

The term structure of interest rates in a financially repressed economy: toward an integrated conceptual reading of the Moroccan case

Ayoub SAIDI, (PhD student)

*Research Laboratory in Organizational Management Sciences
 National School of Business and Management
 Ibn Tofail University, Kenitra, Morocco*

Ahlam QAFAS, (Full Professor)

*Research Laboratory in Organizational Management Sciences
 National School of Business and Management
 Ibn Tofail University, Kenitra, Morocco*

Adresse de correspondance :	École nationale de commerce et de gestion, Campus universitaire B.P: 1420, 14000 Kénitra
Disclosure Statement :	The authors declare that they have not received any financial support that could have influenced the objectivity of this study. They take full responsibility for any potential plagiarism, the use of artificial intelligence in the writing process, as well as for the results presented in this article.
Conflict of Interest:	The authors report no conflicts of interest.
Cite this article	SAIDI, A., & QAFAS, A. (2026). The term structure of interest rates in a financially repressed economy: toward an integrated conceptual reading of the Moroccan case. <i>International Journal of Accounting, Finance, Auditing, Management and Economics</i> , 7(8), 455–479. https://doi.org/10.5281/zenodo.21325635
Licence	This is an open access article under the CC BY-NC-ND

The term structure of interest rates in a financially repressed economy: toward an integrated conceptual reading of the Moroccan case

Abstract:

The yield curve takes the lion's share of attention in the analysis of an economy: it is pivotal in the conduct of monetary policy, the management of public debt and the pricing of assets. Existing research on Morocco has been concerned mostly with fitting the curve, and overwhelmingly through a single family: the parametric approach of Nelson-Siegel, in its dynamic form, which the reference work on the Moroccan case adopts. Equilibrium alternatives such as Vasicek or Cox-Ingersoll-Ross appear only at the margin of that literature and hold a secondary place in what follows. What this work has imported, most often without discussion, is the expectations hypothesis, which relies on the frictionless play of a marginal arbitrageur in a deep and integrated market. That assumption seems ill-suited to a market marked by captive demand, an administratively steered short rate, and a managed exchange-rate regime. The present paper is neither a statistical model nor an estimation; it is a theoretical essay of conceptual synthesis. It seeks to articulate two streams of literature that have remained separate in economics: term-structure theory (expectations, liquidity preference, segmentation, preferred habitat, equilibrium and no-arbitrage models) and the theories of financial repression, fiscal dominance and managed exchange rates. Out of that articulation stems a reading in which the shape of the curve is less a bundle of expected short rates than the imprint of a balance between a supply set by the Treasury's funding needs and a demand constrained by prudential regulation. Four propositions follow: persistent non-inversion looks structural rather than anomalous; the term premium seems governed more by the relative supply of maturities than by expected short rates; the long end appears relatively insensitive to monetary-policy shocks; and the failure of the expectations hypothesis becomes predictable. Morocco, whose captive institutional base and managed float are shared by many emerging markets, illustrates each proposition. The framework remains heuristic: no formal empirical test is conducted, and the Moroccan facts are mobilized for illustrative purposes only; these limits are discussed openly.

Keywords: yield curve; term structure; financial repression; fiscal dominance; preferred habitat; Morocco.

JEL Classification : E43, E58, G12, H63, O16.

Paper type: Theoretical Research.

Résumé:

La courbe des taux occupe la part du lion de l'attention dans l'analyse d'une économie : elle est déterminante pour la conduite de la politique monétaire, la gestion de la dette publique et la valorisation des actifs. Les travaux consacrés au Maroc se sont surtout attachés à ajuster la courbe, et très majoritairement au moyen d'une seule famille : l'approche paramétrique de Nelson-Siegel, dans sa forme dynamique, que retient le travail de référence sur le cas marocain. Les alternatives d'équilibre telles que Vasicek ou Cox-Ingersoll-Ross n'apparaissent qu'à la marge de cette littérature et n'occupent qu'une place secondaire dans ce qui suit. Ce que ces travaux ont importé, le plus souvent sans discussion, c'est l'hypothèse des anticipations, laquelle repose sur le jeu sans friction d'un arbitragiste marginal sur un marché profond et intégré. Cette hypothèse paraît mal ajustée à un marché caractérisé par une demande captive, un taux court piloté administrativement et un régime de change encadré. Le présent article n'est ni un modèle statistique ni une estimation ; il s'agit d'un essai théorique de synthèse conceptuelle. Il cherche à articuler deux courants de la littérature restés séparés en économie : la théorie de la structure par terme (anticipations, préférence pour la liquidité, segmentation, habitat préféré, modèles d'équilibre et d'absence d'arbitrage) et les théories de la répression financière, de la dominance budgétaire et du change administré. De cette articulation émerge une lecture où la forme de la courbe est moins un assemblage d'anticipations de taux courts que l'empreinte d'un rapport entre une offre commandée par les besoins de financement du Trésor et une demande contrainte par la réglementation prudentielle. Quatre propositions en découlent : la non-inversion persistante paraît structurelle plutôt qu'anomale ; la prime de terme semble davantage gouvernée par l'offre relative de maturités que par les anticipations de taux courts ; le segment long apparaît relativement insensible aux chocs de politique monétaire ; et l'échec de l'hypothèse des anticipations devient prévisible. Le Maroc, dont la base institutionnelle captive et le flottement administré se retrouvent dans de nombreux marchés émergents, illustre chacune de ces propositions. Le cadre demeure heuristique : aucun test empirique formel n'est conduit et les faits marocains ont une portée purement illustrative ; ces limites sont discutées ouvertement.

Mots clés : courbe des taux; structure par terme; répression financière; dominance budgétaire; habitat préféré; Maroc.

Classification JEL : E43, E58, G12, H63, O16.

Type du papier : Recherche Théorique.

1. Introduction

The yield curve is perhaps the most closely watched yet poorly understood object in macro-finance. It is watched daily as a signal of what lies ahead: the gap between the long and the short rate is routinely read as a forewarning of recession, disinflation, or the central bank's next move. That confidence rests on an established theoretical foundation: the expectations hypothesis, under which the long rate is the average of expected short rates, plus perhaps a premium. The problem is that the hypothesis comes with conditions. A deep market, numerous arbitrageurs, little friction in the movement of capital, that is the underlying backdrop. When it goes missing, readings wobble.

In this context, the bond market of Morocco offers an illuminating case. Work on the subject, often technically careful, has focused overwhelmingly on building the zero-coupon curve and fitting it parametrically. One encounters there, applied to Bank Al-Maghrib data, the models of Nelson and Siegel (1987), of Svensson (1994), of Vasicek (1977) or of Cox, Ingersoll and Ross (1985), sometimes extended by the dynamic approach of Diebold and Li (2006). Svensson's extension, it should be noted, was developed on Swedish data and serves in this literature as a methodological template rather than as evidence on the Moroccan market. Such work is useful; it provides the market with tools for pricing. And yet a more primary and less comfortable question is left unanswered: what exactly is the object we study when we fit a curve on a market that lacks, in effect, a genuine marginal arbitrageur?

For the market's peculiarities are not anecdotal. The Moroccan curve barely ever inverts. Domestic institutional investors, insurers, pension funds, collective investment schemes, banks, hold government securities for the most part, and their demand stems not so much from a calculation about the future as from balance-sheet positions and regulatory burden. The short end is governed, in large part, by the interventions of the central bank. And the overall mechanism has tended, year after year, toward dependency on the financing need of the Treasury. Noted in isolation, each of these observations has been made before; taken together, they describe not a market of expectations but a captive one.

This is where a genuine fault line lies, or so it seems to us. The theory of the term structure, on one side, models the shape of the curve with great finesse but rarely questions the institutional frame it assumes. The theory of financial repression, on the other, from McKinnon and Shaw down to Reinhart and Sbrancia (2015), describes precisely that frame: the regulatory capture of savings, the captive audience for sovereign debt, the implicit caps on rates. But it says next to nothing about the shape the curve takes as a result. The two literatures sit side by side without speaking. None, as far as we know, has really tied them together for the Moroccan case.

This article takes up that task. It should be stated at the outset what the article is not: not an estimation, not a statistical model, not a systematic review in the bibliometric sense. Its positioning is that of a theoretical essay of conceptual synthesis. It proposes a reading, a way of looking, in which the Moroccan curve is no longer the echo of aggregated expectations but the imprint of a balance of forces: supply driven by the Treasury's needs, demand constrained by prudential regulation, an administered short rate, external arbitrage curbed by the exchange-rate regime. From that shift of perspective we draw four propositions, set out discursively rather than formally proved. To the best of our knowledge, and although the Moroccan literature does address the curve (Lamsaddak & Mentagui, 2019; Soussi Noufail et al., 2024), it does so from a fitting standpoint; no published study has articulated the term-structure and financial-repression corpora for the Moroccan case. We state this as a documented gap rather than as a certainty.

The remainder of the article is organized as follows. Section 2 reviews the canonical theories of the term structure and their institutional presuppositions, then the theories of financial repression, fiscal dominance and managed exchange rates, and closes with a comparative

synthesis of the strands mobilized (Table 1). Section 3 develops the analytical framework: a typology of curve-formation regimes, a minimal formalization of the supply channel and four propositions. Section 4 confronts the framework with the Moroccan stylized facts, examines competing explanations and draws implications for debt management and monetary policy. Section 5 concludes, states the limitations of the research, formulates practical recommendations and sets out a prioritized research agenda.

Just a word more on the issue of stance: When working conceptually it is not the case that rigor has been dispensed with; what happens is that it moved elsewhere. Here it lies with the internal coherence of the reading and its ability to make sense of facts which otherwise remain stuck in juxtaposition. We do not claim this reading to be the only one possible or even the best, all we say is that it is more economical than the piling up of exceptions the as-is import of the expectations hypothesis leads to. A good theory, it has been said, turns several separate puzzles into one -- that is the modest ambition of these pages.

