Oil Price Dynamics and Currency-Hedging Behavior: Out-of-sample Appendix

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In a recent paper, Agudze and Ibhagui (2019) showed that for Korea, a major crude oil importer, the dollar-won cross-currency basis tends to tighten when oil prices increase. They argued that this positive relation stems from importers' increased propensity to currency-hedge, that is to buy the dollar forward, when oil prices are in a high regime. They estimated this high oil price regime to have a median lower bound of $55. Much below this bound, such as the sub $40 oil prices that are being observed in the market in recent times, they noted that this suggests oil prices have transitioned to a low-price regime. Under this regime, they argued that the propensity for oil importers to currency-hedge becomes substantially diminished. As a result, the dollar-won basis no more bears a positive and significant relation with oil prices. Interestingly, under the low-price regime, they found evidence that the relation turns negative, so that a rise in oil prices goes together with wider dollar-won basis rather than the tighter dollar-won basis documented under the high price regime.

Although the sample used for the evidence presented in Agudze and Ibhagui (2019) covers several past events in the oil market, it ended before the recent sell-off that plunged oil prices to multi-year lows of well below $40 which falls into our range of low oil price regime. The recent decline in oil prices thus provides us with a timely opportunity to perform a fresh out-of-sample analysis that puts the main predictions in Agudze and Ibhagui (2019) to a rigorous litmus test. This appendix reports the findings of the out-of-sample analysis.

Table 1: Regression of dollar-won basis on oil prices together with controls in low oil price regime

|	I	II	III	IV
Oil	-2.31	-2.95*	-1.94	-2.04
	(2.51)	(1.53)	(1.66)	(1.67)
FX		-2.07***	-2.23***	-2.34***
		(0.30)	(0.31)	(0.33)
CDS			1.35	1.57
			(0.94)	(0.97)
LIBOR − OIS				51.93
				(50.53)
Constant	-2.42	-2.47	-1.46	-1.03
	(7.66)	(4.67)	(4.63)	(4.64)
R^2	0.03	0.65	0.68	0.64
N	29	29	29	29

*, **, *** significant at 10%, 5% and 1%. Standard error in parenthesis. Variables are expressed as changes to stationarize their series and avoid spurious regressions. Data frequency is daily, and period of analysis covers Feb/March to April 2020. Basis is 1Y dollar-won basis, Libor-OIS is 3M

The evidence from the new sample covering the recent oil market sell-off – that is the low oil price regime – confirms some of the results presented in Agudze and Ibhagui (2019): In a low oil price regime, the relation between the dollar-won basis and oil prices is negative, which implies there exists evidence that marginal increases in oil prices go together with wider dollar-won basis when oil prices are in a low regime.

As shown in Table 1, in all the regressions performed in the period from end of February 2020 to 09 April 2020, changes in crude oil prices relate negatively with changes in the dollar-won basis and the relation is particularly significant in the second regression, at better than 10% level of significance. In this case, a $1 marginal increase in oil prices relates to about 3 basis points widening of the dollar-won basis. The explanatory power, based on R^2, is quite modest, consistent with the low explanatory power of oil prices for the dollar-won basis when oil prices are in a low regime. We also note that, in this sample period, the Korean spot exchange rate has the strongest and most consistently significant negative effect on the basis, together with a remarkably large explanatory power, a result which is consistent with previous studies that have documented the widening effect of currency depreciation on the cross-currency basis.

We compute a 15-day rolling correlation and the entire period correlation between the dollar-won basis and crude oil prices. As in the above regressions, we have used changes in the values of these variables to compute the correlations in order to stationarize their behavior and circumvent spuriousness. The graph showing these correlations is presented in Figure 1 below together with a scatter plot of the two variables.

