



# WEEKLY ECONOMIC INSIGHTS

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## HIGHLIGHTS OF THE WEEK

**Economist insights: In China, the authorities have curbed the drop in the yuan and PMI surveys have confirmed that the slowdown in the economy could be limited (p.2)**

- › The announcement on 24 August by the Chinese authorities of the reintroduction of the “counter-cyclical” factor in its currency fixing mechanism contributed to stabilising the yuan against the dollar
- › Thanks to this measure, which aims to prevent speculative downward expectations on the Chinese currency, the yuan’s potential additional downside against the dollar could be reduced if...
- › ... as we expect, the slowdown in the Chinese economy proves to be limited, which the August PMI surveys appear to have confirmed

**Focus Switzerland: Why do Swiss exports have low sensitivity to the appreciation of the franc? (p.4)**

- › The Swiss economy showed strong resilience following the discontinuation of the exchange rate floor by the SNB, contrary to the fears of some
  - › According to the estimates of our econometric model, the low sensitivity of Swiss exports to the appreciation of the franc can be explained by the far higher quality of goods compared to other countries
  - › The quality of the goods exported by the Swiss watch, chemicals and pharmaceuticals sectors is 50% higher than that of their competitors, hence the small reaction of these exports to the high franc
  - › The tobacco, energy, agriculture and transport equipment sectors suffer the greatest during periods of appreciation of the Swiss currency and could be the main beneficiaries of a future depreciation of the franc
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## IN CHINA, THE AUTHORITIES HAVE CURBED THE DROP IN THE YUAN AND PMI SURVEYS HAVE CONFIRMED THAT THE SLOWDOWN IN THE ECONOMY COULD BE LIMITED

The announcement on 24 August by the Chinese authorities of the reintroduction of the “counter-cyclical” factor in its currency fixing mechanism contributed to stabilising the yuan against the dollar. Thus, the Chinese currency, which had hit a low point at 6.93 yuan to the dollar on 15 August, had returned to 6.83 yuan to the dollar on 31 August. As a result, the drop in the yuan against the dollar at the start of 2018, which on 15 August was at -6.2%, was at -4.8% on 31 August.

According to the Chinese authorities, the aim of this “counter-cyclical” factor is to reduce fluctuations driven by “irrational” expectations and “herd actions” on the forex market. The measure had been put in place in May 2017, with the yuan having depreciated sharply since the summer of 2015, and remained in place until January 2018. Its reintroduction, along with the decision announced at the beginning of August 2018 to impose a 20% reserve requirement on foreign exchange forward yuan positions, is said to aim to prevent downside speculation on the Chinese currency from accentuating its depreciation.

Chart 1: The Chinese authorities had already used this “counter-cyclical” factor between May 2017 and January 2018

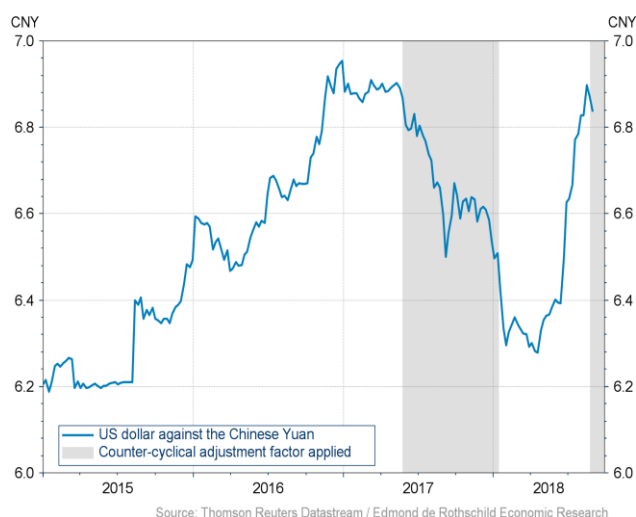
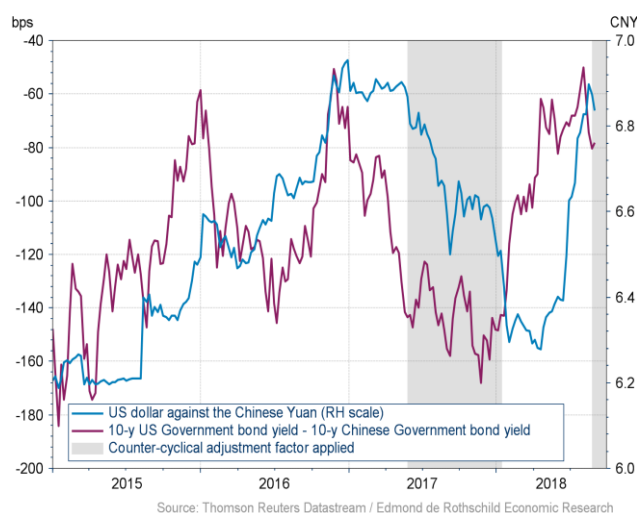


Chart 2: The drop in the yuan vs USD in 2018 was in line with the reduction in the growth and interest rate differentials between China and the US



According to our analysis, these measures, which had already proved to be efficient in 2017, should prevent the past drop in the yuan from leading investors to anticipate a further depreciation, and could thus contribute to interrupting the currency's downward trend.

As we highlighted in the previous issues of our Weekly of the Economic Research Team<sup>1</sup>, the yuan's depreciation against the dollar, which began in mid-April 2018, has up to now notably been the result of the slight slowdown in the Chinese economy, along with an acceleration in GDP growth in the US, as well as the reduction in the interest rate differential in favour of China (see chart 2).

Moreover, if, as we expect, the slowdown in GDP growth in China remains limited, and the pace of the US economy stops accelerating as sharply, the additional downside potential of the yuan linked to economic fundamentals would become limited.

<sup>1</sup> See our Weeklies of the Economic Research Team of 30 July and 27 August 2018.

The most recent economic data for China also appears to have confirmed our scenario according to which the deceleration in the country's growth could be slow. While GDP growth dropped only very slightly in Q3 2018 (at 6.7% year-on-year, after 6.8% in Q1 and 6.9% on average in 2017), industrial production data for July showed a stabilisation of activity in this sector, for which y-o-y growth remained at +6.0%.

Furthermore, China's official PMIs, published by the national Bureau of Statistics, which had contracted in July, reflecting the lower confidence of purchasing managers across all economic sectors as a whole, improved slightly in August. Thus:

- ▶ The official government manufacturing PMI, which was down from 51.5 to 51.2 in July, stood at 51.3 in August, i.e. the same as its average since the start of 2018. While this index may have been supported by the rise in the "input prices" component (up from 54.3 to 58.7, for a 2018 average of 55.9), its production component also increased (from 53.0 to 53.3, with a 2018 average of 53.1). Furthermore, while the "foreign new orders" component continued to decline, down from 49.8 to 49.4, a level far below its 2018 average of 50.1, the "total new orders" component contracted only very slightly, from 52.3 to 52.2, remaining close to its 2018 average of 52.7, which indicates that domestic demand may have picked up some of the slack of foreign orders.
- ▶ The official government non-manufacturing PMI, which was down from 55.0 to 54.0 in July, returned to 54.2 in August, which remains a level close to its 2018 average of 54.7. This index was also notably supported by its "input prices" component, which rose from 53.9 to 54.3. We nevertheless note the clear improvement in the "business outlook" component, which rose from 60.2 to 61.4.
- ▶ The official composite PMI, which reflects the trend in activity for all sectors, and which increased from 54.4 in June to 53.6 in July, returned to 53.8 in August, i.e. only slightly below its 2018 average of 54.0.

