

# GLOBAL MACROECONOMIC SCENARIOS AND WORLD TRADE STATISTICS AND FORECAST

FOR THE

**PANAMA CANAL AUTHORITY**

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## **World Trade Outlook - Overview**

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# **1. OVERVIEW OF THE GLOBAL ECONOMY**

The global economy is already well past its peak growth on a quarter-on-quarter basis, and is headed for a substantial deceleration over the next few quarters. Our latest detailed forecast of the global economy projects world GDP growth of 3.4% in 2005, compared with 4.2% in 2004. In recent months, doubts about the current strength of global economic growth have taken center stage, and uncertainties about sustaining above-trend growth rates through next year have increased as a result of high oil prices and weak labor markets. While global growth will likely decelerate further in the coming quarters, Global Insight believes the world economy's recent setbacks are temporary, and expect its pace to remain strong enough to maintain an above-trend pace through at least next year.

There can be no denying that the industrialized economies' weak labor markets have undermined world growth this year. The lack of robust job growth during the recovery phase of the current business cycle has prevented the type of strong rebound in consumer confidence that normally triggers a dynamic business expansion surge after a recession. Periodic spikes in global oil prices have also sapped the recovery by dampening consumer spending, as well as discouraging businesses from adopting aggressive expansion plans. Another contributing factor to the global slowdown during the current business cycle has been the lack of independent growth outside of the United States and China. Almost all of the second-quarter growth in the Eurozone was export led.

Furthermore, some deceleration in the global economy's pace should have taken place even in the absence of weak labor markets and high oil prices. Some softness should have been anticipated since monetary easing by most major central banks ended last year and most of the fiscal policy stimuli that had been in the pipeline during the past few years have already faded or will lose most of their punch by the end of this year, and not much more policy action can be expected from the financially overstretched governments of OECD or Asia. The extent of the slowdown has re-ignited lingering doubts about the strength and sustainability of the world economy's growth over the medium term.

Nevertheless, the global outlook is generally positive, since inflationary pressures are subsiding and most central banks appear to be easing back the pace of their monetary tightening. The pace of tightening appears to be rather slow when one considers the fast pace of nominal GDP growth and the surge in primary commodity prices over the past several quarters. In fact, real interest rates remain unusually low for the current phase of the recovery. Even when central banks start to hike their policy rates more aggressively, the recovery should remain intact, since labor markets are no longer a major drag on the global economy. Indeed, more rapid hikes in interest rates could be viewed as a welcome indication that the global recovery has become sustainable and that central banks can "normalize" their policy rates after a prolonged period of excessively low rates.

Despite the global economy's deceleration during the past several quarters, 2004 is still destined to be a banner year in terms of aggregate world economic growth, with an average annual real GDP expansion that is projected to be the strongest since 1988. The global economy continues to benefit from low real interest rates, which have been

sustained by remarkably low inflationary pressures (despite high energy prices). Improved investor confidence is reflected in a 60% rebound in most major equity markets since share prices hit their cyclical lows during the height of the Iraq crisis in March 2003. In addition, the world economy has been boosted by improved consumer and business confidence, thanks to the dissipation of geopolitical concerns since the end of the Iraq war and a steady decline in post-September 11 terrorism fears. Similarly, primary commodity prices have seen the type of phenomenal surge that normally suggests the consolidation of a sustainable recovery.

North America and Asia-Pacific, which have led the way with strong rebounds since the end of the Iraq crisis, will likely maintain their lead at least for another nine months, and the economies of other regions should continue to benefit from higher global trade volumes and improving terms of trade. In some regions, though, the recovery remains either anemic or far less robust due to structural economic problems. Nevertheless, for the global economy as a whole, real aggregate growth should remain above the trend for at least another year.

The United States and non-Japan Asia should continue to enjoy the fastest growth, followed by other Anglo-Saxon countries—Australia, New Zealand, Canada, and the United Kingdom. For the United States and those countries whose exchange rates are more or less tied to the U.S. dollar, depreciating currencies will be an additional source of stimulus. As a result, the global manufacturing sector, which has finally emerged from its deep, post-high-tech bubble recession, is now enjoying strong, uninterrupted expansion. Global Insight's latest forecast projects growth in global industrial output to average 5.2% this year—the highest annual rate since 2000, which was the height of the last global business cycle's investment boom and shortly before the high-tech bubble's collapse.

