OTC Derivatives Reform:
Putting asset owners and sovereign wealth funds in the driver’s seat
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Sovereign wealth funds (SWFs), and in many instances asset owners, are well positioned to benefit in the securities lending and repo markets as banks and buy-side market participants increasingly turn to them for the high-quality securities they need to conduct business. As other market participants prepare to centrally clear OTC derivatives under the European Market Infrastructure Regulation (EMIR) this year, SWFs can continue to use one- or two-way credit support annexes to lay off risks on sell-side counterparts.

SWFs may be exempt from certain aspects of OTC derivatives reforms, but they are not immune from the threats and opportunities arising from these and related changes to the post-crisis financial market environment, according to this new research paper produced by BNY Mellon in conjunction with the Judge Business School of the University of Cambridge.

Fundamental shifts in market relationships and dynamics mean SWFs should first conduct a careful cost/benefit analysis of their options – in terms of risk exposures, operating and funding costs to themselves and their dealers, and potential revenue opportunities. Key factors include the following:

- Basel III is having a significant impact on the risk appetites and business models of banks and brokers, not least due to increased capital costs incurred by client-related exposures. As such, sell-side firms that are willing to take on uncollateralised business from SWFs may represent a significant credit counterparty risk.

- On the other hand, Basel III’s liquidity coverage ratio has increased banks’ appetite for safe securities (high-quality liquid assets) typically held by SWFs, such as government bonds, potentially presenting revenue opportunities, for example in the securities lending markets.

- Moreover, the widespread increase in demand for collateral generated by OTC derivatives markets reforms creates further opportunities for SWFs in the repo markets, where many buy-side market participants are urgently seeking collateral transformation deals in order to submit eligible collateral to clearing houses.

While many post-crisis reforms only impact SWFs indirectly, in total they represent a reshaping of the financial markets which presents asset owners with significant challenges and opportunities. Global OTC derivatives and related reforms have profound implications for SWFs’ sell-side counterparts, market infrastructures and other service providers, providing potential upside revenue opportunities to SWFs.

Our analysis of OTC derivatives reforms and related regulatory developments suggests that nothing less than a fundamental review of investment operations and strategy will equip SWFs and other asset owners for the new landscape – as demonstrated through the three model analysis in the paper. Firms that take a flexible approach – enabling them to respond to revenue opportunities as well as minimising counterparty risks – are likely to find themselves well-positioned to turn them to their advantage in the long term.
Foreword

As a leading provider of expertise and solutions to asset owners, including Sovereign Wealth Funds (SWFs), BNY Mellon is constantly analysing market developments and trends to ensure its services continue to meet client demand. The recent OTC reforms raised some concerns at the Investment Committee level of various SWFs, and although in most instances they are exempt from these reforms, the indirect impact remains and is not always clear. BNY Mellon therefore engaged the University of Cambridge Judge Business School to analyse this impact through a consulting project, and over a period of six months, we worked diligently with a team of BNY Mellon experts to examine the OTC reforms and their impact on SWFs. The result is outlined in this white paper and we hope that it provides you as a reader, with a framework to decide on the optimal clearing model.

UNIVERSITY OF CAMBRIDGE JUDGE BUSINESS SCHOOL
Zijing Jiang, Hirokazu Kutsukaka and Shirley Wu
1. Introduction

Policy makers and regulators identified the opaque and interconnected nature of the OTC derivatives market as a major source of systemic risk and a significant contributor to risk contagion in the financial crisis of 2007-2009. To reduce the risks or impact of a repeat, a series of regulatory reform measures were developed, including:

1) Contagion risk mitigation through mandatory central clearing and exchange based trading of standardised OTC derivatives as well as further risk mitigating actions including trade matching;

2) Counterparty risk mitigation through stricter collateral requirements;

3) Banking capital regulations, with liquidity buffers, higher capital requirements, and more robust counterparty credit risk measurement; and

4) Increased transparency and Trade Repository reporting.

These changes have had a profound impact on many market participants, both on the buy- and sell-side of the OTC derivatives markets. But the financial crisis and its aftermath uncovered other systemic weaknesses, many of which have been tackled by far-reaching reform programmes, which have often had unforeseen consequences, in part because of the sheer number of the regulatory changes set in motion.

Not all of these reforms impact sovereign wealth funds (SWFs) and other asset owners directly. In fact, SWFs have been granted exemption from new OTC derivatives reforms, especially in Europe. Despite this, asset owners should be under no illusions about the extent of the changes wrought by the post-crisis reforms. The appetite and capabilities of service providers, the market’s perception of the value of different collateral assets, and the opportunities for asset owners to enhance their investment returns have all changed. As such, nothing less than a fundamental review of investment operations and strategy will equip SWFs and other asset owners for success in the evolving post-crisis landscape.