Lastly, although the Caixin PMI manufacturing index continued to decline in August, this decline was limited. Furthermore, we should be reminded that this survey, unlike the government survey, mainly involves Chinese coastal companies, i.e. the companies that are most likely to have an activity linked to foreign trade and that as a result may have been affected the most by the escalation of trade tensions between China and the US in 2018. Thus:

- ▶ The Caixin manufacturing PMI, which was down from 51.0 to 50.8 in July, came in at 50.6 in August, a level that still indicates economic expansion, but below its 2018 average of 51.1. The details reveal stronger upwards pressure on prices, just like in the official government survey. In particular, the "input prices" and "production prices" components were up from 54.5 to 55.9 and from 51.6 to 52.5, respectively, i.e. slightly above their 2018 averages of 54.9 for the former and 52.2 for the latter. Regarding activity, foreign orders continued to contract, but at a slower pace than in July: the "foreign new orders" component was up from 48.4 to 48.8 in August, i.e. a level that remains below its average for 2018 of 49.9. Conversely, both the current production and production outlook components were up in August, from 51.8 to 52.5 for the former (compared to a 2018 average of 52.1) and from 55.0 to 55.1 for the latter (vs. a 2018 average of 56.4).

#### Implications:

- ▶ The most recent economic data for China indicates that the deceleration in GDP growth could be limited.
- ▶ It notably reveals that domestic demand, supported by the credit stimulus measures implemented over the past few months by the Chinese central bank could take over from foreign demand if the latter were to slow further.
- ▶ In this context, and with the measures implemented by the Chinese authorities to prevent downward speculation on the yuan, any further potential depreciation of the Chinese currency against the dollar could be limited.

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## Why do Swiss exports have low sensitivity to the appreciation of the franc?

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Since the global financial crisis in 2008, the Swiss economy has had to contend with several periods of sharp appreciation in its currency.

- ▶ During the peak of the eurozone sovereign debt crisis, the Swiss franc played its role as a safe haven currency to the full, rising from 1.49 for one euro in January 2010 to 1.14 in August 2011. This initial episode corresponds to an appreciation of more than 23%, before the SNB put an end to by setting an exchange rate floor of 1.20 Swiss francs to the euro on 6 September 2011.
- ▶ The second period of appreciation, which followed the discontinuation of this exchange rate floor on 15 January 2015, was even more abrupt than the first, both in terms of its extent and persistence. The Swiss franc gained more than 20% the day the floor was discontinued (i.e. it rose from EUR/CHF 1.20 to 0.98 between 15 and 16 January) and traded under EUR/CHF 1.10 throughout 2015.

Although the Swiss economy suffered from the overvaluation of the franc due to a major loss in price competitiveness compared to other countries, not once did it undergo two consecutive quarters of decline in real GDP during these periods, and thus never officially entered recession. And, a performance that is even more remarkable, annual trade balance figures do not show a decline in its exports.<sup>2</sup> Conversely, this image is more contrasted on a sector level. Exports in certain sectors were revealed to have little sensitivity to the strong franc (pharma, for example), while other sectors saw a greater impact on their exports (e.g. machinery).

These observations lead to several questions:

- ▶ Why is it that Swiss exports resisted so well during these periods of appreciation of the franc?
- ▶ Why do fluctuations in the Swiss currency have a different impact on exports depending on the sector?
- ▶ Are these differences by sector significant in quantitative terms?

The objective of this focus is to provide an answer to these questions using the estimates of our econometric model, which is based on more than 8,500 observations of export volumes. If the Swiss franc were to depreciate, our conclusions will enable us to anticipate which sectors could benefit the most from this depreciation, and to quantify its impact on growth in export volumes by sector.

### [1. The estimates of our econometric model validate the economic theory: the higher the quality of the goods offered by the sector, the smaller the decline in its exports resulting from the appreciation of the franc](#)

According to economic theory, the quality of a product is one of the main determining factors of the price elasticity of its demand: [the higher the quality of a good or service, the less sensitive demand will be to a change in its price](#). The quality of a product sold by a company is what enables it to be differentiated from competition. By increasing the degree of differentiation, the manufacturer makes it more difficult to find a substitute for the good compared to those of its competitors, thereby reducing the sensitivity of demand to changes in price. For example, simply putting the logo of a famous brand on a pair of shoes makes them unique in the eyes of consumers, leading them to make consumption decisions that are less dependent on price. Conversely, a product with no brand would be considered similar to another product and thus easy to substitute. We thus understand the interest of companies in spending so much on research and development or marketing in order to make their products stand out from those of their rivals.

This economic mechanism can be applied to an international trade theory. According to this theory, the more a sector exports quality goods, the less sensitive its export volumes are to changes in the real effective exchange rate. [We developed an econometric model that enables us to test if this theory applies to Switzerland \(see Appendix 1 for more details\). We then built a database of more than 8,500 observations to estimate it \(see the box on the next page\) and thus quantify the impact of quality on the sensitivity of Swiss exports to changes in the exchange rate.](#)

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<sup>2</sup> We have concentrated our analysis in this Focus on export volumes. Our data and our econometric model could be easily adapted to take into account the price effect and thus quantify the effect of exchange rate fluctuations on exports in value.

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### Box: Our database of export volumes, quality, and the real effective exchange rate

To estimate our econometric model, we first built a database of Swiss export volumes for a large number of goods. Using the website of the United Nations (UN) Comtrade Database, we collected 8,700 observations on the yearly export volume of 517 types of goods over the period 2000-2017.

We were then able to access a measure of the quality of Swiss exports for these 517 types of goods, made available by Feenstra and Romalis (2014). These two economists, specialised in international trade matters, calculated using a complex international trade model a measure of the quality of the exports of a large number of goods for 185 countries over the period 1984-2011. The use of a model is necessary, as the quality of an exported good cannot be observed. This measure indicates, firstly, that the quality of the same exported good differs significantly from one country to the next, and, secondly, that the average quality of exports also varies significantly among countries. According to our calculations, over the period 2000-2007, the quality of goods exported by China is on average 39.2% lower than the world quality, while the quality of Swiss exports is 57.0% greater (see section II for more details).

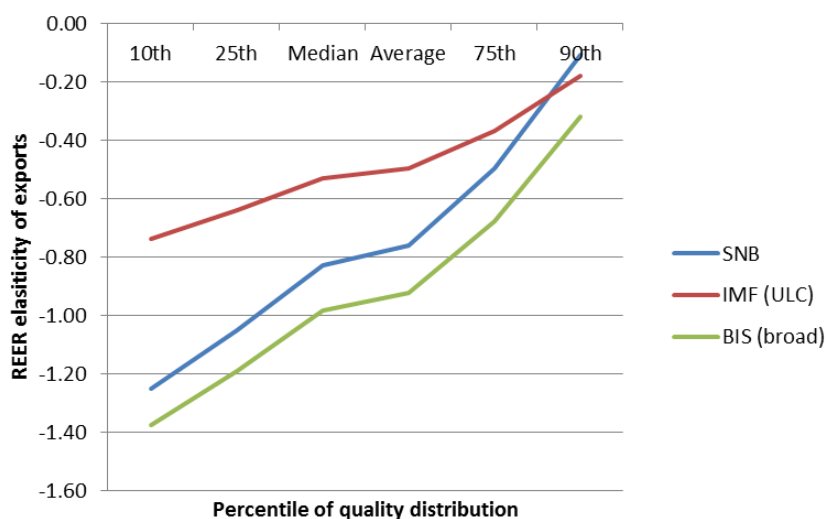
Lastly, we collected data on Switzerland's real effective exchange rate, provided by the Swiss National Bank (SNB), the Bank for International Settlements (BIS) and the International Monetary Fund (IMF). This data enabled us to verify the robustness of our results for different exchange rates.