Since non-Japan Asia's growth is also tied to exporting to the United States, the fate of the global economy will continue to depend on the sustainability and the strength of U.S. economic growth. Given the current low inflation environment, this represents a very risky scenario in which policy errors could push the entire global economy toward a deflationary abyss. Global Insight gauges the likelihood of a global deflationary scenario to be less than 5% over the next 12 months, given the amount of liquidity still being pumped into the global economy and the low likelihood of any severe monetary tightening anytime soon.

Unfortunately, the Eurozone and Japan will not be major contributors to world growth because of their weak household sectors. While both economies are experiencing cyclical recoveries, the key driving force for their growth during the current cycle has been external demand from the rest of the world, particularly the United States and non-Japan Asia. Indeed, given the huge combined size of these two economies (which together account for more than 34% of global GDP), the lagging performance of their domestic demand represents a major drag for the global economy.

Global Insight believes the recovery still has considerable staying power and should further consolidate as output gaps close during the next several quarters, thanks to a still relatively accommodative policy environment (as evidenced by buoyant housing markets and car sales in many major economies) and the increasing willingness of investors to take risk (reflected in high-yield bonds' relatively low spread). Furthermore, if global growth falters, the central banks have some room for easing their monetary policies since there are no signs of any overheating in the major industrialized economies and core inflation rates are rather subdued despite high energy price increases. The impact of rising oil prices on overall inflation is limited by the global economy's reduced oil intensity and output gaps in many sectors, which greatly diminish the inflationary impact of high oil prices. The reduced inflationary impact of oil prices provides central banks with considerably more maneuvering room than in previous oil crises, and since the global economy has already adjusted to relatively high energy prices, oil prices can unhinge the global recovery only if they rise by another 40% or more, which is highly unlikely.

Global Insight's latest forecast projects the world average growth rate to decelerate from 4.2% in 2004 to 3.4% in 2005 and 3.2% in 2006. On a year-on-year basis, we estimate that the world economy's quarterly growth decelerated to 4.1% in the third quarter of this year, after having peaked at 4.6% in the second quarter. (On a quarter-on-quarter basis, however, the world economy peaked earlier—in the fourth quarter of last year.) We project the deceleration to continue in the coming quarters, to 3.7% year on year in the fourth quarter and 3.3% in the first quarter of next year. However, this year's projected growth represents a substantial improvement over the world economy's lackluster performance during the preceding three years, and is above the global economy's long-term trend growth rate of 3.1% per year. Our projected average annual growth rate for the next five years—from 2005 through 2009—is 3.2%, compared with 2.6% for the last five years (1999–2003).

There are many risks to this forecast, however. The global recovery could falter next year due economic risks, such as a retrenchment by the overstretched American consumer, a housing market decline, or a hard landing by the U.S. dollar. There are also a number of potential geopolitical risks that also could unhinge the recovery, such as a civil war in Saudi Arabia, U.S. military conflicts with Iran or North Korea, or a mega-terrorist attack involving weapons of mass destruction. Finally, one cannot ignore various potential scenarios for a severe disruption of oil supplies given the tight oil markets and the uncertain political situations of some of the major oil exporters, such as Saudi Arabia, Nigeria, Venezuela, Iran, and Iraq. Fortunately, the global economy's momentum is now so strong that it should be able to cope with most disruptions. A shortage of one or two million barrels/day of OPEC oil would boost oil prices by as much as \$5–10 per barrel and dent world GDP growth by roughly 0.075–0.150 percentage point, but would be unlikely to cause a global recession. Indeed, the more dynamic regions of the world economy, such as North America, Asia-Pacific, and most of “New Europe,” should be able to shrug off even a \$20 oil price spike.

## Medium-Term Outlook

After five years of weak or uneven growth during 1998-2003, the global economy is now in the midst of a period of above trend performance. Global Insight's latest detailed forecast projects that the world economy will maintain an above-trend rate of growth through 2007, before edging back to its trend growth rate of 3.1% per year. Our projected average annual growth rate for the five years from 2004 through 2008 is 3.2%, compared with 2.6% for the preceding five years (1999–2003).

There are many risks to this forecast, however. The current expansion cycle may falter next year due to weak investment and employment growth in the United States, which could lead to a retrenchment by the over-stretched American consumer. Assuming that the expansion proceeds without any major interruptions over the next few quarters, the medium-term outlook could still be at risk from potential inflationary pressures that have been suppressed since the Asia Crisis by a worldwide capacity glut. After years of horrendously weak pricing power and abysmal profits, there is a tremendous amount of pent-up pressure in the business sector to raise prices, particularly for traded goods. Under such circumstances, the risk of policy error by monetary authorities would be high, since they are very anxious to "normalize" their policy rates and unwind the huge amount of liquidity pumped into the global economy since January 2001.

