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SCHWEIZERISCHE NATIONALBANK  
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BANCA NAZIONALE SVIZZERA  
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SWISS NATIONAL BANK



# Financial Stability Report

Bericht zur Finanzstabilität  
Rapport sur la stabilité financière



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# Bericht zur Finanzstabilität 2005 (Übersicht)

## Vorwort

Der vorliegende Bericht behandelt die unter dem Aspekt der Stabilität massgebenden Tendenzen des schweizerischen Finanzsektors. Es ist das dritte Mal, dass die Schweizerische Nationalbank (SNB) einen Jahresbericht zur Stabilität veröffentlicht.<sup>1</sup> Die SNB bezweckt damit, die Öffentlichkeit über den Zustand des Finanzsystems zu informieren. Sie übermittelt auf diese Weise ihre Einschätzung der Stabilität des Finanzsystems und stellt der Öffentlichkeit eine Übersicht an Informationen und Indikatoren zur Verfügung. Der Stabilitätsbericht gibt der SNB die Möglichkeit, auf Spannungen oder Ungleichgewichte hinzuweisen, die ein Risiko für die Stabilität darstellen könnten. Der Bericht ist Teil der Beurteilung der Stabilität des Finanzsystems, zu der die SNB gemäss Nationalbankgesetz Art.5, Abs.2, Bst. e. beizutragen hat. Der Bericht dient nicht dazu, die Solvenz einzelner Finanzinstitute zu beurteilen. Einzelne Banken werden nur betrachtet, wenn dies für das Gesamtbild wesentlich ist.

Ein stabiles Finanzsystem zeichnet sich dadurch aus, dass dessen Komponenten ihre Funktion erfüllen und sich gegenüber Schocks als widerstandsfähig erweisen. Dieser Bericht beschränkt sich auf zwei wesentliche Komponenten des Finanzsystems: den Bankensektor und die Finanzmarktinfrastruktur.

## Bankensektor

Die Einschätzung der Stabilität des Bankensektors erfolgt in zwei Schritten. Zuerst wird die Entwicklung der Risikofaktoren analysiert, die im makroökonomischen Umfeld und auf den Finanzmärkten für die Stabilität des schweizerischen Bankensystems relevant sind. Anschliessend erfolgt die Beurteilung der Widerstandsfähigkeit des Bankensystems in Bezug auf diese Risikofaktoren. Dazu werden die Rentabilität, die eingegangenen Risiken sowie die Eigenmittelausstattung im Bankensektor gemessen. Ergänzend werden Modelle berücksichtigt, die den auf den Bankensektor ausgeübten Stress und dessen Bezug zum makroökonomischen Umfeld quantifizieren.

Im Jahr 2004 war das Umfeld des schweizerischen Bankensektors mehrheitlich durch positive Entwicklungen geprägt. In den Vereinigten Staaten und Japan gewann die Konjunktur weiter an Fahrt. Zudem verbesserte sich die Wirtschaftslage auch in

der Europäischen Union und in der Schweiz, die in den Vorjahren unter einer schwachen Konjunktur gelitten hatten. Gleichzeitig blieb das Zinsniveau in der Schweiz wie auch auf den meisten anderen Finanzplätzen sehr tief. Parallel dazu verzeichneten die Börsen eine leichte Aufwärtstendenz bei stark sinkender Volatilität. Aus den verfügbaren Indikatoren geht hervor, dass diese Situation die Bonität insbesondere bei den grossen in- und ausländischen Unternehmen positiv beeinflusst hat. Die Ratings haben sich allgemein verbessert, und die Risikoprämien auf den Schulden sind weiter zurückgegangen. Der Anstieg der Konkursrate in der Schweiz kontrastiert jedoch mit dieser Entwicklung und deutet darauf hin, dass sich die Bonität bei den kleineren und mittleren Firmen leicht verschlechtert haben könnte.

In diesem mehrheitlich positiven Umfeld konnten im schweizerischen Bankensektor die hohen Gewinne des Vorjahres nicht nur gehalten, sondern überwiegend sogar gesteigert werden. Da dieser Gewinnanstieg mit einer proportionalen Erhöhung der Bilanzsumme einherging, veränderte sich die Rentabilität (Return on Assets) in Vergleich zu 2003 jedoch kaum (vgl. Grafik 1). Während die guten Ergebnisse des Jahres 2003 primär auf Kostensenkungen zurückzuführen waren, sind die positiven Resultate des letzten Jahres gesteigerten operativen Erträgen – insbesondere aus dem Kommissions- und Dienstleistungsgeschäft – zu verdanken. Zudem konnten die guten Vorjahresergebnisse im Zinsgeschäft mehrheitlich wiederholt werden. Ausserdem gelang es, das im Vorjahr deutlich verbesserte Cost-Income-Verhältnis konstant zu halten. Schliesslich wurden die im historischen Vergleich sehr niedrigen Rückstellungen des Vorjahres weiter reduziert. Diese positive Entwicklung kontrastiert zwar mit dem Anstieg der Konkurse in der Schweiz, steht aber im Einklang mit der relativ günstigen Wirtschaftslage und der positiven Entwicklung der übrigen Indikatoren der Schuldnerqualität. Die niedrigen Rückstellungen sind wohl zudem auf die relativ vorsichtige Kreditvergabepolitik der Banken während der letzten Jahre zurückzuführen.

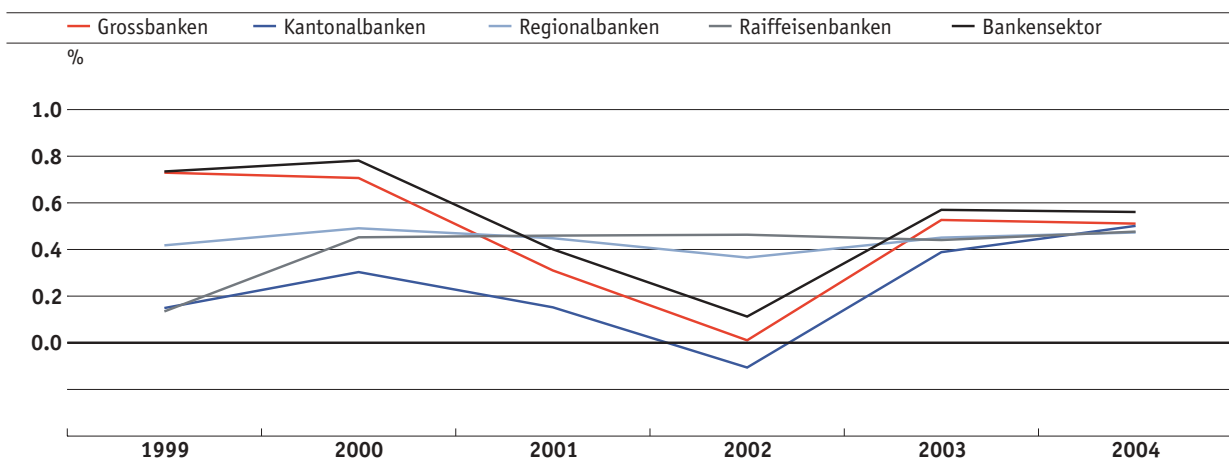
Die hohen Erträge führten zu einer Erhöhung der Eigenmittel im Bankensektor. Ende 2004 lag der Eigenmittelüberschuss deutlich über dem historischen Durchschnitt (vgl. Grafik 2). Die verstärkte Eigenmitteldecke der Banken hat die Fähigkeit des Bankensektors verbessert Schocks abzufedern. Eine wichtige Ausnahme stellen allerdings die Grossbanken dar, die ihre Eigenmittel trotz hoher Gewinne kaum erhöhten. Die Lage der Grossbanken

<sup>1</sup> Frühere Ausgaben des Stabilitätsberichts sind auf der Internetseite der SNB ([www.snb.ch](http://www.snb.ch)) abrufbar.

bezüglich Eigenmittelausstattung hat sich somit im Vergleich zum Vorjahr nur unwesentlich geändert. Aufgrund der für die Regulierung massgeblichen *risikogewichteten Eigenmittelquote* liegen sie im internationalen Vergleich weiterhin auf den vorderen Rängen. Wird dagegen die *ungewichtete Eigenmittelquote* als Massstab herangezogen – sie unterliegt in der Schweiz keiner formellen Regulierung –, ist die Eigenmittelausstattung der Grossbanken im internationalen Vergleich nach wie vor niedrig.

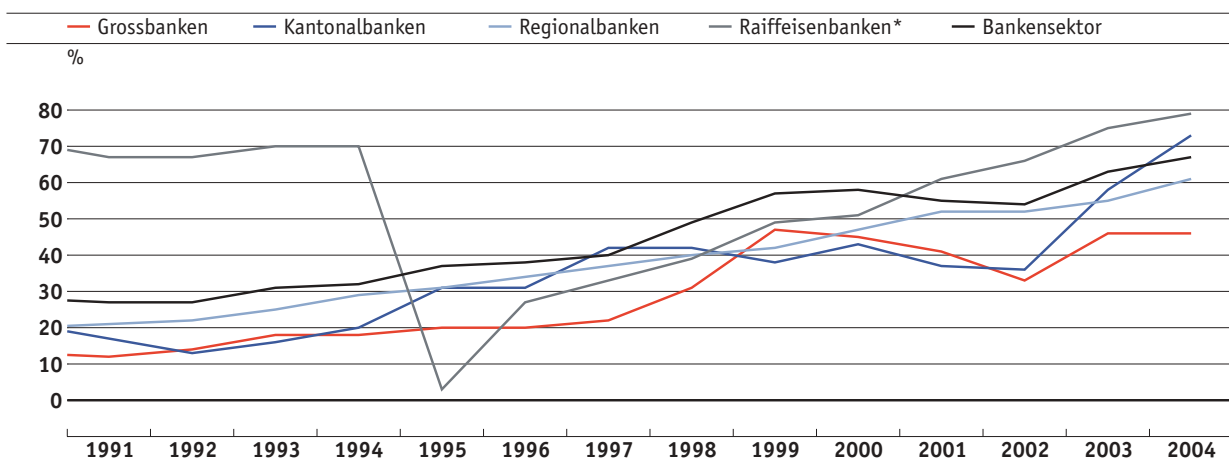
Return on Assets (nach Bankengruppen)

Grafik 1



Eigenmittelüberschuss in Prozent der erforderlichen Eigenmittel

Grafik 2



Grafiken 1 und 2:  
Quellen: Eidgenössische Bankenkommission (EBK), SNB

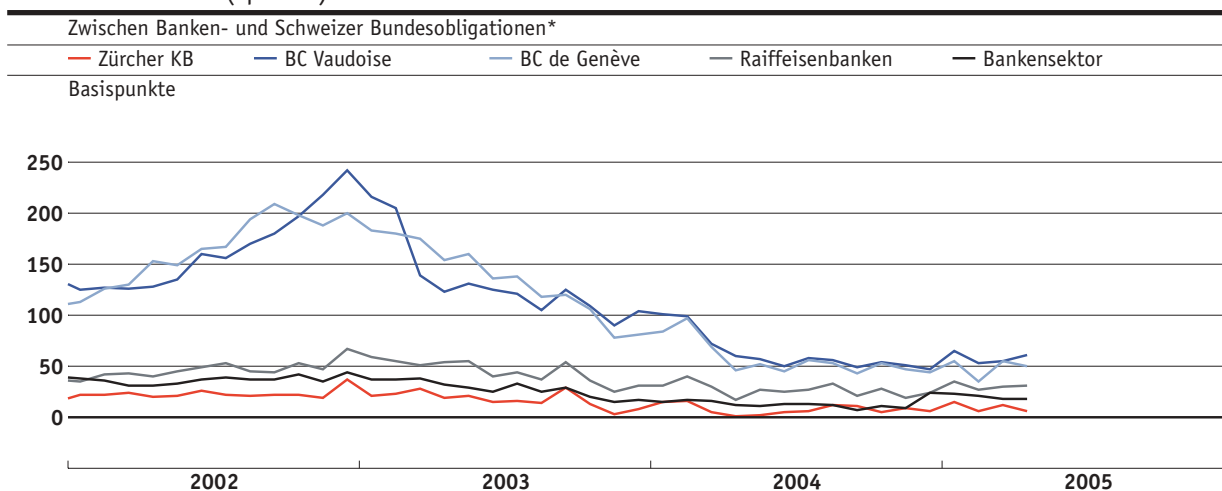
Grafik 2  
\* Einen wesentlichen Teil der Eigenmittel der Raiffeisenbanken bildet die Nachschusspflicht der Genossenschafter. Seit 1995 kann diese nur noch teilweise angerechnet werden, was zu einem Einbruch bei den Eigenmitteln führte.

Die aus den Bewertungen durch die Finanzmärkte hervorgehenden Indikatoren bekräftigen in der Regel den allgemeinen Eindruck der Robustheit, den die hohen Gewinne und die gute Eigenmittelausstattung der Banken vermitteln. Der schweizerische Bankensektor erscheint aufgrund der Spreads der Obligationenrenditen und der Credit-Default-Swap-Preise sowohl im historischen wie auch im internationalen Vergleich als robust (vgl. Grafik 3). Aufgrund der Aktienkurse und der Ratings der einschlägigen Agenturen lässt sich jedoch nicht ableiten dass der Markt die Schweizer Banken im internationalen Vergleich systematisch als überdurchschnittlich sicher einschätzt (vgl. Grafiken 4 und 5).

Der allgemeine Eindruck, dass der Schweizer Bankensektor momentan in einer soliden Verfassung ist, wird durch den SNB-Stressindex bestätigt.<sup>2</sup> Dieser Indikator fasst eine Vielzahl von Informationen über mögliche Stresssymptome im Bankensektor zusammen. Er berücksichtigt insbesondere die Entwicklung der Gewinne, der Aktienkurse und der Risikoprämien auf den Obligationen des schweizerischen Bankensektors. Der Index deutet darauf hin, dass der im Jahr 2004 vom Schweizer Bankensektor erfahrene Stress im Vergleich zum historischen Durchschnitt sehr tief war. (vgl. Grafik 6). Zudem zeigten sich in keinem Wirtschaftsbereich grössere strukturelle Ungleichgewichte, die sich als Stressfaktoren auf den Bankensektor auswirken könnten.

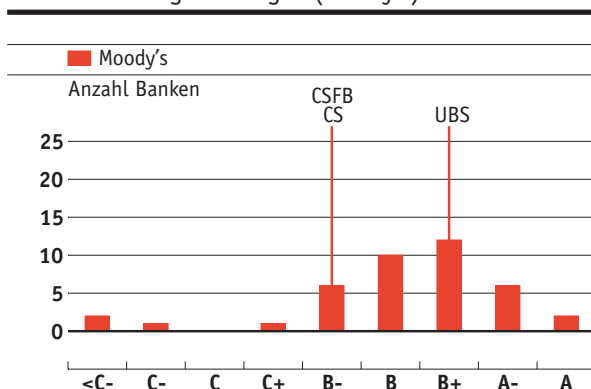
Renditedifferenzen (spreads)

Grafik 3



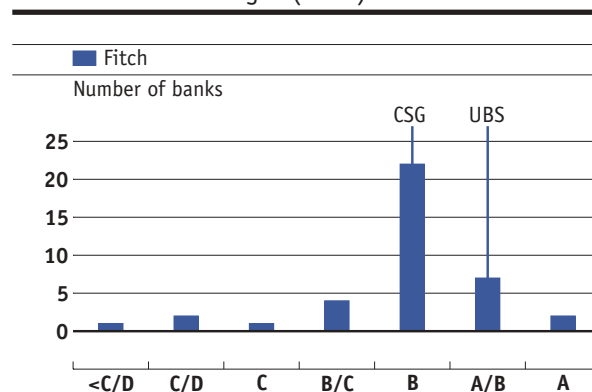
Financial strength ratings\* (Moody's)

Grafik 4



Individual bank ratings\* (Fitch)

Grafik 5



Grafik 3: Quellen: SNB, Thomson Datastream

Grafik 3:

\* Mittelwert der Spreads auf allen Obligationen, welche die folgenden Kriterien erfüllen: fixe Couponauszahlungen, keine Optionen, in CHF, minimale Restlaufzeit von zwei Jahren. Stand am Ende des Monats.

2 Für eine detaillierte Beschreibung dieses Indicators siehe Kapitel 6.

Grafik 4: Quelle: Moody's, Mai 2005

Grafik 5: Quelle: Bankscope, Mai 2005

Grafiken 4 und 5:

\* Auswahl der gemäss „The Banker“ (Juli 2004) weltweit grössten Banken aus Nordamerika, Japan und Europa, sofern sie über ein Rating von Moody's, Standard & Poor's und Fitch verfügten. Ein fehlendes Financial Strength Rating auf Gruppenebene wurde durch das Rating der grössten Tochtergesellschaft ersetzt.



Bezüglich der Zukunftsaussichten sind wir der Auffassung, dass das makroökonomische Umfeld und die Finanzmärkte für die Stabilität des schweizerischen Bankensystems grundsätzlich keine grossen Risiken bergen. Die Perspektiven für 2005 deuten zwar auf eine Verlangsamung des Wirtschaftswachstums in den meisten Regionen hin, allerdings in einem moderaten Ausmass. Zudem geht aus den verfügbaren Indikatoren hervor, dass die Gefahr einer durch Ansteckung übertragenen Krise für den Schweizer Bankensektor zurzeit klein ist. Zum einen scheinen die weltweit wichtigsten Banken- und Versicherungssektoren ebenfalls ziemlich robust zu sein. Zum anderen ist der Schweizer Bankensektor gegenüber den Hedge Funds (siehe Box 1, S. 23) nicht wesentlich exponiert. Schliesslich deutet die Analyse des Hypothekarmarktes darauf hin, dass sich der Wettbewerb in diesem Geschäft verstärkt haben könnte, da die Margen aus dem Zinsgeschäft tendenziell zurückgegangen sind. Wir verfügen jedoch über keine Indikatoren, die Hinweise darauf geben, dass dieser Wettbewerbsdruck destabilisierend gewirkt hat. So blieb der Preisanstieg auf dem schweizerischen Immobilienmarkt im historischen und im internationalen Vergleich moderat; eine abrupte Anpassung dieses Markts nach unten erscheint daher unwahrscheinlich. Zudem sind in den letzten Jahren weder die Hypothekarforderungen insgesamt noch der Anteil der risikoreicheren Hypotheken im zweiten und dritten Rang im Hypothekarportfolio der Banken stark gewachsen. Es gilt jedoch zu betonen, dass dies eine Lockerung der Vergabekriterien der Banken im Hypothekergeschäft – zum Beispiel durch eine von der SNB nicht beobachtbare Erhöhung der Belehnungswerte *innerhalb* der Hypothekentränge – nicht ausschliesst.

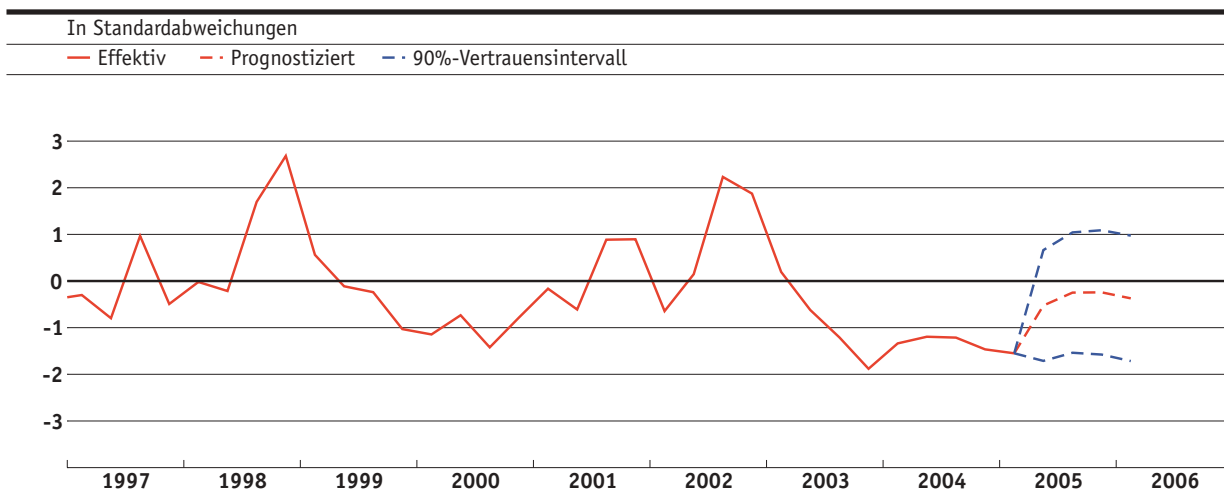
Zwei potenzielle Gefahrenquellen bestehen jedoch. Erstens könnte eine starke konjunkturelle Abschwächung negative Auswirkungen auf die Qualität der Kreditportfolios und auf die Börsenkurse haben. Zweitens könnte, im Fall einer nachhaltigen Wirtschaftserholung, eine unerwartet starke Erhöhung der nach wie vor sehr niedrigen Zinssätze die Qualität der Kreditportfolios ebenfalls beeinträchtigen, insofern die verschuldeten Haushalte und Unternehmen durch die steigende Zinslast unerwartet stark belastet würden. Zudem würde eine starke Zinserhöhung die Banken auch direkt treffen, da ihre Zinsbindung bei den Aktiven tendenziell länger ist als bei den Passiven. Angesichts der niedrigen Rückstellungen sowie der eingegangenen Zinsrisiken im schweizerischen Bankensektor könnten die negativen Konsequenzen einer unerwartet starken Zinserhöhung relativ gross sein. Aus unserer Szenario-Analyse geht allerdings hervor, dass der schweizerische Bankensektor über genügend Eigenmittel verfügt, um eine deutliche Verschlechterung der Konjunktur und der Börse sowie einen erheblichen Anstieg der Zinssätze zu verkraften (siehe Box 3, S. 29).

## Finanzmarktinfrastruktur

Im Bereich der Abrechnung und Abwicklung von Zahlungen und Geschäften mit Wertschriften und anderen Finanzinstrumenten verfügt der Finanzplatz Schweiz über eine reibungslos funktionierende Finanzmarktinfrastruktur, die hinsichtlich Sicherheit und Effizienz auch im internationalen Vergleich sehr gut abschneidet. Aus Sicht der Stabilität des schweizerischen Finanzsystems besonders bedeutsam sind die innerhalb der «Swiss value chain» miteinander

Stressindex\*

Grafik 6



Grafik 6: Quellen: EBK, SNB, Thomson Datastream

\* Je höher das Niveau des Index, desto grösser ist das Stressniveau des schweizerischen Bankensektors. Der Index ist in Standardabweichungen von seinem historischen Durchschnitt (1987–2004) bemessen. Ein positiver (negativer) Wert bedeutet, dass der Stress grösser (kleiner) ist als der historische Durchschnitt.

verbundenen Zahlungs- und Effektenabwicklungssysteme. Dazu zählen das Zahlungssystem Swiss Interbank Clearing (SIC), das Wertschriftenabwicklungssystem SECOM und die zentrale Gegenpartei x-clear. Die ersten beiden dieser Infrastrukturen haben sich seit Jahren bewährt. x-clear wurde 2003 eingeführt und hat sich bisher ebenso bewährt. Alle diese Infrastrukturen vermindern aufgrund ihrer Architektur die Abwicklungsrisiken wesentlich. Durch die Verbindung von SIC und SECOM ist namentlich die real-time-Abwicklung von Effektingeschäften nach dem Prinzip Lieferung gegen Zahlung möglich. Die zentrale Gegenpartei x-clear bringt für die Teilnehmer der elektronischen Handelsplattform virt-x zudem den Vorteil der Eliminierung der einzelnen Gegenpartei- risiken.

Aufgrund ihrer Bedeutung für die Stabilität des schweizerischen Finanzsystems werden SIC, SECOM und x-clear durch die SNB überwacht. Seit dem Inkrafttreten des revidierten Nationalbankgesetzes am 1. Mai 2004 hat die SNB die Überwachung dieser Systeme vorbereitet und vollzieht zurzeit die ersten praktischen Schritte um die Einhaltung der in der Nationalbankverordnung festgelegten Mindestanforderungen durch die Betreiber dieser Systeme fortlaufend zu überprüfen. Ebenfalls von systemischer Bedeutung für die Stabilität des schweizerischen Finanzsystems ist das Mehrwährungszahlungssystem Continuous Linked Settlement (CLS), welches die Abwicklung von Devisengeschäften in 15 Währungen gemäss dem Prinzip Zahlung gegen Zahlung ermög-

licht. CLS wurde von der SNB von der Einhaltung der Mindestanforderungen befreit, da der in New York ansässige Betreiber, CLS Bank International, durch das amerikanische Federal Reserve angemessen überwacht wird. Das Federal Reserve konsultiert regelmässig die übrigen Zentralbanken, deren Währungen in CLS integriert sind. Dies gilt auch für die SNB.

