Goldman Sachs | Economics Research

8 March 2019 | 11:29AM EST

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Chile: What Has Changed with the CPI Revision?

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CPI Revision Led to Significant Decline in Annual Inflation Rates

Chile's national statistics institute updated the CPI basket in its January 2019 release. The revision led to a marked and larger-than-expected decline in annual inflation rates across most aggregate measures. Both headline and core inflation declined significantly and are now tracking below the 2% target lower bound. In addition, tradable, non-tradable, and services inflation declined considerably to levels at or below the 3% target midpoint.

Inflation Changes Largely Concentrated on Few Products

Though the changes were significant, our analysis shows that much of the decline in annual inflation rates was concentrated on a few products. In particular, changes to telecom service and travel package prices explain a large share of the adjustment to headline, core and service inflation. That is, the lower inflation readings reflected mostly methodological changes in the price measurement of some products, rather than a generalized moderation of inflation pressures.

Lower Inflation to Support More Dovish Central Bank, but Rate Hikes Still Valid

The fact that few items were responsible for large changes in inflation numbers indicates that the change in the overall inflation picture is subtler than what aggregate numbers seem to suggest. While we expect the central bank to convey a more dovish guidance in its March 29 MPC meeting, we believe the board will not completely rule out rate hikes in the near future and, instead, will reinforce its previous guidance of prudence and gradualism. In the March IPoM, we expect the central bank to downgrade its 2019 growth forecast and, in light of the inflation decline after the CPI revision, we find it likely that the bank also downgrades its 2019 forecasts for headline and core inflation. Hence, potential downgrades to both growth and inflation outlooks would support a more dovish forward bias, though we believe the current environment calls for a delayed, more gradual hiking cycle rather than an abrupt end to the cycle initiated in October 2018.

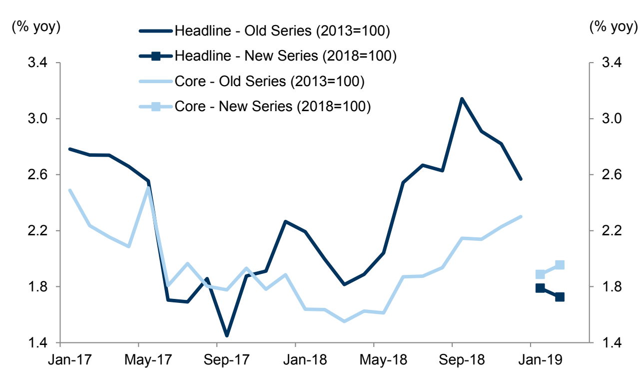
Chile: What Has Changed with the CPI Revision?

CPI Revision Led to Significant Declines in Annual Inflation Rates

Chile's national statistics institute (INE) updated the CPI basket in its January 2019 release, as part of its standard 5-year revision. The revision led to a marked and larger-than-expected decline in annual inflation rates across most aggregate measures. Headline inflation declined significantly to 1.8% yoy in January and further down to 1.7% yoy in February, from 2.6% in December and below the 2% target lower bound. Though the new series (base period 2018=100) is not directly comparable to the previous one (base period 2013=100) due to methodological changes, the Feb-19 annual rate is the lowest since September 2017. We summarize the main methodological changes in the box on page 11.

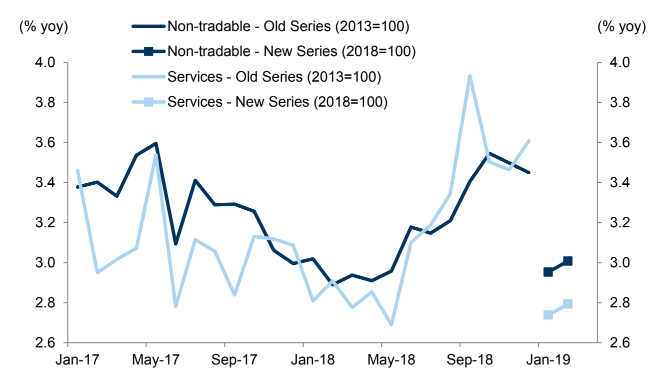
Following the CPI revision, core inflation ex-food & energy also decelerated considerably to 1.9% yoy in January from 2.3% in December. In addition, tradable inflation declined 1pp to 0.8% yoy from 1.8%, non-tradable inflation declined to 2.9% yoy from 3.5%, and services inflation reached 2.7% yoy, 0.9pp below the 3.6% level in December. The February figures remained relatively unchanged, with core, tradable, non-tradable and services inflation printing at 2.0%, 0.6%, 3.0% and 2.8%, respectively (Exhibits 1 and 2).

Exhibit 1: Considerable Decline in Headline/Core Inflation



Source: INE, Goldman Sachs Global Investment Research

Exhibit 2: Lower Non-tradable/Services Inflation



Source: INE, Goldman Sachs Global Investment Research

Though the changes were significant, our analysis shows that much of the decline in annual inflation rates was concentrated on a few products. In particular, changes to measured prices for telecom service (phone, TV and internet bundle) and travel package explain a large share of the adjustment to headline, core and service inflation. That is, the lower inflation readings in January reflected mostly methodological changes in the price measurement of some products, rather than a generalized moderation of inflation pressures.

Monetary Policy Implications of the CPI Revision

Clearly, the most relevant question is how the central bank will react to the new inflation figures. If the bank acts as it did after the 2013 CPI update, it will begin to focus on the new annual inflation figures, which suggests the potential for MPC members to be somewhat less concerned with the upward trend in services inflation seen in the old (2013=100) series.

We believe the central bank technical staff will certainly investigate the 2018 CPI update and likely determine that a few items were responsible for large changes in annual inflation rates, which indicates that the change in the overall inflation picture is subtler than what aggregate numbers seem to suggest. On the other hand, we also believe the fact that most key inflation aggregates are now at or below the 3% target, with headline and core inflation below the 2% target lower bound, will weaken the MPC's resolve in extending the policy rate hiking cycle and support a more cautious, data-dependent stance.

Still, **we believe the case for further rate hikes in the medium term remains valid** (see "LatAm IT-5: Keeping it Easy on Monetary Policy," *Latin America Economics Analyst*, Feb. 22, 2019). Data from the national pension fund system (AFP) show that labor market conditions improved modestly at the end of 2018, with both job creation and wage growth accelerating slightly through 4Q2018. While domestic activity slowed from the peak during 1H2018, most of the slowdown has been concentrated on the mining sector, which is not the central bank's focus when assessing the state of the business cycle. Imports of capital goods have gained momentum recently, suggesting domestic investment remains strong. Moreover, the current policy rate level of 3.00% remains considerably below the 4.00-4.50% neutral range estimate by the central bank, and longer-term interest rates have notably declined since October 2018, partially offsetting the impact of a higher policy rate on broad financial conditions (e.g., the 5-year nominal Camara swap rate has declined from a peak of 4.135% in mid-October to around 3.550% currently).

Overall, **while we expect the central bank to convey somewhat more dovish guidance in its March 29 MPC meeting, we believe the board will not completely rule out rate hikes in the near future and, instead, will reinforce its previous guidance of prudence and gradualism**. At the March meeting, the MPC will base its decision on an updated baseline scenario, which will be published with the March IPoM (Monetary Policy Report) on April 1. We expect the bank's 2019 growth forecast to be downgraded from the current 3.25-4.25% range (we forecast a 3.4% expansion in 2019). Moreover, in light of the significant decline in annual inflation rates after the CPI revision, we find it likely that the bank also downgrades its 2019 forecasts for headline and core inflation, currently at 2.9% and 3.1%, respectively.

Hence, potential downgrades to both growth and inflation outlooks would support a more dovish forward bias, though we believe the current environment calls for a delayed, more gradual hiking cycle rather than an abrupt end to the cycle initiated in October 2018. Finally, **we continue to expect the central bank to deliver two hikes,**

in June and October, driving the policy rate to a terminal 3.50% level, thus below the bank's 4.00-4.50% neutral range.

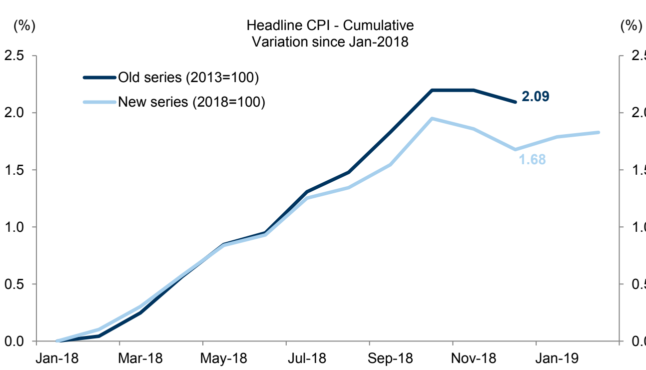
Lower Annual Inflation across Most Aggregate Measures

The 2018 CPI revision produced an overlapping sample during Jan-Dec 2018 (*serie referencial*) for which both old (2013=100) and new (2018=100) price series are available for each item in the representative consumer basket. By analyzing this sample we can identify the main sources of changes to headline and other aggregate inflation measures (core, tradable, non-tradable, services, etc.).

If the changes to CPI measures are generalized, reflecting differences across most items, one could argue that the overall inflation picture represented by the new series is considerably different from the one we knew from the old series, and therefore past inflation was indeed much lower than we initially believed. On the other hand, if the changes reflect large differences concentrated in a few items, as we found to be the case, then the assessment regarding the new inflation environment should not be so different from the previous one.