The medium-term leadership of the global economy could change hands more than once over the next five years. With Japan out of contention—because of its huge public debt, long-term structural problems, shrinking labor supply, and political paralysis—the only major industrialized regions in the competition are U.S.-led North America and Eurozone-led Western Europe. If the U.S. economy's well-known macroeconomic imbalances slow the pace of North America's growth over the medium term, Western Europe could become the industrialized world's pace setter for at least a few years, providing a period of relief during which U.S. consumers could rebuild their balance sheets. Meanwhile, progress in the U.S.-led war against international terrorism should allow the United States to gradually shift some resources from the military back to civilian activities over the medium term. In the longer term, the American economy's structural superiority should allow it to regain its global leadership and get back to its long-term trend growth rate—which, at 3.0% per year, outpaces Europe by more than 0.5 percentage point per year.

Unfortunately, Europe's fiscal and monetary policy constraints could prevent it from taking a pace-setting role even in the medium term. For European growth to surpass that of the United States, the European Central Bank would have to abandon its overly conservative monetary policy posture, and the core Eurozone economies—Germany, France, Italy, and Spain—would have to ignore the fiscal straitjacket of Europe's Stability and Growth Pact. In the absence of more aggressive monetary and fiscal action, European economies would probably decelerate in line with any potential U.S. economic slowdown (resulting from macroeconomic imbalances or other causes), since they have become overly dependent on the American consumer since the Asian crisis.

## **Long-Term Outlook**

The world economy's long-term growth prospects are generally favorable, but they are not as rosy as they appeared to be during the 1990s, when energy prices were low and the Soviet Union's collapse along with the prospects of economic reform in the former Communist world led to widespread euphoria about a "new world order." The current outlook appears even more sober when it is contrasted with the spectacular economic growth projections that were popular during the heyday of "new economy" in the late 1990s.

The new economy hype was brought down to earth with the bursting of the high-tech and telecommunications bubbles in 2000. Most post-bubble assessments have concluded that potential boosts to aggregate productivity from technological advances would be much more modest than was frequently asserted in the late 1990s.

It is now widely accepted that the "new" economy operates on exactly the same principles as the "old" economy. While technological improvements in computers, telecommunications, biology, and other fields will likely lead to spectacular results in some sectors, their impact on overall economic growth will not be spectacular. Furthermore, the American economy's impressive productivity gains during the last ten years now appear to have been mainly the cumulative results of the country's market deregulation and corporate-sector restructuring in the 1980s, global trade liberalization in the 1990s, and an overinvestment binge in the 1990s, rather than any "new economy" magic.

Global Insight's latest detailed forecast of the world economy's GDP projects an average annual trend growth rate of 3.1% for the 20-year period through 2025. This is roughly in line with the average global growth for the past 30 years. (Unless noted otherwise, all world and regional GDP growth rates are based on country GDP numbers converted to U.S. dollars at market exchange rates. Based on purchasing power parity exchange rates, the global economy's trend growth rate would be 3.8%.)

The key economic assumption underlying the forecast is that the productivity gains from new technological advances will moderate the impact of the secular slowdown in factor accumulation. (By factor accumulation, we mean increases in quality and quantity of labor and capital stocks.) In other words, a combination of capital and labor productivity improvements—resulting from technological breakthroughs, incremental advances in production processes, and improvements in business organization and management techniques—would, in the long term, compensate for the slowdown in labor supply growth (due to demographic trends) and capital stock growth (due to a lower global savings rate).

## **UNITED STATES**

Indications for the third quarter suggest that GDP growth has bounced back above 4.0%, after dipping to 3.3% (not as low as first thought) in the second quarter. Stronger

consumer spending, combined with sharp increases in construction and business equipment spending, points to GDP growth exceeding 4.0% in the third quarter. We expect the pace to slow to 3.4% in 2005 as consumer spending growth gradually eases back and the housing sector cools. High oil prices remain a shadow over the recovery. In the immediate future, there is a risk that we will see a second "soft patch" for growth, with oil prices between \$40 and \$45 per barrel. However, second-half real GDP growth should come in near 3.8%, and fourth-quarter growth is projected at 3.4%.

In the third quarter, real consumption increased at a brisk 4.6% annual pace. Consumer spending growth bounced back to an estimated 4.7% in the third quarter, from 1.6% in the second quarter, helped by sharply lower inflation (as gasoline prices fell). Global Insight expects the growth of consumer spending to slow. In the fourth quarter, real spending growth is projected to slow to a 2.4% rate, restrained by high energy prices and a retreat in light-vehicle sales. However, Global Insight believes that the damage to consumer spending from higher interest rates and persistently high energy prices will be mitigated by stronger employment growth this fall and next year. The forecast anticipates monthly payroll gains averaging 183,000 in the fourth quarter and averaging about 180,000 during 2005. Businesses should be the key engine of U.S. economic growth for the rest of this year, with both greater fixed investment and improved hiring pulling the economy higher.

