverified but contrary to the stated purpose of the institutional changes.

3.4 The policy rate as a conditioning variable

The doubtful set includes the policy interest rate. Under a reaction function of the Taylor type the instrument responds to inflation, so conditioning on it absorbs the systematic policy response and the coefficient it carries records the rule rather than any transmission from rates to prices. Section 6.5 finds the rate significant in all thirty-two specifications containing it, with a mean coefficient of +0.654, and the rate–inflation correlation in Table 5 is +0.952. That figure should be read as the reaction function and not as an estimate of monetary transmission.

4. Data and Variable Construction

The sample is annual Mexican data for 1985–2025 (T = 41; T = 40 in the lagged variant; T = 10, 15 and 16 in the three clusters). All rate variables, including the policy rate, are log-transformed as 100 × ln(1 + r/100). The transformation matters here: without it the 1987 observations of 131.8 per cent inflation, 126 per cent money growth and a 96 per cent policy rate would dominate the sums of squares arithmetically.

Table 3

Variable Definitions, Notation and Sources

Symbol	Code	Variable	Construction	Source
y	INF	Inflation (dependent)	100 ln(1 + CPI inflation/100)	INEGI
x	MON	Broad money growth (focus)	100 ln(1 + M2 growth/100)	Banco de México
w_1	GRW	Real output growth	100 ln(1 + real GDP growth/100)	INEGI; World Bank WDI
w_2	UNE	Unemployment	Open unemployment rate, %	INEGI (ENOE from 2005)
w_3	DEP	Peso depreciation	100 ln(1 + peso/USD	Banco de México

Symbol	Code	Variable	Construction	Source
			depreciation/100)	
w_4	TOT	Terms-of-trade growth	100 ln(1 + terms-of-trade change/100)	Banco de México; World Bank
w_5	FIS	Fiscal balance	Public sector borrowing requirement, % of GDP	Secretaría de Hacienda
w_6	INT	Policy interest rate	100 ln(1 + rate/100); CETES 28d to 2007, target rate after	Banco de México

Note. The exchange-rate series spans the 1993 redenomination, in which three zeros were removed from the peso. Open unemployment understates labour underutilisation in Mexico.

Table 4 reports descriptive statistics and Table 5 the correlation matrix. The matrix shows why the pooled exercise produces such an emphatic verdict: inflation is correlated with money growth at +0.923, with the policy rate at +0.952 and with depreciation at +0.849, and all three correlations are dominated by the first cluster, where every series was an order of magnitude more variable than in the third.

Table 4

Descriptive Statistics, Transformed Series, 1985–2025

Variable	Mean	Std. dev.	Minimum	Maximum
y inflation	14.36	19.48	2.66	84.07
x broad money growth	18.78	16.17	4.88	81.54
w_1 real output growth	2.16	3.28	−8.99	6.58
w_2 unemployment	3.77	0.96	2.20	6.20
w_3 peso depreciation	12.08	21.78	−12.78	83.29
w_4 terms-of-trade growth	0.01	5.44	−22.31	7.70
w_5 fiscal balance	2.73	4.18	−5.00	16.00
w_6 policy interest rate	16.07	16.66	2.96	67.29

Note. All rates are log-transformed as 100 × ln(1 + r/100); unemployment and the fiscal balance are in levels. A value of 84.07 for inflation corresponds to 131.8 per cent.

Table 5

Correlation Matrix, Transformed Series, Whole Sample

	y	x	GRW	UNE	DEP	TOT	INT
y inflation	1.000	0.923	−0.122	0.073	0.849	−0.239	0.952
x money growth	0.923	1.000	−0.010	−0.021	0.774	−0.143	0.930
GRW output growth	−0.122	−0.010	1.000	−0.322	−0.420	0.436	−0.141
UNE unemployment	0.073	−0.021	−0.322	1.000	0.321	−0.102	0.025
DEP depreciation	0.849	0.774	−0.420	0.321	1.000	−0.398	0.851
TOT terms of trade	−0.239	−0.143	0.436	−0.102	−0.398	1.000	−0.248
INT policy rate	0.952	0.930	−0.141	0.025	0.851	−0.248	1.000

Note. These are whole-sample correlations. Table 8 reports the money–inflation correlation within each cluster, where it is +0.872, +0.924 and −0.405.

5. Methodology

5.1 The model space

Let W = {w_1, …, w_6} be the doubtful set. The model space is every non-empty subset of W:

$$K = 2^{|W|} - 1 = 2^6 - 1 = 63 \quad (6)$$

Specification j contains y, the focus variable x, and one subset of W, so the number of regressors ranges from two to seven:

$$y_t = a_{0j} + \beta_j x_t + \Sigma_{i \in S_j} \delta_{ij} w_{i,t} + e_{jt}, \quad j = 1, \ldots, K \quad (7)$$

5.2 The two criteria

The robustness share, written Θ, is

$$\Theta = \#\{ j : sign(\beta_j) = sign(\bar{\beta}) \text{ and } p_j < \alpha \} / K \quad (8)$$

with the relationship judged robust if Θ > 0.60 and fragile otherwise. Leamer's own criterion computes

$$\beta_{max} = max_j(\beta_j + 2 \cdot se_j), \quad \beta_{min} = min_j(\beta_j - 2 \cdot se_j) \quad (9)$$

and declares robustness only if the two bounds share a sign. Both are reported for every configuration, together with the range of adjusted R^2 across the space, which Section 6.4 uses to distinguish a fragile verdict arising from genuine uncertainty from one arising from a model that explains little.

5.3 The size of the doubtful set and the size of the sample

A model space cannot be enumerated without regard to the observations available. The largest specification in a six-variable space contains seven regressors and an intercept, so on a cluster of ten annual observations it would leave two residual degrees of freedom. The resulting standard errors would be arbitrary and the bounds computed from them meaningless.

The rule adopted here is that the doubtful set must shrink with the sample. Writing d for the minimum residual degrees of freedom the investigator is willing to accept, the admissible number of doubtful variables satisfies

$$|W| \leq T - d - 2 \quad (10)$$

With T = 10 and d = 5, expression (10) permits three doubtful variables and a model space of $K = 2^3 - 1 = 7$. The cluster exercise in Section 6.4 therefore uses the reduced set {GRW, DEP, INT}, chosen as the three variables that carry explanatory weight in the overall space reported in Section 6.5. The minimum residual degrees of freedom are 5, 10 and 11 in the three clusters.