During the overlapping sample, cumulative headline inflation in the old series printed at 2.09%, while the new series showed a considerably lower 1.68% rate. Hence, the new 2018=100 series registered a 42bp lower cumulative inflation during Jan-Dec 2018 (Exhibits 3 and 4).

Exhibit 3: CPI Revision Led to Lower Headline Inflation



Source: INE, Goldman Sachs Global Investment Research

Exhibit 4: Monthly Headline Inflation - Old vs New Series

Headline CPI	% mom		% cumulative	
	Old Series 2013=100	New Series 2018=100	Old Series 2013=100	New Series 2018=100
Jan-18	0.5	-	-	-
Feb-18	0.0	0.1	0.04	0.10
Mar-18	0.2	0.2	0.25	0.30
Apr-18	0.3	0.3	0.56	0.58
May-18	0.3	0.3	0.85	0.84
Jun-18	0.1	0.1	0.95	0.93
Jul-18	0.4	0.3	1.31	1.25
Aug-18	0.2	0.1	1.48	1.34
Sep-18	0.3	0.2	1.83	1.55
Oct-18	0.4	0.4	2.20	1.95
Nov-18	0.0	-0.1	2.20	1.86
Dec-18	-0.1	-0.2	2.09	1.68
Jan-19		0.1		1.79
Feb-19		0.0		1.83

Source: INE, Goldman Sachs Global Investment Research

Similarly, most aggregate inflation measures printed significantly lower variations during Jan-Dec 2018 in the new series. Core ex-food & energy printed at 1.47% vs 2.01% in the old series (-54bp difference), tradable at 0.98% vs 1.30% (-33bp difference), non-tradable at 2.51% vs 3.06% (-55bp difference), and services at 2.45% vs 3.43% (-97bp difference). Notably, the annual inflation rates (% yoy) on all the above measures declined below the 3.0% target midpoint in January 2019. If the new Jan-19 monthly variations (% mom) were applied to the old series, annual inflation rates would have been much higher: 2.2% headline (+42bp), 2.4% core ex-food & energy (+54bp), 1.1% tradable (+33bp), 3.5% non-tradable (+60bp), and 3.7% services (+98bp) (Exhibit 5).

Exhibit 5: Large Inflation Declines after 2018 CPI Revision

CPI Aggregate	Jan-19 (% mom) 2018=100 (1)	Jan-19 (% yoy) 2018=100 (2)	Jan-19 (% yoy) - with 2018=100 % mom applied to 2013=100 series (3)	Difference in % yoy rate (2) - (3)
Headline	0.1	1.79	2.21	-0.42
CPI ex-Food & Energy	0.4	1.89	2.42	-0.54
Tradable	-0.2	0.82	1.14	-0.33
Non-tradable	0.4	2.90	3.50	-0.60
Services	0.3	2.74	3.71	-0.98
Goods	-0.1	0.87	0.74	0.12
Food	-0.3	1.14	1.31	-0.18
Energy	-1.8	2.55	2.25	0.30

Source: INE, Goldman Sachs Global Investment Research

What Happened after the 2013 CPI Revision?

The 2013 CPI revision did not lead to such large changes in annual inflation figures. When applying the new Jan-2014 monthly variation to the previous 2009=100 series, headline inflation would have reached 3.0% yoy, instead of the new 2.8% yoy rate, a 17bp difference (versus 42bp difference with the 2018 CPI revision). Also, services inflation would have printed at 4.1% yoy instead of 3.7% yoy, a 34bp difference, significantly lower than the 98bp difference after the 2018 revision (Exhibit 6).

Exhibit 6: Moderate Inflation Changes after 2013 CPI Revision

CPI Aggregate	Jan-14 (% mom) 2013=100 (1)	Jan-14 (% yoy) 2013=100 (2)	Jan-14 (% yoy) - with 2013=100 % mom applied to 2009=100 series (3)	Difference in % yoy rate (2) - (3)
Headline	0.2	2.84	3.01	-0.17
CPI ex-Food & Energy	0.3	2.39	2.40	0.00
Tradable	0.0	1.86	1.95	-0.09
Non-tradable	0.5	4.11	4.34	-0.23
Services	0.5	3.75	4.09	-0.34
Goods	-0.1	2.02	2.09	-0.08
Food	-0.4	4.39	4.43	-0.04
Energy	0.8	3.20	4.38	-1.18

Source: INE, Goldman Sachs Global Investment Research

Following the 2013 CPI revision, the central bank noted in the analysis of macroeconomic data that preceded the February 2014 MPC meeting (*Antecedentes, Reunión de Política Monetaria, Febrero 2014*) that inflation had printed at 2.8% yoy in January of that year. This figure corresponds to the first annual rate of the new series (2013=100), as the old series (2009=100) would have shown a 3.0% yoy rate if the same 0.2% mom variation in Jan-2014 was applied to it (the 2009=100 series ended in December 2013). Hence, if the central bank follows the same procedure this time around, the MPC will focus on the new annual inflation rates from the 2018=100 series, which show virtually all key aggregate inflation measures tracking at or below the target midpoint as of February.

Travel Packages and Telecom Services Explain Most Inflation Changes

In order to understand the source of such large differences between old (2013=100) and new (2018=100) inflation series, we sorted each of the 303 products individually (321 in the old CPI basket) according to their contribution to the change in Jan-Dec 2018 cumulative headline inflation after the CPI revision. For example, financial expenses had added 0.10pp to headline inflation during Jan-Dec 2018 in the old series, but they added just 0.01pp to headline inflation in the new series. Hence, financial expenses contributed to *reduce* the Jan-Dec 2018 variation in headline inflation by 0.09pp. Exhibit 7 shows all products that contributed to either increase or decrease headline inflation during that period by least 3bp.

Among the largest contributions, we found that the change in rent added 6bp to Jan-Dec 2018 cumulative headline inflation, which was the largest positive impact on headline inflation. On the other hand, changes in travel packages explained 23bp of the 42bp decline in headline inflation during the Jan-Dec 2018 period.

Exhibit 7: Impact on CPI during Jan-Dec 2018 from Changes in CPI Revision

Product	Impact on Headline CPI	Impact on Core ex-Food & Energy	Impact on Services	Impact on Goods	Impact on Tradable	Impact on Non-tradable
Rent	0.06	0.09	0.13	-	-	0.14
Food at Restaurants	0.06	0.08	0.12	-	-	0.13
Technical/professional school fees	0.04	0.06	0.09	-	-	0.10
Women's shirts	0.04	0.05	-	0.08	0.07	-
Condominium fees	0.03	0.04	0.06	-	-	0.07
Gas through pipeline	-0.03	-	-0.07	-	-0.06	-
Airfare	-0.05	-0.06	-0.09	-	-	-0.10
Potato	-0.05	-	-	-0.10	-0.09	-
College tuition	-0.07	-0.10	-0.15	-	-	-0.16
Financial expenses	-0.09	-0.12	-0.19	-	-	-0.20
Telecom service	-0.17	-0.23	-0.33	-	-	-0.36
Travel package	-0.23	-0.31	-0.46	-	-0.42	-

Source: INE, Goldman Sachs Global Investment Research

The impact from changes in individual products is a function of two variables: change in their weight in the CPI basket, and change in measured prices due to methodological updates. Weight changes reflect changing consumer preferences and were responsible for most of the impact from changes in individual products on headline inflation. However, we found that methodological changes significantly altered the measured prices for some products, ultimately leading to large impacts on aggregate inflation measures.

Exhibit 8 repeats the calculations from Exhibit 7, but keeps the weight on each product constant at their respective values in the old (2013=100) CPI basket. Hence, it shows the counterfactual impact of each product on inflation aggregates if their weights had remained unchanged. The impact from most products would have declined considerably when holding their weights constant, with women's shirts, telecom service (phone, TV and internet bundle) and travel package being notable exceptions. For example, the impact of college tuition on headline inflation would have been just -1bp instead of -7bp if it were not for the large change in its CPI weight to 2.5% from 4.0%.

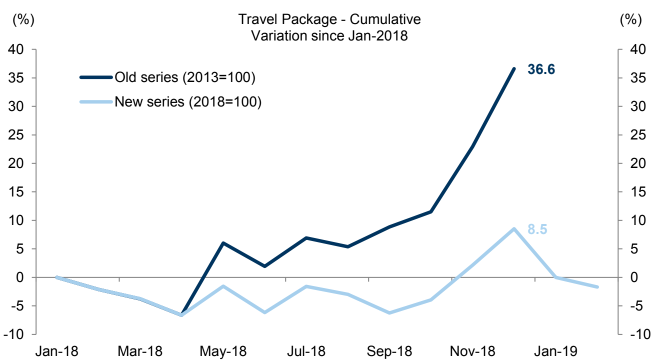
Exhibit 8: Impact on CPI during Jan-Dec 2018 Holding 2013=100 Weights Constant

Product	Impact on Headline CPI	Impact on Core ex-Food & Energy	Impact on Services	Impact on Goods	Impact on Tradable	Impact on Non-tradable
Rent	0.00	0.00	0.00	-	-	0.00
Food at Restaurants	0.02	0.03	0.04	-	-	0.04
Technical/professional school fees	0.00	-0.01	-0.01	-	-	-0.01
Women's shirts	0.06	0.08	-	0.12	0.11	-
Condominium fees	0.03	0.04	0.06	-	-	0.06
Gas through pipeline	0.00	-	0.01	-	0.01	-
Airfare	-0.02	-0.03	-0.05	-	-	-0.05
Potato	-0.02	-	-	-0.04	-0.04	-
College tuition	-0.01	-0.02	-0.02	-	-	-0.03
Financial expenses	-0.03	-0.04	-0.06	-	-	-0.06
Telecom service	-0.19	-0.25	-0.38	-	-	-0.41
Travel package	-0.23	-0.31	-0.46	-	-0.42	-

Source: INE, Goldman Sachs Global Investment Research

These results show how methodological changes for a few products were responsible for a large share of the change in aggregate inflation measures. The price variation in travel packages during Jan-Dec 2018 declined considerably to 8.5% in the new (2018=100) series from 36.6% in the old (2013=100) series (Exhibits 9 and 10). Despite their low weight in the CPI (0.77% of the consumer basket), travel packages explained 23bp of the 42bp decline in headline inflation.

