

Allowing for illiquidity and other market stress impacts in the valuation of insurance liabilities

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There has been much recent debate about the impact of the current financial crisis on the valuation of insurance liabilities, particularly in the context of Solvency II and the Swiss Solvency Test. This paper discusses one of the fundamental problems when valuing insurance liabilities on a market value basis, as well as important questions and implications for the insurance industry.

INTRODUCTION & BACKGROUND

Much debate continues across the insurance industry about the appropriate discount rates to use when determining a market-consistent value of insurance liabilities. Recent debate has focused on two main areas:

- (i) the choice of risk-free reference rates in a risk-neutral valuation (swap rates or government bonds); and
- (ii) the appropriateness and choice of some mechanism to allow for illiquidity (or counter-cyclicality) of insurance liabilities, particularly during periods of market stress.

The aim of this paper is to focus on point (ii) and explore the reasons why it is important to at least consider some form of illiquidity mechanism during periods of market stress.

We believe that making some allowance for illiquidity in insurance valuations is not a 'black-or-white' decision, as is sometimes portrayed by some practitioners. Rather we view this as a 'grey' area, which raises important questions and implications for the insurance industry and regulators. We therefore aim to present a balanced viewpoint to the problem, particularly in the context of solvency capital regimes.

An associated theme of this paper is also to consider the potential exacerbating factors during times of stress which might be caused by a pure market-consistent approach to solvency measurement.

Debate in this area has evolved rapidly, not least due to recent market events, such as the current sovereign debt crisis and the financial crisis

of late 2008. As a result of these market developments, the European insurance industry (along with the wider financial services industry) has experienced significant financial pressure.

Insurance regulation across Europe has an important role to play in ensuring that such pressures are managed appropriately and not exacerbated. This is therefore an especially important debate at the current time, given the on-going development of risk- and principles-based solvency regimes across Europe, in particular Solvency II and the Swiss Solvency Test ('SST').

Recent developments in the Solvency II framework have led to the proposed introduction of the Counter-Cyclical Premium ('CCP') and the Matching Premium ('MP'). Together these mechanisms have been proposed to replace the Illiquidity Premium 'buckets' which were introduced with the 5th Quantitative Impact Study ('QIS5').

In addition to the mechanisms proposed so far under Solvency II, several other suggestions have been offered by industry participants, including the following proposals:

- Include an illiquidity premium adjustment in the discount rate during stress periods, but make a corresponding adjustment to the Risk Margin component of the Market Value of Liabilities ('MVL') to compensate for the additional credit and/or liquidity risk implicit in the discount rate.
- Make an illiquidity adjustment directly to the MVL, rather than via a discount rate adjustment.

- Adjust the asset side of the balance sheet (rather than liabilities), effectively increasing the value of illiquid assets.

Despite the various approaches suggested, some practitioners believe that it is not appropriate to make an illiquidity adjustment to the liabilities, on the basis that any adjustment could be inconsistent with pure market-consistent valuation principles, and therefore inconsistent with the Solvency II Directive. In particular, discussion has focused on maintaining a liability valuation basis which is consistent with market prices in 'deep and liquid' markets, although there remains a lack of clarity about what this actually means, particularly during periods of stress.

Throughout this paper, we consider the above aspects in more detail.

POTENTIAL UNINTENDED CONSEQUENCES

There have been signs during recent periods of market stress that there may be some unintended consequences of using market-value-based measurement for solvency capital purposes. Such issues became apparent in late 2008, when spreads on corporate bond portfolios widened significantly, and again in 2011, when spreads on sovereign debt of certain stressed European countries rose significantly.

Such circumstances severely deteriorated the reported solvency position of certain insurers, in particular life insurers, when measured by a market-value-based solvency regime such as Solvency II or the SST. This widespread threat to the reported solvency of the industry is of concern to regulators across Europe, who will want to ensure that a sensible approach is taken to resolving such issues, as well as avoiding further unintended effects.

There are indications that market-value-based measurement under a solvency capital regime can exacerbate the problems of insurers during stress periods. For example, the following consequences might feasibly result from a deterioration in the market-value-based solvency position of an insurer:

- Policyholders may become concerned at the solvency of the insurer and this could trigger a tendency to surrender policies

(particularly if higher returns are increasingly available from other possible investments).

