

The cost of international sanctions to investors in Russia's airports

What do airspace closures, compound interest and aircraft manual subscriptions have in common?



In this research note, we look at the potential loss of value of Russian airports due to the war in Ukraine. Drivers of impact include the closure of a number of national airspaces to Russian airlines as well as related sanctions that have been imposed since the start of the invasion. We find that the immediate impact on the cash flows of Russian airports so far remains very limited, and it is equity holders who will suffer most; the increase in the price of equity risk is many times more painful for investors marking to market. As a one-off immediate shock, the loss of value for investors exposed to Russian airports in March 2022 is estimated to be less than 5%. However, we show that this cost will increase rapidly the longer the conflict and the sanctions continue. Domestic traffic will be quickly - and severely - reduced by Russian airlines' inability to keep foreign-made planes flying and the compounded effect of higher discount rates will rapidly burn through the NAV of these assets.

Introduction

Since Russia invaded Ukraine on 24 February 2022, several countries have closed their airspace to Russian airlines. In this note, we consider what the impact of these and other sanctions have been so far for investors in Russian airports, and what they might be in the future.

We use a sample of international airports to estimate the impact on the asset values of degraded revenues from cancelled flights on both Russian and non-Russian airports. We also consider the impact on Russian airports of a more-or-less permanent increase in the discount rate implied by the isolation of Russia from the international financial system.

We find that, to date, the immediate harm inflicted on the Russian airport sector is small (less than 5% of NAV) and mostly the result of financial sanctions rather than airspace closures. The latter have had a limited impact on the future cash flows of these airports, which translates into

a very small impact on their net asset value (NAV). By contrast, the implied loss of value due to the spike in the price of airport equity risk is almost eight times larger. In turn, the aggregate impact on the non-Russian airport sector is extremely small, making these sanctions not very costly.

However, in the longer term, a drawnout conflict will create increasingly larger financial losses. The Russian airport sector will lose more revenues due to the increasing inability of Russian airlines to keep flying foreign-made jets that have been cut off from their maintenance and technical support. Moreover, until the Russian risk premia returns to its pre-war level, fair-value losses will keep mounting exponentially.

These findings are a reminder of the different types of risks to which investors in infrastructure are exposed. On the one hand, long-term cash flows ensure the resilience of asset values to extreme but short shocks to the top-line, as the Covid-related lockdowns also demonstrated. On the other hand, the discount rate and its impact on the present value of cash flows has a much greater ability to cause damage to investors. Shocks to risk premia or to base rates can create significant uncertainty about the financial value and performance of long-term investments like airports. This case also shows that infrastructure can be exposed to systemic risks, as its use becomes dependent on global supply chains and access to non-domestic technologies.

The main airports in Russia¹ are owned directly or indirectly by oligarchs such as Oleg Deripaska or Valery Kogan. But international investors in infrastructure are also exposed to Russian airports and have invested at least USD10bn over the past decade.² The resilience of

1 - Moscow-Domodedovo, Moscow-Sheremetyevo, Moscow-Vnukovo, Novosibirsk-Tolmachevo, Saint Petersburg-Pulkovo, Sochi, Yekaterinburg-Koltsovo

2 - International investors include the Sojitz Corporation, Japan Airport Terminal, Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development, Changi Airports International, Mubadala, Strabag, Copelouzos, Fraport, Vienna Airports and the Qatar Investment Authority, as well as flagship development funds such as the Russian Direct Investment Fund and the Russia-China Investment Fund.

their investments will be greatly tested by the current crisis.

Airspace closures and Russian airport traffic

We compare the volume of flights involving Russian airports with the global flight volume for two 15-day periods: between 28 January and 11 February 2022 (pre-invasion) and between 25 February and 11 March 2022 (post-invasion).

Table 1 (Panel A) shows the number of flights to and from Russia, within Russia and the total Russian air traffic pre- and post- invasion. It also shows these quantities as a share of global air traffic. At first the impact of airspace closures can seem dramatic. As a share of global flights, the traffic to and from Russia has decreased by almost 30% since the sanctions (from 0.78% to 0.58%). But global flights have also increased in volume during this period (by about 10%) due to many economies reopening international travel post-pandemic. In this context, air traffic to and from Russia has really fallen by 20% (from 10,226 flights to 8398).