The choice of Morocco is no parochial quirk. Many emerging economies share its features: a young bond market, a thin secondary market, captive domestic institutionals, a partially open capital account, a managed exchange rate. What is said of Morocco holds, with the necessary adjustments, for a good number of those venues. Its structural traits are, moreover, documented rather than assumed: a public debt that is overwhelmingly marketable and domestically placed, an auction market dominated by Treasury securities, and a secondary market that institutional studies describe as developed yet not very liquid (Ahokpossi et al., 2016). The holding structure makes the captivity concrete. Auction-issued Treasury bonds are held almost entirely by resident institutions: at the end of 2024, banks and collective investment schemes (OPCVM) held the largest shares, at 38.3 and 33.3 percent respectively, followed by financial and non-financial clients (14.7 percent), with the remainder held by pension funds and insurance companies (Ministère de l'Économie et des Finances). These institutions are structurally bound toward government paper, since insurers and pension funds must maintain minimum allocations to sovereign debt to meet prudential and asset-liability requirements. Non-resident participation, by contrast, is negligible, at about 0.27 percent of the outstanding stock of domestic debt securities at end-2024 (AMMC, 2024). The Moroccan case simply has the advantage of displaying these traits clearly enough to serve as an illustration without too much noise. It is a convenient laboratory, not a singularity.

There is also a reason of timing. Morocco has, over the past decade, edged toward a more flexible exchange-rate regime and a deeper local-currency market. The captivity we describe is therefore not a fixed feature but a moving one, and a framework that takes captivity seriously is, almost by accident, a framework for reading the transition away from it. We find that worth stressing at the outset: the reading proposed here is meant to be useful precisely while the market is changing, not after it has settled into something else.

Finally, a caveat about ambition. We are wary of papers that promise a new paradigm and deliver a renamed old one. What follows is more modest, a reorganization, not a revolution. If the reorganization holds, it should make a handful of familiar Moroccan puzzles look less like isolated oddities and more like the joint output of a single configuration. That is the test we would apply to our own argument, and the one by which we would ask the reader to judge it.

One more framing remark, since it conditions everything that follows. The objects we will keep returning to, supply, captive demand, the issuance calendar, the managed peg, are not exotic. They are the everyday furniture of an emerging bond market. What is unusual is not their presence but the proposal to put them at the center of how the curve is explained, in place of the expectations they are usually asked to merely complicate. The move is one of emphasis, and emphasis, in theory as in prose, is rarely innocent: where one places the weight decides what one ends up able to see.

2. Literature review

The literature mobilized here falls into two families that, on the surface, everything separates: a financial theory of the curve and a political economy of debt. Reviewing them side by side has one virtue: it brings out the blind spot of each, which happens to be the core of the other. The founding works were identified through standard disciplinary references and citation tracing in JSTOR, ScienceDirect and Google Scholar, using the keywords term structure, yield curve, preferred habitat, financial repression and fiscal dominance; no date restriction was applied, so as to include both the seminal contributions (from the 1930s onward) and the most recent syntheses. A limit of the field itself should also be acknowledged at the outset: academic work on the Moroccan term structure published in indexed journals remains scarce, and the empirical record is carried mainly by institutional studies (Ahokpossi et al., 2016; Queyranne et al., 2021; Bank Al-Maghrib, 2026), and the academic contributions that exist are almost entirely technical, concerned with constructing and fitting the curve rather than with its economic formation: Lamsaddak and Mentagui (2019) build the Moroccan zero-coupon curve by the Smith-Wilson method, and Soussi Noufail, Bourass and Hachimi (2024) study the dynamics of Nelson-Siegel-Svensson models on Moroccan data. Useful as they are, neither connects the shape of the curve to the institutional forces this paper foregrounds.

2.1 The canonical theories of the term structure and their presuppositions

The early and simple idea, almost an accountant's, was that lending for ten years means lending for one year ten times over. The expectations hypothesis came out of the work of Fisher (1930) and was formalized by Lutz (1940); it takes the long rate as the average expected short rate. Hicks (1939) adds a liquidity premium: the investor demands compensation for tying up savings. These two bricks still underpin the dominant intuition. Their appeal lies in their parsimony; their fragility, in the fact that they assume a representative agent arbitraging freely across maturities.

The empirical record challenged this construction at an early stage. In the canonical test of Campbell and Shiller (1991), the subsequent change in the long yield is regressed on the yield spread scaled by maturity; the expectations hypothesis predicts a coefficient of unity. On United States data, the estimated coefficients are not only below unity but frequently negative, and increasingly so with maturity, so that a high spread tends to be followed by a fall rather than a rise in long yields. The finding has proved robust across samples and has never been fully resolved. The profession has learned to live with it by invoking a time-varying term premium, which is an honest response, but one that relocates the puzzle rather than solving it.

Other strands contested the idea of an all-powerful arbitrageur. As early as the 1950s, Culbertson suggested market may be segmented: each maturity has its clientele, its prices are formed locally. Modigliani and Sutch (1966) soften the thesis with the notion of a preferred habitat: agents have a maturity of choice, from which they only move against premium. The idea long stayed marginal for want of a formalization. It found a second life with Vayanos and Vila (2021), bringing maturities-preferring investors and risk-averse arbitrageurs together in a model. Demand shocks travel along the curve via the arbitrageurs carry trades and the term premium is positively related to the slope. This is precious: it reintroduces supply and demand where only expectation is held by the expectations hypothesis.

The mechanics of the Vayanos and Vila (2021) model deserve to be spelled out, since our framework borrows them. The model features two classes of agents. Habitat investors have a preference for a specific maturity: their demand for bonds of maturity τ depends on the yield of that maturity alone, so that demand shocks are local in the first instance. Arbitrageurs have no maturity preference but are risk-averse and hold limited capital: they integrate the curve by trading across maturities, and they require compensation, a term premium, for the duration risk

this carry activity loads onto their balance sheet. Formally, habitat demand for maturity τ can be written $d(\tau, t) = \gamma(\tau)[y(\tau, t) - \beta(\tau)]$, decreasing in the segment's own yield (so that a smaller $\gamma(\tau)$ means more captive, less yield-sensitive demand), while a representative risk-averse arbitrageur with limited capital chooses positions $x(\tau)$ to maximize a mean-variance objective $E(dW) - (a/2)\text{Var}(dW)$, where a is risk aversion. In equilibrium the term premium is affine in the supply that arbitrageurs must absorb, which in reduced form we write $\theta(\tau) = \alpha(\tau) \cdot q(\tau)$ below, with $\alpha(\tau)$ increasing in the arbitrageurs' risk aversion a and in the inelasticity of habitat demand. Two properties follow. Shocks to demand or supply at one maturity are transmitted along the curve only through the arbitrageurs' positions; and the strength of that transmission falls as their risk aversion rises and as the stock of risk they already absorb grows. In the limit where arbitrage capital becomes scarce, effects localize: the long end and the short end decouple. That limit, an abstraction in the original paper, is a fair first description of a captive market.

The equilibrium and no-arbitrage tradition followed its own road. Vasicek (1977), then Cox, Ingersoll and Ross (1985), derive the curve from an intertemporal equilibrium model in which the short rate follows a mean-reverting process, bond prices then obtaining by no-arbitrage. That tradition culminated in affine factor models, and Ang and Piazzesi (2003) offered a macro-finance version by linking latent factors and macroeconomic variables under no-arbitrage restrictions. The approach is analytically elegant and has proved empirically productive. It rests, however, on a no-arbitrage assumption, namely that riskless gains are competed away across maturities, whose validity is precisely what is doubtful in a captive and compartmentalized market. That leaves the most widely used family, and by far the most present in Moroccan work: the parametric approach. Nelson and Siegel (1987) summarize the curve in three factors, level, slope, curvature, which Diebold and Li (2006) render dynamic. The fit is excellent, the interpretation handy. One should bear in mind, though, what these authors themselves say: their approach is neither equilibrium nor no-arbitrage. It is a statistical description of the shape, not a theory of its formation. And it is the latter that concerns us. Fitting a Nelson-Siegel on the Moroccan curve photographs its contour; it does not say why that contour rather than another. There is something common to all these traditions, to differing degrees, and that is what matters to us: they all assume a market where an arbitrageur can, at little cost, move capital from one maturity to another and from one place to another. This assumption is seldom spelled out. Yet it structures the whole edifice. When it falls away, captive demand, curbed external mobility, what changes is not a detail: it is the very mechanism of price formation.

The level-slope-curvature decomposition merits more dwelling, such has been its influence on practice. It bears recalling that Litterman and Scheinkman (1991) showed, with principal component analysis, that three factors account for most movements in the US curve. Nelson-Siegel gives those factors a functional form; Diebold and Li (2006) let them vary over time. The method works so well that it has come to replace a theory. It is a quiet slip, but an important one: one begins to believe that when one has described the slope one has explained it. Yet a well-estimated slope factor can say nothing about what, in the economy, makes it move.

The macro-finance version tried to fill that void. By tying the curve's factors to inflation and activity, Ang and Piazzesi (2003) showed that a large share of yields responds to observable macroeconomic magnitudes. The result matters; it reminds us that the curve is not a purely financial object. But the architecture remains that of no-arbitrage: one assumes prices adjust until any riskless gain is eliminated. Reasonable on a US Treasury market several trillion deep, that assumption turns heroic on a market where a handful of institutions hold most of the stock and have neither the mandate nor the incentive to arbitrage.

One will object, that preferred habitat models, precisely, relax this assumption. True again they appear to be the best way of entry for us. In Vayanos and Vila (2021), the risk-averse and finite in number arbitrageur remains; habitat investors demand shocks no longer vanish without trace. When the arbitrageur becomes scarce (a limit pursued by the authors) demand effects become

localized ; long end shock affects the short one by negligible amount and vice versa. This property is exactly what we will need. So the theory is there - it only remains to apply it directly to an economy in which captivity, not an extreme abstraction but a rule, persists.

The preferred-habitat framework is not beyond criticism, and we should not lean on it uncritically. Its canonical version is linear, treats habitat demand as exogenous, and was calibrated on the deep United States Treasury market; its main empirical support, notably the finding of Greenwood and Vayanos (2014) that the maturity-weighted supply of government debt predicts bond yields and excess returns, comes from that same market. Whether these mechanisms transfer quantitatively to a thin emerging market is an open question, and one that our use of the model inherits. We therefore borrow from Vayanos and Vila (2021) a qualitative mechanism rather than a calibrated structure, and the limitations section returns to this point.

