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CONTENTS

TAXATION OF CORPORATIONS IN SWITZERLAND[1]

A. Introduction

1.   The Swiss government is proposing a major tax reform, primarily of the corporate income tax (CIT). On March 21, 2018, the Swiss Federal Council made a proposal to reform the CIT (known as 'Tax Proposal 17'), after the rejection of a previous reform plan ('Corporate Tax Reform III') in a popular vote in February 2017. It is foreseen that Parliament will decide on the reform this year. According to the current schedule, the major part of the reform could enter into force in 2020 at the earliest.[2]

2.   The substance and timing of the proposed reform were triggered by international developments in corporate taxation. In particular, Switzerland is committed to meet international minimum standards of the CIT set out in the G-20 OECD Base Erosion and Profit Shifting (BEPS) project, including Action item 5 on "countering harmful tax practices more effectively, taking into account transparency and substance" (Box1). Existing preferential tax regimes in Switzerland no longer conform to these international standards. Further, the Council of the EU, in its December 2017 conclusions, included Switzerland in the group of cooperative countries, subject to the successful delivery of its commitments ('grey list').[3]

3.   The CIT reform involves trade-offs between objectives and constraints. The reform objectives are to abolish preferential tax regimes to meet international commitments; to maintain tax competitiveness in the absence of these regimes; and to ensure CIT revenues within budgetary parameters. The reform also takes into account the Swiss-specific relationship between cantons and the Confederation. Furthermore, the Swiss authorities are seeking to avoid a prolonged period of uncertainty. Legal stability is an important consideration, and reform plans have been under discussion for several years.

4.   This paper analyzes key features of corporate taxation in Switzerland and 'Tax Proposal 17'. The reform proposal is an opportunity to revisit tax competitiveness in a changing international CIT environment and be mindful of potential spillover effects from and onto the Swiss economy. Section B describes the current Swiss CIT system. Section C puts the proposed reform into perspective by laying out the main measures, and Section D discusses the potential impacts of the proposed reform. Section E concludes.

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[1] Prepared by Shafik Hebous (FAD) and Stephen Shay (external expert). This paper has benefited from discussions with the Swiss authorities.

[2] The timetable would be delayed if a referendum were called, which would occur in 2019 with the major part of the reform legislation (abolition of cantonal tax regimes), if approved, becoming effective in 2021.

[3] The Council of the EU did not define any measures against these jurisdictions, but implementation of the commitments by these jurisdictions will be monitored. On October 14, 2014, Switzerland and EU Member States signed an understanding on business taxation. In this statement, the Federal Council affirmed its intention to take measures to remove certain tax regimes. No specific deadline for abolishing the regimes was specified in the joint statement. Switzerland remains committed to the 2014 Joint Statement and is planning to abolish the specified tax regimes through Tax Proposal 17.

Box 1. Switzerland's International Commitments Regarding the CIT	
Switzerland has committed to the four Minimum Standards of the G-20 OECD BEPS action plan, where implementation is subject to peer review. These standards are:	

Countering harmful tax practices: This includes:	
Transparency framework regarding tax rulings	Following a peer review, no recommendations have been made. On 1 January 2017, the domestic and legal framework for spontaneous exchange of information entered into force, allowing for spontaneous exchange of information as of 1 January 2018 (revisions to the Tax Administrative Assistance Act and the Tax Administrative Assistance Ordinance, Convention on Mutual Administrative Assistance in Tax Matters).
Reviewing existing preferential regimes	In the October 2017 Progress Report of the Forum on Harmful Tax Practices, the holding company regime, the auxiliary company regime, the mixed company regime, and the commissionaire ruling practice were classified as 'in the process of being eliminated' reflecting the Swiss commitment to abolish these regimes. The tax proposal 17 aims at abolishing the holding company, the auxiliary company, the mixed company and the commissionaire ruling regimes.
Preventing tax treaty abuse:	On June 7, 2017, Switzerland signed the Multilateral Convention to Implement Tax Treaty Related Measures (MLI). Alternatively, Switzerland also stands ready to implement this minimum standard through a bilateral revision of its Double tax agreement (DTAs) (e.g., Switzerland included this minimum standard in its DTA with Latvia).
Transfer pricing documentation and country-by-country reporting (CbCR):	Following a peer review no recommendations have been made. On December 1, 2017, the Federal CbCR Law and Ordinance entered into force, which implement country-by-country reporting in line with the transfer pricing documentation requirements.
Dispute resolutions	Recommendations following a peer review have been made. Switzerland is implementing this minimum standard through the MLI or through bilateral revisions of its DTAs.

B. The Current System of Taxing Corporates in Switzerland

Multi-Level Taxation

5.   The Swiss CIT system is notable for the large role played by sub-national level (cantonal and municipal) corporate taxes. Taxation of corporations is levied at three levels: federal, cantonal (26 cantons), and municipal (2,222 municipalities as of January 2018). Under the Swiss Federal Constitution (the "Constitution"), the cantons are sovereign, including in matters of taxation, except to

the extent limited by the Constitution.[4] Within a canton, municipalities exercise taxing authority under cantonal law.

6. While cantons have extensive autonomy in taxation, the Federal government has authority under the Constitution to harmonize cantonal direct taxation. The Federal Tax Harmonization (FTH) law assures common treatment of many elements of the tax law, including the provision of special tax status to companies under prescribed conditions (i.e., preferential tax regimes discussed below).[5] Further, the FTH authorizes cantons to set their own direct tax rates. The withholding tax on payments by a Swiss resident company to nonresidents is a Federal level tax and administered by the Federal government.

7. The CIT base in Switzerland has relatively few "tax expenditure" provisions, other than preferential tax regimes. Consistent with common international practices, deductions are allowed for expenses necessary to earn income, such as inventory costs, expenses for repair of equipment, general and administration costs, and commercially justified depreciation allowances and reserves and provisions. Certain special deductions and credits are allowed for policy purposes. For example, water pollution abatement machinery is eligible for accelerated depreciation. Losses may be carried forward seven years but may not be carried back.

8. Statutory combined (federal, canton, and municipality) CIT rates in the Swiss cantonal capitals range from 14 percent to 31.9 percent. The federal statutory CIT rate is 8.5 percent. Because the CIT itself is deductible, the 'effective' federal CIT rate is 7.83 percent.[6] The tax rates of a canton and a municipality in that canton are imposed in addition to the federal tax, and these taxes themselves are also deductible (see Appendix 1). Taking into account that the tax amount itself is deductible in Switzerland (and disregarding preferential tax regimes discussed below), the 2017 *'effective'* combined CIT rates in cantonal capital cities ranged from a high of 24.16 percent in Geneva to a low of 12.32 percent in Luzern (Figure 1). The unweighted and weighted average effective combined CIT rates in Switzerland are 17.7 and 19.6 percent, respectively.

9. Cantons are obliged to impose a tax on corporate capital ('net worth'). No net worth tax is levied at the federal level. The taxable base for the net worth canton tax is the equity of the company, defined as paid-in capital plus reserves. In some cantons, the corporate income tax can be credited against the net worth tax. Cantonal net worth taxes on legal entities range from 0.001 percent to 0.525 percent.

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[4] The Federal government is granted exclusive authorization to impose certain taxes, but nonexclusive taxes, including direct taxes, may be imposed by the cantons as well as the Federal government. Municipalities play an important governmental role and may impose taxes as authorized under cantonal constitutions.

[5] These include: standardized assessment for legal entities; taxation of foreign directors' remuneration; deduction of direct taxes; tax rollover relief for reorganizations; definition of holding companies and management companies; and tax incentives for newly incorporated companies.

[6] 8.5%/ (1 + 8.5%) = 7.83 percent. In this paper, 'effective' refers to this formula. See Annex 1.

Figure 1. Effective Combined (Federal, Canton, and Municipal) CIT Rates in Canton Capitals
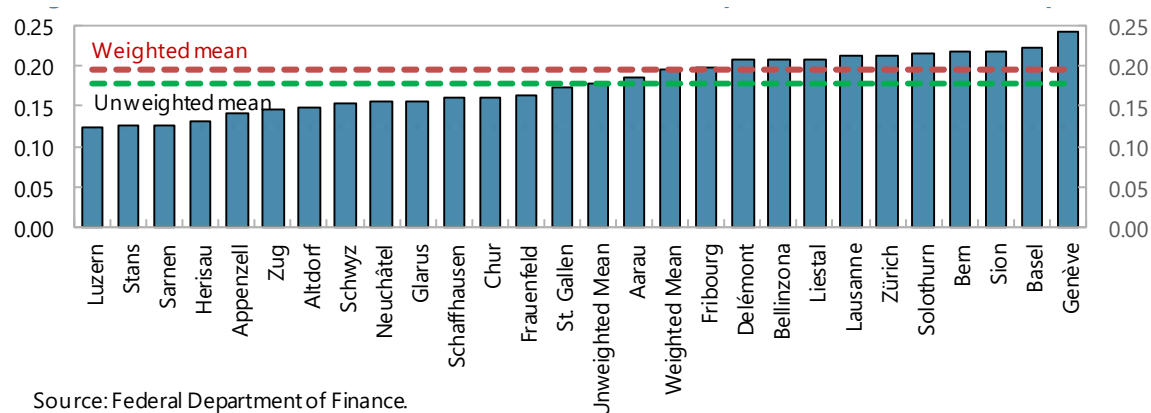
Source: Federal Department of Finance.
Note: The weighted average is based on federal CIT revenues' weights (weights averaged for 2012-2014).

Preferential Tax Regimes

10.   Cantons provide tax relief from the cantonal and municipal CIT to auxiliary, mixed and holding companies (so-called "status companies"), but the federal tax does not provide tax relief for status companies. At the cantonal-level, the CIT system differentiates between the relatively "immobile CIT base" — broadly defined as Swiss-sourced income subject to the ordinary CIT— and the "mobile CIT base" — broadly defined as foreign-sourced income subject to lower taxation through cantonal preferential tax regimes. As the preferential tax regimes are governed by the federal harmonization law, these preferential tax regimes are almost identical across cantons, and provide a preferential tax treatment on the *cantonal and municipal* levels for qualified income, but the federal tax must be paid by all companies—including those that benefit from preferential tax regimes. In contrast to the preferential regimes, generally, the Swiss federal tax law imposes a worldwide income taxation without distinguishing between Swiss and foreign-sourced income (including a deduction based on dividends from a substantial participation in a resident or nonresident company).

11.   There are three cantonal preferential tax regimes allowed by the current FTH law:

- *Holding company regime*. Holding companies are, in principle, exempt from any cantonal and municipal tax on income and pay only a reduced cantonal tax on net worth. Holding companies generally qualify for the income tax exemption if their participations (or income from participations) represents at least two thirds of total assets (or total income), but "participation" is not specifically defined in the tax statutes. A holding company may not be actively engaged in a commercial activity in Switzerland. While most European countries adopt a participation exemption regime[7]—whereby qualified "participation income" of holding companies is exempt from taxation—the Swiss holding company regime applies to all income (in addition to dividends

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[7] For instance, in some cantons, long-term loans to subsidiaries are considered in the notion of "participation" for the purpose of the holding company regime.

and capital gains), including income not derived from qualifying participation such as interest income.[8] This feature makes the regime inconsistent with current international standards.

- *Auxiliary company regime*. An auxiliary company may obtain tax benefits under cantonal tax law if it only carries on administrative activities such as managing its own assets. Auxiliary companies have their legal seat in the canton, but do not have commercial activities in the canton or in Switzerland and derive income from abroad. Foreign-sourced income, including royalties and management fees, as well as income from substantial participations, are exempt (albeit not fully) from cantonal and municipal CITs, whereas Swiss-sourced income and real estate income are taxed at ordinary rates.[9] This differential treatment of foreign and Swiss-sourced income offers tax benefits in the absence of substantial domestic activities and thus has been found to be inconsistent with current international standards.

- *Mixed company regime*. This taxation regime for mixed companies is almost identical to the regime of auxiliary companies. A management company that earns some business income in Switzerland, referred to as a "mixed company," may qualify for a treatment as a management company provided that the underlying business activity is performed predominantly outside of Switzerland. This condition is considered satisfied if at least 80 percent of sales and purchases take place outside of Switzerland and there is no production or manufacturing in Switzerland.

The taxation of cantonal status companies may be the subject of a tax ruling.

12.   In addition to the above three preferential tax regimes, the Swiss "commissionaire ruling" practice that enables federal tax relief (also known as a "principal" company regime) has also been considered inconsistent with international CIT standards. A so-called principal company is a trading company that controls the manufacturing of products sold internationally. Under such a structure, a foreign controlled manufacturer produces products on behalf of the Swiss principal company and receives a compensation on a cost-plus basis. The Swiss principal sells the goods internationally through commissionaires (i.e., local agents) that receive a commission as compensation (typically 3 percent of sales or costs). The Swiss system deems the foreign commissionaire affiliate company as a permanent establishment (PE) of the Swiss principal company (the principal company itself can ultimately be owned by a non-Swiss resident). Further, 70 percent of the net profit of the principal is considered trading profit and only 30 percent as manufacturing profit. The commissionaire ruling practice attributes up to 50 percent of the trading profit to the foreign deemed PE (which may not correspond to the allocation in the country of the PE), and hence exempts this income from federal, cantonal and municipal taxes. In practice, such a ruling is combined with a mixed company

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[8] As noted, the federal tax allows a "participation deduction", which is similar in effect to a participation exemption system.

[9] Foreign-sourced income is taxed at the cantonal and the municipal level to the extent of management activities in Switzerland (See Art. 28 para. 3 of the Federal Act on the Harmonization of Direct Taxation at Cantonal and Communal Levels).

regime such that the taxable income will benefit from exemption from cantonal and municipal taxes. The effective tax rate of this arrangement may be as low as nearly 5 percent.

Further International Aspects of the CIT

13. **The Federal withholding tax on dividends is 35 percent except as reduced by a double tax treaty (DTA) or other international agreement.** Under the 2004 agreement with the European Union, Switzerland exempts dividend payments to companies residing in EU Member States. Switzerland has also signed over 90 bilateral double tax treaties. These treaties generally reduce the withholding tax rate on dividends to qualifying shareholders (depending on the applicable DTA) to a rate generally between zero and 15 percent depending on the treaty. Switzerland has domestic anti-abuse rules applicable to withholding tax. Switzerland does not impose withholding taxes on royalties or technical or managerial fees. There is no withholding tax on interest on company loans. However, Switzerland levies a federal withholding tax of 35 percent on certain types of investment income from Swiss sources (e.g., interest on Swiss bank deposits, income from bonds of Swiss issuers, Swiss shares and other participation certificates) and on lottery gains.[10] For Swiss resident beneficiaries, the withholding tax is not a final tax. For non-resident beneficiaries, the Swiss withholding tax may represent a final tax on Swiss-source investment income.

14. **In January 2017, the Swiss domestic legislation adopted international spontaneous exchange of information in tax matters.[11]** This allows the spontaneous exchange of tax rulings regarding (i) corporate and individual income, (ii) corporate and individual net worth, and (iii) withholding taxes. Additionally, as of the end of January 2018, 51 tax treaties in force included an exchange of information provision conforming to international standards. Switzerland also has signed 10 tax information exchange agreements, 9 of which are in force. As of January 1, 2018, Switzerland has automatic exchange of information on financial accounts with over 75 states and territories.