Exhibit 9: Considerable Decline in Travel Package Cost



Source: INE, Goldman Sachs Global Investment Research

Exhibit 10: Monthly Travel Package Cost - Old vs New Series

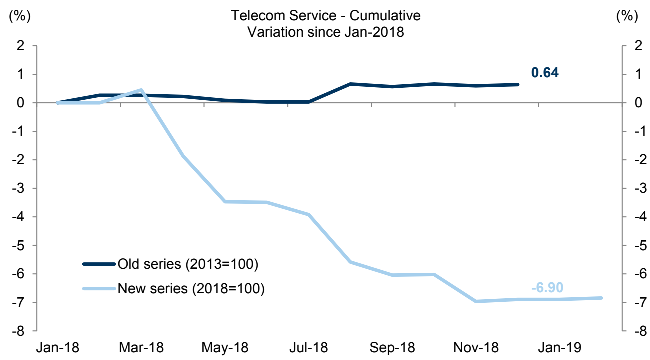
Travel Package	% mom		% cumulative	
	Old Series 2013=100	New Series 2018=100	Old Series 2013=100	New Series 2018=100
Jan-18	-11.8	-	-	-
Feb-18	-2.1	-2.1	-2.13	-2.13
Mar-18	-1.7	-1.7	-3.75	-3.74
Apr-18	-3.0	-3.0	-6.65	-6.64
May-18	13.6	5.5	6.03	-1.54
Jun-18	-3.9	-4.7	1.92	-6.18
Jul-18	4.9	4.9	6.93	-1.59
Aug-18	-1.4	-1.4	5.39	-2.99
Sep-18	3.3	-3.3	8.86	-6.23
Oct-18	2.4	2.4	11.51	-3.96
Nov-18	10.3	6.4	22.95	2.16
Dec-18	11.1	6.2	36.61	8.51
Jan-19		-7.9		-0.02
Feb-19		-1.7		-1.70

Source: INE, Goldman Sachs Global Investment Research

Similarly, telecom services (2.10% of the consumer basket), to which INE applied the new hedonic pricing model, contributed to another 17bp of the decline in headline inflation during Jan-Dec 2018, given the large decline of cumulative price variation to -6.9% from +0.6% (Exhibits 11 and 12).

Without the methodological changes to travel packages and telecom services, headline inflation would have declined only 1bp during Jan-Dec 2018, instead of 42bp.

Exhibit 11: Lower Variation in Telecom Service Cost



Source: INE, Goldman Sachs Global Investment Research

Exhibit 12: Monthly Telecom Service Cost - Old vs New Series

Telecom Service	% mom		% cumulative	
	Old Series 2013=100	New Series 2018=100	Old Series 2013=100	New Series 2018=100
Jan-18	0.1	-	-	-
Feb-18	0.3	0.0	0.27	0.00
Mar-18	0.0	0.5	0.27	0.45
Apr-18	0.0	-2.3	0.23	-1.87
May-18	-0.1	-1.6	0.09	-3.47
Jun-18	-0.1	0.0	0.03	-3.49
Jul-18	0.0	-0.4	0.03	-3.92
Aug-18	0.6	-1.7	0.66	-5.59
Sep-18	-0.1	-0.5	0.57	-6.04
Oct-18	0.1	0.0	0.66	-6.02
Nov-18	-0.1	-1.0	0.60	-6.97
Dec-18	0.0	0.1	0.64	-6.90
Jan-19		0.0		-6.90
Feb-19		0.1		-6.85

Source: INE, Goldman Sachs Global Investment Research

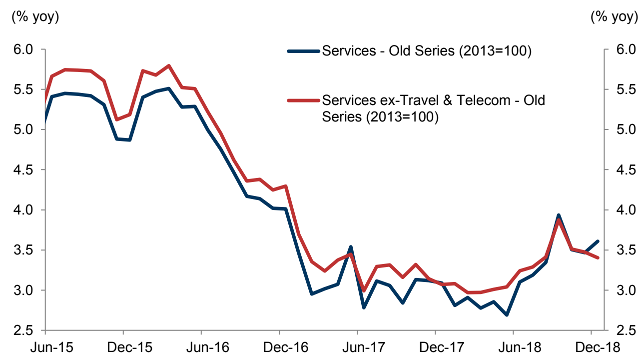
In addition, the changes in these two products led to large differences in the key business-cycle-sensitive inflation aggregates as both are included in core ex-food & energy and services measures. Travel packages are considered a tradable product, while telecom services are included in the non-tradable category.

Large Downward Revision to Services Inflation

From all the significant changes to inflation aggregates, we believe the change in services inflation was the most relevant for two reasons. First, during the Jan-Dec 2018 period services inflation suffered the largest decline among all inflation aggregates, of 97bp (to 2.45% from 3.43%). Second, this is arguably the inflation measure that is most sensitive to the business cycle and, therefore, to monetary policy. Indeed, in its latest communications the central bank has highlighted the upward trend in non-regulated services as its main concern on the inflation front. But the new inflation numbers show a very different (and considerably more benign) picture on services inflation.

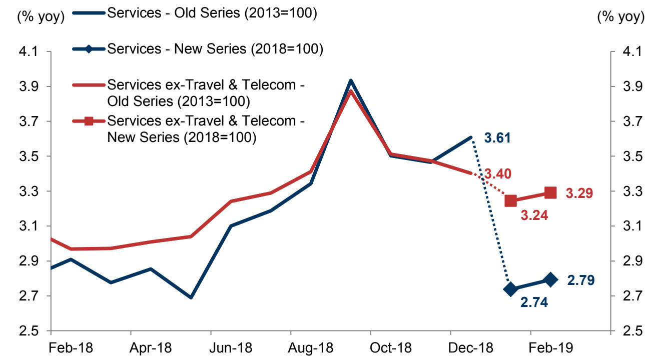
Given the large impact of changes in travel package and telecom service on services inflation, it is useful to examine what happened to the services category when excluding these two products. During the four-year history of annual variations in the old 2013=100 CPI index, services ex-travel & telecom remained above the services category for most of the time, but differences were minimal, averaging 20bp in absolute terms (Exhibit 13). However, after the latest CPI revision, both services measures diverged considerably. Annual services inflation reached 3.61% yoy in December 2018, but declined significantly to 2.74% yoy in January 2019, an 87bp difference. At the same time, services ex-travel & telecom declined to 3.24% yoy from 3.40% yoy, a much smaller 16bp change (Exhibit 14).

Exhibit 13: Travel and Telecom Not Major Drivers of Past Services Inflation



Source: INE, Goldman Sachs Global Investment Research

Exhibit 14: Large Influence of Travel and Telecom after CPI Revision



Source: INE, Goldman Sachs Global Investment Research

Hence, when excluding the two major drivers of changes to the new inflation numbers, the decline in services inflation is notably smaller. Still, we note that the exclusion does not fundamentally alter the declining trend from the September 2018 peak.

Impact of Hedonic Pricing Models on CPI

The use of hedonic pricing models[1] has led to a significant downward correction in telecom service costs, as technological advancements allowed for cheaper service offerings (when holding the quality constant). Hence, one could then conclude that the recent extension of hedonic pricing models to a broader set of products will produce a persistent downward bias on the headline CPI inflation going forward.

However, while the downward bias does occur with technology-intensive products such as TVs and cellphones, the application of hedonic models on clothing produced an opposite, upward adjustment to measured prices. The model for clothing distinguishes products on characteristics such as the use of natural versus synthetic materials, with natural materials likely carrying a premium for quality. As more apparel and footwear has been made with cheaper but also lower quality ingredients, the hedonic pricing adjustment led to a higher price variation across all clothing products in the 2018=100 CPI basket compared to the old 2013=100 index.

Exhibit 15 shows the products to which hedonic prices were applied in the latest CPI revision. In the 2013=100 index, only four products adopted hedonic pricing models: TVs, cameras, cellphones, and computers. These products amount to 1.5% of the new CPI basket. Now, INE applies hedonic models to a total of 26 products, 20 in clothing and 6 in communications (including the 4 products that already used hedonic models in the 2013=100 index). The communication products to which the model is now applied for the first time (telecom and mobile phone service) amount to 4.4% of the headline CPI index and experienced a weighted average decline of -4.0pp in the Jan-Dec 2018

[1] For details on INE's adoption of hedonic pricing models, see "Modelos Hedónicos y Ajuste de Calidad", Nota Técnica, Edición No 1, Feb. 2014, available in Spanish at the following address: http://historico.ine.cl/canales/chile_estadistico/estadisticas_precios/ipc/base_2013/notas_tecnicas/nota_tecnica_modelo_hedonico_ajustes_calidad_IPC_Base2013.pdf.

cumulative variation. On the other hand, all 20 clothing products (2.8% weight in CPI) saw their Jan-Dec 2018 variation rise after the adjustment for a weighted average increase of 5.8pp, with women's shirts increasing significantly from a -9.0% decline to a 12.7% increase.

