

## Annex VI - Case Study - Mexico

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### VI.1. General Description and Basic Economy

Mexico is a federal constitutional republic that is comprised of 31 states. It borders The United States to the north and Guatemala and Belize to the south, and is flanked by the Gulf of Mexico to the east, and the Pacific Ocean to the west. Mexico is the fourteenth largest nation in the world by area, covering 761,606 square miles, and the most populous Spanish speaking country in the world with a population of just under 115 million.<sup>1, 2</sup>

The World Bank considers Mexico an upper-middle income country, and it was the first Latin American country to join the OECD. Per-capita income remains approximately one third that of the US and its economy is closely tied to its NAFTA free trade partners, particularly the US, which is the destination for 71% of its exports.

By purchasing power parity, Mexico's GDP is the eleventh largest in the world and grew at 2.2% in real terms between 2001 and 2010. This growth has been relatively consistently since 1995 other than in 2009, when the economy shrank by more than 6.5%. Wages remain low for many sections of the population, and the economy is one in which the private sector increasingly dominates. The size of the Mexican economy is projected to triple by 2020.<sup>2</sup>

The country's geography and proximity to the US has also driven an ongoing drug war, which has claimed 60,000 lives since 2006. **Error! Bookmark not defined.** Tourism is a modest element of the national economy: the country has consistently hosted about 20 million visitors a year since 1995 and the sector contributes approximately 3% to GDP.<sup>3</sup>

<sup>1</sup> Population Indicators 2012, The World Bank. <http://databank.worldbank.org/> Data for 2011; accessed 19 October 2012

<sup>2</sup> CIA World Fact Book. Available at <https://www.cia.gov/library/publications/the-world-factbook/geos/mx.html>. Accessed October 22nd, 2012

<sup>3</sup> World Development Indicators 2012, The World Bank. <http://databank.worldbank.org/> Data for 2011; accessed 19 October 2012

## VI.2. Nature of Aviation and shipping Industries

### VI.2 1 Aviation

There are 249 airports in Mexico, and a further 1,425 airports without paved runways<sup>2</sup>. The following is a list of all passenger and cargo airlines registered in Mexico along with a description of their fleet. Age of planes is included where data is available.<sup>4</sup>

| <b>Aeromar</b>            |              |                       |                |                               |
|---------------------------|--------------|-----------------------|----------------|-------------------------------|
| <b>Manufacturer</b>       | <b>Type</b>  | <b>Current Active</b> | <b>Planned</b> | <b>Av. Age Active (years)</b> |
| Bombardier                | CRJ 200      | 2                     |                | 10.8                          |
| ATR                       | 72-600       | -                     | 2              | -                             |
| ATR                       | 42-300       | 4                     | -              | 22.7                          |
| ATR                       | 42-500       | 10                    | -              | 14.4                          |
| <b>Aeromexico</b>         |              |                       |                |                               |
| <b>Manufacturer</b>       | <b>Type</b>  | <b>Current Active</b> | <b>Planned</b> | <b>Av. Age Active (years)</b> |
| Boeing                    | 767-300(ER)  | 2                     | -              | 17.5                          |
| Boeing                    | 777-200 (ER) | 4                     | -              | 8.5                           |
| Boeing                    | 767-200 (ER) | 5                     |                | 22                            |
| Boeing                    | 737-800      | 12                    | 6              | 7.9                           |
| Boeing                    | 737-700      | 30                    | 4              | 7.5                           |
| <b>Aeromexico Connect</b> |              |                       |                |                               |
| <b>Manufacturer</b>       | <b>Type</b>  | <b>Current Active</b> | <b>Planned</b> | <b>Av. Age Active (years)</b> |
| Embraer                   | ERJ-190      | 19                    | -              | 1.9                           |
| Embraer                   | ERJ-170      | 2                     | 1              | 8.1                           |
| Embraer                   | ERJ-145      | 10                    | -              | 12.8                          |
| Embraer                   | ERJ-145LR    | 28                    | -              | 10.9                          |
| <b>Aeronaves TSM</b>      |              |                       |                |                               |

<sup>4</sup> Airline Update, Mexico Country Profile. Available at [http://www.airlineupdate.com/content\\_public/airlines/northamerica/mexico.htm](http://www.airlineupdate.com/content_public/airlines/northamerica/mexico.htm). Accessed October 22nd, 2012.

