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Countries we do not think about.

Why global dairy demand retains its momentum and will keep dairy prices high

October 2022

Erik Elgersma

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Insights on future world dairy export markets

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When we say dairy importers, many people think: China.

Here, we also look at 12 Other major dairy importing countries.

With China, these ‘top-13’ countries import about 80% of all milk powders in 2021.

What insights are we looking for re. the Top-13?

- **Price elasticity**
- “**Other 12” and China’s economic performance**
- **Top-13’s demographics**
- **Dairy import, Production, Consumption balance** in Top-13

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The World Market dairy demand and supply

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Net exporters

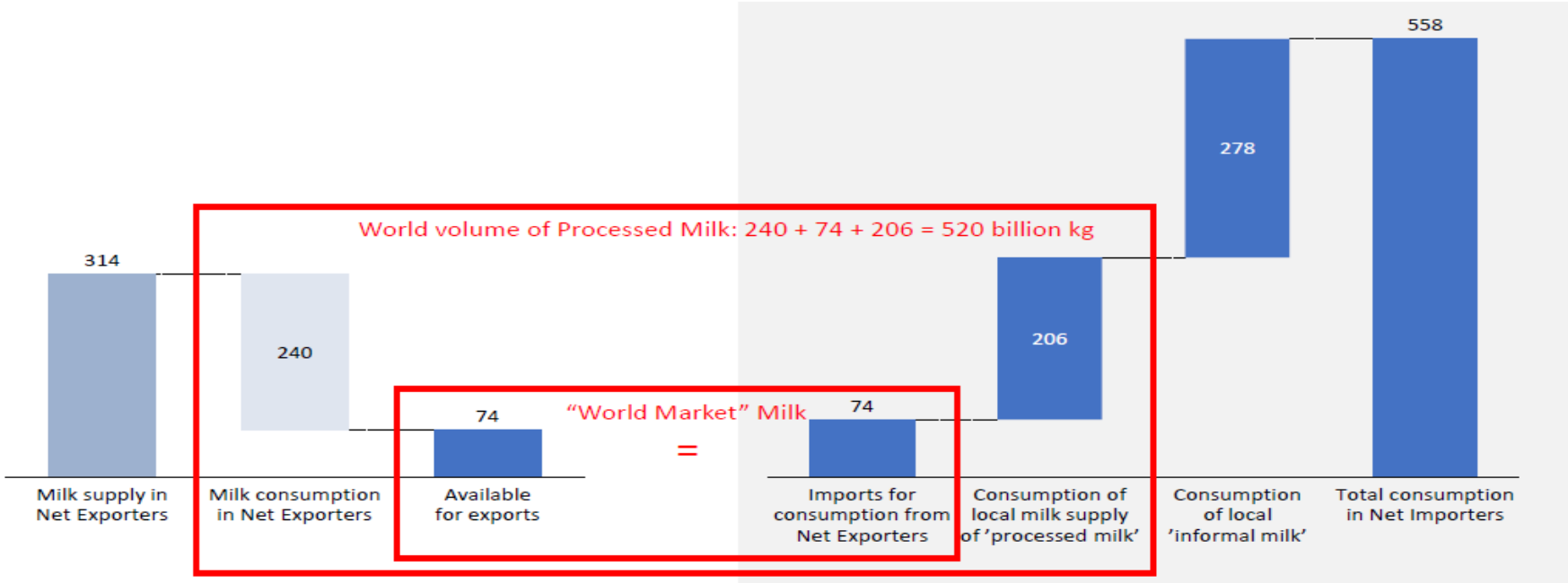
Raw milk supply for processing in factories and domestic demand in main 'dairy exporting countries/regions'*

billion kg ECM, data for 2021

Net importers

Raw milk supply for processing in factories and domestic demand in main 'dairy importing countries/regions'*

billion kg ECM, data for 2021



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Scope: China + 12 major dairy (net) importing countries

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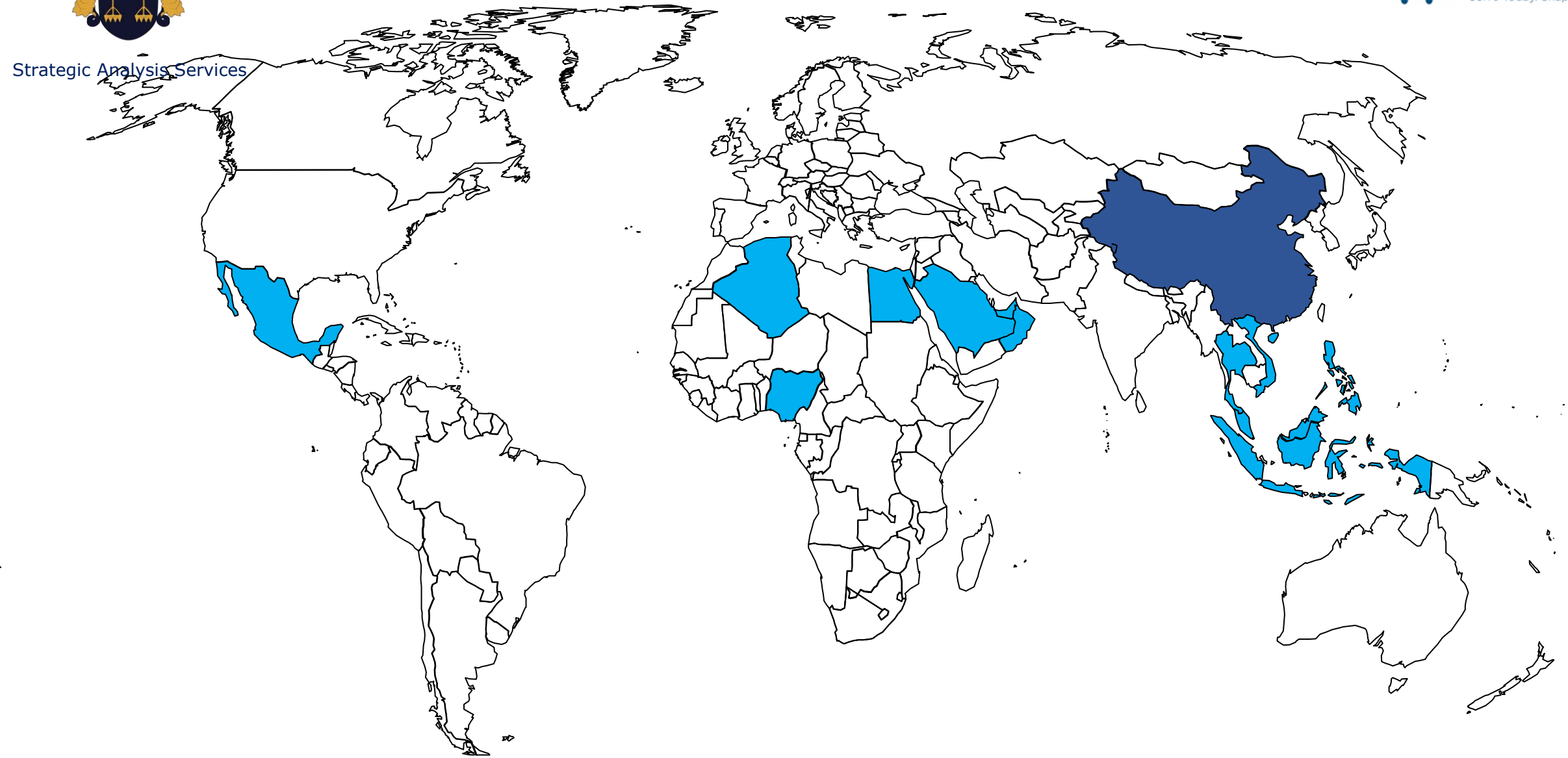

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Dairy Importers‘ price elasticity: six beliefs to be tested

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Six beliefs:

Dairy import volumes will go down in Net Importers as these countries…

1. - experience currency depreciation against the US$.
2. - are mainly home to low-income consumers for whom buying dairy is a luxury.
3. - have a high population growth rate which sustains poverty.
4. - remain economically weak versus The West: the rich got richer while the poor remained poor.
5. - develop a local dairy farming sector, driving up their dairy self-sufficiency.
6. - will see market saturation develop

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1

Top-13 currencies hardly depreciated vs the US$ in 2016 – 2021. Weighted average* of index 98. They were stable.

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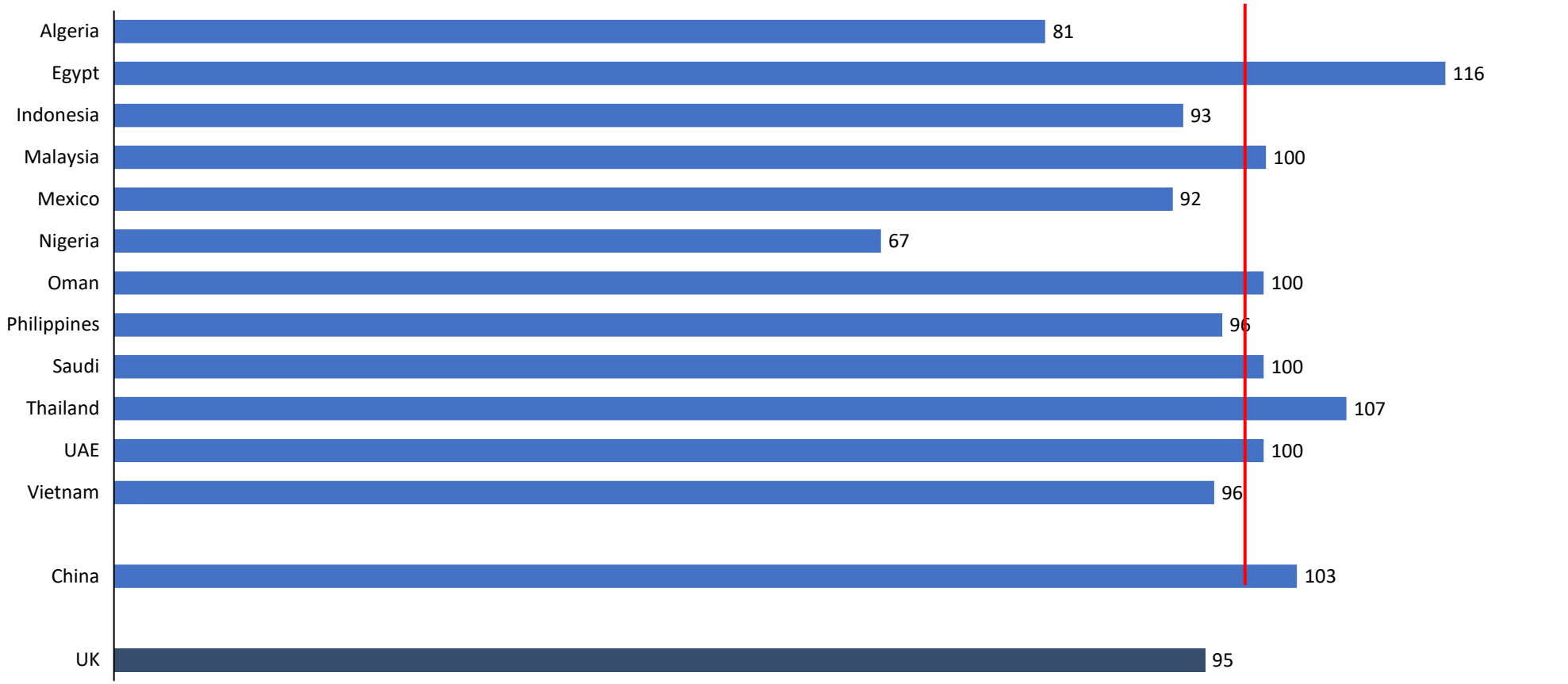
Selected dairy importing countries' exchange rates against the US$ expressed as index of 2021 over 2016 exchange rate. So, an index of 95 means that in 2021 the exchange rate of that currency against the US$ was 5% below the exchange rate in 2016.

Index: 2016 = 100. Index above 100 means: appreciation of the currency versus the US$ since 2016



*Weighing factor is the 2021 population of the individual countries. With China, the weighted average = 98 (red line), without China it is 92.

2

Top-13 population growth weighted average* of 1.0% growth for 2006-2021. US: 0.7% growth. Almost comparable.