Das von operationellen Risiken ausgehende Schadenspotenzial im Finanzsektor ist beträchtlich. Die Stärkung der Widerstandsfähigkeit des Finanzsystems in Krisensituationen durch eine verbesserte Krisenvorsorge ist deshalb ein Thema von grosser Bedeutung, sowohl für die einzelnen Finanzinstitute als auch für die Finanzmarktinfrastrukturen. Der Finanzplatz Schweiz hat sich zum Ziel gesetzt, für Geschäftsprozesse, die aus Sicht der Systemstabilität kritisch sind, die Sicherheit bei Auftreten von grossen Störfällen zu erhöhen und damit Instabilitäten innerhalb des Finanzsystems als Folge solcher Störfälle zu vermeiden. Eine zu diesem Zweck durchgeführte sektorweite Analyse der bestehenden Vorkehrungen bei den zentralen Finanzmarktinfrastrukturen und den kritischen Systemteilnehmern vermittelt ein insgesamt positives Bild: Der Finanzplatz Schweiz ist auch auf grössere Störfälle gut vorbereitet. Dennoch bestehen Verbesserungsmöglichkeiten; entsprechende Empfehlungen werden zur Zeit vorbereitet und werden nach ihrer Verabschiedung von den einzelnen Finanzinstituten bzw. Infrastrukturbetreibern umzusetzen sein.

# Rapport sur la stabilité financière 2005 (Synthèse)

## Avant-propos

Le présent rapport met en évidence les grandes tendances, sous l'angle de la stabilité, dans le secteur financier suisse. Il s'agit du troisième rapport (annuel) sur la stabilité financière publié par la Banque nationale suisse (BNS).<sup>3</sup> En publiant un tel rapport, la BNS a pour objectif de fournir au public des informations sur l'état du système financier. Elle fait part de son évaluation de la stabilité de ce système, met à la disposition du public une synthèse d'informations et d'indicateurs et signale, le cas échéant, des tensions ou des déséquilibres susceptibles de constituer un risque en matière de stabilité. Ce rapport fait partie de l'appréciation de la situation de la BNS sur le plan de la stabilité du système financier, à laquelle elle a pour tâche de contribuer (art. 5, al. 2, let. e, LBN). Il n'a pas pour objet d'évaluer la solvabilité d'établissements financiers pris individuellement. Des établissements ne sont considérés sur une base individuelle que lorsque cela joue un rôle déterminant pour la vue d'ensemble.

Un système financier stable est un système dans lequel les diverses composantes remplissent leur fonction et sont en mesure de résister à d'éventuels chocs. Le présent rapport se concentre sur deux composantes essentielles du système financier: le secteur bancaire et les infrastructures des marchés financiers.

## Secteur bancaire

Notre évaluation de la stabilité du secteur bancaire se fait en deux étapes. Nous analysons d'abord l'évolution des facteurs de risque qui, dans l'environnement macroéconomique et financier, sont pertinents pour la stabilité du système bancaire suisse. Nous évaluons ensuite la capacité de résistance du système bancaire face à ces facteurs de risque. Cette évaluation repose sur une mesure de la rentabilité, des risques encourus ainsi que de la dotation en fonds propres du secteur bancaire. Pour compléter notre analyse, nous utilisons des modèles qui permettent de quantifier le stress subi par le secteur bancaire et son lien avec l'environnement macroéconomique.

En 2004, le secteur bancaire suisse a opéré dans un environnement dans l'ensemble favorable. Les Etats-Unis et le Japon ont connu une croissance éco-

nomique soutenue. Par ailleurs la situation économique s'est améliorée dans l'Union Européenne et en Suisse, après plusieurs années marquées par une croissance faible. Parallèlement, le niveau des taux d'intérêt est resté très bas, à la fois en Suisse et sur la plupart des autres places financières. En outre, les marchés boursiers ont amorcé un léger redressement accompagné d'une baisse substantielle de la volatilité. Cette situation favorable semble avoir eu une influence positive sur la solvabilité des grandes entreprises suisses et étrangères. Leurs ratings ont généralement augmenté et la prime de risque sur leur dette a diminué. L'augmentation du taux de faillites en Suisse contraste cependant avec cette évolution et suggère que, pour les petites et moyennes entreprises, la situation pourrait s'être légèrement détériorée.

Dans cet environnement dans l'ensemble favorable, le secteur bancaire suisse a généré des bénéfices élevés, en augmentation par rapport à l'année 2003. La rentabilité du secteur bancaire, mesurée par le biais de la rentabilité des actifs (Return on Assets), est cependant restée pratiquement inchangée, la hausse des bénéfices s'étant accompagnée d'une augmentation proportionnelle de la somme des bilans (cf. graphique 1). Alors que les bons résultats enregistrés en 2003 avaient avant tout découlé d'une réduction des coûts, ceux de 2004 sont dus à un accroissement des produits opérationnels, notamment par le biais d'une hausse des revenus des commissions et des prestations de services. Parallèlement, les bons résultats des opérations d'intérêts atteints en 2003 ont généralement pu être maintenus. Par ailleurs, le ratio coût/revenu, qui avait pu être nettement réduit l'année précédente, est resté pratiquement inchangé. Finalement, les provisions ont encore été réduites. Cette baisse des provisions, dont le niveau à fin 2003 était déjà particulièrement bas en comparaison historique, contraste avec l'augmentation du nombre de faillites en Suisse. Elle concorde cependant avec la situation économique favorable et avec l'amélioration de la qualité des débiteurs suggérée par d'autres indicateurs. Le bas niveau des provisions pourrait en outre refléter la politique relativement prudente suivie par les banques en matière de crédits durant ces dernières années.

Les bénéfices élevés ont conduit à un renforcement de la dotation en fonds propres du secteur bancaire. A fin 2004, l'excédent de fonds propres se situait sensiblement au-dessus de la moyenne historique (cf. graphique 2). Cette couverture accrue a amélioré la capacité du secteur bancaire à absorber

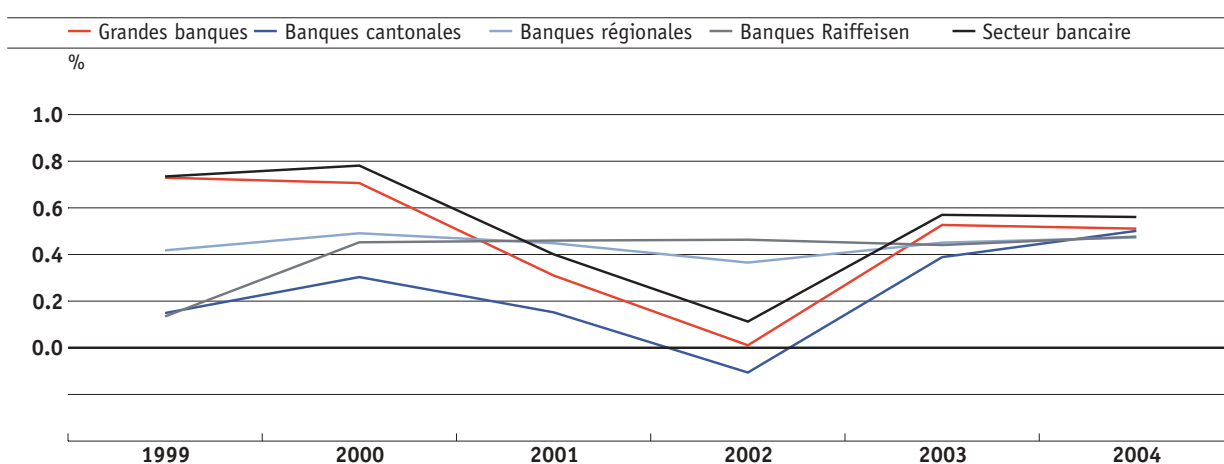
<sup>3</sup> Les précédentes éditions du rapport sur la stabilité financière sont disponibles sous [www.snb.ch](http://www.snb.ch).

des chocs. Les grandes banques, dont les fonds propres sont restés quasiment inchangés malgré des bénéfices élevés, constituent toutefois une exception notable. En matière de dotation de fonds propres, la situation des grandes banques n'a donc que peu évolué. Sur la base des *ratios de fonds propres pondérés en fonction des risques*, déterminants sur le plan réglementaire, les grandes banques occupent toujours les premiers rangs en comparaison internationale. Par contre, mesurée à l'aune du *ratio de fonds propres non pondéré* – ratio qui ne fait pas l'objet d'une réglementation formelle en Suisse –, leur dotation en fonds propres reste faible en comparaison internationale.

L'impression générale de robustesse qui ressort des bénéfices et de la dotation en fonds propres des banques est dans l'ensemble corroborée par les indicateurs reflétant l'évaluation faite par les marchés financiers. Sur la base des écarts dans les rendements des obligations ainsi que des prix des swaps sur défaillance (credit default swaps), le secteur bancaire suisse apparaît solide en comparaison historique et internationale (cf. graphique 3). Les indicateurs basés sur le cours des actions ainsi que les ratings des agences spécialisées ne permettent cependant pas de conclure que le marché considère la solidité du secteur bancaire suisse comme systématiquement supérieure à la moyenne internationale (cf. graphiques 4 et 5).

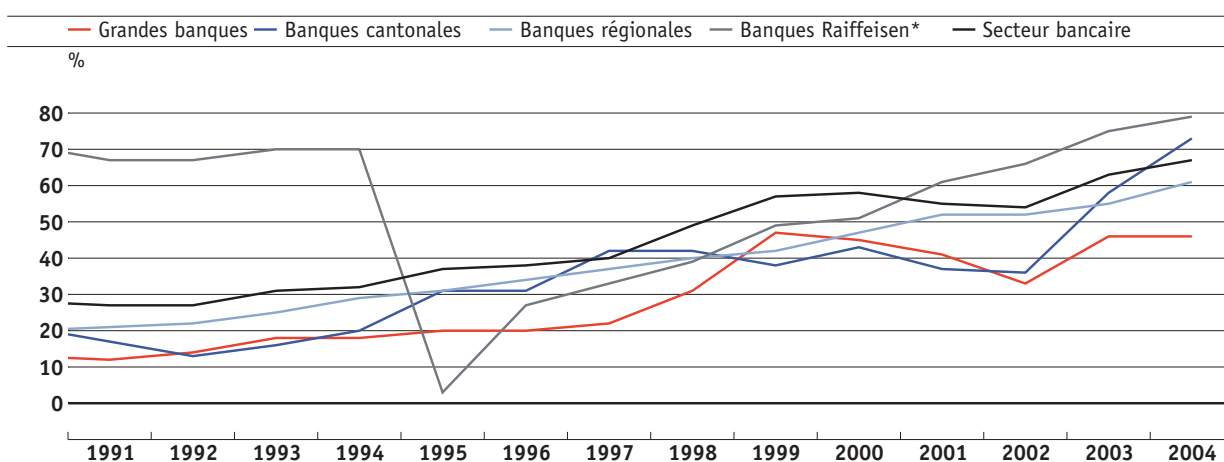
Rentabilité des actifs (par catégories de banques)

Graphique 1



Excédent de fonds propres, en pour cent du montant exigé

Graphique 2



Graphiques 1 et 2:  
Sources: BNS, Commission fédérale des banques (CFB)

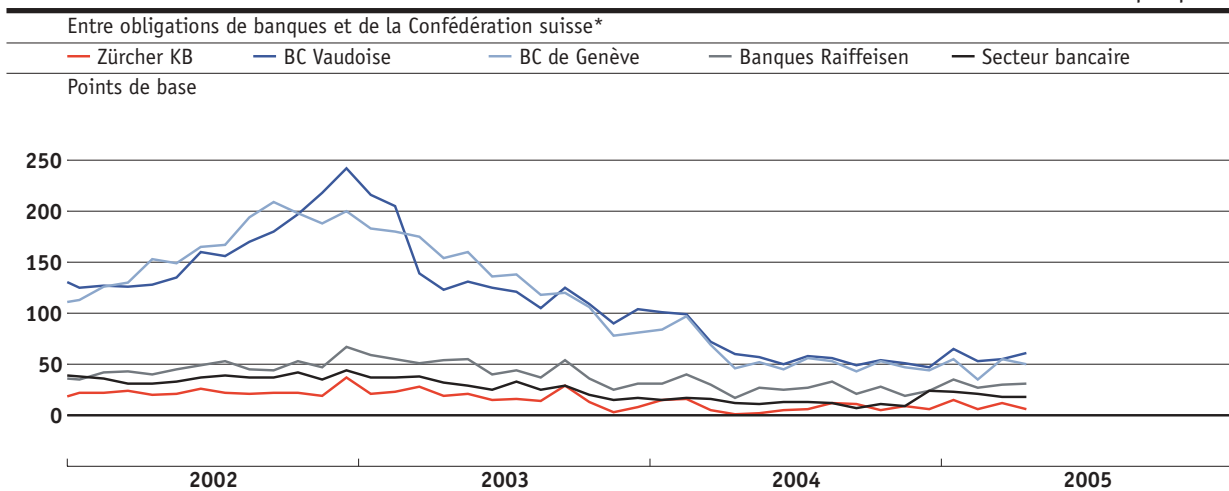
Graphique 2:  
\* Une part importante des fonds propres des banques Raiffeisen est constituée des versements supplémentaires auxquels se sont engagés les sociétaires. Depuis 1995, ces versements supplémentaires ne peuvent être comptés qu'en partie comme fonds propres, ce qui explique la forte diminution observée cette année-là.

L'indicateur de stress de la BNS confirme l'impression de robustesse du secteur bancaire suisse.<sup>4</sup> Cet indicateur présente la synthèse d'un ensemble de variables constituant chacune un symptôme possible de stress dans le secteur bancaire. Il tient compte notamment de l'évolution des bénéfices, des cours des actions et des primes de risque sur les obligations du secteur bancaire suisse. L'indicateur montre que le niveau de stress auquel le secteur bancaire suisse a été soumis en 2004 était très bas en comparaison historique (cf. Graphique 6). En outre, nous n'avons constaté aucun déséquilibre structurel, dont la résorption constituerait un facteur de stress important pour le secteur bancaire.

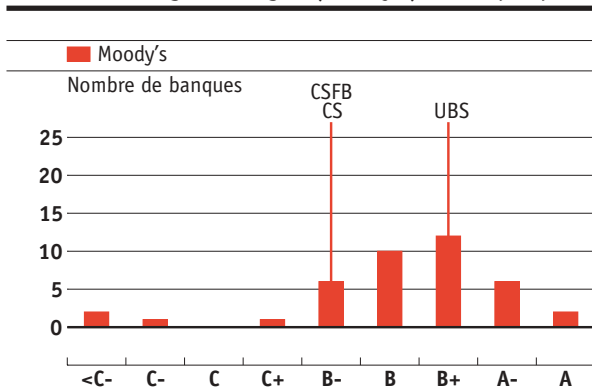
En ce qui concerne les perspectives, nous considérons que, dans l'ensemble, l'environnement macroéconomique et les marchés financiers ne présentent pas de menace majeure pour la stabilité du système bancaire suisse. Les prévisions pour 2005 indiquent certes un ralentissement de la croissance économique dans la plupart des régions, mais celui-ci devrait être modéré. De plus, il ressort des indicateurs disponibles que le danger d'une crise par contagion est actuellement faible pour le secteur bancaire suisse. D'une part, sur le plan mondial, les principaux secteurs bancaires et secteurs d'assurances semblent eux aussi relativement robustes. D'autre part, l'exposition du secteur bancaire suisse aux fonds d'arbi-

Ecarts de rendements

Graphique 3



Financial strength ratings\* (Moody's) Graphique 4



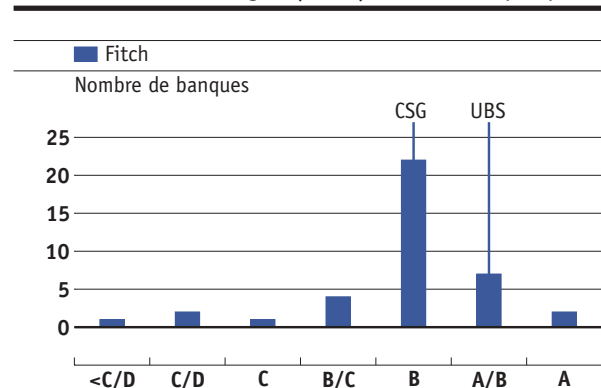
Graphique 3: Sources: BNS, Thomson Datastream

Graphique 3:

\* Ecarts (spreads) moyens pour l'ensemble des obligations satisfaisant aux conditions suivantes: coupon fixe, absence d'options, libellés en CHF, durées résiduelles égales ou supérieures à 2 ans. Données de fin de mois.

4 Voir la section 6 du rapport pour une description détaillée de cet indicateur.

Individual bank ratings\* (Fitch) Graphique 5



Graphique 4: Source: Moody's, mai 2005

Graphique 5: Source: Bankscope, mai 2005

Graphiques 4 et 5:

\* L'échantillon se compose des plus grandes banques au niveau mondial de l'Amérique du Nord, du Japon et de l'Europe d'après "The Banker" (juillet 2004) qui sont notées à la fois par Moody's, Standard&Poor's et Fitch. La notation d'un holding bancaire ne disposant pas de rating est remplacée par celle de sa plus grande filiale.

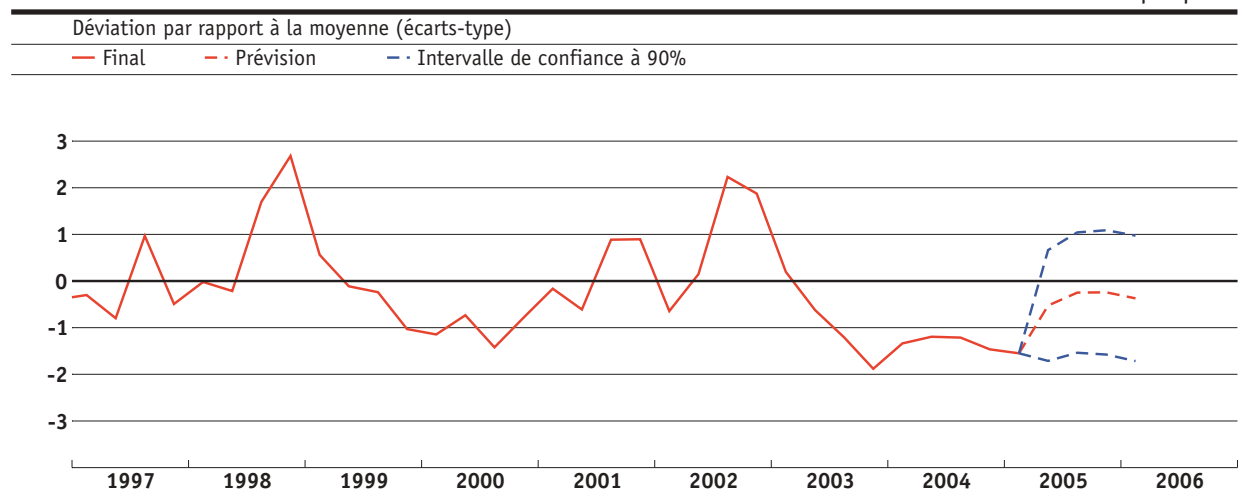
trages ou «*hedge funds*» (voir encadré 1, p. 23) est modeste. Finalement, l'analyse du marché hypothécaire suggère, sur la base du repli des marges dans les opérations d'intérêts, que l'intensité de la concurrence pourrait s'y être renforcée. Nous ne disposons cependant d'aucun indicateur montrant que la pression concurrentielle aurait entraîné des conséquences déstabilisantes. La hausse des prix sur le marché immobilier en Suisse est en effet restée modérée en comparaison historique et internationale; un ajustement brusque à la baisse sur ce marché apparaît donc improbable. Par ailleurs, ni les créances hypothécaires ni, parmi celles-ci, la part relativement risquée des prêts hypothécaires en 2<sup>e</sup> et 3<sup>e</sup> rangs n'ont augmenté fortement ces dernières années. Il convient cependant de signaler que cette situation n'exclut pas un relâchement des critères d'octrois de prêts hypothécaires par les banques; un tel relâchement peut, par exemple, revêtir la forme d'un relèvement de la limite de crédit accordée *au sein* d'un rang hypothécaire, relèvement que la BNS n'est pas en mesure d'observer.

Deux sources de dangers potentiels doivent néanmoins être signalées. Premièrement, un ralentissement sensible de la conjoncture pourrait avoir des répercussions négatives sur la qualité des portefeuilles de crédits ainsi que sur les cours boursiers. Deuxièmement, dans le cas d'une reprise économique durable, une hausse plus forte qu'anticipée des taux d'intérêt – dont le niveau actuel reste particulièrement bas – pourrait elle aussi entraîner une dégradation de la qualité des portefeuilles de crédits, dans la

mesure où elle se traduirait par une augmentation brusque et marquée du fardeau de la dette des ménages et des entreprises. En outre, une hausse sensible des taux d'intérêt affecterait directement les banques, du fait que les taux d'intérêt sur leurs actifs sont généralement fixés pour des durées plus longues que sur leurs passifs. Considérant le bas niveau des provisions ainsi que l'exposition au risque de taux d'intérêt dans le secteur bancaire, une hausse des taux d'intérêts plus forte qu'anticipée pourrait entraîner des répercussions négatives relativement importantes. L'analyse de scénarios que nous avons conduite indique cependant que la dotation en fonds propres du secteur bancaire suisse est suffisante pour résister à une dégradation notable de la conjoncture et de la bourse ainsi qu'à une hausse sensible des taux d'intérêt (voir encadré 3, p. 29).

Indice de stress\*

Graphique 6



Sources: BNS, CFB, Thomson Datastream

\* Une valeur élevée de l'indice correspond à un niveau de stress élevé dans le secteur bancaire suisse. Une valeur positive (négative) signifie que le stress est supérieur (inférieur) à sa moyenne observée entre 1987 et 2004. La déviation par rapport à la moyenne est exprimée en termes d'écarts-type.

## Infrastructure des marchés financiers

Dans le domaine de la compensation et du règlement des paiements et des opérations sur titres et autres instruments financiers, la place financière suisse dispose d'une infrastructure qui fonctionne bien et qui, sous l'angle de la sécurité et de l'efficacité, occupe une position de choix en comparaison internationale. Les systèmes de paiement et de règlement des opérations sur titres qui sont reliés entre eux dans la «swiss value chain» revêtent une importance particulière pour ce qui a trait à la stabilité du système financier suisse. Il s'agit surtout du Swiss Interbank Clearing (SIC), pour les paiements, du SECOM, pour le règlement des opérations sur titres, et de x-clear, la contrepartie centrale. Les deux premiers systèmes ont fait leurs preuves depuis des années; quant à x-clear, qui a été introduit en 2003, il a lui aussi bien fonctionné jusqu'à présent. Toutes ces infrastructures contribuent, par leur architecture, à réduire sensiblement les risques de règlement. Etant donné que le SIC et le SECOM sont reliés entre eux, il est possible notamment d'assurer en temps réel le règlement des opérations sur titres selon le principe livraison contre paiement. La contrepartie centrale x-clear offre en outre aux participants de la plateforme de négoce électronique virt-x l'avantage d'éliminer les risques vis-à-vis de chacune des contreparties avec lesquelles des opérations ont été conclues.

Du fait de leur importance pour la stabilité du système financier suisse, le SIC, le SECOM et x-clear font l'objet d'une surveillance de la part de la BNS. Depuis l'entrée en vigueur, le 1<sup>er</sup> mai 2004, de la loi révisée sur la Banque nationale, cette dernière a procédé aux préparatifs en vue de la surveillance de ces systèmes. Actuellement, elle met en place les premières mesures concrètes pour pouvoir vérifier en permanence le respect des exigences minimales par les exploitants de ces systèmes. Le système de paie-

ment multidevises Continuous Linked Settlement (CLS), qui permet un règlement des opérations de change dans 15 monnaies selon le principe paiement contre paiement, est lui aussi d'importance systémique pour la stabilité du système financier suisse. La BNS a exempté CLS de l'obligation de satisfaire aux exigences minimales suisses, car l'exploitant CLS Bank International, qui a son siège à New York, est déjà soumis à une surveillance appropriée de la Réserve fédérale américaine. Celle-ci entretient des contacts réguliers avec les autres banques centrales dont les monnaies sont intégrées dans le système CLS. La BNS compte également au nombre de ces instituts d'émission.