| Manufacturer                | Type          | Current Active | Planned  | Av. Age Active (years) |
|-----------------------------|---------------|----------------|----------|------------------------|
| McDonnell Douglas           | DC9-30        | 5              | -        | 44                     |
| Convair                     | CV-640 Series | 3              | -        | 58.2                   |
| <b>Aeropacifico</b>         |               |                |          |                        |
| Manufacturer                | Type          | Current Active |          |                        |
| B Ae                        | Jetstream 31  | 1              |          |                        |
| Let                         | L-410 UVP-E   | 1              |          |                        |
| <b>AeroUnion</b>            |               |                |          |                        |
| Manufacturer                | Type          | Current Active | Planned  | Av. Age Active (years) |
| Airbus                      | A300B4 (F)    | 4              | -        | 29.5                   |
| <b>Estafeta Carga Aerea</b> |               |                |          |                        |
| Manufacturer                | Type          | Current Active |          |                        |
| Boeing                      | 737-200C      | 1              |          |                        |
| Boeing                      | 737-300C      | 4              |          |                        |
| Bombardier                  | CRJ100        | 2              |          |                        |
| <b>Global Air</b>           |               |                |          |                        |
| Manufacturer                | Type          | Current Active | Planned  | Av. Age Active (years) |
| Boeing                      | B737-200      | 3              | -        | 30.1                   |
| <b>Interjet</b>             |               |                |          |                        |
| Data not available.         |               |                |          |                        |
| <b>Magnicharters</b>        |               |                |          |                        |
| Manufacturer                | Type          | Current Active | Inactive | Av. Age Active (years) |
| Boeing                      | 737-200       | 2              | -        | 30.9                   |
| Boeing                      | 737-300       | 7              | 2        | 24.3                   |

| <b>Mas Air Cargo</b>  |             |                       |                |                               |
|-----------------------|-------------|-----------------------|----------------|-------------------------------|
| <b>Manufacturer</b>   | <b>Type</b> | <b>Current Active</b> | <b>Planned</b> | <b>Av. Age Active (years)</b> |
| Boeing                | 767-300F    | 2                     | -              | 5.4                           |
| <b>Mayair</b>         |             |                       |                |                               |
| <b>Manufacturer</b>   | <b>Type</b> | <b>Current Active</b> |                |                               |
| Shorts                | 360         | 1                     |                |                               |
| <b>Mexicana</b>       |             |                       |                |                               |
| Data not available    |             |                       |                |                               |
| <b>Mexicana Click</b> |             |                       |                |                               |
| <b>Manufacturer</b>   | <b>Type</b> | <b>Current Active</b> |                |                               |
| Fokket                | 100         | 25                    |                |                               |
| <b>Mexicana Link</b>  |             |                       |                |                               |
| <b>Manufacturer</b>   | <b>Type</b> | <b>Current Active</b> |                |                               |
| Bombardier            | CRJ-200ER   | 12                    |                |                               |
| <b>Regional Cargo</b> |             |                       |                |                               |
| <b>Manufacturer</b>   | <b>Type</b> | <b>Current Active</b> |                |                               |
| Boeing                | 737-200F    | 1                     |                |                               |
| ATR                   | 42-300F     | 1                     |                |                               |
| <b>VivaAeroBus</b>    |             |                       |                |                               |
| Data not available.   |             |                       |                |                               |
| <b>Volaris</b>        |             |                       |                |                               |
| Data not available.   |             |                       |                |                               |

Because of its geographic proximity to its key North American trading partners, the majority of freight destined for The United States and Canada from Mexico travels

by truck (88% in 2005).<sup>5</sup> As The United States is the destination for 71.7% of exported goods from Mexico, and a further 7.4% go to Canada (2009 estimate),<sup>2</sup> terrestrial modes, rather than shipping or aviation, have been central to the Mexican export economy although both shipping and aviation are growing. The growth in air-freight transport has been pronounced over recent years, as shown in Figure 1 below.

