

STRESS TESTING 102

RISE OF THE PPNR MACHINES

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INTRODUCTION

The financial crisis and subsequent responses have brought about a revolution in stress testing. Banks have invested in capabilities to link macro-economic and market factors to forecasts of key risk parameters, especially traditional 'Risk' metrics such as credit losses, trading losses and RWA. More science has been embedded into financial planning.

Nevertheless, forecasting capabilities for pre-provision net revenue¹ (PPNR) have lagged, and this gap is invariably the most significant shortcoming in banks' planning and stress testing toolkits across both the banking and trading books. It prevents a more robust approach being taken to the entirety of the planning and budgeting process, as expert judgement and rules of thumb continue to underlie material drivers.

Banks included within the US Federal Reserve's CCAR and Dodd-Frank Act stress testing regime have begun to develop PPNR capabilities, employing statistical models that borrow from the techniques used for "Risk" stress testing. We observe that leading firms globally are importing or replicating these capabilities. This is an irreversible trend, and one that firms globally should embrace given the wide-ranging benefits that an effective PPNR approach can have for their stress testing, strategy development, planning and budgeting.

This paper addresses four points:

- **What is PPNR modelling?** How does it differ from 'traditional' forecasting approaches?
- **Why is PPNR modelling important?** Is there a rationale for investing in the capability?
- **What challenges need to be overcome?** Why don't banks already do this?
- **How should banks proceed?** What are the practical next steps?

WHAT IS PPNR MODELLING?

Forecasting of P&L and Balance Sheet items is not a new concept and has always been essential for planning and capital projections, what is new is the regulatory focus and statistical rigour demanded. While PPNR modelling ultimately produces outputs that can be aggregated to produce the same types of estimates, it has a number of differences from traditional forecasting methods:

- **Driver analysis:** PPNR items are decomposed into underlying drivers via a driver 'tree' that breaks them into underlying components. For example, rather than predicting the stock volume of lending as a single item, PPNR modelling would separate historical stock, contractual run-off, pre-payments, new lending, defaulted balances and so on. Focusing on economically meaningful drivers increases the robustness of results, and the quality of the challenge and debate around them
- **Data use:** Relationships between drivers and market/economic conditions are derived from historic data using statistical techniques. This is more akin to the approach used for many 'Risk' items; however, the analogy is far from perfect (see below). The aim is to predict the 'systemic' impact of market/economic drivers on PPNR items, often industry rather than bank-specific data is most relevant

¹ Pre Provision Net Revenue. This comprises revenue (e.g. net interest income, fees, commissions), operational costs (e.g. personnel, general & admin expenses) and balance sheet items (customer lending, retail deposits, wholesale funding). These are 'Non Risk' items typically forecast by the Finance or Planning team within a bank.

- **Model coverage:** By extending both the scope of macro-economic factors and the range of drivers modelled, PPNR modelling goes far beyond the scope of traditional ALM models used for modelling NII, though this may borrow on many of the same inputs, models and techniques used. Beyond the NII perspective, PPNR also provides a basis to connect impacts on other areas (for example, fee income and RWA projections)
- **Expert judgment:** The impact of 'specific' drivers (management actions, strategies, regulatory changes) is a crucial part of forecasting P&L and Balance Sheet, and differs from credit and trading losses on stock portfolios (which are primarily sensitive to 'systemic' drivers). PPNR modelling does not naively deny the importance of these 'specific' factors, but rather seeks to frame them in the light of 'systemic' driver effects

PPNR modelling adds an underpinning of rigour to financial plans, providing an analytically-grounded starting point for forecasts that can then be challenged and adjusted through consideration of bank actions.

WHY IS PPNR MODELLING IMPORTANT?

We see three principal reasons to invest in PPNR modelling: as a core part of the risk-management toolkit within stress testing; to meet rising regulatory expectations; and as an essential tool to upgrade the financial planning process.

PPNR is a huge driver of financial risk² and getting the forecasting of PPNR right is critical to understanding the extent of risks facing the bank. In a crisis situation short term credit/traded losses dominate, however, over a longer term projection or benign period, the influence of PPNR comes to the fore. The recent financial crisis is testament to this, with embedded PPNR vulnerabilities having significant medium-term effects (for example, the impact of spread widening on 'tracker' mortgages in Ireland or the widespread NII compression resulting from the refinancing of mismatched positions). Immature stress testing approaches can mask this materiality; for example trading businesses focus on asset revaluation rather than fee revenue which can dominate over multi-year periods.

Regulatory focus on stress testing has picked up on this materiality, with extensive modelling requirements introduced for US banks within the CCAR and Dodd-Frank Act stress testing exercises by the Federal Reserve; as well as higher standards being introduced by both the Bank of England and ECB/EBA. We expect this trend to continue, particularly in Europe where there has been less development to date.