15. **The Swiss tax law contains selected anti-avoidance rules.** Switzerland generally follows the arm's length principle for transfer pricing, but it does not specify rules (i.e., there is no transfer pricing legislation) and cantonal authorities retain some degree of discretion to agree on transfer pricing methods. The thin-capitalization legislation denies deduction of interest expense of "hidden equity" (defined as debt which would not have been granted by third persons under the same conditions), and a Federal Circular (from 1997) lays out safe-harbor rules for assessing total debt of a company in relation to assets (e.g., a debt-to-equity ratio of 6:1 for financial companies). In Switzerland, there is no controlled foreign corporation (CFC) legislation.

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[10] Reduced withholding tax rates are applied on annuities and pensions (15 percent) and on other insurance benefits (8 percent).

[11] The Federal Act on International Administrative Assistance in Tax Matters, January 2017.

Figure 2. CIT Revenues in OECD Countries

Source: OECD Revenue Statistics.
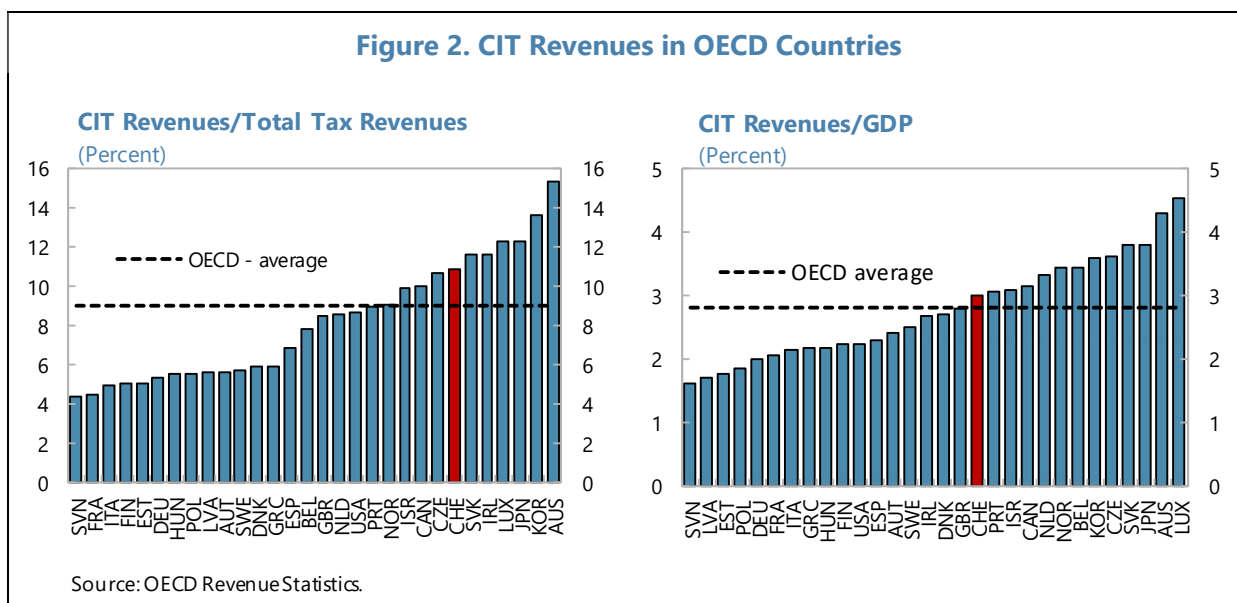
Revenues From the CIT

16. **Revenues from the CIT comprise an above-average 11 percent of total tax revenues in Switzerland (Figure 2).** The CIT-GDP ratio is 3 percent, above the OECD average (2.8 percent). A detailed fiscal equalization system is in place to mitigate the differences between the cantons in terms of their financial capacity.[12]

C. Tax Proposal 17

17. **Tax Proposal 17 abolishes cantonal preferential regimes, and provides cantons with a modified financial and legal basis to reduce the tax burden in the absence of these regimes.** There are two key elements in the proposed reform for maintaining reduced effective tax rates in the absence of preferential regimes:

1. Legal element: While the Swiss CIT system currently does not contain innovation-related tax incentives,[13] under Tax Proposal 17, cantons:

   - Must introduce a **patent box** regime (a 'mandatory' measure) according to the G-20 OECD BEPS standards, and are free to set tax relief of up to 90 percent of qualified income from patents;

   - May introduce super **R&D tax deductions** of up to 50 percent (optional measure), i.e., qualified R&D expenses can be deducted at a rate of up to 150 percent.

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[12] See Frey and Wettstein (2008).

[13] Except for the canton of Nidwalden that adopts a patent box regime with an effective rate of 8.8 percent.

- However, there is a general limitation, whereby the overall cantonal tax relief (all measures including R&D deductions and the patent box by a canton) may not exceed 70 percent of pre-tax profits, i.e., at least 30 percent of income must be subjected to taxation.

2. Financial element: While changes in cantonal CIT rates are not an explicit element of the official reform package, the Proposal would nonetheless incentivize cantons to reduce their statutory CIT rates by raising the share of federal direct tax revenue—from 17 to 21.2 percent— that cantons would receive.

The federal statutory CIT rate remains 8.5 percent, while the new innovation tax incentives apply only to the cantonal tax.

18.   Further, Tax Proposal 17 increases cantonal taxes on dividends for individuals (i.e., for those not subject to participation exemption applicable between related companies) by subjecting at least 70 percent of these dividends to taxation. Cantons would be able to tax a higher fraction than 70 percent. Currently, in most cantons, 40–50 percent of dividends are exempt. Further, under the proposal, the minimum amount employers must pay for child and education allowance would be increased by CHF 30 per month. Additionally, Tax Proposal 17 contains transitional measures.[14]
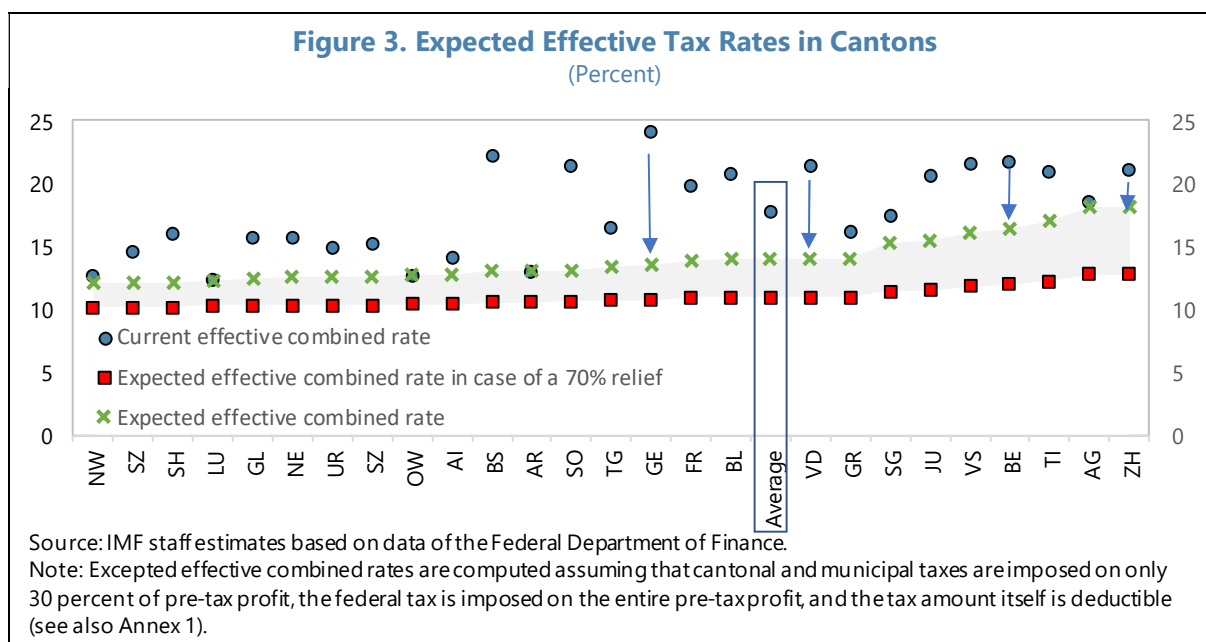
D. Analysis

19.   Aligning the CIT system with international standards is advised not only to avoid possible reputational damage and counter measures, such as EU 'black' listing, but also to minimize potential outward spillover effects from the Swiss system. While progress has been made regarding the 'transparency framework' of international exchange of information, and three of the four minimum standards in the BEPS project (Box 1), abolishing existing preferential tax regimes remains vital to respect Swiss commitments to the minimum standards. The existing commissionaire ruling practice is difficult to reconcile with the internationally agreed arm's length standard and can have particularly negative spillovers for developing countries.

20.   In the new equilibrium, if the reform is implemented, CIT rates would be less dispersed across firms and cantons. The federal CIT rate is imposed on all firms (8.5 percent). However, cantons are expected to lower their statutory CIT rates, bringing the combined effective unweighted average rate from 17.7 percent to 13.9 percent (Figure 3), close to that of Ireland but somewhat higher than the lowest rate in the EU (9 percent in Hungary; Figure 4). Moreover, the coefficient of variation for cantonal tax rates— a measure of their dispersion— would be expected to decrease from 19.7 to 13.1 percent.

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[14] For details, see Bundesrat (2018).

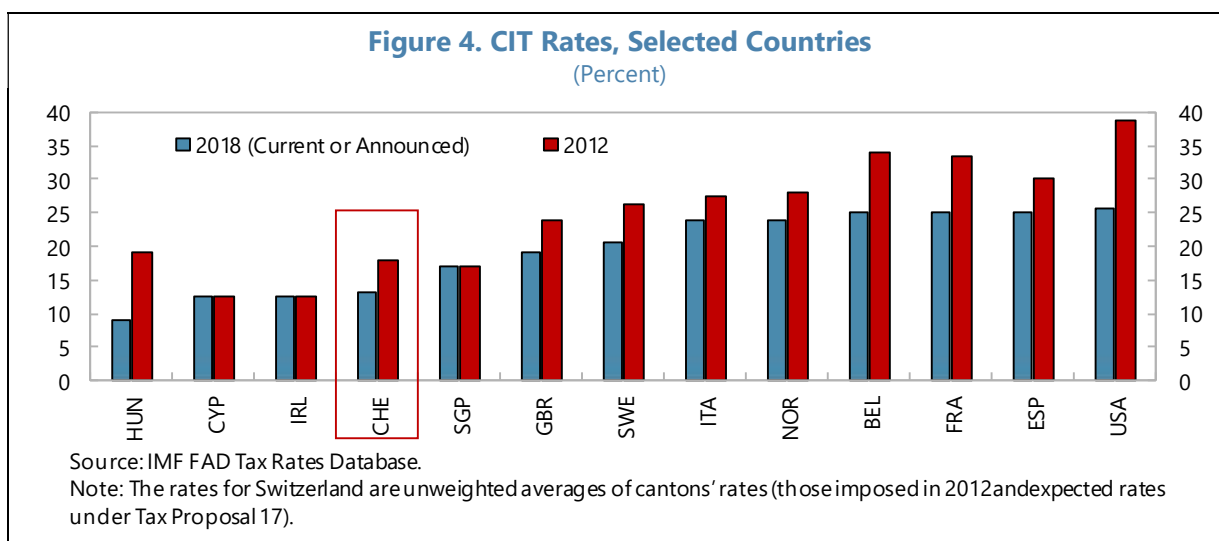**Status Companies Would Face a Higher CIT Rate...**

21.   Assuming that cantons grant the maximum allowable tax relief (70 percent), effective CIT rates in Switzerland would range from 10.2 to 12.75 percent for the companies that fully use the newly introduced tax benefits. The effective unweighted average rate would be 10.9 percent (Figure 3), and the coefficient of variation would be close to 7 percent. These effective CIT rates serve as a reference, and many companies would face rates higher than these minimum effective rates, depending on their use of innovation incentives. Even these minimum effective rates would imply an increase in the tax burden for status companies (because these currently face approximately the federal rate, and some an even-lower rate). The exact tax increase at the firm level would depend on the company and the regime that the canton and municipality have chosen. For instance, international commodity traders would likely face a higher tax burden than firms with high R&D intensity.

Figure 3. Expected Effective Tax Rates in Cantons
(Percent)

Source: IMF staff estimates based on data of the Federal Department of Finance.
Note: Excepted effective combined rates are computed assuming that cantonal and municipal taxes are imposed on only 30 percent of pre-tax profit, the federal tax is imposed on the entire pre-tax profit, and the tax amount itself is deductible (see also Annex 1).

... And Switzerland Would Become More Attractive as a Location for Real Investment

22.   This overall CIT rate cut in Switzerland is part of an international trend (Figure 4). A number of OECD countries, including Belgium, France, and the US, have recently lowered their CIT rate. As a small open economy, CIT changes in other countries can be important for Switzerland. For example, the US is the major FDI partner country for Switzerland (Box 2). Taken together, however, repealing preferential CIT regimes combined with an overall lower effective CIT rate would maintain Switzerland's position as a relatively low taxation location, albeit at some cost to revenue. A low CIT rate is generally not advised if it triggers a minimum tax in the home country of the foreign parent company — e.g., foreign CFC rules and similar provisions such as the new U.S. minimum tax (with no deferral) on 'Global Intangible Low-Taxed Income'. In that case, the low CIT rate is both ineffective and costly.

23.   While preferential treatment would be eliminated, the wider Swiss tax system would become more competitive. By offering cantonal preferential tax regimes, cantons compete for the most mobile capital without lowering the tax on the immobile capital. Removing this targeted tax treatment intensifies tax competition over all (mobile and immobile) capital resulting in a lower the CIT rate (Keen, 2001). Theoretically, it is not entirely clear that the rate cut would be welfare enhancing. In fact, theory predicts that in the new equilibrium, total CIT revenue would be lower because of lower taxation of immobile capital (Keen, 2001). This theoretical framework is relevant for international as well as cantonal contexts.

Figure 4. CIT Rates, Selected Countries
(Percent)

Source: IMF FAD Tax Rates Database.
Note: The rates for Switzerland are unweighted averages of cantons' rates (those imposed in 2012 and expected rates under Tax Proposal 17).

There Are Important Differences Between Cantons

24.   There is a competitiveness-efficiency trade-off associated with the expected reduction of cantons' CIT rates. Companies that currently do not benefit from a preferential tax regime would gain from the planned CIT rate cut. Such companies, however, tend to be relatively immobile, including in response to changes in the CIT rate. Therefore, lower CIT revenues from these companies imply an efficiency cost. At the same time, the lower CIT rate would potentially have a favorable dynamic investment effect by reducing the cost of capital for these less mobile firms. The medium-term net effect will therefore depend on relative elasticities.

25.   Consistent with theory, cantons with larger economies tend to impose higher CIT rates. As discussed in Keen and Konrad (2013), theory predicts that smaller jurisdictions tend to undercut large jurisdictions, exacerbating potential pressures on revenues in large jurisdictions. Four cantons — Bern, Geneva, Vaud, and Zurich — together constitute about 50 percent of Swiss GDP and 52 percent of total CIT revenues in Switzerland (Figure 5). However, despite these cantons significantly contributing to the aggregate CIT revenues, they have relatively low shares of CIT revenues from status companies (Figure 5). Lowering the CIT rate in these cantons would result in higher revenue forgone from non-status companies. As shown in Figure 3, Geneva signaled a significant CIT rate cut from 24.16 to 13.49 percent. Vaud announced it will cut the rate in 2019 from 21.37 to 14 percent. In contrast, the rate cut would be less costly in cantons such as Zug and Basel City, which contribute

significantly less to country-wide CIT revenues and collect about 50 percent of their cantonal CIT revenues from status companies.