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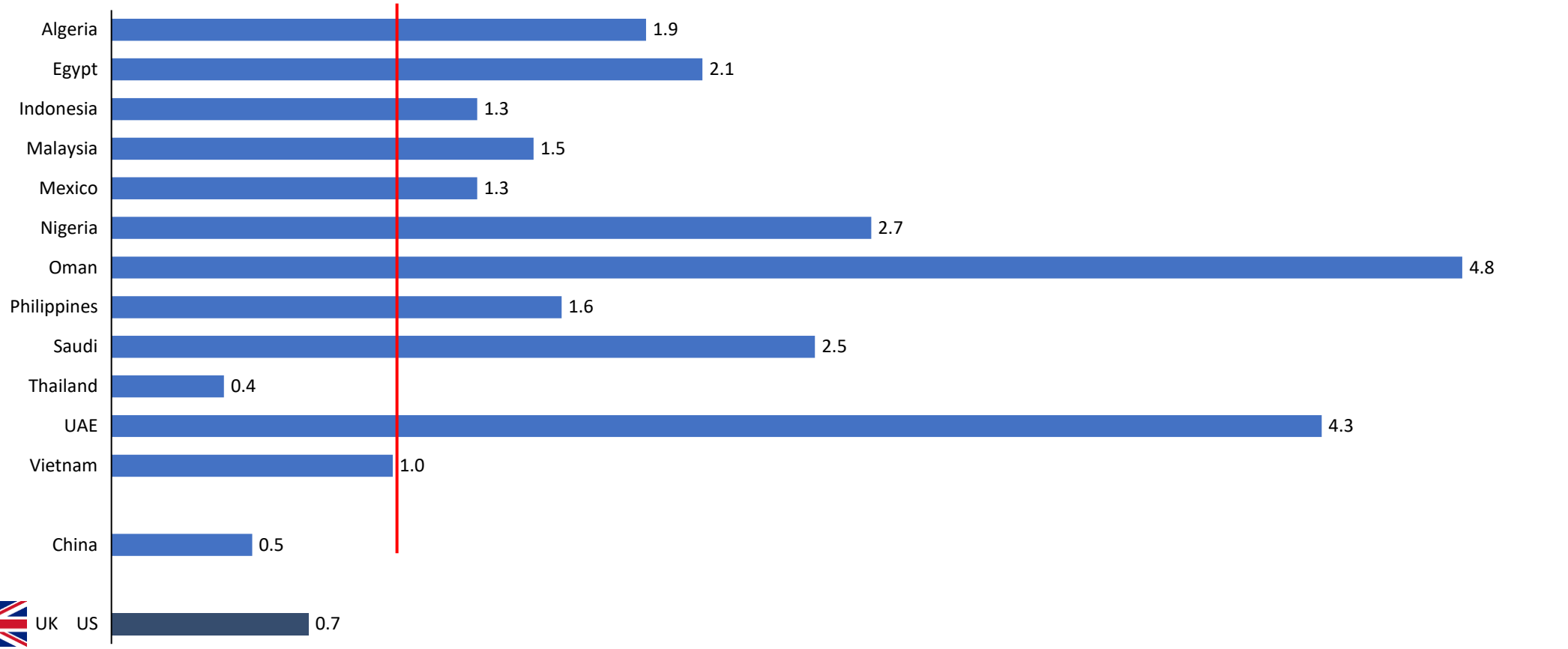
Selected dairy importing countries' population growth

CAGR in %, period 2006-2021



*Weighing factor is the 2021 population of the individual countries. With China, the weighted average = 1.0 (red line), without including China it is 1.6.

3 Top-13 economic growth? Most outperformed the UK in GDP per capita growth (in ppp, international US$) in 2006-2021

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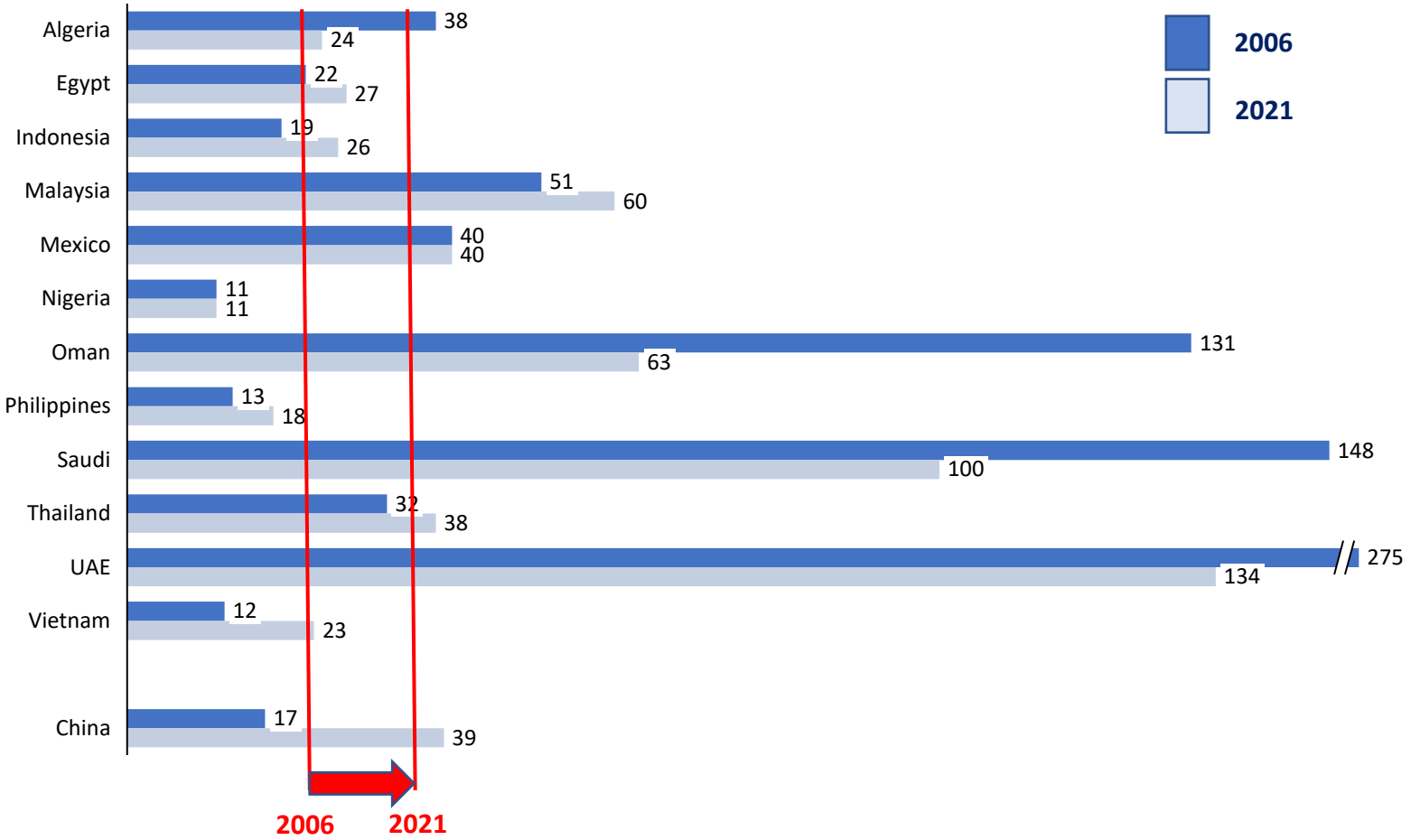
Selected dairy importing countries' GDP per capita development (ppp, international US$) from 2006-2021

Expressed as % of UK GDP/capita in ppp, international US$ for respectively 2006 and 2021



*Weighing factor is the 2021 population of the individual countries.

4

The world raw milk pool from 2010 to 2021 (excl. IN/PAK) increased 80 bn kg/y. Only 9 bn kg/y growth in „Big 13“.

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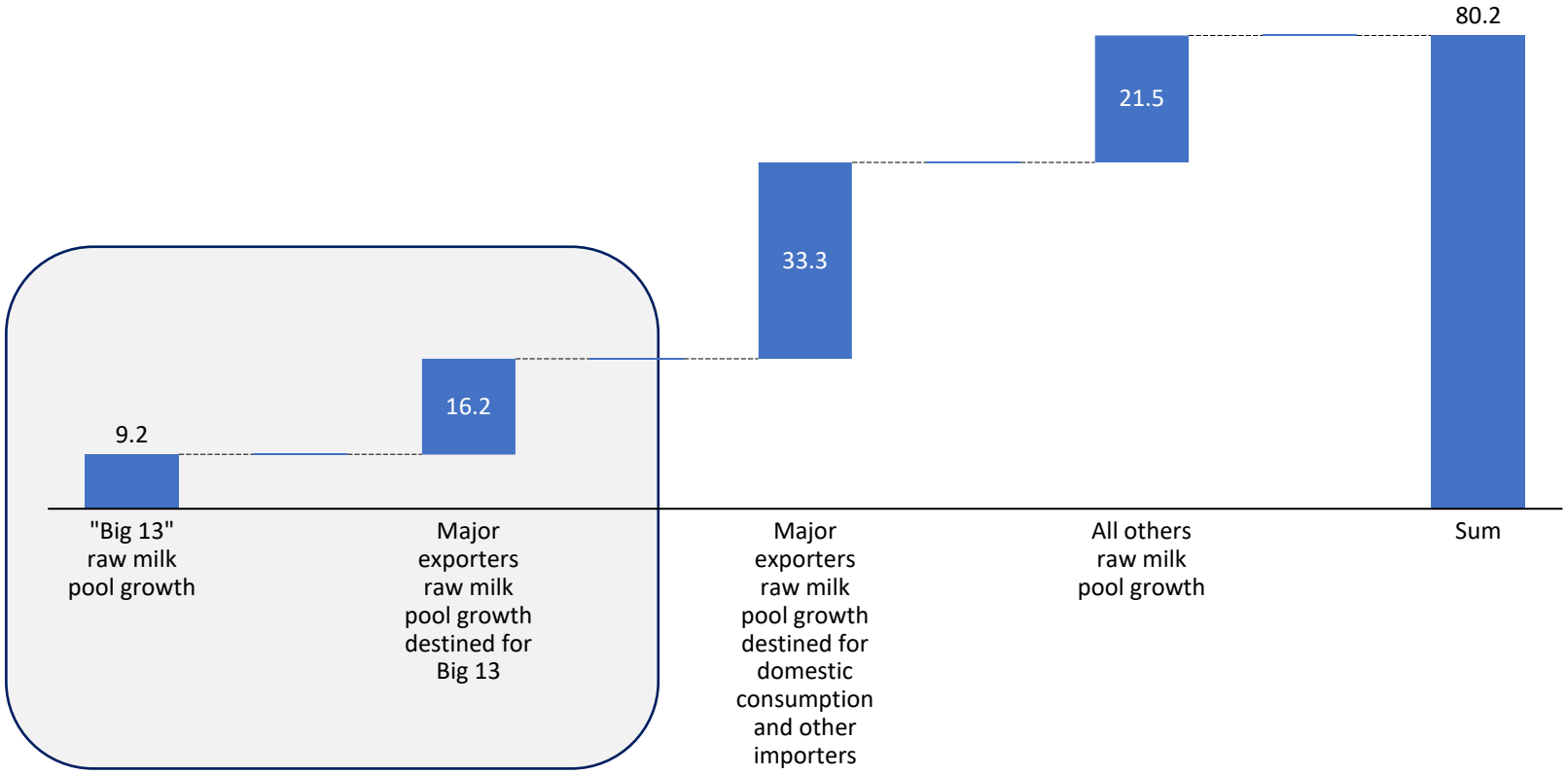
World Raw Milk Pool growth (excluding India and Pakistan) by origin