Exhibit 15: Hedonic Pricing Model Applied to 22 Additional Products

Product	Weight in CPI	Jan-Dec 2018 Cumulative Variation (Old, 2013=100) (1)	Jan-Dec 2018 Cumulative Variation (New, 2018=100) (2)	Difference (pp)* (2) - (1)
Clothing	**2.8%**			**5.8**
Men's winter clothes	0.2%	-7.4%	-3.1%	4.3
Men's pants	0.2%	-4.0%	-0.5%	3.5
Men's shirt	0.2%	-7.9%	-5.9%	2.0
Men's underwear	0.0%	-1.1%	-0.8%	0.3
Women's winter clothes	0.2%	-6.8%	3.1%	9.9
Women's pants, skirt, dress	0.3%	-6.4%	-3.3%	3.1
Women's shirt	0.2%	-9.0%	12.7%	21.6
Women's underwear	0.1%	-1.7%	-0.7%	1.0
Children's winter clothes	0.1%	-14.0%	-9.2%	4.8
Children's pants, skirt, dress	0.1%	-9.4%	-3.7%	5.7
Children's underwear	0.0%	-2.4%	0.1%	2.5
Nursing clothes	0.0%	-8.5%	-3.8%	4.7
Men's sneakers	0.2%	-5.9%	-2.1%	3.9
Men's shoes	0.2%	-4.9%	0.4%	5.3
Women's sneakers	0.1%	-3.4%	0.9%	4.3
Women's shows	0.1%	-0.9%	7.9%	8.8
Women's seasonal shoes	0.2%	-3.1%	4.1%	7.2
Children's sneakers	0.1%	-13.8%	-6.4%	7.4
Children's shoes	0.0%	-3.5%	-1.9%	1.6
School shoes	0.1%	-3.2%	-0.1%	3.1
Communication	**4.4%**			**-4.0**
Telecom service	2.1%	0.6%	-6.9%	-7.5
Mobile phone service	2.3%	-0.7%	-1.5%	-0.8

* Difference for Clothing and Communication groups is the weighted average of individual products within each group.

Source: INE, Goldman Sachs Global Investment Research

Therefore, while the introduction of hedonic pricing models to telecom and mobile phone service could potentially produce a permanent downward bias on the headline CPI and lead to lower annual inflation rates in the future, this bias will likely be offset, at least partially, by the use of these models on clothing products.

Paulo Mateus

Gabriel Fritsch

Summary of Changes in 2018 CPI Update

In the new CPI, the base period was changed to 2018=100 from the previous 2013=100 base, and index constituents and their relative weights were revised based on the most recent Household Budget Survey (*Encuesta de Presupuestos Familiares*; EPF). Such a process has been carried out every five years since 2009 in accordance to OECD guidelines. Exhibit 16 summarizes the new CPI composition and the weight changes to each of the twelve CPI categories.

Exhibit 16: CPI Composition

Category	Weight in New CPI (2018=100)	Weight in Old CPI (2013=100)	Groups	Classes	Subclasses	Products
1. Food and nonalcoholic beverages	19.3%	19.1%	2	11	35	76
2. Alcoholic beverages and tobacco	4.8%	3.3%	2	4	4	8
3. Clothing and footwear	3.5%	4.5%	2	5	10	28
4. Housing and basic services	14.8%	13.8%	4	9	11	16
5. Household furnishing and maintenance	6.5%	7.0%	6	10	13	36
6. Healthcare	7.8%	6.4%	3	7	8	22
7. Transportation	13.1%	14.5%	3	10	14	24
8. Communication	5.5%	5.0%	2	2	2	6
9. Recreation and culture	6.6%	6.8%	5	16	22	37
10. Education	6.6%	8.1%	5	5	5	11
11. Restaurants and hotels	6.4%	4.4%	2	2	3	7
12. Miscellaneous goods and services	5.2%	7.2%	5	7	9	32
TOTAL	**100%**	**100%**	**41**	**88**	**136**	**303**

Source: INE, Goldman Sachs Global Investment Research

Furthermore, INE introduced several methodological improvements following international best practices that, according to the institute, allow for the construction of a more precise and representative price index:

1. **Weight adjustment of specific components:** the weights of certain components were adjusted relative to that given by the EPF for different reasons. Firstly, spending on alcoholic beverages and tobacco is under-reported in the EPF so the National Accounts from the Central Bank of Chile is used as reference. Secondly, because spending on insurance, gambling, or used cars may generate revenue but the EPF reports only gross spending, INE looks at administrative registries to calculate net spending and derive adjusted weights for those items;
2. **Optimization of amount of surveyed prices:** an optimal number of prices to be surveyed for each product is determined by price volatility and the relative importance of the item in the CPI. The larger the price volatility and weight of an item, the larger the number of prices surveyed;
3. **Higher frequency of surveyed prices in healthcare:** prices for healthcare services are now surveyed monthly instead of quarterly;
4. **Larger amount of surveyed prices in households:** a greater sample of households is used to survey prices for rent and domestic services;
5. **Adoption of hedonic pricing models for quality adjustments:** hedonic pricing methods were extended to clothing and footwear, telecom and mobile phone services to control for changes in quality. This method was introduced in the 2013 CPI revision for some technology products (TVs, cameras, cellphones, and computers);

6. **Inclusion of different weights for different product varieties:** new individual weights for different varieties of the same good/service to better represent consumer preferences and the market structure of a specific product. Products subject to this are airfares, tolls, insurance, condominium fees, and medical, paramedical, and hospital services.

LatAm and Global Macroeconomic Outlook

Consolidated Latin America Selected Economic Indicators

	2011	2012	2013	2014	2015	2016	2017	2018F	2019F	2020F	2021F	2022F
I. Economic Activity and Prices												
Nominal GDP (US$bn)	5,083	5,078	5,223	5,182	4,366	4,168	4,645	4,487	4,669	5,124	5,557	5,924
Real GDP growth (% yoy)	4.6	2.6	2.8	1.3	0.3	-0.2	1.7	1.4	1.8	2.7	3.0	3.1
CPI Inflation (% yoy)	7.3	6.6	7.1	8.7	9.0	8.8	6.5	8.8	6.7	4.8	4.2	3.8
Domestic Demand (% yoy)	6.0	2.8	3.0	1.0	-0.7	-1.0	1.8	2.0	1.6	2.8	3.1	3.2
II. External Sector (US$bn)												
Current Account Balance	-111.0	-131.8	-157.8	-168.4	-135.8	-84.1	-75.2	-89.0	-101.3	-124.3	-146.9	-170.1
Trade Balance	64.9	46.7	9.8	-3.6	-10.7	34.6	57.5	46.0	40.3	28.0	17.3	3.8
Gross International Reserves	663.6	722.6	715.9	737.9	705.2	729.3	751.7	762.8	788.4	808.3	823.5	839.1
Change in Reserves	109.2	59.0	-6.8	22.0	-32.7	24.1	22.4	11.1	25.7	19.9	15.2	15.6
Net Capital Inflows	220.2	190.9	151.1	190.4	103.1	108.2	97.6	100.0	127.0	144.2	162.1	185.7
Foreign Direct Investment	148.2	155.4	167.9	167.8	150.1	146.4	143.8	163.4	165.3	177.1	187.1	197.1
III. Public Finance and Indebtness (% GDP)												
Primary Fiscal Balance	1.3	0.8	0.4	-0.9	-1.7	-1.8	-0.9	-0.8	-0.2	0.1	0.4	0.5
Overall Fiscal Balance	-2.1	-2.1	-2.5	-4.3	-6.3	-5.6	-4.7	-4.4	-4.0	-3.8	-3.5	-3.3
Total Public Sector Debt	19.2	19.2	20.0	22.1	24.4	26.8	26.7	28.5	29.5	29.7	29.5	29.8
Total External Debt	22.2	24.7	26.1	29.1	34.4	36.8	34.8	37.7	38.9	38.4	37.9	37.8

Note: Aggregates weighted by nominal GDP in US$ at PPP exchange rates.

Source: Goldman Sachs Global Investment Research

Global Macroeconomic Framework

						2018				2019F			
	2016	2017	2018F	2019F	2020F	Q1	Q2	Q3	Q4F	Q1F	Q2F	Q3F	Q4F
Real GDP Growth (%, yoy)													
United States	1.6	2.2	2.9	2.3	2.0	2.6	2.9	3.0	3.1	2.7	2.4	2.1	2.0
Euro Area	1.9	2.5	1.8	1.0	1.4	2.4	2.2	1.6	1.2	0.9	0.8	1.0	1.1
Japan	0.6	1.9	0.7	0.7	0.7	1.3	1.5	0.1	0.0	0.6	0.3	1.3	0.6
World Economy	3.1	3.7	3.8	3.5	3.6	4.0	4.0	3.6	3.6	3.5	3.4	3.6	3.6
CPI Inflation (%, yoy)													
United States	0.9	2.1	2.2	1.8	2.3	2.2	2.7	2.6	2.2	1.6	1.8	1.8	2.0
Euro Area	0.2	1.5	1.8	1.3	1.2	1.3	1.7	2.1	2.0	1.7	1.4	1.1	1.0
Japan	-0.1	0.5	1.0	0.4	0.7	1.3	0.6	1.1	0.9	0.6	0.4	0.2	0.3
Interest rates (%, e.o.p)													
Fed Funds	0.54	1.30	2.27	2.63	2.63	1.51	1.82	1.95	2.27	2.38	2.38	2.38	2.63
UST 10-Year	2.44	2.41	2.68	3.00	2.85	2.74	2.86	3.06	2.68	2.75	2.90	3.00	3.00