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The estimates of our econometric model clearly show that Swiss export volumes are less sensitive to changes in the real effective exchange rate when they are of higher quality, and thus validate the economic theory for Switzerland. Our results are robust both from the point of view of econometric specification and the exchange rate data used as well as from a statistical point of view (see Appendix 1 for more details). They also highlight the high heterogeneity in the reactions of exports to changes in the interest rate in quantitative terms (see chart 1). Our calculations are based on the real effective exchange rate measured by the SNB, indicating an average elasticity for Swiss exports to the real effective exchange rate of 0.76. This means that, when the Swiss franc gains 1% in real effective terms, the export volumes of an average-quality product drop by 0.76%. The drop increases to 1.25% for the lowest-quality products (i.e. at the 10<sup>th</sup> percentile of distribution), and is reduced to 0.11% for products offering the highest quality (i.e. at the 90<sup>th</sup> percentile of distribution).

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Chart 1: The elasticity of Swiss exports to the real effective exchange rate (REER) decreases (in absolute terms) along with the increase in the quality of the exported product, which implies that exports of higher-quality products do not drop as significantly when the Swiss franc appreciates



Sources: Thomson Reuters Datastream, SNB, IMF, BIS, UN Comtrade Database, Feenstra and Romalis, Edmond de Rothschild Economic Research calculation

Notes: the table compares the elasticity of exports (in volume) to the real effective exchange rate with the level of quality of the product. Among the five different measures of the real effective exchange rate used (see Appendix 2), we chose to show in this chart the highest elasticity (BIS measurement (broad)), the lowest elasticity (IMF measurement (ULC)) and the "average" elasticity (SNB measurement).

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## II. Switzerland exports far higher quality products than its main trading partners and is also much more resilient to exchange rate shocks

It is well known that Swiss products have a reputation for their high quality. We automatically think of the goods that are representative of Switzerland, such as watches and pharmaceuticals. However, this is a subjective and not a quantitative assessment of the quality of Swiss exports. We used the quantitative measure of the quality of Swiss exports developed by Feenstra and Romalis, as well as the sector estimates of the elasticity to the real effective exchange rate to answer the following questions:

- ▶ What is the average quality of Swiss exports compared to that of its main trading partners?
- ▶ What is the sensitivity of Swiss exports to changes in exchange rates at the aggregate level? Is Switzerland really resilient to exchange rate shocks in an international comparison?

Firstly, we calculated the average quality of Swiss exports and its main trading partners over the period 2000-2007. These countries can be considered as the competitors of Swiss products on foreign markets and cover more than 80% of its exports. [Our calculations in Table 1 show that Switzerland is in pole position in terms of quality of exports. On average, Swiss exports offer average quality that is 57% higher than the world average.](#) This result can be explained by the fact that the quality of the exports of the watch, chemicals and pharmaceuticals sectors is by far higher in an international comparison and that they represent a large share of total exports. According to the Swiss Federal Customs Administration, in 2017 the exports of the watch, chemicals and pharmaceuticals sectors (in value terms) represented more than 50% of total exports (44.7% for chemicals and pharmaceuticals and 9.0% for watch-making).<sup>3</sup> Austria is in second place, with an average quality far below that of Switzerland but 19.2% above the world average. Japan is in third place. Last on the list is China, which, according to our calculations, has an export quality that is 39.2% lower than the world average.

Table 1: The quality of Swiss exports is far higher than that of its main trading partners, and they are also more resilient to an appreciation in the Swiss currency

	Average quality of exports	Swiss export share	REER elasticity
<b>Switzerland</b>	<b>57.0%</b>	-	<b>-0.62</b>
<b>Average over major Swiss trading partners</b>	<b>2.0%</b>	-	<b>-0.85</b>
Austria	19.2%	3.5%	
Japan	17.7%	3.8%	
USA	13.5%	17.7%	
United Kingdom	12.9%	6.0%	
France	12.4%	7.3%	
Germany	9.3%	21.8%	
Italy	5.2%	7.2%	
Netherlands	-1.6%	2.7%	
Spain	-5.5%	3.0%	
Hong Kong	-21.6%	2.8%	
China	-39.6%	6.0%	

Sources: Thomson Reuters Datastream, FCA Switzerland, Feenstra and Romalis, Edmond de Rothschild Economic Research calculation

Notes: the first column of the table shows the average quality of the country's exports compared to the world average over the period 2000-2007. The second column indicates the share of Swiss imports to the country in question. In the last column, we find, for each country, the estimate of the annual % change in export volumes due to a 1% increase in the real effective exchange rate of the Swiss franc (REER elasticity).

We then used the estimates of our econometric model in order to measure the exchange rate elasticity of Swiss exports on an aggregate level compared to that of Switzerland's main trading partners. Our calculations point to an elasticity of -0.62, which means that the total volume of Swiss imports decreases by 0.62% over one year when the real effective exchange rate of the franc increases by 1%. This estimate is in line with the results of the econometric analyses published recently by economists at the SNB, Banque de France, and the Bank of Canada (Hanslin Grossmann et al., 2016; Bussière et al, 2017). Furthermore, their results indicate an average price elasticity of the exports of Switzerland's main trading partners of -0.85, while their quality

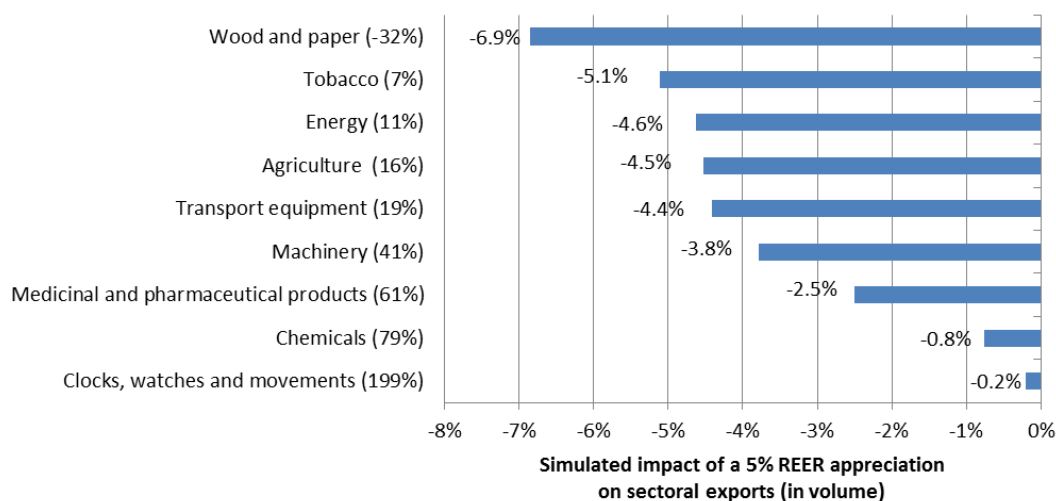
<sup>3</sup> We used the exports in value terms of these sectors and compared them to total exports excluding precious metals, gemstones, works of art and antiques.