For 2010 – 2021, in billion kg ECM



*Major exporters: Australia, New Zealand, Uruguay, Argentina, EU-27, USA

4 Top-13 dairy self-sufficiency in the period 2010-2021 has dropped.

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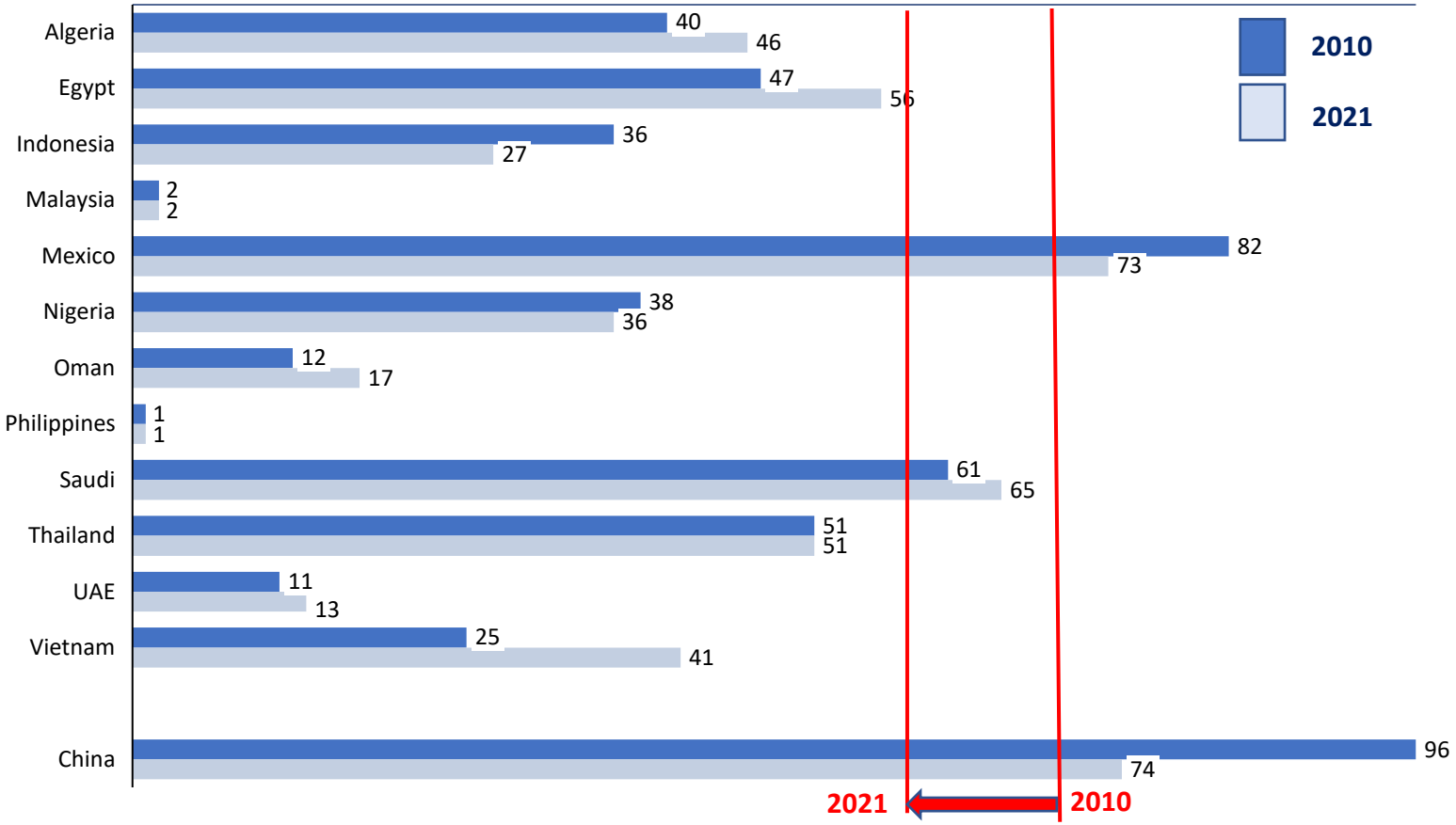
Self-sufficiency for selected dairy importing countries' as % of their dairy consumption for 2010 and 2021

Expressed as %



*Weighing factor is the 2021 population of the individual countries.

Churchill has a lesson on dairy self-sufficiency

"However beautiful the strategy,

you should occasionally look

at the results"

Sir Winston Churchill

Top-13's ability to buy dairy in the period 2010-2021: % of GDP spent on dairy imports has been stable*

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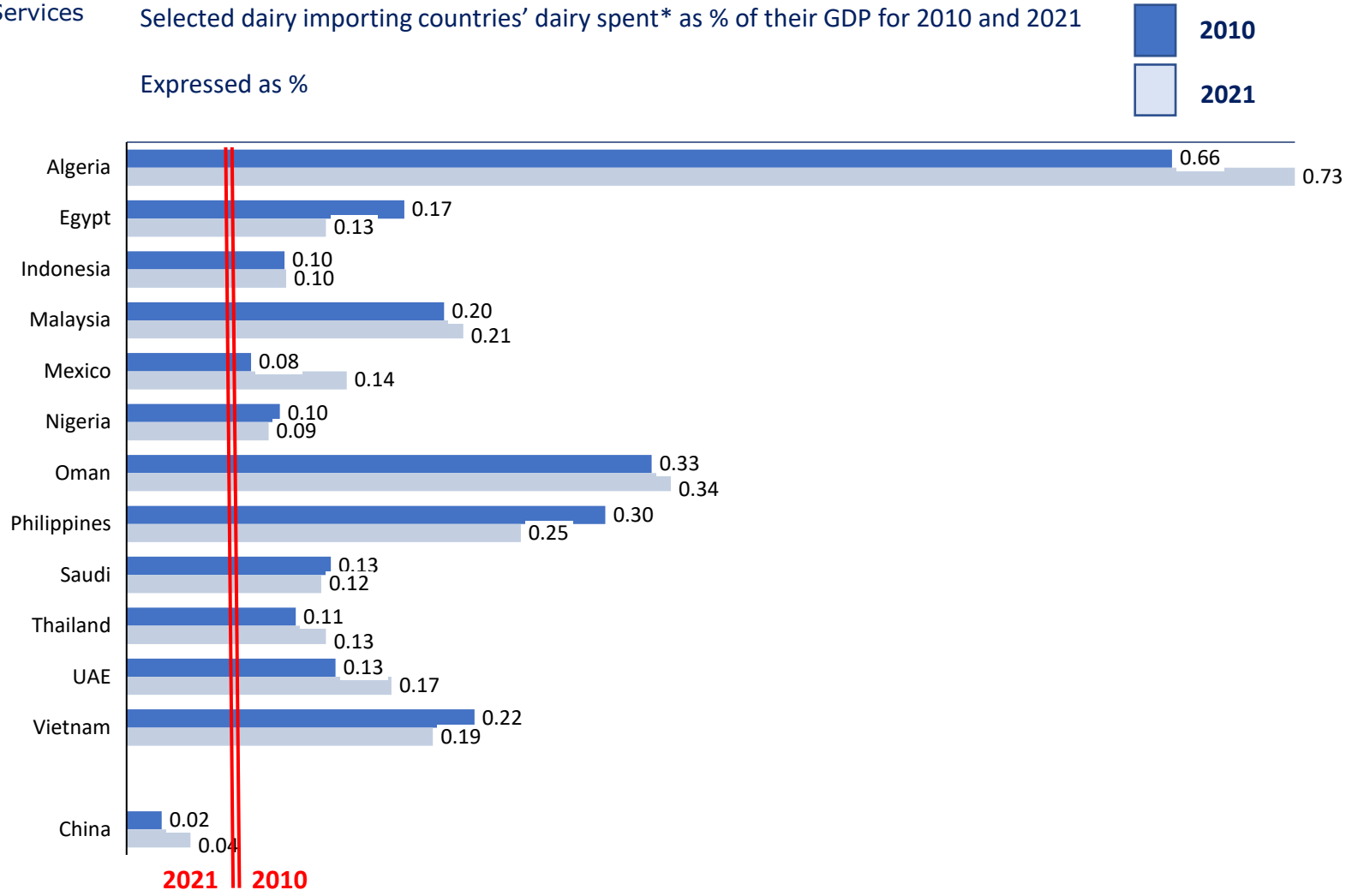
Selected dairy importing countries' dairy spent* as % of their GDP for 2010 and 2021

Expressed as %



*Weighing factor is the 2021 population of the individual countries.

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Top-13 markets are not saturated: per capita consumption* in LME in 2010-2021 has gone up with a CAGR of 2.3%.

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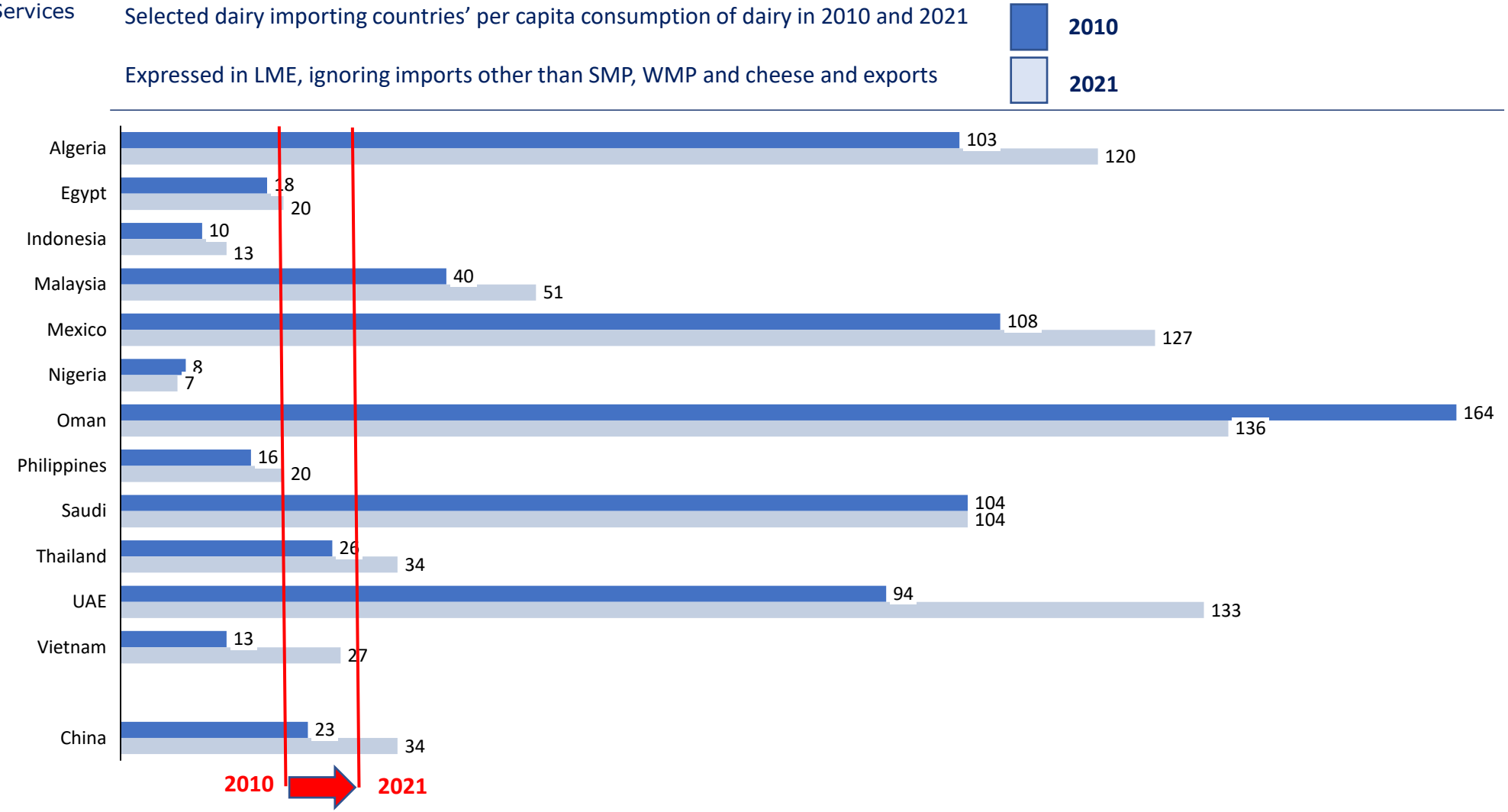
Selected dairy importing countries' per capita consumption of dairy in 2010 and 2021

Expressed in LME, ignoring imports other than SMP, WMP and cheese and exports



*Weighing factor is the 2021 population of the individual countries.