The reduction is a cost and should be stated as one. A seven-model space explores far less of the specification uncertainty than a sixty-three-model space, so the cluster bounds are narrower than a full enumeration would produce and understate the true range. That understatement runs against the paper's conclusion rather than toward it: the clusters disagree with one another even on a conservative enumeration.

6. Results

6.1 The overall exercise

Table 6 reports every specification in the full space with money growth entered contemporaneously.

Table 6

Overall EBA: Full Model Space, Contemporaneous Money Growth, 1985–2025

#	Doubtful variables included	Reg.	β	SE	t	p	Adj. R^2	β ± 2SE
1	GRW	2	1.1113	0.0718	15.48	.000	0.858	[0.968, 1.255]
2	UNE	2	1.1150	0.0729	15.29	.000	0.854	[0.969, 1.261]
3	DEP	2	0.7991	0.0988	8.09	.000	0.892	[0.602, 0.997]
4	TOT	2	1.0939	0.0729	15.02	.000	0.857	[0.948, 1.240]
5	FIS	2	0.9209	0.0831	11.08	.000	0.885	[0.755, 1.087]
6	INT	2	0.3434	0.1532	2.24	.031	0.912	[0.037, 0.650]
7	GRW, UNE	3	1.1131	0.0718	15.50	.000	0.858	[0.969, 1.257]
8	GRW, DEP	3	0.7570	0.1190	6.36	.000	0.891	[0.519, 0.995]
9	GRW, TOT	3	1.0991	0.0725	15.16	.000	0.859	[0.954, 1.244]
10	GRW, FIS	3	0.9373	0.0842	11.14	.000	0.886	[0.769, 1.106]
11	GRW, INT	3	0.3713	0.1639	2.27	.029	0.910	[0.044, 0.699]
12	UNE, DEP	3	0.7757	0.1117	6.94	.000	0.890	[0.552, 0.999]
13	UNE, TOT	3	1.0975	0.0720	15.23	.000	0.860	[0.953, 1.242]
14	UNE, FIS	3	0.9317	0.0830	11.23	.000	0.887	[0.766, 1.098]
15	UNE, INT	3	0.3681	0.1527	2.41	.021	0.914	[0.063, 0.673]
16	DEP, TOT	3	0.8055	0.1043	7.72	.000	0.890	[0.597, 1.014]
17	DEP, FIS	3	0.7574	0.0952	7.96	.000	0.904	[0.567, 0.948]
18	DEP, INT	3	0.3674	0.1489	2.47	.018	0.918	[0.070, 0.665]
19	TOT, FIS	3	0.9283	0.0841	11.04	.000	0.884	[0.760, 1.096]
20	TOT, INT	3	0.3678	0.1592	2.31	.027	0.911	[0.049, 0.686]
21	FIS, INT	3	0.3681	0.1449	2.54	.015	0.922	[0.078, 0.658]
22	GRW, UNE, DEP	4	0.7311	0.1314	5.56	.000	0.888	[0.468, 0.994]
23	GRW, UNE, TOT	4	1.1005	0.0724	15.20	.000	0.859	[0.956, 1.245]
24	GRW, UNE, FIS	4	0.9416	0.0844	11.15	.000	0.886	[0.773, 1.110]
25	GRW, UNE, INT	4	0.3743	0.1628	2.30	.027	0.912	[0.049, 0.700]
26	GRW, DEP, TOT	4	0.7628	0.1215	6.28	.000	0.888	[0.520, 1.006]
27	GRW, DEP, FIS	4	0.7156	0.1140	6.28	.000	0.902	[0.488, 0.944]
28	GRW, DEP, INT	4	0.3298	0.1597	2.06	.046	0.916	[0.010, 0.649]
29	GRW, TOT, FIS	4	0.9389	0.0852	11.02	.000	0.883	[0.768, 1.109]

#	Doubtful variables included	Reg.	β	SE	t	p	Adj. R^2	β ± 2SE
30	GRW, TOT, INT	4	0.3808	0.1669	2.28	.029	0.908	[0.047, 0.715]
31	GRW, FIS, INT	4	0.3755	0.1552	2.42	.021	0.920	[0.065, 0.686]
32	UNE, DEP, TOT	4	0.7809	0.1201	6.50	.000	0.887	[0.541, 1.021]
33	UNE, DEP, FIS	4	0.7477	0.1067	7.00	.000	0.901	[0.534, 0.961]
34	UNE, DEP, INT	4	0.3723	0.1512	2.46	.019	0.916	[0.070, 0.675]
35	UNE, TOT, FIS	4	0.9380	0.0840	11.16	.000	0.885	[0.770, 1.106]
36	UNE, TOT, INT	4	0.3881	0.1586	2.45	.019	0.912	[0.071, 0.705]
37	UNE, FIS, INT	4	0.3874	0.1451	2.67	.011	0.923	[0.097, 0.678]
38	DEP, TOT, FIS	4	0.7512	0.1016	7.39	.000	0.901	[0.548, 0.954]
39	DEP, TOT, INT	4	0.3666	0.1550	2.36	.024	0.915	[0.057, 0.677]
40	DEP, FIS, INT	4	0.3809	0.1439	2.65	.012	0.923	[0.093, 0.669]
41	TOT, FIS, INT	4	0.3701	0.1511	2.45	.019	0.920	[0.068, 0.672]
42	GRW, UNE, DEP, TOT	5	0.7383	0.1358	5.44	.000	0.885	[0.467, 1.010]
43	GRW, UNE, DEP, FIS	5	0.7041	0.1253	5.62	.000	0.899	[0.454, 0.955]
44	GRW, UNE, DEP, INT	5	0.3352	0.1625	2.06	.047	0.914	[0.010, 0.660]
45	GRW, UNE, TOT, FIS	5	0.9436	0.0855	11.04	.000	0.883	[0.773, 1.115]
46	GRW, UNE, TOT, INT	5	0.3850	0.1657	2.32	.026	0.910	[0.054, 0.716]
47	GRW, UNE, FIS, INT	5	0.3781	0.1544	2.45	.019	0.920	[0.069, 0.687]
48	GRW, DEP, TOT, FIS	5	0.7145	0.1172	6.10	.000	0.899	[0.480, 0.949]
49	GRW, DEP, TOT, INT	5	0.3328	0.1638	2.03	.050	0.914	[0.005, 0.660]
50	GRW, DEP, FIS, INT	5	0.3432	0.1543	2.22	.033	0.922	[0.035, 0.652]
51	GRW, TOT, FIS, INT	5	0.3756	0.1586	2.37	.023	0.917	[0.058, 0.693]
52	UNE, DEP, TOT, FIS	5	0.7383	0.1155	6.39	.000	0.898	[0.507, 0.969]
53	UNE, DEP, TOT, INT	5	0.3739	0.1582	2.36	.024	0.913	[0.058, 0.690]
54	UNE, DEP, FIS, INT	5	0.3880	0.1459	2.66	.012	0.922	[0.096, 0.680]
55	UNE, TOT, FIS, INT	5	0.3875	0.1511	2.57	.015	0.920	[0.085, 0.690]
56	DEP, TOT, FIS, INT	5	0.3690	0.1494	2.47	.019	0.921	[0.070, 0.668]
57	GRW, UNE, DEP, TOT, FIS	6	0.7016	0.1301	5.39	.000	0.897	[0.441, 0.962]
58	GRW, UNE, DEP, TOT, INT	6	0.3402	0.1671	2.04	.050	0.912	[0.006, 0.674]
59	GRW, UNE, DEP, FIS, INT	6	0.3510	0.1567	2.24	.032	0.920	[0.038, 0.665]
60	GRW, UNE, TOT, FIS, INT	6	0.3796	0.1578	2.40	.022	0.918	[0.064, 0.695]
61	GRW, DEP, TOT, FIS, INT	6	0.3384	0.1581	2.14	.040	0.920	[0.022, 0.655]
62	UNE, DEP, TOT, FIS, INT	6	0.3781	0.1523	2.48	.018	0.920	[0.074, 0.683]
63	GRW, UNE, DEP, TOT, FIS, INT	7	0.3477	0.1611	2.16	.038	0.918	[0.025, 0.670]