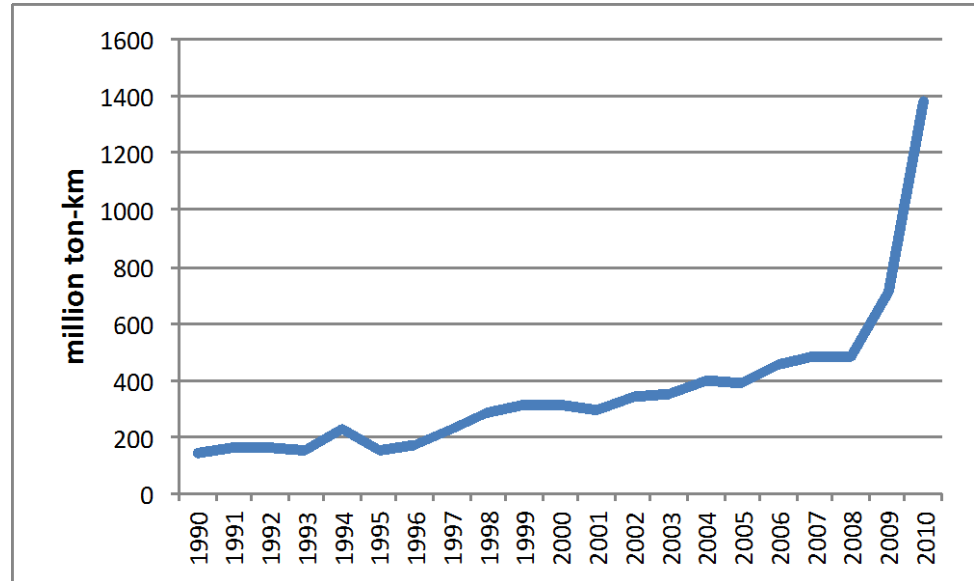


Figure 1 Mexico air transport, freight

Source: World Development Indicators 2012, The World Bank

Having grown through the late 1990's and early 2000's, passenger aviation is, by contrast, contracting, as Figure 2 shows.

<sup>5</sup> Research and Innovative Technology Administration, Bureau of Transportation statistics. Available at [http://www.bts.gov/publications/north\\_american\\_freight\\_transportation/html/us\\_trade\\_with\\_canada\\_and\\_mexico.html](http://www.bts.gov/publications/north_american_freight_transportation/html/us_trade_with_canada_and_mexico.html). Accessed October 24th, 2012.

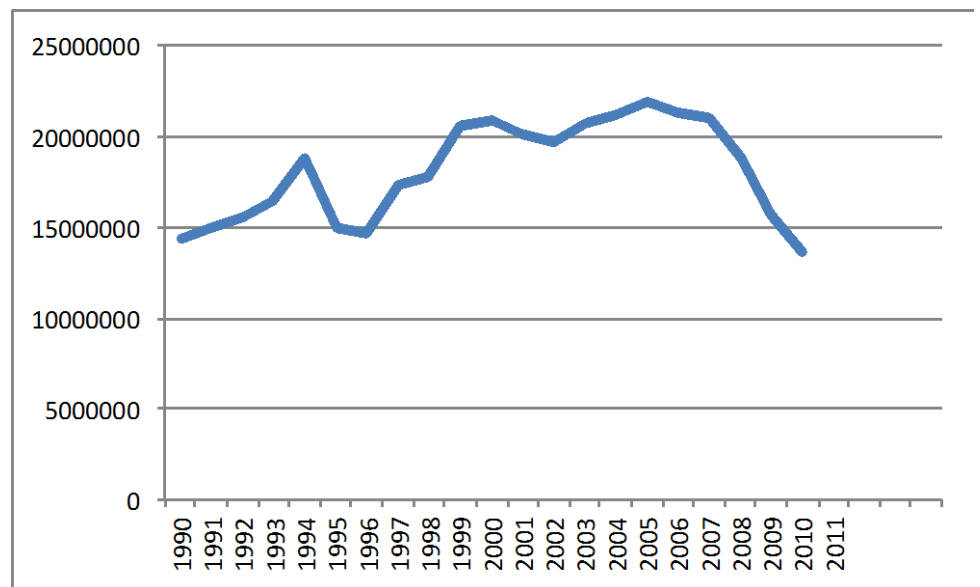


Figure 2 Air transport, passengers carried

Source: World Development Indicators 2012, The World Bank

### VI.2.2 Shipping

There are 8 major ports in Mexico and 34 additional minor ones. Key data is summarized Table 1.<sup>6</sup>