Source: Goldman Sachs Global Investment Research

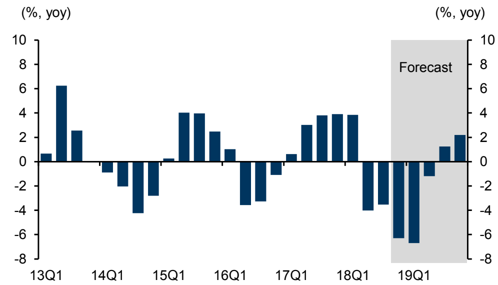
LatAm Country Data Tables

Argentina

	2016	2017	2018F	2019F
Activity and Prices				
Real GDP Growth (% yoy)	-1.8	2.9	-2.6	-1.2
Nominal GDP (US$bn)	554	637	527	444
Consumer Prices, IPC (yoy, e.o.p.)*	N.A	24.8	47.6	31.1
Consumer Prices, IPCBA (yoy, e.o.p.)*	41.0	26.1	45.5	28.7
External Sector				
Current Account (% GDP)	-2.7	-5.0	-5.3	-1.7
Trade Balance (% GDP)	0.8	-0.9	-0.2	3.3
Exports (% yoy)	2.0	1.2	5.1	10.3
Imports (% yoy)	-7.0	19.7	-2.6	-14.6
Exchange Rate ($/ARS, e.o.p.)	15.9	18.6	37.6	47.6
Gross International Reserves (US$bn)	39.3	55.1	65.8	68.8
Monetary Sector				
Monetary Base (% yoy)	26.6	24.7	36.0	18.0
Credit to the Private Sector (% GDP)	13.7	16.1	16.3	14.2
Reference Interest Rate	24.75	28.75	57.00	35.00
Fiscal Sector **				
Federal Govt Primary Balance (% GDP)	-4.3	-3.8	-2.4	0.0
Federal Govt Overall Balance (% GDP)	-5.9	-6.0	-5.2	-3.5

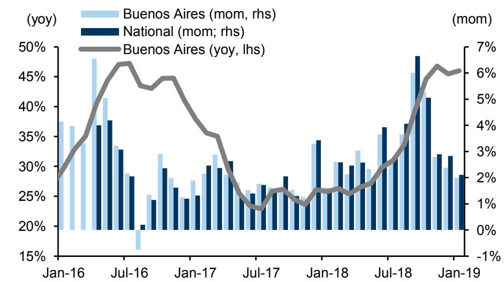
*IPC computed by INDEC, IPCBA by Statistical Institute City of Buenos Aires. **Before Rents from CB and Anses. Accumulated 4Q. *** Including non-performing debt.

Sharp Contraction in 2Q18 and 3Q18



Source: INDEC, Statistical Inst. City of Buenos Aires, Goldman Sachs Global Investment Research

Deteriorating Inflation Dynamics



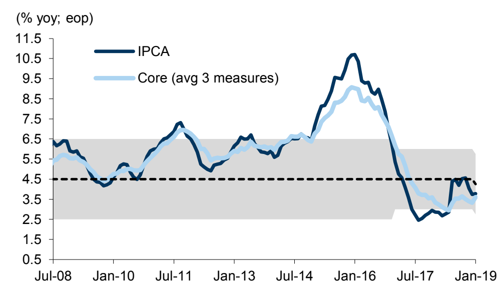
Source: INDEC, Statistical Inst. City of Buenos Aires, Goldman Sachs Global Investment Research

Brazil

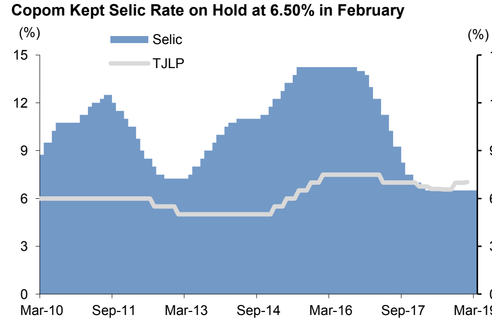
	2016	2017	2018F	2019F
Activity and Prices				
Real GDP Growth (% yoy)	-3.3	1.1	1.1	2.0
Nominal GDP (US$bn)	1,808	2,053	1,876	1,967
IPCA Inflation (yoy e.o.p)	6.3	2.9	3.7	4.0
External Sector				
Current account (% GDP)	-1.3	-0.4	-0.8	-1.8
Trade balance (% GDP)	2.5	3.1	2.9	2.1
Exports of goods (% yoy)	-3.0	17.8	10.0	5.5
Imports of goods (% yoy)	-19.1	9.9	21.0	14.0
Nominal Exchange Rate ($/BRL e.o.p.)	3.26	3.31	3.87	3.60
Net International Reserves (US$bn)	365	374	375	390
Monetary Sector				
Monetary base (% yoy)	5.9	9.8	7.0	8.0
Credit to the Private Sector (%GDP)	45.8	43.8	44.6	47.2
SELIC rate (e.o.p)	13.75	7.00	6.50	6.50
Fiscal Sector				
Public Sector Primary Balance (% GDP)	-2.5	-1.7	-1.6	-0.7
Public Sector Nominal Balance (% GDP)	-9.0	-7.8	-7.1	-6.4
Debt Indicators				
Gross general govt debt (% GDP)	0.0	0.0	0.0	0.0
Domestic public debt (%GDP)	42735.0	43100.0	43465.0	43830.0
External public debt (%GDP)	-9.0	-7.8	-7.1	0.0
Total external debt (% GDP)	30.3	26.7	29.7	30.2

Source: Goldman Sachs Global Investment Research

Headline/Core Inflation Back to Target Range



Copom Kept Selic Rate on Hold at 6.50% in February



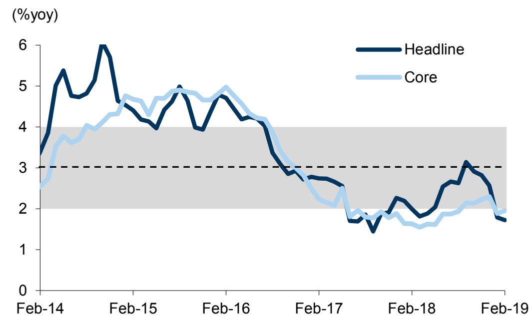
Sources: Bloomberg, Goldman Sachs Global Investment Research, Haver Analytics, IBGE

Chile

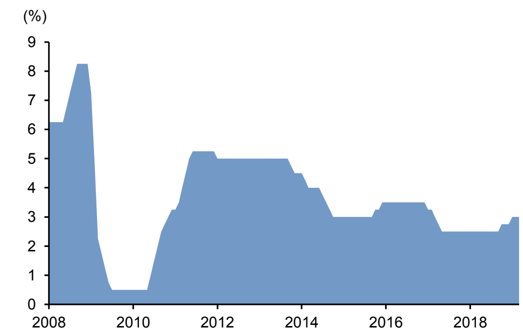
	2016	2017	2018F	2019F
Activity and Prices				
Real GDP Growth (% yoy)	1.3	1.5	4.0	3.4
Nominal GDP (US$bn)	250	277	297	317
Consumer Prices (% yoy, e.o.p.)	2.7	2.3	2.6	2.9
External Sector				
Current Account (% GDP)	-1.4	-1.5	-2.8	-2.4
Trade Balance (% GDP)	2.2	2.9	1.8	1.9
Exports (% yoy)	-2.1	14.0	9.0	5.7
Imports (% yoy)	-5.7	10.9	14.3	5.2
Exchange Rate ($/CLP, e.o.p.)	667	615	696	630
Gross International Reserves (US$bn)	40.5	39.0	39.9	44.0
Monetary Sector				
Broad Money (M3, % yoy)	8.2	4.8	9.0	9.0
Credit to the Private Sector (% GDP)	81.3	80.2	81.7	82.8
Policy Rate (e.o.p.)	3.50	2.50	2.75	3.50
Fiscal Sector				
Central Gov't Primary Balance (% GDP)	-2.0	-2.0	-0.8	-0.6
Central Gov't Overall Balance (% GDP)	-2.7	-2.8	-1.7	-1.5
Debt Indicators				
Central Govt Debt (% GDP)	21.0	23.6	24.0	24.3
Domestic (% GDP)	17.0	19.2	19.0	18.8
External (% GDP)	4.0	4.4	4.9	5.5
Total External Debt (% GDP)	66.7	65.4	62.9	60.8

Source: Goldman Sachs Global Investment Research

Headline/Core Inflation Below Target Range



Central Bank Hiked Policy Rate by 25bp in January



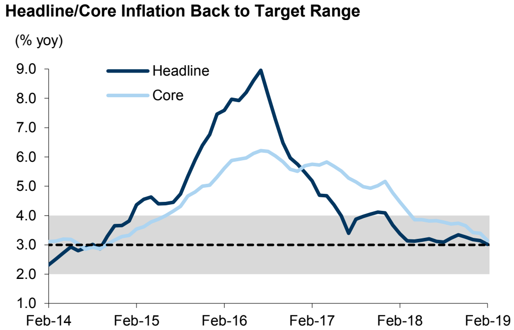
Source: Haver Analytics, INE, Central Bank of Chile