Increased Mobility Intensifies Taking Advantages of Cantonal CIT Differences

26.   The cantonal CIT rate and base would play a significantly more prominent role in location and investment decisions between cantons following the abolishment of preferential tax regimes. Under the current system, for a company that qualifies for a preferential tax regime, the cantonal CIT rate is (almost) irrelevant because income is (almost) exempt from the cantonal tax. However, after the reform, the cantonal CIT rate and base matter for these companies, making differences between cantons more important for location and investment decisions by mobile firms.

Figure 5. Larger Cantons Have Higher CIT Rates and Lower Revenues from Status Companies
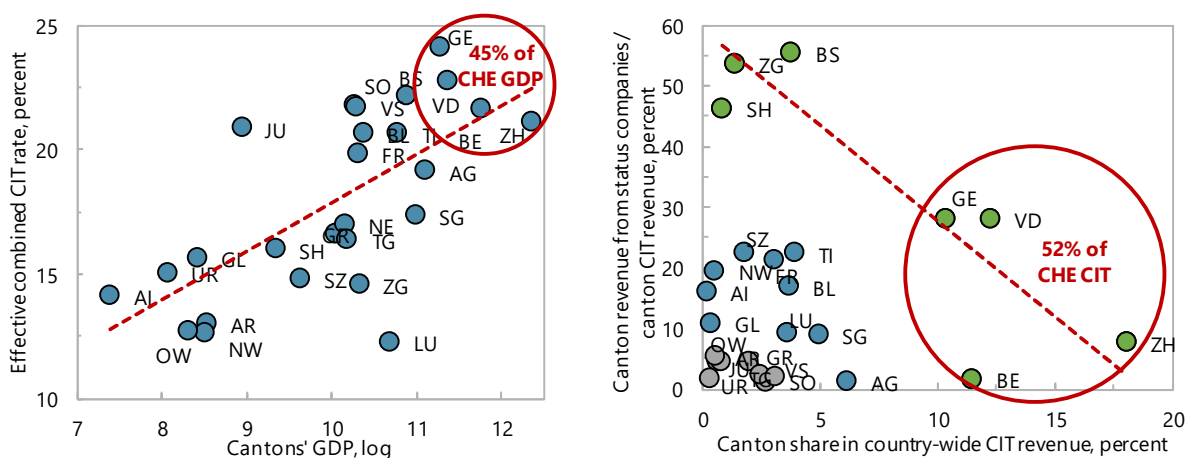
Sources: Federal Department of Finance; and IMF staff estimates.
Note: The line in right panel corresponds to the green dots.

27.   In contrast to the existing system, the reform opens a wider door for CIT base differences between cantons. For example, differences in the R&D tax treatment make it attractive for a company to allocate R&D expenses to cantons with generous R&D deductions but maintain the legal ownership of resulting patents in other cantons with generous patent box regimes. In an international setup, such a structure is somewhat mitigated by the modified nexus approach whereby income from a patent can qualify for the regime if the patent is developed in the same country.

28.   The precise rules regarding inter-cantonal profit splits in Switzerland are based on case law. CIT differences between cantons can be used to lower effective taxation. Currently, the profit of an inter-cantonal company in Switzerland is split either based on separate accounting or by an assigned quota (typically between 10 to 20 percent of profits goes to the headquarters' canton). Other federations (such as Canada, Germany, and the US), adopt a formulary apportionment in the law to allocate profits between cantons. In the short-term, strengthening domestic transfer pricing rules and their application would safeguard revenues. In the medium term, tax law-based formulary options to apportion profits between cantons could be considered.

29.   The fiscal equalization system provides an implicit limit to cantonal tax competition. The financial capacity of a canton — based on taxable income and wealth — determines the position of a canton in the fiscal equalization system. Attracting more direct income implies that a canton receives less from (or contributes more to) the fiscal equalization scheme, which in this case can alleviate tax competition between cantons. However, the general limitation rule that restricts the tax relief to a maximum of 70 percent of taxable income can intensify CIT rate competition. If a canton seeks to lower the tax burden but the general limitation rule is binding, then cutting the CIT rate becomes the option to achieve this policy goal.

Encouraging Innovation Through Taxation

30.   R&D deductions are generally more effective and efficient than IP box regimes (IMF, 2016b). The policy question is: what is the best option for spending CHF1 on a tax relief for innovation? Existing evidence suggests that a CHF1 R&D deduction would result in significantly higher R&D activities than CHF1 spent on a patent box.[15] While a patent box regime in Switzerland can be motivated by the large existing stock of "know-how" assets in Switzerland that receive royalties, for a given

Table 1. Patent Boxes in Selected Countries

	Year of Introduction	Effective Rate (%)
Belgium†	2007	3.75
Cyprus	2012	2.5
France	2000	15
Hungary	2003	4.5
India	2016	10
Ireland	2016	6.25
Israel	2017	6
Italy	2015	6.25
Korea	2014	12.5
Luxembourg	2008	5.84
Netherlands	2007	5
Portugal	2014	10.5
Spain	2008	12
CHE (Nidwalden)	2011	8.8
UK	2013	10
Switzerland (expected)‡	2019 or 2020	10.9

Source: IMF staff summary based on various sources. † Assuming the CIT rate is 25 percent. ‡ The patent box rate reported here is the average combined effective rates of cantons assuming that cantonal and municipal tax apply only to 30 percent of pre-tax income.

cost, maximizing the use of R&D deductions in combination with a less generous patent box relief would yield the highest R&D activities. The patent box effective rate would generally be at the higher end of international comparators (Table 1) because of the federal CIT rate and the limitation on the maximum allowed cantonal tax relief of 70 percent. However, as discussed above, the overall CIT rate in Switzerland would remain competitive.

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[15] See IMF (2016b). For example, in the Netherlands, €1 spent on a patent box generates 56 cents of additional R&D, whereas granting €1 in an R&D tax incentive for inputs results in €1.77expansion in R&D.

Tax Neutrality

31.   Currently, distributed corporate profits tend to be undertaxed compared to non-corporate business income.[16] A study by the Federal Finance Administration (see Bundesrat, 2018) shows that at present incorporating a business with an annual income of at least CHF300,000 has a tax advantage relative to taxing it at the individual level in all cantons. Lowering cantonal CIT rates would further lower the marginal and average tax burden for distributed corporate profits, exacerbating non-neutrality between different legal forms. Therefore, increasing dividend taxation becomes important to preserve the backstop function of the CIT (i.e., protecting the personal income tax base). In fact, taxing 70 percent of dividends under prevailing CIT rates would still imply a tax benefit from incorporation in 17 Cantons (Bundesrat, 2018). Thus, if CIT rates were to be cut, increasing the fraction of taxed dividends, as proposed under Tax Proposal 17, would alleviate distortions in organizational forms, but would not achieve full tax neutrality.

32.   An allowance for corporate equity (which is not part of Tax Proposal 17) would align the tax treatment of equity and debt financed investments. The ACE system has well-known favorable neutrality properties, importantly neutralizing debt bias (IMF, 2016; De Mooij, Hebous, and Hrdinkova, 2018).[17] As a neutral system, the ACE encourages investment, including of SMEs, by taxing only abnormal returns (i.e., economic rent). However, the design of the ACE matters for its effectiveness, including the definition of the base of the ACE and the allowance rate. Further, the design of the ACE should not be thought of as a system for encouraging conduit financing companies, and the design must adopt appropriate anti-avoidance rules (IMF, 2016; Hebous and Ruf, 2017). Political economy considerations in Switzerland — particularly the notion that the inclusion of a proposed ACE was identified as the major reason for the rejection of a previously-proposed CIT reform in 2017—may motivate an appropriately designed ACE as an option only for the future.

Budgetary Impact

33.   The proposed reform is expected to have a static cost.[18] The static cost includes, inter alia, the revenue forgone due to lowering the cantonal CIT rates as well as the increase in dividends taxation, but does not consider possible dynamic effects on firms' investment. The overall budgetary impacts are to some extent uncertain depending on behavior by individual firms, cantons' final implemented tax packages (CIT rates and innovation tax incentives), the exact federal package that will be implemented, and CIT developments in other countries. Regarding firms' responses, one key parameter for estimating the revenue impacts of the reform is the elasticity of taxable income. Recent meta-analysis in Beer et al. (forthcoming) suggests that the semi-elasticity of profit with respect to the CIT rate is -1.2 and tends to be larger for US companies. Importantly, Dowd et al. (2017) find using U.S.

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[16] Analyzing tax neutrality between legal forms (corporate vs. individual) in Switzerland involves detailed analysis since it depends on each canton's personal income tax schedule, CIT, net worth taxes, and social security contributions, inter alia. Therefore, a detailed coverage of this issue is beyond the scope of this paper.

[17] Switzerland levies a one-time federal stamp duty (of 1 percent) on the issuance of corporate equity.

[18] The expected budgetary cost of Tax Proposal 17 is lower than the reform proposal rejected in 2017 (Chatagny et al., 2017), which foresaw, inter alia an ACE.

firm-level data that the profit semi-elasticity is nonlinear in the CIT rate, ranging from -0.7 (for an increase in the CIT rate from 29 to 30 percent) to -4.7 (for a CIT rate increase from 4 to 5 percent).

E. Conclusions

34. The Swiss corporate tax system includes many aspects of a territorial regime; is highly attractive for MNCs; and collects non-negligible revenues, but the status quo is not sustainable. The proposed reform would eliminate differences in the tax treatment of foreign and Swiss sourced income. Further, cantons are expected to lower their CIT rates, bringing the combined (municipal, cantonal, and federal) tax rate (averaged across cantons) to about 13.9 percent. Costs of lowering the CIT rates would be unequally distributed across cantons, and would be costlier for cantons with a large immobile CIT base. As the tendency towards CIT rate and base competition between cantons— including for less- mobile capital—intensifies, strengthening measures to tackle possible income shifting between cantons would safeguard revenues. From an international perspective, there is a limit to the benefits from a low CIT rate as it can prompt the payment of tax in the country of the foreign investor, and hence become ineffective in attracting FDI. Additionally, it is important to consider the neutrality of the tax system with respect to the legal form that may put the personal income tax base at risk. Regarding encouraging innovation, at a given cost, the innovation package should maximize the use of R&D tax deductions in relation to the patent box to encourage real domestic investment and job creation.

Box 2. Potential Spillover Effects of International Tax Reforms on Switzerland

FDI is important for Switzerland. The stock of inward FDI equaled 128 percent of Swiss GDP in 2016. The US is an important source of FDI for Switzerland. The share of U.S. FDI in Switzerland, after correcting for the country of the ultimate-beneficial owner, has increased from about 30 percent in 2006 to about 44 percent in 2016. In contrast, FDI from the EU has declined from 43 to 37 percent during this period. According to the US BEA, about 5 percent of total U.S. corporate net income abroad reported in Switzerland, but which is likely an under estimate as it does not consider U.S. FDI in Switzerland through a third country. In contrast, 1 percent of employment by US companies abroad is in Switzerland, corresponding to 118,000 employees.

Figure 1. Swiss Inbound FDI Capital Stock
(Share in total inbound FDI, percent)

Sources: SNB; and IMF staff calculations.

Switzerland remains an attractive host to investment, despite recently-intensified tax competition. There is a global trend toward lowering the CIT rate and strengthening rules against outbound profit

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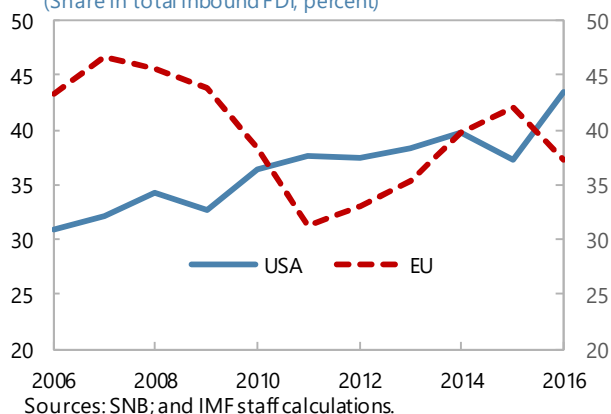
Box 2. Potential Spillover Effects of International Tax Reforms on Switzerland (concluded)
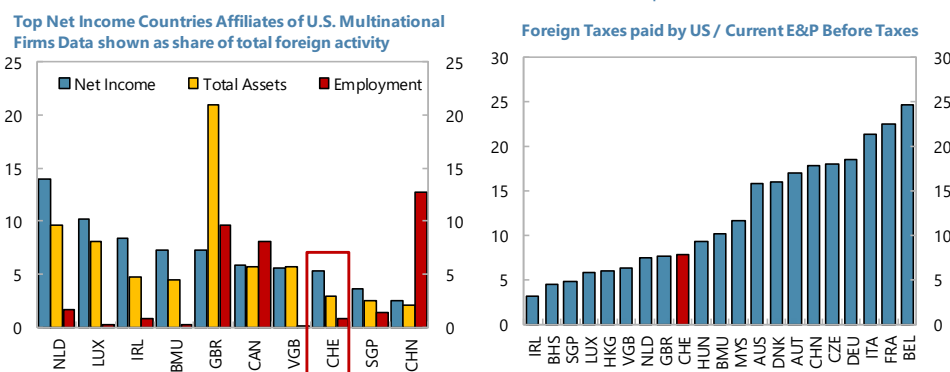
shifting. For example, both France and Belgium have recently announced they will lower their CIT rates to 25 percent, and the 2016 EU's Anti-Tax Avoidance Directive obliges Member States to adopt several rules again tax avoidance. The 2018-cut in the US federal statutory CIT rate to 21 percent (25.75 percent combined rate), follows this international trend, and could make the US more attractive for investment (IMF, 2018), but this rate remains higher than the expected Swiss post-reform average of about 13 percent. The 'territorial' aspect of the new US CIT system intensifies international competition over U.S. investment (IMF, 2018), but Switzerland would remain relatively competitive compared to other countries. One measure of the effective CIT rate on US investment in Switzerland was 7.7 percent in 2014, close to the Swiss federal rate, possibly reflecting the use of cantonal preferential regimes. This rate is higher than in Luxembourg and Ireland, but lower than in Germany and France. The Swiss effective CIT rate is expected to increase (to about 10.9 percent after abolishing the preferential regimes), but other countries' effective CIT rates will increase as well, as e.g., in the EU (ATAD and recent European Court of Justice decisions regarding state aid).

Swiss FDI in the US benefits from the US reform, whereas some Swiss companies may be negatively impacted by the strengthening of the US anti-abuse rules. Ultimately, the effect of the US tax reform is company-specific. Swiss companies in the US—particularly highly-profitable companies, such as pharmaceuticals—benefit from the US CIT rate cut in the form of windfall gains and a lower cost of capital. However, Swiss banks and Swiss insurance companies, may be negatively impacted because of the strengthening of the US anti-abuse rules, such as the introduction of the 'Base Erosion Anti-Abuse Tax' (BEAT) and of the anti-hybrid rule. The BEAT applies to gross payments to foreign related-parties. The anti-hybrid rule addresses situations, e.g. where Swiss banks finance their branches in the US using instruments captured as equity for capital requirement purposes, but treated as debt in the US for tax purposes.