This research project focuses on potential impacts for SWFs arising from the reforms to the OTC derivatives markets as well as other related post-crisis regulatory changes. Section 2 introduces the current investment practices of SWFs, concentrating on OTC derivatives but also outlines other key aspects of portfolio management. Then, Section 3 reviews the key reforms to the OTC derivatives market – namely mandatory central clearing, margin requirements, and banking capital requirements – as well as other reforms that are having a significant impact on SWFs and their counterparts. Section 4 lays out a cost-benefit analysis of SWFs’ options for OTC derivative clearing, touching also on broader strategic counterparty implications, while Section 5 addresses broader challenges and opportunities for SWFs and asset managers in light of current and expected market developments.
2. Asset owners: New perspectives and priorities

Although this report focuses on SWFs, the findings are also relevant to other large asset owners, in terms of their existing investment strategies and operations, and capacity to adjust to the challenges and opportunities presented by post-crisis reforms, such as those to the OTC derivatives markets. In this section, we look at existing investment practices and processes, including the use and clearing of derivatives, and the reasons why established approaches to investment may need to change.

2.1 Investment strategies
The investment objectives or strategies of SWFs vary from organisation to organisation but also share much in common, both with each other and with other large-scale, long-term institutional investors. Variations notwithstanding, we can define typical SWFs as government-owned institutions that invest in international securities and/or assets to transfer the states’ wealth to future generations, as such SWFs dominate the majority of assets under management of the whole sovereign sector. Examples include saving funds, reserve investment funds, and pension reserve funds. These SWFs have the following investment objectives:

- **Long term investment horizon**: Since SWFs aim to increase wealth for future generations, they tend to target long term investments; and

- **Foreign asset investments**: As the major funding source of these SWFs is current account surpluses, these funds are invested into foreign assets.

The ownership structure, remit and funding sources of SWFs typically place them at the more risk-averse end of the institutional investment spectrum, with a cautious approach to financial innovation and most forms of market, operational and counterparty risks.

2.2 Risk management and investment operations
As with other asset owners, the framework for the investment and risk management activities of SWFs is set by boards or committees consisting of experts from a variety of backgrounds and areas of expertise. Historically, these committees would have been at arm's length from the day-to-day execution of investment policy, but this is beginning to change in some institutions, resulting in a change in governance and impact.

Nevertheless it would be fair to characterise some SWFs as having a cautious approach to risk management and investment operations, placing capital preservation above investment returns and process efficiency. This has manifested itself in terms of a comparatively narrow range of asset classes invested, financial instruments used and collateral accepted. It also means that some SWFs have not taken advantage of opportunities to increase yield through full engagement in the securities lending or repo markets, nor to reduce costs through optimised collateral management arrangements and post-trade process efficiencies, for example.

2.3 Types of derivatives used and clearing practices
Like other asset owners with a long-term investment horizon, it can be expected that most SWFs are generally risk-averse and mainly use derivatives for the purpose of hedging the risks inherent in investments, such as interest rate swaps, FX derivatives and/or credit default swaps.

From a clearing perspective, SWFs’ practices are informed in part by their status as creditworthy counterparties to OTC derivative transactions. This means many SWFs have not historically been required to post collateral. This is typically performed under a one-way Credit Support Annex (CSA).

However, some sophisticated SWFs are switching to a two-way CSA, whereby they mutually exchange collateral with their counterparties, in part due to the indirect cost impacts of regulatory reforms on OTC derivatives.

2.4 Evolving operating environment for SWFs and other asset owners
The investment and risk committees of long-term asset owners are responsible for regularly reviewing, and if necessary updating, key policies and procedures. Macro-economic uncertainty and regulatory changes to the financial markets have given asset owners many reasons to reappraise existing strategy. The following chapter considers the major changes to financial markets regulation as they apply to the markets in which SWFs and other asset owners invest, including the counterparties, service providers and other market participants with which they interact. However, this is only part of the picture. Changes in macro-economic environment, geo-politics and related trends in key industries play an important role in determining the priorities of all asset owners, in terms of investment horizons, return expectations and risk appetites. There is evidence that SWFs and other asset owners are responding to higher levels of uncertainty and change by adopting a more flexible approach to their investment strategies and operations.
3. **OTC derivatives and the post-crisis reform agenda**

The financial crisis of 2007-2009 amplified the importance of risk management in the OTC derivatives market. The major impacts of shortcomings in the OTC derivatives market on the global financial system, as experienced during the crisis, include the following:

1. Bankruptcy of a financial firm being transmitted to its counterparties via a huge amount of bilateral positions in OTC derivative contracts;
2. Risk management practices that were shown to be inadequate in highly stressed market conditions;
3. Inadequate capital buffers for banks to absorb losses from counterparty credit risk in OTC derivative contracts;
4. A lack of transparency in the investment process.

More broadly, capital and liquidity levels as well as recovery and resolution regimes for various market participants and market structure operators were found to be inadequate to handle the potential risks posed by such an interconnected financial markets system. Furthermore, the ‘knock-on’ impacts of financial markets reforms have created a need for further rules and guidelines as their initial impacts feed through into the market, leading to new roles and responsibilities for market players. As a result, the international communities of financial regulators and policy makers have developed frameworks to address these issues which continue to evolve during implementation, and differ in detail across jurisdictions. In this section we outline the main regulatory frameworks implemented or being developed in Europe, focused primarily on OTC derivatives but also reflecting other relevant changes to financial market regulation.