Note. Reg. = number of regressors. GRW = real output growth; UNE = unemployment; DEP = peso depreciation; TOT = terms-of-trade growth; FIS = fiscal balance; INT = policy interest rate. T = 41. Minimum residual degrees of freedom 33. Dependent variable: log CPI inflation.

All sixty-three estimates are positive and significant at the 5% level, so Θ = 1.000, and none is wrong-signed. The mean coefficient is 0.618 and the point estimates range from 0.330 to 1.115. The Leamer extreme bounds are [0.005, 1.261] and exclude zero, so both criteria return robust.

Two features of that result deserve notice before the clusters are introduced. The lower Leamer bound of 0.0052 clears zero by five parts in ten thousand, so a single additional doubtful variable would plausibly move it across. And adjusted R^2 ranges from 0.854 to 0.923, which is high for an annual inflation equation and reflects the concentration of variance in the first decade of the sample.

6.2 The one-year-lag exercise

Table 7 repeats the enumeration with money growth lagged one year.

Table 7

One-Year-Lag EBA: Full Model Space, Money Growth Lagged One Year, 1985–2025

#	Doubtful variables included	Reg.	β	SE	t	p	Adj. R^2	β ± 2SE
1	GRW	2	1.0140	0.0943	10.75	.000	0.749	[0.825, 1.203]
2	UNE	2	1.0397	0.0950	10.94	.000	0.752	[0.850, 1.230]
3	DEP	2	0.6426	0.0723	8.89	.000	0.901	[0.498, 0.787]
4	TOT	2	0.9808	0.1017	9.64	.000	0.715	[0.777, 1.184]
5	FIS	2	0.7766	0.0792	9.81	.000	0.858	[0.618, 0.935]
6	INT	2	0.2450	0.0997	2.46	.019	0.910	[0.046, 0.444]
7	GRW, UNE	3	1.0427	0.0923	11.29	.000	0.766	[0.858, 1.227]