A last remark, almost methodological. Moroccan parametric work has most often borrowed not only its parametric toolbox but, without always saying so, its expectations-based interpretive frame. One reads that such-and-such a slope factor reflects market expectations, as if it went without saying that a captive market expects in the sense the theory intends. That shortcut, we believe, should be challenged. It is no reproach to the studies concerned, which are usually meticulous; it is the sign of an interpretive frame imported by default, for want of an available alternative. This paper would like to supply that alternative. It helps to separate two claims that the expectations hypothesis tends to fuse. One is about averaging: the long rate equals the average of expected short rates. The other is about information : the slope therefore tells us what the market expects. The first can fail while the second is salvaged, or the reverse, and much of the post-1991 literature has spent its energy choosing which to keep. On a captive market, we suspect both are weak, not because agents are irrational, but because the agents who set prices are not, in the main, forming expectations about rates at all. They are matching liabilities, meeting ratios, following mandates. Averaging expectations describes a market that, here, barely exists.

The emerging-market literature has long sensed this much, probably with justification. Time and again studies of local-currency sovereign curves in middle-income economies note that the standard term-structure regressions do not seem to work; that the slope predicts badly and that the curve appears segmented. The usual response is to include some combination of controls - a liquidity factor, a credit factor, a global risk factor. As useful as this may be it appears to treat the symptoms one at a time seldom asking whether or not the basic model of how prices are formed is the right one in the first place. We would claim that in the cases of a captive market it is clearly not.

None of this means the canonical theories should be discarded. They remain the reference against which any alternative must be stated, and the preferred-habitat strand in particular offers the very machinery we will lean on. The point is narrower and, we hope, fairer: their default application to a captive market smuggles in an institutional assumption, a free marginal arbitrageur, that the market itself does not honor. Make that assumption explicit, ask whether it holds, and the interpretation of the curve changes before a single parameter is estimated.

The liquidity-premium and preferred-habitat strands are related, but not identical. What Hicks described is a single number tacked onto the average of expected short rates, compensation for investors' dislike of tying up their money over long horizons. Preferred habitat goes deeper: it lets the premium vary across maturities and over time, because different clienteles crowd into different segments and their relative weight shifts. A captive market is, almost by definition, a habitat market, only with unusually immobile inhabitants. Read that way, the habitat tradition is not one option among many for making sense of a captive market; it is the natural one.

There is a subtlety we should not gloss over. Vayanos and Vila (2021) need their arbitrageurs to transmit shocks along the curve; without them, each segment would be an island and the model would collapse into pure segmentation. The Moroccan market sits somewhere between

the two: arbitrageurs exist but are thin, so transmission is present but weak. That intermediate position is, we think, exactly where the interesting behavior lives, strong enough segmentation that supply effects bite, enough residual arbitrage that the curve does not shatter into disconnected points. A fully segmented market would be easy to describe and empirically rare; the captive-but-not-sealed market is harder to describe and far more common.

The vocabulary of « factors » deserves a last, slightly skeptical word. Calling the first principal component a ‘level’ factor and the second a ‘slope’ factor is convenient bookkeeping, and it has become so habitual that the labels feel explanatory. They are not. A slope factor is a statistical summary of how the curve tilts; it is silent on why it tilts. On a deep market one can, with care, map the slope factor onto expectations and premia. On a captive market that mapping is exactly what is in question, and importing the labels along with the method risks smuggling the conclusion into the description. We use the parametric vocabulary here only as shorthand, never as a claim about causes.

A brief note on the affine no-arbitrage models, as they are sometimes held up as the rigorous benchmark compared to which a reading such as the one above looks soft. They are rigorous, it is true, but rigorously conditional: a rigour of pricing conditioned upon no-arbitrage, not a rigour about whether arbitrage (or lack thereof) applies there or not. Take a captive market and feed a typical affine model with data generated by it and it will still spit neat bond forecasts along with breakdown into expectations and premiums - the expectations, of course, resting on the assumption that no-arbitrage enforced consistency among bonds of different maturities. If that assumption is the very thing in doubt, the apparent rigor is borrowed, not earned. We raise this not to dismiss a powerful class of models, but to caution against treating their output as ground truth on a market they were not built for.

2.2 Financial repression, fiscal dominance and managed exchange rates

The second body of work starts from the other end, not from the curve but from savings and who captures them. McKinnon (1973) and Shaw (1973) forged, in two complementary books, the notion of financial repression to designate the set of devices, rate ceilings, high reserve requirements, exchange controls and administered credit allocation, by which the state holds real returns below their market level. McKinnon's emphasis falls on the repression of deposit rates and its cost for saving and investment; Shaw's on the shallow financial deepening that administered rates produce. Their concern was normative and developmental: repression curbed financial development. But the mechanism they describe has a broader reach.

Reinhart and Sbrancia (2015) give it the most useful formulation for our purpose: financial repression works as a quiet tax on savers, through negative or below-market real rates, and it relies on a captive audience for public debt, institutions, pension funds first of all, compelled by regulation or custom to hold sovereign paper. That is exactly the configuration found, in attenuated form, in many emerging economies: the debt is not sold to an anonymous market; it is placed with a designated audience.

The fiscal question follows naturally from this diagnosis. Sargent and Wallace (1981), in their famous unpleasant monetarist arithmetic, show that when fiscal policy dominates, monetary policy loses part of its autonomy: the financing need ends up constraining money creation, hence rates. Leeper (1991) systematizes the idea by distinguishing active and passive policies, and the fiscal theory of the price level draws more radical conclusions still. For our purposes the lesson is narrow but sharp: when the state's financing constraint bites, the issuance calendar becomes a first-order variable. Yet none of these authors asks what that does to the slope of the curve.

The third component is external. The impossibility triangle, in Mundell's line, recalls that one cannot simultaneously hold a fixed exchange rate, perfect capital mobility and an autonomous monetary policy. An economy that opts to manage its exchange rate, a managed float, a

fluctuation band, residual capital controls, keeps some room for monetary policy at the price of curbed capital mobility. The often-underestimated consequence is that interest-rate parity no longer fully operates. The anchor that fastens the domestic long end to world markets, international arbitrage, is loosened. To a large extent, the long yield becomes an internal matter. One can see the paradox. This body of work describes with precision everything the first one assumes away: captive demand, the issuance constraint, curbed mobility. It supplies, in short, the institutional backdrop that term-structure theory leaves off-stage. But it stops at the threshold of the curve. It speaks of rate levels, implicit taxes, sustainability; it does not speak of shape. It is this discontinuity, two literatures that complement each other yet never meet, that the next section tries to close.

What that means in concrete terms, because the word captive can sound a little woolly, is the following- a life insurer's liabilities sometimes run over decades. To match their liabilities, life insurer wants long assets : not because it has a view of rising/ falling interest rates but because duration dictated by its liabilities calls for long sovereign paper. Pension funds reason similarly. The money-market is tied to the short end by its mandate and banks buy sovereign paper essentially to meet liquidity ratios. In each of these cases, the decision to hold the paper arises from meeting a regulation- or actuarial or legal- obligation and not speculating on the future movement of interest rates. That, again, is captivity- demand which is inelastic to yield changes because it is ruled first and foremost by the balance sheet considerations.

It takes no distressed state for fiscal dominance. It points to a more ordinary arrangement where the Treasury finance need dictates market conditions upstream. When the state is the dominant issuer and its debt goes to a captive audience, its issuance calendar becomes part of the system whereas not outside input. It issues more ten year paper this year ? Proportionate supply of that maturity increases ; its price reacts. Sargent and Wallace (1981) discussed on the money creation ; here we draw such inference to the maturity compartment, one which certainly they themselves did not, although is in the spirit of their view.

As for the external dimension, here too one's terms must be precise. Under capital mobility, interest-rate parity tethers the domestic long end to the foreign long: a gap in domestic bond yields would be erased by capital-account arbitrage. But when the exchange rate is managed and the capital account is not entirely open, the tether may cease to hold. Covered parity, thanks to hedging instruments, might still operate on the short end; uncovered parity, which would govern the long end, loses its connection. The domestic long yield then becomes, to a large extent, an internal quantity, governed by local bank liquidity, an administered price. Such an argument, rarely theorized formally for an emerging economy on a crawling peg, is a central part of the case made here.

At the end of this survey the diagnosis sharpens. The first body of work has a theory of shape but assumes a market it does not question. The second has a theory of the market, captive, constrained, managed, but says nothing of shape. The task, then, is not to invent a wholly new theory; it is to wire one onto the other. That is less spectacular than a discovery, and, we believe, more useful.

A point about capital controls is worth making, because it is easy to caricature. Few emerging economies today run the crude controls of the 1970s. What persists is subtler: prudential limits on banks' foreign exposure, frictions in hedging long-dated positions, a managed float that makes the carry-and-cover trade unattractive at the long end. The effect, however, rhymes with the older controls. Foreign capital does not freely arbitrage the domestic long yield against the world curve. The long end is left, to a large extent, to domestic forces, which is exactly the condition under which a captive-supply reading gains traction.

There is, too, a quiet complementarity between the three mechanisms that we do not want to pass over. Financial repression supplies the captive demand; fiscal dominance supplies the issuance pressure; the managed exchange rate supplies the insulation from world arbitrage.

Remove any one and the configuration weakens. A captive demand facing a fiscally disciplined Treasury would still produce supply effects, but muted ones. A fiscally dominant Treasury facing a deep, open market would see its issuance arbitrated away. It is the conjunction that matters, and the conjunction is what one observes, in varying intensity, across a swathe of emerging economies.

The managed float is not external or merely constraining on curve formation; it is an active component. By keeping the exchange rate within a band, the authorities accept a duty to intervene, and that duty colours domestic liquidity: foreign-reserve flows show up as changes in bank liquidity, which in turn move the short end the central bank is steering. The peg, in other words, is not a wall standing outside the bond market; it is plumbed into it, through the liquidity it injects or drains. Any account of the Moroccan curve that treated exchange-rate management as background would miss one of the channels through which the short end is actually set.