### 3.1 Mandatory central clearing

The Pittsburgh G-20 Summit agreement in September 2009 called for mandatory clearing of all standardised OTC derivatives through central counterparties (CCPs) by the end of 2012, alongside trading and reporting obligations. Reporting and clearing requirements were implemented in Europe through the European Market Infrastructure Regulation (EMIR) adopted in July 2012 and the related regulatory standards. EMIR stipulates that all OTC derivative contracts specified by the regulator must be cleared through CCPs.\(^1\)

In addition, with the aim of ensuring their stability, EMIR also requires CCPs to take collateral to limit their credit exposures to their clearing members. For instance, CCPs must impose, call and collect sufficient levels of margin from their clearing members (and their clients) to fully collateralise their exposure. CCPs are expected to adjust their existing risk management and default fund arrangements in respect of the new instruments and counterparties, with cost implications expected for clearing members and end-users of OTC derivatives.

### 3.2 Margining requirements for non-centrally cleared derivatives

In November 2011, the Cannes G-20 Summit agreed to set margining requirements for non-centrally cleared derivatives. Based on this agreement, the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO) developed international standards to mandate the exchange of margin in OTC derivative contracts not cleared through CCPs in September 2013.\(^3\) The European Supervisory Authorities (ESAs) are currently developing the regulatory standards in respect of the risk-mitigation techniques for non-centrally cleared OTC derivatives, including the margin requirements.\(^4\)

Under the BCBS/IOSCO standards, all financial institutions and systemically important non-financial institutions are required to exchange both initial and variation margin with respect to OTC derivative transactions which are not cleared via CCPs, to cover the potential future exposure and current exposure respectively.

### 3.3 Capital requirements for counterparty credit risk

In the G-20 Pittsburgh Summit in 2009, it was also agreed that non-centrally cleared OTC derivatives should be subject to higher capital requirements. These new requirements were developed as part of Basel III, an international standard for banks’ capital requirements set by BCBS, implemented through the Capital Requirements Regulation (CRR) and the Capital Requirements Directive (CRD IV) in Europe.

Under this regulatory framework, banks must set aside sufficient capital to cover Credit Valuation Adjustment (CVA) risks for derivative transactions which are not cleared via CCPs. CVA measures the current value of the credit risk of the derivative.

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1. Article 4 EMIR.
2. Article 41 EMIR.
3. The deadlines of the implementation were postponed in the revised edition published in March 2015.
4. Article 11 (3) and (15) EMIR.
5. See BCBS/IOSCO: Margin requirements for non-centrally cleared derivatives dated March 2015 at pp.5.
counterparty, and is recognised as a deduction of the value of the derivative contract. Some of the major contributors to the increase of future CVA include:

1. Credit spread of the counterparty widening;
2. Increase in exposure to the counterparty; and
3. Lack of counterparty credit risk mitigants (e.g. netting, collateral and CDS).

3.4 Exemptions from derivatives clearing and margin requirements

EMIR excludes public sector entities which are owned by central governments and have explicit guarantee arrangements by the governments. Thus the requirements for central clearing and margining do not apply to SWFs if they are guaranteed by the governments. This exemption grants the SWFs the flexibility to use one of the following three options for their OTC derivatives transactions:

1. Bilateral clearing with unilateral collateral posting (one-way CSA model).
2. Bilateral clearing with mutual collateral posting (two-way CSA model).
3. Central clearing (CCP model) for eligible OTC derivatives.

There is less certainty for the exemption of the capital requirement. The current CRR permits regulated banks to exclude the derivative exposure with the public sector entities specified in EMIR from the calculation of CVA risks, which means that the SWFs owned and guaranteed by central governments can be exempt from the capital requirements for counterparty credit risks. However, this exemption is criticised by BCBS because of the inconsistency with Basel III, which does not provide for the same exemption with CRR.

3.5 Capital and liquidity

The global financial crisis and the ensuing tax-payer funded bail-out of many banks prompted a wholesale review of banking supervision, centre largely on ensuring adequate levels of capital and liquidity to absorb shocks arising from future financial and economic stress. The BCBS developed a series of reform measures which are being rolled out by local regulatory bodies. In addition to the initial Basel III capital framework issued in June 2011, the BCBS subsequently outlined proposals for a liquidity coverage ratio (LCR) and a net stable funding ratio (NSFR), both designed to monitor and reduce liquidity risk. While the LCR ensures banks hold a minimum level of unencumbered high-quality liquid assets to survive a significant stress scenario lasting for one month, the NSFR requires banks to maintain a stable funding profile in relation to the composition of assets and off-balance sheet activities, intended to minimise reliance on short-term funding and promote longer-term funding stability.

