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Dear Sir,

IATA RESPONSE TO AERA'S CONSULTATION PAPER FOR THE DETERMINATION OF AERONAUTICAL TARIFF FOR INDIRA GANDHI INTERNATIONAL AIRPORT (DEL) FOR THE FOURTH CONTROL PERIOD (CP4)

The International Air Transport Association (IATA) is the global trade association for the world's airlines, representing some 340 airlines and over 80% of total air traffic. Many of our member airlines operate in the Indian market and we support many areas of aviation activity and help formulate industry policy on critical aviation issues.

IATA appreciates the consultative approach and the detailed information provided for stakeholders to facilitate our review and offer constructive comments for the consideration of AERA in determining the tariffs for DEL in the CP4. The following are our comments and inputs which draw from our extensive involvement in similar discussions elsewhere and global best practices.

Claim of Losses

While DIAL has raised concerns about its viability as an airport operator, particularly with claims of supposed losses since 2020, it must be recognized that DIAL's target capital returns continue to be above what IATA would consider reasonable and do not seem to be commensurate with the level of business risk (or rather the lack of) given the true up approach applied by AERA. It is worth noting as well that DIAL's tariffs should have been set lower if not for the Base Airport Charges (BAC) + 10% term guaranteed in the OMDA. This, coupled with the hybrid till treatment does not fully reflect the overall profitability of DIAL when all things are considered i.e. including its other non-aeronautical businesses particularly those that rely on the core airport activities. Put simply, without passenger and cargo traffic, the airport doesn't have a role within the aviation ecosystem. The assessment and subsequent decisions must be considered within this context.

IATA had previously stated our position on the application of the hybrid till policy, which is not in the best interest of airport users i.e. unnecessarily raising user charges higher than where they need to be and unfairly over-rewarding airport operators. Similarly, while the revenue share percentage is prescribed within the OMDA, DIAL and the AAI/Government of India could explore possible support options in the spirit of the SSA and OMDA e.g. lowering the extremely high revenue share percentage for a period of time, if indeed the financial viability of DIAL is in question.

SSA: The preamble of the SSA, it is explicit that the GoI is agreeable to provide support for viability of the Airport Operator. Extract as follows:

*In consideration of the JVC having entered into OMDA and to enhance the smooth **functioning and viability of the JVC**, in addition to the obligations of the AAI under the OMDA, the GOI is agreeable to provide some support to the JVC.*



AERA's responsibility is unambiguous; that is to determine what is deemed an efficient level of operation for the regulated airports. Hence, the setting of the tariffs to reflect this efficient pricing level. IATA fully supports this approach as it is the role of an economic regulator to establish decisions and pricing that reflect/mimic a competitive environment where significant airport market power exists. Despite the Noida International Airport (DXN) coming online in 2025, DIAL's forecast by its consultant acknowledged the insignificant/nil impact DXN would have on DEL's traffic demand. It is clear that DEL will have the edge over DXN and continue to possess significant market power. There is simply no real material competition between DEL and DXN for the foreseeable future.

Annual Tariff Plan (ATP)

With regards to the Annual Tariff Plan (ATP) submitted by DIAL to AERA, it is clear that the airport is being unnecessarily creative in proposing to restructure the charges such as across the different user segments. The proposed structure is overly complex to implement, and discriminatory by differentiating the type of users and time for similar services that are being provided. This approach is not in adherence to ICAO's Policies on Charges on the basis of the non-discrimination principle and equally contravenes the OMDA's Pricing Responsibility [Part (ii)] Non-discriminatory.

These proposals are discriminatory "per se" for both aircraft operators and passengers, based on: the choice of aircraft type (larger impact on widebody operators vs. narrowbody); passenger Itinerary (embarking vs. disembarking); travel-segment type (domestic vs. international); time of travel (peak hour vs. non-peak); as well as the class of travel (economy vs. business with a higher impact on full-service operators). We noted that DIAL has also raised the issue of dual airports to justify its proposal for UDF arrival and UDF departure in case of leakage to DXN. As highlighted in its traffic forecast, the impact of DXN is nil or insignificant at least. IATA is not convinced that this justifies a redesign of the UDF recovery mechanism, definitely not at this stage.

Regarding the proposal by DIAL to introduce peak/off-peak charging, a more detailed analysis and consultations are needed. There shouldn't be cross-subsidization from one group of users to the other. Increasing charges during peak hours will not push aircraft operators to off-peak hours as they are serving the underlying demand. Put simply, aircraft operators have limited leeway to adjust the schedules due to the complexity of their operation and connections for their passengers. At the very least, DIAL should demonstrate the scale of differences in cost for servicing operations during peak and off-peak periods. Moreover, it should also be expected that non-aeronautical revenues would be higher at peak times rather than off-peak, which would actually indicate that charges during the peak would be lower, not higher (considering the revenue sharing model). Instead of entering into discriminatory structures, we would encourage DIAL to focus on working with aircraft operators in partnership to grow their operation and support better utilization of the available capacity.

The Ministry of Civil Aviation's Guidelines for Slot Allocation ensure the efficient and equitable use of airport capacity through neutral, transparent, and non-discriminatory practices. The ATP proposals impact airline passengers to differing levels of UDF based on the airline slots at DEL, where the slots themselves are based on longstanding historicity and principles of worldwide slot guidelines and have no relation to DIAL's definitions of peak or non-peak hrs. In the absence of an independent slot coordinator, or references to transparency in slot allocation and capacity declaration, or the set up of an airport-based coordination committee (as espoused in MoCA's guidelines for slot allocation), the ATP proposal gives additional powers to the JV operator for slot determination. However, these principles are compromised by the ATP and the current DIAL slot coordination approach. The introduction of peak and off-peak charges further exacerbates the differential treatment of airlines, undermining the slot coordinator's ability to remain neutral and non-discriminatory.

In summary concerning the ATP, IATA would request AERA to reject the proposed new charges structure by DIAL. We encourage AERA to continue to work towards addressing the discriminatory practice of differentiating landing charges by domestic vs international flights, to at least narrow the differential over time. We would also



request that AERA considers an equitable approach in distributing the costs to be recovered from the different user groups i.e. minimizing the impact of increases and ensuring all users pay their fair share of the costs.

Additionally, IATA requests enhancements for AERA to consider for all future airport tariff determinations. It is requested that the tariff card filed by the airport operators must be accompanied by an impact/comparative analysis, clearly detailing the increases compared to current/prevaling tariffs. In its current form of filings of tariff cards, the airport operator tariff plan does not transparently reveal the headline increases sought by the Airport – and this diverges greatly from the otherwise extensive analysis undertaken by AERA in the consultation document.

BAC+10% and True Up Treatment

IATA is aware of the claim by airport operator that no true-up should be applied when BAC + 10% tariff is in place. We also noted that the decision on the appeal by AERA on this aspect is pending with the Supreme Court. IATA supports the decision by AERA to continue/maintain its true-up approach in this circumstance as it is the right thing to do. The OMDA simply prescribes the lowest ceiling of the level of charges allowable and this should not be construed as a freeride for an airport operator to keep whatever excess/over-recovery collected as profits on top of its allowable capital returns. Based on the same argument, if losses were incurred when BAC + 10% tariff is in effect, no true up should apply for the under-recovery based on the efficient level determined by AERA? It is either that the true-up should be applied for all, or not at all.

Annual Fee Revenue Share Treatment

On the matter of the argument by the airport operator that the annual fee payable to AAI should be excluded/subtracted from the revenue share, IATA fully supports the unbiased approach by AERA. It must be recognized that with the application of the 'S' factor as a result of adopting the hybrid till policy, the 30% is calculated based on the recognized gross revenue, and not after deducting other items. The remaining 70% of the revenue remunerated to the airport operator is meant to cover all the other costs incurred by the airport operator, including its unregulated and uncapped profits for these assets/activities. If the airport operator is free to deduct whatever it deems appropriate from the revenue from revenue share assets before the calculation of the 30%, we would be much better off scrapping the hybrid till policy altogether and reverting to the single till framework previously applied by AERA before the issuance of the hybrid till policy by the Government of India.

Another perspective to bring things into context is by understanding how revenues and costs are treated if they were under a dual till environment Each till will be assessed in isolation – both revenues and costs. The hybrid till is a compromise between the single till and dual till regimes, with the notion that non-aeronautical activities rely on aeronautical activities and hence there should be some form of contribution to offset aeronautical costs. IATA maintains our position that Single Till is the best arrangement to deliver the most optimal outcomes, balancing the need to ensure affordability, mimic the behaviour that would be obtained had the airport been in a truly competitive environment and fairly rewarding the airport operator for their investments and risks.