Next, Table 1 also shows that Russian air traffic is predominantly domestic: before the sanctions, 69% of flights leaving a Russian airport also arrived at a Russian airport. Since the closure of NATO and other airspaces to Russian airlines, this proportion has risen to 72%. Within-Russia air traffic is also 4.3% lower since sanctions were imposed and, while this may be due to some disruptions of the Russian airspace and airport activities, it could also be a seasonal effect. In effect, the absolute number of flights to and from Russian airports has fallen by 8.8% (from 33,024 to 30,232) since the war began. If we consider only NATO countries (Panel B), which include almost all the countries that have closed their airspace to Russia,³ we see that the total number of flights between NATO members and Russia was

³ - Singapore and Finland are also amongst the countries that have closed their airspace to Russia.

small to begin with; it accounted for just 11.1% of all Russian air traffic before the sanctions and about 8.7% since. Looking at all NATO member and Russian air traffic data, the number of flights between the two zones has fallen by 23% since the sanctions were imposed, as of the cut-off date in the data.

Thus, the immediate impact of airspace sanctions on the total traffic volume of Russian airports has so far been limited by the substantial proportion of Russian air traffic that is domestic and by the fact that only some countries have banned flights to and from Russia.

Estimating the loss of air traffic as of mid-March 2022 requires a counterfactual by which there are no sanctions and Russian air traffic would also have benefited from the 10% average global growth of traffic. On this basis, we estimate that non-Russian airports lost a limited 0.12% of traffic due to the sanctions, while Russian airports had to forgo c.15% of their total air traffic (see Table 2).

Loss of revenues

A 1% change in the volume of flights arriving or departing an airport does not necessarily translate into a one-for-one change in revenue. Looking at a range of airports around the world, we observe two patterns of revenue sensitivity to changes in flight volumes, as shown in Table 3. Note that these results are calibrated using data for the years 2019 to 2020 i.e., the sudden stop in air traffic created by the Covid-19 pandemic and the ensuing lockdown. Hence, these results capture the impacts of large shocks.

Table 3 shows that when airports are largely domestic, their revenue model and tariff structure are such that revenues are less sensitive to traffic shocks than those of airports that are focused on international traffic, in which case the 'beta' of the traffic is higher than one. In the case of global hubs like Heathrow airport in the UK, the

Table 1: Flights to and from Russia before and after the Ukraine invasion (cancelled flights in parentheses)

PANEL A					
	Global flights	Flights to/from Russia	Flights within Russia	Total Russian air traffic	Domestic share
28-01-2022 to 11-02-2022	1,366,902 (47,491)	10,251 (25)	22,847 (49)	33,098 (74)	69%
Share of global flights		0.78%	1.73%	2.5%	
25-02-2022 to 11-03-2022	1,487,211 (35,890)	9,699 (1,301)	22,701 (867)	32,400 (2,168)	72%
Share of global flights		0.58%	1.50%	2.08%	
PANEL B					
	Russia + NATO member flights	Flights to/from NATO/Russia			
28-01-2022 to 11-02-2022	684,522 (24,261)	3,680 (15)			
Share of Russia+NATO member flights		0.56%			
25-02-2022 to 11-03-2022	768,404 (8,298)	3,252 (604)			
Share of Russia+NATO member flights		0.35%			

Source: OAS, Flight24, EDHECinfra 2022. Multiple approaches were used to aggregate the relevant air traffic data. The margin of error is estimated to be below 5%.

Table 2: Impact of sanctions on airport traffic

	Loss in flight volume
Russian airports	-18%
Non-Russian Airports	-0.22%

Source: EDHECinfra 2022.

Table 3: Revenue sensitivity of airports to changes in flight volumes

	Sensitivity to a 1% change in flight volume
Mostly domestic airports	0.72
Mostly international airports	1.07

Source: EDHECinfra 2022.