Perhaps most intriguing of all is the potential for PPNR modelling to transform the financial planning process. Many view financial planning as an arduous, time consuming and somewhat futile exercise where targets and strategies are confused with genuine estimates of future business performance. Last minute 'top down' overlays further undermine the robustness of the plan and its internal consistency. PPNR modelling is a cornerstone of improving the efficiency and effectiveness of the strategic planning process and the quality of management decisions. An objective and algorithm-based starting point for a projection focusses attention on deviations from the 'systemic' outcomes that would be expected in the

² PPNR was the second most important driver of base to adverse scenario movement (after credit risk) in the 2014 ECB stress-testing exercise

absence of management actions. A clearer link between economic/market conditions and different PPNR items facilitates a more efficient process capable of planning under multiple different scenarios.

WHAT CHALLENGES NEED TO BE OVERCOME?

If the benefits of PPNR modelling are so clear, why don't banks already have the capability? We see a number of challenges:

- **Culture:** The harsh truth is that PPNR modelling runs counter to the accepted approach to planning, and by implication, management at many banks. Moving towards PPNR modelling paves the way for a more robust, disciplined and objective planning approach. This should be welcomed, but will be a culture shock for many
- **Application:** A naive application of PPNR modelling, with human judgment eliminated in favour of 'the machine' would be a poor approach to forecasting PPNR. Finding a way to marry forecasting 'science' and management 'art' is inherently complex, but essential to effective PPNR forecasting
- **Data:** As PPNR is a relatively new capability, granular underlying historical data is often not readily forthcoming. Where it does exist it can be of questionable relevance (for example, if data is polluted by specific strategies or industry conditions that will not be repeated). A realistic aim for PPNR models in some segments is to produce a 'sensible algorithm' rather than a 'robust model'. The mix of data analysis and expert judgment is difficult to manage in practice
- **Segmentation:** Given modelling challenges, granularity needs to be tailored to available data and intended uses of the models. Revenue from fee based investment banking businesses is generally difficult to model and may be best approximated in aggregate. In contrast, lending asset evolution can be broken down into granular product models and multiple underlying drivers which can be robustly modelled (e.g. run off rate)
- **Standards:** Noting the challenges of developing robust models, it is right to be concerned about challenges of validation and back-testing. Approaches must be developed to ensure that the 'sensible algorithm' is acceptable, as well as a 'robust' model where this is possible. (As noted above, given the questionable nature of historic data in this area the whole notion of statistical robustness is probably misleading). Model testing and governance techniques applied for 'Risk' models will need to be adapted
- **Process rationalisation:** While PPNR modelling is an analytical technique, it raises a number of questions related to discipline and design of the numerous similar planning processes (strategic planning, risk appetite, stress testing, ICAAP, SREP and so on) that banks undertake. It is difficult to undertake the modelling work in isolation from questioning the planning process itself
- **Cost:** Development requires an investment in resource and skill levels

These challenges are not to be dismissed, but neither are they insurmountable. In most cases they are similar to the challenges that have faced 'Risk' model development over the last decades.

HOW SHOULD BANKS PROCEED?

Developing PPNR capabilities will require a concerted analytical effort in addition to existing capabilities management. Given the scale of the task, banks should learn from those who have already been through the process and ensure the programme is carefully planned and managed. Segregating a team of sufficient size and skill set will be challenging; those with the requisite modelling skills and business understanding are few and far between.

Before the heavy lifting starts, three issues must be addressed:

- **Applications:** A first step at most institutions should be to define the applications it is intended for. For example, PPNR models focused on addressing regulatory stress testing exercises will lead to a different approach than if models are expected to be deeply embedded in bottom-up planning processes. Building a common understanding of what PPNR modelling is and why it is beneficial remains a journey for most. Engaging a broad set of stakeholders upfront will be essential, and should include tackling more contentious operating model decisions (for example, Group vs. Divisional ownership of analytics)
- **Ambition level:** Related to the above, banks should pay attention to options around transition. For those starting with only basic PPNR capabilities, the wise option may be to adopt a phased approach with a focus on most material P&L and Balance Sheet components and segments, and using simpler models for other areas. Attempting to build a 'target state' methodology and infrastructure in one go has been achieved at some banks (principally in the US) but involves significant up-front cost and risk
- **Implementation approach:** An (at least high level) understanding of how the capability will be embedded in systems and processes should be built before the modelling starts to ensure that analytics can be deployed efficiently. Many institutions will have to run upgrades to their financial planning toolkit in order to be able to deploy the new capabilities. It is critical that implementation is supported by a revised operating model, not just new analytics

CONCLUSION

Despite the lack of focus on PPNR in crisis response initiatives to date, the development is a 'when' not an 'if' issue. The good news is that much can be learnt from international experience (most notably CCAR) and success stories abound. This is essential to effective risk management and also has potential to overhaul existing planning processes. Whilst the work is inherently challenging and complex, the difficulties are not insurmountable.

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