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Dairy Importers‘ markets have proven remarkably strong

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Six belief-myths debunked:

Dairy import volumes have grown in Net Importers as these countries…

1. - have **not experienced currency depreciation** against the US$.
2. - have **developed a thriving middle class** for whom buying dairy is a staple.
3. - have a **population growth rate** which is becoming **moderate**.
4. - have **economically grown much faster** than The West.
5. - have develop a local dairy farming sector, but **self-sufficiency is down**.
6. - do **not show market saturation**, with especially cheese imports growing fast.

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A closer look at the Top-13 importers‘ markets developments

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Six analyses on Top-13 importers’ dairy markets:

7 - The **total dairy volume** consumption growth by the Top-13 and the relevance of imports

8 - The **population growth** and **per capita growth** as drivers of Top-13 importers

9 - The **protein and fat component** imports by the Top-13

10 - The **volume** respectively **mix growth** driving Top-13 value of imports

11 - The **import value per kg LME** of the Top-13

12 - The **value growth of imported dairy** compared to **GDP-growth** of the Top-13

Top-13 consumption up with over 6 kg/capita from 2010-2021
Total increase: 25.4 bn kg *of which 64% imported*.

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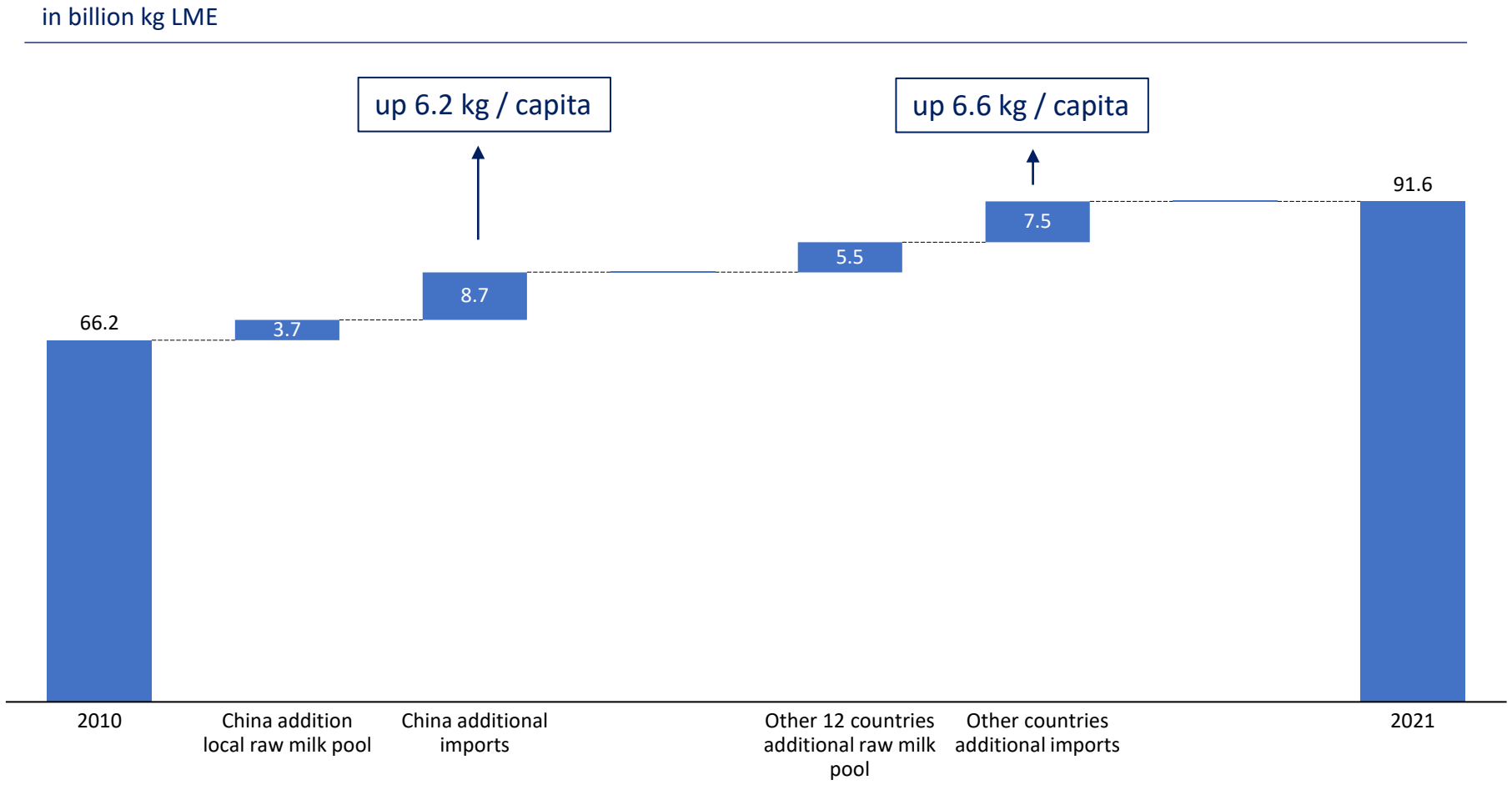
Dairy importing countries' consumption growth split from 2010 to 2021



Top-13 growth segmentation: *per capita growth* determines about 80% of the volume growth

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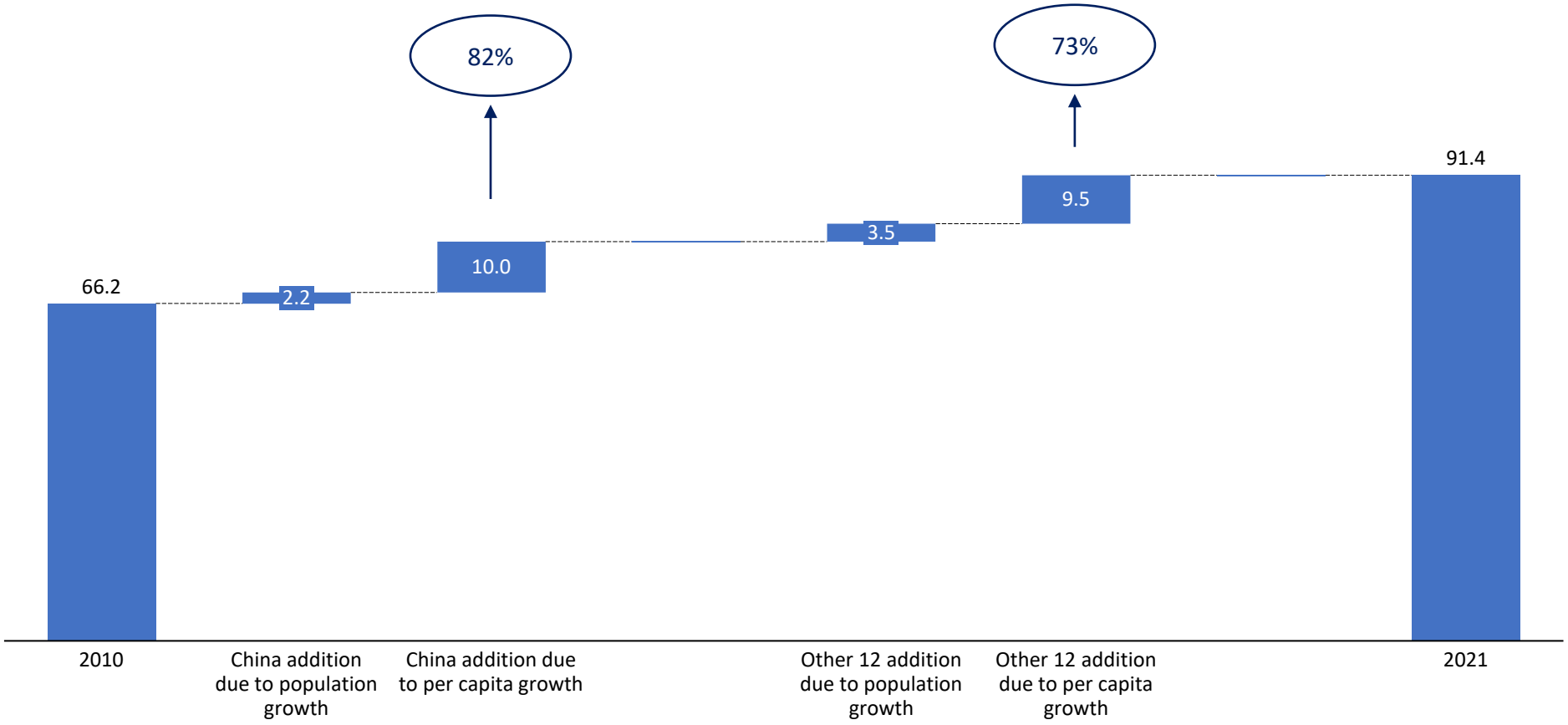
"Big 13" dairy importing countries' total dairy consumption growth split from 2010 to 2021

in billion kg LME



Top-13 have increased their protein component in SMP, WMP and Cheese imports in 2010-2021 with a volume CAGR of 6%

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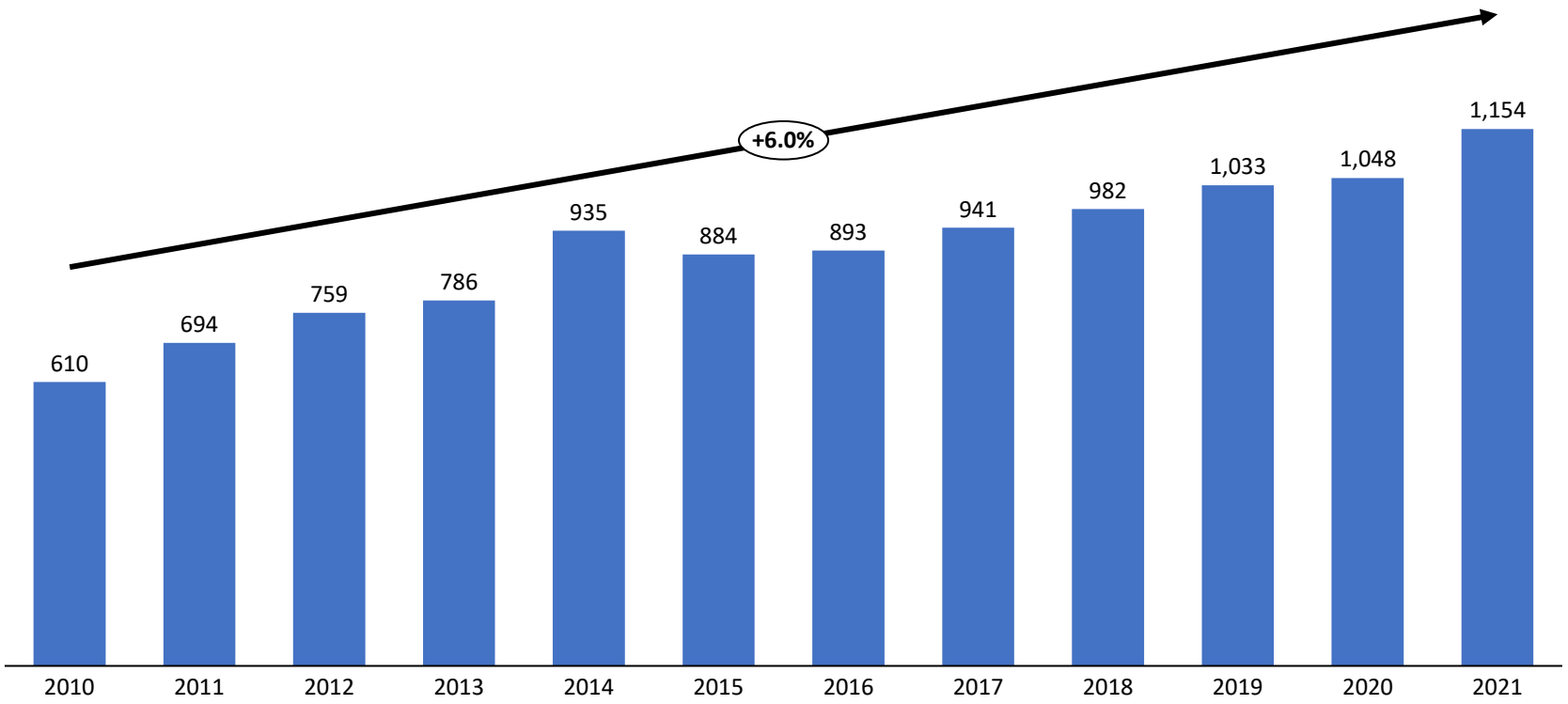
Dairy importing countries' consumption growth of **dairy protein** from 2010 to 2021