Table 4: Average impact on NAV of a one-time revenue shock

Panel A: Immediate loss (March 2020)			
	Revenue only**	Risk premia only	Revenue and premia
Shock	-10.8%	20.00%	Combined
Mean Loss	-0.5%	-4.19%	-4.67%
Panel B: Five-year scenario			
	Revenue only	Risk premia only	Revenue and premia
Shock	Five-year decline*	20.00%	Combined
Mean Loss	-18.30%	-15.14%	-25.78%
Panel C: Permanent impact on the discount rate			
Shock		Permanent increase of risk premia by 20%	
Mean Loss		-71.72%	

Source: EDHECinfra 2022, * Revenues drop from base case of 22% in 2022 (full year), 33% in 2023 and 75% in 2024-2026. Discount rates increase by 2,000 bps in 2022-2026 ** No change in discount rates, no change in dividend-to-revenue ratio

sensitivity of revenues to traffic in 2019-2020 was 1.13, meaning that for each 1% drop in flight volume, the airport lost 1.13% of its revenues. This is due to the differential pricing used by many airports for domestic, regional and international flights.

As we saw above, Russian airports are mostly focussed on their domestic market (somewhat in the manner of those in Australia or the US) while the airports to and from which Russian flights have been banned are more likely to be international airports. As a result, the revenues of Russian and non-Russian airports are impacted differently by the sanctions: per cancelled flight the sanctions are costlier to non-Russian airports than they are to Russian airports.

On aggregate, however, the immediate loss of revenue is greater for the Russian side: with a drop in the total volume of flights of about 18% in March, aggregate airport revenues in Russia can be estimated to already have fallen by about 10.8%. Conversely, non-Russian airports can be expected to suffer aggregate revenues losses of only -0.28%.

Of course, if economic sanctions were to remain in place and Russian airport revenues to continue to be degraded, perhaps increasingly so, the impact would be greater, especially as the companies' dividend payout behaviour is forced to become more conservative.

It should also be noted that airspace closures are not the only type of sanction impacting Russian airports. Since most Russian air traffic is domestic, the ability of domestic or national airlines to keep flying is essential to maintain the revenue stream of local airports.

In this context, the loss of maintenance support from international aircraft manufacturers, all of whom have already excluded Russian airlines from their service, will have an increasing impact. It will gradually make the Russian modern jet fleet

less reliable and, eventually, unusable. Modern aircraft require specific maintenance and part replacement on a regular basis, at least once every six years.

Indeed, Russian airlines mostly use foreign-made aircraft. For example, Aeroflot currently maintains a fleet of 180+ aircraft, 170+ of which are made by Airbus and Boeing⁴. The dozen remaining SU-100 Superjets (cover picture) in service at Aeroflot use engines made in France.⁵ Reports suggest that out of 861 passengers and cargo planes currently in service in Russia, 332 are Boeings, 304 are Airbuses and many more by other international manufacturers. Only 136 civilian aircraft are Russian-made.⁶

Such dependence on foreign technology, which is now out of bounds, can be expected to greatly compound losses of traffic and revenues for Russian airports. In what follows, we consider the immediate effect on revenues as it can be estimated today, as well as a forward-looking scenario involving five years of sanctions and the loss of one quarter of the fleet each year for the first three years.

Indeed, if three quarters of the fleet is foreign-made and the limit for a jet aircraft to keep flying without maintenance is six years then, on average, we can assume that one third of these aircraft will reach this limit each year going forward. The resulting loss of revenue from lower traffic is included in our analysis of the expected loss of financial value in the sector.

Loss of financial value

Next, we consider the financial loss resulting from these sanctions. We first consider the impact of lower revenues on the NAV of airports. While we do not have access to the direct valuation of

⁴ - see for example <https://www.planespotters.net/airline/Aeroflot-Russian-Airlines>

⁵ - In mid-March 2022, reports already highlight a dramatic rise in the use of Russian-made jets within Russia (<https://simpleflying.com/russia-huge-increase-sukhoi-ssj100-flights/>).

⁶ - Data from Cirium, 2022

Russian airports, we can do a sensitivity analysis using the large and medium-sized international and domestic airports tracked in the infraMetrics® database. infraMetrics has documented 140 airports in 25 countries and actively tracks the financial performance of 30 airports in eight countries over the past 20 years.⁷ We assume that investors in Russian airports would be exposed to similar types of medium-to-large assets and that the infraMetrics basket of international airports is representative of the business profile of investments made in the Russian airport sector. We estimate the impact on the market value of this basket of non-Russian airports given a commensurate revenue shock and/or discount rate shock and use it as a proxy of the impact of such shocks on the NAV of Russian airports.