We should add that the strength of all three mechanisms is in the Moroccan case as elsewhere a matter of degree and of date. The captive base is large but not captive without limit; the Treasury is dominant but not the only issuer; the float is managed but gradually loosening. A framework built on these mechanisms must therefore be read as describing a tendency, strong now, that could fade. That is not a weakness peculiar to our argument - every institutional reading of a market is dated - but it is worth stating, so that the framework is not mistaken for a claim about timeless structure.

It is worth recalling that McKinnon and Shaw wrote with a clear normative edge: repression was, for them, a brake on development, and liberalization the cure. That prescription has aged unevenly. The liberalization wave of the 1980s and 1990s delivered deeper markets in some places and costly crises in others, and a more cautious consensus has since emerged, that the sequencing and pacing of liberalization matter as much as its direction. We mention this because our use of the repression framework is descriptive, not prescriptive. We are not arguing that Morocco should, or should not, dismantle the captive arrangements; we are arguing that, while they persist, they shape the curve in a way the standard reading misses.

Reinhart and Sbrancia's emphasis on the captive audience deserves one further gloss. Their concern was the slow liquidation of debt through below-market real rates, a fiscal story about levels. Our concern is a cousin of theirs but distinct: not the level of real rates but the shape of the nominal curve. The same captive audience that lets the state borrow cheaply also, we argue, lets the state shape the term structure through the maturity mix of its borrowing. The fiscal benefit and the curve effect spring from one root, the captivity of demand, which is why the two literatures ought to have met long ago.

Leeper's active-passive taxonomy repays a closer look in this setting. A central bank that pegs, or heavily manages, the short rate is, in his terms, running a comparatively passive monetary policy, leaving the price level and the debt dynamics to be pinned down elsewhere. The managed-float, captive-demand configuration tilts the whole system toward the passive-money, active-fiscal corner, where the financing need does real work. We do not want to overstate the mapping; Leeper's model is about price-level determinacy, not curve shape. But the family resemblance is suggestive: the same institutional features that put an economy in his fiscally led corner are the ones that, in our reading, hand the Treasury its grip on the term structure.

2.3 Where the two literatures fail to meet

Put the two side by side and the gap is embarrassing. Term-structure theory has spent decades refining the geometry of its curve while taking the marketplace as given; the economics of repression has spent decades describing the marketplace while taking no interest in geometry. Each is, in a sense, the other's missing chapter. That supply and demand matter for yields has been noticed before, it was, in fact, the case made by the preferred-habitat revival. Yet that

revival was built for deep markets with a temporary kink in demand, not for markets where captivity is the steady state.

Why did the two never meet ? Partly a matter of audience. Term-structure modeling grew up in finance departments, with US Treasuries as the canonical dataset; repression and dominance grew up in development and monetary economics, with the balance of payments and the budget as the canonical concerns. The journals differ, the toolkits differ, the seminars differ. A Moroccan doctoral student fitjuting a Nelson-Siegel and a Moroccan doctoral student writing on fiscal sustainability may never read each other, though they study the same bonds.

This is also partly a matter of convenience: no-arbitrage is a huge simplifier, and relaxing it means sacrificing tractability. As long as the data come from deep markets, that price is not worth paying. For a captive market the calculus reverses: keeping no-arbitrage buys tractability at the price of representing a mechanism that is not there. We would rather pay the tractability cost and describe the right mechanism, even informally, than keep the elegance at the expense of relevance. The aim of the next section is modest but necessary: to supply the missing chapter, not a new theory of everything, but a wiring of two existing ones, so that the shape of the curve and the institutions of the market finally appear on the same sheet.

It is fair to ask whether anyone has tried to bridge the gap before. Pieces of the bridge exist.

Table 1: Comparative synthesis of the theoretical strands mobilized

Strand (founding works)	Core postulate	Main contribution	Limit on a captive market
Expectations hypothesis (Fisher, 1930; Lutz, 1940)	Long rate as average of expected short rates	Informational reading of the slope	Presupposes free arbitrage across maturities
Liquidity preference (Hicks, 1939)	Premium rising with maturity	Explains a positive average slope	Premium exogenous; demand structure ignored
Segmentation and preferred habitat (Culbertson, 1957; Modigliani & Sutch, 1966; Vayanos & Vila, 2021)	Maturity clienteles; limited arbitrage	Supply and demand price each segment	Canonical version calibrated on deep markets
Equilibrium and no-arbitrage (Vasicek, 1977; Cox et al., 1985; Ang & Piazzesi, 2003)	Prices exclude riskless gains	Tractable pricing; macro-finance link	No-arbitrage doubtful when arbitrageurs are scarce
Parametric fitting (Nelson & Siegel, 1987; Diebold & Li, 2006)	Curve summarized by level, slope and curvature	Excellent fit and forecasting	Describes the shape; does not explain it
Financial repression (McKinnon, 1973; Shaw, 1973; Reinhart & Sbrancia, 2015)	Captive audience; administered returns	Theorizes the captive market	Silent on the shape of the curve
Fiscal dominance and managed exchange rate (Sargent & Wallace, 1981; Leeper, 1991; Mundell, 1963)	Financing need and peg constrain policy	Issuance and liquidity as first-order forces	Curve absent from the analysis

Source: authors' elaboration.

The optimal-debt-maturity literature knows that issuance affects yields; the segmented-markets literature knows that clienteles matter; and the work on quantitative easing rediscovered, after 2009, that bond supply moves term premia, both in the event studies of large-scale asset purchases (Krishnamurthy & Vissing-Jorgensen, 2011) and in the long-sample evidence relating the maturity-weighted supply of government debt to bond returns (Greenwood &

Vayanos, 2014). What is missing is the assembly of these pieces around the specific case of a structurally captive emerging market, where the conditions that make supply effects strong are not a crisis episode but the ordinary state of affairs. The contribution we claim is that assembly, not the individual pieces.

We should also concede the limits of a purely conceptual bridge. Wiring two theories together in prose does not, by itself, deliver predictions sharp enough to be rejected. It delivers a frame within which sharper work can be posed. That is a real but bounded contribution, and we would rather state its boundaries plainly than oversell it. The reader who wants estimated term premia and identified supply effects will not find them here; the reader who wants to know where to look for them may.

There is one more reason the bridge has been slow to build, and it is sociological as much as intellectual. Curve-fitting produces clean, publishable output: a good fit, a tidy decomposition, a forecast horse-race. A claim that the whole interpretive apparatus is misapplied to a class of markets produces no such tidy artifact; it produces an argument, which is harder to referee and easier to resist. We do not say this to excuse the present paper's lack of estimates, but to explain why a gap this visible could persist so long. Filling it requires being willing, for a while, to trade the comfort of a number for the discomfort of a claim.

Table 1 summarizes the strands mobilized, their founding works, their core postulate and the limit each encounters on a captive market. The comparison makes the complementarity visible: the first five rows theorize the shape of the curve while presupposing the market; the last two theorize the market while ignoring the shape of the curve.

3. Analytical framework: toward an integrated reading

The guiding idea is modest to state, demanding to hold: if the marginal arbitrageur is not the leading character, then the curve no longer tells the same story. To show it, we proceed in two steps. A typology first, which places the Moroccan market among three possible regimes. Then a reading, which draws propositions from it.

3.1 Three regimes of yield-curve formation

It seems to us illuminating to distinguish three ideal-typical regimes, which are not descriptions of countries but ideal-types in the Weberian sense. In the first, a deep arbitrage market, the expectations hypothesis roughly operates: the curve can invert, the slope carries information about the future. In the second, a segmented market with captive demand, the shape mostly reflects maturity clienteles and balance-sheet constraints; the positive slope is anchored, inversion rare. In the third, an administered market, the short rate is set by the authority and the long end is closely tethered to it; the curve is flat or constrained. Table 2 summarizes these contrasts; Figure 2 gives a stylized depiction.

Table 2: Three ideal-typical regimes of yield-curve formation

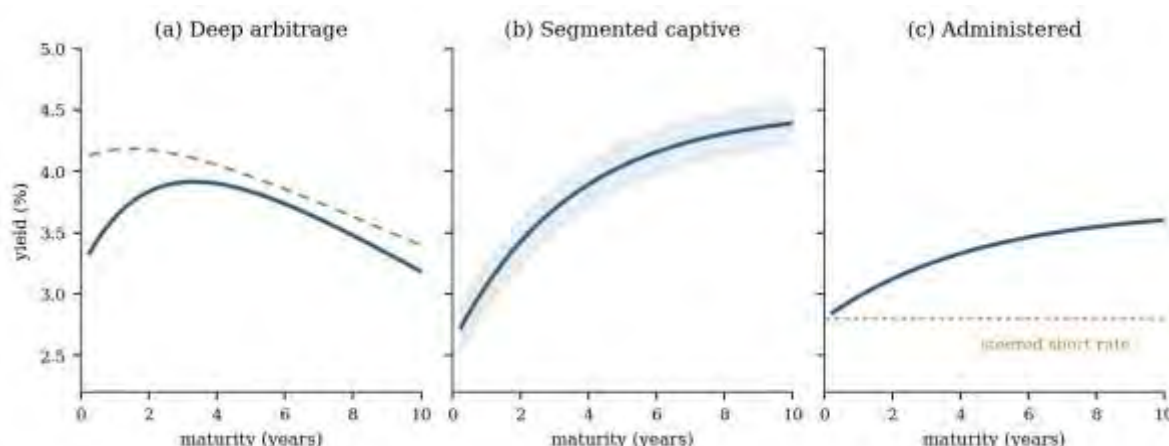
Criterion	Deep arbitrage	Segmented captive	Administered
Dominant agent	Marginal arbitrageur	Captive investor (balance sheet, prudential)	Monetary authority / Treasury
Shape governed by	Expected short rates	Relative supply and maturity clienteles	Administrative decision
Term premium	Variable, risk-related	Tied to maturity supply	Compressed / residual
Inversion possible?	Yes, frequent	Rare	Very rare
Long sensitive to short?	Yes (transmission)	Weakly	By construction
Expectations hypothesis	Approximately valid	Systematically fails	Beside the point

Source: authors' elaboration.