in kt



9 Differences between countries are relevant in the case of protein volume imports‘ growth.

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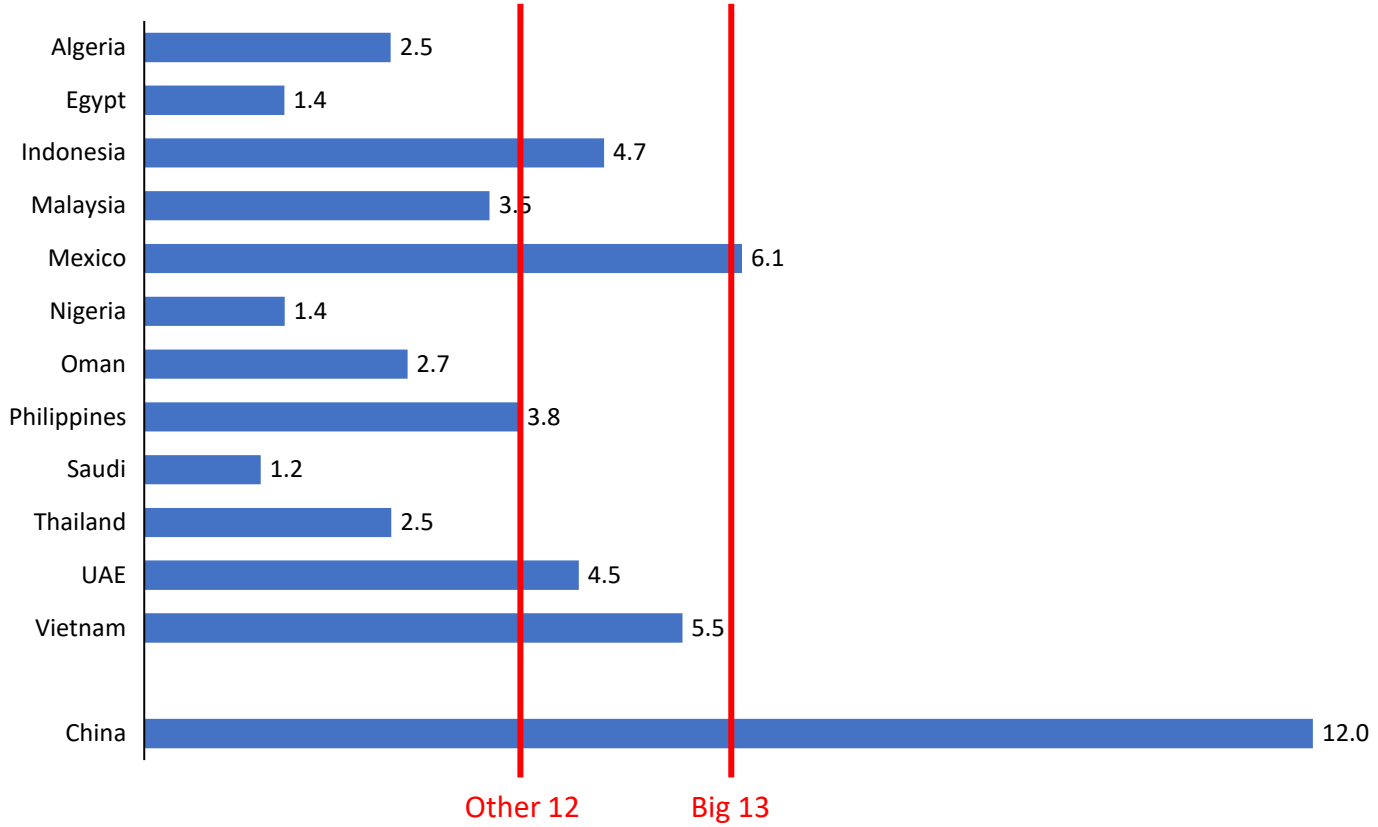
Protein Component volume growth CAGR by country
period 2010 to 2021

(%)



Top-13 increased their fat component in butter (oil), WMP and Cheese imports in 2010-2021 with a volume CAGR of 6%

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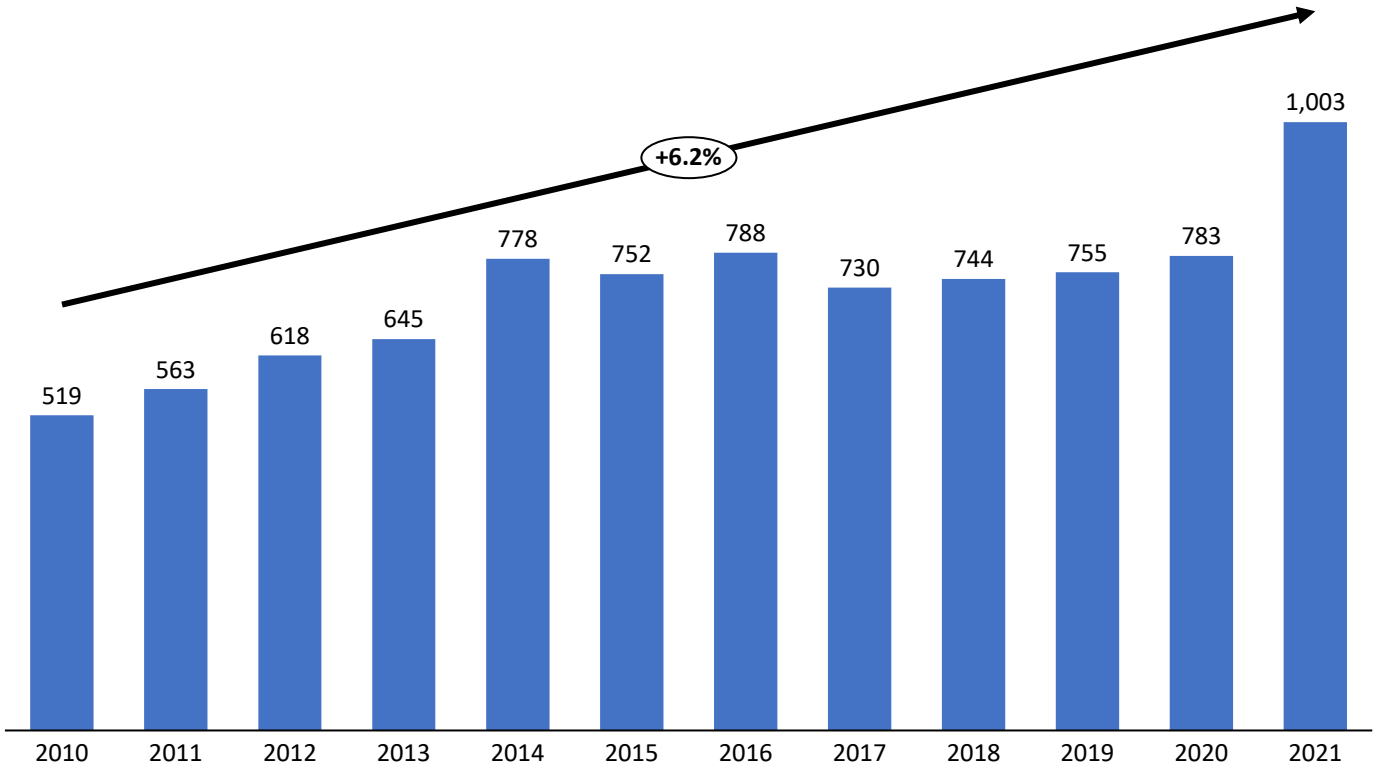
Dairy importing countries' consumption growth of **total dairy fat (embedded and in butter (oil))** from 2010 to 2021

in kt



Top-13 imports of fat component in 2010 -2021. Again Chinese growth exceeds that of other markets

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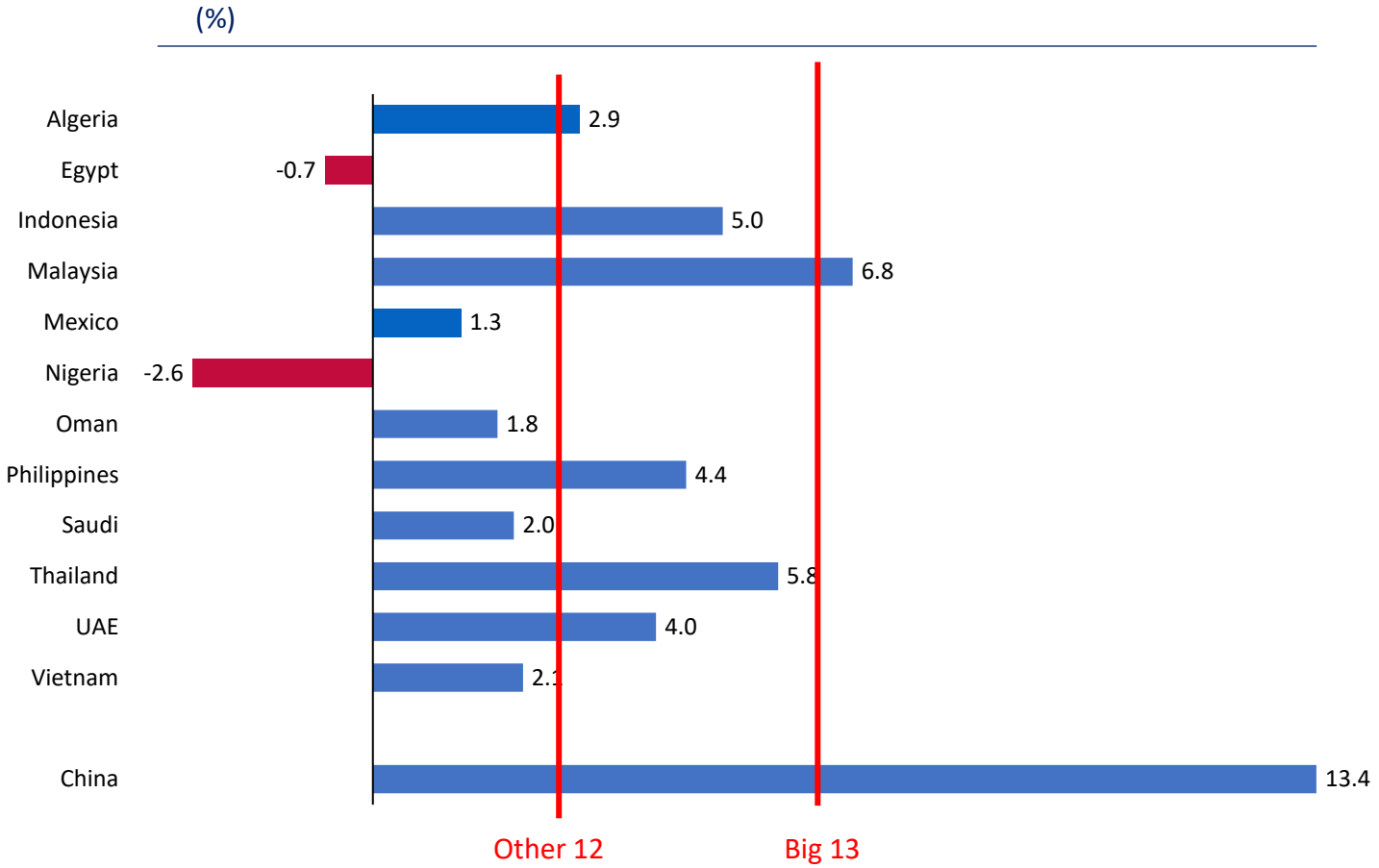
All imported Fat Component volume growth CAGR by country
period 2010 to 2021