Incentives to repatriate profits held by U.S. subsidiaries abroad can have a short-term impact on withholding tax revenues in Switzerland. The withholding tax rate on dividends for corporations in the bilateral tax treaty between the US and Switzerland is 5 percent (a final tax as US tax credits are no longer possible). Routing dividends through a third country with a zero withholding tax, such as the Netherlands or the UK, though possible, may be impeded by Swiss treaty rules against treaty shopping and may trigger, under certain circumstances, a Swiss tax.

 Thus, overall, the spillover effects from the recent U.S. tax reform on Switzerland appear to be moderate. There is no evidence, thus far, of major shifts of US-Swiss FDI patterns. However, this is a preliminary view since it is still rather early to fully assess the spillover effects of the U.S. reform.

Figure 2. U.S. Affiliates Abroad
(Percent of total net income abroad and percent)

Top Net Income Countries Affiliates of U.S. Multinational Firms Data shown as share of total foreign activity

Foreign Taxes paid by US / Current E&P Before Taxes

Sources: US BEA and IMF staff estimates.
Note: Numbers are for 2014. The right panel presents a measure of the effective tax rate of U.S. affiliates abroad computed as the ratio of income taxes paid by foreign subsidiaries of US companies with positive current earnings and profits (E&P) to current E&P before income taxes.

Annex I. Computing the Corporate Tax Rate in Switzerland: An Illustration

In addition to the federal tax rate, many cantons levy a flat CIT rate on total taxable income. In some cantons the rate is multiplied by a canton 'multiplier'. For example, in the canton of Zurich the canton rate is 8 percent and the multiplier is 1 (i.e., the rate is multiplied by one). The municipality tax is computed as a multiplier of the canton tax. In the city of Zurich, the multiplier is 1.2901 of the rate in the canton of Zurich. Table A1 presents an example of computing the effective CIT rate in Zurich.

Table 1. An Example of Computing the CIT Rate in Switzerland

Federal l rate	8.5%
Canton of Zurich (8% * 1)	8%
City of Zurich (8% * 1.2901	10.3208%
Total (statutory) rate	Sum the above 3 rows: 26.8208%
Effective combined rate† (because the tax itself is deductible) = statutory rate/(1+statutory rate)	21.15%

† To compute the effective rate, let $t^{Statutory}$ be the amount of the final tax which is deductible, and consider 1 CHF of taxable income: $(1 - t^{Effective}) \times t^{Statutory} = t^{Effective}$, which implies that the $t^{Effective} = t^{Statutory}/(1+t^{Statutory})$.

References

Beer, S., De Mooij, R., and Li, L., forthcoming, International Corporate Tax Avoidance: A Review of the Channels, Effect Sizes and Blind Spots, IMF Working Paper.

Bundesrat, 2018, Botschaft zum Bundesgesetz über die Steuervorlage 17 (SV17). Bern, March 2018.

Chatagny, F., Koethenbuerger, M., Stimmelmayr, M., 2017, Introducing an IP License Box in Switzerland: Quantifying the Effects, *International Tax and Public Finance* 24, 927-961.

De Mooij, R., Hebous, S, Hrdinkova, M., 2018, Growth-Enhancing Corporate Tax Reform in Belgium, *Nordic Tax Journal*, Forthcoming.

Dowd, Tim, Paul Landefeld, and Anne Moore, 2017, Profit Shifting of U.S. Multinationals, *Journal of Public Economics* 148, 1-13.

Frey, R., and Wettstein, G., 2008, Reform of the Swiss Fiscal Equalization, *CESifo DICE Report* 1/2008.

Hebous, S., and Ruf, M, 2017, Evaluating the Effects of ACE Systems on Multinational Debt Financing and Investment, *Journal of Public Economics* 156, 131-149.

International Monetary Fund, 2018, Capitalizing on Good Times, Fiscal Monitor, April.

International Monetary Fund, 2016a, Tax Policy, Leverage and Macroeconomic Stability, IMF Policy Paper, October.

International Monetary Fund, 2016b, Fiscal Policies for Innovation and Growth, Fiscal Monitor, April.

Keen, M., 2001, Preferential Regimes Can Make Tax Competition Less Harmful, *National Tax Journal* 54(4), 757-762.

Keen, M. and Konrad, K. A., 2013. The Theory of International Tax Competition and Coordination. In: Auerbach, A. J., Chetty, R., Feldstein, M. and Saez M. (Eds.), Handbook of Public Economics, Volume 5., Amsterdam & Oxford, Elsevier, 257-328.

SWITZERLAND'S MONETARY POLICY RESPONSE TO EXCHANGE MARKET PRESSURE IN A CROSS-COUNTRY EXAMINATION[1]

A. Introduction

1.   Very accommodative monetary policies by major central banks and several episodes of severe risk aversion have generated spillovers to small, open economies. In response to the

global financial crisis (GFC) and its aftermath, major central banks adopted historically-low interest rates and unconventional policies in order to revive inflation and economic activity. The resulting increase in domestic demand benefited the rest of the world, primarily through trade channels. However, numerous countries also experienced spillovers through their foreign exchange markets, resulting in sizable capital inflows.[2] In addition, several countries—most notably Switzerland—faced appreciation pressure during periods of heightened global and regional economic and political uncertainty.

Trend appreciation of the Swiss franc
(Units)

Source: Haver.
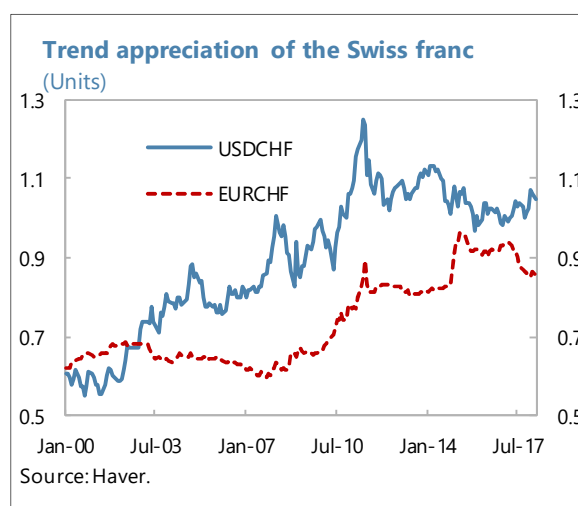
2.   Policy responses to these pressures varied by country, depending on their monetary frameworks and space available under various instruments. Central banks responded—to varying degrees—to appreciation pressures by allowing the appreciation or by resisting it through: (i) purchases of international reserves or domestic assets and, in the process, raising the supply of domestic currency to help meet the increase in demand; and/or (ii) lowering interest rates, thereby narrowing the interest differential with respect to foreign counterparts. In theory, hard peggers would have purchased foreign exchange reserves; pure floaters would have allowed the appreciation; and inflation targeters would have lowered interest rates, with possible induced effects on the exchange rate.[3] In practice, however, many central banks relied on combinations of tools, at different times or even simultaneously. Decisions were often dictated by where policy space existed. When interest rates had reached—or had fallen below—the zero lower bound, and exchange rate appreciation had triggered deflation, central banks tended to expand their balance sheets.

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[1] Prepared by Apostolos Apostolou (EUR) and Tryggvi Gudmundsson (MCM). The paper has benefited from comments and suggestions from Christian Grisse at the Swiss National Bank.

[2] IMF Spillover report (2015).

[3] Limits on the free mobility of capital and looser fiscal policy were also used to varying degrees by some countries.

3.   **With a focus on Switzerland, this paper looks at how several central banks responded to exchange market pressures during the decade since 2008**. Other countries in Europe, but outside the euro area, also experienced pressures during this period. We compare Switzerland's experience with that of several other countries with close economic ties to—but on the perimeter of—the euro area, namely the Czech Republic, Denmark, Israel, Poland, and Sweden. These countries each have their own currency, their economies are small and open, but they are heterogeneous in terms of exchange rate regimes and monetary policy frameworks (Annex Table 1):

- Switzerland established price stability as its policy target in 1999, which the Swiss National Bank (SNB) implements using a target range for the three-month Swiss franc Libor. The SNB lowered interest rates during the GFC to avert a prolonged slowdown and sustained deflation. Before 2011, Switzerland had a floating exchange rate regime; during late-2011 and early-2015, it maintained a minimum exchange rate floor against the euro; and, since then, it returned to a floating exchange rate regime.

- The Czech Republic introduced inflation targeting in 1998. Faced with deflationary pressure and the effective lower bound on the policy interest rate, the Czech National Bank (CNB) introduced an exchange rate floor against the euro in November 2013. The floor was removed in April 2017.

- Denmark has been a member of ERM2 since 1999, and maintains a fixed exchange rate against the euro within a narrower fluctuation band than ± 2.25 percent. Large shocks are therefore absorbed through channels other than the exchange rate.

- Israel introduced inflation targeting in 1992. Since the GFC, the Bank of Israel (BoI) has purchased foreign reserves to build up the level of official reserves, which were assessed as insufficient, and to address disorderly market conditions. In addition, since 2013, the BoI has been purchasing foreign reserves under a pre-announced program to compensate the effect on the exchange rate of replacing energy imports with domestically-produced natural gas.[4]

- Poland and Sweden are both inflation targeters, and operate floating exchange rate regimes whereby shocks are partly absorbed by the price of the currency.

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[4] Purchases under the pre-announced program reached about 11 percent of total foreign currency reserves at end-March, 2018.

Figure 1. NEER, REER, Policy Rates and Central Banks Balance Sheet

Policy Rates
(Percent)

Legend: ECB, Switzerland, Israel, Denmark, Sweden, Czech, Poland
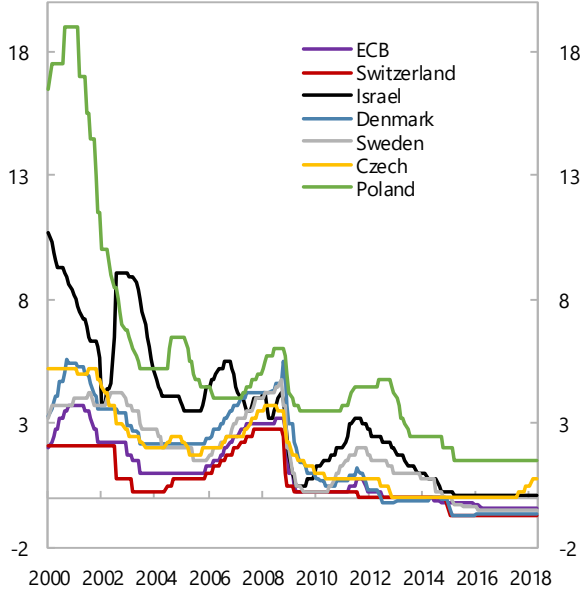
Source: Haver.

NEER
(Index - Jan.2000=100)

Legend: CHE, CZE, DNK, ISR, POL, SWE
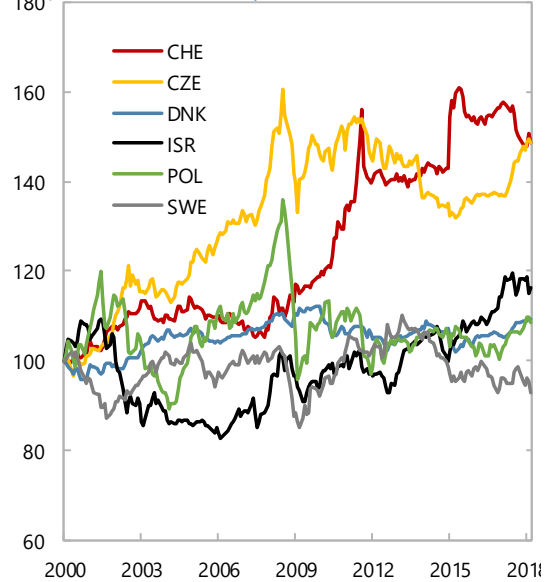
Source: IMF IFS database.

REER
(Index - Jan.2000=100)

Legend: CHE, CZE, DNK, ISR, POL, SWE
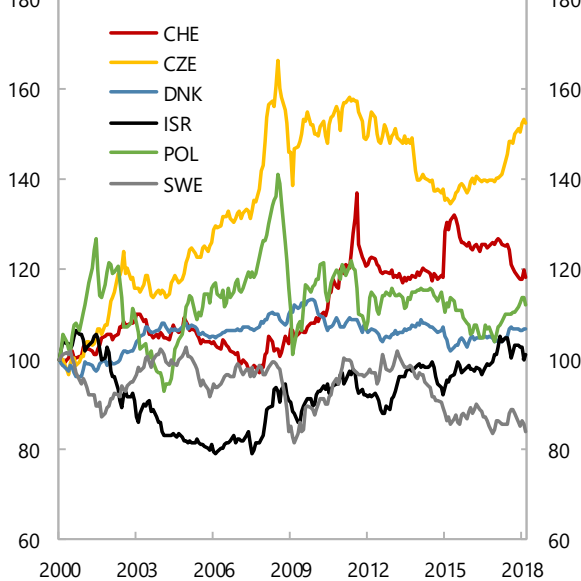
Source: IMF IFS database.

Central bank balance sheets
(Percent of annual GDP)

Legend: CHE, CZE, DNK, ISR, POL, SWE
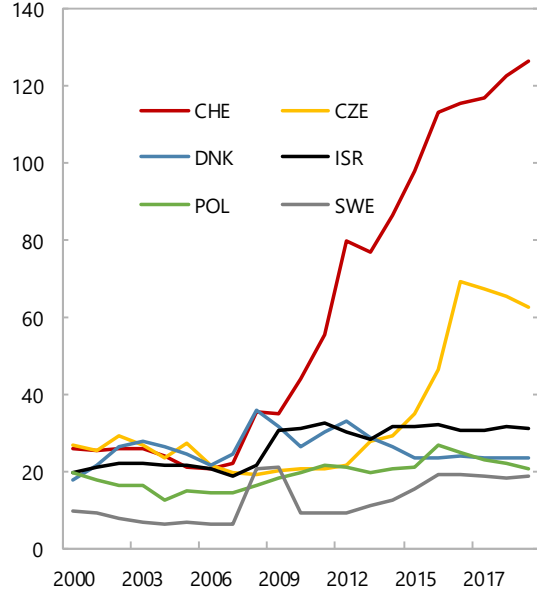
Sources: Haver; IMF WEO, 2018; and IMF staff calculations

4. **Based on the evolution of exchange rates and balance sheets, two groups of countries are apparent.** While all five countries reduced their interest rates after the GFC, central bank balance sheets for Switzerland and the Czech Republic expanded considerably and their nominal exchange rates appreciated significantly. Among the other countries, nominal exchange rates and balance sheets were more stable in the post-crisis period.

B.   EMP—Concept and Methodology

5. **Exchange market pressure (EMP) indices measure the intensity of pressure on a country's exchange rate, and quantify the channels through which that pressure is absorbed.** EMPs can be used to compare pressure and policy responses across time and across countries. Since Girton and Roper (1977), EMPs have primarily been used to document the extent of outflow pressure and associated responses in emerging markets.[5] Policy responses often entailed difficult choices: receive temporary relief by selling some of the dwindling stock of foreign exchange reserves; raise the policy interest rate to support demand for local currency, but at the cost of weakening economic activity; or allow the depreciation, which might improve external competitiveness but would also raise the domestic currency-equivalent of residents' foreign currency-denominated debt. More recently, EMPs have been applied to situations of upward pressure on exchange rates, including in the context of the large capital inflows into Eastern Europe and other regions prior to the GFC (Hegerty (2009), WEO (October, 2007)). In these cases as well, central banks faced tough choices because appreciation hurts net exports and heightens vulnerability to a sharp reversal of inflows, while expanding liquidity as a result of reserve accumulation can create financial stability risks. Policy instruments may also face constraints, including hitting the effective lower bound on interest rates.

