

### Box 3

#### Role of the US dollar as an invoicing currency for oil imports

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Prepared by Frauke Skudelny and Maria Sole Pagliari

The US dollar is widely used as the currency for oil trade invoicing in the European Union (EU). This strong role (around 85% of extra-EU oil imports, see the left panel of **Chart A**) far outweighs the EU's imports of petroleum products from the United States, which accounted for just 4% of total EU petroleum imports over the period 2010-16 (see the right panel of **Chart A**). It is hence used as a vehicle currency, i.e. neither the exporters' currency nor the local currency. To address this imbalance, the European Commission has published a recommendation on the international role of the euro in the field of energy.<sup>31</sup> For the same reason, outside Europe, China launched oil futures contracts denominated in the renminbi on the Shanghai International Energy Exchange in March 2018 and as part of broader plans to raise the renminbi's global profile.

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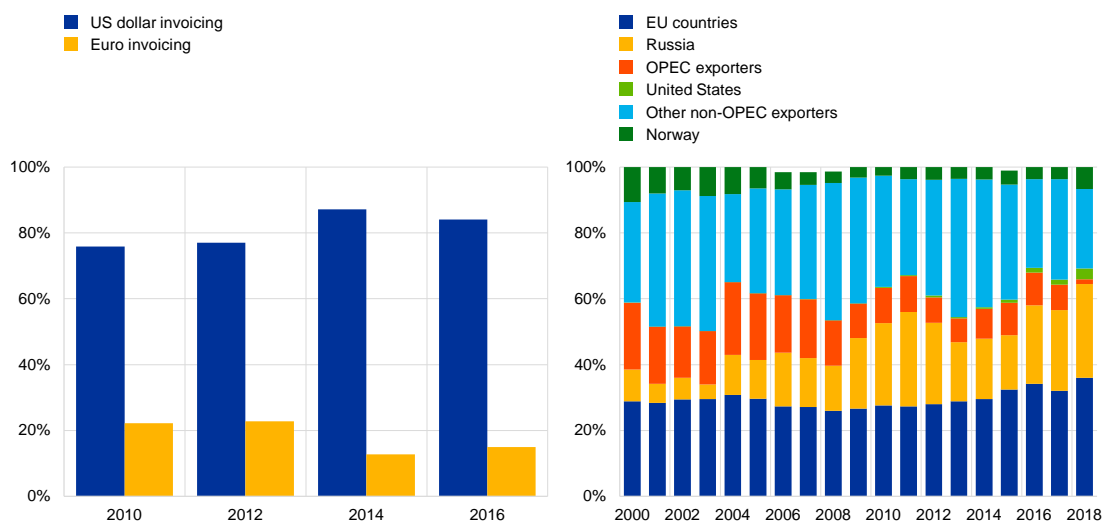
<sup>31</sup> [Commission Recommendation of 5 December 2018 on the international role of the euro in the field of energy](#). In the gas industry, the euro plays a more important role than in the oil market, as a large number of gas hubs use the euro.

## Chart A

### Evidence on currency invoicing patterns in EU trade of oil products

#### Currency breakdown of extra-EU oil imports (left panel) and breakdown of petroleum oil imports of EU countries by region of origin (right panel)

(percentages)



Sources: Eurostat, IMF WEO and ECB staff calculations.

Notes: Countries used to define the EU aggregate shown in the left panel include Belgium, Germany, France, Italy, Spain and the United Kingdom; invoicing is expressed as a percentage of total extra-EU imports of oil; weights defined use the shares of oil imports from the United States (US dollar invoicing) and the EU (euro invoicing). In the right panel, real imports (using the commodity price index as deflator) are weighted using real GDP shares and expressed as a percentage of total oil imports from the rest of the world; OPEC exporters include Algeria, Angola, Congo, Ecuador, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, United Arab Emirates and Venezuela.

The specific features of oil as a product influence invoicing currency choice. Differentiated goods tend to be invoiced in the exporter's currency. But more homogeneous goods such as oil are usually priced in a single (or dominant) currency, such as the US dollar.<sup>32</sup> However, an analysis of post-World War II data suggests that European oil imports were invoiced equally in US dollars and other currencies, notably the pound sterling.<sup>33</sup> This suggests that even for homogeneous goods such as oil, multiple invoicing currencies can coexist.

Most commodities are also upstream (i.e. used as inputs) in the production process. Often, firms that use commodities as inputs may want to use the same currency for their exports as for their imports. For example, the importance of crude oil, largely invoiced in dollars, as an input to petroleum products may explain why the US dollar also dominates the invoicing of EU imports of petroleum products. Indeed, research suggests that the use of a vehicle currency is more likely for exporters with a higher share of inputs priced in that vehicle currency.<sup>34</sup>

The limited data available on commodity invoicing currencies confirm a strong role played by the US dollar. Based on survey data, **Chart A** shows that more than 80% of extra-EU oil imports are invoiced in dollars. Firm-level data for the United Kingdom suggest that almost 90% of mineral fuel imports are

<sup>32</sup> This was first discussed in McKinnon, Ronald, *Money in International Exchange*, Oxford University Press, 1979.