This new framework is being introduced at varying paces across jurisdictions, but its impact is already being felt in a number of ways, reducing banks’ capacity to provide certain services (e.g. market-making in fixed income instruments) and service particular clients (smaller hedge funds and asset managers, among others). It is also changing banks’ funding strategies and therefore their appetite for certain types of asset, which is reducing their overall activity in the repo markets for example, but also offering opportunities to counterparties.

6 Article 1 (5) (b) EMIR.
7 Article 382 (4) (d) CRR.
3.6 Recovery and resolution
In parallel with the new capital and liquidity requirements for banks, regulators have imposed a new framework for recovery and resolution. This is in order to enable a more orderly process to either rescue or wind down failing banks, than that which was seen in the aftermath of the financial crisis, and is aimed at minimising contagion risk and government intervention. The Bank Recovery and Resolution Directive has applied in all European Union member states since the start of 2015. Related initiatives include a single resolution mechanism for European banking union countries, and the ring-fencing of retail banking from wholesale arms, although the latter is yet to be finalised. Overall, the effect is for banks’ services, operations and finances to be subject to more transparency and scrutiny, potentially leading them to further reappraise their strategies.

Partly in recognition of the wider role of CCPs in managing systemic risk in the OTC derivatives market, IOSCO and the Committee on Payments and Market Infrastructures have formulated guidance on recovery and resolution to support their ‘Principles for Financial Market Infrastructures’ framework, itself developed in light of post-crisis reforms. These guidelines are intended to help CCPs and other market infrastructures to adjust to the risks inherent in their post-crisis role in the derivatives market. This includes bringing new types of clearing members – such as asset owners – into their existing risk mutualisation arrangements.

3.7 Collateral management, securities lending and repo
These activities may be impacted significantly by the regulatory changes mentioned above. Both Basel III and the OTC derivatives reform package, for example, increase demand for high-quality liquid assets, either to meet Basel’s LCR or for use as initial and variation margin to support cleared and non-cleared derivatives transactions. Moreover, the repo markets are being impacted by reduced activity levels by banks, also in reaction to Basel III, but also by an increased need by certain types of asset owners and investment managers to use the repo markets to transform the assets they have in their portfolios into those eligible for margin at CCPs. Moreover, corporates and investment institutions that are long in cash and short on yield are looking to the repo market as an alternative to traditional short-term investment vehicles, such as money market funds. The increased demand for collateral assets is also having an effect on the securities lending market, with many participants reviewing their existing criteria in terms of eligible assets, tenors and counterparties. Although it is worth noting that assets are valued differently in the securities lending market compared with those used to support OTC derivatives positions on CCPs.
4. **OTC derivatives clearing: A cost-benefit analysis**

As we discussed in Section 3, changes to clearing are one of the biggest structural changes to the OTC derivatives markets imposed by post-crisis reforms, albeit with exemptions for certain institutions including SWFs, which can choose from three different methods of clearing OTC derivatives to maximize their benefits. This section further investigates the advantages and disadvantages for the following three models:

1. **Bilateral trading with unilateral collateral posting (one-way CSA model)**
   
   Under this model, whilst the dealer has to post collateral to the SWF when the SWF has a positive exposure, the SWF does not have to post collateral when it has a negative exposure. For SWFs, this model neither requires much liquidity nor sophisticated operational systems related to managing or monitoring collateral posting. However, since the dealer usually has mutual collateral exchange (two-way CSA) in an offsetting transaction, the funding cost due to the asymmetric margining incurred by the dealer can be passed on to the SWF, depending on the terms of individual transactions (Figure 4.1).

   **Figure 4.1 One-way CSA**

   - Low liquidity requirements
   - Simple operation

2. **Bilateral trading with mutual collateral posting (two-way CSA model)**

   Two-way CSA means the mutual exchange of collateral between the SWF and the dealer. As it allows for symmetric margining in both the transaction with the SWF and the offsetting transaction, there is virtually no funding cost transferred from the dealer to the SWF. However, the SWF needs to prepare sufficient liquidity to post collateral, as well as to set up or outsource an operational system to manage the collateral exchange (Figure 4.2).

   **Figure 4.2 Two-way CSA**

   - Low transaction cost
   - Liquidity requirements
   - Complex operation

3. **Central clearing for eligible OTC derivatives (CCP model)**

   This model allows the dealer to benefit from multilateral netting of exposures, and such benefit may be passed through to the SWF in the form of product price reduction. In contrast, the dealer has to incur the considerable costs to clear through CCP as discussed in Section 3, which can also be passed on to a SWF. In addition, the initial and variation margin requirements in this model call for additional liquidity by SWFs and may cause operational burdens (Figure 4.3).

   **Figure 4.3 CCP model**

   - Low liquidity requirements
   - Simple operation
The remainder of this section will analyse the direct and indirect costs to the SWF in using the three models described above. Costs to SWFs include:

- SWF's counterparty risk exposure;
- SWF's operational cost;
- SWF's funding cost to prepare collateral;
- Dealer's counterparty risk exposure; and
- Dealer's funding cost to prepare collateral.