6. **EMP is a weighted average of monetary policy responses and is independent of the source of pressure**. Typically, three responses are considered—the exchange rate, the interest rate, and official foreign exchange intervention. In a pure float, EMP depends only on the change in the exchange rate. Under a peg, where the exchange rate remains constant, fluctuations in EMP are attributed to changes in reserves. Under inflation targeting, EMP captures changes to the policy rate and any induced movements in the exchange rate. Weights are needed to aggregate the three responses, and the literature has relied on several approaches: (i) weights calibrated from a structural macroeconomic model (Girton and Roper (1997), Weymark (1995) and Goldberg and Krogstrup (2018)); (ii) empirically-derived weights (Patnaik and others (2017)); and (iii) relative volatility weights, based on the inverse of the standard deviations of each of the components (WEO (2007)), thereby giving more weight to instruments that are used less actively.[6] Following

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[5] For example, Kaminsky and Reinhart (1999) and Pentecost et al (2001).

[6] Weymark (1995) and Goldberg and Krogstrup (2018) use model-consistent weights based on the estimated elasticities. Pentecost, Van Hooydonk, and Van Poeck (2001) use principal component analysis to obtain the weights. We follow Kaminsky and Reinhart (1999); and Van Poeck, Vanneste, and Veiner (2007), who use variance-smoothing weights, which ensures that none of the components dominates the index. WEO (October, 2007) uses time-varying weights equal to the inverse of the within-year standard deviations of the variables.

Eichengreen and others (1996), we weigh the individual EMP components by the inverse of their standard deviations over the entire sample.[7]

7.   We use the EMP index to quantify how central banks on the perimeter of the euro area relied on exchange rate, foreign reserves, and interest rate channels to absorb exchange market pressures. Typically, policy actions by foreign central banks and their effect on the domestic EMP have been ignored in the literature; but here we measure policy responses relative to a reference central bank. The counterfactual effect on other policy instruments when adjustment through one instrument is dampened is also considered.

8.   The EMP index adopted here is constructed as the weighted sum of changes in the exchange rate, official foreign exchange reserves and interest rates, all relative to a reference country. Specifically:

$$EMP = \frac{1}{w_e}\frac{\Delta e_t}{e_t} + \frac{1}{w_{\left(\frac{\Delta R_t}{Y} - \frac{\Delta R_t^*}{Y^*}\right)}}\left(\frac{\Delta R_t}{Y_t} - \frac{\Delta R_t^*}{Y_t^*}\right) - \frac{1}{w_{i-i^*}}\Delta(i_t - i_t^*)$$

where

   e is the NEER or bilateral exchange rate, defined as number of euro per unit of local currency

   R is international reserves (measured in local-currency terms) or the monetary base of the central bank

   Y is nominal GDP, measured in local currency

   i is the policy interest rate[8]

   w is the standard deviation of each variable over the 1999–2018 sample period[9]

   Δ is the first difference operator. Variables with a "*" denote those corresponding to the reference central bank, in this case, taken to be the ECB (unless otherwise indicated), while those without refer to the home country.

A positive EMP indicates net appreciation pressure, and is typically associated with some combination of a strengthening exchange rate, increasing reserves, and/or a decrease in the gap between the home country's and the reference country's interest rates. A negative EMP indicates

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[7] Different weighting schemes can generate quite different measures of total EMP and relative contributions of each component. See Goldberg and Krogstrup (2018) for a critique of established approaches. In particular, weighing by the inverse of the standard deviation (precision weights) implies that more weight is given to components with less variation. Under a pegged exchange rate, this tends to be the exchange rate, with changes in reserves responding to exchange market pressures in such a regime. Nonetheless, all weighting schemes have their own limitations.

[8] An increase in the interest rate differential tends to increase appreciation pressure, and hence this term enters with a negative sign.

[9] Data for some countries begins in 2002.

depreciation pressure which may be tempered by an interest rate increase and/or reserve sales. In both cases, one or more components may move in the opposite direction to overall EMP.[10] Moreover, because EMP is measured relative to a reference country, changes in policy instruments by the reference country that are matched by those of the home country do not generate pressure.

C.   Results

9.   We compute EMP indices for Switzerland, the Czech Republic, Denmark, Israel, Poland, and Sweden for the period 1999–2018, using monthly data. Point-in-time and cumulative EMPs are calculated. The results are presented in the form of charts.

Switzerland

10.   The EMP for Switzerland indicates that exchange market pressure intensified following the GFC. Before 2009, the EMP for Switzerland was small and bi-directional (both appreciation and depreciation pressures). Post-GFC, Switzerland experienced several episodes of large appreciation pressure, especially during 2010–11 and again in 2015. With interest rates already below the ECB's and very close to zero, further reduction in the euro area policy rate narrowed the interest rate differential, leading to a negative EMP contribution (i.e., a tightening of policy). As a result, the SNB accumulated foreign reserves to defend against appreciation pressure, but the franc nonetheless appreciated significantly.[11] Since mid-2017, the sign of EMP switched to negative, and has mainly been reflected in depreciation of the franc.

CHE - EMP composition (NEER)
(Units - 12 month rolling window)

Legend: i — Reserves — ER — Total

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations

CHF and interest rate differential
(Percent - ∑ΔFX in 1999.Jan=2008.Jan=2011.Aug=2014.Dec=0)

Legend: CHFEUR-1M-Libor-Spread; ∑%ΔEURCHF (lhs)

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations

11.   For Switzerland, cumulative EMP has been large and positive. While cumulative EMP declined in 2011, following the adoption of the exchange rate floor, more generally pressures have tended to increase monotonically. Based on the weighting scheme described previously, the
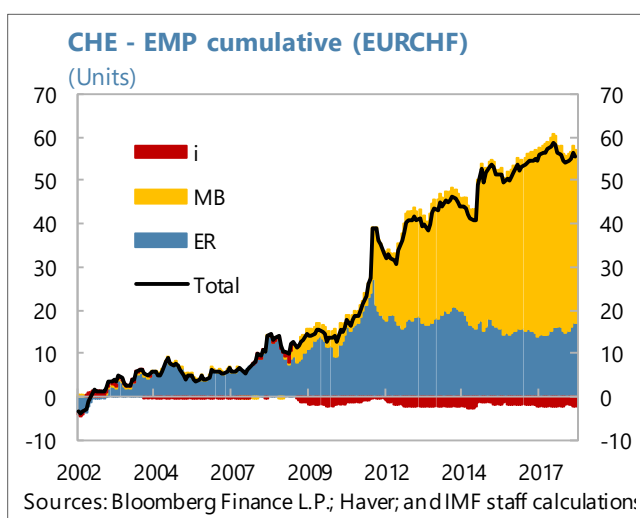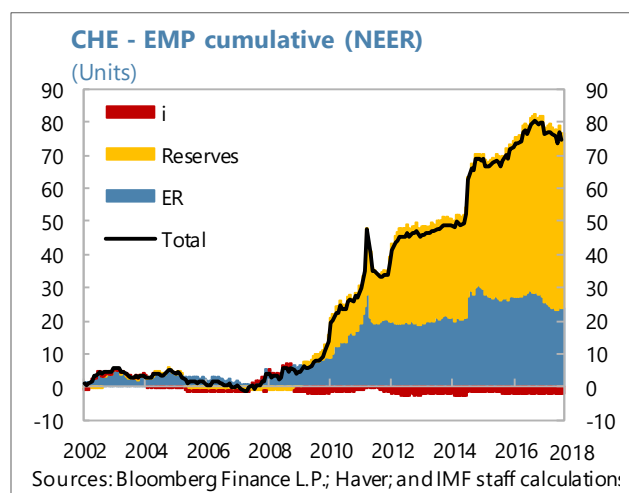
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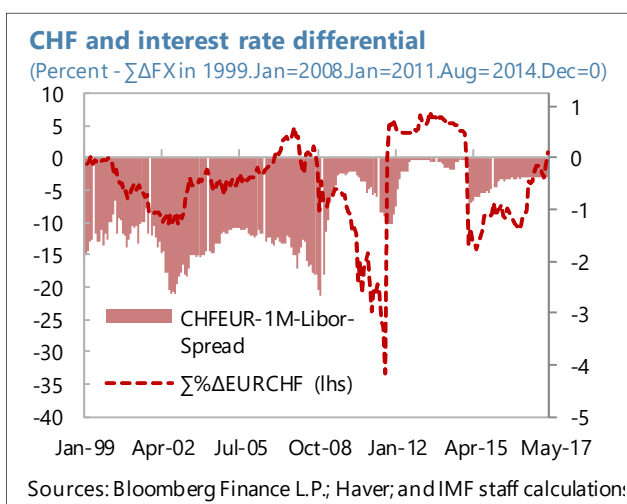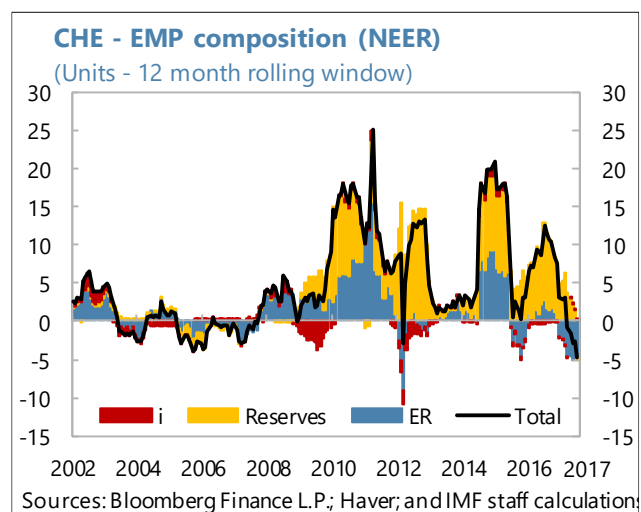
[10] For example, according to uncovered interest parity, an increase in the interest rate is associated with a subsequent depreciation of the currency.

[11] In 2012, the SNB temporarily divested some reserves.

exchange rate initially absorbed the largest share of the appreciation pressure. Since 2012, the role of reserve accumulation increased considerably. Interest rates played a modest—if slightly negative—role owing to the limited policy space.

CHE - EMP cumulative (NEER)
(Units)

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations

12.   The results are similar if changes in reserves are replaced with changes in the monetary base. Changes in reserves reflect both foreign exchange intervention and valuation effects on the existing stock of reserves, including those due to exchange rate movements. Moreover, change in the monetary base has the advantage that it also captures purchases and sales of domestic assets by the home country's and the reference country's central bank. Replacing official reserves with monetary base reveals a similar EMP pattern for Switzerland, although the extent of EMP is somewhat lessened because (i) it excludes valuation effects on (mainly foreign) assets acquired by the SNB and (ii) it includes the ECB's monetary base expansion due to purchases of euro-area assets.

CHE - EMP cumulative (EURCHF)
(Units)

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations

Other Countries

13.   Denmark's EMP remained bi-directional since the GFC, although the intensity of pressure—in both directions—increased. Given the limited flexibility for the exchange rate owing to the narrow band of the Danish krona against the euro, and the modest scope for interest rate differentials against the euro area, most of Denmark's EMP was ultimately absorbed by reserve accumulation. Nonetheless, the exchange rate helped to absorb a significant share of the bi-directional EMP, although in cumulative terms, its contribution was small.

14.   Sweden also saw bi-directional EMP since the GFC, but its exchange rate absorbed more of the pressure, consistent with its more flexible exchange rate regime. Sweden faced substantial depreciation pressure at the onset of the GFC, followed by two episodes of strong appreciation pressure and, since 2014, a return to moderate depreciation pressure. During the initial appreciation episode, the interest differential increased as the Riksbank raised its policy rate, which supported the buildup of a reserve buffer. Since then, Sweden has experienced sustained negative EMP, which has unwound the previous cumulative appreciation pressure. During this later period, the exchange rate was allowed to depreciate, but tempered by some selling of official reserves.

15.   Israel experienced significant positive EMP following the GFC, with reserve accumulation absorbing most of the pressure. Israel faced negative EMP pressure before the GFC. Since then, it has seen substantial appreciation pressure, especially in the early on in the crisis. This pressure was met primarily with reserve accumulation, possibly attracted by a widening of the interest rate differential, allowing it to reinforce its reserve adequacy. Later episodes were met with a combination of reserve accumulation and a strengthening exchange rate. All told, pressure was mainly absorbed through reserve accumulation.

16.   Poland also experienced bi-directional EMP, with strong depreciation pressure at the onset of the GFC followed by net appreciation pressure thereafter. The policy response reflects the build-up of reserves for precautionary purposes since the GFC, interest rate cuts since 2013 to fight low inflation/deflation. These responses helped to stabilize the zloty against euro in recent years.[12]

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[12] Reserve accumulation was in part to meet the qualification criterion on holding adequate reserves under the IMF's Flexible Credit Line (IMF Country Report No. 16/12).

Figure 2. Point-in-Time (12 Month Rolling Window) and Cumulative EMP

DNK - EMP composition (EURDKK)

DNK - EMP cumulative (EURDKK)

SWE - EMP composition (EURSEK)

SWE - EMP cumulative (EURSEK)

ISR - EMP composition (EURILS)

ISR - EMP cumulative (EURILS)

POL - EMP composition (EURPLN)

POL - EMP cumulative (EURPLN)
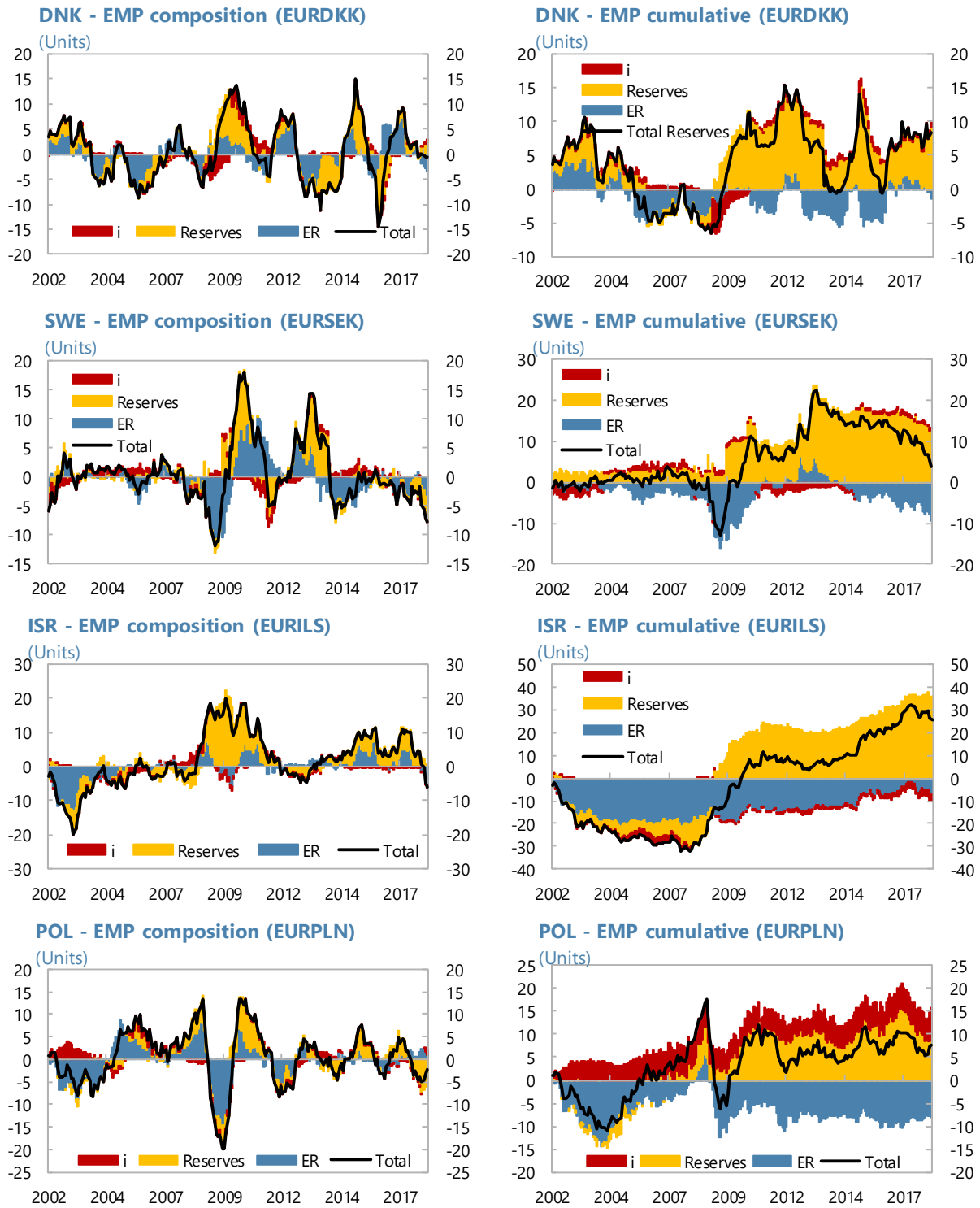
Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations.