Figure 1: Rolling and whole-period correlations between dollar-won basis and oil (LHS) and scatter plot (RHS)
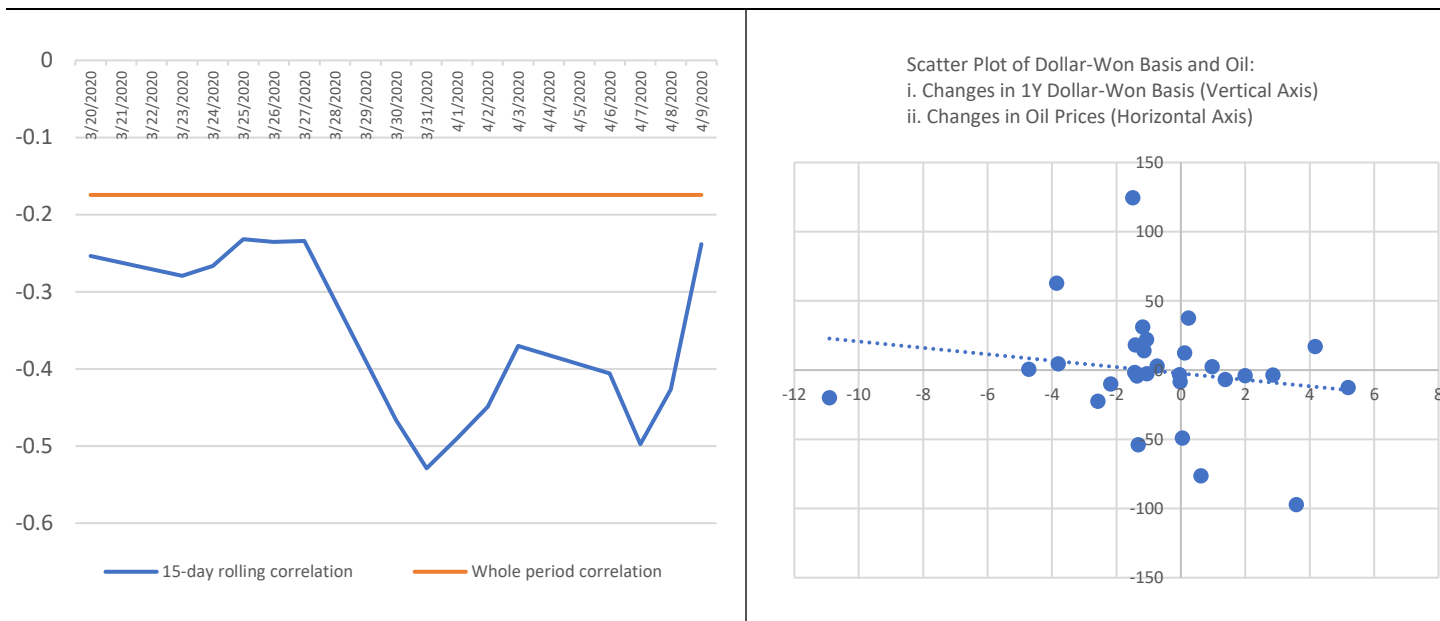
Sources: Bloomberg, authors' estimations

Consistent with the original evidence in Komla and Agudze (2019) and as documented in the preceding regressions, we find that, in the period of low oil price regime, the dollar-won basis and crude oil prices exhibit negative comovements, so that marginal increases in oil prices relate to wider (i.e. more negative) dollar-won basis. In fact, on March 19, 2020 when crude oil prices recorded one of the largest increases of around $4 per day in the sample period was the day that the dollar-won basis widened the most, by 97 basis points on a single day. Conversely, on March 20, 2020 when crude oil prices fell by $1.5 was the day that the dollar-basis recorded its largest tightening of over 124 basis points on a single day. These numbers are not just anecdotal, they echo the evidence of a negative connection[1] between the dollar-won basis and crude oil prices when oil prices are in a low or depressed regime as has been the case since the beginning of March 2020.

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[1] One important caveat though: As with any links in the financial market, we note that this evidence may not always be significant; moreover, it is not impossible for connections between variables to give way even in periods or regimes when they are expected to exhibit certain previously established characteristics, Agudze et al. (2020).

References

1. Agudze, K and Ibhagui, O (2020). Oil Price Dynamics and Currency-Hedging Behavior. Available at SSRN: http://dx.doi.org/10.2139/ssrn.3538870

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