is on average 2% higher than the world quality. In conclusion, Switzerland exports much higher-quality goods than its main trading partners, making it more resilient to exchange rate shocks.<sup>4</sup>

### III. The quality of the goods exported by the Swiss watch, chemicals and pharmaceuticals sectors is 50% higher than that of their competitors, meaning they benefit from low sensitivity of their exports to fluctuations in the Swiss franc

The estimates of our econometric model clearly show that the quality of an exported good remains a key factor behind the vulnerability or resilience of export volumes in the event of an appreciation of the Swiss franc on a sector level. We used the results of Chart 1 to simulate the impact of a real effective rise in the Swiss franc of 5% and thus identify which sectors are the most resilient and the most vulnerable. Chart 2 summarises our conclusions.

Chart 2: A real effective rise in the franc of 5% has just a small impact on the exports of the watch sector; conversely, it reduces export volumes by 0.8% for chemicals products, 2.5% for medicinal and pharmaceutical products, and notably 6.9% for wood and paper



Sources: Thomson Reuters Datastream, SNB, UN Comtrade Database, Feenstra and Romalis, Edmond de Rothschild Economic Research calculation

Notes: this table shows the yearly % change in export volumes for different sectors to a real effective rise of 5% in the Swiss franc. The quality of exports compared to the average world quality for each sector over the period 2000-2007 is shown in parentheses.

- ▶ **The watch sector.** The Swiss watches and watch movements exported abroad offer a quality that is on average 199% higher than the world average quality. This figure thus confirms the uniqueness of Swiss watches. As shown in our simulations in Chart 2, which measure the effect of a 5% real effective rise in the Swiss franc on the export volumes of the different sectors, the unique character of Swiss watches and watch movements is reflected by the fact that their exported volume reacts only slightly when the franc appreciates.<sup>5</sup>
- ▶ **The chemicals and pharmaceuticals sector.** Although the proportions are not as impressive as for the watch sector, Swiss chemical, medicinal and pharmaceutical products also offer much higher quality than that of competitors. The quality of Swiss exported chemicals products is 79% higher than the average world quality, while that of medicinal and pharmaceutical products is 61% higher. This results in a greater reaction of exports to a rise in the franc compared to the watch sector, but which remains low compared to other sectors. According to our calculations, a real effective appreciation in the Swiss franc of 5% results in a 0.8% drop in export volumes for the chemicals sector, and a 2.5% drop for the medicinal and pharmaceutical sector.

<sup>4</sup> Note that the methodology used by Hanslin Grossmann et al. (2016) to measure price elasticity is different than the one we use in this focus. Despite this difference, we find a correlation of 0.54 between the average quality of the exports of the countries listed in Table 1 and their elasticity to real effective exchange rates. Economic theory is thus also validated empirically on an international level: the higher the quality of the goods exported by a country, the lower the reaction of its exports in volume terms to an appreciation in its currency.

<sup>5</sup> It is evident that in addition to the exchange rate, other macroeconomic or sector-specific factors can influence export volumes. For example, the watch sector has suffered since 2012 from the decline in Chinese demand due in part to the anti-corruption measures introduced by Xi Jinping. Our econometric model enables the sector impact of the exchange rate to be separated out from other macroeconomic factors, such as the GDP growth of Switzerland's main trading partners (see column (3) of Table A1 in Appendix 1).

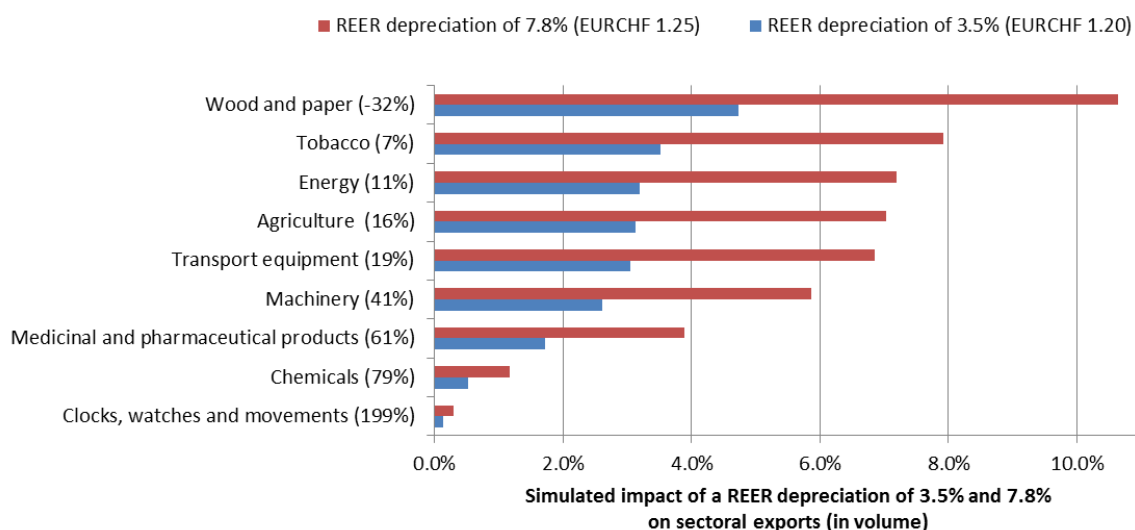


- ▶ The wood and paper, tobacco, energy and agriculture sectors. The sectors most vulnerable to a strong franc are the wood and paper, tobacco, energy and agriculture sectors. Our quality measurement indicates that the quality of the exports of goods in the wood and paper sector is significantly lower than the average world quality (i.e. below 32%). According to our simulation exercise, its exports would drop 6.9% in the event of a 5% real effective appreciation in the Swiss franc. The drop would be 5.1% for the agriculture sector, 4.6% for the tobacco sector, and 4.5% for the energy sector.

#### IV. The sectors that suffered the most from the discontinuation of the floor exchange rate should be the main beneficiaries of depreciation in the Swiss franc

In the event of a depreciation of the Swiss franc in 2019, we can quantify, using the estimates of our econometric model, which sectors would benefit the most. We simulated the impact on sector exports of depreciation in the franc in real effective terms of 3.5% and 7.8%. These figures correspond, respectively, to a depreciation in the franc from 1.16 for one euro (current average over 2018) to averages of 1.20 and 1.25 over 2019, with the assumption of a EUR/USD rate and inflation differential remaining at their current levels.

Chart 3: The wood and paper, tobacco, energy and agriculture sectors could see strong growth in their exports if the franc were to depreciate



Sources: Thomson Reuters Datastream, SNB, UN Comtrade Database, Feenstra and Romalis, Edmond de Rothschild Economic Research calculation

Notes: this simulation exercise is based on the assumption of "all other things being equal". It is also based on two additional assumptions: (1) that the EUR/USD rate remains at its current level, and (2) that the inflation differential between Switzerland and its main trading partners remains the same as it is today. Based on these assumptions, we simulated the % impact on sector export volumes of a depreciation in the franc from 1.16 for one euro (the current average over 2018) to averages of 1.20 and of 1.25 in 2019. The quality of exports compared to the average world quality for each sector over the period 2000-2007 is shown in parentheses.