#	Doubtful variables included	Reg.	β	SE	t	p	Adj. R^2	β ± 2SE
8	GRW, DEP	3	0.5932	0.0797	7.44	.000	0.904	[0.434, 0.753]
9	GRW, TOT	3	1.0179	0.0982	10.37	.000	0.742	[0.822, 1.214]
10	GRW, FIS	3	0.8005	0.0799	10.02	.000	0.861	[0.641, 0.960]
11	GRW, INT	3	0.2690	0.1080	2.49	.017	0.909	[0.053, 0.485]
12	UNE, DEP	3	0.6297	0.0822	7.66	.000	0.899	[0.465, 0.794]
13	UNE, TOT	3	1.0274	0.0976	10.53	.000	0.748	[0.832, 1.223]
14	UNE, FIS	3	0.8210	0.0765	10.74	.000	0.875	[0.668, 0.974]
15	UNE, INT	3	0.3088	0.1001	3.09	.004	0.918	[0.109, 0.509]
16	DEP, TOT	3	0.6346	0.0708	8.96	.000	0.906	[0.493, 0.776]
17	DEP, FIS	3	0.6236	0.0635	9.82	.000	0.924	[0.497, 0.751]
18	DEP, INT	3	0.3608	0.0979	3.68	.001	0.927	[0.165, 0.557]
19	TOT, FIS	3	0.7777	0.0798	9.74	.000	0.855	[0.618, 0.937]
20	TOT, INT	3	0.2455	0.1011	2.43	.020	0.908	[0.043, 0.448]
21	FIS, INT	3	0.3249	0.0922	3.52	.001	0.929	[0.140, 0.509]
22	GRW, UNE, DEP	4	0.5820	0.0884	6.58	.000	0.901	[0.405, 0.759]
23	GRW, UNE, TOT	4	1.0456	0.0961	10.89	.000	0.759	[0.853, 1.238]
24	GRW, UNE, FIS	4	0.8304	0.0776	10.70	.000	0.873	[0.675, 0.986]
25	GRW, UNE, INT	4	0.3126	0.1061	2.94	.006	0.916	[0.100, 0.525]
26	GRW, DEP, TOT	4	0.6022	0.0794	7.58	.000	0.905	[0.443, 0.761]
27	GRW, DEP, FIS	4	0.5811	0.0698	8.32	.000	0.926	[0.441, 0.721]
28	GRW, DEP, INT	4	0.3425	0.0997	3.44	.002	0.927	[0.143, 0.542]
29	GRW, TOT, FIS	4	0.8129	0.0795	10.23	.000	0.865	[0.654, 0.972]
30	GRW, TOT, INT	4	0.2708	0.1106	2.45	.019	0.906	[0.050, 0.492]
31	GRW, FIS, INT	4	0.3369	0.0989	3.41	.002	0.927	[0.139, 0.535]
32	UNE, DEP, TOT	4	0.6174	0.0806	7.66	.000	0.903	[0.456, 0.779]
33	UNE, DEP, FIS	4	0.6311	0.0720	8.76	.000	0.922	[0.487, 0.775]
34	UNE, DEP, INT	4	0.3681	0.0991	3.72	.001	0.926	[0.170, 0.566]
35	UNE, TOT, FIS	4	0.8237	0.0768	10.73	.000	0.874	[0.670, 0.977]
36	UNE, TOT, INT	4	0.3087	0.1015	3.04	.004	0.916	[0.106, 0.512]
37	UNE, FIS, INT	4	0.3844	0.0910	4.22	.000	0.936	[0.202, 0.566]
38	DEP, TOT, FIS	4	0.6119	0.0596	10.26	.000	0.934	[0.493, 0.731]
39	DEP, TOT, INT	4	0.3745	0.0985	3.80	.001	0.927	[0.177, 0.571]
40	DEP, FIS, INT	4	0.4052	0.0908	4.46	.000	0.939	[0.224, 0.587]
41	TOT, FIS, INT	4	0.3275	0.0929	3.52	.001	0.928	[0.142, 0.513]
42	GRW, UNE, DEP, TOT	5	0.5875	0.0878	6.69	.000	0.903	[0.412, 0.763]
43	GRW, UNE, DEP, FIS	5	0.5892	0.0775	7.60	.000	0.924	[0.434, 0.744]
44	GRW, UNE, DEP, INT	5	0.3499	0.1010	3.47	.001	0.926	[0.148, 0.552]
45	GRW, UNE, TOT, FIS	5	0.8414	0.0772	10.90	.000	0.876	[0.687, 0.996]
46	GRW, UNE, TOT, INT	5	0.3138	0.1087	2.89	.007	0.913	[0.096, 0.531]
47	GRW, UNE, FIS, INT	5	0.3799	0.0957	3.97	.000	0.934	[0.188, 0.571]
48	GRW, DEP, TOT, FIS	5	0.5927	0.0670	8.85	.000	0.933	[0.459, 0.727]
49	GRW, DEP, TOT, INT	5	0.3582	0.1020	3.51	.001	0.926	[0.154, 0.562]
50	GRW, DEP, FIS, INT	5	0.3874	0.0923	4.20	.000	0.939	[0.203, 0.572]
51	GRW, TOT, FIS, INT	5	0.3557	0.1010	3.52	.001	0.927	[0.154, 0.558]
52	UNE, DEP, TOT, FIS	5	0.6159	0.0678	9.09	.000	0.932	[0.480, 0.751]
53	UNE, DEP, TOT, INT	5	0.3793	0.0998	3.80	.001	0.926	[0.180, 0.579]
54	UNE, DEP, FIS, INT	5	0.4171	0.0911	4.58	.000	0.939	[0.235, 0.599]
55	UNE, TOT, FIS, INT	5	0.3899	0.0913	4.27	.000	0.936	[0.207, 0.573]
56	DEP, TOT, FIS, INT	5	0.4324	0.0889	4.86	.000	0.943	[0.254, 0.610]
57	GRW, UNE, DEP, TOT, FIS	6	0.5973	0.0742	8.04	.000	0.931	[0.449, 0.746]
58	GRW, UNE, DEP, TOT, INT	6	0.3629	0.1033	3.51	.001	0.924	[0.156, 0.570]
59	GRW, UNE, DEP, FIS, INT	6	0.3994	0.0927	4.31	.000	0.939	[0.214, 0.585]
60	GRW, UNE, TOT, FIS, INT	6	0.3974	0.0976	4.07	.000	0.934	[0.202, 0.593]
61	GRW, DEP, TOT, FIS, INT	6	0.4208	0.0927	4.54	.000	0.942	[0.235, 0.606]
62	UNE, DEP, TOT, FIS, INT	6	0.4403	0.0896	4.91	.000	0.943	[0.261, 0.619]
63	GRW, UNE, DEP, TOT, FIS, INT	7	0.4284	0.0933	4.59	.000	0.941	[0.242, 0.615]

Note. T = 40. Minimum residual degrees of freedom 32. All sixty-three estimates are significant at the 5% level and none is wrong-signed. Mean 0.552; range [0.245, 1.046]. Leamer extreme bounds [0.043, 1.238]. Adjusted R^2 ranges from 0.715 to 0.943.

The lagged exercise reproduces the contemporaneous one almost exactly. The share is again 1.000, both criteria again return robust, and the mean falls only from 0.618 to 0.552. The lower Leamer bound rises from 0.005 to 0.043, so the lagged configuration is the firmer of the two, but the difference is small.

Taken together the two exercises are as close to unanimous as this method can be. A hundred and twenty-six regressions across two horizons, all positive, all significant at five per cent, both criteria satisfied in both cases. Sections 6.3 and 6.4 show what that unanimity conceals.

6.3 The policy clusters

The sample is partitioned into three clusters of years grouped by the homogeneity of the monetary arrangement. The grouping is institutional and was fixed before estimation: each cluster holds one exchange rate regime, one operating framework and one legal status of the central bank. Table 8 reports the profile of each.

Table 8

Policy Cluster Profile

Cluster	Years	n	Mean y	SD y	Mean x	SD x	SD of INT	Corr(y, x)
I Anchored disinflation	1985-1994	10	36.08	28.75	39.83	19.85	20.98	0.872
II Float and transition	1995-2009	15	10.61	9.15	15.61	6.60	9.87	0.924
III Mature targeting	2010-2025	16	4.30	1.28	8.60	2.03	2.48	-0.405

Note. All figures in log-transformed units. The final column is the within-cluster correlation between inflation and broad money growth.

The profile establishes that the three clusters are not three samples from one population. Mean inflation falls from 36.1 to 10.6 to 4.3 log points and its standard deviation from 28.8 to 9.2 to 1.3. The standard deviation of the policy rate falls from 21.0 to 9.9 to 2.5. Every series is an order of magnitude more variable in the first cluster than in the third.

The final column is the result in outline. The within-cluster correlation between inflation and money growth is +0.872 in the first cluster, +0.924 in the second, and −0.405 in the third. A pooled estimate of a single β across those three is estimating an average of two strong positive associations and one moderate negative one.

6.4 Cluster estimation

Tables 9 to 11 report the seven-model space within each cluster.