With spending outpacing disposable income growth, the personal saving rate dropped to 0.4% in the third quarter—its lowest level in the history of the quarterly series, which dates back to 1947. One thing is clear: the personal saving rate is unlikely to fall further as interest rates rise. The Federal Reserve seems determined to keep "normalizing" interest rates, and the evidence of faster growth in the third quarter will reassure that it is on the right track. Because of this softer growth and muted inflationary pressures, we expect the Fed to push the funds rate to 2.5% by spring, at which time core inflation should be about 2.0%. The ongoing favorable inflation outlook, together with solid but unspectacular employment gains, should allow—even encourage—the Federal Reserve to stretch out the pace of tightening in 2005, giving a little extra help to growth.

The U.S. dollar has been relatively stable in recent months, fluctuating around 110 yen/dollar and \$1.23/euro. The forecast continues to incorporate a trend dollar decline, driven by the current account deficit. We assume that the dollar declines 3.5% against major currencies from the fourth quarter of 2003 to the fourth quarter of 2004, and then by another 2.0% over the course of 2005.

## **CANADA**

Canada had stronger growth than the United States in each year over the 1999–2002 period. However, in 2003, beset by a strengthening Canadian dollar and a series of misfortunes (SARS, the power blackout, and restrictions on exports of lumber and beef), Canada slipped behind the United States with a 2.0% rate, relative to 3.1% in the United States. Canada's economy is now forecasted to expand by 3.0% in 2004, compared with 4.3% in the United States. In 2004, Canada's growth will be weak—considering the recovery in the United States—due to the continuing adjustment to the higher Canadian

dollar. Strong global growth, particularly in the United States and China, has led to strong demand for Canadian exports and strengthening commodity prices, particularly oil. The impacts on the demand for exports and export prices are working effectively to offset the negative impact of the higher dollar on the profits and volumes of Canada's exporters. Global Insight forecasts the Canada economy will grow 3.4% in 2005.

## **EUROZONE**

The Eurozone economy has lost momentum, following relatively healthy growth in the first half of 2004. Eurozone growth slowed to 0.3% quarter on quarter in the third quarter. Exports came under increasing pressure in the third quarter from softer global growth, and they may well also have suffered from the lagged impact of the euro first nearing US\$1.30 early in the year. Still, the economy expanded for a fifth successive quarter in the third quarter of 2004, having been essentially stagnant in the first half of 2003 and fourth quarter of 2002, as it was pressurized by global economic and political uncertainty, high oil prices, a markedly strengthening euro, and restrictive monetary and fiscal policies.

Eurozone businesses are facing an increasing threat to their competitiveness, reflecting the renewed strengthening of the euro against the dollar. Furthermore, the euro seems set to make further gains over the coming months as the huge U.S. current account weighs down on the dollar. Net trade reduced overall Eurozone GDP growth by 0.5 percentage point in the third quarter. Eurozone exports benefited in the first half from robust global growth, while the euro eased back temporarily, to trade under US\$1.20 at times during April-August. However, it appears that Eurozone exports came under increasing pressure in the third quarter from softer global growth.

We expect businesses to remain cautious in stepping up their employment. With labor markets now unlikely to see sustained marked improvement until well into 2005, consumers are also expected to be cautious in their expenditure for some months to come. Domestic demand in the Eurozone has been held down during 2004 by very subdued consumer spending. This largely reflects continuing consumer caution amid concerns over unemployment and personal finances. The breakdown of the Eurozone GDP components shows that domestic demand drove growth in the third quarter, in marked contrast to the first half of the year, when it remained disappointingly subdued, and growth in Eurozone imports of goods and services accelerated, reflecting stronger Eurozone domestic demand and the competitiveness of foreign companies. However, this was heavily reliant on a contribution from building up of inventories and not on consumer spending.

In addition, there is significant consumer uncertainty in many Eurozone countries about future government reforms and fiscal measures, and how they will affect them. On the positive side, we expect the European Central Bank to keep its key interest rate down at 2.0% until well into the second half of 2005.

In our November monthly interim forecast, Global Insight projected Eurozone GDP growth at 1.9% in 2004. We believe that Eurozone growth will be relatively subdued over

the rest of this year and through 2005, held back by continuing high oil prices, the strength of the euro, softer global growth, and only a very gradual improvement in persistently weak Eurozone domestic demand.