As indicated by the results in Chart 3, the sectors that suffer the most during periods of sharp appreciation of the Swiss franc are those that could benefit the most in the event of a depreciation of the currency. The economic mechanism is exactly the same as the one that we described above. These sectors offer lower-quality export goods compared to the average Swiss quality, and thus benefit from renewed price competitiveness in the event of a depreciation of the franc, as their exports have higher exchange rate elasticity. All other things being equal, according to our simulations, the wood and paper, tobacco, energy and agriculture sectors could see a rise in their exports in 2019 of 4.7%, 3.5%, 3.2% and 3.1%, respectively, if the Swiss franc were to depreciate to 1.20 to the euro. If the Swiss franc were to depreciate further to 1.25 for one euro, the impact on the export volumes of these sectors could vary between 7.0% and 10.6%.

Conversely, the sectors that are generally the least affected in periods of sharp appreciation of the franc could see the weakest export growth in the event of a depreciation. This conclusion stems from the results of our simulations in Chart 3. An exchange rate of EURCHF 1.20 would contribute to growth in the exports of the watch, chemicals and pharmaceuticals sectors of 0.1%, 0.5% and 1.7%, respectively. In the event of a sharper depreciation to EURCHF 1.25, the exports of the watch, chemicals and pharmaceuticals sectors could rise by 0.3%, 1.2% and 3.9%, respectively. The impact of a depreciation of the franc on the exports of these sectors is thus much lower than that estimated for the sectors that react the most strongly to fluctuations in exchange rates.



## V. Conclusion

Following the discontinuation of the floor exchange rate by the SNB and the resulting sharp appreciation of the franc, a certain number of observers were predicting a disaster for the Swiss economy, calling it the “Frankenschock” of 15 January 2015.

The Swiss economy has proven to be more resilient than anticipated. The estimates of our econometric model highlight one of the main reasons for this resilience. Switzerland offers far higher-quality export goods than its competitors, thereby benefiting from foreign demand that is less sensitive to a rise in price. The exchange rate elasticity of Swiss exports is lower than that of its main trading partners.

Conversely, this image is more contrasted on the sector level. Our analysis illustrates significant quantitative heterogeneity by sector in terms of the reaction of exports to exchange rate shocks. Some sectors suffered more from the strong franc because they export goods that are not of such high quality and are thus more vulnerable to the effects of substitution by rival products. Conversely, these goods would be the ones that would benefit from renewed competitiveness in the event of a depreciation of the franc. Thus, [if the franc were to depreciate in 2019, our simulations show that:](#)

- ▶ The tobacco, energy, agriculture and transport equipment sectors should be the main beneficiaries of a rise in the Swiss franc. All other things being equal, our simulations indicate that an exchange rate of EURCHF 1.20 could result in a rise in their export volumes of 3.0% to 3.5% in 2019 depending on the sector. This rise could reach between 6.8% and 7.9% in the event of a depreciation in the Swiss franc to 1.25 to the euro. Among the companies making up these sectors, those that generate the largest share of their sales abroad could benefit the most from a lower franc.
- ▶ While the watch, chemicals and pharmaceuticals sectors resisted much better during the phases of sharp appreciation of the franc, they are also the ones that benefit the least when the Swiss currency depreciates. According to our simulations, an exchange rate of CHFEUR 1.20 could lead to a rise in export volumes of 0.1% for watchmakers, 0.5% for chemicals and 1.7% for the pharma sector.

## APPENDIX 1

### Our international trade econometric model

In order to identify the heterogeneous effect of fluctuations in the exchange rate on export volumes, we developed the following international trade econometric model:

$$\ln x_{it} = \alpha_i + \beta \ln REER_t + \gamma(\ln REER_t \times \ln quality_i) + \varepsilon_{it}$$

where  $x_{it}$  designates export volumes (in kilos) of sector  $i$  during year  $t$ ,  $REER_t$  the real effective exchange rate,  $\alpha_i$  a fixed effect by sector and  $quality_i$  measures the average quality of the exports of the sector over the period 2000-2007. According to economic theory, a real effective appreciation in the Swiss franc (i.e. the  $REER_t$  increases) has a negative impact on export volumes ( $\beta < 0$ ), while the REER elasticity of exports is lower for sectors that export higher-quality goods ( $\gamma > 0$ ).

### The estimates of our econometric model

Table A1 compares the estimates of different versions of our econometric model, which uses a database of more than 8,500 observations of export volumes for 527 different goods over the period 2000-2017. The results of our estimate empirically validate the economic theory for Switzerland. Firstly, they show that a rise in the real effective exchange rate of the Swiss franc leads to a drop in export volumes ( $\hat{\beta} < 0$ ) but that this drop is smaller for higher-quality products ( $\hat{\gamma} > 0$ ). Secondly, they are robust from a statistical point of view. All of the estimated coefficients in Table A1 are statistically significant at least at the threshold of 5%.

Table A1: Estimates of our econometric model

	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	SNB			BIS (narrow)			BIS (broad)		
$\ln REER_t$	-0.756*** (0.202)	-1.162*** (0.322)	-	-0.784*** (0.154)	-1.126*** (0.244)	-	-0.913*** (0.194)	-1.293*** (0.308)	-
$\ln REER_t \times \ln quality_i$	-	0.836** (0.390)	0.837** (0.389)	-	0.692** (0.293)	0.693** (0.293)	-	0.774** (0.369)	0.776** (0.368)
Sector fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	No	No	Yes	No	No	Yes	No	No	Yes
Observations	8,700	8,614	8,700	8,700	8,614	8,700	8,700	8,614	8,614
R-squared	0.890	0.889	0.891	0.890	0.889	0.890	0.890	0.889	0.890
	(1)	(2)	(3)	(1)	(2)	(3)			
	IMF			IMF Unit labor cost					
$\ln REER_t$	-0.763*** (0.151)	-1.090*** (0.239)	-	-0.490*** (0.0935)	-0.695*** (0.146)	-			
$\ln REER_t \times \ln quality_i$	-	0.660** (0.287)	0.661** (0.287)	-	0.410** (0.177)	0.410** (0.177)			
Sector fixed effect	Yes	Yes	Yes	Yes	Yes	Yes			
Year fixed effect	No	No	Yes	No	No	Yes			
Observations	8,700	8,614	8,614	8,700	8,614	8,614			
R-squared	0.890	0.889	0.890	0.890	0.889	0.890			

Sources: Thomson Reuters Datastream, SNB, IMF, BIS, Feenstra and Romalis, Edmond de Rothschild Economic Research

Notes: we have estimated different versions of the econometric model below using the OLS (Ordinary Least Square) method. The first line shows the estimated coefficient  $\hat{\beta}$ , while the second show the estimated coefficient  $\hat{\gamma}$ . The model is estimated using the fixed effects by sector in columns (1) and (2), and by sector and country in column (3). The export volume data by sector for Switzerland comes from the UN Comtrade database. The real effective exchange rate (REER) used is provided by the SNB and BIS (broad and narrow, respectively) and the IMF. We have used the data of Feenstra and Romalis (2014) to measure the average quality of exports over the period 2000-2007. The standard deviations that we calculated using the White-Huber method are shown in parentheses and take into account the heteroscedasticity. \*\*\*, \*\* and \* indicate a level of significance of 1%, 5% and 10%, respectively.