- This may force the insurer to sell assets at an unfavourable time, in order to meet its obligations. It is likely that the assets sold would be the more liquid assets held by the insurer, thus leaving the company with a rather less liquid asset portfolio.
- Realising assets at an unfavourable time potentially damages the interests of remaining policyholders, due to realised losses, and therefore lower book returns and future bonus rates on participating policies.
- Where contracts pay out surrender values based on book values (with no market value adjuster), considerable further strain can be introduced.
- All this may lead to further surrenders, and/or force further asset sales to de-risk the balance sheet in order to protect future solvency or liquidity, which in turn could drive market prices down further, particularly in markets where insurers hold a material portion of the total debt market.

To summarise, a market-value-based approach in times of stress can feasibly create unintended 'feedback loops', whereby a weakening of reported solvency drives not only further deterioration of the reported position but also has real consequences for the company's financial condition. This can cause significant problems for companies who might otherwise be quite capable of meeting future long-term policyholder obligations.

In the following sections, we explore in more detail why some allowance for illiquidity of insurance liabilities might be appropriate and could help diminish such negative feedback loops.

MEASURING THE MARKET VALUE OF LIABILITIES

When preparing the Economic Balance Sheet of an insurer, a key goal is to determine the MVL. This is a challenging objective, not least because there is currently no market for most insurance

liabilities (and hence no observable market value exists for the liability).

Due to the lack of available market prices for insurance liabilities, the MVL is assessed, where possible, relative to the market prices of suitable, tradeable instruments. The underlying insurance contract cashflows can be considered as split into two separate components: one part that is replicable by tradeable instruments; and another part that is not replicable by tradeable instruments. The value of the replicable cashflows can be measured relative to the price of corresponding tradeable instruments. The value of the non-replicable component is estimated using a Risk Margin (or Market Value Margin). The latter component represents the compensation that a third party would require for accepting the non-hedgeable risk associated with the liability, and is typically estimated using a 'Cost of Capital' approach.

It is sometimes useful to consider the concept of a 'Replicating Portfolio' in relation to the replicable part of the liability, and we explore this further in the following section.

In relation to the Risk Margin component, there remains a fundamental question of exactly which risks should be classified as 'non-hedgeable'. For example, significant exposures to major asset-liability matching (ALM) risks and/or the risks relating to management decisions are often not reflected in the Risk Margin. We believe this is an area that requires further thought in the context of market-consistent valuation.

SOME COMMENTS ON THE REPLICATING PORTFOLIO

As indicated above, the MVL in respect of replicable liability cashflows should be consistent with the value of a Replicating Portfolio¹. The base MVL is typically estimated using stochastic discounted cashflow techniques. Determining the appropriate discount rate for valuing the replicable liability cashflows is analogous to determining the component assets of the appropriate Replicating Portfolio.

¹ A Replicating Portfolio can be defined as a pool of tradeable instruments which reproduces the cashflows or market values of a liability across all economic scenarios for all future time periods.

However, it should be highlighted that the cashflows associated with life contracts can be challenging to replicate using tradeable (or even synthetic) assets, and this is especially the case for traditional participating business. The difficulty arises largely from the non-hedgeable features which are inherent in life insurance contracts - by definition, these non-hedgeable features are not replicable by tradeable assets. For example, dynamic management actions and dynamic policyholder behaviour are significant drivers of liability cashflows, yet these aspects often remain non-hedgeable and hence non-replicable.

The implication is therefore that the impact of dynamic management actions or dynamic policyholder behaviour in extreme market risk scenarios might not be captured by a Replicating Portfolio approach, and therefore such risks are potentially not reflected in the Target Capital. Furthermore, it is questionable whether all residual non-hedgeable risks would be fully allowed for in the Risk Margin as defined under current approaches.

Even where a Replicating Portfolio for a participating life portfolio can be found, it may not always be unique - there might be more than one implied market price for the same insurance contract sold by two different insurers. This non-uniqueness can be a consequence of differences in liquidity, as well as other characteristics, of possible replicating assets. This is especially true during current times, when the availability of highly-liquid instruments is relatively scarce.

However, even if the asset universe is fully liquid, the Replicating Portfolio can still be influenced by an insurer's investment strategy. In particular, participating life liability cashflows (specifically profit-sharing bonus rates) are often dependent on book returns, which are in turn dependent on the underlying investment strategy. For example, two insurers might write identical participating contracts, yet adopt a different investment buy/sell strategy, which leads to a different set of expected policyholder cashflows and hence a different MVL.