For each model, we look at a transaction between a SWF and a dealer as well as the dealer's transaction with another counterparty to offset the exposure to the SWF. The worked examples assume the current regulatory framework and the common industry practice, where initial and variation margin requirement for bilateral clearing has not been implemented but variation margin is already exchanged in practice in inter-dealer derivative transactions.

### 4.1 One-way CSA model

| SWF's counterparty risk exposure | MEDIUM |
| SWF's operational cost | LOW |
| SWF's funding cost | LOW |
| Dealer's counterparty risk exposure | MEDIUM |
| Dealer's funding cost | HIGH |

### 4.2 Two-way CSA model

The SWF is exposed to a medium level of counterparty risk. The variation margin collected by the SWF only covers the current exposure, but cannot cover the worst-case close-out costs in the event of dealer default (potential future exposure).

The dealer’s exposure to counterparty risks is two-fold. On one hand, it faces low counterparty risks from the SWF thanks to its high credit quality. On the other hand, the dealer is exposed to counterparty risks in the offsetting transaction, where the amount of risk depends on the counterparty's credit quality and the terms of individual margin agreements.

#### SWF's operational and funding costs

Since the SWF does not have to post collateral to its counterparty, it doesn't incur high costs for operation and funding as seen in the Two-way CSA Model.

#### Dealer's funding costs

In the trade with the SWF, the dealer needs to post collateral for negative exposure, but does not receive collateral in case of positive exposure. Further, the dealer also needs to exchange collateral in the offsetting transaction. The cost resulting from this asymmetric margin posting might be passed on to the SWF through pricing. A series of OTC derivative regulations may force dealers to raise relatively costly term money, further incentivizing them to integrate their costs within their price setting methodology.
SWF’s and dealer’s counterparty risk exposure
From one perspective, the level of counterparty risk which the SWF faces is the same as that in the one-way CSA model. After all, the dealer still has exposures to the same counterparties (the SWF and the counterparty for offsetting the transaction). Though the risk from the SWF is mitigated by collecting variation margin from the SWF, the level of counterparty risk exposure could still be rated as ‘Medium’ since the counterparty risk of SWFs is comparatively low even without collateral. However, when viewed from a holistic, portfolio perspective, the risk to the SWF and its dealer might be higher if the latter is taking on a high proportion of uncollateralised positions from clients.

SWF’s operational costs
A two-way CSA requires the SWF to set up sophisticated systems or outsource the operation to deal with procedures such as: documentation, daily reconciliation of positions with counterparties, daily valuation of positions and calculation of counterparty exposures, processing of margin calls (frequency of calls increases and the volume of calls is at least doubled compared with that of a one-way CSA), inventory management and reporting.

SWF’s funding costs
Utilising a two-way CSA increases the SWF’s funding costs transparently because it is required to post collateral in case of negative exposure. Furthermore, the SWF may also face additional funding costs from having to source alternative assets from the repo market to satisfy collateral requirements. However, as a rule of thumb, SWFs are typically major holders of HQLAs and as such have access to eligible collateral required by counterparties.

Dealer’s funding costs
In the two-way CSA model, the SWF has to post variation margin which can be re-used by the dealer in its offsetting transaction. Therefore, in theory, the dealer incurs less funding cost because of this symmetric margin posting. However, it is possible for the dealer’s funding cost to increase. When the SWF wants to purchase standardised products but does not want them to be cleared via CCPs, the dealer is required to centrally clear the offsetting standardised transaction and thus post both initial and variation margin to CCPs, which makes the dealer’s margin posting asymmetric. Under the current regulatory framework, the dealer can avoid this situation by making a slightly non-standard transaction which is not required to centrally clear. However, once the margin requirement is implemented, the dealer is expected to use the centrally cleared standardised products for offsetting transaction, as the margin requirement for bilateral clearing is expected to be much stricter than that for central clearing. In this case, the dealer faces higher funding costs and these costs may be transferred to the SWF.

4.3 CCP model

<table>
<thead>
<tr>
<th>SWF’s counterparty risk exposure</th>
<th>LOW</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWF’s operational cost</td>
<td>HIGH</td>
<td></td>
</tr>
<tr>
<td>SWF’s funding cost</td>
<td>HIGH</td>
<td></td>
</tr>
<tr>
<td>Dealer’s counterparty risk exposure</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>Dealer’s funding cost</td>
<td>HIGH</td>
<td></td>
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</tbody>
</table>

SWF’s and dealer’s counterparty risk exposure
The SWF’s and the dealer’s counterparty risks are both low under the CCP model compared with bilateral clearing because central clearing shifts counterparty credit risks to CCPs and unifies the default management.

SWF’s operational costs
The operational costs associated with posting margin are also high as is the case with the two-way CSA model. Though central clearing can reduce the number of counterparties, the frequency of margin exchange in central clearing is much higher (mainly intraday) than bilaterally negotiated terms, which may add to operational burdens.
SWF's funding costs
Margin requirements in CCPs are more expensive than those in the current two-way CSA for the SWF for the following reasons:

1. Since the exchange of initial margin is required and the frequency of margin exchange increases in central clearing, higher liquidity levels are required for SWFs.