Dans le secteur financier, le potentiel de dommages associé aux risques opérationnels est considérable. Renforcer la capacité de résistance du système financier en améliorant la prévention des crises revêt donc une grande importance, aussi bien pour les établissements financiers pris individuellement que pour les infrastructures des marchés financiers. La place financière suisse s'est fixé comme objectif d'accroître la sécurité, lors de l'apparition de perturbations majeures, des processus opérationnels qui sont sensibles sur le plan de la stabilité systémique et, partant, de juguler toute instabilité qui pourrait en découler au sein du système financier. Menée à cette fin dans tout le secteur concerné, une analyse portant sur le dispositif de sécurité en vigueur actuellement dans les infrastructures financières centrales et chez les participants d'importance sensible donne une image positive de la situation d'ensemble: la place financière suisse est bien préparée pour faire également face à des perturbations majeures. Mais des améliorations sont toujours possibles. Des recommandations appropriées sont actuellement en préparation et, une fois adoptées, devront être appliquées par les établissements financiers et les exploitants d'infrastructures.





## Introduction

This report highlights the main trends in the Swiss financial system with a view to their impact on stability. It is the third annual Financial Stability Report published by the Swiss National Bank (SNB).<sup>5</sup> The report aims to inform the public of the state of the financial system. Through this report, the SNB communicates its evaluation of the stability of the system, provides a set of information and indicators and highlights potential tensions or imbalances that could jeopardise system stability. The report forms part of the assessment of the financial system stability, to which the SNB is required to contribute according to the National Bank Act (art. 5 para. 2 (e) NBA). It is not the purpose of this report to analyse the solvency of individual financial institutions. Individual banks are only considered if it is deemed relevant for the overall picture.

A stable financial system can be defined as a system where the various components fulfil their functions and are able to withstand the shocks to which they are exposed. This report focuses on two vital elements in the system: the banking sector and the financial market infrastructure.

## Overall assessment

### Banking sector

The analysis of the stability of the banking sector is divided into two steps. Firstly, we analyse the development of risk factors in the macroeconomic environment and in the financial markets which are relevant to the stability of the Swiss banking sector. Secondly, the resilience of the banking system with regard to these risk factors is assessed. This involves measuring the profitability, the risks taken and the capital adequacy in the banking sector. To complete the analysis, we use indicators provided by models quantifying the level of stress experienced by the banking sector and its connection to the macroeconomic environment.

In 2004, the Swiss banking sector operated in a predominantly positive environment. Economic growth in the US and Japan was robust. The economic situation in the European Union and Switzerland also saw a recovery after having been dogged by weak growth in the previous years. Furthermore, the interest rate level remained very low in Switzerland, as too in most other financial centres. Moreover, the stock markets reported a slight upswing accompanied by a

substantial drop in volatility. The available indicators suggest that this situation led to an improvement in the financial standing of the large domestic and foreign companies. Their credit ratings improved, while the risk premiums on their debts declined further. However, the increase in the number of bankruptcies in Switzerland contrasts with this trend. This suggests that in spite of the positive conditions, the situation of the small and medium-sized companies might have deteriorated slightly.

In this predominantly positive environment, the Swiss banking sector not only succeeded in maintaining the high profit levels of the previous year, it actually managed to exceed them in most cases. However, because the rise in profits was accompanied by a proportional increase in the balance sheet total, there was hardly any change in profitability (return on assets). While the good results in 2003 were primarily attributable to cost-cutting measures, the positive figures for 2004 can be ascribed to the increase in operating earnings, particularly from the commission business and services. At the same time, the favourable results achieved in 2003 in the interest-earning business could for the most part be repeated. It was also possible to maintain the cost-income ratio at last year's improved level. Finally, the level of provisions – which was already very low by historical standards – was reduced yet further. On the one hand, this trend contrasts with the rise in the number of bankruptcies in Switzerland, while on the other hand, it is consistent with the relatively favourable economic environment and the positive development of other credit standing indicators. Moreover, the low level of provisions might reflect banks' relatively cautious lending policies in recent years.

The high earnings enabled the banking sector to increase its capital base, leading to levels of excess capital that significantly exceed the historical average. This increase improved the banking sector's resilience. One major exception, however, are the big banks, which – despite higher profits – hardly increased their capital base at all. The situation of the big banks with regard to capitalisation thus remained almost unchanged compared with the previous year. Given the *risk-weighted capital ratio* relevant for regulation, they still rank among the best when compared with their foreign competitors. However, if the *unweighted capital ratio* is used as a benchmark (in Switzerland, this ratio is not subject to formal regulation), the capital levels of the big banks are still low in an international comparison.

<sup>5</sup> The previous editions of the Financial Stability Report are available at [www.snb.ch](http://www.snb.ch).

The indicators reflecting financial market valuations generally shore up the overall impression of robustness, which is conveyed by the banks' high profits and solid capital base. Looking at the bond yield spreads and the credit default swap prices, the Swiss banking sector appears robust both in a historical and international comparison. However, according to share prices and the ratings of major agencies, it does not appear that the market considers the soundness of the Swiss banks to be systematically above the international average.

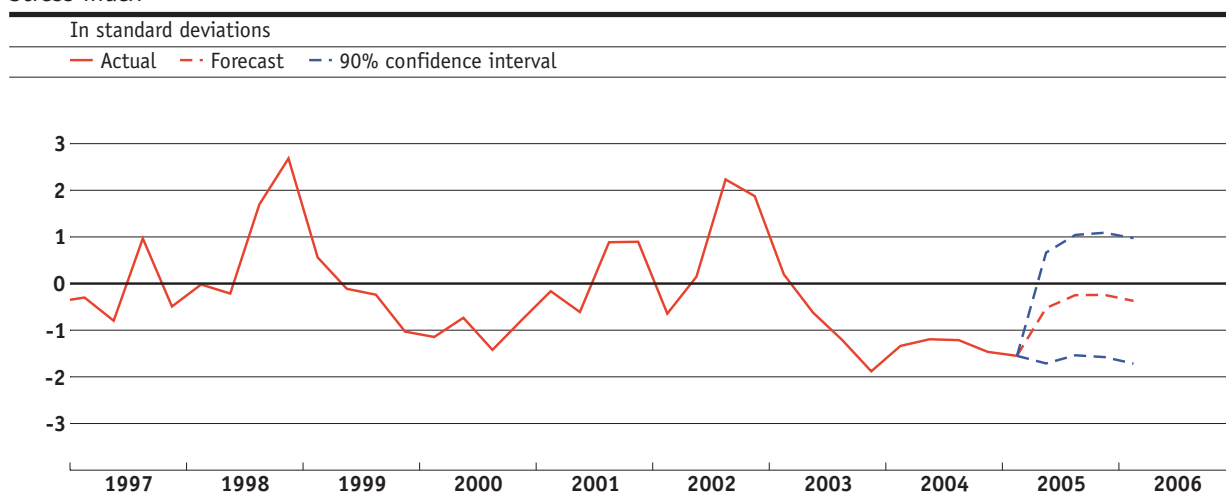
Finally, this overall impression of robustness is confirmed by the SNB stress index.<sup>6</sup> This indicator combines a number of variables representing potential stress symptoms in the banking industry. Among other variables, it takes into consideration the development of profits, share prices and risk premiums on bonds in the Swiss banking industry. The values taken by the index suggest that the stress experienced by the Swiss banking sector in 2004 was very low compared with the historical average (cf. Graph below). Furthermore, there was no sign of any structural imbalances whose unwinding would constitute a major source of stress for the banking sector.

As far as the prospects for the future are concerned, we believe that the macroeconomic environment and financial market conditions pose no major threat to the stability of the Swiss banking system. The outlook for 2005 indicates a slowdown in economic growth in most regions, albeit to a moderate degree. In addition, the available indicators suggest that there is currently little risk of contagion effects causing a crisis in the Swiss banking sector. On the

one hand, the world's main banking and insurance sectors also appear to be quite robust. On the other hand, the exposure of the Swiss banking industry to hedge funds (cf. Box 1, p. 23) is modest. Finally, the analysis of the development of the mortgage market indicates – based on the decline in margins from the interest-earning business – that the competition in this area has intensified. However, none of our indicators suggest that the competitive pressures have had a destabilising effect. The price rise in the Swiss real estate market, for instance, remained moderate both by historical and international standards; an abrupt downward adjustment in this segment is therefore unlikely. Furthermore, in recent years, neither mortgage claims nor the proportion of higher-risk second and third-rank mortgages in banks' mortgage portfolios grew strongly. It should be emphasised, however, that this does not exclude a relaxation of the lending criteria by banks in the mortgage business – for instance, through an increase in the loan-to-value ratios *within* the mortgage categories. Such an increase cannot be observed by the SNB.

Nonetheless, two potential sources of risk should be mentioned. Firstly, a sharp economic downturn could negatively impact the quality of the loan portfolios and the stock markets. Secondly, in the event of a sustained economic recovery, an unexpectedly sharp hike in the still very low interest rates could also affect the loan portfolio quality. Such a hike would lead to a sudden and significant increase in the debt burden of households and companies. Banks would also be directly affected by a steep

### Stress index\*



Sources: Swiss Federal Banking Commission (SFBC), SNB, Thomson Datastream

6 For a detailed description of this indicator, cf. Chapter 6 (Stress index for the banking sector) and Box 5.

\*The higher the level of the index, the higher the level of stress in the Swiss banking sector. The index is expressed in terms of standard deviations from its 1987–2004 average. A value above (below) zero indicates that the stress is above (below) its historical average. The stress index for the first quarter of 2005 is computed with provisional data. For a description of the underlying variables and the methodology, cf. Box 5.

interest rate hike, as the interest rates on their assets tend to be fixed for a longer period than those on their liabilities. In view of the interest rate risk taken and the low level of provisions in the Swiss banking sector, the negative consequences of an unexpectedly sharp interest rate increase could be relatively far-reaching. However, our scenario analysis indicates that the Swiss banking sector's capital base is sufficient to withstand a substantial deterioration both in economic and stock market conditions as well as a sharp rise in interest rates (cf. Box 3, p. 29).

### **Financial market infrastructure**

With regard to the clearing and settlement of payments and transactions involving securities and other financial instruments, the Swiss financial sector has a smoothly functioning financial market infrastructure that compares very favourably with those of other countries in terms of safety and efficiency. Of particular significance for the stability of the financial system are the payment and securities settlement systems which are interlinked within the Swiss value chain. These include the payment system Swiss Interbank Clearing (SIC), the securities settlement system SECOM and the central counterparty x-clear. The first two are long-established infrastructures. x-clear, which was launched in 2003, has hitherto also proved its worth. Given their architectures, all of these systems contribute considerably to the minimisation of settlement risks. The link between SIC and SECOM permits real-time settlement of securities transactions in accordance with the delivery-versus-payment principle. The central counterparty x-clear further benefits the participants of the electronic trading platform virt-x as it eliminates the individual counterparty risks.

Given their significance for the stability of the Swiss financial system, SIC, SECOM and x-clear are overseen by the SNB. Since the revised National Bank Act (NBA) entered into force on 1 May 2004, the SNB prepared for the oversight of these systems and is now implementing the first practical steps necessary for an ongoing review of the compliance of the operators of these systems with the minimum requirements prescribed in the National Bank Ordinance (NBO). The multi-currency payment system Continuous Linked Settlement (CLS) is also of systemic importance to

the stability of the Swiss financial system – it enables the settlement of foreign exchange transactions in 15 currencies in accordance with the payment-versus-payment principle. The SNB exempted CLS from compliance with the minimum requirements, as the New York-based system operator, CLS Bank International, is already adequately overseen by the US Federal Reserve. The Federal Reserve has regular contact with the other central banks whose currencies are integrated into CLS, including the SNB.

The damage potential emanating from operational risks in the financial sector is considerable. Strengthening the financial system's resilience to crises through improved contingency planning is therefore a vitally important objective – both for the individual financial institutions and for the financial market infrastructures. In the event of major disruptions, the Swiss financial sector set itself the goal of increasing the resilience of business processes that are considered to be critical for system stability, thus avoiding instabilities within the financial system as a result of such disruptions. A special sector-wide analysis on the existing measures for central financial market infrastructures and critical system participants gives an overall positive impression: the Swiss financial sector is well-prepared, even for severe disruptions. Nevertheless, there is room for improvement. To this end, appropriate recommendations are currently being drawn up and, once approved, will have to be implemented by the individual financial institutions and infrastructure operators.

### **Data and data sources**

Unless otherwise stated, all data used in this report come from internal statistics prepared by the SNB and the Swiss Federal Banking Commission (SFBC). The banking statistics are based on official data submitted by the individual banks. The data on the big banks are analysed on a consolidated basis. For the other banks, an individual (non-consolidated) view is used.

This document is based on the data available as at 15 May 2005.

## Part I: Banking sector

# 1 General conditions

The analysis of the economic and financial environment is based on economic activity, interest rates, the credit standing of borrowers in general and of major insurance companies and foreign banks in particular, the real estate market and the stock market.<sup>7</sup> These risk factors have been singled out on the basis of an analysis of the sensitivity of the banking sector to a range of economic variables and on the basis of information on its exposure to specific sectors of the economy. Overall, it appears that during 2004 the Swiss banking sector operated in a favourable environment. The outlook for 2005 is relatively good, both with regard to the Swiss and the international economy.

## Robust economic growth in 2004

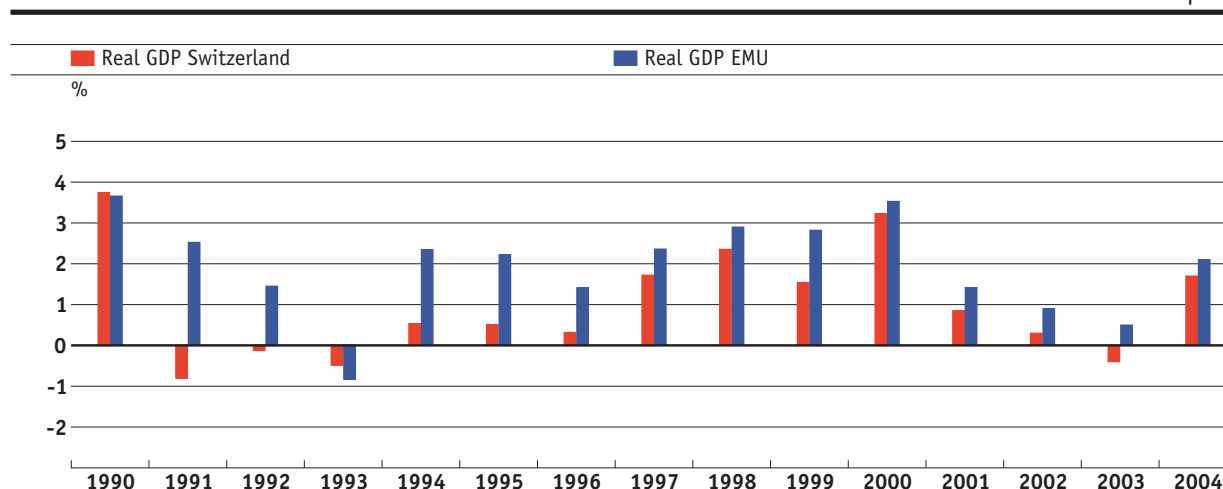
Economic growth picked up in Switzerland in 2004 and – with a 1.7% rise in GDP – exceeded the growth rates of the three previous years, thus bringing to an end the slowdown in growth that has been ongoing since 2001 (cf. Graph 1). GDP growth also climbed in Europe<sup>8</sup> – to 2.1% – after having slipped continuously for the past three years. In the US and Japan, meanwhile, the uptrend of recent years continued unabated in 2004, with a GDP increase of 4.4% and 2.7% respectively.<sup>9</sup>

## Interest rates still low

Overall, interest rates remained very low in 2004. At 2.7% and 0.5% respectively, the average yield on ten-year Swiss Confederation bonds and the average three-month Libor were both well below the average of the last 15 years (cf. Graph 2). In fact, the real three-month rate reached a negative value of –0.3%.<sup>10</sup> While the three-month Libor was raised in two steps in 2004 from 0.25% in January to 0.75% in December, the average yield on ten-year Swiss Confederation bonds dropped from 2.85% to 2.38%. In view of the current growth prospects (which have not deteriorated in the medium term) and the inflation forecasts, the medium and long-term interest rate levels recorded at the end of 2004 are low. This is the case both in Switzerland and abroad. Long-term interest rates also fell back in Europe and Japan, while the three-month Libor trended sideways. In the US, both short and long-term interest rates increased. In a longer-term perspective, however, their levels are still low.<sup>11</sup>

Growth in GDP

Graph 1



Sources: OECD, SNB

10 Annual average of Libor minus annual inflation of 0.8%

11 Source: Reuters

7 Swiss banks are discussed in Chapters 2–6

8 European Monetary Union

9 Source: OECD

### Mixed signals regarding credit standing of borrowers

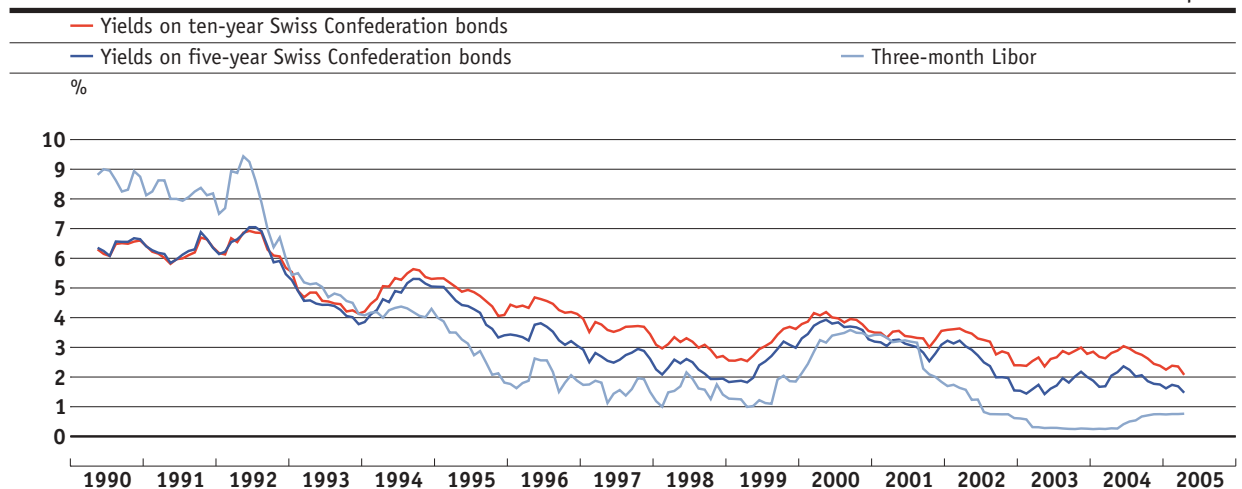
Indicators present a mixed picture of borrowers' creditworthiness. The low yield spreads between the indices for industrial and government bonds suggest a high credit standing. After having dropped steeply in 2003, these yield spreads declined yet further in the US and Europe in 2004 (cf. Graph 3), hitting a historically low level. At the end of 2004, the spreads reached 0.51% in Europe and 0.92% in the US. The interest rate differential in Switzerland remained virtually unchanged at its currently low level (-2 bp to 0.61%). The credit rating trend also indicates an improvement in credit standing. Of the companies assessed in Moody's global survey in 2004, 14% were upgraded and 9% downgraded. The development of the bankruptcy figures in Switzerland contrasts with this picture. In 2004, the bankruptcy rate rose slightly from 2.14% to 2.26% (cf. Graph 4), reaching a level close to the average of the last ten years. At the same time, losses from concluded bankruptcy proceedings increased for the first time since 1998 (+32%). However, it should be emphasised that half of this significant rise is due to one single bankruptcy case.<sup>12</sup>

### Better assessment of credit standing of major foreign banks

A number of indicators point to an improvement in the credit standing of major foreign banks. Firstly, most of the biggest institutions generated higher profits in 2004 than in the previous year. The sector was thus able to improve its results for the second time running. The increase in earnings was broad based and the write-downs and provisions among European banks were lower overall. Secondly, the credit ratings tended to increase in the banking industry. It should be noted, however, that the ratings of the larger Japanese and German banks, which are below-average by international standards, did not follow this positive trend. Thirdly, the development of credit default swaps (CDS) for bank debts indicates an improvement in banks' credit quality (cf. Graph 5). CDS prices exhibited a downward trend in Europe, the US and Japan. The decline was relatively weak in the US, where the average prices for these swaps were high in an international comparison in December 2004.<sup>13</sup>

Swiss interest rates

Graph 2

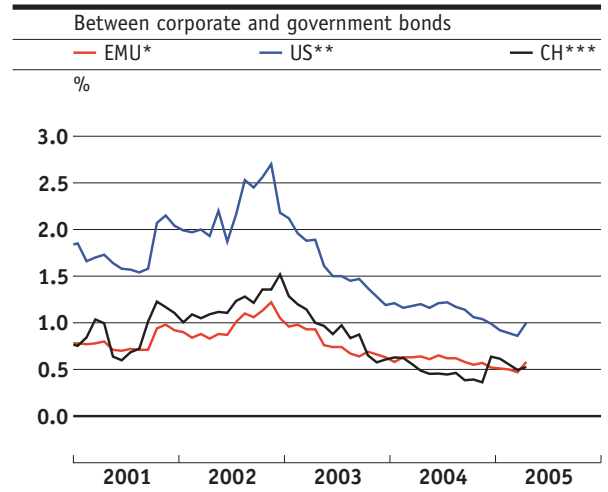


Sources: Reuters, SNB

12 Sources: Swiss Federal Statistical Office (SFSO)

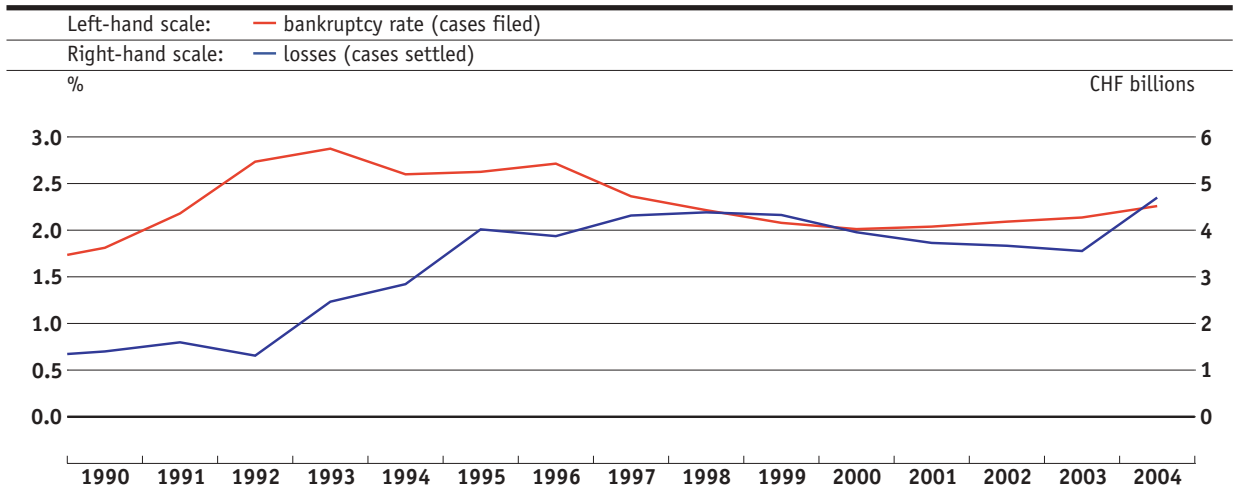
13 Sources: Bloomberg, Moody's Investors Service

Yield spreads Graph 3



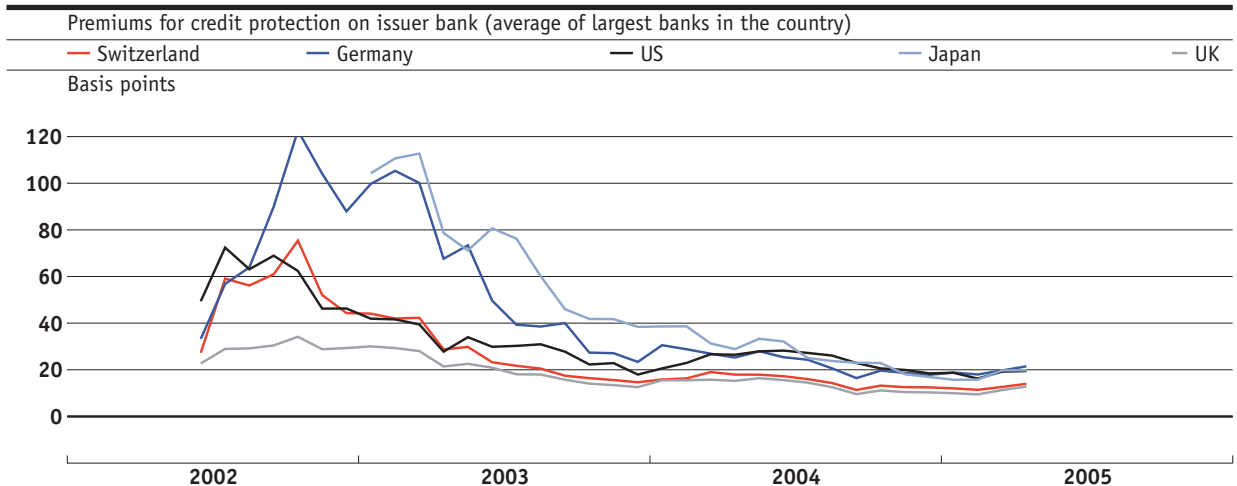
Bankruptcy rate in Switzerland

Graph 4



Five-year senior credit default swap prices

Graph 5



Graph 3: Sources: SNB, Thomson Datastream  
Graph 4: Sources: SFSO  
Graph 5: Source: Bloomberg

Graph 3:  
\* Euro Aggregate Corporate and Euro Aggregate Government indices, Lehman Brothers  
\*\* US Aggregate Corporate Investment Grade and US Aggregate Government indices, Lehman Brothers  
\*\*\* Yields (spot rates) for corporate bonds with a rating of at least BBB- and on Swiss Confederation bonds, calculated by the SNB

### Mixed signals for major insurance companies

Indicators paint a mixed picture with regard to the creditworthiness of Swiss and foreign insurance companies. The major companies abroad reported higher profits for 2004. This positive result is only partially reflected in the credit-standing indicators, however. On the one hand, the number of credit rating upgrades among life insurance companies significantly exceeded the number of downgrades. At the same time, the development of CDS for insurance company debts suggests a slight improvement in the companies' credit standing. The decline in CDS prices was particularly pronounced in Europe, where they are currently much lower than the international average. On the other hand, the trend regarding credit ratings points to a deterioration of the creditworthiness in the non-life sector, which has seen a sharp increase in claims.