Colombia

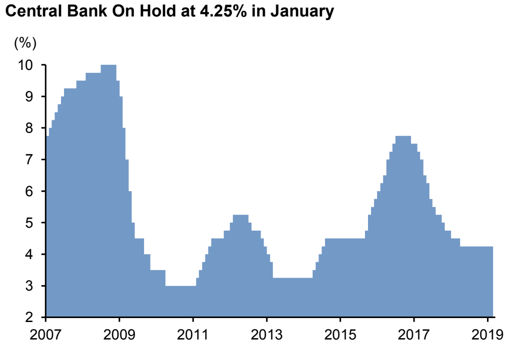
	2016	2017	2018F	2019F
Activity and Prices				
Real GDP Growth (% yoy)	2.1	1.4	2.7	2.9
Nominal GDP (US$bn)	283	312	331	341
Consumer Prices (% yoy, e.o.p.)	5.7	4.1	3.2	3.1
External Sector				
Current Account (% GDP)	-4.2	-3.3	-3.8	-6.4
Trade Balance (% GDP)	-3.2	-1.5	-1.6	-3.6
Exports (% yoy)	-11.6	16.4	11.7	2.9
Imports (% yoy)	-16.9	2.3	12.2	16.5
Exchange Rate ($/COP, e.o.p.)	3001	2984	3250	2950
Gross International Reserves (US$bn)	46.2	47.1	47.7	50.1
Monetary Sector				
Monetary Base (% yoy)	2.5	5.0	7.0	9.0
Credit to the Private Sector (% GDP)	48.8	51.3	53.2	54.8
Policy Rate (% e.o.p.)	7.50	4.75	4.25	4.25
Fiscal Sector				
Central Government Primary Balance (% GDP)	-1.1	-0.8	-0.2	0.4
Central Government Overall Balance (% GDP)	-4.0	-3.6	-3.1	-2.4
Debt Indicators				
Gross Non-fin. Public Sector Debt (% GDP)	54.9	55.9	57.4	57.9
Domestic (% GDP)	31.1	33.0	34.9	35.4
External (% GDP)	23.7	22.8	22.5	22.5
Total External Debt (% GDP)	42.5	39.6	37.5	38.0

Source: Goldman Sachs Global Investment Research

Headline/Core Inflation Back to Target Range



Central Bank On Hold at 4.25% in January



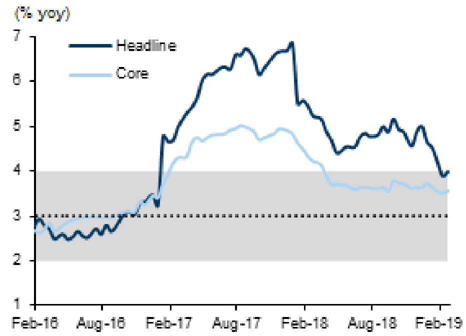
Source: Banco de la Repœblica

Mexico

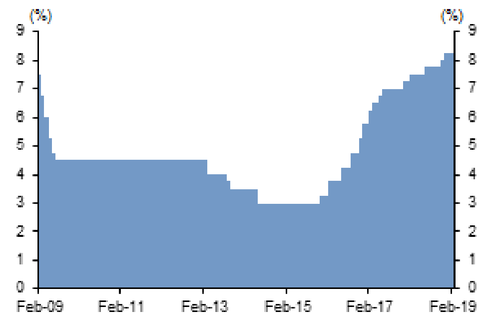
	2016	2017	2018F	2019F
Activity and Prices				
Real GDP Growth (% yoy)	2.9	2.1	2.0	1.5
Nominal GDP (US$ bn)	1078	1158	1223	1274
Consumer Prices (yoy, e.o.p.)	3.4	6.8	4.8	3.6
External Sector				
Current Account (% GDP)	-2.3	-1.7	-1.8	-1.9
Trade Balance (% GDP)	-1.2	-0.9	-1.1	-1.2
Exports (% yoy)	-1.7	9.5	10.1	4.9
Imports (% yoy)	-2.1	8.6	10.4	5.1
Exchange Rate ($/MXN, e.o.p.)	20.73	19.79	19.68	19.30
Net International Reserves (US$ bn)	176.5	172.8	174.8	174.0
Monetary Sector				
Monetary Base (% yoy)	14.4	8.8	8.3	10.3
Credit to the Private Sector (% GDP)	18.0	18.5	18.9	19.2
Tasa de Fondeo Rate (e.o.p.)	5.75	7.25	8.25	7.50
Fiscal Sector				
Public Sector Primary Balance (% GDP)	-0.1	1.4	0.9	0.5
Public Sector Overall Balance (% GDP)	-2.5	-1.1	-2.0	-2.4
Debt Indicators				
Gross Federal Govt Debt (% GDP)	48.7	45.8	44.8	45.2
Domestic (% GDP)	30.9	28.9	28.4	29.1
External (% GDP)	17.8	16.9	16.4	16.1
Total External Debt (% GDP)	38.3	37.7	37.2	37.5

Note: *Public Sector Borrowing Requirements
Source: Goldman Sachs Global Investment Research

Headline Inflation Has Likely Peaked



Banxico On Hold at 8.25% in February



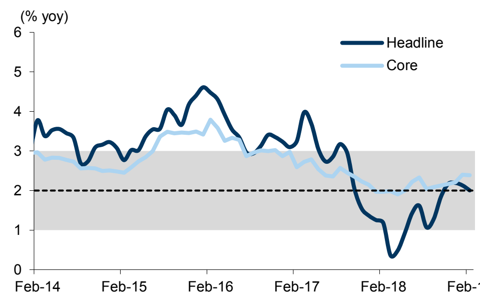
Source: Haver Analytics, INEGI, Goldman Sachs Global Investment Research

Peru

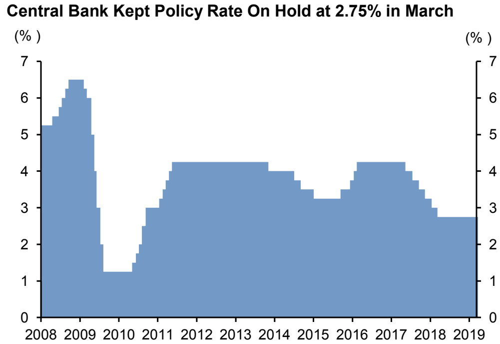
	2016	2017	2018F	2019F
Activity and Prices				
Real GDP Growth (% yoy)	4.0	2.5	4.0	4.1
Nominal GDP (US$bn)	194	214	225	240
Consumer Prices (% yoy, eop)	3.2	1.4	2.2	2.5
External Sector				
Current Account (% GDP)	-2.7	-1.2	-1.5	-1.7
Trade Balance (% GDP)	1.0	3.1	3.1	2.6
Exports (% yoy)	7.7	22.1	8.1	2.9
Imports (% yoy)	-5.9	10.2	8.2	5.2
Gross International Reserves (US$bn)	61.7	63.7	59.8	61.5
Exchange Rate ($/PEN, e.o.p.)	3.36	3.24	3.36	3.25
Monetary Sector				
Monetary Base (% yoy)	4.1	7.2	3.5	9.0
Credit to the Private Sector (% GDP)	29.1	28.8	27.0	29.0
Reference Interest Rate (e.o.p.)	4.25	3.25	2.75	3.00
Fiscal Sector				
Non-fin Pub. Sector Primary Balance (% GDP)	-1.4	-1.9	-1.8	-1.5
Non-fin Pub. Sector Overall Balance (% GDP)	-2.5	-3.1	-2.8	-2.6
Debt Indicators				
Total Federal Govt Debt (% GDP)	23.9	24.9	25.7	26.4
Domestic Public Debt (% GDP)	13.5	16.1	16.4	16.6
External Public Debt (% GDP)	10.4	8.8	9.3	9.8
Total External Debt (% GDP)	38.4	35.9	37.0	37.9