17.   Prior to adopting the exchange rate floor, the Czech Republic faced bi-directional EMP, but appreciation pressures intensified prior to removing the floor. Before 2013, the exchange rate absorbed most of the EMP, with the exchange rate both appreciating and depreciating. With the introduction of the floor, exchange market pressures subsided, and accumulation of reserves allowed the koruna to depreciate (i.e., move above the floor). After pre-announcing in late 2016 that the floor would be removed, appreciation pressure increased significantly, and the CNB substantially increased its foreign exchange reserve purchases.

Figure 3. Switzerland and Czech Republic

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations.
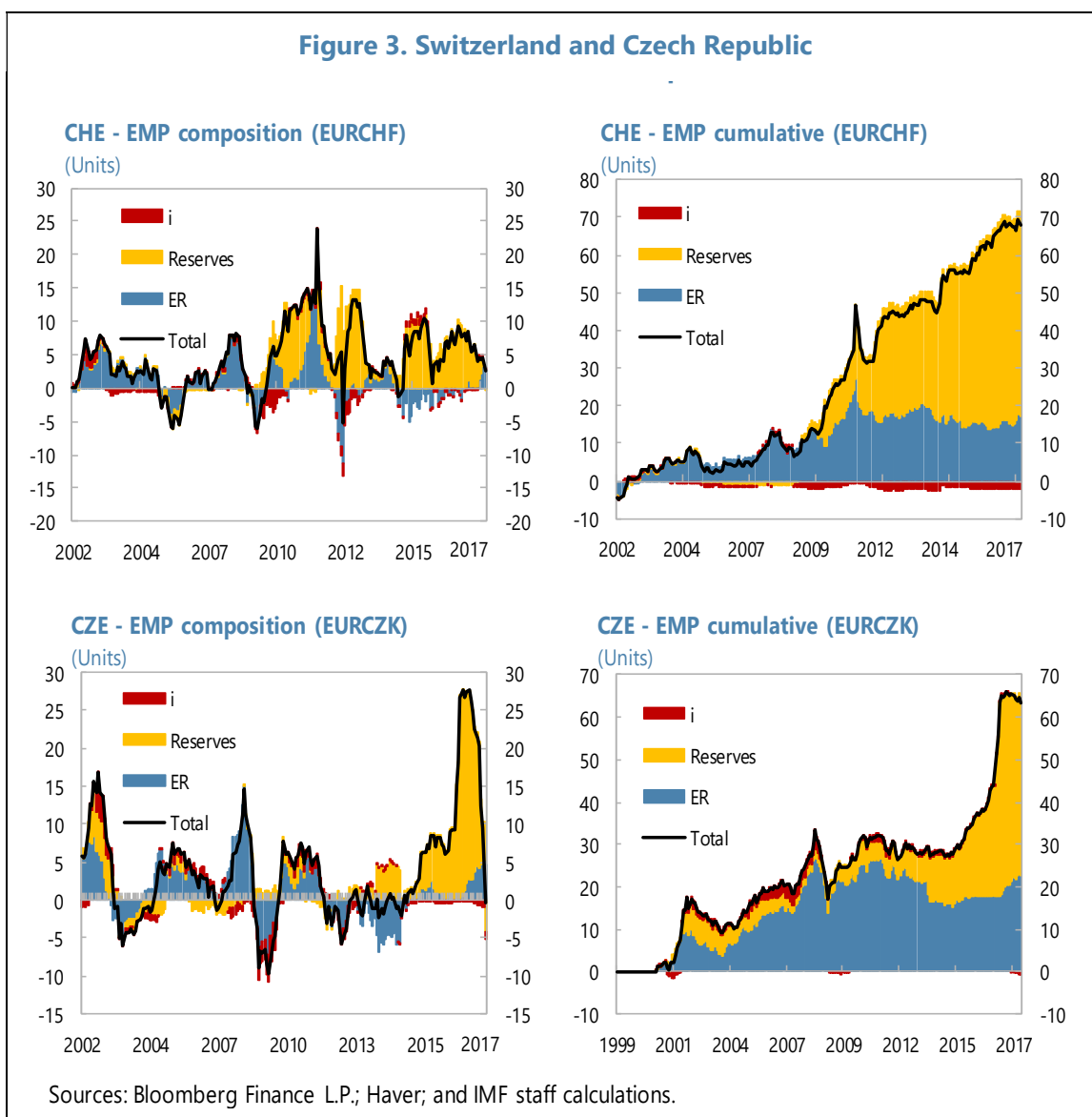
18. **A cross-country comparison of EMP reveals both common and idiosyncratic features.** At the onset of the GFC, all countries in the sample—with the exception of Israel—experienced depreciation pressure. Thereafter, pressures were more diverse across countries, although there were several extended periods of strong co-movement across countries (e.g., Switzerland and Sweden during 2012–14; Israel, Poland and Switzerland during 2014–17). Denmark, Poland and Sweden experienced bi-directional pressures since the GFC and, as a result, their cumulative EMPs are generally small. On the other hand, the Czech Republic and Switzerland saw several episodes of intense appreciation pressure that tended to only partially reverse. As a result, both countries have seen large cumulative appreciation pressure. Israel is somewhere in between these two groups—having shifted from bi-directional pressure to one-sided appreciation since 2014 that has led to sizable cumulative appreciation. All countries experienced depreciation—or weaker appreciation—pressure since mid-2017.
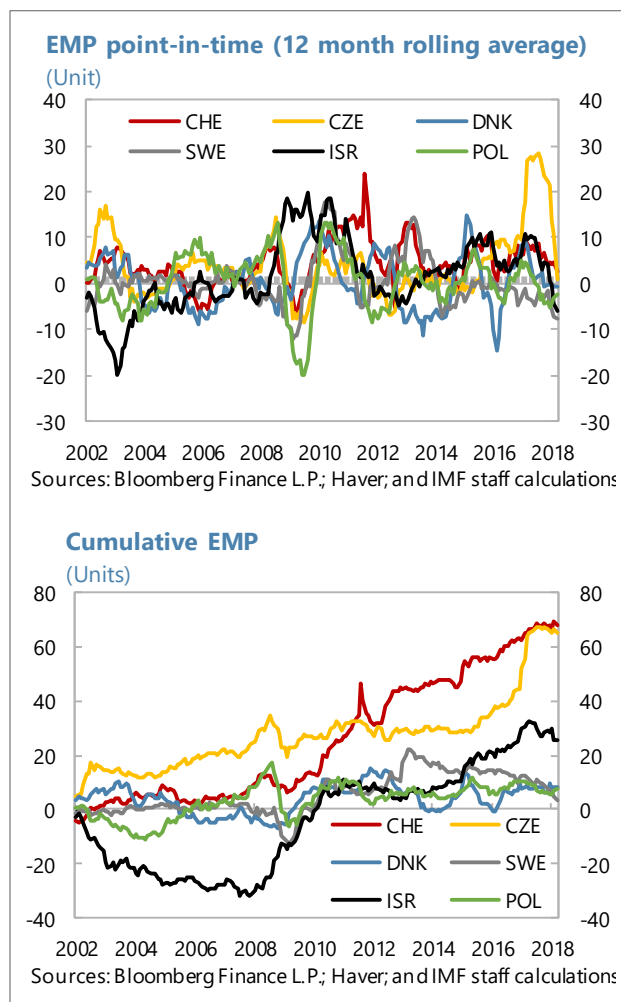
D.   Extensions

19. **The EMP framework may be used to obtain illustrative counterfactual paths for Swiss policy variables on the assumption that some channels were less-actively utilized to absorb appreciation pressures**:[13]

- Keeping the original path for the EMP and the actual contribution from the interest rate channel, one can derive a counterfactual exchange rate path

EMP point-in-time (12 month rolling average)
(Unit)

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations

Cumulative EMP
(Units)

Sources: Bloomberg Finance L.P.; Haver; and IMF staff calculations

Counterfactual
(Exchange rate)

Sources: Bloomberg Finance L.P, Haver; IMF staff calculations

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[13] The results in this section should be viewed as illustrative as these counterfactuals are based on strong assumptions. In particular, they assume that no countervailing market forces would have prevented the exchange rate or interest rate from reaching extreme levels. Similar reservations also apply to the shadow interest-rate literature. Additionally, as with the EMP concept itself, these results depend on the appropriateness of the weights.

assuming reserve accumulation was dampened. Comparing the actual and counterfactual exchange rates suggests that the franc would, ceteris paribus, have been around 40 percent stronger as of early 2018 if reserve accumulation had been halved.

Counterfactual
(Percent)

Swiss 3M Libor (dampened reserves contribution)

----- Swiss 3M Libor

2003 2005 2007 2009 2011 2013 2015 2017

Sources: Bloomberg Finance L.P, Haver; and IMF staff calculations

- A similar approach can be used to generate a counterfactual interest rate path. If reserve accumulation had been dampened by half, Swiss interest rates would have had to decline to very negative levels. Such levels are similar to shadow interest-rates estimated by Wu and Xia (2017) for the euro area on the assumption that the ECB's asset purchase program was replaced by lower short-term interest rates.
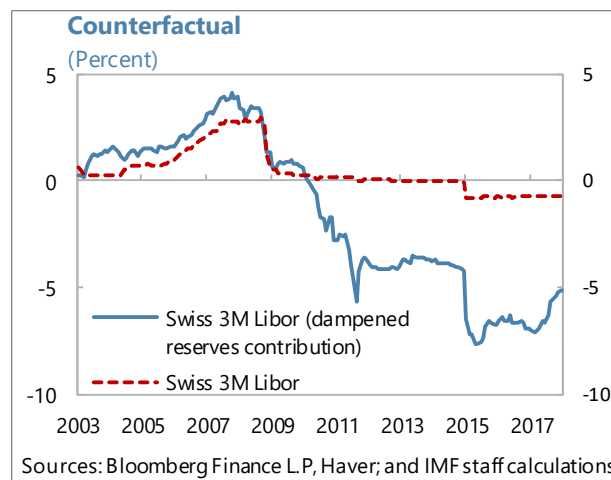
E. Conclusions

20. **Switzerland has experienced positive and relatively-sustained appreciation pressure for much of the past decade.** The EMP commenced with the onset of the GFC and continued periodically until mid-2017. Unlike typical safe-haven behavior that would tend to oscillate between positive and negative EMP—consistent with risk-off and risk-on cycles—Switzerland's EMP varied in intensity, but generally did not reverse until a year ago.[14] As a result, the cumulative pressure has been among the largest in the group of small open economies on the perimeter of the euro area. Despite large purchases of international reserves to resist the appreciation pressure, much of it was nonetheless absorbed through the exchange rate. Reserve accumulation avoided the need for a more appreciated exchange rate and/or much lower interest rates.

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[14] However, the Swiss franc appreciated strongly in May, 2018.

Annex I. Exchange Rate Classifications

Year	Czech Republic	Denmark	Israel	Poland	Sweden	Switzerland
1999	Managed	Peg	Crawling band	Floating	Floating	Floating
2000	Managed	Peg	Crawling band	Floating	Floating	Floating
2001	Floating	Peg	Crawling band	Floating	Floating	Floating
2002	Managed floating	Peg	Crawling band	Floating	Floating	Floating
2003	Managed floating	Peg	Crawling band	Floating	Floating	Floating
2004	Managed floating	Peg	Floating	Floating	Floating	Floating
2005	Managed floating	Peg	Floating	Floating	Floating	Floating
2006	Managed floating	Peg	Floating	Floating	Floating	Floating
2007	Floating	Peg	Floating	Floating	Floating	Floating
2008	Floating	Peg	Floating	Floating	Floating	Floating
2009	Floating	Peg	Floating	Floating	Floating	Floating
2010	Floating	Peg	Floating	Floating	Floating	Floating
2011	Floating	Peg	Floating	Floating	Floating	Other managed arrangement
2012	Floating	Peg	Floating	Floating	Floating	Other managed arrangement
2013	Other managed arrangement	Peg	Floating	Floating	Floating	Crawl-like arrangement
2014	Stabilized arrangement	Peg	Floating	Floating	Floating	Crawl-like arrangement
2015	Stabilized arrangement	Peg	Floating	Floating	Floating	Floating
2016	Stabilized arrangement	Peg	Floating	Floating	Floating	Floating

Source: IMF, Annual Report on Exchange Arrangements and Exchange Restrictions

References

Aizenman, Joshua, Jaewoo Lee and Vladyslav Sushko, 2012. "From the Great Moderation to the Global Crisis: Exchange Market Pressure in the 2000s," Open Economies Review, Springer, vol. 23(4), pages 597-621, September.

Bowman, David, Juan M. Londono, and Horacio Sapriza. "US unconventional monetary policy and transmission to emerging market economies." Journal of International Money and Finance 55 (2015): 27-59.

Bruno, Valentina, and Hyun Song Shin. 2014. "Cross-border banking and global liquidity." The Review of Economic Studies 82.2 (2014): 535-564.

Bruno, Valentina, and Hyun Song Shin. 2015. "Cross-border banking and global liquidity." Journal of Monetary Economics 71 (2015): 119-132.

Chen, Qianying, et al. "Financial crisis, US unconventional monetary policy and international spillovers." Journal of International Money and Finance 67 (2016): 62-81.

Eichengreen, Barry, Rose, Andy, and Wyplosz, Charles, 1995, "Exchange Market Mayhem: The Antecedents and Aftermaths of Speculative Attacks." Economic Policy, 21 (October), 249-312.

Eichengreen, Barry, Rose, Andy, and Wyplosz, Charles, 1996, "Contagious Currency Crises: First Tests." Scandinavian Journal of Economics, 98(4), 463-484.

Girton, Lance, and Don Roper. 1977. " A monetary model of exchange market pressure applied to the postwar Canadian experience." The American Economic Review 537-548.