Change in NAV due to a fall in revenues

Table 4, Panel A shows that a one-off negative shock on revenues has a small impact on the NAV of a basket of airport: with a temporary (intra-year) revenue drop of 10.8% the NAV is reduced by c.0.5% on average, leaving both the discount rate and the dividend payout ratio unchanged. This is due to the long life of such assets and the many remaining future dividends that enter the present value calculation. Hence, the immediate revenue shock of March 2022 has had a rather limited impact on the NAV of Russian airports.

However, once we consider the impact of a forward-looking scenario including five years of sanctions, and declining domestic traffic due to the issues with the maintenance of the international aircraft fleet highlighted above, the impact on the NAV of Russian airports of lower revenues is much larger at -18.3% of the NAV at the 2026 horizon (Panel B).

In fact, these estimates are conservative since this scenarios would trigger other effects, including potential defaults and greater cash preservation on the part of Russian airport companies. In this

7 - Germany, France, Chile, Australia, UK, Portugal, New Zealand and Italy.

Figure 1: Russian yield curve, 16 March 2022



Source: World Government Bonds

scenario, the cash flow profile of the investments returns to its pre-war path after five years, which could also be considered optimistic.

Change in NAV due to an increase in discount rates

Since the conflict started, the price of risk has increased for Russian investors, as have interest rates, and the one-month increase on Russian corporate bonds credit spreads is about 900bp.⁸ Meanwhile the Russian central bank has increased interest rates from 9.5 to 20%.⁹ These changes imply an increase of the discount rate of Russian airports of the 2,000bp order of magnitude.

The discount rate shock impacting Russian airports in March 2022 is large. Hence - rather than using a measure of key rate duration (sensitivity to discount rate risk at one point in time) which is based on a linear approximation for small changes in rates - we recomputed the impact of such a shock directly for the same basket of international airports.

Assuming that the sanctions are one-time hit on the risk premia that would disappear after a year indicates a limited loss of 4.2% (see Table 4, Panel A). Conversely, if this increase in the risk premia was to apply for the next five years, the loss from that change in the price of risk alone would be 15.2% (Panel B).

8 - MSCI, 2022, "Russian Corporate Bond Markets: Braced for Default?" available at <https://www.msci.com/research-and-insights/russia-ukraine-war/russian-corporate-bond-markets>

9 - Bank of Russia, 2022, "Bank of Russia increases the key rate to 20% p.a." accessed at <https://www.cbr.ru/eng/press/keypr/>

The long-term nature of airport investments makes the compounded effect of large shocks to the risk premia so powerful that if Russia was considered to be a much riskier investment destination on a permanent basis, (or until further notice), international investors in Russian airports could have to write off these assets entirely. Should discount rates for Russian assets remain permanently at this level, with this increase applying to discounting all future periods, then investors in Russian airports would be looking at losses in excess of 70% of NAV (Panel C). At the moment, the inverted hump of the Russian yield curve suggests that the next five years are priced as riskier than the following two decades (see Figure 1).

Conclusions

The combined impact of airspace closures, commercial sanctions and the higher costs of capital for Russian airports amounts to a loss of approximately 4.7% in March 2022 (Table 4) for investors exposed to this sector. However, this calculation assumes that the world returns to its pre-invasion state very soon, which currently seems most unlikely.

Assuming a somewhat protracted war and enduring sanctions, our five-year scenario considers a) the combined loss of access to NATO airspace, b) the expected rapid collapse of Russian domestic traffic due to the loss of technical support from international aircraft manufacturers, and c) the impact of much higher discount rates on the NAV of these assets. We find that investors can expect to lose at least a quarter (-25.8%) of the value of these investments, assuming a return to base case after five years.

The longer the current situation continues, the larger will be the impact on Russian airport asset values. As we have shown, this impact is not primarily due to airspace closures, given the mostly domestic nature of the Russian

airline market. Instead, the negative impact stems almost entirely from the loss of access to technical support from international firms (the limits of Russia's technological sovereignty) and the increase in the risk premia on Russian investments.

Of course the Russian state may not worry about market fair value, but international investors do, whether they are oligarchs or pension and sovereign wealth funds.

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