Table 1: Major Mexican Ports

| Port Name  | Port Type | Size   |
|--|-----------|--------|
| Altamira   | Seaport   | Medium |
| Altamira is the deep water port closest to the US that supported 1363 vessels in 2009 carrying 13.3 million tons of cargo, including oil products, mineral bulk cargo, containerized cargo and vehicles. It handled 431,000 TEU's in 2009 and is the country's gateway for chemical products and petrochemicals. |           |        |
| Coatzacoalcos  | Seaport   | Medium |
| Coatzacoalcos is connected to Mexico City by rail and exports petroleum products and other exports. The port can accommodate vessels up to 250m long and has depths of at least 11m. 90 vessels visited in 2008 with 411,000 tons of cargo.  |           |        |
| Lazaro Cardenas  | Seaport   | Medium |
| 1158 vessels visited in 2008, carrying 20.9 million tons of cargo and more than 524,000 TEU's. It is the only port in Mexico with an 18m deep access channel, and can receive the largest vessels and all types of cargo.  |           |        |
| Manzanillo   | Seaport   | Medium |
| By volume of cargo the busiest port in Mexico. This port is connected by 26 shipping lines to 74 global ports, and has dredged channels 16m deep. In 2008, 1871 commercial vessels visited, as well as 30 cruise ships. 22.3 million tons of cargo was handled, including 1.4m TEU's.                            |           |        |
| Salina Cruz  | Seaport   | Small  |
| Further data unavailable   |           |        |
| Veracruz   | Seaport   | Large  |
| Veracruz served 1671 vessels in 2008, carrying 18.4 million tons of cargo, including 716,000 TEU's. Berths are up to   |           |        |

<sup>6</sup> All data in this table is drawn from World Port Source. Available at <http://www.worldportsource.com/ports/index/MEX.php#M>. Accessed October 22<sup>nd</sup>, 2012.

|   |                    |            |
|---|--------------------|------------|
| 507m long, and 12.8m deep.  |                    |            |
| Cayo Arcas terminal   | Off-shore Terminal | Very Small |
| Further data unavailable  |                    |            |
| Dos Bocas terminal  | Seaport            | Medium     |
| The arrival channel is 10m deep, and in 2008 the port exported 8 million tons of cargo, down from its 2003 peak of 30 million tons. The port can accommodate container ships up to 1000 TEU's, roll-on/off vessels to 27.5 thousand tons, and tankers to 13,000 tons. |                    |            |

At present, the national fleet of merchant marine vessels includes the following ship types:

- 5 bulk carriers
- cargo ships
- 11 chemical tankers
- liquefied gas ships
- 10 passenger/cargo ships
- 17 petroleum tankers
- roll on/roll off vessels<sup>2</sup>

The composition of the fleet emphasises the importance of shipping for the export of fossil fuel, which in 2011 accounted for 14% of merchandise exports.<sup>7</sup> Mexican ports are important trade nodes, particularly for petro-chemical exports. In addition Mexican ports are increasingly in use for imports into the US, whose South Western ports lack adequate capacity for US imports and further expansion. (See below.)

### VI.3. Import and Export Summary

#### Imports

Mexico's most important imports are machinery and parts for manufacturing, including metalworking machines, steel mill products, agricultural machinery, electrical equipment, car parts for assembly, repair parts for motor vehicles, aircraft, and aircraft parts.<sup>2</sup> The significance of imports as a fraction of GDP has remained steady at around 30% since 1995. Within this import stream, the importance of refined fuel imports has increased.

<sup>7</sup> World Development Indicators 2012, The World Bank.  
<http://databank.worldbank.org/> Data for 2011; accessed 19 October 2012