Table 9

Cluster I: Anchored Disinflation, 1985–1994

#	Doubtful variables included	d.o.f.	β	SE	t	p	Adj. R^2	β ± 2SE
1	GRW	7	1.0924	0.2280	4.79	.002	0.807	[0.636, 1.548]
2	DEP	7	0.6374	0.3217	1.98	.088	0.835	[-0.006, 1.281]
3	INT	7	0.3552	0.4059	0.88	.410	0.840	[-0.456, 1.167]
4	GRW, DEP	6	0.7228	0.4082	1.77	.127	0.812	[-0.094, 1.539]
5	GRW, INT	6	0.5106	0.5019	1.02	.348	0.824	[-0.493, 1.514]
6	DEP, INT	6	0.3651	0.4090	0.89	.406	0.838	[-0.453, 1.183]
7	GRW, DEP, INT	5	0.3881	0.5585	0.69	.518	0.806	[-0.729, 1.505]

Note. T = 10; minimum residual degrees of freedom 5. Significant at the 5% level: 1 of 7 (Θ = 0.143); at the 10% level: 2 of 7. No estimate is wrong-signed. Mean across all models 0.582; range [0.355, 1.092]. Leamer extreme bounds [−0.729, 1.548]. Adjusted R^2 ranges from 0.806 to 0.840.

Table 10

Cluster II: Float and Transition, 1995–2009

#	Doubtful variables included	d.o.f.	β	SE	t	p	Adj. R^2	β ± 2SE
1	GRW	12	1.3592	0.1130	12.03	.000	0.911	[1.133, 1.585]
2	DEP	12	1.0903	0.1197	9.11	.000	0.917	[0.851, 1.330]
3	INT	12	0.4862	0.2096	2.32	.039	0.932	[0.067, 0.906]
4	GRW, DEP	11	1.1851	0.1992	5.95	.000	0.912	[0.787, 1.584]
5	GRW, INT	11	0.7225	0.3036	2.38	.036	0.933	[0.115, 1.330]
6	DEP, INT	11	0.6342	0.2652	2.39	.036	0.931	[0.104, 1.165]
7	GRW, DEP, INT	10	0.7206	0.3180	2.27	.047	0.926	[0.085, 1.357]

Note. T = 15; minimum residual degrees of freedom 10. Significant at the 5% level: 7 of 7 (Θ = 1.000). No estimate is wrong-signed. Mean 0.886; range [0.486, 1.359]. Leamer extreme bounds [0.067, 1.585]. Adjusted R^2 ranges from 0.911 to 0.933.

Table 11

Cluster III: Mature Inflation Targeting, 2010–2025

#	Doubtful variables included	d.o.f.	β	SE	t	p	Adj. R^2	β ± 2SE
1	GRW	13	-0.2216	0.1595	-1.39	.188	0.090	[-0.540, 0.097]
2	DEP	13	-0.1013	0.1598	-0.63	.537	0.260	[-0.421, 0.218]
3	INT	13	-0.1494	0.1806	-0.83	.423	0.117	[-0.511, 0.212]
4	GRW, DEP	12	-0.0936	0.1654	-0.57	.582	0.214	[-0.424, 0.237]
5	GRW, INT	12	-0.0582	0.1880	-0.31	.762	0.168	[-0.434, 0.318]
6	DEP, INT	12	-0.0378	0.1787	-0.21	.836	0.242	[-0.395, 0.320]
7	GRW, DEP, INT	11	0.0033	0.1868	0.02	.986	0.226	[-0.370, 0.377]

Note. T = 16; minimum residual degrees of freedom 11. Significant at the 5% or 10% level: 0 of 7 (Θ = 0.000). One estimate is wrong-signed relative to the model-space mean. Mean −0.094; range [−0.222, 0.003]. Leamer extreme bounds [−0.541, 0.377]. Adjusted R^2 ranges from 0.090 to 0.260.

The three clusters give three different answers. In the first the relationship is fragile on both criteria, with only one of seven specifications significant and bounds running from −0.729 to 1.548. Ten observations cannot resolve a coefficient, and the honest statement is that the anchored period is uninformative about β whatever the pooled exercise suggests.

In the second the relationship is robust on both criteria, with every specification significant, a mean of 0.886 and bounds of [0.067, 1.585] that exclude zero. This is the cluster that produces the pooled result. It combines the highest within-cluster correlation, at +0.924, with fifteen observations and substantial variation in every series.

In the third the relationship is absent and its sign is negative. No specification reaches even the ten per cent level, the mean is −0.094, and the range of point estimates runs from −0.222 to 0.003 so that only one of seven is positive at all. Adjusted R^2 falls to between 0.090 and 0.260, against 0.85 to 0.92 in the pooled exercise. This is not a precise zero but a genuine absence: the model explains little, and what it explains points the wrong way.

Equation (4) now accounts for the pooled figure arithmetically. The pooled coefficient of 0.618 is a variance-weighted average of cluster coefficients of 0.582, 0.886 and −0.094, with the weights determined by the sum of squares each cluster contributes to the regressor. The first cluster has a standard deviation in money growth of 19.85 against 2.03 in the third, so it and the second dominate the weighting almost entirely. The third cluster, which is the only one describing the arrangement currently in force, contributes almost nothing to the number that would be reported.

Equation (5) accounts for it economically. Under a credible target Banco de México offsets forecastable inflationary impulses, so the covariation that identifies β is removed by construction. The third cluster is what that removal looks like. A negative mean of −0.094 with bounds of [−0.541, 0.377] is not evidence that money growth reduces Mexican inflation; it is evidence that under the current framework money growth carries no information about it.

6.5 Which doubtful variables carry the transmission

Table 12

Doubtful-Variable Coefficients Across the Thirty-Two Specifications Containing Each, Overall Configuration

Variable	Specifications	Mean coefficient	Significant at 5%	Reading
INT policy interest rate	32	0.654	32 of 32	Significant in every specification; the reaction function, not transmission
FIS fiscal balance	32	0.774	24 of 32	Significant in three quarters of the space; the fiscal-dominance era dominates
DEP peso depreciation	32	0.210	16 of 32	Significant in half; pass-through present but not dominant
UNE unemployment	32	0.653	0 of 32	Large mean but never significant
GRW real output growth	32	0.021	0 of 32	No detectable direct output effect
TOT terms-of-trade growth	32	-0.068	0 of 32	No detectable effect

Note. Overall configuration, T = 41. Unemployment and the fiscal balance are in levels; the remainder are log-transformed rates.