Source: Goldman Sachs Global Investment Research

Headline Inflation Back to Target Range

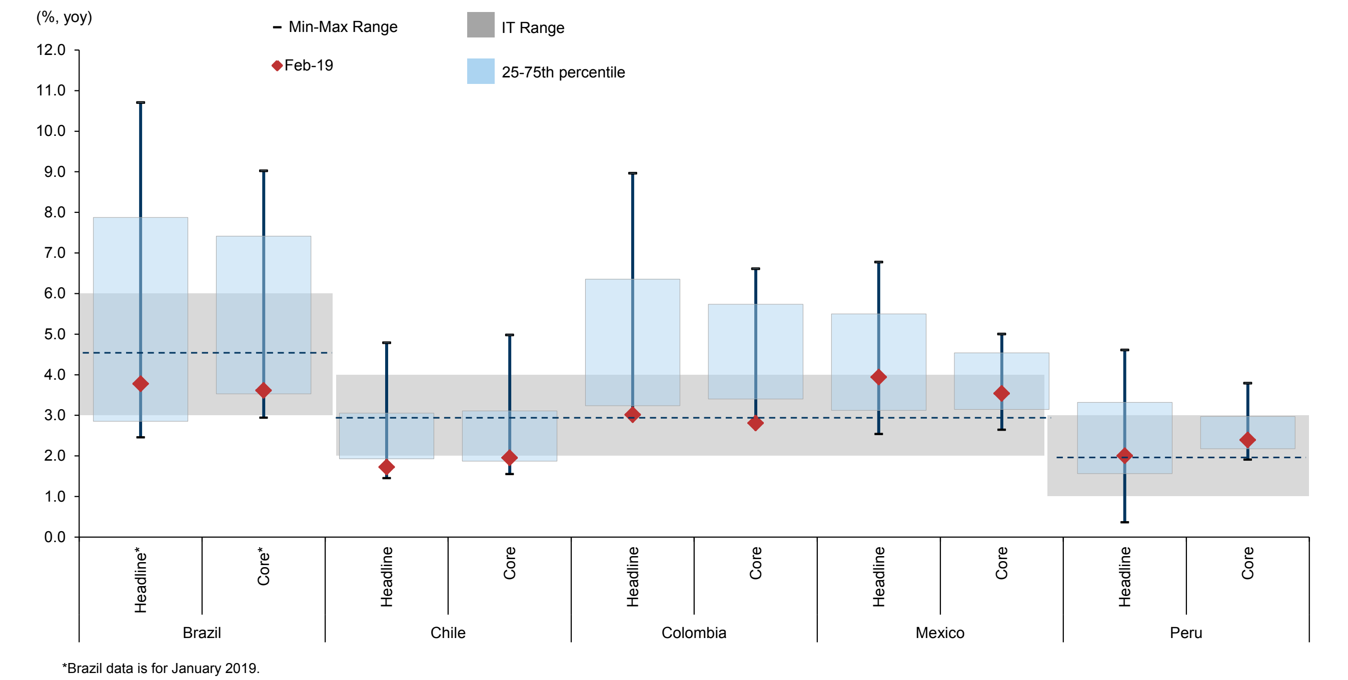


Central Bank Kept Policy Rate On Hold at 2.75% in March



Source: BCRP, INEI, Goldman Sachs Global Investment Research

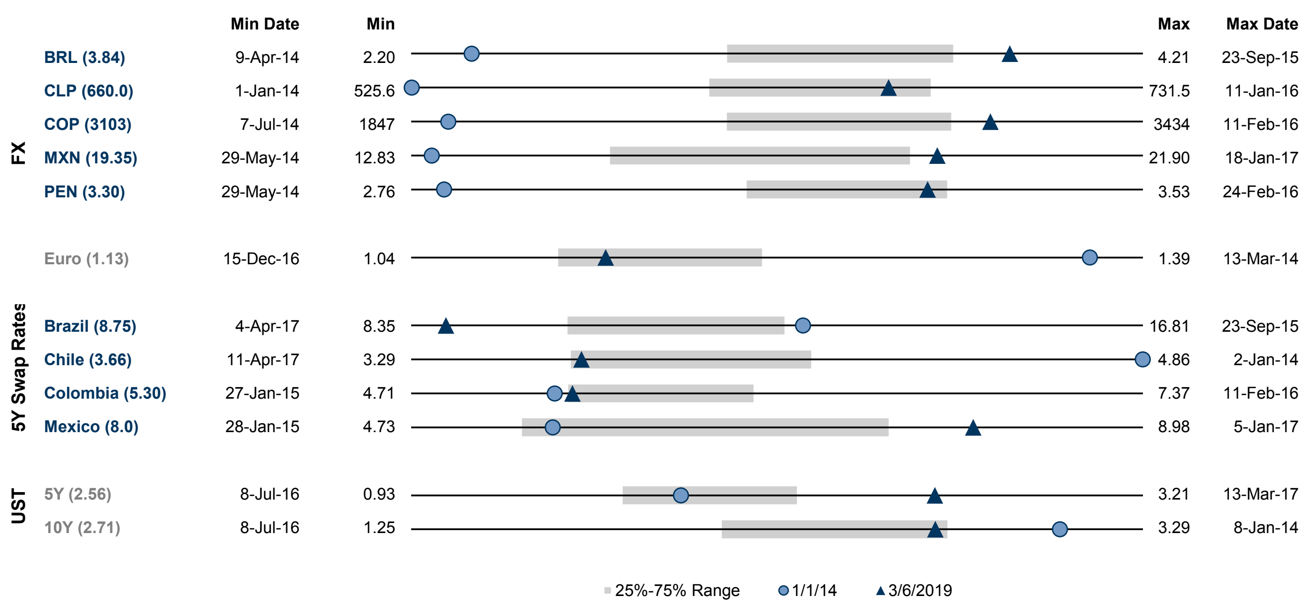
LAIT-5 Annual Headline and Core Inflation Dynamics Since January 2016



Source: Haver Analytics, Goldman Sachs Global Investment Research

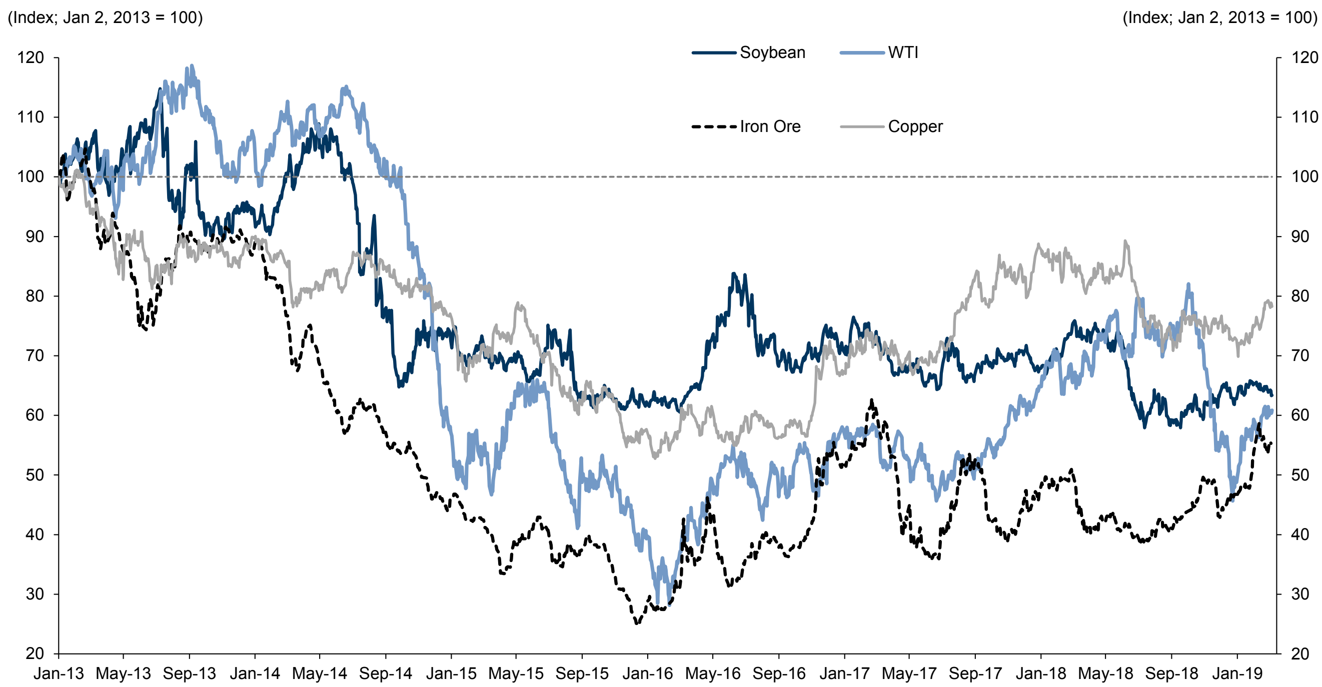
LatAm Financial Markets Outlook

LatAm Financial Markets Indicators (2014-2019)



Source: Goldman Sachs Global Investment Research

Key Commodities Prices



Source: Goldman Sachs Global Investment Research

Latin America Swap Rates

					Change Since (bps)	
		End-2017	End-2018	Current (03/06/2019)	End-2017	End-2018
Swap Rates (%)	**Brazil**					
	2y	8.06	7.36	7.34	-73	-2
	10y	10.78	9.57	9.39	-139	-18
	Chile					
	2y	2.84	3.29	3.32	48	2
	10y	4.24	4.06	4.08	-16	2
	Colombia					
	2y	4.46	4.62	4.58	12	-4
	10y	6.10	6.11	6.01	-9	-10
	Mexico					
	2y	8.02	8.61	8.10	8	-51
	10y	7.98	8.84	8.33	35	-51
	United States					
	2y	2.07	2.66	2.63	55	-3
	10y	2.42	2.74	2.71	29	-3