To see this from the right lens, we must also revisit the intent and process of the airport privatization exercise. Potential bidders would have done the necessary calculations, projecting future earnings and profitability before deciding on the revenue share percentage. It was and should never be the intent of the Government of India to allow airport operators to pass through the annual fee as a cost/expense, as seen in the last round of airport privatizations to the Adani Airports, where for the removal of any doubt it is explicitly mentioned that the per passenger fee to the Government must not be passed through to users. Otherwise, if the annual fee were meant to be treated as a cost/expense that can be fully passed through to airport users, such private airport operators would inflate their bids/offers to any astronomical level – and pass that cost through to the users.

CHAPTER 2: TRUE UP FOR THE FIRST CONTROL PERIOD

IATA supports the decision by AERA to consider the cost of Refundable Security Deposits (RSD) to reflect the cost of debt (10%) rather than treating this as the same as the cost of equity (16%).

CHAPTER 3: TRUE UP FOR THE SECOND CONTROL PERIOD

IATA supports AERA for the treatment in calculating the S-Factor and to not consider any adjustment in revenue from the Revenue Share Assets towards revenue from Existing Assets and annual fee payable to AAI. AERA has made very valid observations regarding the tariff-setting principles enshrined in the OMDA and the SSA.

As with the treatment of costs associated with non-aero services, the tax component should not be borne by aeronautical users. The principle of the hybrid till is for only the revenue to be recognized to partially offset aeronautical costs, and not for the non-aeronautical costs to be passed on to aeronautical users.

CHAPTER 4: TRUE UP FOR THE THIRD CONTROL PERIOD

We are in alignment with AERA on the many aspects of its decisions. One particular point that we would like to raise concerns the CAPEX true up, which further demonstrates the business risk is being borne by users e.g. cost escalations of Phase 3A despite AERA's rationalization. As raised by IATA in various AUCCs and our submissions to AERA, a lifecycle view must be taken for not just the planning and delivery of these major assets. Ongoing consultations and stakeholders' involvement are necessary to assess and take a joint call on the best decision at the various points of the development.

We noted that AERA in its Control Period 3 order has taken IATA's comments on the need to rationalize the OPEX, leading to the more efficient level needed. It is great to see that the actuals are quite close and lower than what AERA had approved. This is a positive outcome where a clear expectation is set and is then met by DIAL. This is a clear example where the regulatory decision is driving the necessary response/behaviour from the regulated airport operator.

IATA supports the finding by AERA in arriving at the over-recovery of 852.04 cr in the CP3 to be trued up in CP4.

Not specific to this consultation alone, IATA would like to propose to AERA more broadly that since CAPEX development is being paid for by users, in the case of delays or even quality of infrastructure works leading to delays and/or disruptions, or in instances where the infrastructure that users paid for is not available for use, the Authority may consider introducing a rebate mechanism that allows airports to return/offset the regulatory charges that have been paid by users.

CHAPTER 5: TRAFFIC PROJECTIONS FOR THE FOURTH CONTROL PERIOD

We noted that AERA has taken into consideration the IATA traffic forecast (Nov 2024) for India in its assessment. As mentioned earlier, we don't believe that there is any material impact posed by the operationalization of DXN in the near and medium term. Considering that DEL is planning for a major transfer hub, it is useful to also understand the split of Departure/Arrival/Transfers in the projections presented. This would be necessary to ensure the right capacity is delivered timely through fit-for-purpose infrastructure based on the projected splits.

This deviation between billable and non-billable ATMs perhaps also highlights the important aspects of funding for the RCS flights - and the mechanism through which the landing and parking charges/costs for aircraft under 80 seats are billed. The exclusions provided for billing of RCS flights would mean that the billed flights will bear that cost. However, the RCS scheme is being funded via the RCS levy on scheduled domestic tickets. We would

appreciate AERA for checking for any discrepancies and correcting them, in particular whether certain users are being inadvertently charged twice over for funding of the RCS scheme.

CHAPTER 6: CAPITAL EXPENDITURE (CAPEX), DEPRECIATION AND REGULATORY ASSET BASE (RAB) FOR THE FOURTH CONTROL PERIOD

We greatly appreciate AERA's efforts in conducting a detailed review and scrutiny of DIAL's CAPEX proposals for the Fourth Control Period (CP4) and in particular its review of capital benchmarks and efficiency.

From a pure costing perspective, we agree with the logic AERA and its independent consultants have applied to address excessive cost estimates and some elements of scope that should not be passed to users, such as facilities management services and marketing. In this context, we agree with AERA's assessment of the overall CAPEX proposed summarised in Table 228 being Rs. 4,211.39 Cr.

Notwithstanding this, we would however like to raise some important points for AERA to consider in its final determination given user and consumer impacts.

It is essential for all parties involved that CAPEX and all other regulatory building blocks are consulted upon and agreed well in advance of the start of a Control Period. Airline- airport consultation should occur at least 6 months in advance of any determination allowing sufficient time for a dialogue to better understand airport major capital investment plans, to allow airlines to provide inputs regarding their own requirements, and to take a view on the overall affordability of plans. Without sufficient time, this undermines the AUCC and consultation process with users and limits our ability to meaningfully comment on CAPEX that airport users are expected to pay for. In addition, a single AUCC called on short notice is insufficient to enable us to provide informed feedback regarding large scale CAPEX investments that will impact passengers and operations for years to come.

There is a need for airport operators to recognize the importance of effective user consultation in their engagement with airline customers and users. AERA too has a role to play in putting in place more robust regulatory controls to deliver this attitudinal change that is required, for what is effectively monopoly providers delivering public services, with significant market power. Towards that, IATA appreciates AERA for its issuance of the letter of 1 Jan 2025 reiterating for the airports to ensure compliance with the consultation protocol & to conduct AUCCs for major projects.

From a CAPEX perspective a number of regulatory enhancements such as disallowing any projects that have not been consulted upon with users per AERA's consultation protocol at key stages (needs identification stage, options development stage, and detailed project design stage) in the design process; tougher penalties for non-delivery to the required cost, quality, scope or program; and an independent review of costs at a project level during the design and development process would be very useful. An Independent Fund Surveyor (IFS) approach similar to the mechanism applied by the Irish Airport Authority works well, where costs are agreed at each major stage gate, with the airline community's input.

Regarding Third Control Period true-up, we vigorously disagree that users should be burdened with the airport operator's inability to deliver a program of works it previously committed to, both in terms of benefits that should have been delivered and costs that have escalated due to a shift in market conditions or ineffective procurement processes. Cost escalations should be removed from any true-up considerations and immediately disallowed. We also suggest the current 1% reduction of costs regarding uncapped project costs from the target revenue is increased to a 5% penalty to provide a greater focus and incentive in this area. While 1% is useful, it may not be sufficient for airport operators to act as a competitive business would be expected to.

Various references are made to the 2016 airport master plan regarding CP4 investment, in particular with regarding to Pier E expansion. Before commenting on project specifics, master plans should be consulted upon every 5 years, which reflects both the IATA Airport Development Reference Manual (ADRM) co-produced with

the Airports Council International (ACI) and industry experts, and ICAO's recently published master plan guidance. This is reflected in ICAO's Doc 9184 Airport Planning Manual Part 1 – Master Planning, Third Edition 2023, that states under section 1-2 “To ensure a realistic and appropriate fit to continuously evolving aviation industry conditions, the master plan should be reviewed in its entirety every 5 years, or more often if changes in economic, operational, environmental and financial conditions warrant an earlier revision. Adjustments may need to be made to assumptions used during the initial master plan process, including phasing and ongoing airfield and facility development as air transport evolves.” As the guidance indicates, this is especially important in fast-paced markets such as in India and the Delhi area, to ensure changes in the market in terms of traffic, latest trends, compatibility, affordability etc. are taken into account.