Due to such difficulties in calibration, Replicating Portfolio techniques are not always useful or appropriate for life insurance contracts.

COMPARISON OF SOLVENCY II AND THE SST

It is worth briefly describing the differences in the area of discount rates between the Solvency II standard formula and the SST standard model. The difference between these two market-value-based solvency regimes illustrates some of the differing viewpoints on the issue of illiquidity and choice of risk-free discount rate.

Under the SST, risk-free reference rates are based on government bonds, with no explicit adjustment for liquidity or credit spreads.

Under Solvency II, risk-free reference rates are based on swap rates, with an explicit adjustment for the associated credit risk.

The draft implementing measures for Solvency II have recently introduced the concepts of the 'Counter-Cyclical Premium' and the 'Matching Premium'. Both of these proposed mechanisms involve an adjustment to the discount rate used to value the insurance cashflows. These mechanisms have been designed to replace the illiquidity premium 'buckets' approach, which was introduced with the QIS 5 technical specification. The purpose of these two discount rate adjustments is broadly as follows:

- **Counter-Cyclical Premium:** to effect a temporary 'cushioning' adjustment to the value of liabilities during periods of market stress. The level of adjustment, and conditions under which the adjustment can be applied, would be defined by EIOPA (European Insurance and Occupational Pensions Authority).
- **Matching Premium:** to reflect the fact that a portfolio of illiquid assets can often be held to back a well-defined portfolio of liabilities (e.g. immediate annuities). Certain conditions must be satisfied, and agreed with the regulator, before the Matching Premium can be applied.

ALLOWING FOR ILLIQUIDITY UNDER MCEV AND IFRS

Discussion of liquidity premiums is not limited to Solvency II and the SST. The discussion is also important in the context of financial reporting, notably the European Insurance CFO Forum Market-Consistent Embedded Value Principles

('MCEV Principles')² and IFRS Phase II for Insurance.

In October 2009, the MCEV Principles were updated to allow the use of liquidity premiums³ in the discount rate. In particular, Principle 14 states the following:

"Where the liabilities are not liquid the reference rate should be the swap yield curve with the inclusion of a liquidity premium, where appropriate."

For recent MCEV reporting, European insurers have adopted various approaches to liquidity premium (including some insurers choosing to make no allowance). Among those who adopted a liquidity premium adjustment, there was a general trend to adopt a pragmatic approach for measuring and applying the liquidity premium.

The proposed IFRS Phase II framework also makes reference to liquidity characteristics in the recent Exposure Draft for Insurance Contracts:

"...in estimating discount rates for an insurance contract, an insurer shall take account of any differences between the liquidity characteristics of the instruments underlying the rates observed in the market and the liquidity characteristics of the insurance contract."

Under both MCEV and IFRS therefore, the approach to allowing for illiquidity is rather vague and in particular little guidance is provided on the level of liquidity premium that can be applied, which potentially results in a significant comparability issue.

ILLIQUIDITY CHARACTERISTICS

There is broadly-accepted empirical evidence for the existence of liquidity spreads on tradeable instruments, and this is supported by numerous published research papers. Discussion of this empirical evidence is outside the scope of this paper.

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³ While Solvency II adopted the terminology 'illiquidity premium' (IP), MCEV Principles use the terminology 'liquidity premium' (LP). We use the terms interchangeably in this paper.

As noted earlier, there is currently no liquid market for insurance liabilities. In other words, insurance liabilities are, by definition, highly illiquid. Given the empirical evidence of liquidity spreads within the yields on tradeable assets, it is natural to question whether the MVL should include some allowance for the illiquidity characteristics associated with the insurance liabilities.

This consideration becomes particularly important during times of market stress, when both liquidity and credit spreads might be observed to widen, and the asset side of the balance sheet typically reduces in value (although highly-rated government bonds might increase in value due to a 'flight to safety' by investors).

Since the concept of liquidity is, by its very nature, really only relevant to tradeable assets, liquidity might therefore be considered undefined for untradeable cashflows such as those underlying the MVL. However this does not necessarily mean that it would be reasonable to ignore the liquidity characteristics of the insurance instrument when evaluating the MVL.