The Swiss insurance sector was also able to increase its profits. Furthermore, market indicators point to an overall improvement in the financial robustness of Swiss insurance companies. In a long-term comparison, however, the credit ratings of the big Swiss insurers are still low (cf. Box 2, p. 25). Looking at the CDS prices, it can be inferred that the credit standing of Swiss insurers is similar to that of their international competitors, but lower compared with the Swiss big banks.<sup>14</sup>

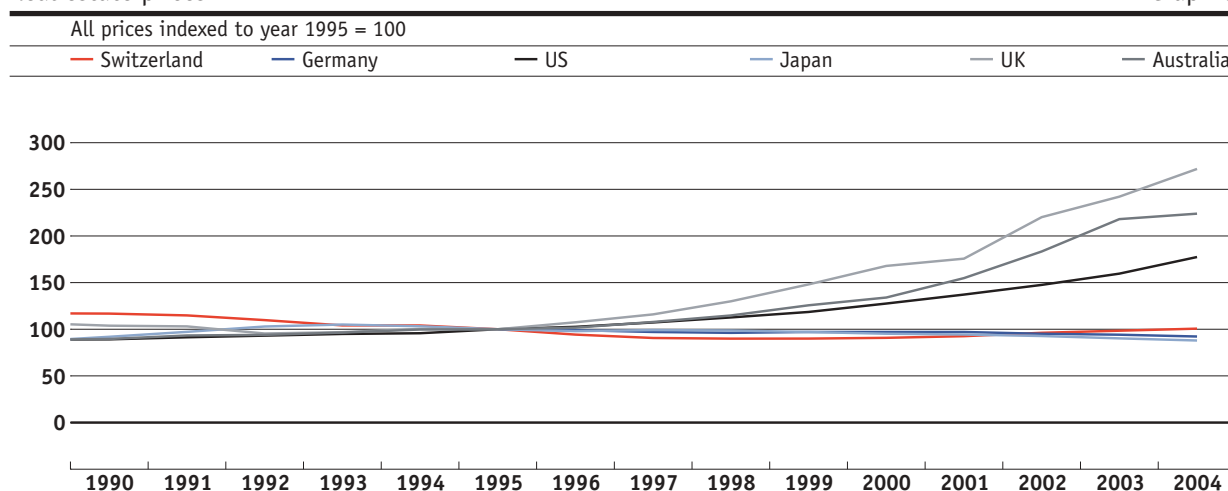
### Moderate increase in real estate prices in Switzerland

Real estate prices rose 2.3% in Switzerland in 2004 (cf. Graph 6). Although growth rates were higher than those of consumer prices (0.8%), they can nonetheless be considered modest and fell back slightly on the previous year. In 2004, real estate prices were still 14% below the peak level recorded in 1989 and there was no sign of a speculative bubble in the Swiss real estate market. However, substantial price increases were observed in some regions. This applies in particular to Geneva and the Lake Geneva area, where property prices climbed in 2004 by 11.5%, and also to Ticino (+5.8%).<sup>15</sup>

The situation in the Swiss real estate market differs from that of the UK and US, where property prices increased in 2004 by 12% and 11% respectively. By contrast, prices for real estate dropped in Japan (-3%) and Germany (-2%).<sup>16</sup>

Real estate prices

Graph 6



Sources: Bank for International Settlements (BIS), Wüest & Partner (Price index for single-family houses)

15 Source: Wüest & Partner (Price index for single-family houses)  
16 Figures are year-on-year growth rates for Q3 2004. Source: BIS

14 Sources: Bloomberg, Moody's Investors Service, Standard & Poor's



## Box 1: Hedge funds – a threat to system stability?

Hedge funds are private pooled investment limited partnerships which fall outside most of the rules and regulations governing traditional investment funds. We have reached the conclusion that for the time being hedge funds do not pose a particular threat to system stability – despite their recent strong growth and reduced profitability. Hence, the direct regulation of hedge funds does not appear necessary from a financial stability perspective. Due to the rapid evolution of the hedge fund industry, however, its development and its linkages with the banking sector need to be closely monitored.

Typically, hedge fund investors are wealthy, sophisticated individuals or institutions. The market discipline provided by this investor class constitutes a significant counterweight to the hedge funds' low degree of regulation. We have not identified any serious shortcomings as regards transparency. It is important that the clients and counterparties of the hedge funds have access to the relevant information. This seems to be the case in general. Therefore, the absence of any comprehensive, public data source (e.g. on the risk profiles and the positions of the individual hedge funds) is not problematic. Besides, there are a number of public databases which provide a good overview of the hedge fund industry.

Hedge funds are rather small – both on an individual and on an aggregated level – and they pursue relatively heterogeneous strategies. According to various estimates, there are currently over 8,000 hedge funds managing assets of approximately USD 1,000 billion in total. At the end of 2003, only around a dozen funds held more than USD 10 billion in assets, and none held more than USD 20 billion.<sup>17</sup> By comparison, institutional investors manage USD 25,000 billion in shares and bonds, the global market capitalisation of all shares and bonds totals around USD 20,000 billion each, and there are over 100 banks worldwide whose assets exceed USD 100 billion. And at the end of 2004, the trading books of individual large internationally banks represented up to USD 500 billion. It is thus unlikely that the liquidation of individual hedge funds could destabilise large segments of the financial markets, in spite of the fact that they generate a large share of the turnover in some segments.

Moreover, as hedge funds do not play a role in traditional financial intermediation (deposits and lending), the failure of individual hedge funds has no direct bearing on those functions of the financial system that are crucial for the economy as a whole.

Based on the above factors, we consider it unlikely that at this stage hedge funds are capable of causing a major financial crisis, i.e., they do not pose a direct threat to financial stability. The failure of a single or several hedge funds is more likely to be the symptom of a crisis triggered by other factors, such as a deterioration in the macroeconomic environment. However, there is a potential for hedge funds to indirectly affect financial stability, namely through exposures of large banking institutions. For the time being, the linkages between hedge funds and large banking institutions do not represent a particular danger. Although the hedge fund business constitutes a significant source of income for Switzerland's big banks, at present they play only a limited role compared with the total income, managed assets and risks of these banks. The banks keep a watchful eye on their exposure to hedge funds. Moreover, banks' transactions with hedge funds are subject to the regulations and supervision by the Swiss Federal Banking Commission. In particular, the same capital adequacy requirements as for other market and credit risks apply for hedge fund exposure.

From a financial stability perspective, a direct regulation of hedge funds appears to be neither necessary nor useful for the time being. The minimum solution – the compulsory registration of hedge funds with an oversight authority – would provide a false sense of security, as this would limit neither the risks associated with hedge funds nor their possible contribution to systemic risk. Likewise, it is not necessary to request hedge funds to report their positions, given their modest size and the sophistication of their main counterparties. Such reporting would, moreover, give the misleading impression of transparency, since the high volatility of trading portfolios makes it virtually impossible to provide a timely, representative picture of these positions. And finally, direct restrictions regarding leverage, investment possibilities or risk profile seem unreasonable in view of the limited systemic significance of hedge funds and the sophistication of the counterparties.

Given the rapid evolution of the hedge fund industry, the developments in this area must nevertheless be observed to ensure that hedge funds do not jeopardise system stability in the future. Particular attention should be paid to the banks' exposure to hedge funds and the way they handle this exposure. This is all the more important as the banks are signalling that they are under mounting pressure from hedge funds to relax their lending standards.

<sup>17</sup> The LTCM hedge fund, which almost became insolvent in 1998, was an exception: it had assets totalling USD 100 billion under management.

### Comparatively favourable stock market climate

The stock markets performed relatively well in 2004. The Swiss Performance Index (SPI) rose over the course of the year by 5.1% to 4,235 points (cf. Graph 7). The major foreign stock market indices, too, were higher at the end of 2004 than at the beginning of the year. The European market (DJ STOXX 50) climbed 4.3%, the US market (S&P 500) gained 9.0% and the Japanese index (Nikkei 225) moved up 7.6%. In addition, the volume of Swiss equities traded on the Swiss stock exchange increased by 17%, after having declined in the three previous years. At the same time, the uncertainty in the markets abated. The volatility of the SPI – which had already decreased in 2003 – staged yet another marked decline in 2004 (–45%), reaching a level which is close to the 15-year low.

### Relatively good prospects for 2005

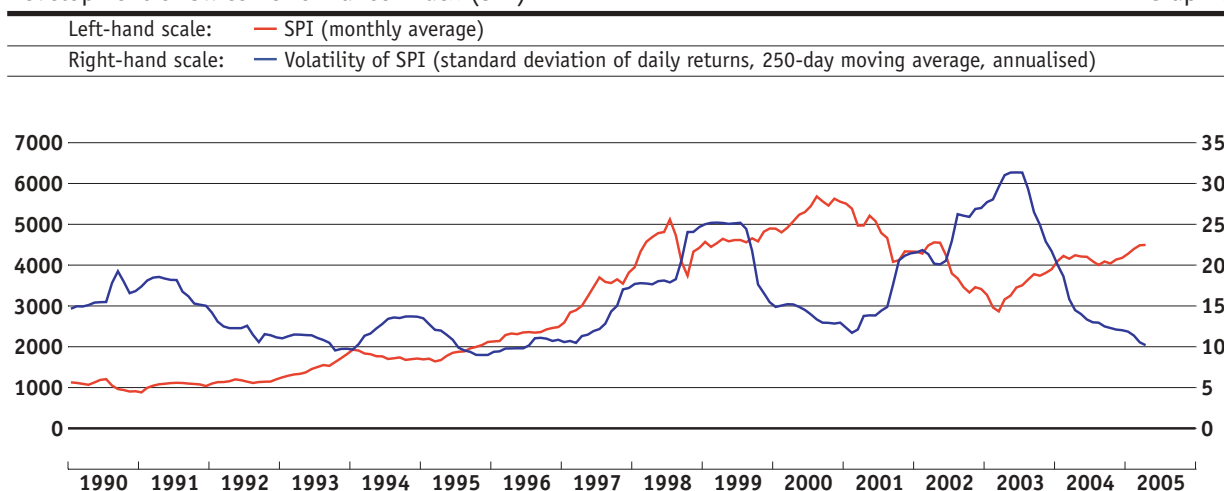
The outlook for 2005 is quite positive for both the Swiss and the international economy. Firstly, the situation in the financial markets since the beginning of 2005 appears relatively stable. Stock market prices rose in Switzerland and Europe, while they declined somewhat in the US and Japan. At the same time, both stock market volatility and the yield spreads remained at their low levels; even though the latter experienced a significant – but temporary – increase

in May. Secondly, GDP growth is set to continue, albeit at a somewhat slower pace than in 2004. For 2005, the SNB puts GDP growth in Switzerland at around 1.0% and growth rates in Europe, the US and Japan are expected to be within the region of 1.5%, 3.5% and 0.9% respectively. Thirdly, there is no indication of a price bubble having developed in either the Swiss real estate market or the stock market. A sharp change in prices, which could potentially destabilise the banking sector, is therefore unlikely at present. Finally, available indicators suggest that there is little risk of contagion effects causing a crisis in the Swiss banking sector. For one thing, the world's biggest banking and insurance sectors also appear to be quite robust. For another, the exposure of the Swiss banking sector to hedge funds (cf. Box 1, p. 23) is modest.

Notwithstanding these relatively positive prospects, risks do exist. Firstly, the flattening of the yield curve implies that the market expects only a moderate interest rate hike in the medium term. An unexpectedly sharp hike might lead to a significant deterioration of the creditworthiness of borrowers overall. Debtors in countries where there is a high risk of a price adjustment in the real estate market could be particularly affected. Secondly, a slowdown in economic growth combined with a drop in share prices cannot be ruled out.

Development of Swiss Performance Index (SPI)

Graph 7



Source: SNB

## Box 2: Risks for the financial system emanating from insurance companies

Problems experienced by insurance companies can have destabilising effects on the financial system. Essentially, two types of effects can be distinguished:

*Direct macroeconomic effects:* The four major direct effects of an insurance company's default are (1) the discontinuation of insurance services, (2) a possible loss of savings, (3) the disruption of the insurance company's function as a creditor and (4) price effects on asset markets. The first two of these effects are more significant, as they could weaken the economy in the event of an insurance crisis. The threat to, or loss of, savings in particular is an important factor in this regard, since it would adversely affect consumer confidence. According to our estimate, savings<sup>18</sup> placed with Swiss insurance companies amounted to approximately CHF 230 billion at the end of 2003, compared with CHF 1,000 billion held with banks. However, savings placed with insurance companies are used only to a very limited extent to finance transactions of private households and companies. The role played by insurance companies with regard to supplying the national economy with liquidity is therefore very modest compared to that of banks, and the macroeconomic effects of an insurance crisis are consequently far less severe than those of a bank crisis.

*Effects on the banking system:* Problems in the insurance sector can generate high macroeconomic costs if they contribute to, or even trigger, a destabilisation of the banking system. The extent to which an insurance crisis will spread to the banking system depends on the significance of possible transmission channels. In this respect, three different cases can be distinguished:

- 1 *Banks as main owners of insurance companies within a financial conglomerate.* In Switzerland, this applies to Credit Suisse Group (CSG). At the end of 2003, borrowed capital at Winterthur Insurance equalled 446% of CSG's equity capital. In extreme circumstances, problems experienced by Winterthur – which belongs to this bancassurance group – could impact on CSG to such an extent that the banking entity's existence would be jeopardised.
- 2 *Banks as creditors and shareholders of insurance companies.* Swiss banks are important lenders to insurance companies. In individual cases, the amount of the credit

limit – expressed as a percentage of the corresponding bank's equity capital – is not negligible. This does not, however, imply that real concentration risks exist. Banks' stakes in insurance companies are of minor importance compared with their overall lending activities. The same is true of credit default swaps.

- 3 *Assets held both by banks and by insurance companies.* Insurance companies held domestic bonds to the value of CHF 63 billion, or 25% of the market capitalisation, at the end of 2003. The banks accounted for a 10% share. The stakes in the other asset markets are considerably smaller.<sup>19</sup> Negative price effects might possibly be expected from the bond markets, particularly from the market for government bonds, in which insurance companies held a 28% stake at the end of 2003. Government bonds are relatively easy to price, though, and it is improbable that an insurance crisis would significantly weaken the credit rating of the Swiss Confederation. It is thus unlikely that problems at insurance companies would be transmitted to banks through price falls of bonds and other assets.

The extent to which the risks emanating from the insurance sector can jeopardise the stability of the financial system depends, on the one hand, on the significance of the different above-mentioned effects in the event of an insurance crisis and, on the other hand, on the robustness of Swiss insurance companies, i.e. on the likelihood of a crisis. As regards the significance of the effects, our analysis shows that their transmission within CSG has the potential to destabilise the financial system. The other effects could contribute to – but not actually trigger – a destabilisation.

Regarding the robustness of Swiss insurance companies, the available indicators show that it deteriorated drastically in 2000 and 2001 before stabilising at a low level in the following two years and moderately improving in 2004: the insurance sector was able to boost its profit in 2003 and 2004. In general, moreover, the market indicators<sup>20</sup> signal an improvement in the financial robustness of insurance companies in 2003 and 2004. The insurance sector's overall capital base and the ratings<sup>21</sup> of the large Swiss insurance companies are, however, still low compared with 1999.

18 Excluding the accounts held with independent pension funds

19 Insurance companies accounted for 1% of domestic equities, and banks for 2%

20 Credit default swaps, insolvency indicators (SNB calculations)

21 Moody's and Standard & Poor's

## 2 Profitability

The Swiss banking sector published positive results for 2004. While profits grew compared with the previous year, profitability – measured by return on assets – remained practically unchanged at a relatively high level. Much of the renewed rise in earnings is attributable to the growth in income from commissions and services. By contrast, the development of net interest income was well below average. Given the higher lending volume, this indicates a decline in the interest margin. In addition, the cost-income ratio remained virtually stable. While the outlook for 2005 is relatively good, growth in profits is expected to be rather modest.

### Renewed increase in earnings

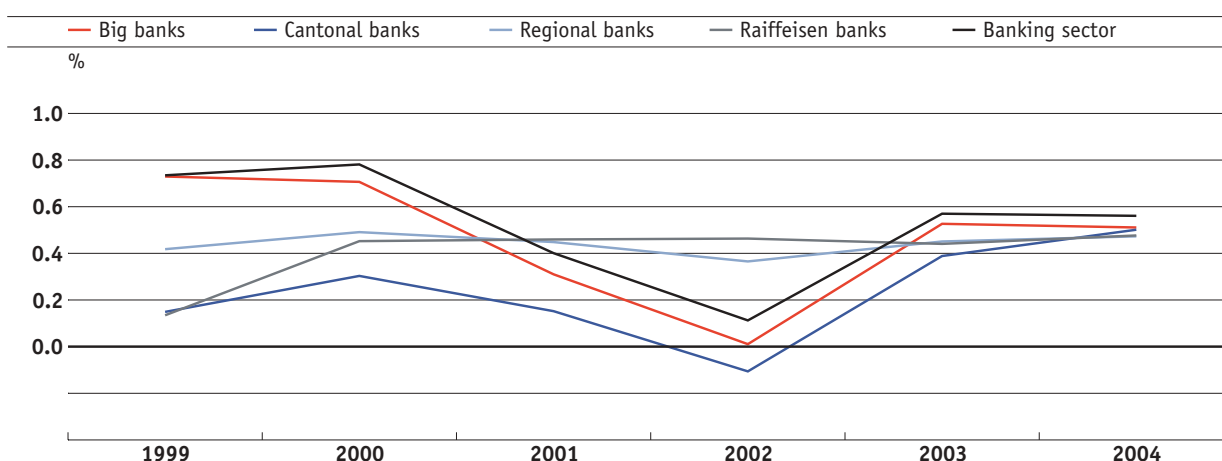
Net profit in the Swiss banking sector rose in 2004 by 14.3% to CHF 19.8 billion. The cantonal banks reported a particularly sharp increase of 30.6%. Only among the commercial and stock exchange banks did earnings show a slight fall (-1.3%). Given that the earnings growth at the big banks was accompanied by a steep increase in the balance sheet total, the return on assets (ROA) of the Swiss banking industry remained almost unchanged at 0.56% (2003: 0.57%). The ROA of the big banks dropped slightly from 0.53% to 0.51%, while that of the cantonal banks climbed from 0.39% to 0.50% (cf. Graph 8). Another reason for the fall in ROA at the big banks is the accounting changeover at CSG from Swiss

GAAP to US GAAP. Its ROA for 2003 would have been far lower if it had been stated according to US GAAP instead of Swiss GAAP. The return on equity, by contrast, increased both across the entire banking sector and at the big banks. Finally, only 22 banks posted a loss for 2004 – the lowest number in the last nine years. Of these banks, there was one regional bank and 21 foreign banks, accounting altogether for only 0.24% of the Swiss banking sector in terms of assets.

Gross profits in the Swiss banking industry rose by 12.3% to CHF 33.8 billion.<sup>22</sup> Unlike in 2003, however, the rise in 2004 was not due to further cost-cutting measures, but to higher earnings. Overall, earnings grew by 11.3% to CHF 94.3 billion. The contributions of the various components varied, however (cf. Graph 9). While income from commission business and services grew by CHF 3.4 billion (8.3%), net interest income fell slightly by CHF 0.14 billion (-0.5%). Along with other indicators, the stagnation of net interest income together with rising lending volumes points to a moderate decline in the interest margin. This may be due to an increase in competitive pressure, which is exerted in part by the big banks. In this bank category, both net interest income (-1.7%) and the interest margin dropped considerably. At the cantonal banks, net interest income fell by 1.1%, while at the regional and Raiffeisen banks it increased by 1.1% and 3.4% respectively against a background of higher lending volumes (these rose moderately at the regional banks, but recorded a sharp rise at the Raiffeisen banks).

Return on assets

Graph 8



Sources: SFBC, SNB

<sup>22</sup> Gross profit corresponds to net profit before taxes, extraordinary income and expenditure, write-downs and provisions, as well as depreciation of fixed assets.

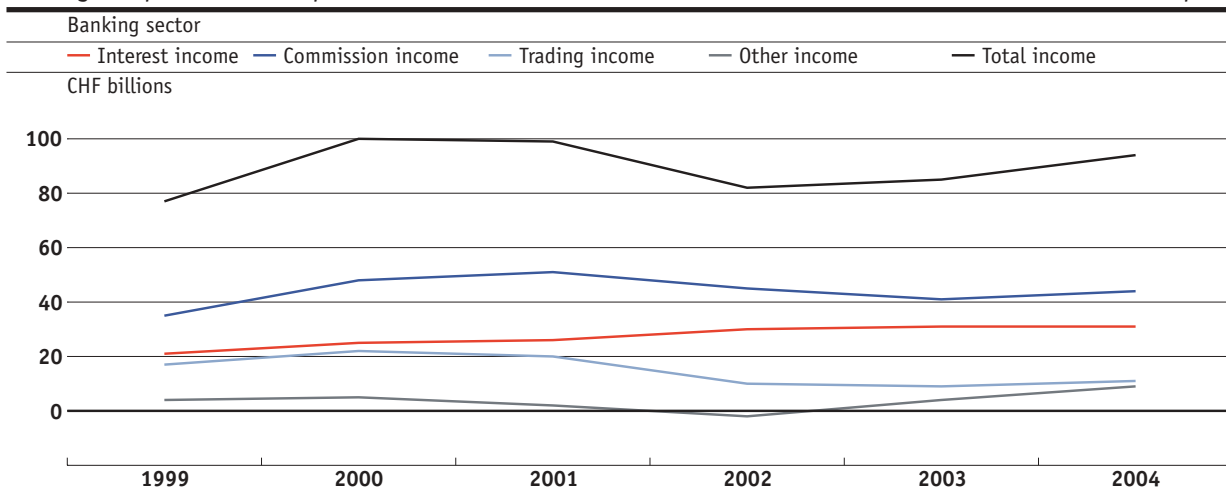
Finally, net trading income developed very differently in the various bank categories. The big banks recorded a rise of 23.6%, while at the Raiffeisen banks and commercial and stock exchange banks these earnings contracted by 14.8% and 6.9% respectively. Overall, net trading income increased by CHF 1.5 billion, or 15.8%. Considering the low level of volatility and the rather moderate price rise in the asset markets, this increase is remarkable.