Without an updated master plan to inform CP4 CAPEX investments, there is a risk plans are misconceived, and the wrong infrastructure could be built at the wrong time. A few important considerations should be taken into account for CP4 including:

- The demand triggers for investment taking into account capacity and demand factors directly linked to phasing plan, construction timeframes, and level of service also need to be identified and clearly understood to provide the assurance and validate the right infrastructure is being planned to meet users' needs. At present little detail has been provided other than references to a master plan review. We understand this is in MoCA's domain, however nonetheless a review is required now before large scale CP4 investment decisions are taken.
- One point related to demand triggers for investment and DIAL's phasing strategy is the refurbishment and enhancement of T2 in the context of traffic growth and future phases including T4, raised by airlines at the January AUCC. For instance, DIAL's traffic forecasts indicate 95.58 million passengers by 2029, however with T2 and T3 development, capacity will increase by about 110 million passengers overall. We are interested to understand the impact if T2 is deferred to the next control period. Is T2 capacity really required in CP4 as an interim step, and has the timing of T4 development been considered in this context?

Regarding planning assumptions and the Business Case for investments, additional information is requested that is essential for users to review and provide feedback on major CAPEX plans (in addition to the points above). Fundamentally, airport infrastructure exists to serve the airlines that operate from it, and therefore the endorsement of users should be required before projects move ahead. Required details include:

- Project options, costs, benefits for each major project with a corresponding business case demonstrating the return on investment for users. This is lacking for each and every project yet is essential to demonstrate these investments are required, and where justified the optimal solution has been selected to meet users passenger and operational needs.
- Regarding traffic forecasts and the related capacity assessments:
 - DIAL states IGI will reach its handling capacity for international passengers by FY26 and 90% of T3's capacity in the same time period. Please substantiate this with data.
 - Extrapolated from traffic forecasts and design day flight schedules, peak hour planning inputs by terminal, broken down into passenger segments for Departures, Transfer and Arrivals for terminal facilities. Please also share the methodology to calculate peak hour planning and the rationale for it.
 - Related, for security related elements, is the same methodology applied? Excess provision for space should not be provided beyond industry best practices e.g. reflected in ADRM.
- Specific level of service parameters ideally within IATA's ADRM framework and Optimum range e.g. space per passenger m2 and maximum waiting time for each passenger individual processing element and holding areas e.g. % seating in gate room areas.
- For each project a thorough understanding of how construction delivery proposals retain existing capacity and levels of service (LoS) throughout the proposed construction period in CP4. A commitment to avoid any reduction in LoS, the need to avoid forced airline moves and a detailed understanding of phasing is required now, to ensure these principles are included in DIAL's project planning from the start. Without this planning, costs are likely to escalate, projects may not be delivered on time, and passengers and airlines will suffer from avoidable disruption.
- As important is a clear understanding of project dependencies and risks. There will inevitably be knock-on impacts between projects, which is a common issue experienced at many airports. In the interest of DIAL and

all users, we request the overall program including critical path for each major project, and major risks are shared now for review in advance of AERA's final determination.

- These are important aspects to consider informing the capitalization schedule for the period, that are closely linked to the strategic choices for the airport based on points made.

Stands:

A large number of stands are being proposed in CP4 however there is little supporting detail to substantiate the requirement. We request details regarding the underlying planning assumptions in particular taking into account the following details:

- Assumptions regarding removing redundant aircraft currently occupying parking areas.
- Overall stand demand for the airport reflecting on ATM traffic forecasts, split by terminal and aircraft code:
 - How many parking stands overall are required in CP4, and how many can be deferred until a later period to phase capacity in accordance with demand and capacity side impacts?
- Related, has any revenue recovery from grounded aircraft (even if delayed) and penalties from airlines/lessors for such long-term parking been factored into regulated revenues?
- Stand planning rules and related service measures including:
 - The time allowed on contact and remote stands used for live operations and the relationship between this and parking stands, and towing. In principle, towing should not compensate for a lack of available stands.
 - The level of pier service/contact gates e.g. in % terms that may drive the need for contact gates:
 - Related, while the outdated 2016 master plan states 12 contact stands on pier E, what is driving this requirement for CP4? Are the previous assumptions still valid, and how have these been consulted upon with users?
 - Any preferential stands for particular aircraft types e.g. wide-body, or by airline or alliance?
 - What specifically is driving the overnight parking requirement e.g. based aircraft, first wave operations?
 - Are multi aircraft ramp system (MARS) stands being planned, or swing gates between piers C and D for any further flexibility?
 - Regarding the costs associated with parking stands, please clarify if these can also be used for live operations. No associated equipment such as FEGP, PCA, fuel systems are noted in the high-level scope

Pier E, Pier C reconfiguration:

For all terminal-related project proposals from the redevelopment of existing piers to infills and the new pier:

- How has technology been leveraged and planned to efficiently utilize expensive infrastructure?
- How is infrastructure being planned to safeguard for the future?

DIAL should provide detailed answers to these important points taking into account processing time, space for queuing and the overall passenger experience vision are key elements to take into account, for instance:

- How are biometrics being used to drive space efficiency, and what GIFA benchmarks are being used taking these elements into account?
- Please note IATA has developed an industry business case to demonstrate the benefits of removing physical barriers at airports on Departure, enabled by biometrics, based on various scenarios including passenger segregation issues typically faced by airports in India. This reinforces the need to plan for flexibility in the future regarding passenger processing.

A substantial amount of CAPEX being Rs. 2,402.54 Cr. is allocated to expansion projects, regarding Pier E, C reconfiguration and infill. We request DIAL clarify a number of points (noting some similar generic points have been raised), that DIAL should be sharing at AUCC meetings from a basic design and development perspective to inform design and development decisions and the related functional scope and costs:

- Please can DIAL share details of the passenger journey for all T3 developments and pier E, for departures, transfers (by type e.g. D-D-D-I, I-D) and arrivals taking into account passenger walking distances and times, level changes, minimum connection times:
 - We request DIAL share terminal and pier layouts to more clearly illustrate the passenger journey routes.

- We also request a clear understanding of the delineation between commercial and all other areas. Commercial layouts should also include back of house corridors, lifts, storage areas, waste areas and break out rooms, to demonstrate DIAL's position that less than 10% of these areas are non-aeronautical and 100% for pier E (meaning no retail concessions at all will ever be placed on that pier).
- Passenger levels of service in terms of space or passenger and queuing times, boarding gate sizing.
- For Pier E and C, 10 MAP split into peak hour passenger numbers and LoS.
- Stand demand and levels of pier service versus remote operations assumption.
- Terminal gross floor area (GFA) per million passengers or equivalent planning inputs and an associated breakdown of these areas as a minimum per million pax per including:
 - Pier GFA
 - Check in / bag drop GFA
 - Departures baggage GFA
 - Reclaim GFA
 - Early bag store
 - Stands throughput e.g. annual per stand average
- Regarding T3 forecourt capacity, is there sufficient space for vehicles to drop off and pick up passengers? What ratios are used to calculate curb length and forecourt sizing?
- What is the vehicle and car parking strategy to balance capacity and demand without penalizing passengers through excessive payments?
- Regarding the Departures BHS, what is the baggage strategy for Terminal 3 including Pier E to ensure there is sufficient capacity to accommodate demand based on assumptions are used:
 - Bags per passenger ratios by segment
 - Check-in/bag drop belt capacity and in-system time for the sortation system
 - Baggage reconciliation and compliance with IATA resolution 753
 - Capacity of HBS
 - EBS capacity and ratios of direct to transfer baggage
 - System reliability and resilience planning KPIs and strategy
 - Planning for growth
 - Flexibility e.g. any input to any output
 - Baggage tag technology
 - Baggage make-up strategy including capacity assumptions and the number of handlers
- Regarding ground services equipment (GSE) please explain the assumed area per stand for vehicles and equipment noting sufficient space should be provided e.g. % allocation as a total proportion of the stand.
- Construction of Pier E is bound to have a major disruption in Pier D Apron. IATA would like AERA to ensure that the airport takes the required measures to mitigate disruptions, ensure a minimum acceptable level of service and to agree a realistic phasing plan.

General CAPEX:

We thank AERA for highlighting the AUCC discussions in this consultation, and for its thorough assessment of CAPEX line items throughout the consultation, and for general CAPEX. From a pure cost component perspective we agree with AERA's assessment and support its independent consultants' logic and conclusions to exclude or defer certain items such as:

- CT-XBIA and body scanners taking into account supply chain and body scanners, resulting in an overall reduction in CP4 reflecting required facilities.
- Facilities management services and marketing are not reasonable to include and expect user to fund.
- A reassessment of boarding gate seating costs.

We agree with the Authority's assessment of Rs. 1,678.35 Cr.