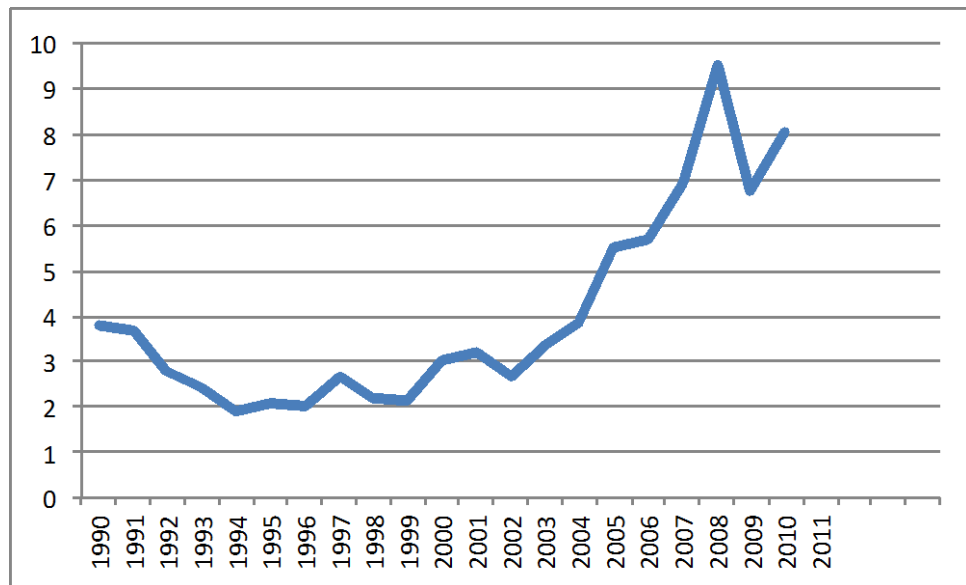


Figure 3 Fuel imports (% of merchandise imports)

Source: World Development Indicators 2012, The World Bank

Exports

Mexico is the world's eighth largest producer of oil, and exports 3 million barrels per day. Fuel exports have broadly grown since 1998 with some years of contraction and now constitute approximately 14% of merchandise exports.<sup>7</sup> Shipping is the primary mode of oil transportation.

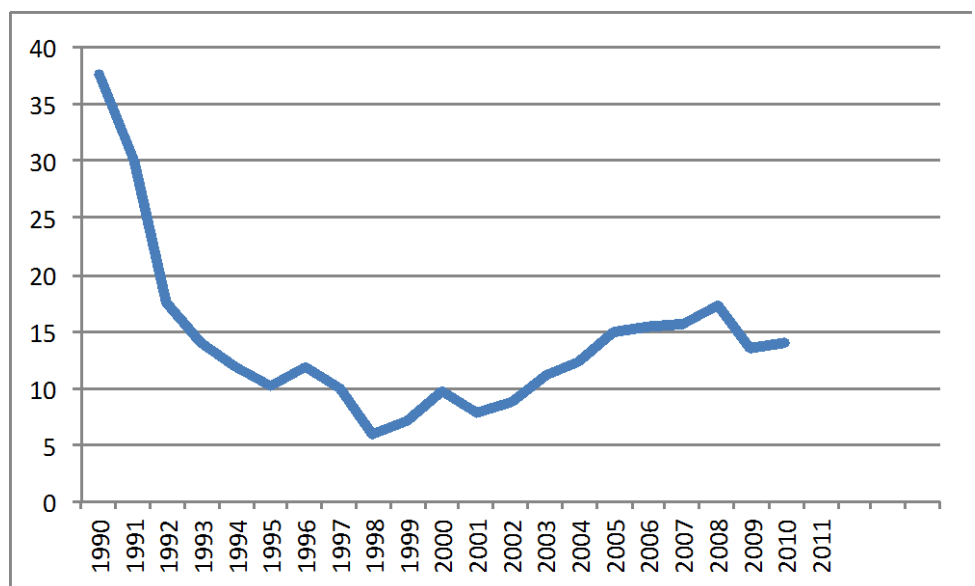


Figure 4 Mexico Fuel exports (% of merchandise exports)

Source: World Development Indicators 2012, The World Bank



Mexico's other main exports are manufactured goods, silver, fruits, vegetables, coffee, and cotton, of which 79% goes to the US and Canada. As mentioned above, Mexico's NAFTA arrangements are central to their economy, and ground based transportation has been important for trade in non-oil products.<sup>5</sup>

### Tourism

Tourism's contributions to the national economy are important but modest. Since 1995, tourism has constituted a shrinking portion of GDP, and receipts from tourism represented 4% of total exports in 2010, down from 7.7% in 1995. Visitor numbers have hovered between 20 and 22 million per year and while Mexico's tourist economy is the largest in Latin America, its relative economic importance has mostly fallen since 1995.<sup>3</sup>