Column (1) compares the estimate of the average REER elasticity of exports for the 527 products considered in our database. To ensure the robustness of our results, we used different measures of the real effective exchange rate provided by the SNB, the BIS (two measures: narrow and broad) and the IMF (two measures: one based on consumer prices and the other on unit labour costs). The results of the SNB column (1) indicate that export volumes drop on average by 0.76% with a 1% appreciation

in the real effective exchange rate of the Swiss franc as measured by the SNB. This estimate falls to 0.49% when we use the real effective exchange rate of the IMF based on the unit labour cost (see IMF Unit labor cost column (1)). The SNB columns (2) and (3) indicate that the REER elasticity of export volumes decreases from 0.76 to 0.67 when the quality of a product improves by 10% compared to the average quality.

#### Simulation of the impact by sector of a 5% appreciation in the real effective exchange rate of the Swiss franc

To simulate the impact of a 5% appreciation in the real effective exchange rate of the Swiss franc on the export volumes of a specific good, we used the following formula, which is based on the estimates of the SNB column (2):

$$Impact_i = (-1.162 + 0.836 \times \ln quality_i) \times 5$$

#### Calculation of the aggregate price elasticity of Swiss exports

To obtain the aggregate elasticity of Swiss exports to the real effective exchange rates per institution  $j$  (SNB, BIS or IMF), we calculated a weighted average of the elasticities of each product using the estimates in column (2):

$$Elasticity^j = \hat{\beta}_j + \hat{\gamma}_j \times \left( \sum_{i=1}^N \frac{X_i}{X_{total}} \times \ln quality_i \right)$$

where  $\frac{X_i}{X_{total}}$  represents the average share of exports in value terms of good  $i$  over the period 2000-2017. Then, to obtain the aggregate elasticity of Chart 3, we took the average of the three following elasticities:  $Elasticity^{IMF\ ULC} = 0.43$ ,  $Elasticity^{SNB} = 0.64$  and  $Elasticity^{BIS\ broad} = 0.80$ .

#### References

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## APPENDIX 2 – LATEST CHANGES ON FINANCIAL MARKETS

PERFORMANCE IN LOCAL CURRENCY	LAST PRICE	WEEKLY CHANGE	MONTHLY CHANGE	YEAR-TO-DATE CHANGE	1-YEAR CHANGE
<b>Equities (total return)</b>					
World (MSCI)	523	0.7%	0.8%	3.8%	12.0%
United States (S&P 500)	2'902	1.0%	3.3%	9.9%	19.7%
Eurozone (Euro Stoxx)	380	-0.6%	-2.6%	1.1%	5.0%
Germany (DAX)	12'335	-0.2%	-3.4%	-4.3%	2.6%
France (CAC 40)	5'416	-0.5%	-1.9%	4.4%	9.6%
Spain (IBEX 35)	9'389	-2.0%	-4.8%	-3.8%	-5.2%
Italy (FTSE MIB)	20'340	-2.3%	-8.8%	-5.0%	-3.7%
Portugal (PSI 20)	5'406	-1.4%	-3.5%	4.4%	9.3%
United Kingdom (FTSE 100)	7'502	-1.9%	-3.3%	-0.2%	4.1%
Switzerland (SMI)	9'000	-0.9%	-2.2%	-1.2%	4.0%
Japan (Nikkei)	22'707	1.2%	1.4%	1.5%	18.6%
Emerging Markets (MSCI)	1'056	0.6%	-2.7%	-7.0%	-0.3%
<b>Sovereign Bonds, 10Y (change in basis point)</b>					
United States	2.86%	1.4	-8.8	45.5	69.4
Eurozone	0.32%	-5.3	-8.4	-10.1	-5.4
Germany	0.32%	-5.3	-8.4	-10.1	-5.4
France	0.68%	-2.7	-5.2	-9.5	0.1
Spain	1.45%	4.4	3.2	-10.7	-14.2
Italy	3.22%	6.6	29.4	121.0	114.4
Portugal	1.90%	7.3	13.0	-0.8	-91.2
United Kingdom	1.40%	12.8	7.7	21.6	34.9
Switzerland	-0.12%	0.2	-6.2	6.2	4.1
Japan	0.11%	2.1	1.1	7.0	12.2
Emerging Markets (local currency)	5.19%	-4.9	-9.9	38.5	44.5
<b>Corporate Bonds (change in basis point)</b>					
United States (IG Corp.)	3.95%	2.9	-5.9	69.8	84.5
Eurozone (IG Corp.)	1.00%	3.1	-0.7	23.1	26.9
Emerging Markets	6.11%	6.4	28.6	160.5	176.7
<b>High-Yield Bonds (change in basis point)</b>					
United States (HY Corp.)	6.27%	2.5	-1.9	54.9	70.0
Eurozone (HY Corp.)	3.80%	9.5	16.8	79.9	76.6
<b>Convertible Bonds (price change)</b>					
United States (Convert. Barclays)	54	0.9%	2.4%	8.9%	10.9%
Eurozone (Convert. Exane)	7'803	0.4%	0.6%	0.9%	3.5%
<b>Commodities</b>					
Commodities (TR)	404	0.7%	-1.9%	-4.0%	-0.4%
Gold	1'205	-0.9%	-1.5%	-9.6%	-10.9%
Crude Oil (Brent)	78	2.9%	5.6%	15.5%	47.2%
<b>Currencies</b>					
Dollar Index	95.2	0.4%	0.0%	3.3%	2.6%
EURUSD	1.16	-0.6%	0.4%	-3.3%	-2.4%
GBPUSD	1.29	-0.2%	-1.1%	-4.8%	-0.5%
USDCHF	1.03	-0.9%	-2.4%	-0.4%	1.3%
USDJPY	111.2	0.1%	-0.1%	-1.3%	1.3%