APM System:

IATA noted that details regarding the APM connecting T1 and T3 were not included in this consultation paper and do not form part of the CAPEX to be approved in the CP4. IATA would expect greater transparency of the design and development process and similar scrutiny and validation by users i.e. capital efficiency and a business

case review particularly as the infrastructure is part of the airport master plan, impacts connectivity and MCTs. Noting that if there is a separate charge to be imposed on passengers, we would reasonably expect that the APM passenger charge would be reviewed and regulated by AERA if this is the case. We assume the OPEX and maintenance of the system will also therefore be funded by the project bidder. There may be other sensitivities for review, such as staff travel between terminals for work purposes, will this group also be charged if landside?

We also request clarity regarding any elements of scope that may not be included in the bid with the APM provider, for instance please confirm if the station boxes, platforms, and rolling stock are also provided by the bidder, or if users are expected to fund these or any related elements. Regarding the design, we need the confidence and assurance there is sufficient capacity and future proofing for growth, and we also require a detailed understanding of the concept of operations regarding the frequency of services based on peak hour passenger numbers for transfers, integration with baggage MCTs, and how different passenger types will be segregated.

CHAPTER 7: WEIGHTED AVERAGE COST OF CAPITAL (WACC) FOR THE FOURTH CONTROL PERIOD

Based on the information in the consultation paper, it is not clear if DIAL has factored in the consideration of asset beta in its calculation of the WACC, and if yes what was the asset beta estimate used? Similarly, for the WACC estimate by AERA, we were not able to identify the asset beta parameter used. IATA commissioned an independent study by Swiss Economics to estimate the asset beta of DEL which found that the appropriate asset beta to be the point estimate of 0.40. A copy of this independent study is attached for reference by AERA. We request that AERA reassess the proposed WACC to take into account the asset beta consideration presented in this independent study.

On the cost of debt, we believe that a more efficient level can be expected from DIAL. Looking at the decisions of AERA for the airports listed below, DIAL and the GMR group should have greater access to more affordable debt given its market-leading position and minimal business risk i.e. with DIAL capacity saturated and the true-up approach by AERA.

Airport	Asked by airport	Approved by AERA
BOM	10.30%	10.30%
HYD	9.24%	8.99%
GAU	12%	9%
LKO	12%	9%
AMD	12%	9%
JAI	12.1%	9%
TRV	12.1%	9%
IXE	12.1%	9%
BLR	10%	7.85%
MOPA	10.45%	9%
CJB	7.25%	7.25%
PAT	8.10%	8.10%
BBI	6.57%	6.57%
SXR	6.21%	6.21%

CHAPTER 8: INFLATION FOR THE FOURTH CONTROL PERIOD

On the 4.6% inflation for O&M expenses, IATA opines that this has no basis to start with. While we understand that eventually they will be trued up based on actuals in the following CPs, there is a potential that allowing inflationary increases will de-emphasize the airport's focus on the delivery of efficiency improvements. Towards a regulatory enhancement going forward and for this particular determination, we request AERA to set expectations/targets on lowering the unit cost per pax, per ATM, etc., which would be better measures to counter any inflationary pressure on costs. It would be useful for AERA to analyze the unit cost over CP1 to CP3, and how the proposed unit cost in the CP4 fares against these.

CHAPTER 9: AERONAUTICAL OPERATION AND MAINTENANCE (O&M) EXPENSES FOR THE FOURTH CONTROL PERIOD

On the matter of the airport operator fee, IATA would appreciate greater clarity on the demarcation of responsibilities and costs between the airport operator/Fraport vs DIAL. We need to establish that the current arrangement is the best approach and efficient for the interest of the users. Secondly, while the 3% was first set in CP2, it might be worth reassessing this percentage, given the growth in revenue over the years i.e. the airport operator being over-rewarded.

We support the valid scrutiny by AERA that the increase in terminal area is not directly proportional to the increase in manpower growth, and to only allow 2/3 of what is proposed by DIAL in terms of manpower growth.

IATA noted that DIAL has claimed staff welfare expenses of 4.7% of salaries and wages. While we agree that the welfare of DIAL's staff should be looked after, anything that is not mandatory should not be funded by users. We request AERA to assess the various components claimed by DIAL and reject the non-mandatory welfare expenses. It would also be useful to understand the local benchmark for similar expenses as at first glance, 4.7% might seem too high.

IATA has made comments in the past that legal expenses should not be included in the O&M expenses and considered as a passthrough. We strongly support AERA's decision to exclude these legal expenses from its tariff determinations. Airport operators should not be allowed to recover legal expenses from users that are by their very nature paid towards the airport operators' legal cases with other aviation stakeholders. This decision is aligned with the specific provisions in recent concession agreements awarded by the government of India. While we note that the same treatment of excluding the legal expenses has also been accorded for the Third control period, we would request AERA to review legal expenses on the same basis for all previous control periods as well; and to clawback these allowances for the previous periods as well.

On some of the expenses submitted to AERA, DIAL has submitted the aero portion of expenses e.g. table 269. It is necessary to understand the allocation methodology employed by DIAL for AERA to better assess the validity and appropriateness of these costs. We also noted that GMR's related party Raxa is providing these security services. It would be useful to understand the arrangement and selection process to ensure that it is done on "arms length" commercial basis and is the best option.

CHAPTER 10: REVENUE FROM REVENUE SHARE ASSETS FOR THE FOURTH CONTROL PERIOD

While DIAL has put forward the need to increase user charges significantly, its estimate of increases for revenue share assets is extremely moderate – typically in single digits i.e. inflation-based. We would expect a higher projection of growth in the revenue share as a result of traffic growth. However, it is important for AERA to also monitor and ensure that the revenue growth is not fuelled by higher royalties imposed by DIAL on its concessionaires.



CHAPTER 11: AERONAUTICAL TAXES FOR THE FOURTH CONTROL PERIOD

IATA supports the decision by AERA to not consider the annual fee pertaining to aeronautical revenues as an expense while computing aeronautical taxes.

CHAPTER 12: QUALITY OF SERVICE FOR THE FOURTH CONTROL PERIOD

Regarding the Authority's summary in 12.3.1 to not consider any adjustment in the Aggregate Revenue Requirement/Target Revenue on account of Quality of Service for the Fourth Control Period, we would highlight that a purely qualitative and perception-based approach, while overlooking quantitative, objective measurement of DIAL's actual performance is ineffective and not reflective of the true passenger experience or operational performance at the airport. Nor does it recognize the customer (airlines) – service provider (airport) relationship.

The purpose of any airport service quality framework or service level agreement is to provide the Airport with a clear understanding of the levels of service and outcomes required in order to meet Users (the airlines and passengers) expectations, in return for the airport charges that they pay. Despite this critical requirement there is no accountability, cost relatedness or recognition of airline customer's requirements in an ASQ based approach resulting in a major failure of the Concession Agreement and current approach.

Further, performance can only be truly measured and continuous improvement be supported with regular, structured reviews of airport performance conducted between the airline community and DIAL, which is largely lacking.

In this context, we greatly appreciate and value the Authority's efforts to develop an enhanced service quality framework with appropriate metrics and measurement, to ensure the actual performance at regulated airports is recorded and airports are held to account in the consumers and users interest. IATA would appreciate any insights the Authority may be able to share regarding the early application of its enhanced framework in the context of this review.

CHAPTER 13: TARGET REVENUE FOR THE FOURTH CONTROL PERIOD

IATA commends AERA for its detailed assessment and for making the necessary adjustments/corrections to the requests submitted by DIAL. In the context that a private airport operators' primary objective is profit maximization, the importance of the role of AERA cannot be understated and must be reinforced and supported unequivocally by all parties.

IATA looks forward to AERA's consideration of our concerns and recommendations highlighted above that will deliver better outcomes for consumers. We are available for any further clarifications that AERA may require during the review process of the stakeholder submissions to AERA.

Yours Sincerely,

A handwritten signature in blue ink, appearing to read "Amitabh Khosla".

Amitabh Khosla

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Asset Beta for BOM and DEL

Final Version

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Executive Summary

Swiss Economics was mandated by the International Air Transport Association (IATA) to conduct a study on the level of Chhatrapati Shivaji Maharaj International Airport (BOM) and Indira Gandhi International Airport's (DEL) asset beta – a proxy variable for the level of financial risk to equity holders, which feeds into tariff calculations.