Liquidity can be considered as an economic characteristic of a tradeable financial instrument which impacts the value of that instrument, in the same way as other economic characteristics. Therefore, an important next consideration is how to capture the illiquidity characteristics of the untradeable liability cashflows in the valuation. We explore this further in the next sections.

Lastly, at this stage it is worth noting that much debate has focused on measuring the MVL and the Replicating Portfolio with reference to 'deep and liquid' market prices. There is ambiguity about what this actually means. In the current economic environment, there are a limited number of truly 'deep and liquid' candidate assets against which to measure liability values, and tradeable instruments which are normally considered liquid (including sovereign debt of numerous European countries) have exhibited widening spreads during recent stress periods.

It might seem unreasonable to suggest that assets which would normally be considered highly liquid, cannot be relied upon for the purposes of measuring insurance liabilities during stress periods.

DEFINING 'LIQUIDITY' OF AN INSURANCE CONTRACT

Significant debate continues in the industry around whether liquidity premiums are appropriate to use when valuing illiquid policy liabilities. Nevertheless, increasing support for the liquidity premium concept has led to recent changes in the MCEV Principles and the Solvency II framework.

Even among those who believe that an adjustment for liquidity is appropriate, there is no consensus view about what should be an appropriate definition, level or application of liquidity premium. As mentioned in the previous section, the concept of liquidity is only really relevant for tradeable instruments; the concept remains largely undefined for insurance contracts, given the lack of market for such instruments.

In the following paragraphs, we highlight some key implications of the choice of definition for liquidity of an insurance contract, because the chosen definition of "illiquidity" can have a significant influence on the decision to include a liquidity premium adjustment when valuing insurance liabilities.

In the previous section, we considered liquidity of a liability in terms of the company's ability to trade that liability to a 3rd party (essentially equivalent to how liquidity is considered on the asset side of the balance sheet).

However, the MCEV Principles use an alternative definition in the Basis for Conclusions (paragraph 138):

"A liability is liquid if the liability cash flows are not reasonably predictable."

This definition considers the liability more from the viewpoint of the liquidity option of the policyholder, rather than the tradeability perspective of the company. So, for example, an immediate annuity contract is generally relatively illiquid from the policyholder's perspective. The cashflows are therefore 'reasonably predictable' from the insurer's point of view due to the absence of surrender risk. The rationale, then, is that the more predictable the liability cashflows, the higher the proportion of backing assets that can be illiquid and held to

maturity, in order to target a higher expected investment return.

The above two viewpoints are based respectively on alternative views of how to define the liquidity premium, namely

- (a) the liquidity premium associated with the tradeability of the liability itself; or
- (b) the liquidity premium that might be earned on the underlying assets (which is intended to be a proxy for the liquidity premium associated with the liability cashflows).

Debate continues over which of these two views is more appropriate for insurance liabilities.

A key point to highlight, however, is that two different definitions can lead to very different conclusions about the appropriateness of a liquidity premium adjustment and the level of that adjustment. For example:

- **When considering the liquidity of the liability itself (i.e. the ‘tradeability’):** from a tradeability perspective, is there any reason to suggest that an immediate annuity contract is more or less liquid than a participating life contract? In other words, is it easier for a company to find a 3rd party buyer for the participating life portfolio or the annuity portfolio?
- **When considering the liquidity premium that can be earned on underlying assets:** the main rationale for including liquidity premiums in the discount rate is to reflect the fact that insurers can potentially earn a liquidity premium on certain ‘held-to-maturity’ assets backing insurance liabilities which are illiquid for the policyholder (e.g. excess yield on illiquid bond or mortgage contracts to back an immediate annuity portfolio).

As observed earlier, the level and price of liquidity of tradeable instruments have the potential to vary over time, especially during periods of stress. It is worth noting, however, that the level and price of liquidity for insurance liabilities (or the movements thereof) are not necessarily consistent with those of the underlying assets. This makes it difficult to reliably assess the appropriate level of any illiquidity allowance for an insurance liability.

Also note that, for contracts which are illiquid for the policyholder (e.g. immediate annuities), there is already a reduced allowance in the Risk Margin component of the MVL, due to a lower lapse risk. It might therefore be argued that also taking credit for lack of surrender risk in the discount rate is to some extent double-counting.