No real market coincides exactly with one of these types; they are poles. The Moroccan market belongs mainly, we will argue, to the second (segmented captive), with a strong component of the third on the short end, where the central bank operates. The point is not to deny any presence of expectations, there are expectations at the margin. The point is to say they are not the main driver. The distinction is not just a matter of filing; it governs the interpretation one gives of one and the same fact. Take a slope that flattens. In the arbitrage regime, one reads it as the announcement of a slowdown: the market expects lower short rates. In the segmented regime, one sees instead a shift in supply: the Treasury has loaded the short end, or institutionals have rushed into the long. In the administered regime, it is the acknowledgement of a decision. Same flattening, three narratives, which is to say how far the choice of reference regime is not neutral, and how imprudent it would be to apply mechanically, to a captive market, the interpretive recipes forged for an arbitrage market.

One might object that the typology is too clear-cut, that the regimes often coexist within a single curve. That is fair, and we grant it willingly: the Moroccan short end is administered, the medium and long ends are captive, and a thin fringe of arbitrage survives. The real curve is a blend. But acknowledging the blend does not excuse one from identifying the dominant driver, short of giving up on understanding. Ideal-types do not describe the real; they help decipher it. The typology can also be given a first operational content, even if a full measurement exercise lies beyond this article. Three indicators seem natural candidates for locating a market within it: the share of sovereign securities held by domestic institutional investors, as a proxy for the captivity of demand; the turnover ratio of the secondary market, as a proxy for the thickness of arbitrage; and the share of non-resident holdings, as a proxy for external openness. A market combining a high captive share, a low turnover ratio and a marginal non-resident presence would be classified as segmented captive; the deep-arbitrage regime corresponds to the opposite corner. On the three counts proposed, the recent Moroccan market sits squarely in the captive cell. Domestic-currency debt makes up about three-quarters of the total and is placed with a large base of resident institutional investors, the marketable share reaching roughly four-fifths and the average maturity about 8.2 years (Ahokpossi et al., 2016; International Monetary Fund, 2025). The secondary market, by contrast, remains thin and lightly traded, and non-resident participation in the domestic curve is marginal, the capital account being only partially open.

Figure 2: Stylized depiction of the three curve regimes

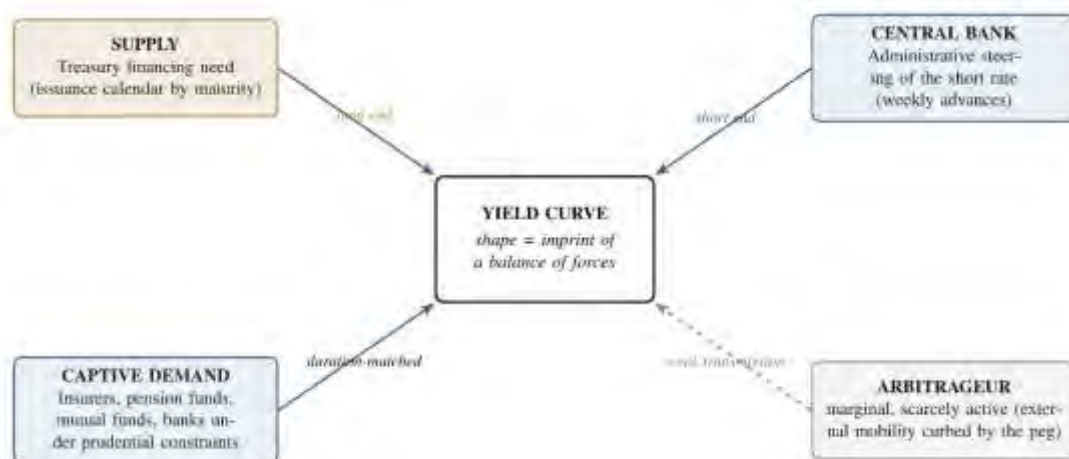


Source: authors' conceptual schema (illustrative, no estimated data).

3.2 The curve as the imprint of a captive-supply / financing-need balance

The curve of a captive market gains, we think, from being read as the outcome of an encounter rather than a bundle of expectations. On one side, a supply: the Treasury issues on a calendar dictated by its financing need and splits that issuance across maturities. On the other, a constrained demand: insurers and pension funds seek long paper to match their long-dated liabilities, money-market vehicles stay on the short end, banks arbitrage under the eye of their prudential ratios; between them, a residual arbitrageur, scarce in number and curbed in action, too, by the managed exchange rate. Finally, the central bank sets the starting point by steering the short rate. Figure 1 schematizes this architecture.

Figure 1: Conceptual architecture of curve formation in a captive market



Source: authors' conceptual schema.

Before stating the propositions, a minimal formalization helps fix ideas; it claims no originality and follows the reduced form of preferred-habitat models. Write the yield of maturity τ as $y(\tau) = m(\tau) + \theta(\tau)$, where $m(\tau)$ is the average of the short rates expected over the life of the bond and $\theta(\tau)$ is the term premium. In an economy of the Vayanos and Vila (2021) type, the premium takes the form $\theta(\tau) = \alpha(\tau) \cdot q(\tau)$, where $q(\tau)$ denotes the net relative supply of maturity τ that arbitrageurs must absorb, and where the coefficient $\alpha(\tau)$ increases with their risk aversion and with the inelasticity of habitat demand. Two limiting cases follow. When arbitrage capital is abundant, $\alpha(\tau)$ tends toward zero and $m(\tau)$ dominates: this is the deep-arbitrage regime, in which the curve is a forecast. When arbitrage capital is scarce and habitat demand inelastic, $\alpha(\tau)$ is large and $\theta(\tau)$ dominates: this is the segmented captive regime, in which the curve is an imprint. The four propositions below are the qualitative content of this second limit.

This way of seeing, which owes much to the preferred-habitat intuition revived by Vayanos and Vila (2021), leads to four propositions. We use the term in a precise sense: reasoned conjectures that are falsifiable in principle once operationalized, though not yet tested (Popper, 1959). The test they call for lies beyond the scope of this article. Table 3 gathers them.

The four differ in how readily they can be falsified: P2 and P4 lend themselves to direct test (issuance shifts are datable, the Campbell-Shiller regression is standard), P3 to an event-study around policy shocks, while P1 is the hardest to identify, since the rarity of inversion admits several causes.

Let us unfold the propositions one by one, since a table flattens what argument should carry. First proposition : Non inversion is structural. If indeed it is long-horizon captive demand that holds on to the long end-demand not leaving long maturity assets when the short rate surges since it is bounded by its commitments- the long yield does not collapse on the short as an expectation ridden market has it. The best expectation driven phenomenon-inversion is not allowed to take place. Something that would elsewhere signal the happening recession is

disallowed to happen. The slope stays positive not because the future is bright, but because the structure of demand keeps it there.

Table 3: Four conceptual propositions and their underlying mechanism

Proposition	Statement	Underlying mechanism
P1: Structural non-inversion	The curve hardly ever inverts	Long-horizon captive demand that does not desert the long end when the short rises locks in a positive slope.
P2: Supply-driven term premium	The term premium follows the relative supply of maturities	What moves yields is the quantity of paper the Treasury places per segment, not revisions to expected short rates (supply effect).
P3: Insensitive long end	The long end responds little to short-rate shocks	The arbitrageur who elsewhere propagates the shock is marginal here, so transmission is dampened; the curve pivots, gently.
P4: Predictable EH failure	An expectations-hypothesis test should reject	If P1–P3 hold, the mechanism the hypothesis describes is not the one at work; rejection is expected, not accidental.

Source: authors' elaboration.

Second proposition: the term premium follows the relative supply of maturities. On a captive market, what moves yields is not the revision of expected short rates but the relative quantity of paper the Treasury places on each segment. Does it issue more long ? The term premium tends to rise, independently of any monetary-policy news. This is, transposed, the supply-effect intuition: the price of maturity depends on its relative scarcity in the eyes of clienteles that shift only imperfectly from one segment to another. The debt manager, in this light, holds an instrument whose power is usually underestimated.

Third proposition: the long end is comparatively insensitive to short-rate shocks. Since the arbitrageur who elsewhere propagates the short-rate shock to the long end is marginal here, transmission dulls. Monetary tightening moves the short rate; it does not mechanically drag the long. The curve does not translate, it pivots, and gently at that. This point has a direct bearing on monetary policy, whose grip on long-term financing conditions appears limited.

Fourth proposition: the failure of the expectations hypothesis is predictable and even expected. If the three preceding propositions hold, then a Campbell-Shiller-style test run on Moroccan data should reject the expectations hypothesis, not by sampling accident, but because the mechanism it describes is not the one operating. The failure stops being bad news for the theory; it becomes a prediction of the framework. There, it seems to us, lies the conceptual gain: what was an anomaly turns into a consequence.

We do not underrate the difficulty. These propositions, stated in words, would gain from being anchored in an explicit supply-demand model, which the Vayanos-Vila framework would allow. But the stake of this article is not formalization; it is to show that a shift of gaze suffices to reorganize facts that were until now scattered. Formalization will come, or not, in a second stage. We would rather have the reading right than have it premature.

We will remain with the first suggestion, which we think sounds most counterintuitive. In the textbook, a flat curve describes how the market expects short rates to fall, usually because there is a downturn due. It appears strange that a market might be structurally incapable of sending that message. But it automatically follows from captivity: if the institutions that hold the long end are there to match decades-long liabilities they do not jump back to the short end when the policy rate goes up and so they long yield does not collapse under the short one. The signal is not oppressed by any censorship - it is absent because the trade that would result in it is not the trade these holders make. Thus, an economy might suffer a perfectly healthy downturn from an ever upward sloping curve, a possibility which it is harder for the expectations reading to admit.

There is a corollary to the second proposition, which we feel is well worth mentioning. If the amount of issuance determines the amount of the premium that is paid then it may in-fact be that the central bank is not as instrumental in determining the shape of the yield curve as the government because their actions affect its steepness more directly. In a year when there is much long issuance the curve steepens and, in a year, when the Treasury crowds the short-end of the market then the curve flattens regardless of what it is the central bank are doing. Than being a condition then it may be that fiscal policy has greater control over this aspect of economic policy than monetary policy. When operating a captive market the two must share responsibility at least, yet it does appear that at the longer end it must surely be the Treasury which exercises more power.