For this purpose, we identified the key risk criteria that determine BOM and DEL's risk relative to other airports. We found the main drivers of beta risk to be:

- the Airport Economic Authority of India's (AERA) approach to economic regulation and especially its practice of “truing-up” building blocks at the end of regulatory periods (minimising profit fluctuations for the operators), and
- the geographic location of the airports in India, Asia's second largest emerging economy.

Based on these criteria, we aimed to identify a group of exchange-listed airports that could serve as a peer group to conduct empirical analysis of beta risk.

However, our risk analysis revealed that regulation regimes for Asian airports typically differ significantly from AERA's approach in a range of aspects. Thus, we opted to also include European airports that operate under regulatory regimes with a primacy of commercial contracts over regulation and/or price cap regulation with significant traffic risk sharing mechanisms. Yet, we found that even when substantial shares of demand risks are transferred to users, all peer candidate airports operate under regulatory regimes that leave them exposed to higher degrees of profit fluctuations than BOM and DEL.

To nevertheless capture the effects of AERA's regulatory regime, we decided to also consider Asian electricity network providers in addition to airports as potential peers. Electricity networks are often considered to be natural monopolies and operate under regulatory frameworks comparable to airports, but with lower degrees of profit risks (e.g. rate of return regulation).

Table 1 illustrates the selection criteria we used and lists the peers in each group.

Table 1: Peer group selection criteria and selected peers

Peer Group	Selection Criteria	Selected Peers
Airport operators	- Airports under regulatory regimes with (at least partially) comparable tariff flexibility - Asian Airports in emerging markets - Other risk factors related to business and demand structure are secondary in the context of BOM and DEL	Peers in economic regulation: - Aéroports de Paris - Flughafen Wien - Fraport - Zurich Airport Peers in geographic location: - Beijing Airport - Guangzhou Baiyun International - Shanghai Airport (AVINEX) - Shenzhen Bao'an International - Xiamen Gaoqi International
Electricity network operators	- Electricity network operators under rate of return regulation with limited demand and cost risks - Asian electricity network operators in emerging markets	- Powergrid Corporation of India - CLP Holdings - Chubu Electric Power

Source: Swiss Economics.

In line with AERA's previous methodology, we determined empirical asset betas for the peers using weekly stock data over a three-year-period. However, to avoid estimation bias due to Covid-19 market turmoils, we excluded all 2020 data from the analysis.

We estimate that BOM and DEL's asset beta lies within a range from 0.14 to 0.53, where the lower boundary is based on the asset beta average of the peer group of electricity network providers and the upper boundary is based on the average asset beta of the peer group of airport operators. We opine for a point estimate of 0.40, giving more weight to the airport peers than to the electricity network peers.

Table 2 summarises our findings on DEL and BOM's asset betas.

Table 2: Asset beta range for BOM and DEL

Airport	Lower boundary (based on electricity network peer group)	Upper boundary (based on airport operator peer group)	Point estimate
BOM	0.14	0.53	0.40
DEL	0.14	0.53	0.40

Source: Swiss Economics based on Datastream data.

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Abbreviations

AERA	Airport Economic Authority of India
BOM	Chhatrapati Shivaji Maharaj International Airport
CAPM	Capital Asset Pricing Model
CRE	Economic Regulation Agreement (Contrat de Régulation Économique)
DEL	Indira Gandhi International Airport
DXN	Noida International Airport
GDP	Gross Domestic Product
IATA	International Air Transport Association
IIMB	Indian Institute of Management Bangalore
RAB	Regulatory Asset Base
WACC	Weighted Average Cost of Capital

1 Introduction

1.1 Background

Airport tariffs for **Chhatrapati Shivaji Maharaj International Airport (BOM)** and **Indira Gandhi International Airport (DEL)** are administered by the Airport Economic Authority of India (AERA). AERA uses a so-called building-block approach to economic regulation based on 5-year regulatory periods (**Control periods**). Within this approach, the cost of capital building block is the element that determines the level of remuneration that investors require in return for the risks that they take. It is typically measured using a weighted average of the cost of equity and the cost of debt, namely the weighted average cost of capital (WACC). While a regulated firm's cost of debt can, in principle, be determined based on its actual debt obligations, the cost of equity cannot be inferred from accounting data and must be estimated using economic thinking and analysis.

An established measure of industry-specific risk to equity holders (and hence a key determinant of the cost of equity) is the **asset beta**. This measure captures the extent to which returns on an asset correlate with the returns of a well-diversified investment portfolio. It can be estimated using regression analysis of stock returns of exchange-listed peer companies (the peer group) with a similar risk profile. In the past, AERA has used a peer group composed of airports that it considered to be close comparators in terms of regulatory till structure, ownership structure, and traffic composition.

Ahead of the next Control Period starting in April 2024, the International Air Transport Association (IATA) has asked us to determine a range for the asset betas of BOM and DEL, taking into account the regulatory and economic particularities of the two airports, such as the "true-up" process at the end of the Control Period, wherein outturn deviations from forecast of passenger numbers and a range of cost categories are balanced with allowance for the next Control Period.

1.2 Methodology

Our methodology to determine a range for the asset betas of BOM and DEL can be summarised as follows:

- **Development of selection criteria:** We developed a peer selection scheme that broadly resembles AERA's previous approach to selecting peers but makes several amendments to reflect relevant aspects of AERA's regulatory regime and the economic conditions in emerging markets.
- **Risk analysis for BOM, DEL, and peer candidates:** Based on the previously defined selection criteria, we conducted a risk analysis for BOM, DEL, and a list of peer candidates. The peer candidates comprise of exchange-listed airport operators and electricity network operators, the latter of which often operate under regulatory schemes more comparable to AERA's approach to economic regulation than the regulatory schemes of many candidate peer airports.

- **Peer group selection:** Based on the results of the risk analysis, we derived peer groups of exchange-listed companies that reflect the risk exposure of BOM and DEL for equity investors.
- **Empirical estimation:** We determined a range for BOM and DEL's asset betas, using the defined peer groups.

1.3 Structure of this report

The remainder of this report is structured as follows:

- In **section 2**, we discuss the theory behind the asset beta. We discuss AERA's previous approach to peer group selection and give our own view on relevant selection criteria.
- In **section 3**, we present our risk analysis for BOM and DEL along the relevant selection criteria and conduct a similar analysis for candidate peer airports and electricity providers from which we derive peer groups for the asset beta calculation.
- In **section 4**, we describe our methodology for calculating the asset betas and discuss our results and recommendations for determining asset beta ranges for BOM and DEL.

2 Asset Beta Risk Drivers

2.1 CAPM and asset beta

To estimate the cost of equity, AERA has historically used the Capital Asset Pricing Model (CAPM).¹ The CAPM is defined by the following formula:

$$COE = RFR + \beta \times EMRP$$

Where:

- *COE* is the cost of equity,
- *RFR* is the risk-free rate, which AERA has estimated using government bond yields in the past,
- β is the beta, which measures BOM and DEL's risk exposure relative to a broad investment portfolio (e.g. if BOM and DEL's shareholders are exposed to half of the volatility in returns compared to the observed returns of a broad market portfolio, the beta equals 0.5), and
- *EMRP* is the equity market risk premium, which is the premium investors require for a well-diversified investment portfolio and which AERA has estimated based on studies of international valuation practitioners in the past.

The beta of an exchange-listed firm can be estimated directly using regression analysis of its stock returns. Without stock return data being available, as in the case of BOM and DEL, a group of exchange-listed peers must serve as the basis for the empirical analysis.

¹ AERA, (Terms and Conditions for Determination of Tariff for Airport Operators) Guidelines, 2011, P. 12.

The peer group should consist of companies that share the relevant risk characteristics. It is best practice to first identify the relevant drivers of risk in the industry and for the company under investigation in particular and then select a list of suitable peers based on selection criteria that reflect these.

2.2 AERA's previous approach to determining the peer group

AERA has previously used a peer group for both BOM and DEL that consists of **Sydney Airport, Gatwick Airport, Auckland Airport, Malaysia Airport Holdings, Airports of Thailand and Dublin Airport**.

AERA's approach to select the peer group (and determine BOM and DEL's cost of capital more generally) relied on two studies conducted by the Indian Institute of Management Bangalore (IIMB).²

In these studies, the IIMB used a longlist of international exchange-listed candidate peer airports with **at least 50 percent private ownership as a starting point**. US and Canadian airports were excluded from the longlist, as their administrative, operations and governance structure differ significantly from BOM and DEL. Brazilian airports were excluded due to only recently being privatised.