It is also worth recognising that some practitioners argue, somewhat justifiably, that the MVL might even be expected to increase during times of stress (i.e. one would have to pay a 3rd party more, not less, to take on a given liability during stress periods). In other words, any widening of the liquidity premium on the replicable component of liability would be more than offset by an increased Risk Margin.

This last point merits some attention, because it is often overlooked. As described in earlier sections, a key driver for a regulator to introduce an illiquidity mechanism is to avoid exacerbating apparent solvency issues stemming from market stresses. The desire, perhaps necessity, for such a mechanism in a solvency framework perhaps indicates that differences might emerge between risk-based solvency frameworks (e.g. the SST and Solvency II) and realistic reporting frameworks (e.g. IFRS and MCEV).

SIMPLE EXAMPLE

To illustrate these ideas further, we consider the following simple example:

- A company with a portfolio of simple liability contracts, where policyholder cashflows are ‘fixed’ in nature (i.e. not dependent on asset performance or changes in economic conditions).
- A Replicating Portfolio consisting of a portfolio of credit-risk-free, zero-coupon, but not perfectly liquid bonds in the same currency as the liability contracts.
- For assets backing the liability portfolio, the company invests in this Replicating Portfolio to minimise ALM risk exposure.
- For simplicity, we assume that available funds (‘equity’) are invested in cash instruments, and hence are protected against movements in interest rates.

- For the purposes of the example, we consider the impact of a liquidity premium adjustment, which is measured relative to the observed liquidity spread on the Replicating Portfolio.

Figure 1 illustrates the impact on the insurer's economic balance sheet from a widening of liquidity spreads on the bond portfolio.

Note that there is no change in the underlying risk-free reference rates, only in the liquidity spread. We illustrate the impact on two bases: 'with' and 'without' liquidity premium adjustment in the MVL.

It can be seen from Figure 1 that, with an allowance for illiquidity in the MVL, there is no change in the reported equity of the insurer, even though the market value of assets and liabilities both reduce. This would seem a reasonable outcome, given that the insurer invested in a portfolio of replicating assets.

In contrast, when there is no liquidity premium adjustment in the MVL, the reported equity deteriorates significantly.

A key point, then, is that the company invests in economically-matching assets and hence should be protected from any change in economic factors, including changes in liquidity spreads. It can therefore be argued that a 'reporting mismatch' is observed when there is no corresponding liquidity adjustment on the liability side of the balance sheet. This phenomenon seems to conflict with the fundamental principle that, under a pure market-consistent valuation framework, reporting mismatches should not occur, i.e. the reporting should be reflective of the underlying economics.

This example suggests that it might seem reasonable to include some form of liquidity adjustment or counter-cyclical mechanism in the liability valuation, to avoid these apparent reporting mismatches.