Costs in the Swiss banking sector climbed again for the first time since 2001 and, at CHF 60.4 billion, were 10.8% higher than in 2003. This rise is primarily attributable to the growth of the big banks in particular. The operating expenses of the big banks rose by 13.4%, while those of the regional banks decreased by 0.2%. The cost-income ratio in the Swiss banking industry receded slightly from 64.5% to 64.4%. The ratio across all the bank categories remained relatively constant. Only the Raiffeisen banks reported a small increase from 55.1% to 58.4% (cf. Graph 10).

A further reason for the rise in the net profit is the decline in write-downs, provisions and losses. These narrowed from 0.32% of total lending (customer claims and mortgage loans) to 0.22%, or CHF 2.3 billion. Write-downs, provisions and losses decreased in all bank categories and are now very low by historical standards. On the one hand, this trend contrasts with the rise in the number of bankruptcies in Switzerland, while on the other hand, it is consistent with the relatively favourable economic environment and the positive development of other credit standing indicators.

Earning components development

Graph 9



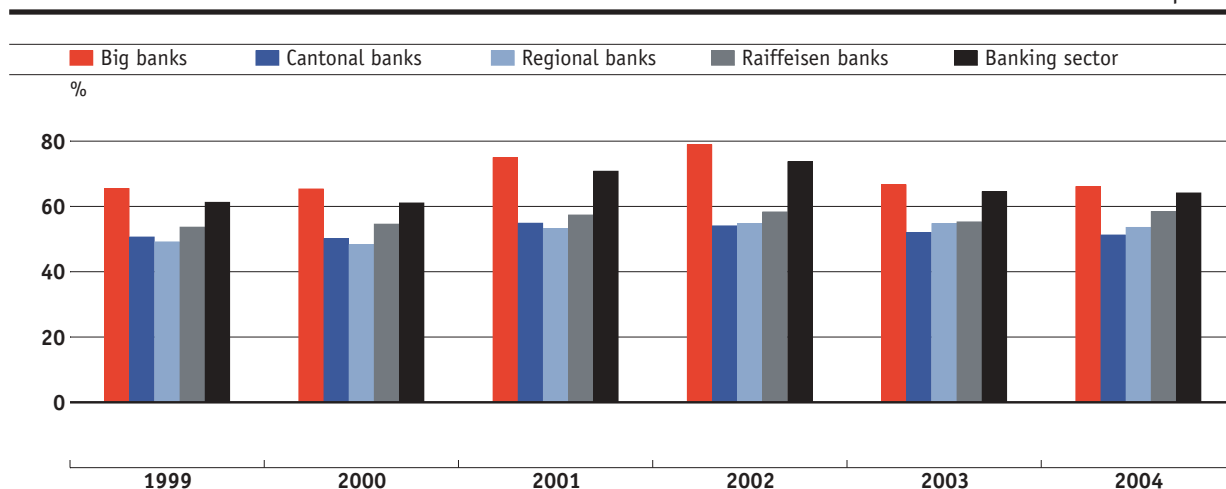
Sources: SFBC, SNB

## Outlook

The prospects for the profitability of the Swiss banking sector in 2005 are relatively good. However, a number of factors suggest that the growth in profits is likely to be rather modest. Firstly, profitability is already high. Secondly, in recent years the larger banks in particular cut costs significantly. However, the cost-cutting appeared to bottom out in 2004 and the potential for further reductions seems to have dwindled somewhat. Thirdly, write-downs, provisions and losses are at a level that leaves very little room for any downward movement. Thus, any growth in profits must be generated first and foremost by higher earnings. This in turn depends on the rate of growth in the Swiss economy, on the timing and magnitude of change to the interest rate levels and on the extent to which competition – especially in the lending market – intensifies.

Cost-income ratio

Graph 10



Sources: SFBC, SNB

## Box 3: Scenario analysis

The scenario analysis described in this box uses microeconomic methods and a set of macroeconomic and individual bank variables to reveal systematic relations between the macroeconomic environment and profitability in the Swiss banking sector. The objective of the analysis is threefold: (i) to identify macroeconomic factors which are systematically linked to the profitability of the banking sector; (ii) to simulate the present and future profitability of the banking sector on the basis of these variables; (iii) to provide an additional instrument to assess the resilience of the Swiss banking sector. The scenario analysis involves two steps. In the first step, three essential components of bank earnings – net interest income, provisions, and net earnings from trading and commissions – are regressed on a set of macroeconomic variables and individual bank characteristics in a panel regression. The set of macro variables includes short and long-term interest rates, real GDP growth, real estate prices, the unemployment rate, and the return on the Swiss stock market. The parameters obtained from the regression, which are estimated over the 1987–2004 period, reflect the sensitivity of the banking sector's earning components to changes in the macroeconomic environment. Those parameters which are statistically significant are then used, in the second step, to simulate the banking sector's profitability under four macroeconomic scenarios: Firstly, an interest rate scenario characterised by an increase of the short and long-term nominal interest rate by 200 bp to a level of 300 bp and 450 bp, respectively. Secondly, a recession scenario characterised by negative GDP growth (–1%), a relatively high unemployment rate (5%) as well as a decline in real estate prices (–10%). Thirdly, a stock market scenario where the SPI is assumed to decrease by 30%. And, finally, a scenario which combines the shocks specified under scenarios 1 to 3. The size of the shocks used in each scenario is in line with the extreme variations observed during the period considered for the estimation.

Based on the first-step regression analysis it appears, firstly, that net interest income is rather insensitive to macroeconomic developments. The expected negative relation between interest rate changes and the interest margin is supported by the data; however, it is weak and appears to have reversed in recent years. These results are consistent with the evidence from banks' reporting on their direct interest rate risk (cf. Chapter 3). Secondly, bank provisions are positively related with interest rate and unemployment rate on the one hand and negatively related with GDP growth and real estate prices on the other hand. Finally, the results show that there is a positive correlation between stock market prices and trading and commission income and a negative correlation between interest rates and trading and commission income. The results from the

second-step simulation are reported in the table below. The table contains two elements: Firstly, the profit for the banking sector measured as a percentage of the level of excess capital for each scenario. Secondly, the difference with respect to the baseline scenario which roughly represents the status quo. For example, according to the second scenario – which implies a 200 bp interest rate increase – the profit of the banking sector would amount to 17% of excess capital. Compared to the baseline scenario, this implies a decrease of profit representing 16% of excess capital.

As can be seen from the table, the resilience of the Swiss banking sector to potential macroeconomic shocks appears to be relatively high. For instance, an interest rate shock would lead to a decrease in profitability, through its impact on net interest income, provisions and the value of the bond portfolio. Under such a scenario, however, the banking sector would still be profitable. Similarly, the recession scenario would entail substantially higher provisions and hence reduced profits without, however, affecting the banking sector's capitalisation. In comparison, the consequences of a stock market crash would be relatively severe. Under this scenario, the banking sector as a whole would experience losses. However, a stock market crash does not by itself constitute a serious threat to the banking sector, as the losses entailed are small when compared to the size of the sector's excess capital. Finally, the scenario assuming a joint occurrence of a strong interest rate increase, a recession and a stock market crash, would lead to substantial losses and a considerable decrease of excess capital in the banking industry.

The scenario analysis is subject to a number of limitations. In particular, stress tests based on statistical inference assume that the observed structural relation is stable. For example, the speed of adjustment of the banking sector's exposure to a particular risk factor during a period of stress is assumed constant. As a consequence, the figures reported in the table would overestimate the impact of a macroeconomic scenario, should the speed of exposure adjustment be higher now than during the period considered for the estimation. Another limitation lies in the fact that the analysis does not account for possible non-linearities in the influence of macro variables on banks' profitability. In particular, synergy effects may amplify the impact on profitability of each macroeconomic variable when various shocks occur simultaneously. Because the period used for the estimation never saw the joint occurrence of a strong interest rate increase, a recession and a stock market crash, the model may underestimate the real effect of such a combination of shocks. Despite these reservations, the scenario analysis seems to corroborate the current assessment that the Swiss banking sector is quite robust with regard to reasonable macroeconomic shocks.

### Estimated profits for 2005 (total banking sector)

Scenario	Profits (in percent of excess capital)	Difference with respect to the baseline scenario (percentage points)
1. Baseline scenario*	33%	
2. Interest rates increase (+200 bp; parallel shift)	17%	–16%
3. Recession (GDP growth: –1%)	20%	–13%
4. Stock market crash (SPI: –30%)	–4%	–37%
5. Combined scenario (2. to 4. combined)	–33%	–66%

\* The baseline scenario approximately corresponds to the status quo.

### 3 Risks

In terms of the proportion of non-performing loans and of write-downs and provisions, the credit risk of Swiss banks declined again from the previous year and is now at a low level. Market risk and interest rate risk have risen slightly from their modest 2003 levels. In short, total risk in the banking sector appears to be relatively low. There is a danger, however, that an unexpectedly sharp hike in the interest rates could trigger a rise in credit risk as debtors encounter payment difficulties.

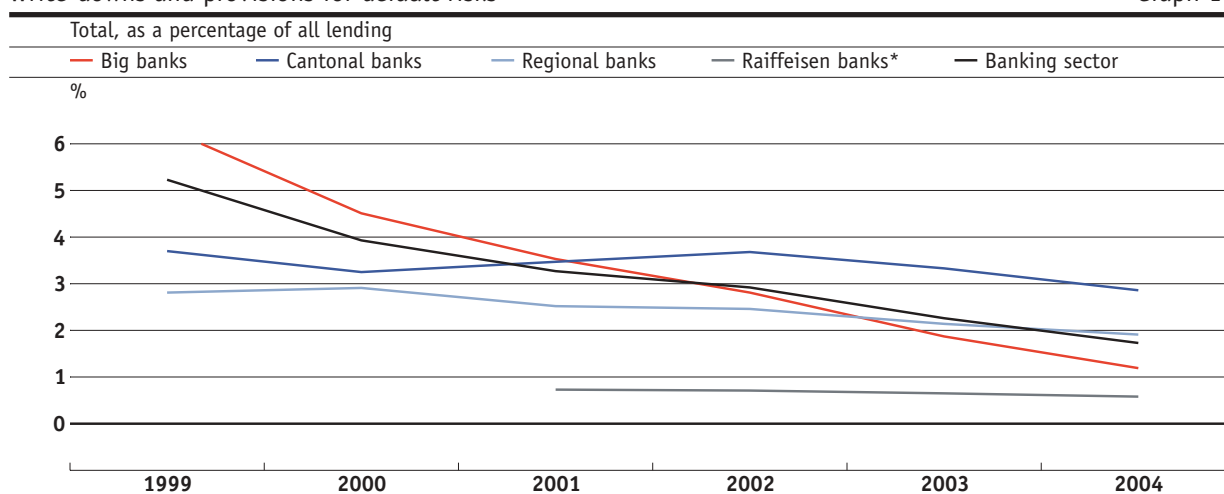
#### Credit risk declining again

Credit risk measures the risk of default by the counterparty, in other words, the risk that the counterparty will fail to make the agreed interest and repayment instalments in full. New write-downs and provisions made by banks may be used as an indicator for this risk. Write-downs and provisions reflect the average quality, i.e. credit standing, of the loan portfolios.

Write-downs and provisions for default risk as a percentage of total lending (customer claims and mortgage loans) declined from 2.3% at year-end 2003 to 1.7% at the end of 2004. Moreover, the share of total lending accounted for by non-performing loans<sup>23</sup> dropped from 2.1% to 1.5%. Overall, there-

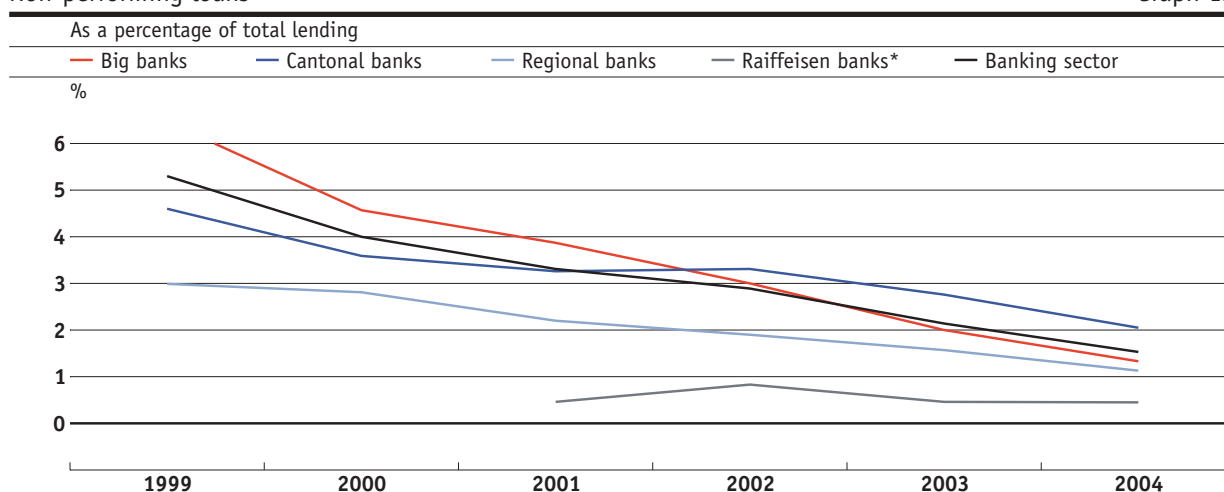
Write-downs and provisions for default risks

Graph 11



Non-performing loans

Graph 12



Graphs 11 and 12: Sources: SFBC, SNB

Graphs 11 and 12:

\* Statistics for the Raiffeisen banks only available from 2001

<sup>23</sup> Non-performing loans are claims against customers and mortgage loans where interest payments are at risk or no longer expected to be made. A loan is considered to be non-performing if payments (including interest payments) related to this loan are more than 90 days overdue.



fore, the average quality of loan portfolios improved between year-end 2003 and year-end 2004. Write-downs and provisions for default risk and non-performing loans vary between approximately 0.5% and 3% of total lending, depending on the category of banks (cf. Graphs 11 and 12).

In 2004, *new* write-downs and provisions – as a proportion of total lending volume – have also registered a marked decline compared with the previous year. Write-downs in the banking sector as a whole amounted to 0.22% (2003: 0.32%). The new write-down and provisioning requirements were thus below the average for the previous nine years (0.72%). Broken down by categories of banks, this year's proportion of new write-downs and provisions was 0.13% of total lending at the cantonal banks, 0.17% at the big banks, 0.20% at regional banks and 0.05% at the Raiffeisen banks.

The decline in credit risk was due in large part to the efforts undertaken in recent years to boost loan quality. Bad debt was reduced by streamlining lending portfolios, improving the quality of loans (e.g. by demanding higher collateral) and implementing a more cautious lending policy. For instance, the share of collateralised loans rose again in the past year and now accounts for 83% (end-2003: 82%, average of the past 10 years: 78%). Moreover, the share of low-risk first-rank mortgages<sup>24</sup> in domestic mortgage claims rose again: depending on the bank category, these mortgages now account for 90% to 94% of total mortgage claims.

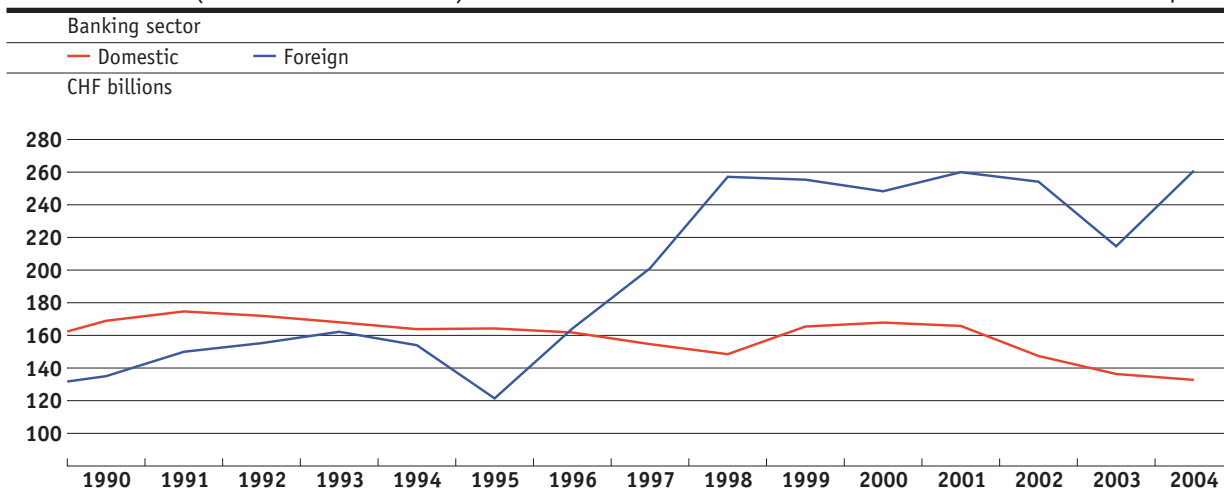
The credit risk indicators discussed above are largely guided by the present and the past. In other words, they reflect future developments only to a lim-

ited extent. Even though some more future-oriented indicators also suggest that credit risk is now lower,<sup>25</sup> a deterioration cannot be ruled out. Should interest rates go up significantly, some debtors are likely to encounter payment difficulties. Estimates based on our scenario analyses (cf. Box 3, p. 29) suggest that a 200 bp rise in interest rates will reduce the banking sector's profitability by one-sixth. While this overall effect also comprises direct interest rate change and valuation risks (cf. the next two sections), the main reason for the decline in profits is higher provisioning and write-down requirements. In interpreting the scenarios, one must bear in mind that the period over which the parameters of the models were estimated does not include any periods when interest rates were as low as they are at present. Consequently, it is conceivable that the effects of an interest rate increase are in fact stronger than the model – which was estimated on the basis of higher interest rates – would imply.

In a longer-term perspective, it appears that the volume of lending has remained within reasonable limits in recent years. Firstly, between 1994 and 2004, domestic mortgage claims grew at an average rate of 3.3% (2004: 4.3%), whereas real estate prices fell by an average of 0.3% p.a. over the same period (cf. Graph 6). There is no sign of a speculative real estate bubble accompanied by high growth in mortgage claims, as there was in the late 1980s. Secondly, there has been a general reduction in total customer claims in recent years. At the end of 2004, domestic claims were 11% lower than in 1998, while foreign claims remained at their 1998 level (cf. Graph 13). This suggests that the banks have pursued a cautious

Customer claims (secured and unsecured)

Graph 13



Sources: SFBC, SNB

24 First-rank mortgages are claims that do not exceed 2/3 of the market value of residential real estate or 1/2 of building land and commercial real estate. The limit is just 1/3 for large industrial commercial properties or industrial real estate.

25 Among the big banks, for instance, the ratings distribution of UBS's loan portfolio tended to improve year-on-year. Credit Suisse Group's economic risk capital (ERC) for credit risk is lower than in the two preceding years. Source: Annual reports.

lending policy overall and have not expanded lending aggressively by lowering lending standards.<sup>26</sup> Accordingly, neither mortgages nor customer claims seem to show any structural imbalances that would reflect a divergence between the development of the lending activity and the economic fundamentals. This assessment is confirmed by the analysis of the stress index (cf. Box 5, p. 43), which does not currently identify any macroeconomic imbalances in lending or in real estate prices. It should be noted in this context that, firstly, these statements refer to the banking sector as a whole and to the entire country. Problems at individual banks or local imbalances cannot be discounted. For instance, growth in mortgages in the Lake Geneva region has been well above the national average for some years now and could thus indicate regional overheating. And secondly, it is conceivable that the banks might relax their lending criteria by allowing higher lending limits *within* individual mortgage ranks or by issuing more generous real estate appraisals. Due to a lack of data, the development of these variables does not, however, enter into our analysis. Should these variables have in fact changed – e.g. as a result of stiffer competition in the mortgage business – our analysis based on the other indicators would underestimate the credit risk in the Swiss banking sector.

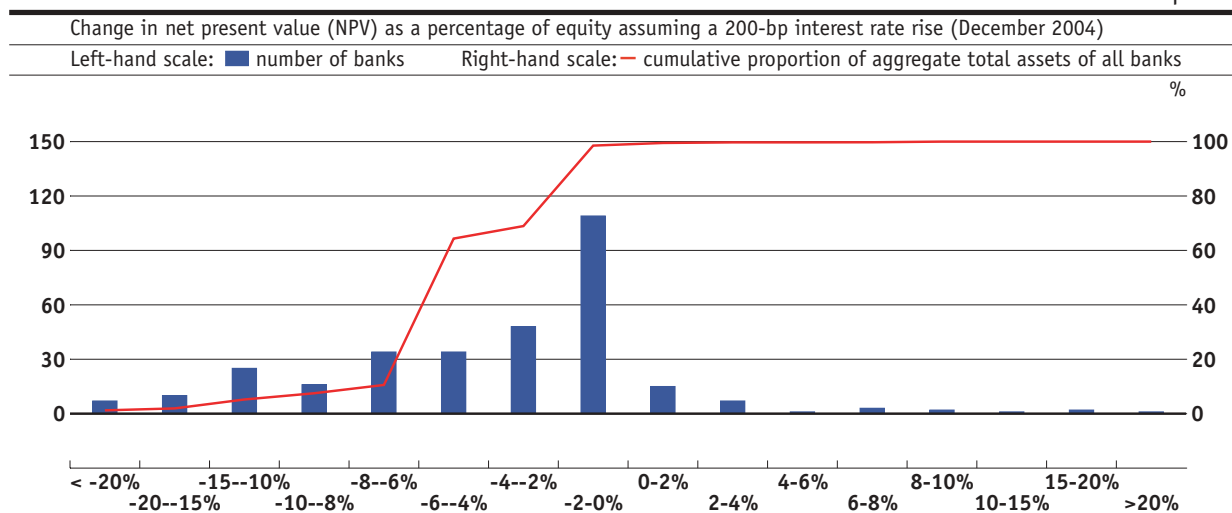
### Direct interest rate risk moderate

A direct interest rate risk exists if there is a serious mismatching between the repricing maturities<sup>27</sup> of a bank's assets and liabilities. Banks typically use short-term liabilities to refinance long-term loans. As a result of such maturity transformations, interest rates on assets may be fixed for a longer period than interest rates on liabilities. If a bank finds itself in such a position, a rise in interest rates reduces the present value of assets more significantly than the present value of liabilities, thus reducing the net present value of the bank. The interest rate risk statistics compiled by the SNB for the SFBC measure the exposure of individual banks to changes in interest rates. Essentially, the change in the present value of individual on-balance and off-balance-sheet items resulting from a change in interest rates is calculated. The sum of the changes in the present value of both assets and liabilities shows the change in the net present value of the banks.

The measurement of interest rate risk is partially based on hypotheses. For certain positions, such as sight deposits, savings accounts and traditional variable-rate mortgages, the interest rate lock-in period is not explicitly specified in the contract. The development of interest rates for these positions depends on both the bank's policy and on market pressures. Such pressure is linked in particular to the clients' options with regard to early withdrawal or early repayment.

Interest rate risk

Graph 14



Sources: SFBC, SNB

26 The sharp rise in loans to foreign customers in 1996–1998 is attributable to the big banks, which were realigning their strategic focus and expanding their international presence in this period.

27 Time interval until interest rates can be readjusted.

Our primary analysis of the interest rate statistics rests on banks' assumptions with regard to the interest lock-in period of all their various positions. This basic analysis suggests that the Swiss banking system as a whole is well hedged against the risk of interest rate changes. If the general level of interest rates were to rise by 200 bp, the aggregate result for all banks would be a reduction in the net present value corresponding to 4.6% of available capital (end-2003: 4.1%). For those bank categories traditionally exposed to interest rate risk (big banks, cantonal and regional banks and Raiffeisen banks), the figure is between 3% and 8%. At most banks, the risk is close to this mean, but at others it deviates sharply. In terms of their share of the aggregate balance sheet total, however, these outliers are of limited systemic importance (cf. Graph 14).

Besides, the National Bank performs a complementary interest rate risk analysis which is based on standard hypotheses regarding the interest rate lock-in period of some positions, in particular savings deposits and traditional variable-rate mortgages. While our standard hypotheses are close to the lock-in period assumed by the average bank in the sample, they are significantly shorter than the average lock-in periods assumed by the larger banks. Based on this hypothesis, with a 200-bp rise in interest rates, the average sensitivity to interest rates is between 6% and 16% of available capital, depending on the bank category. This sensitivity is 1.5 to 2 times higher than that measured on the basis of the banks' hypotheses, but it can still be qualified as moderate.

Finally, it should be noted that the interest rate risk only takes into account the valuation risk resulting from fluctuations in interest rates. A significant rise in interest rates will additionally result in liquidity or solvency problems for debtors, in particular those with variable-rate loan agreements, which in turn means a higher risk for the bank (cf. previous section). This risk, however, is reflected in a higher credit risk and not in the interest rate risk statistics.