9 Top-13 absorb in 2010-2021 ever more of the ‚world market' dairy volume

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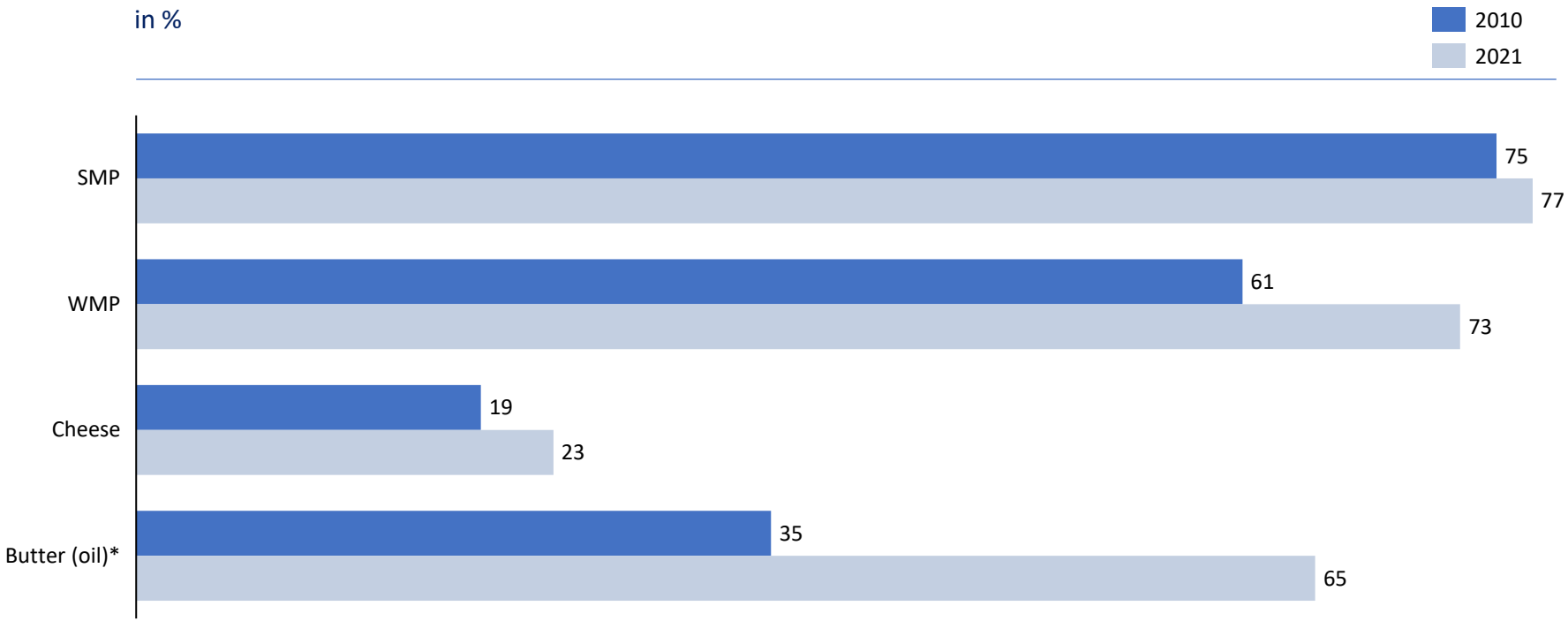
Ratio of imports by "Top-13" of total world market imports by dairy commodity for 2010 and 2021



*Butter and Butter Oil have been added up and are expressed in butter equivalents.

Top-13 imports in volume absorbed 94% of all export volume growth by major dairy exporters

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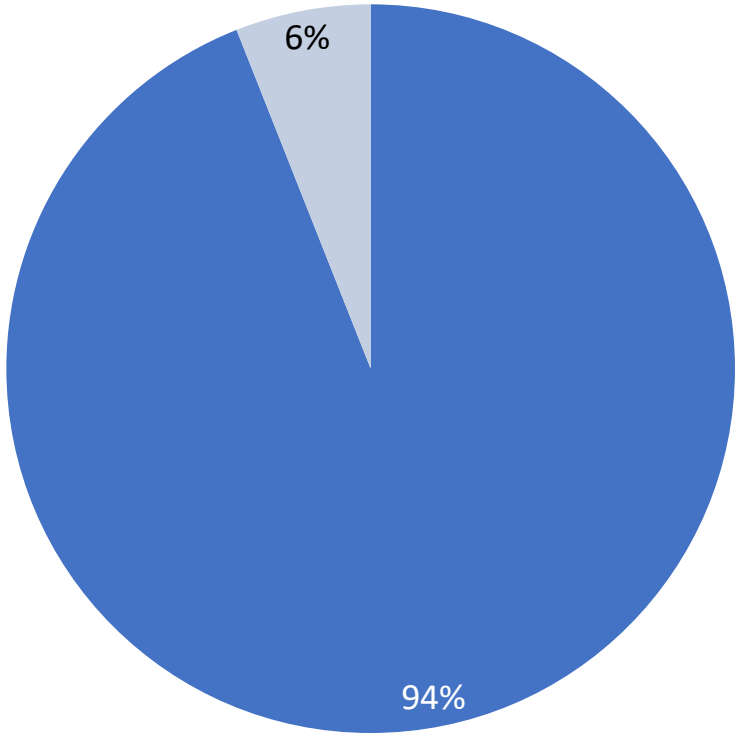
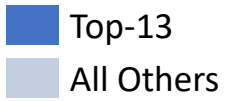
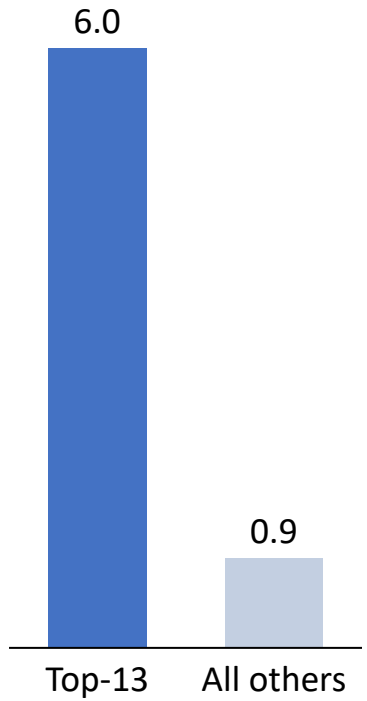
Top-13 as export destination of 'volume growth of major exporters' in 2010 - 2021

in LME as % of total export growth of major exporters in 2010 – 2021 and expressed in volume growth CAGR







Top-13 imports absolute value growth in US$ from 2010 to 2021; up ~ 8 bn US$ i.e. CAGR 6.6%.

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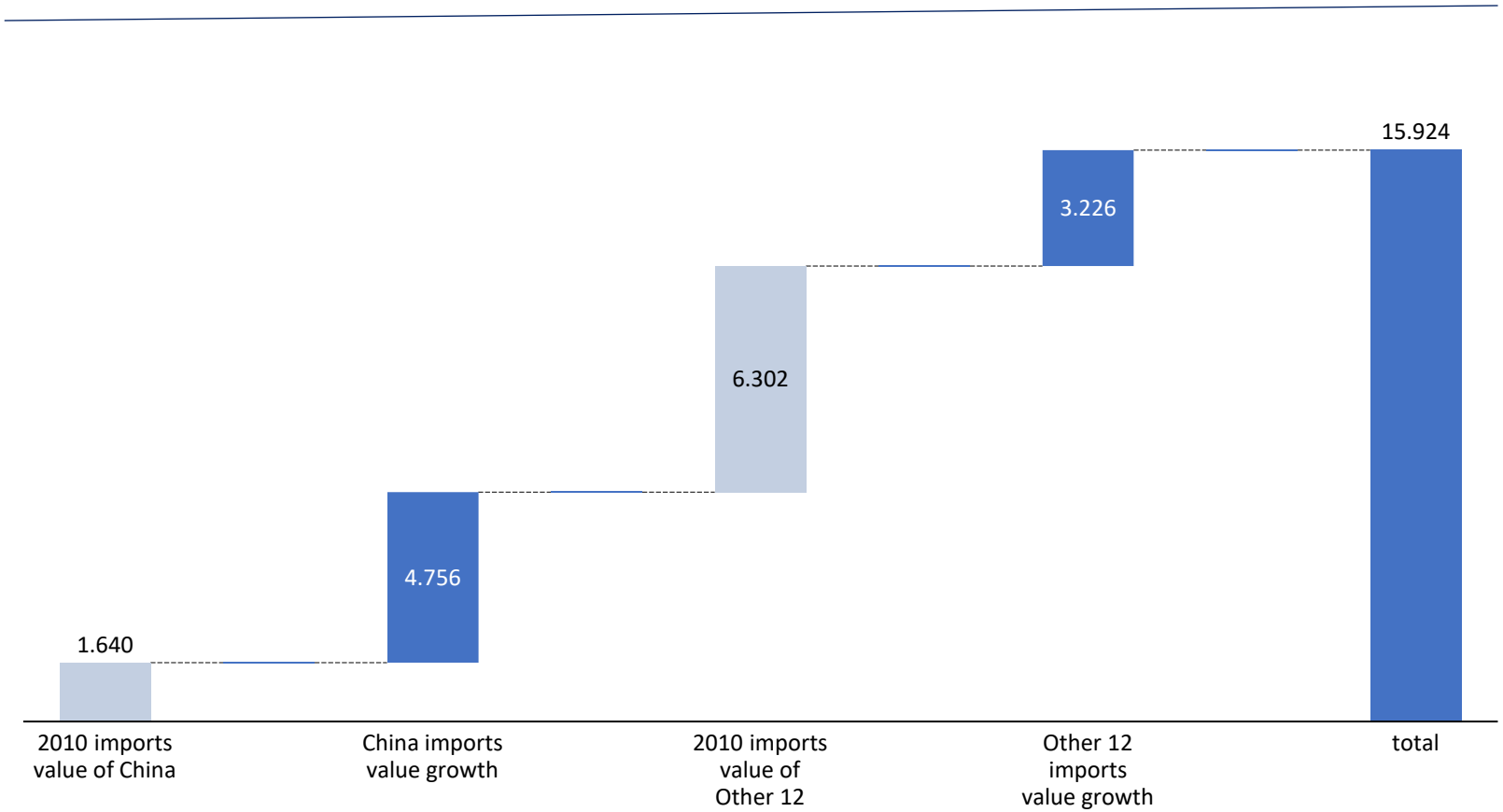
Import value growth breakdown for China respectively the 'Other 12' from 2010 to 2021

in million US$



11

Top-13 ratio of Import Value over Import Volume: the ‚import value per kg LME'. in average it equaled $ 0.42/kg.*

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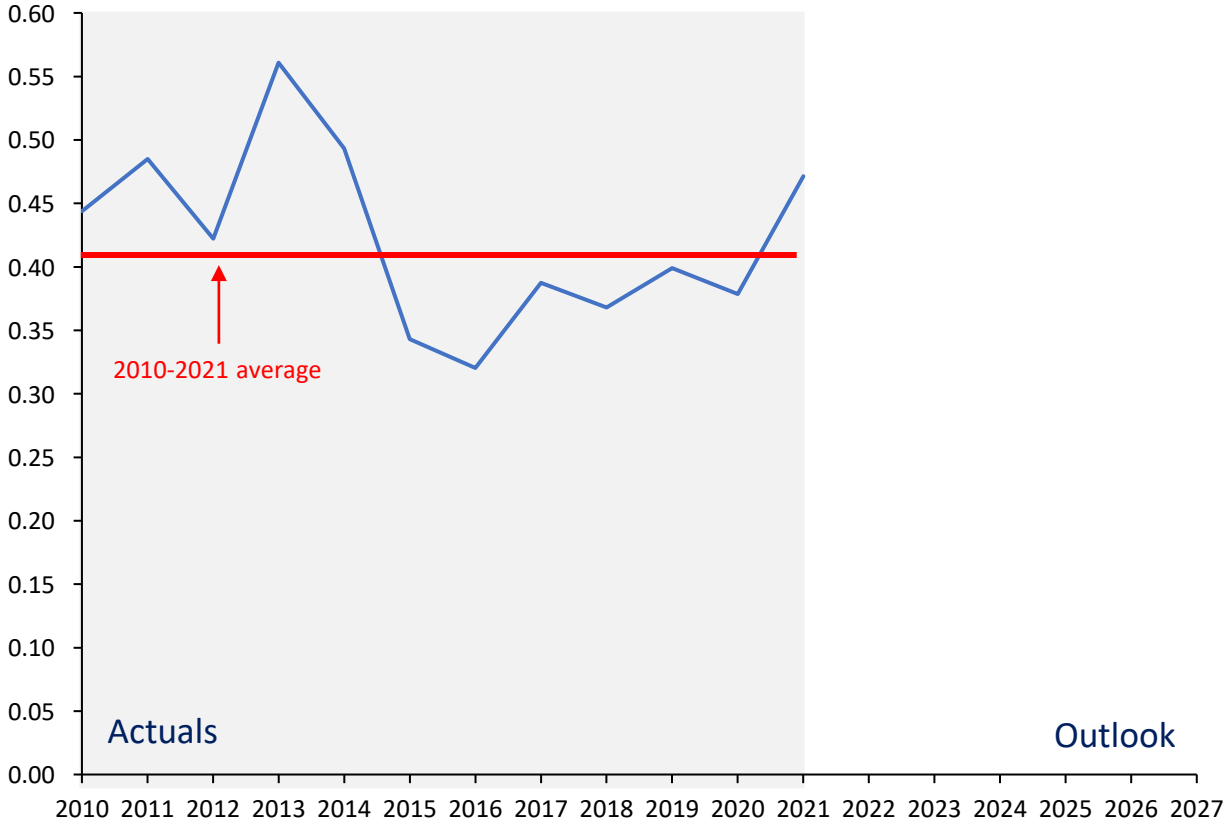
Dairy Import Value per kg LME for China and the "Other 12" countries together

in US$ / kg LME for 2010 - 2021



*This unit value is de facto based on milk with 3.3% protein, 3.0% fat *plus processor conversion cost*.