2. The SWF, as with other buy-side institutions, generally has directional portfolios and as such sees fewer benefits from concentrating clearing at a given CCP. Indeed, such large and directional portfolios may expose the SWF to margin multipliers imposed by CCPs to protect against concentrated risks, which result in higher initial margin requirements.

3. Initial margin has an obvious negative carry problem due to funding the margin posted at a rate significantly above LIBOR but receiving only the OIS rate (less than LIBOR). Initial margin, unlike variation margin, may be held for a long period. However, due to EMIR segregation requirements, it will be hard for initial margin holders to generate higher returns in order to pay significantly higher rates. In other words, margin requirements are expensive due to the entity posting initial margin being funded at a long-term rate, while the receiving party earns a short-term rate.

4. Margin requirements by CCPs are generally set solely based on the risks of the associated investments; the credit quality of the institution posting it is ignored. This procedure does not allow the SWF to leverage its high credit quality, requiring it to post just as much initial margin as other investors with a lower credit quality.

Dealer's funding costs
The dealer’s funding costs reflect a trade-off between higher CCP-related requirements and benefits from multilateral netting of exposures. On one hand, higher margin as well as other funding costs are incurred by the dealer in the CCP model:

1. Margin requirements. Both initial and variation margin are required and are stricter than the current bilateral market. For dealers’ hedge transactions, CCP margin may be cheaper than bilateral after implementation of non-central clearing margin requirements.

2. Default fund contribution. A default fund is set up with resources from all clearing members, the cost of which may be transferred to end-users.

On the other hand, central clearing minimises margin requirements for dealers in terms of maximising the scope for netting and reducing exposures compared to bilateral trades. An illustration of netting efficiencies from central netting can be seen in Figure 4.3.1:

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**Figure 4.3.1 Demonstration of netting efficiencies**

![Netting Efficiencies Diagram](image-url)
However, the netting benefits may not be achieved in the case of partial clearing where certain trades of the portfolio cannot be centrally cleared, or alternatively where they are cleared via multiple CCPs. Netting efficiencies from centrally-cleared trades may be offset by the loss of exposure reduction in the remaining fragmented non-centrally cleared bilateral transactions.

4.4 Summary and caveat
The table below summarises the costs among bilateral and central clearing models.

<table>
<thead>
<tr>
<th></th>
<th>One-way CSA</th>
<th>Two-way CSA</th>
<th>Central Clearing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct costs to SWFs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWF's CP risk exposure</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>SWF's operational costs</td>
<td>LOW</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>SWF's funding costs</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>HIGH</td>
</tr>
<tr>
<td><strong>Indirect costs to SWFs</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Dealer's CP risk exposure</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>Dealer's funding costs</td>
<td>HIGH</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
</tbody>
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There are no apparent absolute advantages for the SWF either to trade bilaterally via one-way CSA or two-way CSA or to use central clearing in the OTC derivative transaction with the dealer. The SWF faces different cost and risk trade-offs under varying scenarios. Nevertheless, it can be concluded that costs from central clearing are high and direct, whereas in the one-way or two-way CSA models the SWF is subject to more indirect cost transferring from the dealer.

A trade between the SWF and the dealer is shown as “(1) Trade” in Figure 4.4.1. The dealer can also choose either CCP or two-way CSA model in the hedging transaction, shown as “(2) Hedge” in the figure.

Figure 4.4.1 Demonstration of trade dynamics

10 With consideration of regulation arbitrage; see section 4.2 under Dealer’s Funding Costs.
In this example, the dealer would probably clear the hedge transaction through a CCP, after the implementation of margin requirements on non-centrally cleared derivatives for cost reasons. But the dealer will incur additional costs in the form of initial margin to the CCP, which may be transferred to the SWF.

On the surface, the SWF and the dealer engaging in a two-way CSA arrangement looks like a win-win situation. If the SWF chooses to use the CCP model in trade (1), the dealer incurs considerable costs (default fund and margin requirements under CCP), which may not be well compensated by the netting benefits of a CCP. For the dealer, if it can continue to trade bilaterally with the SWF, it can benefit from the exemption that is not available for trades with regulated entities. In return, it may be willing to transfer only part of the costs emerging from trade (2) to the SWF.