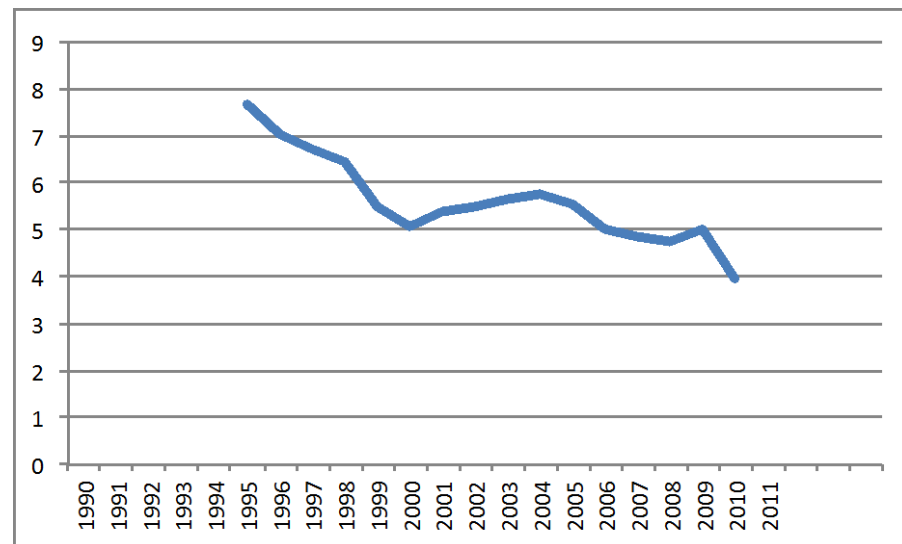


Figure 5 Mexico International tourism, receipts (% of total exports)  
Source: World Development Indicators 2012, The World Bank

## VI.4. Key Demographics

Mexico's Human Development Index is 0.77, which is considered high. Nevertheless, significant inequity exists and Mexico is considered by the OECD to be the country with the second highest degree of disparity between the extreme rich and the extreme poor in the world after Chile. 5.2% of the population live on less than \$2 per day, 17% of the population live below Mexico's poverty line, and the overall poverty rate stands at 44%. From 2004 to 2008 the portion of the population who received less than half of the median income has risen from 17% to 21% and the absolute levels of poverty have risen considerably from 2006 to 2010, with a rise in persons living in extreme or moderate poverty rising from 35 to 46%.**Error! Bookmark not defined.**

There is a significant indigenous population in Mexico, representing 62 indigenous languages and 10.1 million people in 2005, or 9.8% of the population (2005 estimate). All of the indices of social development for the indigenous population are considerably lower than the national average. 55% of the indigenous population receive less than a minimum salary and many practice subsistence agriculture and receive no salaries. There is little connection with tourism here, or a particular dependence on key imports or exports from indigenous peoples.**Error! Bookmark not defined.**

## VI.5. Potential Tourism impacts

As tourism's role in the Mexican economy is modest compared with other emerging economies considered in this study, the impact of an enfeebled tourism industry is likely to be relatively limited. As a large country with significant fossil fuel exports, a diverse economy, and strong and accessible regional trading partners, other factors will more decisively affect its future.

Increased shipping prices would certainly affect Mexico's oil export industry. The impact on planned port expansion and Mexico's maritime imports would also be pronounced (see below). The growing air-freight industry would also be impacted by higher air costs.

It is difficult to speculate on the impact of such changes on Mexico's poorest, although the impact is likely to be limited, as these groups have an extremely limited role in the petro-chemical, shipping, or tourism industries.

## VI.6. Planned Port Expansions

Significant port developments are taking place in Mexico with the aim of relieving the congestion at ports at Los Angeles, Long Beach and Oakland in the US, and expanding Mexico's role as a logistics centre for global trade. Current US congestion is such that ships must wait a week to unload in some places.<sup>8</sup>

At Lazaro Cardenas Mexico, three-phases of port development are planned that will increase annual capacity to 2 million TEU's per year by 2026. Expansion is underway at Manzanillo to double TEU capacity to 2 million per year, and at Veracruz, new transport links have improved ground transportation for cargo travelling to and from the port by both road and rail.<sup>8</sup> Further development for 32 new docks is proposed. Significant expansion is also planned at Guayamas, although specifics are unclear.<sup>9</sup>

A large port is proposed for Punta Colonet, in the north of Baja, just south of San Diego. A sparsely populated inlet is proposed as the location for what would become the largest Mexican port, and the third largest global port. The multi-model maritime centre would be a mega-container port capable of handling next-generation vessels, and would handle 1 million TEU's per year.<sup>10</sup>

Airport expansion is also planned and taking place. Mexico's second busiest airport, Cancun, is constructing a fourth terminal to handle 800,000 additional passengers by 2015.<sup>11</sup> Guadalajara airport is also planning to upgrade and expand its passenger

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<sup>8</sup> Financial Times://www.ft.com/cms/s/517fa2d0-3b8b-11df-a4c0-00144feabdc0  
Accessed on October 24<sup>th</sup>, 2012.