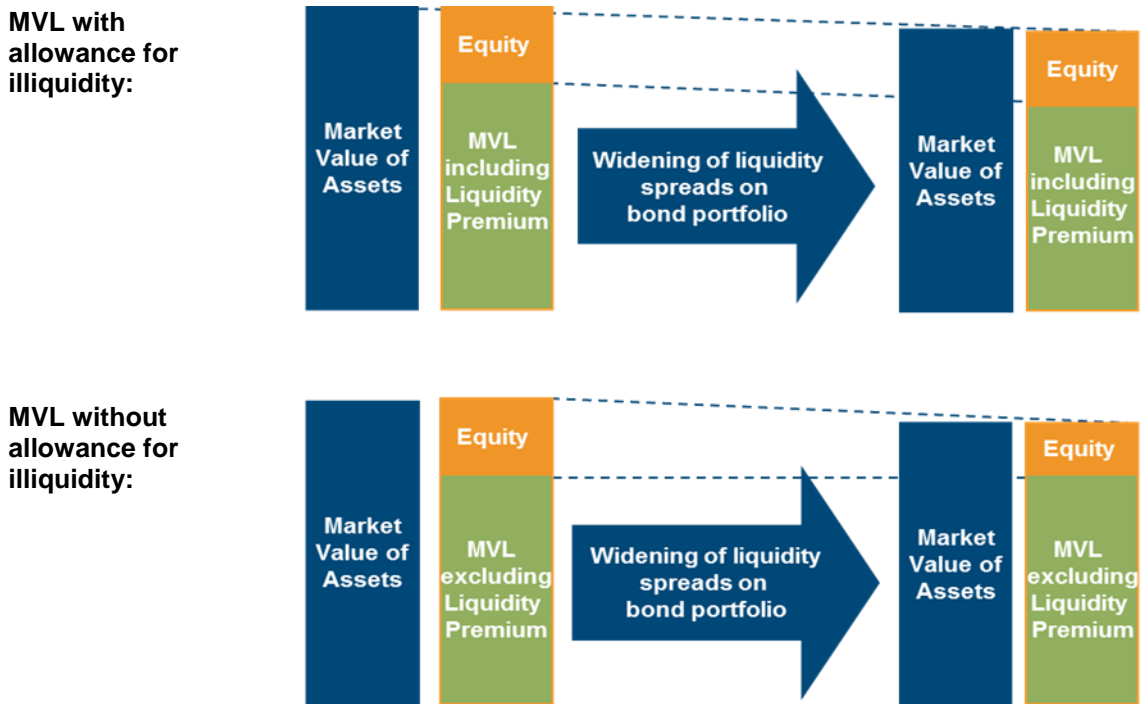


Figure 1: Impact of a change in observed liquidity spreads on an economic valuation of insurance liabilities

COMMERCIAL CONSIDERATIONS

The capital and business implications of any illiquidity mechanism are potentially significant. The introduction of any liquidity-type adjustment under Solvency II can potentially lead to significantly increased available capital and solvency coverage. Different levels of available and required capital could lead to differences in the costs of capital, which might influence a company's premium pricing basis.

Consistency between the insurance and the banking industries could potentially be influenced by relative differences between Basel III and Solvency II or the SST. Any relative differences might impact areas such as risk management practices and relative appetite for different risk types, and would likely result in transfers of certain risks from insurers to banks (or possibly vice versa). Such differences could also lead to differences in competitiveness of investment products between the banking and life insurance industries.

An additional consideration is comparability of economic frameworks. Comparability can be difficult when different realistic reporting and capital regimes adopt different methodologies to assign a 'market value' on the same contract or portfolio. This lack of comparability can potentially have additional commercial impacts, such as distortions in relative share price or credit rating, depending on the regime under which the entity operates.

CONCLUSIONS

Because there is no liquid market for insurance liabilities, insurance liabilities are, by definition, highly illiquid instruments. However, liquidity is by its very nature really only relevant to tradeable assets, and so liquidity is largely undefined for untradeable insurance contracts. This has not held back various industry attempts at 'defining' liquidity for insurance liabilities, and these have then driven distinct practical approaches to adjusting the MVL for illiquidity. However the essentially undefined nature of insurance liability liquidity means that practitioners have so far found it impossible to agree on a consensus approach.

What is apparent is that without any appropriate mechanism to counteract market distortions during times of stress, there are potentially adverse financial and commercial implications for the insurance industry. In this sense it is therefore important to consider whether an allowance for illiquidity is appropriate.

While such an allowance for illiquidity might be contrary to the idea of pure market consistency, it remains ambiguous what such a framework actually means, especially during periods of market stress when the availability of 'deep and liquid' assets is more limited.

Additionally, there are signs that a pure market-consistent approach can potentially lead to unintended consequences and negative feedback loops during stress periods, exacerbating solvency issues or forcing sales of assets.

As principles-based solvency frameworks, in particular Solvency II and the SST, continue to evolve, it will be important for insurance regulators to consider actions that can mitigate against the unintended implications of a pure market-consistent solvency measurement.

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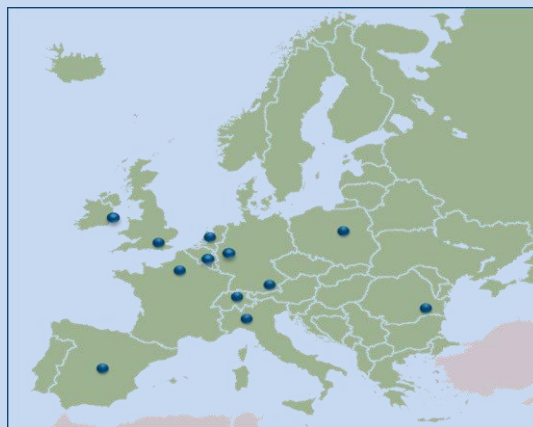
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