The value growth rate of imports of Top-13 as multiple of their GDP growth rate: for 2010-2021: weighted average equals 1.1.

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Import value growth CAGR by country over GDP growth CAGR by country
period 2010 to 2021

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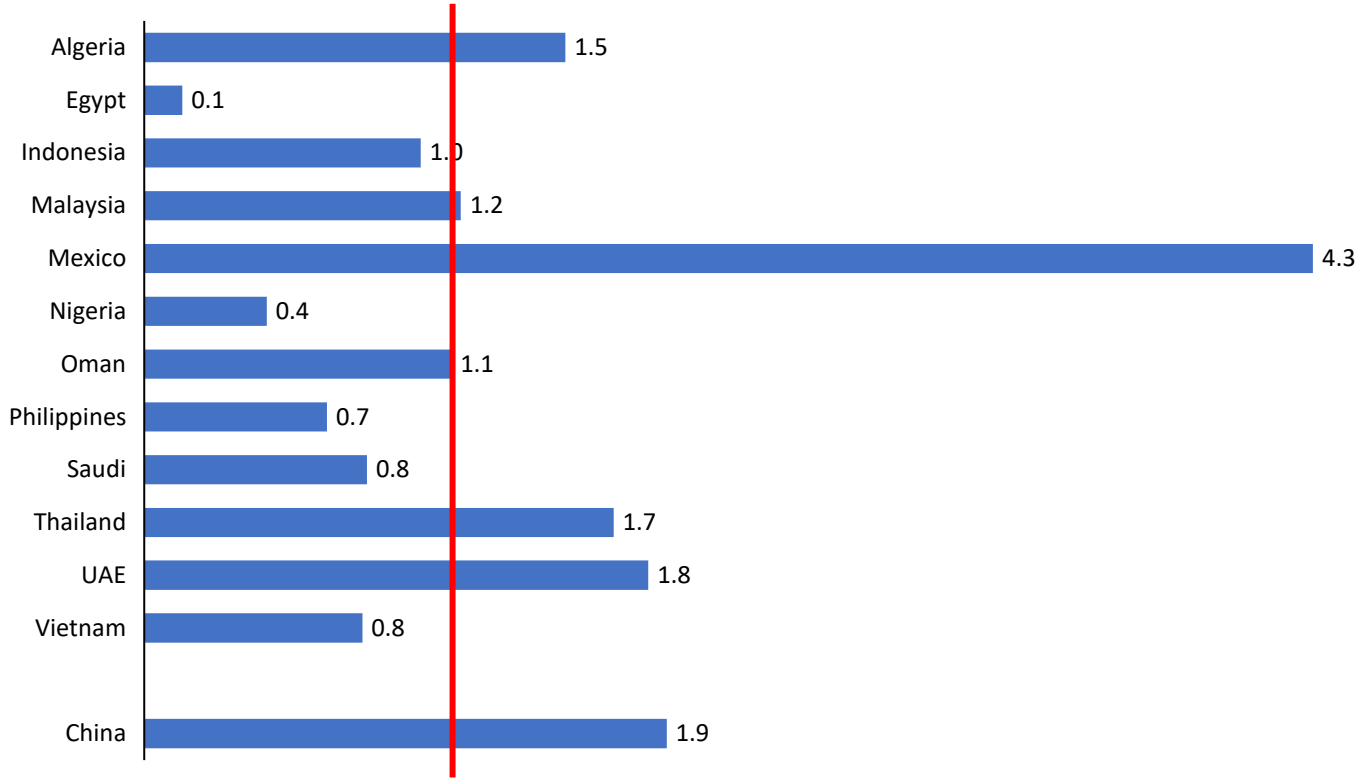

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Turning a GDP Outlook into a Dairy Import Value Outlook for the Top-13 major dairy importers (in *constant* US$ of 2015)

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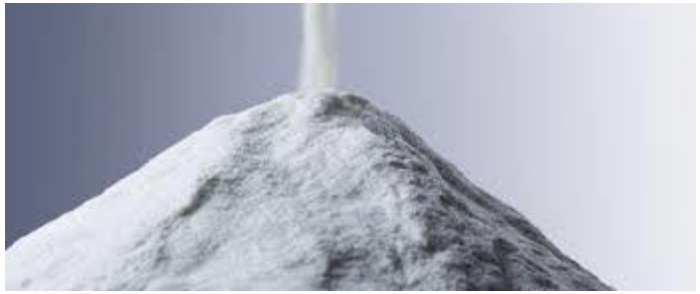

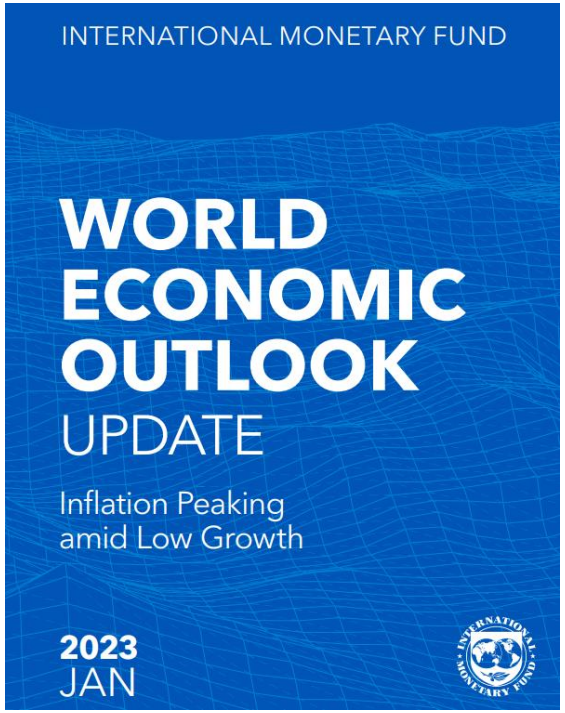

Assumption: Top-13 Dairy Import Value growth (US$) = 1.1 GDP growth (real US$)

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The Outlook for Dairy Import Value of Top-13 major dairy importers (in *constant* US$ of 2015)

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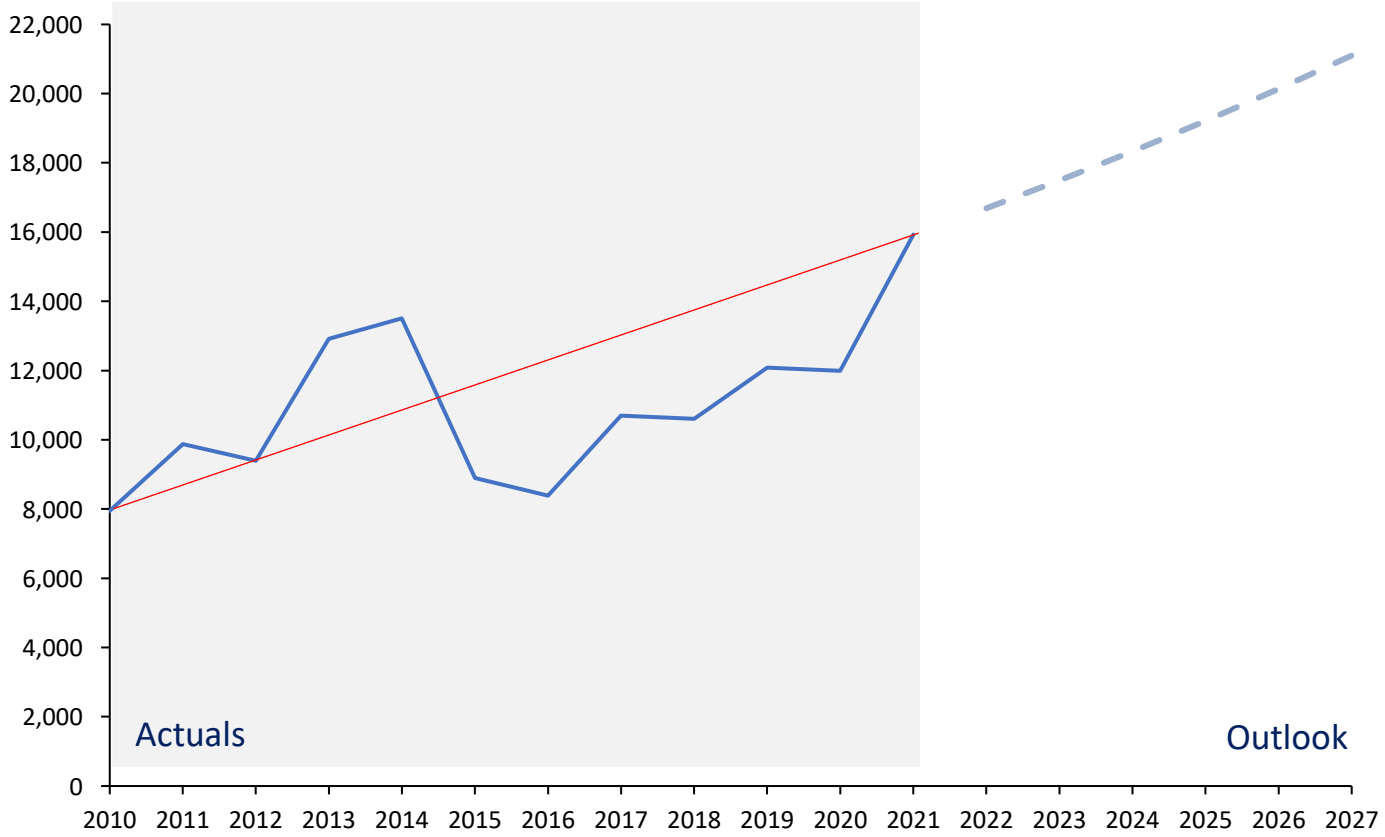
Dairy Import Value for China and the "Other 12" countries together

in constant US$ millions (2015)



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We define five scenarios for the World Dairy Market 2022-2027

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Assumptions

For all scenarios: We use the Import Dairy Value Growth Outlook of the Top-13.
We assume a stable raw milk pool (world excl. IN/PAK) from 2021 to 2027.
We assume the 'major exporters' raw milk pool to decline from 2021 to 2027 with -0.3% CAGR*.