Goldberg, Linda S., and Signe Krogstrup 2018. "International capital flow pressures." IMF Working Paper WP/18/30.

Hegerty, Scott W., 2009, "Capital inflows, exchange market pressure, and credit growth in four transition economies with fixed exchange rates." Economic Systems 33.2: 155-167.

International Monetary Fund, 2015, 'Spillover Report.

International Monetary Fund, World Economic Outlook, October, 2007, 'Globalization and Inequality.' Chapter 3.

Kaminsky, Graciela, Saul Lizondo, and Carmen M. Reinhart. 1998. "Leading indicators of currency crises." Staff Papers 45.1: 1-48.

Kaminsky, Graciela L., and Carmen M. Reinhart, 1999, "The twin crises: the causes of banking and balance-of-payments problems." American economic review 89.3: 473-500.

Patnaik, Ila, Joshua Felman, and Ajay Shah (2017. "An exchange market pressure measure for cross country analysis." Journal of International Money and Finance 73: 62-77.

Pentecost, Eric J., Charlotte Van Hooydonk, and Andre Van Poeck, 2001, "Measuring and estimating exchange market pressure in the EU." Journal of International Money and Finance 20.3: 401-418.

Rey, Hélène. 2016. "International channels of transmission of monetary policy and the Mundellian trilemma." IMF Economic Review 64.1: 6-35.

Ribon, Sigal, 2017, "Why the Bank of Israel Intervenes in the Foreign Exchange Market, and What Happens to the Exchange Rate," Bank of Israel, Discussion Paper No. 2017.04.

Tanner, Evan C. 2002. "Exchange Market Pressure, Currency Crises, and Monetary Policy; Additional Evidence From Emerging Markets," IMF Working Papers 02/14, International Monetary Fund.

Weymark, Diana N. 1997. "Measuring the degree of exchange market intervention in a small open economy." Journal of international Money and Finance 16.1: 55-79.

Weymark, Diana N. 1995. "Estimating exchange market pressure and the degree of exchange market intervention for Canada." Journal of International Economics 39.3: 273-295

Wu, Jing Cynthia, and Fan Dora Xia. 2016, "Measuring the macroeconomic impact of monetary policy at the zero lower bound." Journal of Money, Credit and Banking 48.2-3: 253-291.

Wu, Jing Cynthia, and Fan Dora Xia, 2017. "Time-varying lower bound of interest rates in Europe." Chicago Booth Research Paper No. 17-06.

BANKING SECTOR RESPONSES TO THE NEGATIVE INTEREST RATE POLICY[1]

1.   The Swiss National Bank (SNB) set the policy interest rate at minus 0.75 percent in January 2015. The SNB first announced a negative rate of minus 0.25 percent in December 2014, which was lowered to minus 0.75 percent with the removal of the exchange rate floor.[2] The negative rate applies to banks' sight deposits at the SNB, subject to bank-specific exemption thresholds of 20 times the minimum required level of reserves (fixed as of November 2014).[3] Balances below this amount carry a zero interest rate. To discourage banks from accumulating cash as way to avoid the negative rate, the exemption threshold is reduced (raised) by the cumulative increase (decrease) in a bank's cash withdrawals.[4] The interest rate and method for computing minimum exemption thresholds are unchanged since January 2015.

2.   The exemption threshold makes the effective rate considerably less negative than the marginal rate, helping to insulate banks' profits. Initially, sight deposits at the SNB jumped in response to the removal of the exchange rate floor, and thereafter, increased steadily until mid-2017. Staff estimates that sight deposits above banks' exemption thresholds, and hence subject to the negative deposit rate, currently amount to about CHF180 billion (39 percent of total sight deposits and 27 percent of GDP).[5] As a result, the effective rate on banks' deposits at the SNB is about -0.3 percent. Anecdotal evidence suggests that most banks have exhausted their exemption thresholds, including through interbank transactions.[6,7]

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[1] Prepared by Seung Mo Choi (EUR). The paper has benefited from comments and suggestions from Toni Beutler and Thomas Nitschka at the Swiss National Bank.

[2] The target range for 3-month Swiss-franc LIBOR was set between -0.25 and -1.25 percent in January 2015.
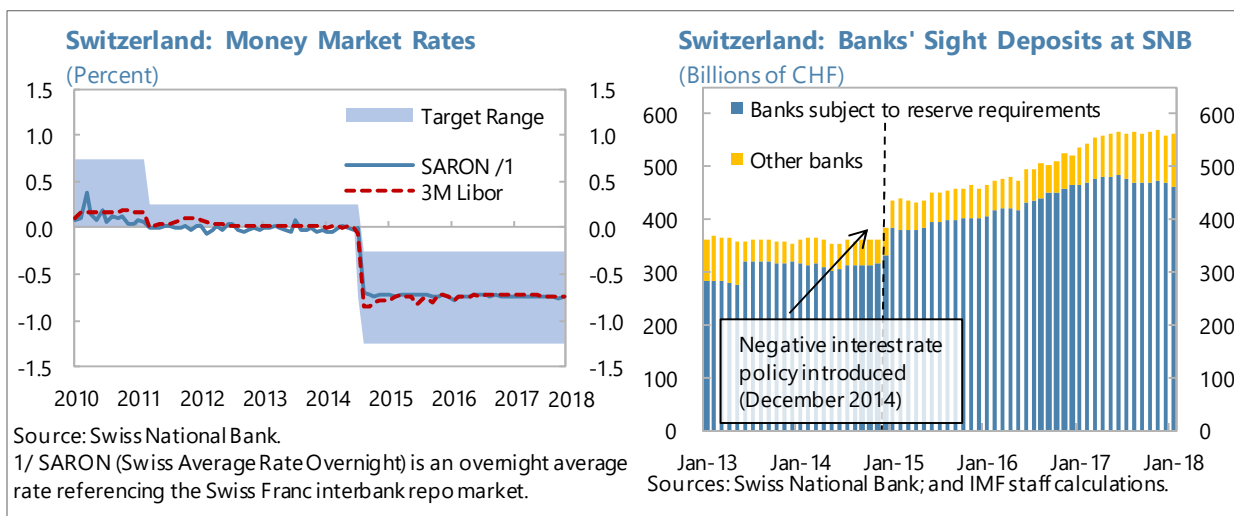
[3] Foreign banks and some non-bank holders of SNB accounts have different, but constant, exemption thresholds.

[4] The exemption threshold is computed as "the minimum reserve requirement of the reporting period of October-November 2014 times 20" minus/plus "an increase/decrease in cash holding from the reporting period of October-November 2014 to the current reporting period."

[5] This estimate is for the banks which are subject to the reserve requirements (i.e., blue bars in the text chart) and is obtained from two separate approaches: (i) information on minimum required reserves as of November 2014 and subsequent changes in banks' cash holdings; and (ii) the SNB's 2017 income statement which indicates a "net result from Swiss franc positions" which is assumed to reflect mainly interest collected on sight deposits. For all banks, according to the Swiss Banking Association (SBA), CHF234 billion of sight deposits at the SNB were subject to negative interest rates at the end of 2016.

[6] According to the Swiss Banking Association (SBA), a market for liquidity developed between banks whereby those with liquidity exceeding their exemption threshold (e.g., cantonal banks), transferred their excess liquidity for a fee to banks that were below their exemption threshold. Private banks are reported to have been most impacted by the NIRP primarily because they are subject to lower minimum statutory reserve requirements.

[7] The SNB (2017a) reported that as of 2016, "... Most of these [domestically-focused] banks' sight deposits remain below or at the exemption threshold, in spite of the steady increase observed since the introduction of negative interest. ..." (footnote 26).

Switzerland: Money Market Rates
(Percent)

Switzerland: Banks' Sight Deposits at SNB
(Billions of CHF)

Source: Swiss National Bank.
1/ SARON (Swiss Average Rate Overnight) is an overnight average rate referencing the Swiss Franc interbank repo market.
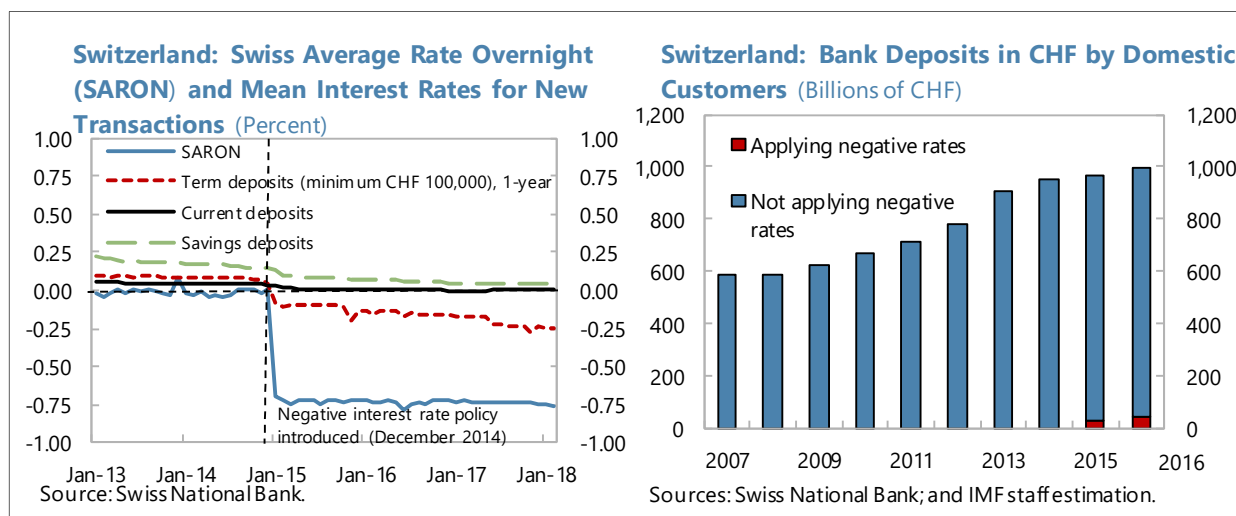
Sources: Swiss National Bank; and IMF staff calculations.

3. **The negative interest rate policy (NIRP) was transmitted quickly to the short-end of the interbank market, although global financial conditions had already pushed down longer rates.** The 3-month LIBOR converged quickly to the policy interest rate. Arbitrage opportunities encouraged banks to reallocate liquidity via the interbank market from those whose sight deposits were above their exemption threshold to those whose sight deposits were below the threshold.[8] Short-term government bond yields were modestly negative even before the adoption of NIRP, but decreased further thereafter. Interest rates on longer-term instruments also decreased, although they had been on a decreasing trend prior to the adoption of NIRP, with the entire yield curve for sovereign bonds (through to 50 years) falling into negative territory on at least one occasion.

4. **Banks kept most retail deposit interest rates floored at zero, while those on institutional depositors turned negative.** The zero-interest-rate floor for retail customers likely reflects banks' reliance on these deposits to fund their loan books, as well as retail depositors'

potentially higher elasticity of substitution between holding deposits and holding cash (relative to institutional investors). While no official data is available, deposit rates for institutional investors and, more recently, for large retail depositors (reportedly above CHF1 million) are thought to have declined close to the policy rate. Interest rates on new 1-year term deposits exceeding CHF100,000 turned modestly negative immediately after NIRP adoption, and have edged lower since then (but only to minus 0.25 percent). Rates on current accounts remain anchored at zero, while savings deposits maintain marginally positive

Switzerland: Customer Deposits Denominated in CHF 1/ (Billions of CHF)

Sources: Swiss National Bank; and IMF staff estimations.
1/ Assumes households, corporates, and the public sector hold only CHF-denominated deposits and that foreigners hold only foreign-currency-denominated deposits.

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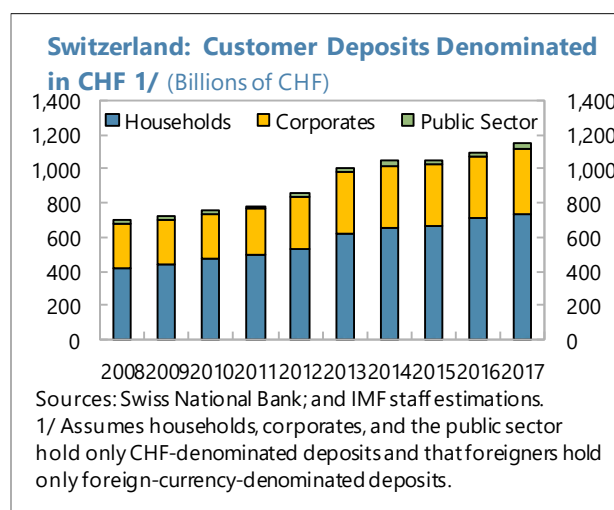
[8] See Basten and Mariathasan (2018).

rates. Overall, only 5 percent of franc-denominated deposits of domestic clients were subject to negative rates at end-2016.[9]

Switzerland: Swiss Average Rate Overnight (SARON) and Mean Interest Rates for New Transactions (Percent)

Switzerland: Bank Deposits in CHF by Domestic Customers (Billions of CHF)

Source: Swiss National Bank.

Sources: Swiss National Bank; and IMF staff estimation.

5.   To preserve interest margins when retail deposit rates are floored at zero, banks initially *raised* their mortgage lending rates. The interest rate on a 10-year fixed rate mortgage increased by 50 bps by mid-2015, although rates on shorter-duration loans increased by considerably less.[10] After that, mortgage interest rates declined, partly in response to competition from nonbank mortgage lenders with funding costs close to the policy rate. Rates have seen an uptick since late-2017, broadly in line with LIBOR swap rates typically used to price fixed-term mortgages in Switzerland (Cecchin, 2011). Nonetheless, interest rates on new fixed-rate mortgages have risen by much less than market interest rates since mid-2016, highlighting the pressure faced by banks in the mortgage market.