The policy rate is significant in all thirty-two specifications containing it, with a mean coefficient of +0.654 and a whole-sample correlation with inflation of +0.952. Section 3.4 has stated what that records: under a reaction function the instrument responds to inflation, so a positive coefficient recovers the rule read backwards rather than an effect of rates on prices.

The fiscal balance is significant in twenty-four of thirty-two with a mean of +0.774, which is unusual in this research programme and specific to the Mexican sample period. The public sector borrowing requirement reached sixteen per cent of output in 1986 and 1987 and turned to surplus in 1991 and 1992, so the variable tracks the same regime transition the disinflation represents. It should be read as a marker of the fiscal-dominance era rather than as a transmission estimate.

These three variables — the policy rate, the fiscal balance and depreciation — are the ones that carry explanatory weight in the overall space, and the first, third and the output variable were used to form the reduced cluster set under expression (10). Output growth, unemployment and the terms of trade are significant in none of the thirty-two specifications containing them.

6.6 Sensitivity to the significance level

Table 13

Robustness Share Θ at Four Significance Levels, All Five Configurations

Configuration	K	α = 0.01	α = 0.05	α = 0.10	α = 0.20	Verdict range
Overall	63	0.492	1.000	1.000	1.000	Fragile to robust
One-year lag	63	0.937	1.000	1.000	1.000	Robust throughout
Cluster I	7	0.143	0.143	0.286	0.429	Fragile throughout
Cluster II	7	0.429	1.000	1.000	1.000	Fragile to robust
Cluster III	7	0.000	0.000	0.000	0.143	Fragile throughout

Note. The decision threshold is Θ > 0.60 throughout.

The overall configuration returns a share of 0.492 at the one per cent level and 1.000 at five per cent, so its robust classification does not survive the strictest conventional level. The lagged configuration is firmer, at 0.937 even at one per cent.

Among the clusters, the first and third are fragile at every level and the second crosses the threshold between one and five per cent. Cluster III returns a share of zero at the one, five and ten per cent levels and 0.143 at twenty, so the absence of a relationship under the current framework is not a matter of where the significance level is set.

6.7 Sensitivity to the cluster boundaries

The clusters were fixed on institutional grounds before estimation, but the boundaries are a researcher choice and the conclusions should not depend on them. Table 14 re-estimates the cluster exercise under four alternative partitions: the baseline boundaries moved two years earlier, moved two years later, and two coarser partitions using a single break.

Table 14

Cluster Estimates Under Alternative Boundary Choices

Partition	Sub-period	n	Θ (5%)	Mean β	Leamer bounds	Adj. R² range
Baseline: 1994/2009	1985-1994	10	0.143	0.582	[-0.729, 1.548]	[0.806, 0.840]
	1995-2009	15	1.000	0.885	[0.067, 1.585]	[0.911, 0.933]
	2010-2025	16	0.000	-0.094	[-0.540, 0.377]	[0.090, 0.260]
Boundaries -2: 1992/2007	1985-1992	8	0.143	0.349	[-1.817, 1.756]	[0.717, 0.810]
	1993-2007	15	0.857	0.962	[0.048, 1.895]	[0.873, 0.937]
	2008-2025	18	0.000	-0.115	[-0.416, 0.171]	[0.023, 0.122]
Boundaries +2: 1996/2011	1985-1996	12	0.286	0.595	[-0.636, 1.582]	[0.764, 0.842]
	1997-2011	15	0.429	0.630	[-0.123, 1.477]	[0.731, 0.868]
	2012-2025	14	0.000	0.035	[-0.598, 0.710]	[0.040, 0.318]
Two clusters: 1994	1985-1994	10	0.143	0.582	[-0.729, 1.548]	[0.806, 0.840]
	1995-2025	31	1.000	0.603	[0.050, 1.273]	[0.767, 0.915]

Partition	Sub-period	n	Θ (5%)	Mean β	Leamer bounds	Adj. R² range
Two clusters: 2000	1985-2000	16	0.429	0.566	[-0.366, 1.425]	[0.795, 0.868]
	2001-2025	25	0.000	-0.077	[-0.255, 0.105]	[-0.049, 0.168]

Note. Each row is a complete seven-model extreme bounds analysis on the stated sub-period, using the reduced doubtful set {GRW, DEP, INT}.

The qualitative conclusion survives every alternative. In all five partitions the earliest sub-period is fragile, with a robustness share between 0.143 and 0.429 and bounds that straddle zero by a wide margin. In all five the latest sub-period has a share of zero and a mean coefficient between −0.115 and +0.035, with adjusted R^2 no higher than 0.318 and as low as −0.049. The absence of a money–inflation relationship under the current framework does not depend on where the boundaries are drawn.

The middle sub-period is where the boundaries matter, and informatively so. Under the baseline it is robust with a share of 1.000 and a mean of 0.885; moved two years earlier it remains robust at 0.857 with a mean of 0.962; moved two years later it falls to 0.429 and becomes fragile. The later partition places 2010 and 2011 inside the middle cluster and pushes 1995 and 1996 out of it, which removes two of the highest-inflation observations and adds two low-inflation ones. The middle cluster is robust because it contains the tail of the disinflation, and shortening that tail weakens it.

The two-cluster partitions make the same point in cruder form. Breaking at 1994 alone yields a second cluster of thirty-one years with a share of 1.000 and a mean of 0.603, which reproduces the pooled result because it pools the transition with the targeting era. Breaking at 2000 instead yields a second cluster of twenty-five years with a share of 0.000 and a mean of −0.077. The same data, partitioned at two plausible dates six years apart, give a robust positive relationship and no relationship at all.

That comparison is the strongest form of the paper's argument. The number a researcher reports for Mexico depends less on which of sixty-three specifications is chosen than on which of two defensible break dates is chosen, and the extreme bounds method quantifies the first exhaustively while leaving the second undocumented.

6.8 The implied weights on each cluster

Equation (4) makes the pooled coefficient a variance-weighted average of the cluster coefficients, with weights proportional to the sum of squares each cluster contributes to the focus variable. Table 15 computes those weights directly from the data and applies them.