### Slightly higher market risk

Market risk is the risk that changes in market prices will generate profits or losses. This price risk mainly affects banks' trading books, financial assets and unconsolidated stakes in other companies. We take the minimum capital requirements derived from these items as a measure of market risk.

In absolute terms, market risk in the Swiss banking sector rose by 4% year-on-year. This risk also increased slightly compared to total capital requirements, edging up from 12.3% to 12.6%. A breakdown by bank category shows that the risk was 9.4% at the cantonal banks (2003: 9.4%), 12.7% at the big banks (2003: 12.3%), 4.8% at the regional banks (2003: 4.9%) and 2.6% at the Raiffeisen banks (2003: 2.3%). Market risk directly related to the banks' trading activities showed a similarly marginal change and remains in the range of previous years. UBS is a notable exception here, in that its market risk, measured by value-at-risk (VaR), rose by just under 20%. Since UBS adjusted its risk model last year, this significant increase in risk is not, however, reflected in the capital requirements.<sup>28</sup>

The *direct* valuation risk, i.e. the risk that the banks' own securities portfolio could depreciate, seems low relative to the credit risk. However, the figures need to be put into context on two counts. Firstly, banks whose capital requirements are calculated on the basis of a VaR model<sup>29</sup> profit from the currently low market volatility (cf. Graph 7). With the composition of the portfolio unchanged, the lower market volatility, the lower the VaR. A general increase in volatility would therefore push up risk and required capital. Secondly, *indirect risks* which emanate from the financial markets are not included. For example, the performance of asset management and investment banking operations depends heavily on the varying financial market conditions. Consequently, in addition to the valuation risk in the balance sheets, financial market risks have an impact on bank revenues.

Our scenario analyses (cf. Box 3, p. 29) provide a guide to the overall impact of market risks, i.e. the sum of the direct and indirect risks mentioned here. The estimates show that a 30% slump in the Swiss equity market would result in the banking sector going into the red.

28 With risk constant and depending on the composition of the portfolio, this adjustment caused the published VaR figures to fall by up to a quarter. Despite a rise in risk during the year under review, the required capital resulting from this risk model is lower at year-end 2004 than the figure produced by the former model at the end of 2003. Source: UBS, media release, 13 October 2004.

29 These include the two big banks in particular. As an alternative to this model approach, under the current capital adequacy rules a bank can calculate the required capital by weighting and adding up the individual trading positions without taking into account the correlation between the positions.

## 4 Capital base

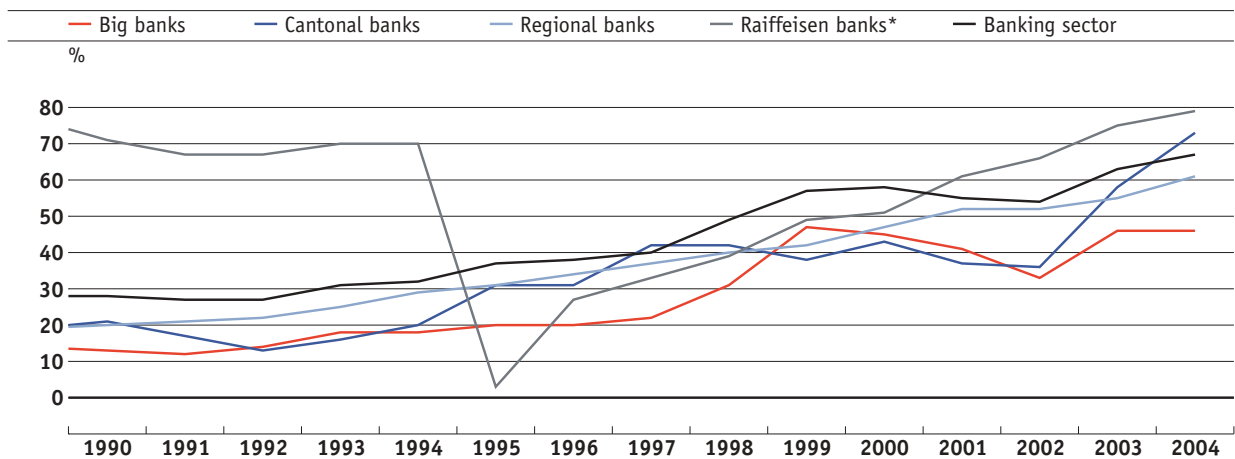
Excess capital increased considerably in 2004 as a result of good annual results. However, the improvement at the big banks was modest compared with the rest of the banking sector, despite high profits. From a historical perspective, all bank categories have a high level of excess capital. Taking an international view, the big Swiss banks are leading in terms of risk-weighted capital ratios, but bring up the rear in terms of unweighted capital ratios.

### Rise in risk-weighted capital ratios

The *risk-weighted capital ratios* rose overall in 2004. On an aggregate level, excess capital as a percentage of required capital rose by 6% to 67%. The increase was particularly marked at the cantonal banks: their excess capital increased by 26% to 73%. The rise was slightly lower at the regional banks (+11% to 61%) and the Raiffeisen banks (+6% to 79%). At the big banks, however, excess capital as a percentage of required capital was basically unchanged (+1% to 46%) (cf. Graph 15). Similarly, the core capital (BIS Tier 1 capital) ratio of the big banks experienced only a small change from 11.8% to 12.0% on average.

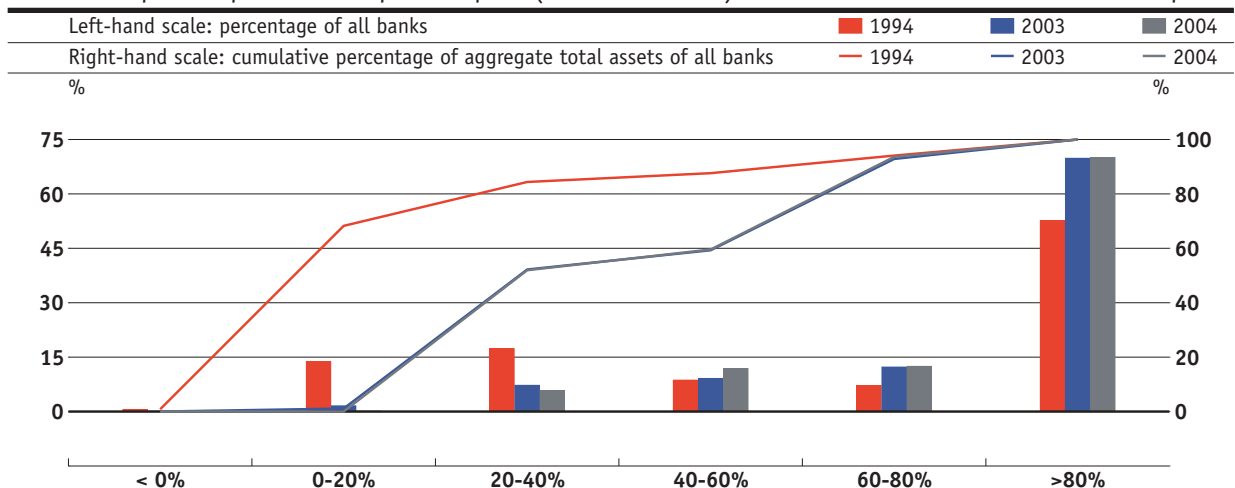
Excess capital in percent of required capital

Graph 15



Excess of capital in percent of required capital (individual banks)

Graph 16



Graphs 15 and 16: Sources: SFBC, SNB

Graph 15:

\* A significant proportion of capital at the Raiffeisen banks comprises the members' obligation to pay in additional capital. As of 1995, only part of this can be included in eligible capital, hence the sharp drop in capital at the Raiffeisen banks.

## Box 4: Regulatory framework

Swiss banking legislation prescribes minimum capital adequacy ratios (cf. arts. 11–14 Banking Ordinance). Essentially, capital backing is required for all on-balance-sheet assets, off-balance-sheet operations and other open items in the trading book and elsewhere. These items are of a diverse nature, however, and the underlying risks vary depending on the counterparty and collateral provided. To take account of this, the various items are risk-weighted. Of these risk-weighted items, 8% must be backed by capital at all times (*required capital*). However, the SFBC can relax or tighten the regulations in specific cases (cf. art. 4 para. 3 Banking Act). Cantonal banks with a state guarantee are permitted to reduce required capital by up to 12.5% (cf. art. 13 (b) Banking Ordinance).

The *eligible capital* used to calculate capital adequacy comprises three components: core capital, supplementary capital and additional capital. Core capital comprises paid-up equity capital, reserves, retained earnings brought forward and, under certain conditions, profit of the current year. Supplementary capital comprises hidden reserves, subordinated debt papers and certain hybrid instruments (e.g. mandatory convertible bonds). Additional capital comprises unsecured, subordinated and fully paid-up liabilities that are subject to a lock-up clause which prevents the payment of interest and repayment of the principal if this violates the capital adequacy requirements.

If banks have more eligible capital than required, they are said to have *excess capital*. The *risk-weighted capital ratio* comprises eligible capital as a percentage of risk-weighted assets. The *unweighted capital ratio* comprises eligible capital as a percentage of total assets.

### Rise in excess capital mainly due to increase in eligible capital

The improvement in risk-weighted capital ratios was due to a rise in *eligible capital*. Thanks to high profits<sup>30</sup>, eligible capital was up 4% year-on-year in the banking sector as a whole. In particular, the cantonal banks (+9%) and Raiffeisen banks (+8%) greatly strengthened their capital base. The only category where the rise was modest – compared to the high profits – was the big banks (+1%). This is attributable to share buy-back programmes and high dividend payments. *Required capital* remained virtually unchanged at the big banks, cantonal banks and regional banks. This was particularly surprising at the big banks, as their total assets increased by 20% in 2004. However, the rise mainly related to receivables with a risk weighting of 0%. As a result, total required capital for balance-sheet assets actually declined despite the sharp increase in total assets. The Raiffeisen banks were the only category in which required capital increased (+5%), in line with the rise in total assets (+4%).

By historical standards, the Swiss banks have strong risk-weighted capitalisation. In the past ten years, the capitalisation of most banks has improved considerably (cf. Graph 16; bars). This applies to both small and large banks: measured by assets, the market share of those banks with high excess capital has risen (cf. Graph 16; lines). At year-end 2004, all banks had excess capital amounting to at least 20% of required capital.

Looking at *unweighted capital ratios*, the picture is less uniform. The increase in eligible capital accompanied by an only slight rise in total assets is clearly reflected in the unweighted capital ratios for the cantonal, regional and Raiffeisen banks; they rose from 7.0% in 2003 to 7.5% in 2004 at the cantonal banks, from 7.4% to 7.6% at the regional banks and from 6.9% to 7.2% at the Raiffeisen banks. By contrast, the unweighted capital ratio at the big banks decreased from 2.9% to 2.5% in 2004 (–15.9%) due to strong growth in total assets. This divergent development is part of a longer-term trend: at year-end 2004, proportionately more banks had high unweighted capital ratios than in 1994 (cf. Graph 17; bars). However, their importance – in terms of their share of the banking sector's total assets – has declined sharply (cf. Graph 17; lines). In Switzerland, there are no regulatory restrictions on the ratio of capital and unweighted assets.<sup>31</sup> The regulatory capital adequacy requirements refer exclusively to risk-weighted assets (cf. Box 4). Nevertheless, the

30 Cf. Chapter 2 (Profitability)

31 Unlike Switzerland, the US has capital adequacy regulations that stipulate risk-weighted and unweighted capital ratios. Further information can be found at [www.fdic.gov/regulations/laws/rules/2000-4400.html](http://www.fdic.gov/regulations/laws/rules/2000-4400.html).

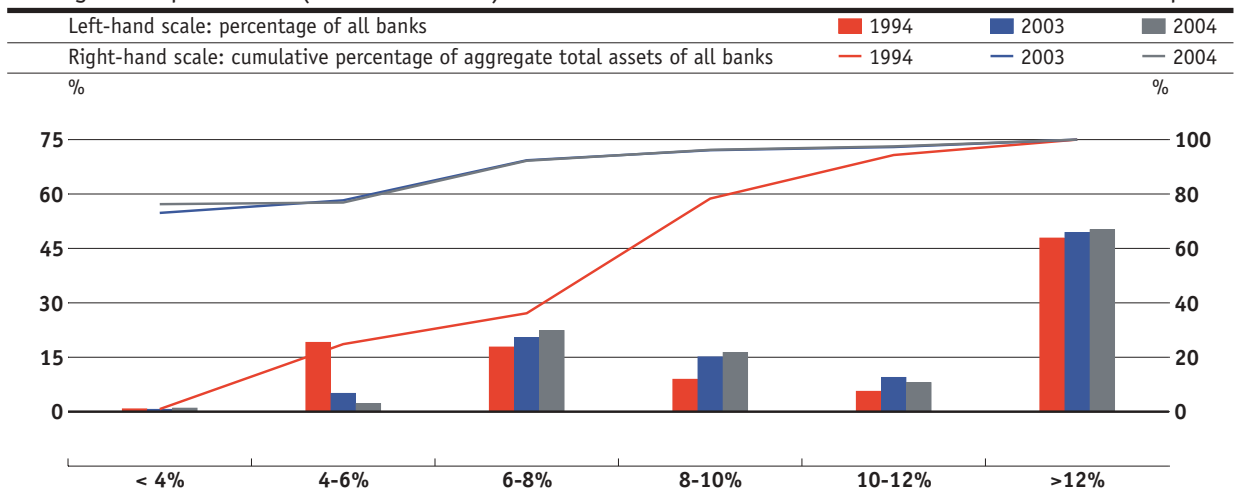
unweighted capital ratios are important when assessing the solidity of a bank's capital base. Since not all risks can be covered fully by capital adequacy requirements, risk-weighted capital ratios do not contain all information of relevance when judging solvency.<sup>32</sup> Unweighted capital ratios can round out the picture by indicating the bank's level of indebtedness and the buffer available to absorb shocks, regardless of how risky its business was considered to be ex ante.

### Divergent trends in risk-weighted and unweighted capital ratios at big banks

At the big banks, the *two capital ratios have diverged* in recent years. While the risk-weighted ratios are essentially rising, the unweighted ratios are declining. In other words, capital coverage of total assets is declining, yet these banks are able to report a rise in excess capital compared to required capital. This trend has led to a discrepancy between the Swiss big banks' risk-weighted and unweighted capital ratios, which is particularly large in an international comparison. On the one hand, when compared with 50 of the largest international banks in the US, Japan and Europe, the Swiss big banks have above-average risk-weighted capital ratios. Measured by the BIS total capital ratios, CSG ranks top (16.6%), while UBS ranks third (13.6%). On the other hand, their unweighted capital ratios are low: looking at BIS total capital as a percentage of total assets, they bring up the rear (CSG (3%) is 47<sup>th</sup>, while UBS (2.1%) ranks 50<sup>th</sup> out of 50). The discrepancy between their risk-weighted and unweighted capital ratios is therefore exceptionally high (cf. Graph 18).<sup>33</sup>

Unweighted capital ratios (individual banks)

Graph 17



Sources: SFBC, SNB

33 Sources: Bloomberg, annual reports

32 The revision of the Basel Capital Accord, which forms the basis for standards on risk-weighted capital, was triggered by a desire to reflect the various banking risks more accurately.

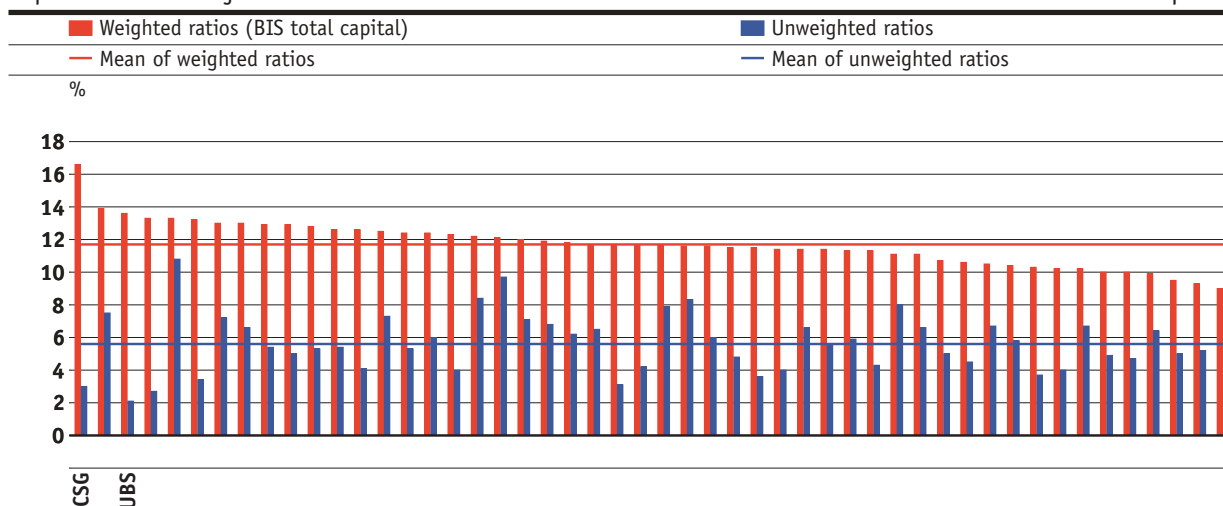
This discrepancy is attributable to the fact that the ratio of risk-weighted assets (including off-balance-sheet items) to total assets is very low. The comparatively low unweighted capital ratios of the Swiss big banks cannot be explained by (i) differences in international accounting standards, (ii) differences in the accounting treatment of the repurchase value of derivatives, or (iii) different volumes of securitisation. Moreover, it is only due to a small extent to reverse repurchase transactions.<sup>34</sup> If reverse repurchase transactions and liquid assets were deducted from total assets, the unweighted capital ratio for the big banks would be 3.4% rather than 2.6%. However, that is still low by international standards (6.3% on average). The main reasons for this discrepancy are the comparatively low proportion of off-balance-sheet business at the Swiss banks and its low average risk weighting. It is also partly due to the low average risk weighting of on-balance-sheet trading inventories and loans at the Swiss big banks. In other words, according to the Basel Capital Accord risk-weighting scheme, off-balance-sheet items and trading and loan books at Swiss banks are considered to be less risky than those of their foreign competitors.

### Scenario analysis and market indicators suggest capital base is adequate overall

Determining the adequacy of the capital base would require a complete identification and assessment of all the risks to which banks are exposed. Since we do not have such an accurate yardstick, we base our analysis on a set of indicators. In particular, to complete the picture provided by the (risk-weighted and unweighted) capital ratios, we also conduct a scenario analysis (cf. Box 3, p. 29). According to this analysis, the Swiss banks seem to have a sound capital base. This suggests that the banking sector should be well able to withstand even larger shocks. All bank categories should be able to continue to report excess capital, even in an unfavourable scenario featuring higher interest rates, a recession and a slump in the financial markets. A deterioration in operating conditions on this scale would nevertheless trim excess capital in all categories and could seriously weaken some individual banks. Finally, we also use a market assessment to evaluate the capital adequacy of the banking sector.<sup>35</sup> The results obtained are somewhat less favourable than suggested by the scenario analysis. According to the market assessment, the soundness of the Swiss big banks is not as good as indicated by the risk-weighted capital ratios, but is better than the unweighted capital ratios suggest.

Capital ratios of major international banks\*

Graph 18



Sources: 2003 and 2004 annual reports

\* Comprises the five largest banks in North America, Japan and all European countries, with total assets of over USD 100 billion ("The Banker", July 2004).

34 In a repurchase transaction, the recipient of funds sells securities to the provider of the funds. At the same time, an agreement is entered into to repurchase securities of the same type and volume from the provider of the funds at a subsequent point in time. From the fund provider's viewpoint (in this case, big banks), this is a reverse repurchase transaction. Economically, the transaction constitutes a loan secured by securities.

35 Cf. Chapter 5 (Market assessment)

## 5 Market assessment

The market assessment of the soundness of a bank is reflected in yield spreads, share prices and credit ratings. These indicators suggest that the situation in the Swiss banking sector is essentially good. At present, the market seems to assess the risk of default by Swiss banks as low. In an international comparison, the position of the big banks differs: while UBS ranks among the top banks, CSG is in mid-field.

### Spreads on bank bonds and CDS prices remain low

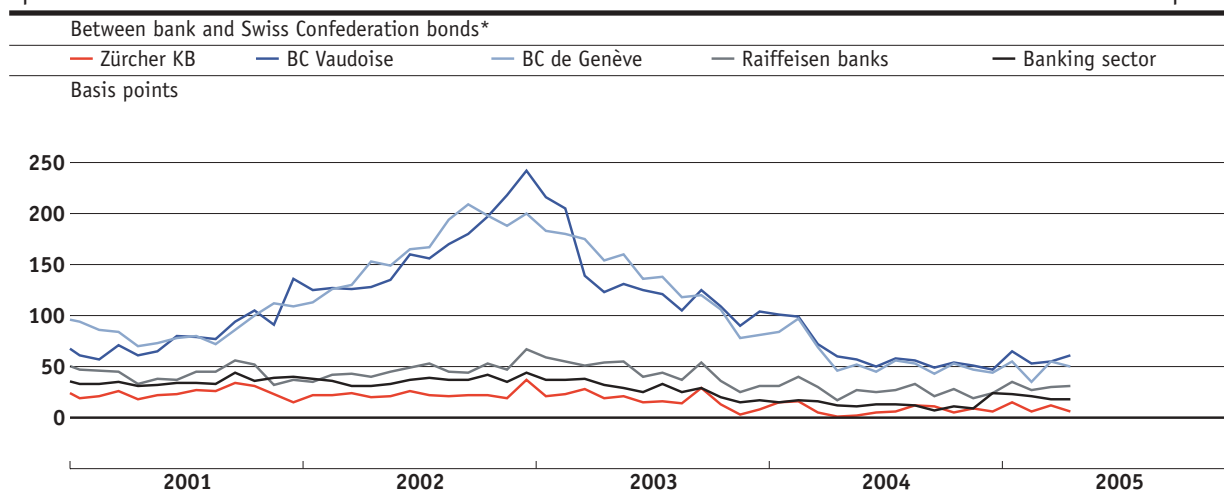
The yield spreads between bank bonds and sovereign bonds or the prices of credit default swaps (CDS) are indicators of the market's assessment of the soundness of banks. The higher the credit risk for the holder, the greater the spread between the corresponding bond and a risk-free sovereign bond and the higher the price of a CDS.

Having declined in 2003, the spread between the bank bond and sovereign bond indices essentially moved sideways at a low level in 2004. The same trend can be observed at most banks. By contrast, a further significant decline was registered at Banque Cantonale Vaudoise and Banque Cantonale de Genève, where spreads had increased strongly between mid-2001 and end-2002 (cf. Financial Stability Report 2003 and 2004). Spreads at all banks are low – in some cases very low – compared with the average for the past seven years (cf. Graph 19).<sup>36</sup>

Prices of CDS suggest that the market currently rates the risk of default by the Swiss big banks as very low (cf. Graph 20). The premiums for UBS are also low relative to other major international banks. CSG ranks somewhere in mid-field following a sharp deviation at year-end 2002. Prices are declining at virtually all major Swiss and foreign banks.<sup>37</sup>

Spreads

Graph 19



Sources: SNB, Thomson Datastream

\* Average spread of all available securities satisfying the following conditions: fixed coupons, no options, CHF denominated, residual term of at least two years. End-month calculations.