It then calculated **proximity scores** for each remaining airport, based on their **comparability to BOM and DEL in terms of till mechanism, ownership structure, and operations scale** (which included indicators of passenger ratios, cargo and aircraft movements). Equal weight was given to each factor. Airports without comprehensive data were dropped from the list. Finally, to **avoid geographic clusters**, if two or more airports were from the same region, only the airport with the lowest proximity score (i.e. the airports closest to BOM and DEL) were retained.

In our opinion, AERA's previous approach **overlooks some key differences in risk exposure between BOM, DEL and the peer airports**.

- Most notably, AERA's regulatory practice of **"truing-up" building blocks reduces BOM and DEL's exposure to business risk significantly** compared to a more traditional price cap regulation, as it is implemented at many of the selected peer airports (see section 3.1 for a detailed analysis).
- The considerations relating to the geographic location of peer airports **do not necessarily capture the fundamental drivers of differences in business risk across regions**.
- Given the very distinct regulatory and geographic characteristics of BOM and DEL compared to the peer airport candidates, **too much weight was given to risk factors that are**

² Indian Institute of Management Bangalore (IIMB), Study on the Determinants of Cost of Capital of Delhi International Airport Limited (DIAL), December 2019, and Study on the Determinants of Cost of Capital of Mumbai International Airport Limited (MIAL), December 2019.

of **secondary importance** in our view, such as till mechanism, ownership structure, passenger ratios, and movements.

Thus, a more meaningful risk assessment would likely result in a different peer group composition.

2.3 Our own assessment of relevant risk drivers

Based on the observations in section 2.2, we lay out below a refined assessment of relevant risk drivers, focusing on the flexibility of economic regulation and geographic location.

Flexibility of economic regulation

The design of economic regulation under which an airport is governed has a major influence on how risks are shared between the airport and its users. In the following we discuss the most important aspects of economic regulation concerning the degree of flexibility.

- **Length of regulatory period:** In general, longer regulatory periods (e.g. of 5 years) increase the risk an airport operator faces due to estimation errors of cost or passenger number forecasts. Shorter regulatory periods imply a more flexible regulation since tariffs are adjusted more often. Thus, a price cap regulation based on 1-year-periods is comparable to rate of return regulation from a risk point of view. Some airports have the leisure of selecting the length of the regulatory period (up to a maximum). We consider this akin to having shorter regulatory periods as airports can select the length based on their confidence in forecasted figures.
- **Within period adjustments:** Some regulators may adjust tariffs within a regulatory period if actual passenger numbers or costs deviate from forecasts. This may significantly reduce the risk exposure for airports and may happen on the discretion of the regulator or automatically through a risk sharing mechanism implemented in the price cap formula. Some regulatory frameworks also have clauses which can lengthen or shorten the regulatory period.
- **Role of the regulator:** For some airports, tariff regulation only applies in the case that commercial negotiations with users fail. In this case, economic regulation often serves as a threat that strengthens airlines' negotiation power rather than as a tool to implement strict and cost-based airport charges. It is likely that the primacy of commercial negotiations mitigates the profit risks to airports.

Geographic region

Geography may contribute to airports' risk exposure in the sense that overall economic activity in certain geographic areas (including air travel and airport operations) are **more volatile** than in others and in the sense that **economic business cycles and trends are regional in nature**.

More general, a country's stage of economic development may determine the risk profile of its airports to some degree. Namely, emerging markets differ from advanced economies

in a number of aspects, including more volatile GDP growth, more market frictions, or volatile fiscal policy (e.g. Marioli et al., 2023).

3 Risk Analysis and Peer Selection

3.1 Risk analysis for BOM and DEL

In the following, we assess BOM and DEL's exposure to the relevant risk drivers identified in section 2.3.

Flexibility of economic regulation

The length of the **Control Periods** for BOM and DEL is **5 years**. To determine the maximum yield per passenger, AERA sets a **target revenue** based on the weighted cost of capital, efficient operating and maintenance costs, depreciation, corporate taxes and 30 percent of the gross revenue from non-aeronautical assets.

There are several factors that make the regulation of BOM and DEL unique. First, at the end of each regulatory period, AERA **true-up most of the building blocks** that make up the tariff order. At the request of airports, the "true-up" process can even go beyond the last Control Period. The determination of the Third Control Period involved a "true-up" process for the First and Second Control Period. During the true-up process, traffic numbers are true-up based on actual numbers and the regulatory asset base (RAB), capital expenditure, operating expenditure and depreciation are "true-up" based on actual numbers, subject to efficiency analysis. The target revenue set at the beginning of the Control Period is re-calculated and compared to actual revenues. Revenues above or below the target revenues are then recovered by adjusting the tariffs of the next regulatory period. However, the airport operator is eligible to levy a minimum charge (so-called "Base Airport Charge"). In case revenues are above target and the true-up process leads to a downward-adjustment of the tariffs, the tariffs cannot be decreased to a level below the minimum charge. This may further decrease the risk for the airport operators of BOM and DEL.

Second, adjustments are made even **within a specific regulatory period**. According to the guidelines set by AERA, in years 3 to 5 of the 5-year regulatory period, any **over- or under-recovery** of yield per passenger can be compensated by adjusting the tariff of the following year.³ Under-recovery is compensated in cases of changes in operating costs, and forecast errors in the number of passengers (if traffic is higher or lower than a specified bandwidth). Additionally, the tariffs are adjusted for actual inflation. The AERA Act of 2008 further allows the Authority to amend the tariff if "*considered appropriate and in public interest*".⁴ The "true-up" of building blocks and the within period adjustments bring the scheme close to a rate of return regulation. However, the airport still faces some risks, such as failing to

³ AERA (2011), Terms and Conditions for Determination of Tariff for Airport Operators, Guidelines.

⁴ The Airports Economics Regulatory Authority of India Act, 2008, Paragraph 13 (2).

achieve efficient costs. Compared to other regulated airports, BOM and DEL operate under a very flexible regulation and the airport operator bears very little risk.

Finally, there are some additional elements in AERA's current regulatory regime that may reduce risk compared to most exchange-listed airports (e.g. the current practice of classifying cargo and ground handling as non-aeronautical activities).

Geographic region and economic development

Measured in nominal GDP, India is the fifth largest economy in the world.⁵ After China, India is the largest economy of the emerging markets and will very likely remain the fastest-growing major economy in 2024.⁶ It is therefore important to take into account peer airports from other Asian emerging market economies with similar characteristics.

Table 3 summarises our risk assessment for BOM and DEL.

Table 3: Summary of risk assessment for BOM and DEL

Airport	Regulatory flexibility	Geographical region
BOM	Very high	Emerging market, Asia
DEL	Very high	Emerging market, Asia

Source: Swiss Economics.

Other considerations

Another factor that could potentially be of relevance in this context is the completion of Noida International Airport (DXN), located 72 kilometres from DEL, in the relatively near future.

We have not conducted a proper assessment of the competitive impact of DXN on DEL (which would require detailed analysis of passenger and airline behaviour, demand levels and trends, capacity constraints, and closeness of business strategies at both airports) which exceeds the scope of this study. Yet, rapid air travel growth in the region and a strategy focus at DXN that differentiates itself from DEL indicate that the impact may be rather limited *prima vista*.⁷ As such, we have no indication that DEL's competitive situation may change in the future.

Nevertheless, even if competition were to increase, we argue that the impact of increased competition on the asset beta is negligible, despite that it may increase the volatility of DEL's profits. This is because the volatility can be mitigated through investment diversification, i.e. a hypothetical equity investor can avoid (at least partly) the risks associated with

⁵ See for example the World Bank, [Statistics on GDP](#) [last accessed 22.01.2024].

⁶ The Economic Times, "India to remain fastest-growing major economy in 2024", 31. December 2023.

⁷ Based on airport coordination data provided by IATA, DEL operates at full capacity, with demand exceeding available slots. Given rapid growth of air travel demand, it is expected that both airports will be seeing high levels of occupancy, particularly at peak times, cementing current levels of market power. Also, DXN will have a greater focus on cargo business with the largest cargo terminal in India.

competition by making complementary investments into other airports with similar competitive conditions whose returns are uncorrelated (or negatively correlated) with DEL.