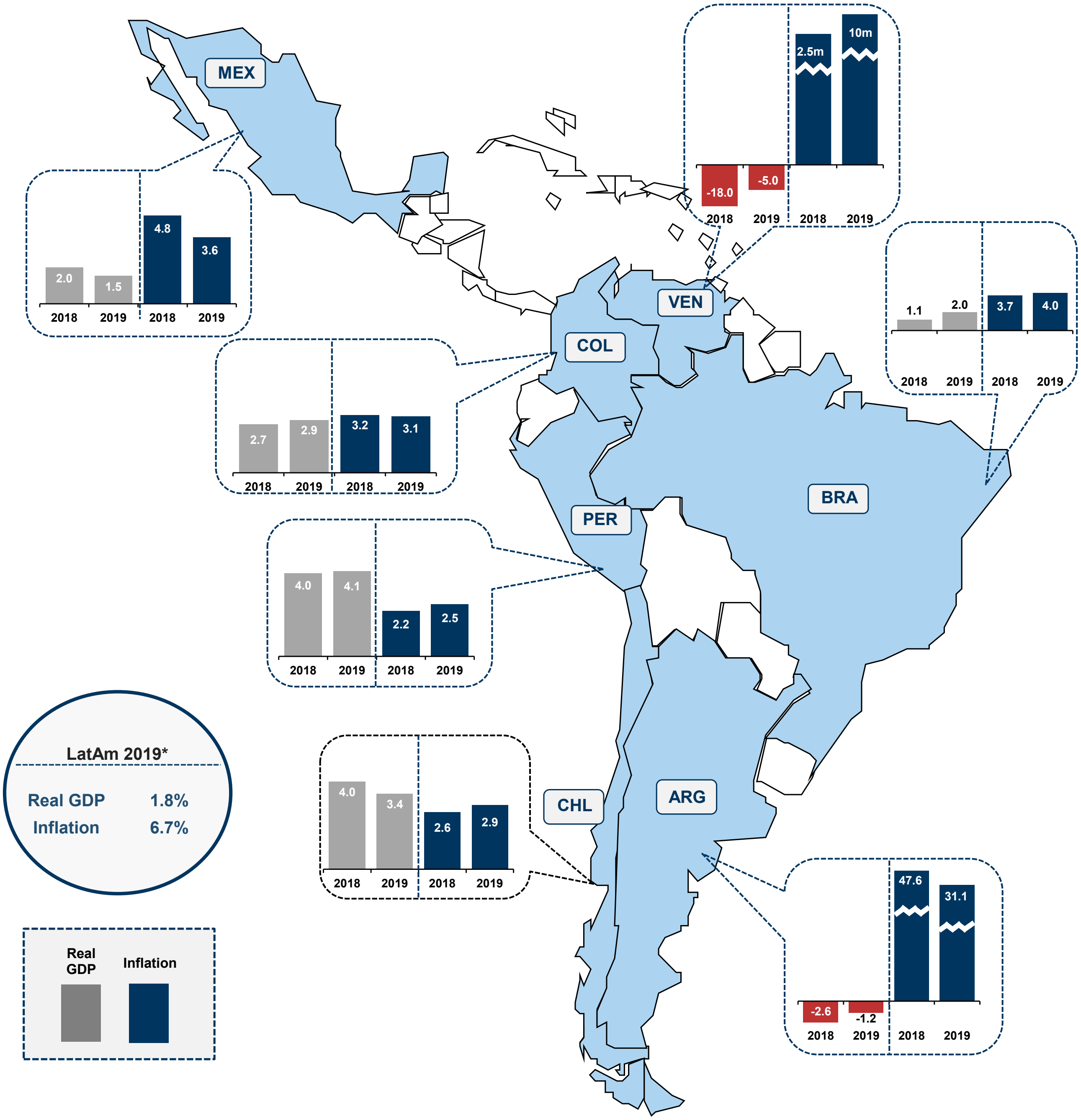
Source: Goldman Sachs Global Investment Research

Latin America Forecasts

		Policy Rates and FX Levels (End of Period)						Implied Change (Policy Rate in bps; FX in %)			
		Current	1Q2019	2Q2019	3Q2019	4Q2019	1Q2020	1Q2019	2Q2019	3Q2019	4Q2019
Policy Rate (%)	**Brazil**	6.50	6.50	6.50	6.50	6.50	6.50	0	0	0	0
	Chile	3.00	3.00	3.25	3.25	3.50	3.50	0	25	25	50
	Colombia	4.25	4.25	4.25	4.25	4.25	4.50	0	0	0	0
	Mexico	8.25	8.25	8.25	8.00	7.50	7.25	0	0	-25	-75
	Peru	2.75	2.75	2.75	2.75	3.00	3.25	0	0	0	25
FX (Local / USD)	**Argentina**	40.73	39.93	42.34	44.90	47.62	48.55	-2.0%	3.9%	10.2%	16.9%
	Brazil	3.84	3.75	3.60	3.60	3.60	3.60	-2.3%	-6.2%	-6.2%	-6.2%
	Chile	660.3	646.7	638.3	633.3	630.0	622.5	-2.1%	-3.3%	-4.1%	-4.6%
	Colombia	3099	3065	3033	2992	2950	2937	-1.1%	-2.1%	-3.5%	-4.8%
	Mexico	19.36	19.70	19.50	19.50	19.30	19.23	1.8%	0.7%	0.7%	-0.3%
	Peru	3.31	3.29	3.27	3.26	3.25	3.22	-0.6%	-1.3%	-1.6%	-1.8%

Source: Goldman Sachs Global Investment Research

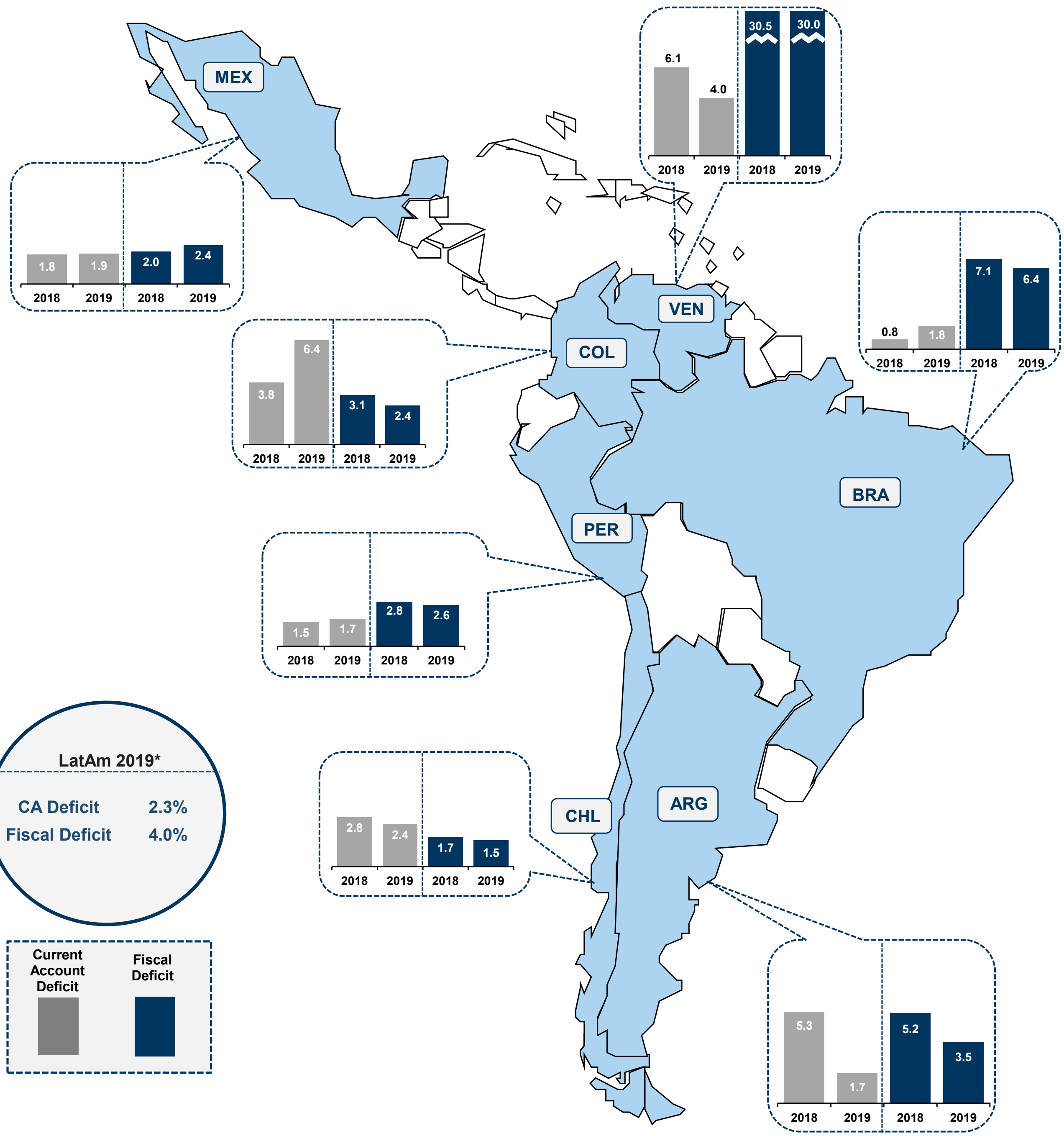
LatAm Outlook for 2018-19: Real GDP Growth and Inflation (YoY, %)



*Aggregate numbers calculated excluding Venezuela

Source: Goldman Sachs Global Investment Research

LatAm Outlook for 2018-19: Current Account and Fiscal Deficit (% of GDP)



*Aggregate numbers calculated excluding Venezuela

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Source: Goldman Sachs Global Investment Research

Calendar of Economic and Political Events

Date	Forthcoming Events	Comment
Argentina		
11-Aug	National Open and Mandatory Primaries (PASO)	Primary elections to define party candidates. Citizens may vote for any candidate of any party, but may only cast a single vote.
27-Oct	Presidential Election (First Round)	On October 27, Argentines will elect a new president. Mauricio Macri is expected to seek re-election.
24-Nov	Presidential Election Runoff (if needed)	The two leading candidates will face a run-off on November 24 if no candidate wins more than 45% of the vote in the first round or over 40% of the vote with a >10pp lead over the second candidate.
Brazil		
20-Mar	COPOM Meeting	We expect the Copom to leave the Selic policy rate unchanged at 6.50%.
Chile		
31-Mar	MPC Meeting	Following the hike in January, we expect the BCCh to leave the policy rate unchanged at 3.00%.
Colombia		
29-Mar	MPC Meeting	We expect Banrep to keep the policy rate at 4.25% in the near future.
Mexico		
28-Mar	MPC Meeting	We expect the Banxico to keep the policy rate at 8.25%. In the last meeting, the forward guidance pivoted from hawkish to a vigilant but neutral short-term bias, with risks to inflation still skewed to the upside.
Peru		
11-Apr	MPC meeting	We expect BCRP to keep the policy rate at 2.75% in the near future.

Source: Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

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