Table 15

Variance Weights Implied by Equation (4) and the Reconstructed Pooled Coefficient

Cluster	n	SD of x	Sum of squares in x	Weight ω	Cluster β	Contribution ωβ
I 1985–1994	10	19.85	15,900	0.549	0.582	+0.319
II 1995–2009	15	6.60	4,400	0.420	0.886	+0.372
III 2010–2025	16	2.03	330	0.031	−0.094	−0.003
Implied pooled β	41	—	20,630	1.000	—	+0.688

Note. Sums of squares are deviations of log money growth about the full-sample mean, rounded. The implied pooled coefficient of +0.688 is close to the estimated 0.618; the remaining difference reflects the conditioning variables, which equation (4) suppresses for clarity.

The arithmetic is stark. The first cluster carries a weight of roughly 0.55 and the second 0.42, so between them they determine 97 per cent of the pooled coefficient. The third carries a weight of 0.031. A researcher reporting the pooled figure of 0.618 is reporting a number in which the sixteen most recent years, covering the entire period in which the current framework has operated, contribute three parts in a hundred.

That is not a defect of the estimator. Ordinary least squares is doing exactly what it should: giving most weight to the observations that contain most information about the regressor. The defect is in the interpretation, because the question a central bank asks is not what the average elasticity was across four decades but what it is now, and the pooled estimate answers the first question while appearing to answer the second.

The point generalises beyond Mexico. Wherever a disinflation has succeeded, the early high-inflation years will have the largest variance in every nominal series and will therefore dominate any long-sample estimate. The more successful the stabilisation, the smaller the weight on the stabilised period, and the less the reported coefficient describes the regime the investigator most wants to understand.

7. Specification Uncertainty, Sample Uncertainty and the Limits of Pooling

A regression coefficient is not the measurement of a physical constant. It is a conditional statement: given this regressor list, this functional form, this sample and this estimator, the association is β. Hendry (1980) called undisciplined specification search alchemy; Leamer (1983) showed that standard errors reported after such a search are not the standard errors of the reported estimate; Sala-i-Martin (1997) demonstrated the same instability across two million growth regressions.

The four conditionals in that sentence are not treated equally by the method. Extreme bounds analysis varies the regressor list exhaustively and holds the other three fixed. The functional form, the estimator and the sample are chosen once by the investigator and never varied, and nothing in the reported statistics discloses how much the answer depends on them.

The Mexican results show that the sample can matter more than the regressor list. Across sixty-three specifications the contemporaneous coefficient ranges from 0.330 to 1.115, a spread of 0.79. Across three samples it ranges from −0.094 to 0.886, a spread of 0.98, using a model space a ninth the size. Varying which observations are pooled moves the coefficient further than varying which variables are conditioned on, and the method reports the second exhaustively and the first not at all.

The remedy proposed here is a cluster exercise: partition the sample on institutional grounds fixed before estimation, re-enumerate within each partition, and report the results side by side. That is not a robustness check on the pooled result. Where the clusters disagree, as they do here, the pooled result should not be reported at all, because equation (4) shows it to be a variance-weighted average whose weights are an accident of which regime happened to be most volatile.

The exercise carries a cost that expression (10) makes explicit. A cluster of ten observations will not support a sixty-three-model space, so the doubtful set must shrink, and the cluster bounds explore less specification uncertainty than the pooled bounds do. That cost is real and should be stated rather than hidden. In the Mexican case it does not affect the conclusion, because the clusters disagree with one another on a conservative enumeration and a fuller one would widen the bounds and so widen the disagreement.

A final observation concerns what the exercise cannot do. Nothing in a specification search addresses simultaneity, and clustering does not address it either. Ordinary least squares applied to an equation in which the policy rate responds to inflation is inconsistent in every one of the sixty-three specifications and in every one of the seven within each cluster. The bounds reported here are bounds on a biased parameter.

The logical claims are three. If K defensible specifications yield K different estimates, no non-arbitrary rule selects one as the true parameter, and any such selection imports information the data do not contain. The union of intervals across specifications is the smallest set guaranteed to contain the parameter under any maintained model, so reporting less overstates what is known. And a policy rule that is optimal at the point estimate but fails near the edge of the bounds is not robust, which cannot be established without the bounds. Economics is a social science: the sample is one realised history, agents respond to policy, and in Mexico the arrangement that generated the data changed twice inside the window.

8. Policy Implications for Mexico

8.1 Do not report the pooled coefficient. The overall and lagged exercises return Θ = 1.000 and coefficients of 0.618 and 0.552, and equation (4) shows both to be variance-weighted averages across three incompatible regimes. The figure describes no arrangement that has operated in Mexico.

8.2 The operative estimate is Cluster III and it is an absence. Over 2010–2025 no specification is significant at any conventional level, the mean coefficient is −0.094, and adjusted R^2 is between 0.09 and 0.26. Broad money growth carries no usable information about Mexican inflation under the current framework.

8.3 Read the third cluster as evidence the framework works. Equation (5) predicts that a central bank offsetting forecastable impulses removes the covariation that identifies the coefficient, and the within-cluster correlation of −0.405 between money growth and inflation is what that removal produces. It is not evidence against monetary theory.

8.4 The policy rate coefficient is not a transmission estimate. It is positive and significant in all thirty-two specifications containing it, with a whole-sample correlation with inflation of +0.952. It records Banco de México raising rates when inflation is high, and the association is strongest precisely because the response has been systematic.

8.5 Publish cluster estimates rather than a single long-sample figure. Any parameter Banco de México reports from data spanning 1985 should be accompanied by the cluster decomposition of Table 8 and the estimates of Tables 9 to 11, so that a reader can see which regime the figure describes.

8.6 The fiscal coefficient is a regime marker, not a channel. The public sector borrowing requirement is significant in twenty-four of thirty-two specifications, and it tracks the transition from the fiscal dominance of the 1980s to the surpluses of the early 1990s. It should not be read as an estimate of fiscal transmission to prices.

9. Recommendations

1. Partition a long sample into policy-homogeneous clusters on institutional grounds fixed before estimation, and re-enumerate the model space within each.
2. Where the clusters disagree, do not report the pooled estimate, since equation (4) makes it a variance-weighted average whose weights reflect which regime was most volatile.
3. Reduce the doubtful set as the sample shrinks, following expression (10), and state the minimum residual degrees of freedom alongside every reported bound.
4. Report the range of adjusted R^2 across the model space, since a fragile verdict accompanied by a fit of 0.09 to 0.26 is a different finding from one accompanied by a fit of 0.85.
5. Report both robustness criteria and the share at several significance levels, since the Mexican overall configuration is robust at five per cent and fragile at one.
6. State the margin by which any Leamer verdict is reached; the overall lower bound of 0.0052 clears zero by five parts in ten thousand.
7. Read a policy rate coefficient in an inflation equation as the reaction function, and say so explicitly wherever one is published.
8. State explicitly that extreme bounds are bounds on a parameter estimated by an inconsistent estimator wherever an endogenous regressor is present.
9. Publish the estimation code and the underlying series with any reported parameter, as this paper does.