Sharp down	Scenario 1: Top-13 imports in volume go down with 1.4% CAGR from 2022 to 2027. This scenario expects that within Western (exporting countries') markets will pull even harder than the Top-13 on the anticipated, globally scarce raw milk pool
Modest decline	Scenario 2: Top-13 imports in LME drop with CAGR 0.7% vol.
Volume stable	Scenario 3: Top-13 imports in LME remain stable in volume in time
Half the growth	Scenario 4: Top-13 imports in LME will be growing with a CAGR of 3%, so, half of 2010-2021 level
Maintain growth	Scenario 5: Top-13 imports remain growing in LME with the CAGR of 2010-2021: 6%

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Outlook: a structural increase of dairy import unit value <u>potential</u> of the Top-13 in *constant* 2015 US dollars

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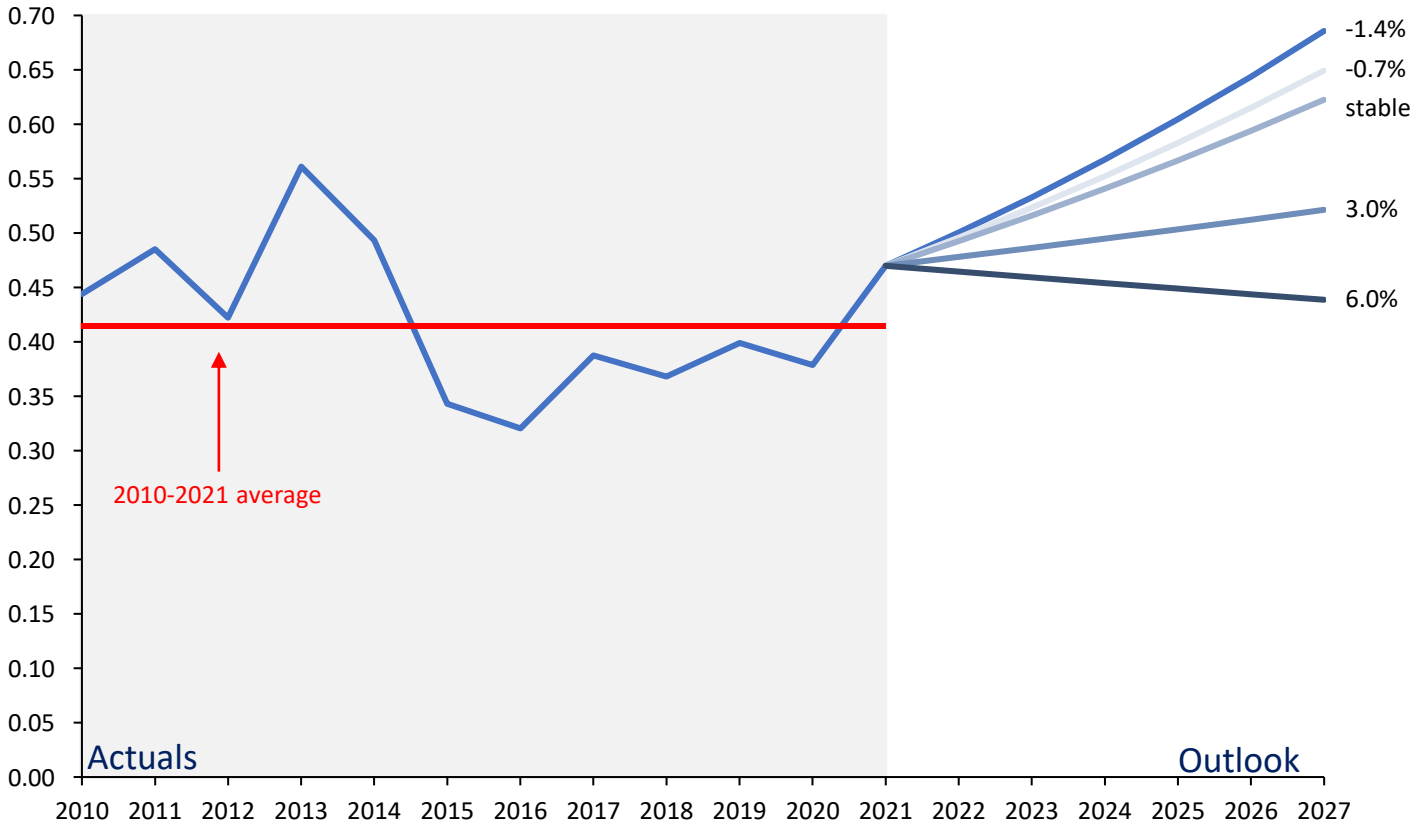
Dairy Import Value per kg LME for Top-13 countries together

In **constant 2015 US$ / kg LME** for 2010 – 2027. Actuals up to 2021, "potential" for 2022-2027



The less they buy in volume, the more they can afford to pay per unit of volume bought

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Outlook: Top-13 import unit value in *real US$* when assuming the IMF inflation estimate for 2022-2027 for the US$

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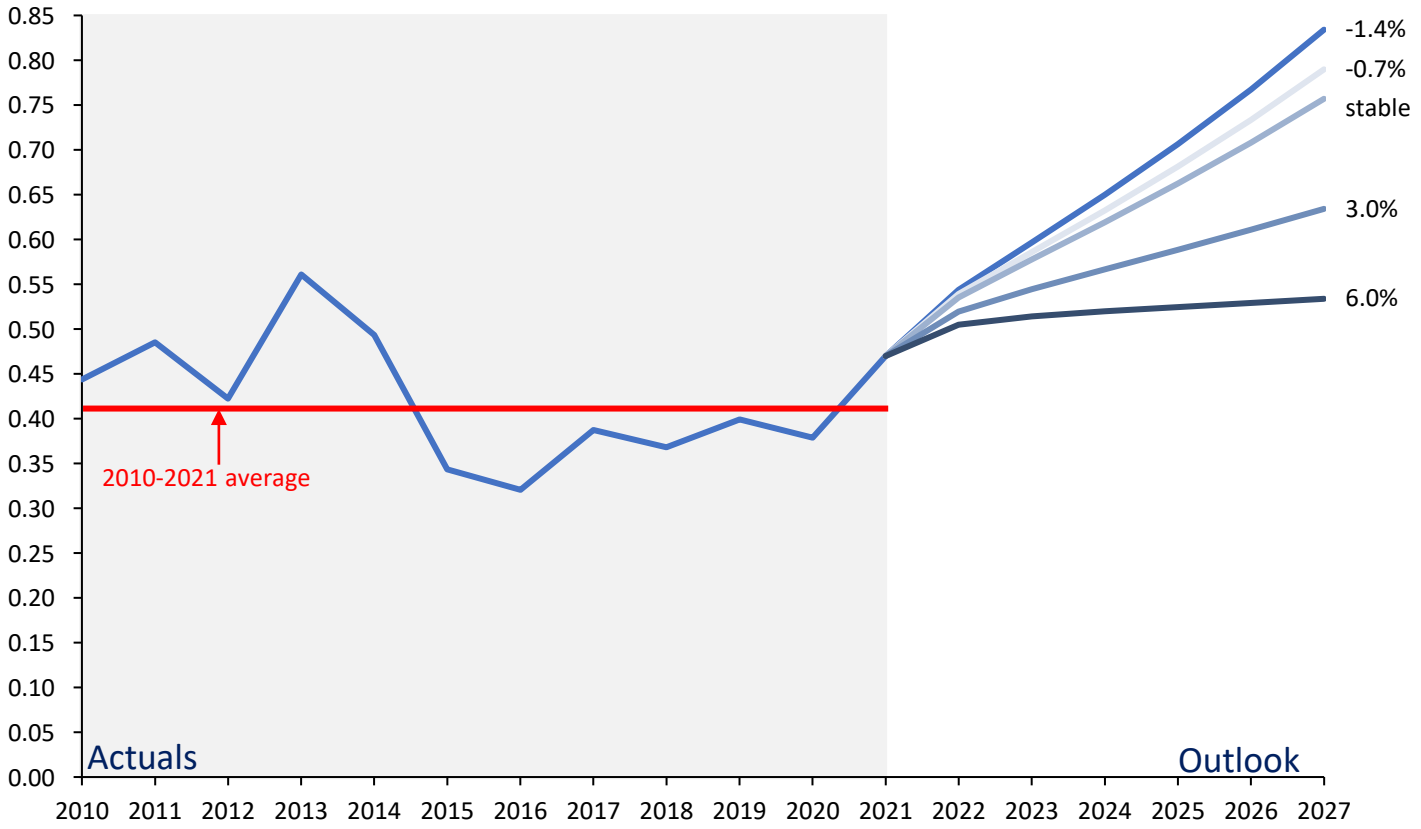
Dairy Import Value per kg LME for China and the "Other 12" countries together

In **actual US$ / kg LME for 2010 – 2027**. Actuals up to 2021, "potential" for 2022-2027



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Outlook: the lower the Top-13 import volume CAGR for 22-27 the higher the 2027 unit value the Top-13 can afford to pay

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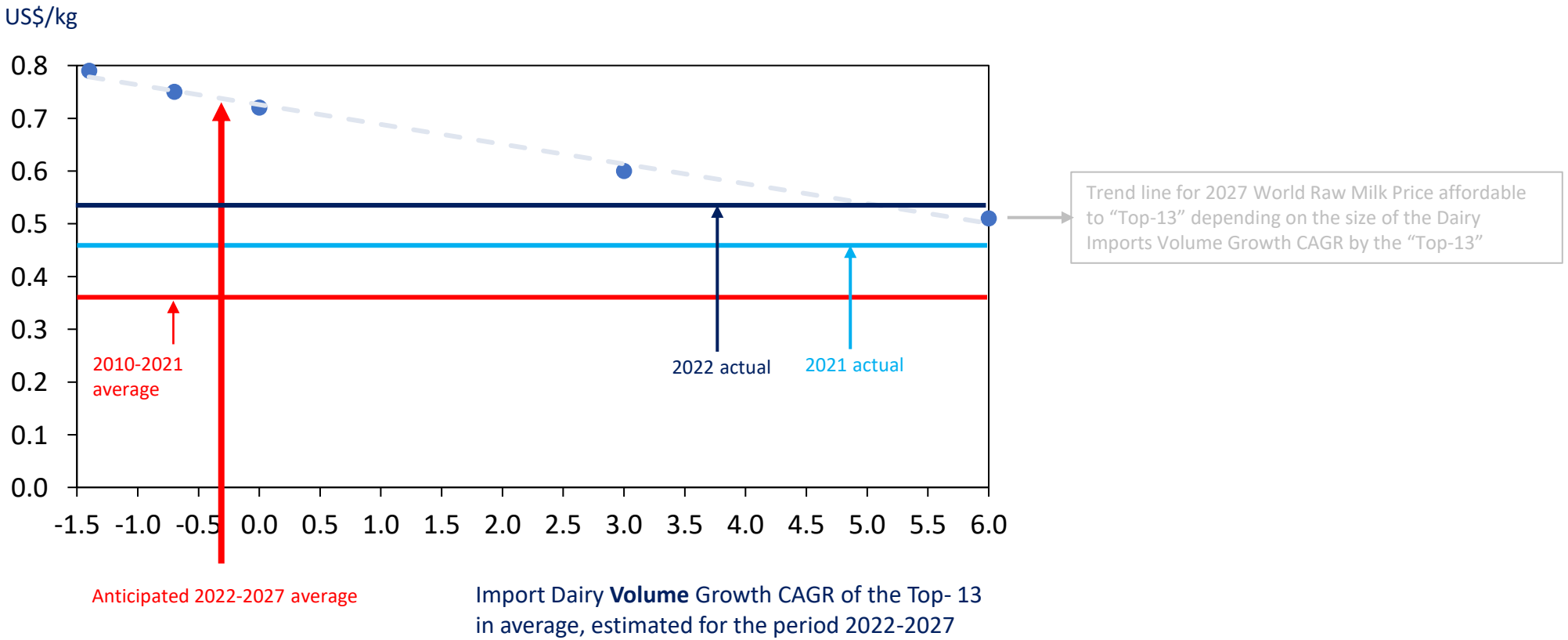
World Raw Milk Price by 2027 (blue dots) for different levels of the Import Dairy Volume CAGR of the "Big 13" that the "Big 13" **would be able to afford** (≠ what the price will be!)

in actual US$ per kg



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Outlook for world dairy towards 2027: scarcity and prolonged high prices. Battle for milk will be global

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- Dairy market globally will remain cyclical. There is always noise on the signal trend.

- The trend line, however, remains sharply up.

- Key driver no. 1 is **strengthening demand**:

  strong economic growth / population growth in the Top-13 major dairy importing countries

- Key driver no. 2 is **constrained global supply**:

  - Environmental constraints in major dairy exporters (NZ, EU)
  - Farmer demography in major dairy exporters
  - Slow dairy development in current major importers (e.g., water scarcity in ME, droughts…)

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Outlook in layman‘s terms for world dairy market for towards 2027: scarcity and prolonged high prices as the battle for milk will be global

Implications:

- Global scarcity of cow’s milk
- Dairy commodity and milk prices grow (trendline) faster than inflation
- Dairy will become unaffordable to ever more consumers globally
- With EU and NZ as exporters being restrained, US opportunity to export more dairy

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Thank you for your time and interest

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