But we would add a substantial two-part caveat. Firstly, the SWF should carefully consider the counterparty risk that the dealer is taking on, not only by trading and clearing with SWF clients on a two-way CSA basis as the new OTC derivatives reforms come into place, but also by taking on uncollateralised positions with a wider range of counterparties. It is perfectly conceivable that a default on a bilateral OTC derivative transaction with such a counterparty could have a significant negative impact on the dealer and its other counterparts. Secondly, SWFs should accept that risks taken on from buy-side counterparts will be priced in by sell-side counterparties, whether implicitly or explicitly. At a time when sell-side funding, operations and business models are all under review in response to the wide-ranging post-crisis reform agenda, it is important SWFs and asset owners understand how these factors are influencing the risk profiles and appetites of their major counterparties.
5. Recommendations for a changing world

Regulatory changes to the OTC derivatives market require SWFs and other asset owners to reconsider their existing approaches to how they trade and clear these instruments. But, as highlighted in Section 3, the OTC derivatives markets reforms are part of a wider, interconnected picture. While many of these other post-crisis reforms only impact SWFs indirectly, in total they represent a reshaping of the financial markets which presents significant challenges and opportunities to all asset owners. As such, this section summarises the key considerations when choosing a future clearing model, and also offers some further suggestions for how the investment strategies and operations of SWF and other asset owners may evolve for optimal returns in an ever-changing world.

5.1 Recommendations

Our research does not make specific recommendations, because the optimal clearing model depends on the characteristics of each asset owner. Moreover, some potential changes in OTC derivative regulations remain uncertain. As such, below we offer a framework to help determine the optimal clearing model:

**Alternative 1: Switching to Central Clearing**

- **Regulatory circumstance (1):** When margin requirements are implemented according to the international standards, central clearing or two-way CSA will be more favourable due to the increase of funding liquidity costs under dealers’ hedge transactions.

- If CVA charges are required for exposures to SWFs, central clearing will be more favourable as capital costs will increase substantially for dealers (which may be transferred to SWFs) in one-way CSA.

- **Regulatory circumstance (2):** Currently the US rules do not permit the exemption seen in EMIR, meaning central clearing will be the only option in the event of international convergence with US regulation.

- **Product type:** Where SWFs rely on vanilla products (e.g. interest rate swap or indexed CDS), central clearing will be more favourable through a great reduction in counterparty credit risk.

- **CCP coverage:** When the options for central clearing increase (e.g. the number of CCP or the type of CCP-eligible products), central clearing will be more favourable due to a great reduction in counterparty credit risk.

- **Liquidity:** In cases where SWFs have surplus liquidity available as collateral, central clearing will be more favourable for those who want to reduce their transaction costs.

- **Operational:** Sophisticated systems need to be in place for completing central clearing requirements; such infrastructure could be outsourced.

- **Counterparty risks:** If SWFs are concerned about the level of counterparty risk being taken on by dealers using two-way CSAs with a range of clients, central clearing’s risk mutualisation approach offers a lower-risk environment.

- **Systemic risk:** Even more importantly, perhaps, central clearing is proven as an effective barrier to contagion; the default fund waterfall model used by central counterparties is designed to counteract systemic risk and prevent the domino effect that the failure of a major market participant might otherwise trigger.

**Alternative 2: Switching to two-way CSA**

- **Regulatory circumstance (3):** Product type: In cases where SWFs mainly use exotic products which are not covered by CCPs, then it may be preferable to use two-way CSA to reduce overall transactions costs.

- **Liquidity:** In cases where SWFs have surplus liquidity for available collateral, two-way CSA will be more favourable for those who want to reduce the transaction costs.

- **Operational:** SWFs that have sophisticated collateral management systems will find two-way CSA more favourable.

In theory, exemption from the new regulations allows SWFs and their dealers to customise bilateral agreements. For instance, adopting shared initial margin is a model proposed by the industry in response to the mandatory initial margin requirements. However, we would caution any client to fully understand the risks taken on by...
the broker either by adopting such approaches with individual clients, or the collective risk of offering such arrangements to multiple counterparties.

Alternative 3: Remaining with one-way CSA

- **Product type:** In cases where SWFs rely largely on the products which are outside the scope of regulations, there may appear to be little incentive to switch to two-way CSA or CCP. However, whether it is explicit to the client or not, the broker-dealer will still need to carry balance sheet assets to cover the risk it accepts, and this will be reflected in pricing.

5.2 A flexible approach to a changing world

Post-crisis financial reforms have had a much larger impact on market structure operators and service providers than on asset owners such as SWFs. But that does not mean large institutional investors should leave their banks and other service providers exclusively to implement and manage the new regulatory requirements. All asset owners will have their own investment priorities and risk appetite, informed by their own set of unique circumstances. However, the scale of change in the financial markets is such that an increasing number of SWFs are already reviewing their policies and procedures in light of emerging opportunities.

At a core level, Basel III is decreasing banks’ appetite for short-term cash and increasing aggregate demand for high-quality liquid assets. As long term, risk-averse investors, SWFs and other asset owners are well-positioned to provide access to these assets on terms that can improve overall yield, with minimal change to counterparty or operational risks and costs. Undeniably, the current practice of some SWFs to split custodian mandates will limit the overall benefit from collateral optimisation and leveraging assets. Product and service developments are increasing levels of transparency and functionality to make it easier for asset owners to track and retrieve assets at short notice. Moreover, a number of market practices are evolving in recognition of the need to encourage a more proactive approach by asset owners and asset managers to providing liquidity while enhancing returns. In the repo market for example, tri-party repo capabilities have developed considerably, in line with an overall paradigm shift in the fixed-income world from a market-maker-led to an all-to-all environment. The increased demand for collateral is also leading to major changes in the securities lending market – with equities playing an enhanced role compared with the pre-crisis era – providing opportunities to asset owners with the tools and policies to respond to fluctuations in demand.