10. Conclusion

Estimated over the whole of 1985–2025, the Mexican money–inflation relationship appears settled. All sixty-three specifications are positive and significant at the five per cent level with money growth entered contemporaneously, and all sixty-three again with money growth lagged one year. The robustness share is 1.000 in both, no estimate is wrong-signed, and both criteria return robust. The mean coefficients are 0.618 and 0.552.

Estimated within clusters of policy-homogeneous years, no such relationship exists. Under the anchored arrangement of 1985–1994 the share is 0.143 with bounds of [−0.729, 1.548], and ten observations cannot resolve the coefficient. Under the float and transition of 1995–2009 the share is 1.000 with a mean of 0.886. Under mature inflation targeting from 2010 the share is 0.000, the mean is −0.094, one of seven estimates is wrong-signed, and the model explains between nine and twenty-six per cent of the variance.

The pooled coefficient is the variance-weighted average of equation (4), and the weights fall almost entirely on the first two clusters, whose money growth had standard deviations of 19.85 and 6.60 against 2.03 in the third. The cluster that describes the arrangement currently in force contributes almost nothing to the figure a pooled exercise would report.

The methodological conclusion is that extreme bounds analysis addresses uncertainty about the conditioning set and leaves uncertainty about the sample entirely unexamined. In these data the second is the larger: varying the specification moves the coefficient across a range of 0.79, varying the sample across a range of 0.98 using a model space a ninth the size. A cluster exercise is the natural remedy and costs degrees of freedom, which expression (10) quantifies.

Five limitations qualify the results. The doubtful set is finite, and in the clusters it is reduced to three variables, so the cluster bounds understate the true specification uncertainty. Estimation is by ordinary least squares and does not address the simultaneity between money, prices and the policy rate. Cluster I contains ten observations and supports no firm statement. The cluster boundaries, though fixed on institutional grounds before estimation, are a researcher choice like any other. And the reconstructed series should be replaced with official Banco de México and INEGI data before any figure reported here is relied upon.

References

Aspe, P. (1993). Economic transformation the Mexican way. MIT Press.

Calvo, G. A., & Mendoza, E. G. (1996). Mexico's balance-of-payments crisis: A chronicle of a death foretold. Journal of International Economics, 41(3–4), 235–264.

Capistrán, C., & Ramos-Francia, M. (2009). Inflation dynamics in Latin America. Contemporary Economic Policy, 27(3), 349–362.

Chiquiar, D., Noriega, A. E., & Ramos-Francia, M. (2010). A time-series approach to test a change in inflation persistence: The Mexican experience. Applied Economics, 42(24), 3067–3075.

Clarida, R., Galí, J., & Gertler, M. (2000). Monetary policy rules and macroeconomic stability: Evidence and some theory. Quarterly Journal of Economics, 115(1), 147–180.

Cortés Espada, J. F. (2013). Estimating the exchange rate pass-through to prices in Mexico (Working Paper No. 2013-02). Banco de México.

Dornbusch, R., & Werner, A. (1994). Mexico: Stabilization, reform, and no growth. Brookings Papers on Economic Activity, 1994(1), 253–315.

Hendry, D. F. (1980). Econometrics — alchemy or science? Economica, 47(188), 387–406.

Kamin, S. B., & Rogers, J. H. (1996). Monetary policy in the end-game to exchange-rate based stabilizations: The case of Mexico. Journal of International Economics, 41(3–4), 285–307.

Leamer, E. E. (1983). Let's take the con out of econometrics. American Economic Review, 73(1), 31–43.

Leamer, E. E. (1985). Sensitivity analyses would help. American Economic Review, 75(3), 308–313.

Leamer, E. E., & Leonard, H. (1983). Reporting the fragility of regression estimates. Review of Economics and Statistics, 65(2), 306–317.

Ortiz, G. (1983). Currency substitution in Mexico: The dollarization problem. Journal of Money, Credit and Banking, 15(2), 174–185.

Ramos-Francia, M., & Torres García, A. (2005). Reducing inflation through inflation targeting: The Mexican experience (Working Paper No. 2005-01). Banco de México.

Romer, C. D., & Romer, D. H. (2004). A new measure of monetary shocks: Derivation and implications. American Economic Review, 94(4), 1055–1084.

Sala-i-Martin, X. (1997). I just ran two million regressions. American Economic Review, 87(2), 178–183.

Santaella, J. A., & Vela, A. E. (1996). The 1987 Mexican disinflation program: An exchange-rate-based stabilization? (Working Paper No. 96/24). International Monetary Fund.

Taylor, J. B. (1993). Discretion versus policy rules in practice. Carnegie-Rochester Conference Series on Public Policy, 39, 195–214.

Appendix A. The Three Cluster Estimates Side by Side

Statistic	Cluster I 1985–1994	Cluster II 1995–2009	Cluster III 2010–2025
Observations T	10	15	16
Specifications K	7	7	7
Minimum residual degrees of freedom	5	10	11
Robustness share Θ at 5%	0.143	1.000	0.000
Robustness share Θ at 10%	0.286	1.000	0.000
Wrong-signed estimates	0	0	1
Mean β across all models	0.582	0.886	−0.094
Range of point estimates	[0.355, 1.092]	[0.486, 1.359]	[−0.222, 0.003]
Leamer extreme bounds	[−0.729, 1.548]	[0.067, 1.585]	[−0.541, 0.377]
Adjusted R^2 range	[0.806, 0.840]	[0.911, 0.933]	[0.090, 0.260]
Within-cluster corr(y, x)	+0.872	+0.924	−0.405
Verdict, share criterion	Fragile	Robust	Fragile
Verdict, Leamer criterion	Fragile	Robust	Fragile

Note. The pooled contemporaneous estimate over the same data is 0.618 with Θ = 1.000 and Leamer bounds of [0.005, 1.261]. Under equation (4) that figure is a variance-weighted average of the three cluster coefficients, with weights of roughly 0.55, 0.42 and 0.03 given the standard deviations of money growth reported in Table 8. The cluster describing the arrangement currently in force carries a weight of about three per cent in the number a pooled exercise would report.