Source : Bloomberg

## APPENDIX 3 – MAIN ECONOMIC INDICATORS

Main Economic Indicators - Released (27 - 31 August) and to be released (3 - 7 September)						
<b>US</b>						
Date	Indicator	Period	Consensus	Actual	Prior	Revised
28/08	Case-Shiller 20-City Home Price index, YoY	June	6.4%	6.3%	6.5%	6.5%
29/08	GDP, QoQ annualized	Q2 S	4.0%	4.2%	4.1%	-
29/08	GDP, YoY	Q2 S	-	2.9%	2.8%	-
30/08	Personal Income, MoM	July	0.4%	0.3%	0.4%	-
30/08	Personal Spending, MoM	July	0.4%	0.4%	0.4%	-
04/09	ISM Manufacturing, month	Aug.	57.4	-	58.1	-
06/09	ADP Employment Change, month	Aug.	191k	-	219k	-
06/09	ISM Non-Manufacturing, month	Aug.	56.8	-	55.7	-
07/09	Change in Nonfarm Payrolls, month	Aug.	192k	-	157k	-
07/09	Change in Private Payrolls, month	Aug.	189k	-	170k	-
07/09	Unemployment Rate, month	Aug.	3.8%	-	3.9%	-
07/09	Average Hourly Earnings, YoY	Aug.	-	-	2.7%	-
<b>Zone euro</b>						
Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
28/08	M3 Money Supply, YoY	July	4.3%	4.0%	4.4%	4.5%
28/08	Loans to non-financial corporations, YoY	July	-	4.1%	4.1%	-
28/08	Loans to households, YoY	July	-	3.0%	2.9%	3.0%
30/08	Economic Confidence, month	Aug.	111.9	111.6	112.1	-
31/08	Core HICP, YoY	Aug. A	1.1%	1.0%	1.1%	-
31/08	HICP, YoY	Aug.	2.1%	2.0%	2.1%	-
03/09	Manufacturing PMI, month	Aug. F	-	-	54.6	-
04/09	PPI, YoY	July	-	-	3.6%	-
05/09	Services PMI, month	Aug. F	-	-	54.4	-
05/09	Composite PMI, month	Aug. F	-	-	54.4	-
07/09	GDP, QoQ	Q2 F	-	-	0.4%	-
07/09	GDP, YoY	Q2 F	-	-	2.2%	-
<b>Allemagne</b>						
Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
27/08	IFO Business Climate, month	Aug.	101.8	103.8	101.7	-
30/08	HICP, YoY	Aug. P	2.1%	1.9%	2.1%	-
03/09	Manufacturing PMI, month	Aug. F	-	-	56.1	-
05/09	Services PMI, month	Aug. F	-	-	55.2	-
05/09	Composite PMI, month	Aug. F	-	-	55.7	-
06/09	Factory Orders, MoM	July	-	-	-4.0%	-
07/09	Industrial Production, MoM	July	-	-	-0.9%	-
<b>France</b>						
Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
29/08	GDP, QoQ	Q2 P	0.2%	0.2%	0.2%	-
29/08	GDP, YoY	Q2 P	1.7%	1.7%	1.7%	-
31/08	HICP, YoY	Aug. P	2.5%	2.6%	2.6%	-
03/09	Manufacturing PMI, month	Aug. F	-	-	53.7	-
05/09	Services PMI, month	Aug. F	-	-	55.7	-
05/09	Composite PMI, month	Aug. F	-	-	55.1	-
07/09	Manufacturing Production, MoM	July	-	-	0.6%	-
<b>Suisse</b>						
Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
30/08	KOF Leading Indicator, month	Aug.	101.3	100.3	101.1	101.7
04/09	CPI, YoY	Aug.	-	-	1.2%	-
06/09	GDP, QoQ	Q2	-	-	0.6%	-
06/09	GDP, YoY	Q2	-	-	2.2%	-
07/09	Unemployment Rate, month	Aug.	-	-	2.6%	-
07/09	Foreign Reserves, CHF, month	Aug.	-	-	749.7b	-
<b>Royaume-Uni</b>						
Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
31/08	Nationwide House Price Index, MoM	Aug.	0.1%	-0.5%	0.6%	0.7%
31/08	Nationwide House Price Index, YoY	Aug.	2.7%	2.0%	2.5%	-
03/09	Manufacturing PMI, month	Aug.	-	-	54.0	-
05/09	Services PMI, month	Aug.	-	-	53.5	-
05/09	Composite PMI, month	Aug.	-	-	53.6	-
07/09	Halifax House Price Index, MoM	Aug.	-	-	1.4%	-
07/09	Halifax House Price Index, YoY	Aug.	-	-	3.3%	-

## Main Economic Indicators - Released (27 - 31 August) and to be released (3 - 7 September)

### Japon

Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
31/08	<b>Industrial production, MoM</b>	<b>July P</b>	<b>0.2%</b>	<b>-0.1%</b>	<b>-1.8%</b>	-
04/09	<i>Monetary Base, End of previous month</i>	<i>Aug.</i>	-	-	¥503.0t	-
04/09	<i>Monetary Base, YoY</i>	<i>Aug.</i>	-	-	7.0%	-

### Chine

Date	Indicateur	Période	Consensus	Réalisé	Précédent	Précédent révisé
31/08	<b>Non-manufacturing PMI, month</b>	<b>Aug.</b>	<b>53.7</b>	<b>54.2</b>	<b>54.0</b>	-
31/08	<b>Manufacturing PMI, month</b>	<b>Aug.</b>	<b>51.0</b>	<b>51.3</b>	<b>51.2</b>	-
31/08	<b>China PMI Composite, month</b>	<b>Aug.</b>	<b>-</b>	<b>53.8</b>	<b>53.6</b>	-
03/09	<b>Caixin China PMI Manufacturing, month</b>	<b>Aug.</b>	<b>50.7</b>	<b>50.6</b>	<b>50.8</b>	-
05/09	<i>Caixin China PMI Composite, month</i>	<i>Aug.</i>	-	-	52.3	-
05/09	<i>Caixin China PMI Services, month</i>	<i>Aug.</i>	52.5	-	52.8	-
07/09	<i>Foreign Reserves, month</i>	<i>Aug.</i>	-	-	\$3117.95b	-

## APPENDIX 4 – OUR GROWTH AND INFLATION FORECASTS

GDP GROWTH IN VOLUME (%)	2015	2016	2017	Q1 18	Q2 18f	Q3 18f	Q4 18f	2018f	Consensus	Q1 19f	Q2 19f	2019f	Consensus
United States	2.9	1.5	2.3	2.9	3.2	2.9	3.0	3.0	2.8	2.7	2.9	2.8	2.5
Eurozone	2.0	1.8	2.5	2.5	2.0	1.5	1.4	1.8	2.3	1.4	1.5	1.6	2.0
France	1.0	1.1	2.0	2.1	1.8	1.5	1.2	1.6	2.0	1.2	1.4	1.5	1.8
Germany	1.5	1.9	2.5	2.3	2.2	1.9	1.7	2.0	2.3	1.7	1.8	1.8	2.0
Spain	3.4	3.3	3.3	2.8	2.4	2.6	2.7	2.6	2.7	2.6	2.4	2.1	2.3
Italy	0.8	1.0	1.6	1.5	1.4	1.3	1.2	1.4	1.4	1.0	1.1	1.1	1.2
Luxembourg	2.9	3.1	2.3	3.2	2.9	2.8	3.3	3.0	3.5	2.9	3.1	2.9	3.0
Portugal	1.8	1.6	2.7	0.9	-0.4	0.7	0.8	2.0	2.3	0.9	-0.4	1.9	1.9
Europe ex-Eurozone													
United Kingdom	2.3	1.9	1.8	1.2	1.3	1.2	1.0	1.2	1.5	1.2	1.0	1.0	1.5
Switzerland	1.2	1.4	1.1	2.2	2.3	2.3	2.2	2.2	2.1	2.0	1.9	1.9	1.7
Israel	2.6	3.9	3.3	4.0	3.7	3.4	3.3	3.6	3.5	3.3	3.6	3.5	3.4
Japan	1.4	1.0	1.7	0.9	1.2	1.1	1.1	1.1	1.3	1.3	1.0	0.9	1.0
Emerging countries	4.0	4.1	4.9	5.4	5.2	5.1	5.0	5.1	-	5.0	4.9	4.9	-
China	6.9	6.7	6.9	6.8	6.7	6.5	6.5	6.6	6.6	6.5	6.4	6.4	6.4
Brazil	-3.5	-3.5	1.0	2.1	2.2	2.3	2.5	2.3	2.5	2.5	2.5	2.5	2.8
India	7.6	7.9	6.3	7.3	7.3	7.4	7.4	7.4	7.3	7.4	7.5	7.5	7.5