The third proposition, about long-end insensitivity, deserves a caveat lest it be read too strongly. We do not claim the long end is frozen. Over long horizons it moves, with inflation trends, with shifts in the captive base's appetite, with the slow rollover of the stock. What we claim is narrower: it responds weakly to high-frequency policy-rate surprises, because the channel that would transmit them, active arbitrage, is thin. The distinction matters. A long end that ignores a policy surprise this week may still drift over a year as the issuance stock turns over. Insensitivity to shocks is not the same as immobility, and conflating the two would caricature the argument.

3.3 How the framework changes the reading of the slope

If the propositions hold even loosely, a familiar habit must be unlearned: reading the slope as a forecast. On a deep market, a steep slope tells tales of recovery, a flat one of slowdown, an inverted one of an incoming recession. Transplant that grammar to a captive market and it misleads. A steep Moroccan curve may say little about growth but a great deal about the Treasury leaning toward longer-term issuance, or about insurers lengthening the duration of their assets to meet an incoming tide of new liabilities. The slope may still be rich in news, of course, just not the news the textbook assigns to it.

What information could that be? An institutional kind, we would suggest: a persistently steep curve signals a heavy long-end issuance programme, or a binding duration-matching need among captive holders; a flattening short of any policy move signals that the central bank has nudged the short end, or that liquidity has tightened in the banking system. Read this way, the slope becomes a gauge of the configuration, of supply pressure, of balance-sheet strain, of the degree of repression, rather than a crystal ball for the cycle. A demotion in one sense, a promotion in another.

We hold this loosely, and we should say why. The institutional reading of the slope is, at this stage, a proposition resting on the four stated above, and thus doubly in need of evidence. It needs its own proof: episodes where issuance moves and the slope follows, with expectations held constant. Such proof is, in principle, gatherable at a later stage, though not in these pages. We raise the point less to settle it here than to mark where the framework, if pursued, would lead, and to warn against importing, unexamined, a forecasting grammar built for a different kind of market.

3.4 An illustrative thought experiment

Let us illustrate the mechanism with a fictional episode - no data, just a scenario the framework is designed to contend with. Faced with a wider deficit, the Treasury decides to add length to its issuance: more ten- and fifteen-year paper, less of the short. On a deep arbitrage market, arbitrageurs jump in, the extra long supply is absorbed at nothing more than barely perceptible price concession, the curve hardly moves; the expectations content dominates. Now run the same episode on the captive market. Here the extra long bonds must be absorbed by insurers and pension funds whose appetite, however real, is not infinitely elastic; the marginal long bond finds its buyer only for a slightly higher yield. The long-end cheapens, the term premium widens,

curves steepens - and none of this is down to changed views of future short rates. Our observer wedded to the expectations grammar will record a steeper curve and infer brighter growth prospects - backwards: the steepening came from a wider deficit and not a stronger economy. The framework by contrast will read the steepening for what it is, a supply effect.

The experiment indicates what would show the reading false; if in such an episode the long end did not shift - extra supply was absorbed without a premium, then arbitrage would be deeper than we argue and the captive market reading weakened. Therefore, far from being empty the conjecture outlaws something and may thereby be asked whether this something did or did not happen. That is as much as can be asked of a conceptual proposition and at least demanded of it.

It is worth running the experiment once more in reverse, because the asymmetry is telling. Suppose now the central bank cuts the policy rate sharply, with no change in issuance. On a deep market the cut would ripple out along the curve as arbitrageurs repriced every maturity against the new short rate; the long end would follow, attenuated by expectations of eventual normalization. On the captive market the ripple is faint. The short end drops, obediently, because it is administered. The long end, held by duration-matchers who are not repricing against the policy rate, barely stirs. The curve steepens, not because growth prospects brightened, but because only one end of it was free to move. Read through the expectations lens, this looks like a market forecasting recovery; read through the captive lens, it is simply the mechanical signature of an administered short end and an inert long one.

On the policy side, the asset-purchase program simulated for Morocco by Queyranne et al. (2021) involves purchases of about 8 percent of the stock of Treasury bonds and produces, in their exercise, a compression of term premia of between 50 and 85 basis points. Supply movements of this size are therefore neither hypothetical nor marginal for the market under discussion.

Before turning to the Moroccan facts, a word on what kind of object the framework is. It is not a model in the sense of a system of equations with a solution; it is a reading, a disciplined way of assigning causes to the curve's features. That may strike some readers as unsatisfying, since economics has learned to equate seriousness with formalization. But a reading can be wrong, and can be argued against, which is more than a description that merely fits can claim. The propositions are the points at which the reading commits to a testable claim. The rest of the paper asks whether, for Morocco, those claims hold.

4. Discussion: The Moroccan case as illustration

It remains to confront the reading with the facts. We do so cautiously: the aim is to illustrate coherence, not to administer a proof. The Moroccan case is convenient in that it brings together, almost in pure form, the ingredients of the segmented-captive regime.

4.1 The Moroccan stylized facts revisited

Four traits recur in descriptions of the Moroccan bond market and each finds, in the proposed framework, a place that is no longer that of a curiosity. The absence of inversion over long stretches, first, which one might be tempted to chalk up to mere sampling luck. The first proposition reads it otherwise: long-horizon captive demand locks the slope. Next, the captive holding of government securities by domestic institutionals - a much-noted fact - ceases to be a detail of the holding structure and becomes the driver of price formation.

The third trait - the central bank's dominance over the short end, through its weekly advances - corresponds to the administered side of the regime: the curve's starting point is set, not negotiated. The fourth - the dependence of the term structure on the Treasury's financing needs

- is the direct translation of the supply effect of the second proposition. Table 4 sets these correspondences side by side.

Table 4: Moroccan stylized facts and their reading by the integrated framework

Observed stylized fact	Reading by the integrated framework
No curve inversion over long periods	P1: the slope is locked by long-horizon captive demand (structural non-inversion).
Captive holding of government securities by domestic institutionals	Central driver of price formation: supply meets constrained demand, not a free arbitrageur.
Central-bank dominance over the short end (weekly advances)	Administered side: the curve's starting point is set, hence dampened transmission to the long end (P3).
Term structure dependent on the Treasury's financing needs	P2: supply effect: the term premium follows the split of issuance across maturities.

Source: authors' elaboration, drawing on regularities reported in the descriptive literature.

Some descriptive magnitudes, drawn from institutional sources, anchor these traits. The sovereign debt is overwhelmingly domestic and marketable: at the end of 2014 already, marketable instruments represented about 81 percent of public debt, with roughly 73 percent issued as Treasury securities through the auction market (Ahokpossi et al., 2016). The same study describes a market that is well developed and diversified but not very liquid, which is a compact way of saying that placement works and trading does not. On the funding side, sight deposits amount to about 40 percent of bank deposits, a structure that Queyranne et al. (2021) identify as one of the factors limiting the pass-through of policy-rate cuts. We do not claim these figures establish the framework; we claim the framework is the natural way to read them together. A fuller measurement exercise, using security-level holdings and the Treasury's issuance statistics, is part of the research agenda set out in the conclusion.

The recent monetary sequence gives the reading further texture. After raising its policy rate by a cumulative 150 basis points during the inflationary episode of 2022 and 2023, Bank Al-Maghrib reversed course and lowered it in three quarter-point steps between June 2024 and March 2025, from 3.00 percent to 2.25 percent, a level maintained through the first quarter of 2026 (Bank Al-Maghrib, 2026). The bank's communications motivate the easing by the return of inflation toward its reference range and by the need to accompany activity. Two features of this sequence matter here. First, the cuts passed through only partially to credit conditions, a pattern consistent with transmission frustrated by balance-sheet and pricing rigidities (Queyranne et al., 2021). Second, and more telling for our first proposition, the tightening of 2022 and 2023 was not accompanied by an inversion of the curve, although an expectations reading of a disinflationary tightening would have made inversion the natural outcome.

One should note, finally, that the question of asset purchases by the central bank, flattening the curve by buying sovereign paper on the secondary market, has already been examined for Morocco in the working paper of Queyranne et al. (2021). The proposed framework clarifies the stake: on a captive market, such a program would act less through the expectations channel than through a supply effect, by withdrawing long maturities from a market where captive demand shifts only imperfectly. The instrument, on this view, would operate precisely where the reading locates the driver of prices.

A second contextual observation corroborates the picture without, we stress, proving it. The Moroccan secondary market for government paper is thin: a sizable share of the bonds issued are bought and held to maturity by the same captive institutions, with little subsequent trading. Thinness of this kind is usually filed under 'market development', a problem to be fixed. The framework suggests reading it also as a consequence: where demand is captive and duration-matched, there is little reason to trade, the secondary market stays quiet not by accident but by the design of holders' incentives.

One can press the point to the transmission of policy. If the long end is held by buy-and-hold institutions that are refreshed mainly through new issuance, then changes in the policy rate reach long-term financing conditions slowly and only in part, through the gradual rollover of the stock, not through a prompt repricing. The partial pass-through of rate cuts observed recently is consistent with that story. We would not claim it is the only explanation; the pricing power of banks or the state of credit demand are plausible candidates too. But captive reading offers a structural reason where competing stories offer a behavioral one, and the two need not be mutually exclusive.

This curve is remarkable also for what does not happen, when it is the absences that alert us more than the occurrences. One does not observe the type of swift, expectations driven repricings punctuating deep data markets and policy driven meetings at the long end; the curve does not invert ahead of slowdowns; long yields are also oblivious to movements of foreign flows that often respond to evolving global risk sentiment. Expectations approach has labelled each nonevent as an anomaly, providing elaborate explanations for their lack of occurrence. Under captive reading they are exactly what one would expect from a long end held by immobile domestic institutions and sealed off from world arbitrage. A theory that predicts the dogs that do not bark has, we think, something going for it.

A skeptic might reply that thin trading and few surprises simply reflect an immature market that will, with time, come to behave like a developed one. That may well be true, and nothing in our argument denies it. But 'immature' is a label, not a mechanism. The captive-market reading tries to say what, concretely, makes the market behave as it does, who holds the bonds, why they hold them, what sets the short end, what keeps foreigners out, and to derive the observed quiet from those specifics. Maturation, if it comes, will come precisely through the loosening of those specifics, which is one more reason to name them rather than to fold them into an adjective.