<sup>9</sup> Arizona Daily Star: [http://azstarnet.com/business/local/port-of-quaymas-set-to-expand/article\\_1faea8eb-20bf-5fa3-b22c-95d98727a374.html](http://azstarnet.com/business/local/port-of-quaymas-set-to-expand/article_1faea8eb-20bf-5fa3-b22c-95d98727a374.html). Accessed on October 24<sup>th</sup>, 2012.

<sup>10</sup> Punta Colonet, Wikipedia. Available at [http://en.wikipedia.org/wiki/Punta\\_Colonet#Proposed\\_Port](http://en.wikipedia.org/wiki/Punta_Colonet#Proposed_Port) Accessed on October 25<sup>th</sup>, 2012.

<sup>11</sup> Cancun Airport, Wikipedia. Available at: [http://en.wikipedia.org/wiki/Canc%C3%BAn\\_International\\_Airport#Expansion](http://en.wikipedia.org/wiki/Canc%C3%BAn_International_Airport#Expansion) Accessed October 25<sup>th</sup>, 2012.

facilities and double its passenger capacity to 12 million per year although dates of completion are not available.<sup>12</sup>

## VI.7. Modelling results

The modelling results of the Global Emissions Trading for international aviation and shipping (MBM1a) scenario foresee a relatively small impact on the national GDP of Mexico, totalling a 0.042% contraction of GDP in 2025. The majority of this contraction (-0.035%) is through impacts on the aviation sector, with the remainder (-0.008%) from shipping.

The impact on Mexico's GDP could relate to the country's proportionately high dependence upon overland trade and shipping, with aviation-based trade accounting for a smaller fraction of imports and exports than in many of the other case study economies considered. In addition to this, a declining contribution of tourism to national GDP may be a factor in buffering the impact of MBMs.

If MBMs auctioning revenues are used for reducing employers' social security contributions, then this is anticipated to further reduce the negative impacts of Global Emissions Trading for international aviation and shipping on Mexico's GDP, to -0.017% for aviation and -0.001% for shipping, totalling -0.018%. The negative impacts can be reduced even further if Mexico provides 2% of CDM credits demanded under MBMs for international Shipping and aviation. In this case the modelling estimates a slight decrease of 0.010%.

## VI.8. Similar Countries

Mexico's economy is largely defined by its proximity to and physical connection with The United States, the NAFTA trade agreement that accompanies this connection, and its oil reserves. These characteristics are not wholly replicated in other emerging economies although some partial parallels exist.

Countries with similar HDI indexes include Chile, Trinidad and Tobago, and Samoa. In terms of income, the other countries in this study have higher poverty levels, but Mexico's income discrepancy is comparable to Chile's.<sup>13</sup>

From the perspective of key domestic industries, other economies that produce more than 1.5 million barrels of oil a day include Iran, China, Venezuela, Nigeria, Libya, Angola, and Kazakstan.<sup>14</sup> For Mexico, oil is central to the export economy, and this would apply in the other cases listed here. Constraints on shipping would affect their maritime oil exports in a similar way to Mexico's.

Physically, there are no other emerging economies that are as geographically close to the US, but other countries with close geographic and economic ties and include The Bahamas and other Caribbean nations. Mexico's extensive coastline is similar to Chile's and other coastal South American countries, although Mexico's bi-coastal geography is only replicated by Guatemala, Honduras, Nicaragua, Panama, and

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<sup>12</sup>Guadalajara Airport. Available at: <http://www.pgal.com/portfolio/guadalajara-international-airport-t-1-improvements/> Accessed on October 24<sup>th</sup>, 2012.

<sup>13</sup> Climate Strategies, Phase3Report, August 14<sup>th</sup>.

<sup>14</sup> Oil Producing Countries, Wikipedia. Available at [http://en.wikipedia.org/wiki/Oil\\_producing\\_nations](http://en.wikipedia.org/wiki/Oil_producing_nations) Accessed October 26th 2012.

Colombia. Other than Colombia, these other nations coastlines are much less extensive than Mexico's.