CONSUMER PRICE INDEX (%)	2015	2016	2017	Q1 18	Q2 18f	Q3 18f	Q4 18f	2018f	Consensus	Q1 19f	Q2 19f	2019f	Consensus
United States	0.1	1.3	2.1	2.2	2.7	2.8	2.7	2.6	2.5	2.5	2.2	2.3	2.2
Eurozone	0.0	0.2	1.5	1.3	1.6	1.9	1.8	1.7	1.5	1.7	1.6	1.6	1.5
France	0.0	0.2	1.0	1.6	1.7	1.6	1.5	1.6	1.6	1.4	1.2	1.3	1.5
Germany	0.3	0.5	1.8	1.6	1.8	1.8	1.7	1.7	1.6	1.6	1.4	1.5	1.7
Spain	-0.5	-0.2	2.0	1.2	1.6	1.5	1.4	1.5	1.5	1.4	1.4	1.4	1.6
Italy	0.0	-0.1	1.2	1.4	1.6	1.4	1.4	1.4	1.2	1.3	1.3	1.3	1.3
Luxembourg	0.1	0.0	2.1	1.2	1.3	1.9	1.8	1.5	1.5	1.8	1.8	1.9	2.0
Portugal	0.5	0.6	1.4	0.7	1.4	1.2	1.2	1.2	1.4	1.2	1.1	1.2	1.5
Europe ex-Eurozone													
United Kingdom	0.0	0.7	2.7	2.7	2.5	2.4	2.3	2.5	2.5	2.3	2.3	2.3	2.1
Switzerland	-1.1	-0.4	0.5	0.7	0.9	0.9	1.0	0.9	0.7	1.0	1.1	1.1	0.9
Israel	-0.6	-0.5	0.2	0.2	0.6	0.9	1.0	0.7	0.8	1.0	1.1	1.2	1.2
Japan	0.8	-0.1	0.5	0.7	0.8	0.8	0.9	0.8	1.0	0.9	0.9	1.0	1.1
Emerging countries	4.3	3.8	3.0	3.1	3.4	3.6	3.4	3.4	-	3.3	3.4	3.3	-
China	1.4	2.0	1.6	2.2	2.1	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3
Brazil	9.0	8.8	3.5	2.8	3.0	3.5	3.4	3.2	3.3	3.7	4.0	3.8	4.0
India	4.9	5.0	3.3	4.6	4.9	5.2	5.0	4.9	4.7	4.9	4.8	4.8	4.7



## APPENDIX 5 – OUR INTEREST RATE AND CURRENCY FORECASTS

INTEREST RATES AND YIELDS (%)*	2015	2016	2017	Q1 18	Q2 18f	Q3 18f	Q4 18f	2018f	Consensus	Q1 19f	Q2 19f	2019f	Consensus
<b>United States</b>													
Policy rate	0.50	0.75	1.50	1.75	2.00	2.25	2.50	2.50	2.40	2.75	3.00	3.25	3.05
2-year yield	0.68	0.83	1.39	2.27	2.45	2.65	2.80	2.54	2.51	3.00	3.20	3.30	3.01
10-year yield	2.13	1.83	2.33	2.74	3.00	3.20	3.30	3.06	2.95	3.35	3.40	3.45	3.36
<b>Eurozone</b>													
Policy rate	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
2-year Schatz yield	-0.25	-0.59	-0.72	-0.60	-0.50	-0.40	-0.30	-0.45	-0.50	-0.20	-0.15	-0.05	-0.07
10-year Bund yield	0.54	0.14	0.37	0.50	0.70	0.85	1.00	0.76	0.73	1.15	1.25	1.35	1.22
2-year OAT yield	-0.18	-0.51	-0.48	-0.49	-0.40	-0.30	-0.25	-0.36	-0.37	-0.15	-0.10	0.00	0.19
10-year OAT yield	0.86	0.48	0.81	0.72	0.90	1.05	1.20	0.97	1.14	1.30	1.40	1.50	1.82
<b>United Kingdom</b>													
Policy rate	0.50	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.80	0.50	0.50	0.50	1.15
2-year yield	0.54	0.29	0.25	0.82	0.80	0.80	0.75	0.79	0.98	0.70	0.70	0.70	1.41
10-year yield	1.82	1.22	1.20	1.35	1.40	1.45	1.45	1.41	1.60	1.40	1.35	1.35	2.01
<b>Switzerland</b>													
Policy rate	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.70	-0.75	-0.75	-0.50	-0.50
2-year yield	-0.89	-0.91	-0.85	-0.85	-0.75	-0.60	-0.50	-0.68	-0.64	-0.40	-0.25	-0.05	-0.06
10-year yield	-0.09	-0.35	-0.09	0.03	0.10	0.30	0.45	0.22	0.23	0.65	0.80	0.85	0.72
<b>Japan</b>													
Policy rate	0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	0.00	-0.10	-0.10	-0.10	0.00
2-year yield	0.01	-0.21	-0.17	-0.13	-0.10	-0.10	-0.10	-0.11	-0.13	-0.10	-0.05	0.00	-0.09
10-year yield	0.36	-0.04	0.06	0.05	0.05	0.05	0.10	0.06	0.11	0.15	0.25	0.30	0.16
<b>Emerging countries - Policy rates</b>													
China	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Brazil	14.25	13.75	7.00	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.75	7.25	7.75
India	6.75	6.25	6.00	6.00	6.00	6.25	6.25	6.25	6.15	6.25	6.50	6.50	6.35

\* data at end of period for trimestrial values and period average for annual values

EXCHANGE RATE**	2015	2016	2017	Q1 18	Q2 18f	Q3 18f	Q4 18f	2018f	Consensus	Q1 19f	Q2 19f	2019f	Consensus
<b>Dollar</b>													
EUR/USD	1.08	1.11	1.13	1.23	1.20	1.17	1.15	1.19	1.24	1.15	1.16	1.17	1.29
USD/JPY	120	109	112	108	110	113	115	112	108	115	115	115	105
GBP/USD	1.47	1.36	1.29	1.39	1.36	1.33	1.29	1.34	1.40	1.29	1.29	1.29	1.44
USD/CHF	1.00	0.98	0.98	0.95	0.99	1.03	1.04	1.00	0.96	1.06	1.08	1.06	0.95
USD/CNY	6.28	6.65	6.75	6.36	6.38	6.40	6.45	6.40	6.36	6.45	6.45	6.45	6.28
USD/BRL	3.34	3.48	3.19	3.24	3.45	3.50	3.50	3.45	3.40	3.50	3.55	3.50	3.31
<b>Euro</b>													
EUR/JPY	130	120	127	133	132	132	132	132	133	132	133	133	135
EUR/GBP	0.73	0.81	0.88	0.88	0.88	0.88	0.89	0.88	0.88	0.89	0.90	0.91	0.89
EUR/CHF	1.09	1.09	1.11	1.17	1.19	1.20	1.20	1.19	1.18	1.22	1.25	1.24	1.21
EUR/SEK	9.36	9.47	9.64	9.97	10.10	9.90	9.75	9.93	10.10	9.65	9.55	9.45	9.50

\*\*period average

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