Stepping back, the most remarkable thing about these traits, the one that strikes us as soon as we put on the captive-market lens, is how easily they fit into a single configuration; how well they hang together. Non-inversion, captive holding, administration of the short end, dependence on the Treasury: four separate footnotes under the expectations reading, each demanding its own special pleading. Under the integrated reading they are four faces of one configuration, one market, where supply is set by the state, demand by the balance sheet, the short end by the monetary authority, and outside arbitrage tempered by the peg. Rightly or not, that economy of explanation is, in our view, the strongest argument in its favour.

4.2 Scope, limits and competing readings

To be honest there is also a case to make the whole argument wobble. Other explanations for non-inversion are possible and perhaps more prosaic - long-subdued and low-volatility inflation, mild cycles, a short sample - no need for it be (or even require) captive demand that makes inversion so rare. Identification of proposition we thus does not, as such, arise. Consistent with the facts, sure, but the facts need not imply it. That is a given.

The relative plausibility of these explanations can nevertheless be discussed. The low-inflation account fits the period before 2022 but sits uneasily with the most recent one: the 2022 and 2023 episode combined an inflation shock with a 150-basis-point tightening, precisely the configuration in which expectations-driven curves invert, and the Moroccan curve did not. The short-sample account is real but weakening as the sample lengthens. The mild-cycle account and ours are, in truth, complementary rather than rival: mild cycles reduce the occasions for inversion, while captivity removes the mechanism that would produce it on those occasions. We read the joint evidence as tilting toward the structural account without settling the matter. Next, captivity is itself neither total nor frozen. Gradual liberalization, a widening of the exchange-rate band, a progressive opening of the capital account, the development of the

secondary market, slowly erodes the constraints that ground the regime. Should that erosion continue, the Moroccan market might migrate, step by step, from the captive regime toward the arbitrage regime. The framework would then not become false; it would become dated, historically situated. That, by the way, is a virtue: it offers a grid for thinking the transition itself. A third objection, more fundamental, targets the status of the propositions. Stated in words, they are not, strictly, falsifiable without some empirical apparatus (a term-premium decomposition, a measure of the long end's elasticity to short-rate shocks, a test of supply effects). The framework is heuristic: it organizes the gaze, it does not settle matters. We present it as nothing else. Its value, if it has one, lies in making scattered facts mutually intelligible and, by that token, in suggesting a research program.

There is, finally, a tension we do not think we can resolve here. To say the curve carries little information about the future, because it is captive, is also to say it may carry another kind of information, more institutional: about the state of the financing constraint, the health of captive balance sheets, the degree of repression. The slope stops being a cyclical predictor and becomes an indicator of regime. That displacement would deserve, on its own, a study.

One might press a further worry: are we not merely relabeling, calling « supply effect » what others would call a time-varying term premium? The two are cousins, we concede. But the relabeling is not idle. A time-varying premium left unexplained is a residual; a premium tied to the issuance calendar is a mechanism, and a testable one. Naming the source is not a cosmetic gain, it points to where one should look.

There is a still deeper concern that our fair-minded critic might raise: that the story is not falsifiable in practice, since almost any behaviour of the curve can be told as a supply story after the fact. The charge is sharp, and we take it seriously. It is not true, however, that there are no predictions, or that they do not jointly constrain. The propositions above preclude frequent inversion; they predict that shifts in issuance move the term premium with expectations held fixed; and they anticipate a weak long-end response to policy surprises. A market where inversion is frequent, where participants ignore issuance, and where policy changes pass fully to the long end would refute the story. That such a world is conceivable is exactly what keeps this reading from being vacuous.

Finally, the problem of generality versus fit arises. Morocco is well-behaved and has clear characteristics that lend to our analysis, but a reading that fits just one country can be of only limited interest. Our suggestion is no more than that at this stage - but we suspect the same approach could shed new light on the performance of other emerging markets with active but controlled institutional spaces across North Africa, through parts of South Asia into parts of East Asia. It might also usefully develop the framework for the cases in which the captivity might be present but the curve movement we would expect is absent.

We want to register one self-doubt that the framework cannot dispel from within. By foregrounding institutions, we may be underweighting the role that genuine expectations still play, even on a captive market. Captivity is a matter of degree; some holders do trade on views, some foreign capital does seep in and at the margin the expectations channel breathes. A reading that wrote it out entirely would overcorrect. So we hold the claim in its weaker, defensible form: expectations are present but not dominant and the curve's gross features are better explained by supply and captivity than by them. Where exactly the balance tips is, again, an empirical matter - and one on which we would not be shocked to be partly wrong.

4.3 Implications for debt management and unconventional policy

If the second proposition is even roughly right, the most powerful lever over the Moroccan curve sits not at the central bank but at the Treasury. The maturity composition of issuance - how much short, how much long - shapes the relative supply that captive clienteles must absorb and hence the term premium. A debt manager who lengthens the average maturity is, in effect,

raising the long-end premium; one who shortens it is flattening the curve from the supply side. This is familiar idea in the literature on optimal debt maturity; what the captive market reading adds is that here the effect is unusually strong - because the demand that must absorb the supply is inelastic.

The same reasoning recasts the asset-purchase debate. Large-scale purchases are often defended on deep markets with a signaling channel, telling the market that policy will stay loose. On a captive market that channel is thin since the marginal price-setter is not forming policy expectations anyway. What remains and is highlighted by the framework is the supply channel: purchases compress the long end premium directly by removing long bonds on a market where captive demand shifts only imperfectly. The instrument is not pointless on a captive market, it simply works through a different door than the one usually advertised.

Comparable exercises give a sense of scale. In the simulation of Queyranne et al. (2021) for Morocco, purchases of about 8 percent of the stock of Treasury bonds compress term premia by 50 to 85 basis points. On United States data, Greenwood and Vayanos (2014) find that the maturity-weighted supply of government debt is a significant predictor of bond yields and excess returns, with stronger effects at longer maturities. Magnitudes of this order are indicative rather than transferable, but they suggest that the supply channel described here is quantitatively material rather than a curiosity. Evidence from other emerging markets points in the same direction. Reviewing the local-currency bond-purchase programmes launched by emerging central banks in early 2020, Arslan, Drehmann and Hofmann (2020) find that announcements lowered long-term yields significantly with little effect on exchange rates: in South Africa the ten-year yield fell by about 100 basis points on the announcement day, with smaller but sizeable effects in India and Korea. That these declines came without a rise in inflation expectations or a currency sell-off is consistent with a supply and liquidity channel rather than a signaling one, which is precisely the channel our framework isolates for a captive market.

We would not push these implications too hard. They are directional, not quantitative, and they inherit all the caveats of the propositions that ground them. Still, they have the merit of being actionable and, in principle, checkable. A debt-management office could, in time, look for the footprint of issuance shifts on the term premium; a central bank weighing purchases could ask whether the supply channel, rather than signaling, is the relevant one for a captive market. The framework does not answer these questions. It does, we hope, ask them in the right register.

A related implication concerns the coordination between the Treasury and the central bank. If both the issuance mix and the short-rate setting bear on the curve, then the two authorities are, whether they intend it or not, jointly steering the term structure. On a deep market this coordination is diffuse, mediated by countless arbitrageurs. On a captive market it is direct, and its effects are concentrated. That concentration is a double-edged thing: it gives the authorities real leverage over financing conditions, and it makes any misalignment between debt management and monetary policy more visible in the curve than it would be elsewhere.

None of this argues for or against repression as a policy. It argues that, given repression, certain levers are unusually potent and certain signals unusually misleading. A debt office that ignored the supply channel would be leaving a real instrument unused; a central bank that read the captive curve as a market forecast would be listening to an echo of its own and the Treasury's actions. The practical payoff of the framework, modest but real, is to flag both errors before they are made.

There is a tempting but mistaken inference we should head off. To say that the Treasury can shape the curve is not to say it should aim to. Using issuance to flatten the long end might lower financing costs today, at the price of concentrated rollover risk tomorrow; the supply lever, like any lever, has a far end. Our point is descriptive. The lever exists and is unusually strong on a captive market. Whether and how to pull it is a question of debt-management strategy beyond the scope of this paper, requiring at a careful weighing of cost versus risk, and, perhaps, the

political desirability of such weighing. We will only note that a framework that makes the lever visible is the precondition for using it wisely - or for choosing, deliberately, to leave it alone.

4.4 A note on measurement, for the work that would follow

Since we have insisted that the framework points toward testable work without doing it, let us at least indicate where the tests would bite. The first proposition - structural non- inversion - is the weakest to identify, because rarity of inversion has many possible causes; it would need to be approached indirectly, by showing that the long end stays put precisely in episodes where an expectations account would predict inversion. The second - the supply-driven premium - is the most promising, because issuance shifts are observable and datable : one would look for movements in the estimated term premium that line up with changes in the maturity mix, holding expectations proxies fixed.

The third proposition, long-end insensitivity, invites an event-study logic: track the long yield around Bank Al-Maghrib policy shocks and ask whether it barely moves, as the captive reading predicts, rather than translating the shock. The fourth, the expected failure of the expectations hypothesis, is almost a by-product: run the Campbell-Shiller regressions and predict, in advance, that they reject; a rejection then confirms the framework rather than embarrassing it, and a non-rejection would be a genuine surprise. Neither exercise requires more data or insight than Bank Al-Maghrib already has; both are within reach of any researcher with patience. That they remain to be done is the honest limit of a conceptual paper, and its invitation.

There are two practical hazards to any such test which it is only fair to mention. First there is the short and evolving Moroccan sample period. Second and harder to separate, is perhaps whether the supply is an independent variable as the issuer's decision may respond to expectations. Neither is fatal -issuance calendars are often administrative not a fresh view of the cycle and help identification - but both point to humility of how conclusive any one test could ever be. A body of convergent evidence, not one clean regression would be needed for the framework.