<sup>33</sup> Eichengreen, B., Chitu, L. and Mehl, A., "Network Effects, Homogeneous Goods and International Currency Choice: New Evidence on Oil Markets from an Older Era", *Canadian Journal of Economics*, Vol. 49, No 1, 2016, pp. 173-206. The study uses data for 1947, 1949 and 1950, and estimates for 1953.

<sup>34</sup> See Chung, W., "Imported Inputs and Invoicing Currency Choice: Theory and Evidence from UK Transaction Data", *Journal of International Economics*, Vol. 99, 2016, pp. 237-250.

invoiced in a vehicle currency. Similarly, data for Japan suggest that about 90% of petroleum, coal and natural gas imports were invoiced in US dollars in 2015.<sup>35</sup>

Conducting an empirical evaluation of oil trade currency invoicing for the euro area is difficult as the above-mentioned data are only available for a few years. Nevertheless, the pass-through of fluctuations in the exchange rate into oil import prices might provide an indirect approximation of the role of the US dollar as a vehicle currency for oil import transactions. Recent empirical findings do in fact show that for international transactions carried out in a vehicle currency such as the US dollar, exchange rate fluctuations against that vehicle currency have much higher pass-through into domestic inflation than those affecting transactions priced in the local or producer (i.e. the partner country) currency.<sup>36</sup> A measure of exchange rate pass-through to oil import prices could therefore give some indication of the use of the US dollar as a vehicle currency. This can be estimated in the following panel regression<sup>37</sup>:

$$d\ln(p_{it}^{MO,nc}) = c_i + \alpha d\ln(p_t^{Brent,USD}) + \beta d\ln(e_{it}^{USD}) + \varepsilon_{it}$$

where changes in import prices are regressed on changes in oil prices and the exchange rate. The closer the coefficient estimate  $\beta$  is to one, the higher the pass-through of exchange rate changes against the US dollar to oil import prices. This, in turn, could be an indication of a higher share of US dollar invoicing in oil imports than what would be expected through the import share from the United States. As a caveat, it could be that prices adjust flexibly for reasons other than invoicing currency. Moreover, Borio (2019) suggests that the US dollar tends to weaken vis-à-vis the euro when commodity prices rise; as a result, oil price increases in US dollars would not necessarily match those in euro.<sup>38</sup> We apply the exchange rate with its lags in the spirit of the GMM methodology to control for possible endogeneity resulting from this relationship between the oil price and the US dollar exchange rate.

The empirical analysis points to the dominance of the US dollar as an invoicing currency for global oil trade transactions. The results show that pass-through is almost complete, with a coefficient of 0.93 for the full sample (see **Table A**). As regards advanced economies, the coefficient is almost equal to 1, which could be an indication of almost complete US dollar invoicing of imports. Similar results hold for the EU and the euro area. These estimates differ from the survey results shown in the left panel of **Chart A** above as the latter draw from evidence gained over the period 2010-16 for Belgium, Germany, France, Italy, Spain and the United Kingdom. The estimates, in contrast, are for the period 1983-2018 and for a larger sample of countries than that covered in the survey, some of which most

<sup>35</sup> See Ito, T., Koibuchi, S., Sato, K. and Shimizu, J., "Choice of Invoice Currency in Japanese trade: Industry and commodity level analysis", *RIETI Discussion Paper*, No 16-E-031, 2016; Ito, H. and Kawai, M., "Trade invoicing in major currencies in the 1970s-1990s: Lessons for renminbi internationalization", *Journal of the Japanese and International Economies*, Vol. 42, 2016, pp. 123-145.

<sup>36</sup> See, for instance, Chen, N., Chung, W. and Novy, D., "Vehicle Currency Pricing and the Exchange Rate Pass-Through", *CEPR Discussion Paper*, No DP13085, 2018.

<sup>37</sup> This is a variation of the standard pass-through regression proposed in Gopinath, G., Itskhoki, O. and Rigobon, R., "Currency Choice and Exchange Rate Pass-Through", *American Economic Review*, American Economic Association, Vol. 100(1), 2010, pp. 304-36. Data are annual and cover 144 countries over the period 1983-2018 (we excluded the United States, OPEC and Russia from the sample as they are not typical oil importers affected by US dollar invoicing). The regression is estimated via random effects as suggested by the Hausman test. A test for serial correlation suggested that there was no autocorrelation in the residuals, hence no need to introduce lagged dependent variables in the model equation. Robustness checks have been performed introducing lags to the dependent variable. The results remained broadly unchanged.

<sup>38</sup> See Borio, C., "Strengthening the international role of the euro: European and international perspectives", speech at the public hearing before the European Economic and Social Committee, Brussels, 4 April 2019.

likely use the US dollar as a vehicle currency to a greater extent (for example Australia or Canada). For emerging market economies, the coefficient is statistically smaller than one. Still, it has to be borne in mind that other factors can influence the pass-through of the US dollar so that the estimation results provide only some tentative indication that the US dollar is indeed a vehicle currency for most oil imports.

**Table A**  
Regression results

	Total	Advanced	Emerging
$d\ln(P_{it}^{Brent})$	0.93***	0.96***	0.91***
$d\ln(e_{it}^{USD})$	0.93***	0.99***	0.91***
Constant	0.0024*	0.0025**	0.0024
Observations	4,617	1,142	3,375
# of countries	144	35	109

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.