Switzerland: Interest Rates for New Mortgage Transactions (Percent)
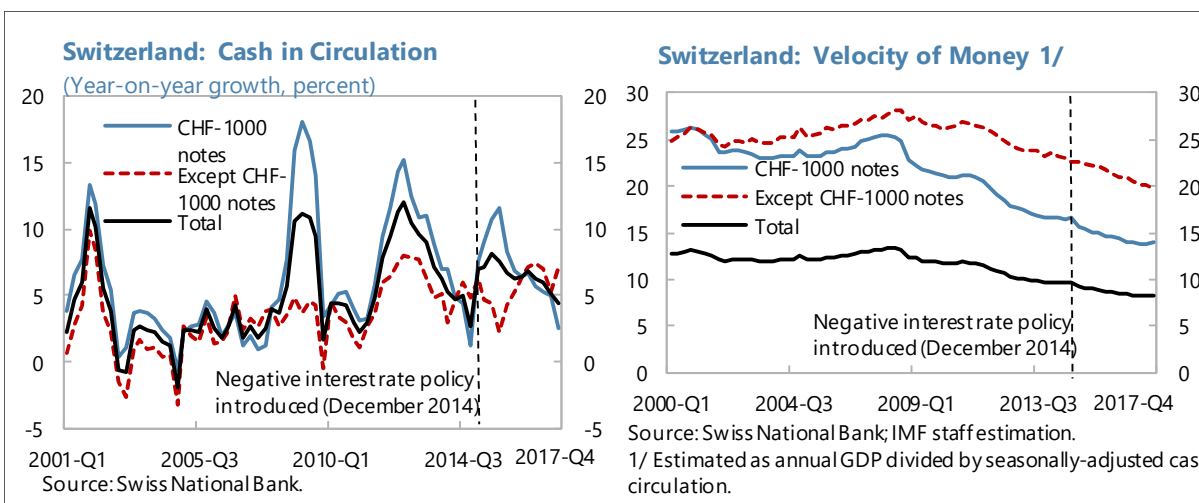
Source: Swiss National Bank.
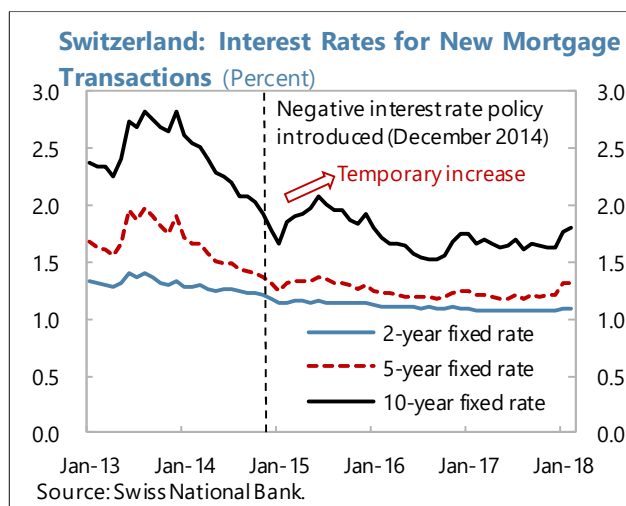
6.   As the foregoing discussion suggests, banks are—in effect—segmenting their balance sheets into above-zero and below-zero books, corresponding respectively, to their retail and institutional customers. While money is fungible, banks' practices suggest that pricing of mortgage lending is linked to interest rates on retail deposits, which remain around zero on average. For institutional customers and interbank transactions, deposit pricing is anchored to the cost of placing

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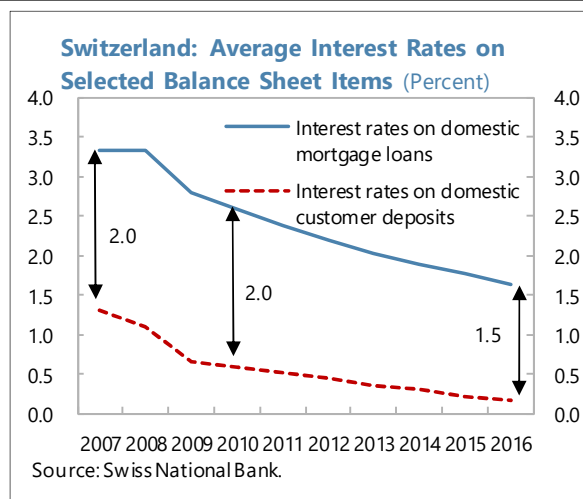[9] Nonresidents' deposits are only about 6 percent of total CHF-denominated deposits.

[10] The limited pass-through to lending rates was also observed in other countries that adopted a NIRP, such as Sweden and Denmark. See Eggertsson, Juelsrud and Wold (2017) and Bech and Malkhozov (2016).

these funds at the SNB (minus 0.75 percent). Moreover, banks are reported to have become somewhat less receptive to accepting new deposits, especially from institutional clients.

7.   Demand for cash increased only temporarily, and by a relatively modest amount, around the time that NIRP was introduced. The increase was concentrated in the CHF1000 note, but was more modest than for earlier demand spikes that occurred at the time of the global financial crisis (in 2008 and in 2012). More recently, the growth of currency in circulation has slowed, consistent with widening use of cashless-payment systems. Reflecting this longer-term trend, the velocity of money (nominal GDP relative to cash in circulation) has been decreasing since the turn of the decade, with a small, temporary increase in early 2015. The very limited cash hoarding likely reflects banks' decisions not to lower retail deposit rates below zero and that cash withdrawals by banks would be factored into the calculation of their exemption threshold. However, sustained negative interest rates for an extended period could make cash hoarding more attractive.[11]
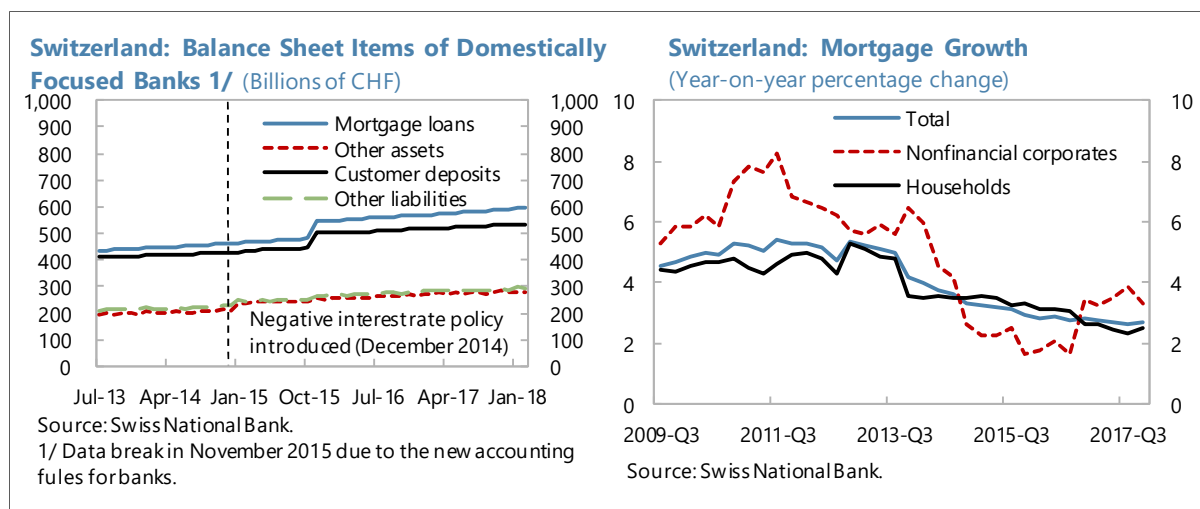
Switzerland: Cash in Circulation
(Year-on-year growth, percent)

Negative interest rate policy introduced (December 2014)

Source: Swiss National Bank.

Switzerland: Velocity of Money 1/

Negative interest rate policy introduced (December 2014)

Source: Swiss National Bank; IMF staff estimation.
1/ Estimated as annual GDP divided by seasonally-adjusted cash circulation.

8.   Introduction of NIRP did not raise the pace of mortgage lending in the aggregate, or accelerate the narrowing of banks' interest margins. Mortgage lending by continued to expand—but at a slowing pace—for several years following the introduction of a series of macroprudential measures in 2012–14 and the temporary increase in mortgage interest rates. However, mortgage volume at domestically-focused banks has been growing significantly faster than at big banks since the onset of the

Switzerland: Average Interest Rates on Selected Balance Sheet Items (Percent)

Interest rates on domestic mortgage loans
Interest rates on domestic customer deposits

Source: Swiss National Bank.

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[11] The cost of hoarding cash includes an upfront fixed cost (e.g., building secure storage facilities), in addition to per-period variable costs (e.g., security and insurance). Therefore, the breakeven interest rate at which it becomes cost effective to convert to cash will be lower the longer that negative rates are expected to persist.

global financial crisis in 2007.[12] Aggregate mortgage lending has quickened since late-2017. The spread between rates on mortgage loans and customer deposits had been on a decreasing trend that pre-dates the introduction of NIRP, decreasing from 2.0 percentage points in 2010 to 1.5 percentage points in 2016.

Switzerland: Balance Sheet Items of Domestically Focused Banks 1/ (Billions of CHF)

Source: Swiss National Bank.
1/ Data break in November 2015 due to the new accounting rules for banks.

Switzerland: Mortgage Growth (Year-on-year percentage change)

Source: Swiss National Bank.

9.   **Sustaining the pace of mortgage loan growth has caused domestically-focused banks to assume higher credit risk and increased interest-rate risk.** New lending by domestically-focused banks has been provided to borrowers with higher affordability risk. Based on survey data, the SNB finds that loan-to-income ratios on newly-issued mortgages reached a new peak in 2016 (SNB (2017a)). Also, about one third of new mortgage loans are reportedly for residential investment properties, even though vacancy rates are rising and rents are decreasing. In addition, the SNB reports that interest rate risk from maturity transformation by domestically-focused banks increased in 2015 from an already-high level and has remained elevated since then.
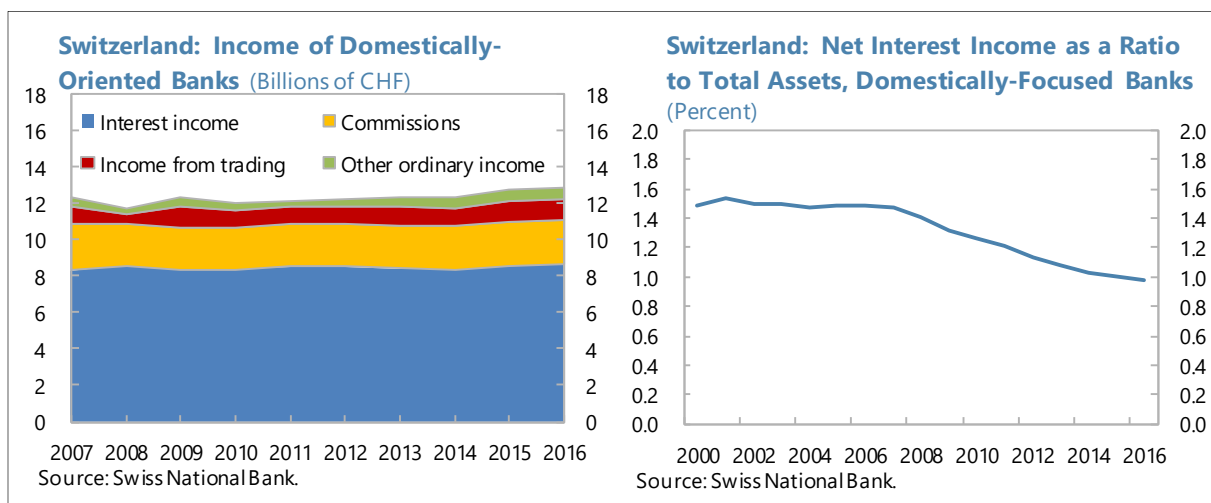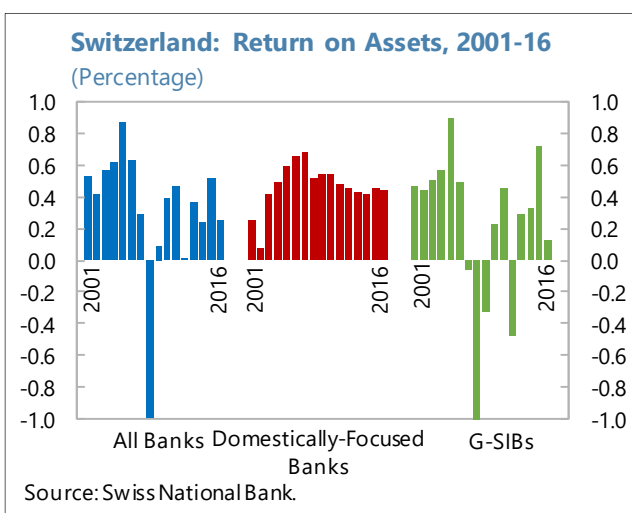
10.   **Consistent with the aggregate-level picture, individual bank data confirm that banks with larger exposure to NIRP adjusted their balance sheets more actively.** Basten and Mariathasan (2018) find that domestically-owned retail banks[13] with larger amounts of SNB sight deposits in excess of their exemption thresholds worked actively to reduce these balances by shifting into other assets (loans and financial instruments) and also by scaling-back their liabilities. Preference was given to reducing longer-term bond financing, rather than deposits, even though the former were cheaper, as banks sought to preserve their long-term relationships with retail

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[12] The Swiss banking sector consists of G-SIBs (owning about a half of banking sector assets), domestically-oriented banks, defined here to include cantonal, regional, savings, and Raiffeisen banks (about one fourth of sector assets), and others, including private banks, foreign-controlled banks, and branches of foreign banks. This definition is not fully consistent with the SNB's (2017a) definition of "domestically-focused commercial banks" (banks where domestic loans exceed 50 percent of total assets or with a prominent role in the domestic deposit market).

[13] The analysis is based on 50 banks that fulfill the supervisory authority's definition of a retail bank. The two big banks and cooperative banks—which together account for 40 percent of the Swiss loan market—are excluded from the analysis.

clients, but were nonetheless less-receptive to accepting new deposits. As a result, balance sheets of these banks tended to contract.

11.   During the early years of NIRP, domestically-focused banks managed to preserve, and even marginally increase, their return on assets.[14,15] This result reflects a combination of: (i) continued expansion of mortgage lending, which more than compensated for the narrowing interest rate margin;[16] (ii) the limited burden of NIRP due to large exemption thresholds; and (iii) higher rates

on newly-issued mortgage loans in early 2015, but which can be expected to support interest income throughout the duration of these loans. Further support was provided by lower credit losses, value adjustments and provisions, and greater cost efficiency (see SNB (2017a)). However, ongoing pressure on lending rates from nonbank credit institutions providing mortgage loans, gradual dissipation of the effect of temporarily-higher mortgage lending rates, and the already very-high credit penetration of the population suggest that it may be difficult over the longer term to sustain profits at their 2015–16 levels.[17]

Switzerland: Return on Assets, 2001-16
(Percentage)

Source: Swiss National Bank.

Switzerland: Income of Domestically-Oriented Banks (Billions of CHF)

Source: Swiss National Bank.

Switzerland: Net Interest Income as a Ratio to Total Assets, Domestically-Focused Banks
(Percent)

Source: Swiss National Bank.

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[14] Turk (2016) documents that bank profits were broadly stable in Denmark and Sweden after the introduction of the NIRP. In these countries, lower interest income was offset by lower wholesale funding costs and higher fee income.

[15] G-SIBs have a different business model and showed more volatile returns.

[16] The average interest margin on outstanding claims of domestically-focused banks decreased by 0.3 percentage points (equivalent to 2.5 percent) in 2016, while mortgage lending grew by 4.1 percent, resulting in an increase in net interest income.

[17] At the time of writing, profit data for 2017 was not yet available.

References

Basten, Christoph, and Mike Mariathasan, 2018, "How Banks Respond to Negative Interest Rates: Evidence from the Swiss Exemption Threshold," CESifo Working Paper 6901 (CESifo Group: Munich).

Bech, Morten Linnemann, and Aytek Malkhozov, 2016, "How Have Central Banks Implemented Negative Policy Rates?" BIS Quarterly Review, March, pp. 31-44 (Bank for International Settlement: Basel).

Cecchin, Iva, 2011, "Mortgage Rate Pass-Through in Switzerland", SNB Working Paper 2011-8.

Eggertsson, Gauti B., Ragnar E. Juelsrud, and Ella Getz Wold (2017), "Are Negative Nominal Interest Rates Expansionary?" NBER Working Paper 24039 (National Bureau of Economic Research: Cambridge).

Nucera, Federico, Andre Lucas, Julia Schaumburg, and Bernd Schwaab, 2017, "Do negative interest rates make banks less safe?" ECB Working Paper Series, No. 2098 (European Central Bank: Frankfurt).

Swiss Bankers Association, 2016, Banking Barometer, September.

Swiss National Bank, 2017a, Financial Stability Report.

Swiss National Bank, 2017b, Banks in Switzerland 2016.

Turk, Rima A., "Negative Interest Rates: How Big a Challenge for Large Danish and Swedish Banks?" IMF Working Paper, No. 16/198 (International Monetary Fund: Washington).