<sup>36</sup> Source: Thomson Datastream

<sup>37</sup> Source: Bloomberg



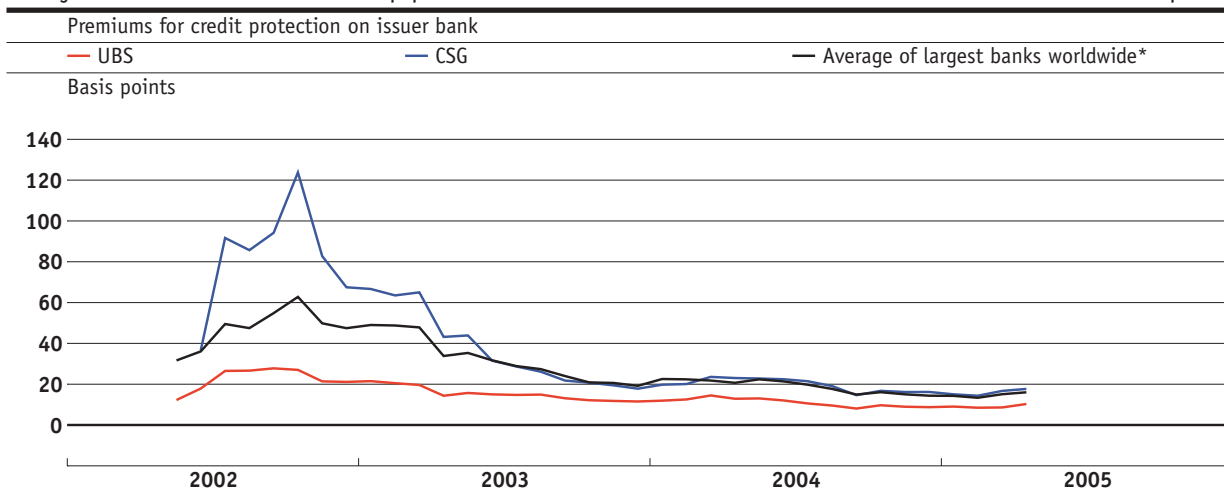
### Insolvency indicators derived from equity prices are low

Share prices provide an insight into the current situation and future profit prospects of a bank. They reflect, in particular, the market valuation of the bank's assets and of the risks embedded in those assets. These values, which can be derived from a bank's share prices using the option pricing theory, can then be used to assess the probability that the value of a bank's assets falls below the value of its liabilities over a given time horizon. In other words, the option pricing theory can be employed to derive the probability of insolvency priced into shares and hence, allows the construction of an insolvency indicator.

Graph 21 shows the insolvency indicator for the two Swiss big banks and the average for a sample of big banks worldwide. The higher the indicator, the higher the implied risk of insolvency as seen by the market. Having peaked at year-end 2002, the risk of insolvency for both the Swiss and the foreign banks declined substantially by end-2003 and stabilised at this level in 2004. Based on share prices, it appears that the market currently considers the soundness of the Swiss banks to be broadly in line with the international average.<sup>38</sup> However, caution is called for when interpreting the insolvency indicator, as its calculation is based on a number of simplifying assumptions.<sup>39</sup>

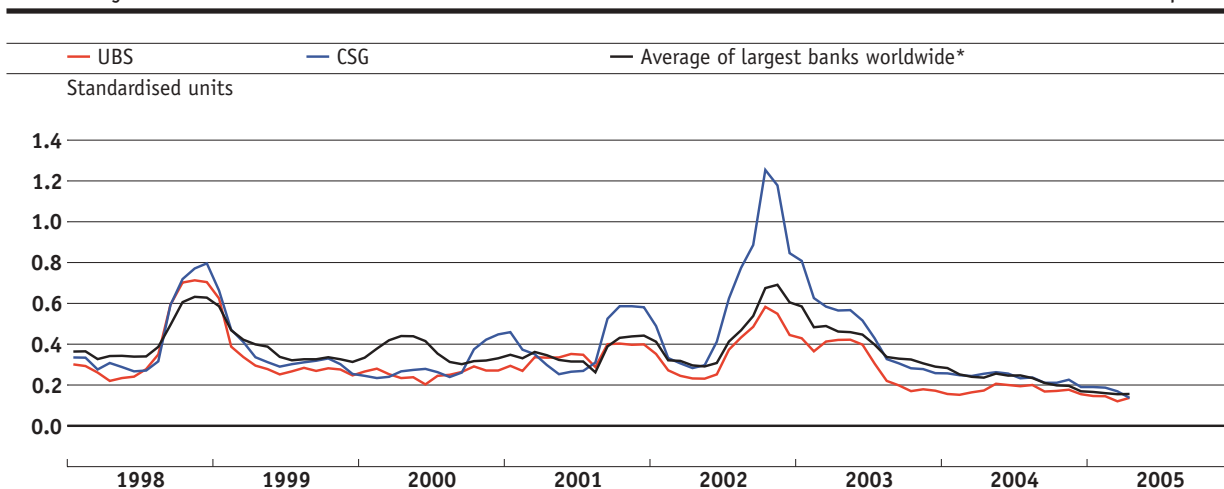
Five-year senior credit default swap prices for UBS and CSG

Graph 20



Insolvency indicator

Graph 21



Graph 20: Source: Bloomberg  
Graph 21: Sources: Bloomberg, SNB, Thomson Datastream

Graphs 20 and 21:  
\* Comprises a sample of the world's largest banks from North America, Japan and Europe according to "The Banker" (July 2004).

38 Sources: Bloomberg, Thomson Datastream, SNB

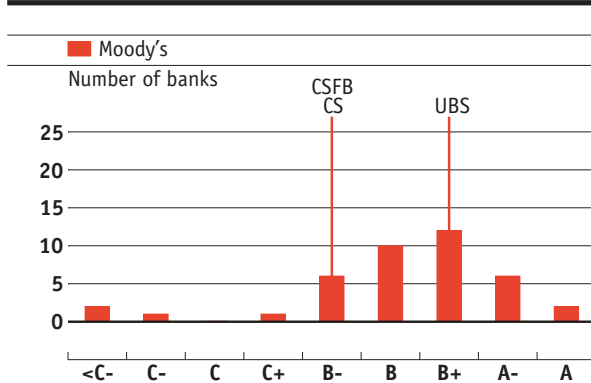
39 In particular, normal distribution of bank revenues is assumed. If the actual distribution is different and bank specific, the insolvency indicator may provide misleading figures. Moreover, in the short and medium run, bank share prices and thus the insolvency indicator can be influenced by factors that do not necessarily reflect fundamentals.

### Ratings for big banks show a mixed picture

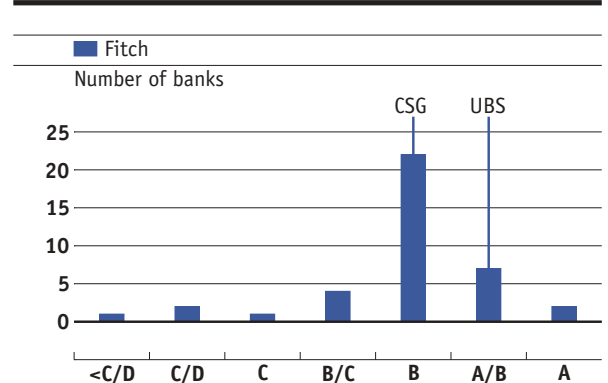
Of the 338 banks in Switzerland, 23 currently have a rating from Moody's, Standard & Poor's and/or Fitch. Their ratings remained unchanged at a relatively high level in 2004. The rating agencies also issue an outlook showing the anticipated medium-term trend in their ratings. With the exception of an upgrade for two institutions, this outlook remained unchanged at all banks in 2004. Overall, the outlooks reported by the rating agencies anticipate stable ratings in the medium term.<sup>40</sup>

On an international perspective, the picture for the two Swiss big banks is mixed. According to the "Financial Strength Ratings" (Moody's) and "Individual bank ratings" (Fitch), UBS ranks in the upper and CSG in the lower mid-field (cf. Graphs 22 and 23).<sup>41</sup> The ratings thus show a less positive view of the soundness of the Swiss big banks than indicators such as CDS prices and, above all, risk-weighted capital ratios (cf. Chapter 4, Capital base).<sup>42</sup>

Financial strength ratings\* (Moody's) Graph 22



Individual bank ratings\* (Fitch) Graph 23



Graph 22: Source: Moody's, May 2005

Graph 23: Source: Bankscope, May 2005

Graphs 22 and 23:

\* Comprises a sample of the world's largest banks from North America, Japan and Europe according to "The Banker" (July 2004), provided they are rated by Moody's, Standard & Poor's and Fitch. If a bank holding company is not assigned a financial strength rating, the corresponding rating of its largest affiliate is taken instead.

40 Sources: FitchRatings, Moody's Investors Service, Standard & Poor's

41 The Financial Strength Ratings (Moody's) and the Individual bank ratings (Fitch) reflect an assessment of a bank's strength on a stand-alone basis. They exclude considerations of external (government or parent company) support.

42 Sources: Bankscope, Moody's Investors Service. If there is no rating for a group, the rating of the largest subsidiary is taken. CSG does not have a Financial Strength Rating from Moody's. However, CS and CSFB have the same credit rating as CSG.

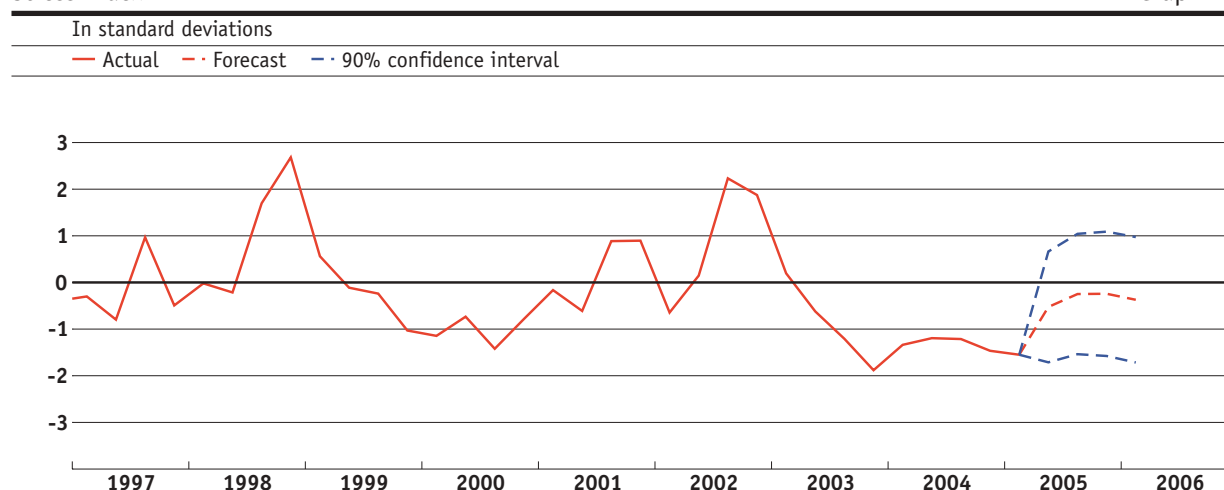
## 6 Stress index for the banking sector

The previous chapters of this report cover different aspects of the banking sector, all of which are potentially relevant for its stability. In this chapter, we combine these pieces of information within a “stress index” measuring the current degree of instability in the Swiss banking sector. We also develop a forecasting model for this index, using a set of macroeconomic and financial variables reflecting potential economic imbalances. This allows the identification of potential sources of future instability. Box 5 (Stress index) on p. 43 outlines the methods used to produce the stress index and its forecast.

According to this indicator, 2004 was a particularly calm period in the banking sector (cf. Graph 24). The level of stress remained relatively stable throughout the year and was low by historical standards. The average level of stress recorded in 2004 was the lowest observed since the index was introduced (1987). Moreover, aside from capital variations (temporary dip in the first half of the year) and interbank loans (decline in the fourth quarter), all variables included in the index pointed to low levels of stress for 2004 (cf. Graph 25).

Stress index\*

Graph 24



Sources: SFBC, SNB, Thomson Datastream

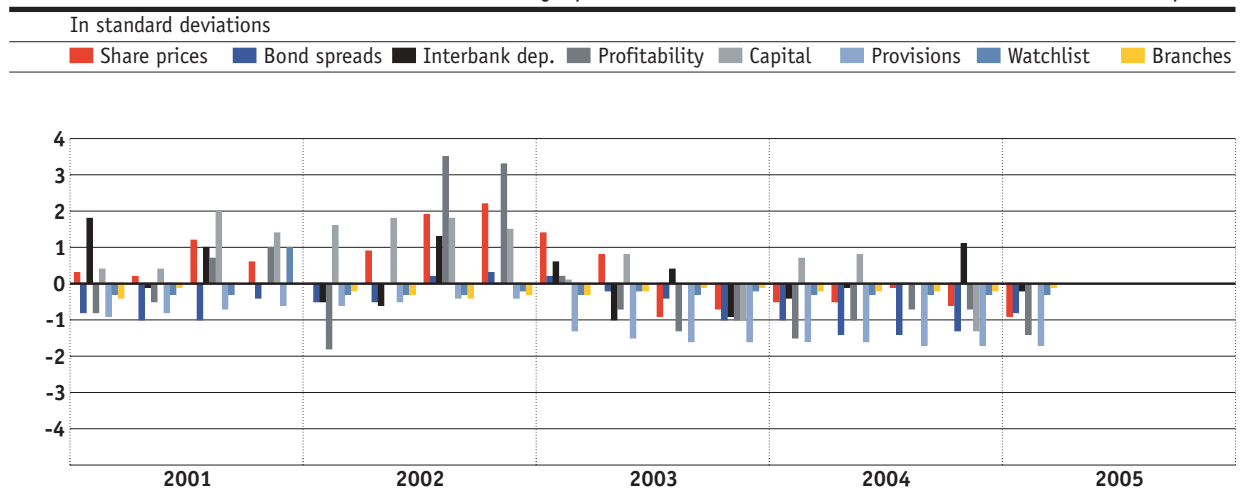
\*The higher the level of the index, the higher the level of stress in the Swiss banking sector. The index is expressed in terms of standard deviations from its 1987–2004 average. A value above (below) zero indicates that the stress is above (below) its historical average. The stress index for the first quarter of 2005 is computed with provisional data.

For a description of the underlying variables and the methodology, cf. Box 5.

Our forecasting model suggests that the level of stress should remain below average in 2005, although it would probably increase in the next 12 months (cf. Graph 24). Such an increase would principally be a correction: since the index is currently below the level forecasted by the model, it would bring it into line with the forecasts. The stress index should remain below average, as most of the financial and macroeconomic variables which influence it – the housing price index, GDP, the investment ratio and the credit ratio – are below or close to their long-term equilibrium level. A sudden downward correction in these variables – and thus a rise in stress – therefore seems unlikely. The only real exception here is the stock market index.

Stress index - contribution of individual stress symptoms to total stress\*

Graph 25



Sources: SFBC, SNB, Thomson Datastream

\*The higher the intensity of an individual crisis symptom (e.g. the sharper the decrease of banks' share prices), the higher the level of the stress index. A value above (below) zero indicates that the intensity of an individual crisis symptom is above (below) its historical average. The stress index for the first quarter of 2005 is computed with provisional data. For a description of the underlying variables and the methodology, cf. Box 5.

## Box 5: Measuring and forecasting stress in the Swiss banking sector – methodology<sup>43</sup>

### Construction of the stress index

The index is a continuous indicator of the level of stress experienced by the Swiss banking sector at a given date. It is based on a set of variables – including market data, balance sheet data, non-public data of the supervisory authorities and structural data – which all represent possible symptoms of stress in the banking sector.

These symptoms are:

- a fall in the banks' stock price index
- an increase in the banks' bond yield spreads
- a fall in interbank deposits
- a decrease in the banks' profitability
- a decrease in the banks' capital
- an increase in the banks' provisioning rate
- the share of total assets held by banks listed on the regulator's watchlist
- a decrease in the number of banks' branches

The higher the intensity of the individual stress symptoms, the higher the level of the stress index. To build the index, the eight variables described above are first normalised and then aggregated with identical weights. The index is expressed in terms of standard deviations from its historical average. A positive (negative) value indicates that the stress is above (below) its historical average.

Because the index is based on a large spectrum of potential symptoms of instability, it should appropriately reflect the different types of stress experienced by the banking sector. The values taken by the index between 1987 – the starting date of the index – and 2004 are consistent with this conjecture. The index peaked three times and each peak corresponds to a period of significant stress for the Swiss banking sector with different sources and symptoms: (i) the early 1990s, which were characterised by a real estate crisis in Switzerland, (ii) 1998, when the Russian and LTCM crisis occurred, and (iii) the 2001/2002 period, which was characterised by a stock market crash and an economic slowdown. More generally, the index shows that economic downturns or falls in stock or housing prices generate higher levels of stress in the banking sector.

### Use of the stress index in forecasting

Past experience suggests that banking crises tend to follow the build-up of macroeconomic and financial imbalances. The (sudden) correction of these imbalances, such as recessions or stock market crashes, may eventually cause situations which generate stress in the banking system. The forecasting model presented here makes use of this fact and is based on the observation of macroeconomic imbalances.

The forecasting model includes five macroeconomic and financial variables that are reliable predictors of banking crises according to several studies: the share price index, the housing price index, gross domestic product (GDP), the investment ratio (investment/GDP) and the credit ratio (private credits/GDP). The measure of imbalance is defined as the gap between the variable and its trend, where the trend is computed using the

Hodrick-Prescott filter. For example, a positive credit ratio gap means that credits are growing faster than their sustainable rate. This could be interpreted as a sign of lower lending standards of the banks. This imbalance will start to unwind when borrowers find it more difficult to service their debt (e.g. because of an interest rate rise, a recession or a drop in asset prices). For the banks that are engaged in lending business, both the share of non-performing loans and the provisioning increase, which eventually leads to higher levels of stress. For the other four macroeconomic and financial variables, one can think of similar mechanisms in which the correction of an existing imbalance could lead to higher levels of stress.

The forecast is based on a linear regression of the stress index on the past gaps of the macroeconomic and financial variables:

$$Y_{t+h} = \alpha + \beta_1 X_{1,t-z_1} + \beta_2 X_{2,t-z_2} + \dots + \beta_k X_{k,t-z_k} + \varepsilon_t$$

where  $Y_{t+h}$  is the forecast of the stress index,  $h$  the forecast horizon,  $X_{k,t-z_k}$  the gaps of the  $k$  variables with a lag of  $z_k$ . A positive gap – i.e. the build-up of an imbalance – signals that a future correction is likely to take place, which could lead to a higher level of stress for the banks. In addition, different combinations of the gaps have also been used as explanatory variables. The regression is estimated with an autoregressive error term (AR(1)).

The results comprise forecasts for one to four quarters ahead. The lag between the stress index and the gap is 25 quarters for the housing price index, 19 quarters for the share price index, 15 quarters for the investment ratio and 5 quarters for GDP. The model also uses combinations of the credit ratio with the stock price index, the housing price index and GDP. The model's results are relatively robust to changes in the lag structure.

With an average  $R^2$  of 56.4% over the four forecast horizons, the fit of the model can be considered as fairly good. The out-of-sample error ratio (percentage of errors in the forecast of the direction of the stress index evolution) equals 20.9%, suggesting satisfactory predictive power.

### Limitations of the method

Although the forecasting model for the stress index performs relatively well, it is subject to several limitations. First, the macroeconomic and financial imbalances are computed using a rather simple and mechanical Hodrick-Prescott filter. The main advantage of this approach is that it does not impose much structure on the model. However, it may not guarantee the most efficient use of the information available to assess the magnitude of the imbalances. Second, different studies have emphasised that banking crises are complex phenomena, which may involve non-linear interactions between the variables. Even if the model takes into account some degree of non-linearity by combining some variables, it might miss some more complex interactions between them. Finally, other non-macroeconomic/financial factors that are not included in the model (e.g. deregulation), may also influence the level of stress experienced by the banking sector.

43 This box is based on Monnin (2004), "Measuring, Explaining and Forecasting Stress in the Swiss Banking Sector", Swiss National Bank, mimeo.

## Part II: Financial market infrastructure

# 1 Introduction

Safe and efficient financial market infrastructures are a key prerequisite for a stable financial system. Alongside stock exchanges, the financial market infrastructures mainly comprise clearing and settlement systems for payments and for transactions in securities and other financial instruments (subsequently referred to as payment and securities settlement systems). Of particular interest are those payment and securities settlement systems which are considered to be important to the stability of a country's financial system. The chief feature of these systems is that they may trigger or channel the spread of a systemic crisis and thus jeopardise the stability of the financial system.

At the centre of the analysis in this part of the Financial Stability Report are thus those risks inherent in payment and securities settlement systems which might give rise to financial instability. For instance, severe operational failures or malfunctions in systemically important infrastructures may cause widespread credit or liquidity problems for a large number of participants. Also, credit or liquidity problems affecting one participant could spread to others through the system. To reduce the likelihood and impact of such systemic events, adequate organisational and technical measures to mitigate operational risk as well as suitable rules and procedures that allow confining the propagation of credit and liquidity risks through payment and securities settlement systems are needed.

The risks inherent in payment and securities settlement systems do not change constantly as a result of cyclical fluctuations or market trends. Rather, the safety of a financial market infrastructure depends mostly on structural factors where change is rare and gradual. The main events that directly affect the infrastructures' safety include the introduction of new payment and securities settlement systems and fundamental changes to established infrastructures. Major developments in the regulatory environment can also have an impact on financial market infrastructures. Such innovations are often a response to underlying trends, such as a change in risk conditions or risk awareness or a change in the needs of market participants.

The statement made in last year's Financial Stability Report – namely, that Switzerland has very well-functioning infrastructures and that safety and efficiency are high by international standards – therefore remains valid. The key elements of the Swiss post-trade value chain, i.e. the Swiss Interbank Clearing (SIC) system for payments, the securities settlement system SECOM and the central counterparty x-clear, have proven their functional efficiency over the years, and their architectures and procedures contribute to reducing settlement risks and, ultimately, systemic risk.

To promote the objective of safe and efficient financial market infrastructures, the Swiss National Bank (SNB) oversees payment and securities settlement systems. Chapter 2 of this part deals with the SNB's oversight activities. In particular, it explains why the National Bank Act (NBA) mandates the SNB to focus its oversight activities on systemically important infrastructures and why SIC, SECOM, x-clear and the multi-currency payment system Continuous Linked Settlement (CLS) were designated to be of systemic importance. Moreover, it is described how the SNB oversees these systems in practice, both domestically and in cooperation with foreign central banks or authorities in the case of cross-border systems. Chapters 3 and 4 provide some background information on two significant developments that have a direct bearing on the safety and efficiency of systemically important infrastructures. First, Chapter 3 provides an overview of the Swiss financial sector's current efforts to strengthen the resilience of the financial system by improving preparations for dealing with major disasters. Chapter 4 reviews major international developments in the design of large-value payment systems. Innovations such as the introduction of offsetting mechanisms or central banks' policies of broadening the range of collateral they accept in their liquidity provision operations allow to achieve earlier finality of payments (and thus lower risks) or to economise on liquidity (and thus lower cost).

## 2 Oversight of systemically important infrastructures

Payment and securities settlement systems have attracted greater attention over the last two decades. This reflects the significant growth in the values of transactions cleared and settled, the growing technological complexity of many systems and the consequent concern that systemic risk could increase should the design of key systems not adequately address various payment and settlement risks. Along with the awareness of mounting risks, central banks' endeavours to contain these risks – without compromising efficiency – have gained momentum. Accordingly, many central banks have strengthened their oversight arrangements. The term "oversight" typically refers to those central bank activities that promote the objectives of safety and efficiency in a currency's payment and settlement infrastructure by monitoring existing and planned arrangements, assessing them against the objectives and, in the light of this, inducing any necessary change.

The new National Bank Act (arts. 19–21 NBA) contains the principles for the oversight of payment and securities settlement systems by the SNB. It empowers the SNB to impose minimum requirements on the operation of those systems from which risks for the stability of the Swiss financial system may emanate. The minimum requirements and other implementation provisions on oversight are set out in the National Bank Ordinance (arts. 19–39 NBO). The smooth functioning of the systemically important infrastructures is a key prerequisite for the implementation of monetary policy and for the successful development of the national economy. In other words, systemically important payment and securities settlement systems are essential for the supply of liquidity to the economy.

Since the revised NBA entered into force on 1 May 2004, the SNB has determined which systems are important for the Swiss financial system and implemented the first practical steps for continuously verifying the corresponding system operators' compliance with the minimum requirements. Which systems have been classified as systemically important and how they are overseen is described below.

### Evaluation of systemic importance

The systemic importance of a payment or securities settlement system is assessed primarily based on the effects which the disruption of operations or payment or delivery difficulties experienced by individual system participants can have on the stability of the Swiss financial system. The main focus is thus on the potential threat to the Swiss financial system's stability.

The SNB evaluated the systemic importance of all payment systems that settle at least CHF 25 billion per financial year and all securities settlement systems. The analysis was based on the criteria set out in art. 20 NBO, which were broken down into more detailed specifications and weighted according to their importance. The criteria (in the order of their weighting) are explained below. Table 1 lists the evaluated systems and some of the criteria taken into consideration.

- *Type of transactions*: Systems that clear or settle financial market transactions are extremely likely to be of key importance to the Swiss financial system. By contrast, systems that primarily settle retail payments cause inconvenience to the user in the event of failure, but they entail only minor risks for the stability of the financial system.
- *Links with other systems*: If a system is linked with other systems, there is a risk that shocks can be transmitted to other financial market infrastructures. Depending on the type of links, however, the consequences may vary. For instance, operational problems of a retail payment system that settles its interbank liabilities in a large-value payment system do not significantly affect the functioning of the latter. By contrast, the failure of a payment system that is linked with a securities settlement system for the delivery-versus-payment settlement of securities transactions is likely to severely impair this securities settlement system.