5. Conclusion

We have tried to defend a simple thesis. On a captive, fragmented bond market backed by a managed exchange rate, the yield curve does not read as the bundle of expectations the textbook would make it. It reads like the imprint of a balance of forces between the Treasury's financing need (supply) and the constraint of prudential regulation (demand). The Moroccan literature has fitted the curve a great deal; it has thought it little. And the theory of financial repression, which forms the backdrop of the argument, has stopped at the door of its shape. To tie the two together has been the aim of these pages.

The gain is not only academic. If the slope of the yield curve is driven by supply rather than by expected short rates, debt management takes on a powerful first-order role: the maturity profile of issuance, the issuance calendar, becomes instrumental in shaping the curve. And if monetary policy shifts the long end only little, the debate over possible asset purchases (already examined for Morocco by Queyranne et al., 2021) must be conducted, for Morocco, in the register of the supply effect rather than of signalling.

If a single shift had to name the contribution, it would be this: to stop treating the institutions of the market as a backdrop to the curve and to start treating them as its cause. The canonical theories were built for markets where that backdrop could safely be ignored, because a dense crowd of arbitrageurs washed institutional detail out of prices. On a captive market the crowd is thin, the detail survives and the curve records it. Reading the curve, there, is less like reading a forecast and more like reading a balance sheet: the consolidated balance sheet of a Treasury that must borrow and of a captive base that must lend.

The limits of this work should be stated in one place. First, the contribution is purely conceptual: no formal empirical test is conducted, and the Moroccan facts are mobilized as illustrations, not as evidence. Second, the scope is a single country, which restricts external validity; the claim that the framework travels to other emerging markets is itself untested. Third, the four propositions, while falsifiable in principle, are not yet operationalized: their test requires a term-premium decomposition and captivity indicators that do not exist to date for Morocco. Fourth, the framework leans on a preferred-habitat model whose canonical version is linear, treats habitat demand as exogenous and was calibrated on deep markets; the quantitative transfer of its mechanisms to a thin market remains an assumption. Fifth, captivity itself is a moving target: the gradual liberalization under way may date the framework faster than it can be tested.

Turning to practical implications, three recommendations follow for the institutions concerned, stated with the caution the previous subsection imposes. For the Treasury, the maturity composition of issuance should be treated explicitly as a curve instrument: on a captive market the issuance calendar shapes the term premium, and its effects should be monitored, and weighed against rollover risk, rather than left implicit. For Bank Al-Maghrib, the slope of the curve should be read as a gauge of supply pressure and balance-sheet constraints rather than as a forecast of activity; and, should the policy rate approach its effective lower bound, an asset-purchase program should be evaluated through the supply channel, along the lines simulated by Queyranne et al. (2021), rather than through signaling. For both institutions jointly, the coordination of debt management and monetary policy deserves an explicit framework, since on a captive market the two authorities steer the same curve whether they intend to or not.

As for the research agenda, the extensions we see are three, and they are not equally ripe. The most feasible in the short run is the test of the expectations hypothesis on Moroccan data: the zero-coupon curve exists, the regressions of Campbell and Shiller (1991) are standard, and the framework makes a falsifiable prediction, namely rejection. Next comes the construction of captivity indicators and a decomposition of the Moroccan term premium, which requires security-level holdings and issuance data but no new theory. The most demanding extension is the full formalization of the mechanism in a preferred-habitat framework adapted to a thin market, which would give the propositions the status of results. None of this work is trivial; all of it, we believe, becomes better defined once the gaze has shifted. None of this work is trivial; all of it, we believe, becomes better defined once the gaze has shifted from expectations to the balance of supply and captive demand.

References:

- (1). Ahokpossi, C., Garcia Martinez, P., & Kemoe, L. (2016). Monetary and fiscal policies and the dynamics of the yield curve in Morocco (IMF Working Paper No. 16/103). International Monetary Fund. <https://doi.org/10.5089/9781484365465.001>
- (2). Ang, A., & Piazzesi, M. (2003). A no-arbitrage vector autoregression of term structure dynamics with macroeconomic and latent variables. *Journal of Monetary Economics*, 50(4), 745–787. [https://doi.org/10.1016/S0304-3932\(03\)00032-1](https://doi.org/10.1016/S0304-3932(03)00032-1)
- (3). Arslan, Y., Drehmann, M., & Hofmann, B. (2020). *Central bank bond purchases in emerging market economies* (BIS Bulletin No. 20). Bank for International Settlements. <https://www.bis.org/publ/bisbull20.htm>
- (4). Autorité Marocaine du Marché des Capitaux. (2024). *Rapport sur l'investissement étranger en instruments financiers*. AMMC.
- (5). Bank Al-Maghrib. (2026). *Historique des décisions de politique monétaire*. Bank Al-Maghrib. <https://www.bkam.ma/Politique-monetaire/Cadre-strategique/Decision-de-la-politique-monetaire/Historique-des-decisions>

- (6). Campbell, J. Y., & Shiller, R. J. (1991). Yield spreads and interest rate movements: A bird's eye view. *The Review of Economic Studies*, 58(3), 495–514. <https://doi.org/10.2307/2298008>
- (7). Cox, J. C., Ingersoll, J. E., & Ross, S. A. (1985). A theory of the term structure of interest rates. *Econometrica*, 53(2), 385–407. <https://doi.org/10.2307/1911242>
- (8). Culbertson, J. M. (1957). The term structure of interest rates. *The Quarterly Journal of Economics*, 71(4), 485–517. <https://doi.org/10.2307/1885708>
- (9). Diebold, F. X., & Li, C. (2006). Forecasting the term structure of government bond yields. *Journal of Econometrics*, 130(2), 337–364. <https://doi.org/10.1016/j.jeconom.2005.03.005>
- (10). Fisher, I. (1930). *The theory of interest*. Macmillan.
- (11). Greenwood, R., & Vayanos, D. (2014). Bond supply and excess bond returns. *The Review of Financial Studies*, 27(3), 663–713. <https://doi.org/10.1093/rfs/hht133>
- (12). Hicks, J. R. (1939). *Value and capital: An inquiry into some fundamental principles of economic theory*. Clarendon Press.
- (13). International Monetary Fund. (2025). *Morocco: 2025 Article IV consultation* (IMF Country Report No. 25/94). International Monetary Fund.
- (14). Krishnamurthy, A., & Vissing-Jorgensen, A. (2011). The effects of quantitative easing on interest rates: Channels and implications for policy. *Brookings Papers on Economic Activity*, 2011(2), 215–287. <https://doi.org/10.1353/eca.2011.0019>
- (15). Lamsaddak, K., & Mentagui, D. (2019). Modeling of the Moroccan risk-free interest rate curve by the Smith-Wilson method. In *2019 Third International Conference on Intelligent Computing in Data Sciences (ICDS)* (pp. 1–6). IEEE. <https://doi.org/10.1109/ICDS47004.2019.8942317>
- (16). Leeper, E. M. (1991). Equilibria under 'active' and 'passive' monetary and fiscal policies. *Journal of Monetary Economics*, 27(1), 129–147. [https://doi.org/10.1016/0304-3932\(91\)90007-B](https://doi.org/10.1016/0304-3932(91)90007-B)
- (17). Litterman, R., & Scheinkman, J. (1991). Common factors affecting bond returns. *The Journal of Fixed Income*, 1(1), 54–61. <https://doi.org/10.3905/jfi.1991.692347>
- (18). Lutz, F. A. (1940). The structure of interest rates. *The Quarterly Journal of Economics*, 55(1), 36–63. <https://doi.org/10.2307/1881665>
- (19). McKinnon, R. I. (1973). *Money and capital in economic development*. Brookings Institution.
- (20). Ministère de l'Économie et des Finances. (2025). Rapport sur la dette publique [Rapport accompagnant le Projet de loi de finances pour l'année budgétaire 2025]. Direction du Trésor et des Finances Extérieures. https://www.chambredesrepresentants.ma/sites/default/files/07-%20Rapport%20Dette%20publique_Fr.pdf
- (21). Modigliani, F., & Sutch, R. (1966). Innovations in interest rate policy. *The American Economic Review*, 56(1/2), 178–197.
- (22). Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. *The Canadian Journal of Economics and Political Science*, 29(4), 475–485. <https://doi.org/10.2307/139336>
- (23). Nelson, C. R., & Siegel, A. F. (1987). Parsimonious modeling of yield curves. *The Journal of Business*, 60(4), 473–489. <https://doi.org/10.1086/296409>
- (24). Popper, K. R. (1959). *The logic of scientific discovery*. Hutchinson.
- (25). Queyranne, M., Baksa, D., Bazinas, V., & Abdulkarim, A. (2021). *Morocco's monetary policy transmission in the wake of the COVID-19 pandemic* (IMF Working Paper No. 21/249). International Monetary Fund. <https://doi.org/10.5089/9781589067264.001>

- (26). Reinhart, C. M., & Sbrancia, M. B. (2015). The liquidation of government debt. *Economic Policy*, 30(82), 291–333. <https://doi.org/10.1093/epolic/eiv003>
- (27). Sargent, T. J., & Wallace, N. (1981). Some unpleasant monetarist arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3), 1–17. <https://doi.org/10.21034/qv.531>
- (28). Shaw, E. S. (1973). *Financial deepening in economic development*. Oxford University Press.
- (29). Soussi Noufail, O., Bourass, H., & Hachimi, H. (2024). Analyzing the dynamics of Nelson-Siegel-Svensson term structure models using time series data. In *2024 10th International Conference on Optimization and Applications (ICOA)* (pp. 1–6). IEEE. <https://doi.org/10.1109/ICOA62581.2024.10754443>
- (30). Svensson, L. E. O. (1994). *Estimating and interpreting forward interest rates: Sweden 1992–1994* (IMF Working Paper No. 94/114). International Monetary Fund. <https://doi.org/10.5089/9781451853759.001>
- (31). Vasicek, O. (1977). An equilibrium characterization of the term structure. *Journal of Financial Economics*, 5(2), 177–188. [https://doi.org/10.1016/0304-405X\(77\)90016-2](https://doi.org/10.1016/0304-405X(77)90016-2)
- (32). Vayanos, D., & Vila, J.-L. (2021). A preferred-habitat model of the term structure of interest rates. *Econometrica*, 89(1), 77–112. <https://doi.org/10.3982/ECTA17440>