Global OTC derivatives reform changes the trading and clearing landscape for SWFs and other asset owners, regardless of any temporary regulatory exemptions, because of the profound changes these and other reforms have on sell-side counterparts, market infrastructure and other service providers.

However, the post-crisis regulatory landscape offers significant upside revenue opportunities to asset owners due to the increased buy- and sell-side demand for collateral created by OTC derivatives reform and other reform measures, notably via the securities lending and repo markets.

SWFs and asset owners should re-evaluate their existing investment operations in light of these changing regulatory and market realities. Firms that take a flexible approach – enabling them to respond to revenue opportunities as well as minimising counterparty risks – are likely to find themselves well-positioned to turn them to their advantage in the long term.
Appendix – Excerpts from Regulations & Agreements

REGULATION (EU) No 575/2013 (CRR)
TITLE VI: OWN FUNDS REQUIREMENTS FOR CREDIT VALUATION ADJUSTMENT RISK
Article 382: Scope

4. The following transactions shall be excluded from the own funds requirements for CVA risk:
   (d) transactions with counterparties referred to in Article 1(4)(a) and (b) and Article 1(5)(a), (b) and (c) of Regulation (EU) No 648/2012 and transactions with counterparties for which Article 115 of this Regulation specifies a risk weight of 0% for exposures to those counterparties.

REGULATION (EU) No 648/2012 (EMIR)
TITLE I: SUBJECT MATTER, SCOPE AND DEFINITIONS
Article 1: Subject matter and scope

5. With the exception of the reporting obligation under Article 9, this Regulation shall not apply to the following entities:
   (b) public sector entities within the meaning of point (18) of Article 4 of Directive 2006/48/EC where they are owned by central governments and have explicit guarantee arrangements provided by central governments;

TITLE II: CLEARING, REPORTING AND RISK MITIGATION OF OTC DERIVATIVES
Article 4: Clearing obligation

1. Counterparties shall clear all OTC derivative contracts pertaining to a class of OTC derivatives that has been declared subject to the clearing obligation in accordance with Article 5(2), if those contracts fulfil both of the following conditions:

Article 11: Risk-mitigation techniques for OTC derivative contracts not cleared by a CCP

3. Financial counterparties shall have risk-management procedures that require the timely, accurate and appropriately segregated exchange of collateral with respect to OTC derivative contracts that are entered into on or after 16 August 2012. Non-financial counterparties referred to in Article 10 shall have risk-management procedures that require the timely, accurate and appropriately segregated exchange of collateral with respect to OTC derivative contracts that are entered into on or after the clearing threshold is exceeded.

15. In order to ensure consistent application of this Article, the ESAs shall develop common draft regulatory technical standards specifying:
   (a) the risk-management procedures, including the levels and type of collateral and segregation arrangements, required for compliance with paragraph 3;

TITLE IV: REQUIREMENTS FOR CCPs
CHAPTER 3: Prudential requirements
Article 41: Margin requirements

1. A CCP shall impose, call and collect margins to limit its credit exposures from its clearing members and, where relevant, from CCPs with which it has interoperability arrangements. Such margins shall be sufficient to cover potential exposures that the CCP estimates will occur until the liquidation of the relevant positions. They shall also be sufficient to cover losses that result from at least 99% of the exposures movements over an appropriate time horizon and they shall ensure that a CCP fully collateralises its exposures with all its clearing members, and, where relevant, with CCPs with which it has interoperability arrangements, at least on a daily basis. A CCP shall regularly monitor and, if necessary, revise the level of its margins to reflect current market conditions taking into account any potentially procyclical effects of such revisions.
Article 42: Default fund

1. To limit its credit exposures to its clearing members further, a CCP shall maintain a pre-funded default fund to cover losses that exceed the losses to be covered by margin requirements laid down in Article 41, arising from the default, including the opening of an insolvency procedure, of one or more clearing members. The CCP shall establish a minimum amount below which the size of the default fund is not to fall under any circumstances.

2. A CCP shall establish the minimum size of contributions to the default fund and the criteria to calculate the contributions of the single clearing members. The contributions shall be proportional to the exposures of each clearing member.

G20 Leaders Summit in Pittsburgh (September 2009)
Improving over-the-counter derivatives markets: All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements.

G20 Leaders Summit in Cannes (November 2011)
24. We call on the Basel Committee on Banking Supervision (BCBS), the International Organization for Securities Commission (IOSCO) together with other relevant organizations to develop for consultation standards on margining for non-centrally cleared OTC derivatives by June 2012, and on the FSB to continue to report on progress towards meeting our commitments on OTC derivatives.

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