A stylised example may shed light on the intuition behind this argument: If an investor held equity (a minority stake without control) in both DEL and DXN, he or she should, in principle, be indifferent to the profit fluctuations induced by the competitive dynamics between the two. If DXN managed to steal a route from DEL, the corresponding loss in cashflows for DEL should be cancelled out by the increase in cashflows for DXN, eliminating any overall effects on the investor's portfolio income and, as such, any related portfolio risks.⁸

However, portfolio diversification helps mitigating profit risks due to competition even if there is no direct business stealing between the individual holdings, simply due to the mutualization of more or less random effects.

It should be noted that also in the Mumbai area a second airport (i.e., Navi Mumbai International Airport) is currently being constructed that will serve as an alternative to BOM. In contrast to DEL and DXN however, both airports will be operated by the same airport operator, leaving the local competition landscape as is.⁹

3.2 Risk analysis of peer airports

In the following, we describe how the initial set of possible airports was chosen and how we assessed their exposure to different risk drivers, as outlined in section 2.2.

The starting point of our analysis was a longlist of peer airport candidates, including most international exchange-listed airport operators that could be used to empirically determine a comparator asset beta (see Table 9 in Appendix for the full list of stock-listed airports).¹⁰

We narrowed down the longlist of peer candidates to a peer group of airport operators, using a similar risk assessment as described in section 3.1 above for BOM and DEL. The peer group was narrowed down based on their regulatory framework and geographic region.

- The first risk factor we analysed was the **flexibility of the regulatory framework**.
 - We found that **no exchange-listed airports operate under a regulatory framework similar to BOM and DEL**, which transfers the majority of risk onto their users. We

⁸ Note that the notion of asset beta risk only refers to volatility in returns and not to their level. Investors may dislike competition because of its tendency to erode profits and reduce company value, but as long as it does not increase undiversifiable profit volatility, this is not an effect that increases the asset beta.

⁹ BOM is operated by Mumbai International Airport Limited, which is owned by Adani Enterprises (74%) and Airports Authority of India (26%). Navi Airport will be operated by Navi Mumbai International Airport Limited, which is owned by Adani Enterprises (74%) and CIDCO (26%).

¹⁰ We excluded airports for which there was insufficient stock market data or national stock market index data. This includes Malta International Airport plc, Malaysia Airports Holding Berhad, Aeroporti 'G. Marconi' di Bologna S.p.A., TAV Airports Holding, Belgrade Airport.

did not identify an airport operator that is subjected to a similar regulatory framework that includes a “true-up” process for most building blocks that make up the tariff order or the possibility for extensive within-period tariff adjustments.

- However, some European airports’ regulatory frameworks transfer a substantial share of risk to users, e.g. due to the primacy of commercial contracts over regulation, or because of the existence of traffic risk sharing mechanisms within price cap regulation.
 - When under an Economic Regulation Agreement (CRE) with the French sector regulator, Aéroports de Paris operates under a price cap regime. However, in the event of significant demand shocks, there is i) a traffic risk sharing mechanism incorporated in the price cap formula, and ii) the possibility for Aéroports de Paris to opt out of the CRE on relatively short notice to continue under a less risky rate of return regulation.
 - For Copenhagen Airport and Zurich Airport there is a primacy of commercial contracts over economic regulation in place, which is likely to offer them more flexibility to deal with risks.
 - Frankfurt Airport (Fraport) and Vienna Airport have their charges reset annually, which typically brings forecasts close to actual outturns.
- Table 9 in the appendix summarizes the analysis of each peer candidate’s regulatory framework.
- The second risk driver we analysed was the geographic region a peer airport candidate is located in and related to that the stage of economic development of the geographic region.
 - We believe China to be closest to India in terms of geographic proximity and economic development. China and India are often compared in terms of their economic development, as they are the two largest emerging economies, and are among the founding members of the BRICS organization. Both countries have seen similar levels of economic growth in the past decades.^{11 12}
 - As such, the Chinese airport operators Beijing Airport, Guangzhou Baiyun International Airport, Shanghai Airport, Shenzhen Bao’an International Airport, and Xiamen Gaoqi International Airport can be considered suitable peers for BOM and DEL.
 - However, most Asian airports (including Chinese airports) are not subject to a systematic approach for tariff calculation and are therefore not comparable in terms of regulatory framework. Nevertheless, they are included for their geographic location.

¹¹ World Bank national accounts data, [GDP growth \(annual %\)](#) – China, India

¹² This does not apply to other Asian countries, such as Thailand. While Thailand is also considered an Asian emerging market, it is much smaller than India or China and has seen a lower economic growth in the past decades.

In addition, the stocks of all peer airports were assessed for their suitability for empirical analysis in terms of their liquidity. We followed the approach adopted by the French Autorité de Régulation des Transports,¹³ which only considers stocks that meet at least two of the following four criteria:

1. a free-float rate larger than 15 percent,
2. a daily float turnover larger than 0.10 percent,
3. a number of trading days in the past year larger than 20, and
4. a relative bid-ask spread lower than 1 percent.

Based on this, Copenhagen Airport was excluded due to its very low free-float rate and failure to meet any of the four criteria. All other airports in the sample meet at least two of the criteria.

Table 4 provides an overview of all the selected peer airport operators chosen either for their regulatory comparability to BOM and DEL or geographical region.

Table 4: Overview of peer airport operators

Airport	Regulatory comparability*	Geographic region
Peers in economic regulation		
Aéroports de Paris	Medium	Advanced economy, Europe
Flughafen Wien	Medium	Advanced economy, Europe
Fraport	Medium	Advanced economy, Europe
Zurich Airport	Medium	Advanced economy, Europe
Peers in geographic location		
Beijing Airport	Low	Emerging market, Asia
Guangzhou Baiyun Intl. Airport	Low	Emerging market, Asia
Shanghai Airport (AVINEX)	Low	Emerging market, Asia
Shenzhen Bao'an Intl. Airport	Low	Emerging market, Asia
Xiamen Gaoqi Intl. Airport	Low	Emerging market, Asia

* a more detailed analysis of the regulatory framework, leading to the assessment of regulatory comparability, is presented in Table 9 in appendix

Source: Swiss Economics.

3.3 Additional peers from other sectors

As discussed, the suitability of the airports peer group suffers to some degree from the fact that BOM and DEL are operated under a very flexible regulatory regime that is distinctive among airports – even when focusing on airports with a relatively flexible regulatory regime. Thus, in the case of BOM and DEL it is appropriate to extend the risk analysis to a

¹³ Autorité de Régulation des Transports, Décision n° 2023-052 du 9 novembre 2023, paragraph 36.

peer group consisting of comparators from other industries that operate under more similar regulatory regimes.

In our view, electricity networks may be a suitable industry to look for additional peers, for the following reasons:

- Electricity networks are natural monopolies, just like a majority of airports and often operate under economic regulation frameworks that are comparable to airport regulation, except that they minimise profit fluctuations (e.g. rate of return or revenue cap regulation).
- Electricity networks may be exposed to fewer risks than airports, as it seems unlikely that demand for electricity experiences similar volatility as passenger numbers due to changes in the economy.
- However, electricity networks may have a higher operating leverage than airports, implying that they may not reduce their costs as well to demand fluctuations, which would offset the difference in demand risk, at least partially.

We focused on exchange-listed electricity companies with a significant share of network activity.

- All of the identified comparators are electricity companies with a main share of their revenues coming from network operations – either transmission or distribution of electricity – which can be considered monopolistic bottlenecks.
- All comparators operate under a rate of return regulatory regime that minimises demand risks as well as cost risks – comparable to AERA's approach to BOM and DEL regulation.
- All comparators are based in Asia, in order to capture BOM and DEL's risk exposure related to the geography.

Table 5 summarises the comparator firms in our alternative peer group.

Table 5: Overview of alternative peer group (electricity networks)

Electric utility	Country	Length of regulatory period	Main business segment	Regulatory regime
Chubu Electric Power	JPN	5 years	Transmission & Distribution	Rate of return*
CLP Holdings	HKG	15 years	Transmission & Distribution	Rate of return
Powergrid Corporation of India	IND	5 years	Transmission	Rate of return

* Revenue cap regulation as of April 2023

Source: Swiss Economics.

4 Determination of Asset Betas

4.1 AERA's previous empirical methodology

For the third control period, AERA determined asset betas of **0.57 for BOM** and **0.59 for DEL**.

This was derived from IIMB estimates of empirical peer asset betas for Sydney Airport, Malaysia Airports Holdings, and Airports of Thailand. IIMB used weekly returns from 2016 to 2018 (i.e. a 3-year-period) in their regression analysis.