- *Alternative clearing and settlement arrangements:* If a system has at least one alternative that can be employed immediately and without incurring any additional settlement risks, the system poses hardly any risk to financial stability.
- *Value and number of transactions:* The gross value (on peak days in particular) is directly related to the damage potential and is a significant indicator of a system's importance. The number of cleared or settled transactions must also be taken into consideration, but it is less relevant overall.
- *Group of participants:* In particular, systems whose direct participants are financial intermediaries have the potential to destabilise the financial system.
- *Currencies:* From the viewpoint of the Swiss financial system, the question of whether a system clears and settles in Swiss francs must be taken into account.

#### **SIC, SECOM, x-clear and CLS designated as systemically important**

The SNB considers the following four systems to be systemically important: the payment system Swiss Interbank Clearing (SIC), the securities settlement system SECOM, the central counterparty x-clear and the multi-currency payment system Continuous Linked Settlement (CLS). The first three – SIC, SECOM and x-clear – are integrated in the Swiss Value Chain and, together with the electronic stock exchange SWX, form the core of Switzerland's financial market infrastructure. These systems are used almost exclusively for clearing and settling financial market transactions. Participants include various financial intermediaries with an important role to play in the Swiss financial system. Operational problems occurring in one of these systems, and causing liquidity shortages among participants as a result, could have a negative impact on the functioning of the other linked systems. With the exception of x-clear, the transaction values in these systems are so large that a system failure could jeopardise the economy's supply of liquidity. Moreover, if a system experiences operational problems – particularly where SIC and SECOM are concerned – no alternative settlement arrangements exist for the settlement of payments or securities transactions. Although there are alternatives to CLS and x-clear, it must be assumed that these could be employed only after a delay and with considerably higher risks. The systemic importance of x-clear is

primarily attributable to the concentration of various counterparty risks. The risk management of x-clear must ensure in particular that no domino effect occurs in the event of default by a participant.

Due to their systemic importance, the operators of SIC, SECOM and x-clear have to comply with the minimum requirements stipulated in arts. 22–34 NBO. CLS was exempted from compliance with the minimum requirements as the New York-based operator, CLS Bank International, is already adequately overseen by the Federal Reserve (art. 21 NBO).

#### **Retail systems not systemically important**

The other systems that were evaluated – DTA, LSV, euroSIC and PostFinance – were classified by the SNB as not systemically important. While euroSIC also settles financial market transactions, the transaction volumes are relatively small overall. The other systems mainly settle retail payments. While the transaction volumes are very high, the actual amounts processed are relatively low. Although the transactions cleared via DTA and LSV are settled in SIC, these systems nonetheless have no critical influence on the large-value payment system with regard to either operational problems or participants' liquidity bottlenecks. The same applies to PostFinance, which is also connected directly to SIC for certain payments. With these systems, moreover, it is possible to switch at short notice to other retail payment systems. In consideration of the above facts, these systems do not pose any potential threat to the stability of the financial sector.

As a consequence, their operators do not have to comply with the SNB's minimum requirements. However, the SNB continuously monitors developments in the area of retail payments and will periodically review the importance of these systems.

**Table 1: Evaluated payment and securities settlement systems**

	System type	Type of transaction	Value of transactions in CHF billions <sup>1</sup>	Number of transactions <sup>1</sup>
SIC	Large-value payment system	Financial market transactions and retail payments	164	816,700
SECOM	Securities settlement system	Financial market transactions	36.9	74,000
CLS	Multi-currency payment system	Financial market transactions	1,800 <sup>2</sup> 82 <sup>3</sup>	133,000 <sup>2</sup> 7,300 <sup>3</sup>
x-clear	Central counterparty	Financial market transactions	1.4	19,000
euroSIC	Large-value payment system	Financial market transactions and retail payments	3.9	9,500
LSV	Retail payment system	Retail payments	0.3	148,500
DTA	Retail payment system	Retail payments	0.9	218,600
PostFinance (EZAG + Postcard)	Retail payment systems	Retail payments	4.0	1,662,700

1 Daily averages for 2004

2 Transactions of all currencies settled in CLS

3 Only transactions in Swiss francs

### Three-step oversight methodology

The SNB's oversight focuses on ensuring compliance of the systemically important infrastructures with the minimum requirements specified in the National Bank Ordinance (NBO). In order to guarantee effective and efficient oversight, a three-step oversight methodology has been developed and is currently being implemented. The three steps can be summarised as (1) monitoring, (2) assessment and (3) inducing change. These three steps form a continuous process. In formulating its oversight methodology, the SNB greatly benefited from a constant exchange of views on oversight issues with other central banks within the Committee on Payment and Settlement Systems (CPSS, cf. Box 6) under the auspices of the Bank for International Settlements (BIS). The SNB also ensures that its oversight is in accordance with internationally agreed principles of central bank oversight (cf. Box 7, p. 50).

The oversight methodology is uniformly applied across the systemically important infrastructures SIC, SECOM and x-clear. This helps to ensure that oversight standards are applied in a consistent and comparable manner. As both SIS SegInterSettle AG (the operator of SECOM) and SIS x-clear AG are also licensed as Swiss banks and supervised by the Swiss Federal Banking Commission (SFBC), the SNB cooperates closely with the SFBC to avoid gaps or duplications in its oversight efforts. In the case of SIC, the SNB is responsible for performing certain functions such as determining participation requirements, managing settlement accounts and leading crisis management. As a consequence, the SNB oversees its own organisational units responsible for providing these operational tasks. To avoid potential conflicts of interest, the units responsible for oversight and operations are organisationally separated and report to different members of the Governing Board.

### Box 6: Committee on Payment and Settlement Systems (CPSS)

Under the auspices of the BIS, the Committee on Payment and Settlement Systems (CPSS) serves as a forum for central banks to monitor and analyse developments in domestic payment, settlement and clearing systems as well as in cross-border and multi-currency settlement schemes. Through their collective efforts to analyse and promote awareness of risks and to develop minimum standards or best practices, the CPSS and its member central banks have played a leading role in promoting efficient and robust payment and settlement arrangements. Their continuing work in this area reflects the need to continuously monitor and improve risk management in these systems, which are essential to the stability of financial markets and the global economy. CPSS members are the central banks from the Group of Ten countries (G-10) as well as the Hong Kong Monetary Authority, the Monetary Authority of Singapore and the European Central Bank. The CPSS reports to the G-10 Governors.

The CPSS has published several important international standards, among them the "Core Principles for Systemically Important Payment Systems" (2001), the "Recommendations for Securities Settlement Systems" (2001) and the "Recommendations for Central Counterparties" (2004). The latter two were jointly prepared by the CPSS and the International Organisation of Securities Commissions (IOSCO). Beside these standards, the CPSS also regularly publishes reports on specific topics related to payment and settlement systems. The most recent reports are "Central Bank Oversight of Payment and Settlement Systems" and "New Developments in Large-Value Payment Systems" (cf. also Chapter 4).<sup>44</sup>

44 For these and other CPSS publications, cf. [www.bis.org/cpss](http://www.bis.org/cpss).

### Monitoring relies on four sources of information

In order to carry out effective oversight and to assess compliance with minimum requirements, the SNB must have a good understanding of the relevant payment and securities settlement systems, including their policies, operations and processes, potential risks as well as planned developments. Therefore, monitoring serves to gather information and to enhance the SNB's understanding of the systems it oversees. Monitoring focuses on areas that potentially pose the greatest threat to financial stability. These areas typically include governance arrangements, IT systems and operations (especially information security), financial risk management and outsourcing relationships.

Specifically, the SNB relies on four different sources of information:

- *Reporting*: The system operators provide relevant documentation and key indicators on a regular or ad-hoc basis. Relevant documentation includes system rules, organisational rules

and regulations, business continuity plans and other static information. Key indicators typically contain transaction figures, financial positions, risk exposures and information system performance data.

- *Self-assessment*: A self-assessment, complemented by a questionnaire, is completed by the system operators on an annual basis. In the self-assessment, the system operators indicate whether they consider themselves to be in compliance with the minimum requirements.
- *Audits*: Internal or external auditors are commissioned by the system operators to conduct audits in areas of specific importance from the perspective of financial stability. The results of these audits are shared with the SNB. For example, such audits are conducted on a regular basis in the areas of financial risk management and information security.
- *Meetings*: Specific developments as well as results from other monitoring activities are discussed in meetings with the system operators.

## Box 7: General principles of central bank oversight

In its recently published report “Central Bank Oversight of Payment and Settlement Systems”, the CPSS explains why and how central banks oversee payment and securities settlement systems. Overall, there is substantial common ground in oversight practices among G-10 central banks. Based on this common ground, the CPSS has developed two sets of oversight principles to help central banks organise and conduct effective oversight. The first set consists of five general oversight principles applicable to all oversight arrangements. They read as follows:

- *Transparency*: Central banks should set out publicly their oversight policies, including the policy requirements or standards for systems and the criteria for determining which systems these apply to.
- *International standards*: Central banks should adopt, where relevant, internationally recognised standards for payment and settlement systems.
- *Effective powers and capacity*: Central banks should have the powers and capacity to carry out their oversight responsibilities effectively.
- *Consistency*: Oversight standards should be applied consistently to comparable payment and settlement systems, including systems operated by the central bank.
- *Cooperation with other authorities*: Central banks, in promoting the safety and efficiency of payment and settlement systems, should cooperate with other relevant central banks and authorities.

The second set of principles is concerned with international cooperative oversight between central banks and other authorities. These principles build on the well-established Lamfalussy principles for netting arrangements. The CPSS has carefully reviewed the experiences gained since 1990 when the

Lamfalussy principles were adopted, and concluded that they are still universally applicable. However, the applicability of the five cooperative oversight principles was extended to all cross-border and multi-currency payment and settlement systems.

- *Notification*: Each central bank that has identified the actual or proposed operation of a cross-border or multi-currency payment or settlement system should inform other central banks that may have an interest in the prudent design and management of the system.
- *Primary responsibility*: Cross-border and multi-currency payment and settlement systems should be subject to oversight by a central bank which accepts primary responsibility for such oversight and there should be a presumption that the central bank where the system is located will have this primary responsibility.
- *Assessment of the system as a whole*: In its oversight of a system, the central bank or authority with primary responsibility should periodically assess the design and operation of the system as a whole in consultation with other relevant central banks and authorities.
- *Settlement arrangements*: The determination of the adequacy of a system's settlement and failure-to-settle procedures in a currency should be the joint responsibility of the central bank of issue and the central bank or authority with primary responsibility for oversight of the system.
- *Unsound systems*: In the absence of confidence in the soundness of the design or management of any cross-border or multi-currency payment or settlement system, a central bank should, if necessary, discourage use of the system, for example by identifying its use as an unsafe and unsound practice.

### **Assessment of compliance with minimum requirements**

The insights gained from the monitoring activities form the basis for the assessment of the operators' compliance with the minimum requirements. The minimum requirements are based on international standards, particularly the "Core Principles for Systemically Important Payment Systems", the "Recommendations for Securities Settlement Systems" and the "Recommendations for Central Counterparties" (cf. Box 6, p. 49). In addition, the SNB relies on commonly accepted industry standards, for example in the area of information security.

To allow for a thorough assessment, the minimum requirements are put in concrete terms in detailed, system-specific control objectives. Compliance with these control objectives is assessed according to a scale with four degrees of compliance (observed, broadly observed, partly observed, non-observed). To account for developments of international standards and best practices in the area of payment and securities settlement systems, the control objectives are reviewed and, if required, updated on a regular basis.

### **Different measures to induce change**

If the SNB concludes in the assessment that the operator of a payment or securities settlement system is not in compliance with the minimum requirements, it issues a recommendation to the operator. In the recommendation, a clear and convincing case for change is provided. If the situation is not remedied, the SNB can issue a legally enforceable instruction. Before imposing these measures, the SNB gives both the Swiss Federal Banking Commission and the operator an opportunity to put forward their views regarding compliance with the specific minimum requirement in question.

If an instruction is not followed, other corrective measures such as notification of other authorities, issuing of a public statement on non-compliance with the minimum requirements, or withdrawal of access to the SNB's sight deposit accounts can be employed.

In addition, the SNB may induce a desired change within a system by commenting on specific issues or developments. This is typically done if a system is considered to be in compliance with the actual minimum requirements, but there is still room for improvements to achieve best practice in a critical area.

### **Cooperative oversight of cross-border systems**

Operators of payment and securities settlement systems which are systemically important from a Swiss perspective can be located outside Switzerland. Conversely, it is possible that systemically important infrastructures domiciled in Switzerland are a source of systemic risk for foreign financial markets. For the purpose of overseeing systems from which risks for the financial system emanate and which are international in their scope and origin, the SNB is empowered to cooperate with foreign supervisory and oversight authorities and to exchange information with them (art. 21 NBA). Furthermore, the operator of a systemically important infrastructure which is domiciled abroad can be discharged in whole or in part from compliance with the minimum requirements, provided the system is subject to standards commensurate with the minimum requirements established by the SNB and the relevant foreign oversight authorities are willing to collaborate with the SNB (art. 21 NBO).

The SNB currently engages in cooperative oversight for Continuous Linked Settlement (CLS) and for x-clear. CLS Bank International, the operator of CLS, is domiciled in the US and the Federal Reserve acts as authority with primary responsibility for oversight. Oversight of CLS is carried out in accordance with the principles for international cooperative oversight (cf. Box 7, p. 50). In its role as overseer with primary responsibility, the Federal Reserve consults with other central banks whose currencies are integrated in CLS, including the SNB. Consequently, CLS was discharged in whole from compliance with the minimum requirements laid down in the NBO.

SIS x-clear AG, the operator of x-clear, is domiciled in Switzerland. However, since x-clear is also recognised as an Overseas Clearing House by the Financial Services Authority (FSA), the authority responsible for supervision of Overseas Clearing Houses in the United Kingdom, there is a need for cooperation between Swiss and UK authorities. The SNB and the Swiss Federal Banking Commission (SFBC) act as authorities with primary responsibility for oversight and supervision, and cooperate with the FSA. The guidelines for this cooperation have been established in a Memorandum of Understanding (MoU). In this document, the involved authorities agree on the principles and modalities of the cooperation in order to promote effective oversight and supervision. Specifically, the MoU governs the communication between the involved authorities, the exchange of information and confidentiality issues as well as practical matters, such as the frequency of meetings.

### 3 Business continuity planning in the Swiss financial sector

The operational risks, i.e. vulnerabilities arising from inadequate or failed internal processes, people and systems or from external events, have generally increased in the financial sector over the past few years. This is due in particular to the increasing dependence on rapidly changing technologies and, partly, also to the changed assessment of risks arising from deliberate acts. At the same time, the damage potential of operational events has increased. The reasons for this development are the consolidation process within the financial sector on the one hand, and intensifying integration of the financial markets and interconnection of infrastructures on the other. Strengthening the resilience of the financial system by means of improved business continuity arrangements is thus an increasingly important issue both for the financial sector itself and for financial authorities. In this respect, particular emphasis is laid on disaster recovery and business continuity plans to ensure that financial institutions and critical infrastructures are able to operate on an ongoing basis in the event of severe business disruptions. Business continuity planning (BCP) on the one hand entails preventive measures aimed at preventing any disruptions or minimising their likelihood and, on the other hand, contingency measures to overcome disruptions as smoothly as possible.

#### **Sector-wide task force to assess BCP arrangements**

In autumn 2003, a task force under the direction of the SNB started to review and assess the business continuity plans of the major financial participants with a view to strengthening the BCP arrangements in the Swiss financial sector. The task force consisted of representatives from the SNB as well as from the central financial market infrastructures (SIS, SWX and Telekurs), the major participants in these infrastructures (Credit Suisse, UBS and Post-Finance) and the Swiss Federal Banking Commission. The sector-wide cooperation with regard to contingency planning reflects the awareness that while effective business continuity arrangements must be planned and implemented by the individual companies, they need to be coordinated to some degree. Sufficient coordination between all parties involved is the only way to ensure that critical functions of the financial system can be maintained or quickly resumed even after severe disruptions.

In January 2005, the SNB submitted a task force report for consultation. Besides listing the arrangements currently in place, it also contained a number of specific recommendations. The task force will publish its final report in the second half of 2005. In addition to recommendations, it will include statements on the form of regulation that should be chosen for the implementation of these recommendations. The main elements of the consultation report are described below.

#### **Recovery and resumption requirements for critical business processes**

The task force focused its analysis on the two business processes that were considered to be especially critical for system stability and which must be maintained without fail even in exceptional situations: (1) liquidity supply of the financial system with central bank money by means of repos concluded with the SNB and (2) large-value payment transactions between the commercial banks in Swiss Interbank Clearing (SIC). The corresponding measures taken by the individual institutions were analysed with regard to physical and staff resources in the IT and business divisions.

The consultation report first presents a scenario with a severe disruption causing the failure of an important operational centre and incapacitating its staff. Some key requirements are then defined for this scenario, notably with regard to the maximum tolerable downtime until the resumption of normal operations. These requirements can be summarised as follows:

- In the event of disruptions, the central infrastructures which are crucial for the critical business processes must be able to resume the critical business activities within two hours and without losing any confirmed transactions.
- In the event of disruptions, critical system participants must be able to resume the defined critical business activities within four hours.
- In the event of disruptions, the other system participants must be able to resume operations within 24 hours.

A significant aspect is that the participants are free to decide how to keep within the stipulated time limits. They may, for example, employ alternative processing mechanisms in the short term to process the most important transactions. This would allow them more time to restore normal operations.

The fact that the central infrastructures, the critical and the other system participants have to fulfil different requirements reflects their respective significance for the maintenance of the critical business processes “liquidity supply” and “large-value payments”. The failure of a central infrastructure brings the financial centre to a de facto standstill and can cause widespread credit and liquidity problems among market participants. It is thus only logical that these infrastructures must meet very high requirements. However, the precautionary measures taken by the central infrastructures to maintain the critical business processes are only of limited benefit unless the (critical) system participants are functioning as well. Therefore, they too must satisfy high requirements.

#### **Good preparations, but room for improvement**

Overall, the central infrastructures and the individual system participants have made extensive preparations to ensure that the critical business processes are maintained even in exceptional circumstances. There is still room for improvement in various respects, though, notably in the following areas:

- The precautionary measures are better suited to the failure of physical components (such as buildings or hardware) than for events that affect staff availability.
- Tests in the IT area are carried out mostly on a prepared basis and, in some cases, do not consider staff-specific aspects.
- The physical distance between the primary and secondary operation centres is often below average by international standards.
- The sector-wide alarm and crisis organisation should be improved so that, in the event of disruptions, problem and process-specific communication can be coordinated among all parties involved.



## 4 Developments in large-value payment systems

The design of large-value payment systems (LVPS) changes over time. These changes, which are generally due to technological progress, are driven by participants' requirements and the regulators' endeavour to reduce risks and costs in LVPS. At the same time, to the extent that there is a trade-off between risks and cost, innovations aim at improving the risk-cost equilibrium. The most important developments that have taken place in LVPS over the last couple of years are analysed in a recent report by the Committee on Payment and Settlement Systems (CPSS).<sup>45</sup> Based on this analysis, the major trends and innovations in LVPS of CPSS member countries are summarised below.

### Reduction of settlement risks

One of the distinct trends of the last decade is that LVPS have increasingly moved towards the provision of intraday finality. LVPS that are based on deferred net settlement (DNS) still exist, but their number has clearly decreased over the past few years. In a DNS system, payment orders are accumulated throughout the day and only the net amount is settled typically at the end of the day. While netting has the advantage that relatively little liquidity is needed, the deferred settlement has the drawback that finality of settlement is only achieved at the end of the day, thus creating settlement risk. There have been several approaches to reduce the settlement risk associated with deferred settlement. The first is to protect systems with enough financial resources in order to ensure final settlement even in the event that the participant with the largest net debit position fails to meet its payment obligation. The second is to introduce real-time gross settlement (RTGS), which has been done in most of the CPSS member countries. However, a third alternative has been developed which achieves continuous intraday finality in LVPS without settling on a RTGS basis. The Large Value Transfer System (LVTS) in Canada, for instance, still settles just once at the end of the day like a conventional DNS system. Yet it provides real-time intraday finality like an RTGS system, because certainty of settlement is achieved by a combination of collateral posted by participants and a guarantee by the Bank of Canada for the residual exposures.

### Reduction of liquidity needs and costs in RTGS systems

RTGS systems have become the most common type of large-value payment systems in CPSS member countries. In Switzerland, the Swiss Interbank Clearing (SIC) system was introduced as early as in 1987. RTGS systems continuously process and settle payment orders in real time on a transaction-by-transaction basis. Since finality is achieved intraday, they do not bear the settlement risks of DNS systems. However, real-time gross settlement has the disadvantage that it is more costly in terms of liquidity. In order to address this issue, new features have been implemented to reduce the liquidity needs and to allow participants to better control and manage the payment process. Moreover, central banks extend intraday credit to participants of RTGS systems at favourable conditions.

One major innovation has been the implementation of LVPS that combine design features of DNS and RTGS systems. Whereas the classic hybrid systems apply netting or offsetting routines at short, but discrete time intervals, a number of LVPS have recently combined this feature with real-time settlement functionality. Examples of such systems are CHIPS in the United States, PNS in France and RTGS<sup>plus</sup> in Germany. These systems first attempt to settle a payment order on a gross basis. If immediate settlement is not possible due to a lack of settlement balances, the payments are stored in a queue, and then the system checks whether the queued payments can be offset bilaterally or multilaterally. While in net settlement only the net amounts are transferred, offsetting comprises the gross execution of single payments simultaneously within one legal and logical point in time. Different kinds of algorithms exist to execute the offsetting mechanism. Usually, relatively simple bilateral algorithms tend to be applied in real-time, while more complex multilateral algorithms are employed intermittently at short intervals. The application of continuous netting or offsetting has mostly been made feasible by significant technological progress in the area of computing power. Features that were previously too expensive to be implemented have become affordable over time. A fairly simple bilateral offsetting mechanism has been implemented in SIC. It is automatically triggered should the system not be able to settle any payment within 20 seconds due to insufficient or unevenly distributed funds on the participants' settlement accounts.

<sup>45</sup> Cf. CPSS (2005), "New developments in large-value payment systems", [www.bis.org/cpss](http://www.bis.org/cpss).

In response to demand among participants for better possibilities to manage their liquidity and payment flows, most of the LVPS nowadays provide a broad range of real-time information on the settlement process, such as detailed information on queues and account balances. This information is crucial to the reasonable employment of the various interactive control features that enable the participants to fine-tune the settlement process. Such controls include, for instance, the possibility to change the location of a payment in the queue, the scheduling of the release of an instruction, the setting of bilateral and multi-lateral credit limits to control the outflow of funds as well as the reservation of funds on the settlement account.

While the introduction of netting and offsetting features tends to reduce the amount of liquidity needed to settle payments, central banks' collateral policy influences the costs of this liquidity. Since most central banks extend credit only against collateral, the type of collateral that LVPS participants can use is an important factor in determining the opportunity costs of holding collateral. In the last few years, several central banks have substantially broadened the range of collateral they accept in their liquidity provision operations, thus lowering the opportunity costs of liquidity. Central banks from the Eurosystem, for instance, accept euro-denominated collateral cross-border within the European Monetary Union. Furthermore, a few central banks, such as the Federal Reserve or the SNB now also accept collateral denominated in foreign currency. The fact that 55–70% of the SNB's outstanding repo transactions are typically secured by euro-denominated collateral reflects the participants' strong demand for these facilities.

### **Increased cross-border activity**

Another block of developments in LVPS can be attributed to expanding cross-border activities of the financial sector. Examples are the creation of TARGET in the European Union in order to interlink the domestic RTGS systems, and the emergence of new large-value payment infrastructures in countries where a foreign currency plays an important role. In Switzerland, euroSIC was created in order to process euro payments. Similarly, a US Dollar and a Euro Clearing House Automated Transfer System (USD CHATS and Euro CHATS) were introduced in Hong Kong for the processing of US dollars and euros respectively. These systems are basically replicas of the local LVPS, thus displaying more or less the same design, but settling on the accounts of a correspondent bank. Finally, Continuous Linked Settlement (CLS) was introduced in 2002. CLS is a private sector system that specialises in the settlement of foreign exchange transactions on a payment-versus-payment basis. This settlement mechanism eliminates credit risk (Herstatt risk) in the settlement of foreign exchange transactions of the 15 most actively traded currencies. Although settlement members pay their obligations via the domestic LVPS, settlement takes place in commercial bank money on the books of CLS Bank.