The peer asset betas of Auckland, Dublin and Gatwick Airports stem from regulatory decisions.¹⁴

The final asset betas for BOM and DEL were then estimated by calculating a weighted average of the comparator asset betas, weighted by the inverse of their proximity scores. The difference between BOM's and DEL's asset betas is due to slightly different proximity scores for the two airports, reflecting differences in passenger, aircraft, and cargo movements.

4.2 Our own empirical methodology

For consistency with AERA's previous methodology (see section 4.1 above), we used a 3-year period of weekly observations of stock returns for our empirical analysis of the asset betas of the two peer groups. The sample period starts in April 2019 and ends in March 2023. We excluded all 2020 observations from the sample period, given the market turmoil observed (in particular for airport stocks) during the global outbreak of the Covid-19 pandemic.

Including 2020 data in the determination would have risked creating a significant bias in the asset beta estimates for BOM and DEL for the following reasons:

- Covid-19 was an outlier event that put the airline and airport industry worldwide under tremendous pressure and temporarily led to a massive increase in (perceived) risk.
 - Including the Covid-19 turmoil in the 3-year-sample underlying the empirical analysis would vastly overemphasise the likelihood of another pandemic happening over the next Control Period (implicitly attributing a probability of 33 percent that another pandemic breaks out every year).

¹⁴ Auckland airport is stock-listed, but preference was given to the regulatory asset beta determined by the New Zealand regulatory authority.

- The risk of overestimating the asset beta due to Covid-19 observations in the data has been acknowledged by a range of independent sector regulators, including the Civil Aviation Authority in the UK.¹⁵
- Even if it the probability of another pandemic happening was indeed high enough to justify leaving the 2020 data in the sample or even if there was a way to give 2020 data a meaningful probability weight that reflects the actual probability of another pandemic breaking out, the resulting asset betas would likely not be informative of BOM's and DEL's actual risk exposure over the next Control Period.
 - First, there exists research that indicates that stock markets had sharply overreacted to the pandemic outbreak in 2020 and airport stocks fell more than prompted in hindsight, leading to excessive empirical beta estimates.¹⁶
 - Second, given AERA's regulatory regime that incorporates ex-post "true-ups", the demand risks related to a pandemic outbreak are heavily mitigated for BOM and DEL. As such, the airport peer group becomes even less comparable.

The empirical equity betas for the peer group are converted into asset betas using the Harris-Pringle formula (assuming a debt beta of 0.1).

For both peer groups, an average asset beta is determined, giving equal weight to all comparators within the peer group.

¹⁵ See Final Decision for H7 price control of Heathrow Airport, available at <https://www.caa.co.uk/commercial-industry/airports/economic-regulation/h7/consultations/final-and-initial-proposals-for-h7-price-control/> [21 December 2023].

¹⁶ See e.g. Maneenop & Kotcharin (2020), The impacts of COVID-19 on the global airline industry: An event study approach, Journal of Air Transport Management, Volume 89, October 2020.

4.3 Asset Beta Results and Discussion

The resulting asset betas for the airport peers are reported in Table 6 below.

Table 6: Asset betas comparator airports operators

Peer	Asset beta
Peers in economic regulation	
Aéroports de Paris	0.64
Flughafen Wien	0.10
Fraport	0.54
Zurich Airport	0.63
Peers in geographic location	
Beijing Airport	0.31
Guangzhou Baiyun International Airport	0.66
Shanghai Airport (AVINEX)	0.77
Shenzhen Bao'an International Airport	0.43
Xiamen Gaoqi International Airport	0.68
Average	0.53

Source: Swiss Economics based on Datastream data.

The asset betas from comparator airports provide an upper boundary of the asset beta estimate for BOM and DEL. As discussed in section 3.2, none of the comparator airports are regulated under frameworks that transfer as much risk to users as is the case for BOM and DEL.

The asset betas for the peer group consisting of electricity network operators are reported below in Table 7.

Table 7: Asset betas comparator electricity network operators

Peer	Asset beta
Powergrid Corporation of India	0.22
CLP Holdings	0.10
Chubu Electric Power	0.11
Average	0.14

Source: Swiss Economics based on Datastream data.

The asset betas from electricity networks provide the lower boundary of the asset beta estimate for BOM and DEL. Given limited demand volatility, it seems plausible that electricity networks tend to be exposed to less risk than airports in general.

The resulting asset beta range for BOM and DEL is reported in Table 8.

Table 8: Resulting asset beta range and point estimate

Airport	Lower boundary	Upper boundary	Point estimate
BOM	0.14	0.53	0.40
DEL	0.14	0.53	0.40

Source: Swiss Economics based on Datastream data.

We use the same range for BOM and DEL, as there is no apparent reason for why the risk profiles of the two airports should diverge.

To derive a point estimate, we recommend weighting the airport beta (the upper boundary) by two thirds and the electricity network beta (the lower boundary) by one third. This results in a point estimate for BOM and DEL of 0.4.

5 References

Marioli, F. A., Fatás, A., & Vasishtha, G. (2023). Fiscal Policy Volatility and Growth in Emerging Markets and Developing Economies. Policy Research Working Papers; 10409. World Bank, Washington, DC.

A Appendix

Table 9: Analysis of regulatory framework of different airports

Airport	Length of regulatory period	Role of the regulator	Risk allocation	Comparability
AENA	5 years	Price setting	Traffic and cost risk borne by AENA. The decision can be re-opened only if there is a large deviation in traffic which affects the financial sustainability of the company.	Low
Aéroports de Paris	1-5 years	Price setting	No risk adjustment if charges set outside of a regulatory contract. Airport has right to extend the charges for an additional year without justification. Charges are “rate of return” but any increase must be moderate. Optional 2-5 year regulatory contracts must contain adjustments for traffic, investment, operating expenses and new charges, but magnitude of the adjustment is not specified.	Medium
Airports of Thailand	Variable	Price setting	Not explicitly foreseen.	Low
Auckland Airport	5 years	Price setting	Within-period adjustments if unforecast operating expenditures or capital expenditures resulting from airline-requests, or unforeseen regulatory requirements.	Low
Beijing Airport	Unclear	Price setting	Unclear but price adjustments unlikely, as charges are set to the same level for all Chinese airports.	Low
Copenhagen Airport	Negotiated, max. 6 years, otherwise 2-year regulatory decision	Primacy of commercial negotiations over price cap regulation	Traffic and capex risk sharing agreements.	Medium
Guangzhou Baiyun International Airport	Unclear	Price setting	Unclear but within-period adjustments unlikely, as charges are set to the same level for all Chinese airports.	Low

Mexico (Grupo Aeroportuario del Pacífico, Grupo Aeroportuario del Sureste, Grupo Aeroportuario Centro Norte)	5 years	Price setting	Airport bears traffic and cost risk. Exceptions for changes in legislation regarding quality or security, unexpected capex changes from natural disasters. Regulator can allow a lower capex spend if traffic was substantially lower than expected	Low
Flughafen Wien	Annual	Price setting using formula	Within-period adjustments generally not possible, exceptionally (regulatory like EES), following cost-based model and then formula.	Medium
Fraport	Generally annual, at the discretion of the airport	Price setting	Operator can initiate consultation on new charges at own discretion (with at least 6 months in advance before implementing the new charges).	Medium
Haneda (Japan Airport Terminal)	Not set	Not set, pricing negotiation with airlines before approving tariffs	Ad-hoc basis for specific charges	Low
Shanghai Airport	Unclear	Price setting	Unclear but within-period adjustments unlikely, as charges are set to the same level for all Chinese airports.	Low
Shenzhen Airport	Unclear	Price setting	Unclear but within-period adjustments unlikely, as charges are set to the same level for all Chinese airports.	Low
Sydney Airport*	Annual	Price setting	n/a	Medium
Toscana	10 years, split into two 5 years sub-periods	Price setting	Annual reviews resulting from verified progress on capex plans, service quality, environmental protection and traffic risk.	Low
Xiamen Gaoqi International Airport	Unclear	Price setting	Unclear but within-period adjustments unlikely, as charges are set to the same level for all Chinese airports.	Low
Zurich Airport	Negotiated, max. 4 years	Primacy of commercial negotiations over price setting	Within-period adjustments under exceptional circumstances affecting costs	Medium

* Sydney Airport was delisted in 2022.

Source: Swiss Economics based on information provided by IATA.