## **UNITED KINGDOM**

Growth remained robust in the first half of 2004, with GDP rising by 0.7% quarter on quarter in the first quarter, and then accelerating to 0.9% quarter on quarter in the second. Furthermore, year-on-year growth reached 3.6% in the second quarter, the best performance since the third quarter of 2003. However, GDP growth slowed markedly in the third quarter, when it was just 0.4% quarter on quarter. Year-on-year growth moderated to 3.1%. We believe that while economic activity peaked in the second quarter, the third-quarter slowdown in growth exaggerates the economy's loss of momentum. Indeed, we expect a growth rebound in the fourth quarter, although the rate of expansion is unlikely to be as strong as in the second quarter. In our October detailed quarterly forecast, we trimmed our 2004 GDP growth projection to 3.2%, from the previously expected 3.3%.

On the output side, the third-quarter slowdown in growth was primarily the result of the renewed struggles in the industrial sector. The sector is clearly being hit by higher interest rates, strong oil prices, and at least a temporary moderation in global growth. Domestic demand is projected to rise by a very robust 3.9% in 2004, despite a moderation in the second half of the year. Consumer spending growth is seen at a very healthy 3.1%, although it is expected to gradually soften. The Bank of England has lifted its key interest rate to 4.75% from the 48-year low of 3.50% seen in 2003. Higher interest rates and the slowdown in the housing market now appear to be weighing down increasingly on the consumer, although it is still being supported by record-high employment, modestly rising earnings, and recent substantial mortgage equity withdrawal (although the support from this started to wane in the second quarter).

A particularly disappointing factor behind the third-quarter slowdown in growth was the stagnation in gross fixed capital formation. Meanwhile, gross fixed capital formation is projected to extend the marked overall improvement seen in the second half of last year and first three quarters of 2004, supported by relatively healthy business profitability, still-low interest rates by past norms, and a reasonably healthy equity market. It is also assumed that the manufacturing sector will continue to recover, despite its third-quarter relapse. Exports of goods and services are forecasted to rise by 2.0% in 2004. Exports should benefit increasingly from a more competitive exchange rate, while global growth is expected to be relatively healthy over the coming months, even though it almost certainly peaked earlier this year. With import growth expected to be 4.8%, reflecting robust domestic demand and competitive products from overseas, net trade is forecasted to once again negatively contribute to overall GDP growth in 2004.

## **ASIA-PACIFIC**

Asia's growth appears to have peaked. China's economy rose 9.1%, down from 9.6% in the previous quarter. Growth in Japan advanced just 0.3% (quarter on quarter, annualized) in the third quarter, down from 1.1% in the second quarter. Singapore's GDP fell 3.0% from the second quarter (seasonally adjusted and annualized), compared with the second quarter's 12.0% expansion. The Taiwanese economy expanded 5.1% year on year in the third quarter, compared with 7.8% in the second. Australia, Hong Kong, Malaysia, and the Philippines all saw growth slow down in the quarter. The only exception was Indonesia, whose economy rose 5.0% in the third quarter, up from 4.5% in the second.

Looking forward, growth will likely slow, but not slump, over the next several quarters. Export growth should continue to decelerate as a result of cooling global demand and a weaker dollar. In addition, Asian central banks' reduced foreign exchange intervention has allowed their currencies to appreciate against the dollar. This has somewhat eroded the competitiveness of these Asian exports, especially against the Chinese exports that are priced at a fixed exchange rate. The only exceptions are Indonesia and the Philippines, whose currencies have remained stable vis-à-vis the dollar. Export growth of these two countries, as a consequence, accelerated in the third quarter.

Besides Japan and Indonesia, consumer demand growth in Asia has also slowed. Still bothered by the bursting of the consumer credit bubble, household consumption is especially weak in Korea, falling (on a year-over-year basis) for six consecutive quarters through the end of the September 2004 quarter. Investment expansion has also cooled almost across the region. Although slowing in the third quarter, fixed capital formation growth in Taiwan and Singapore has remained in double-digit territory. Japan and Korea saw investment rise around 3.0% in the quarter. Investment growth in Indonesia accelerated to 13.1% in the third quarter, compared with 12.5% in the second.

An Asian slump could materialize if external demand falters, especially in China and the United States. Crashing investment can also trigger an economic slump. However, Asia's tame inflation, in spite of record-high oil prices, will allow monetary policy to remain accommodative to support domestic demand.

## **LATIN AMERICA AND CARIBBEAN**

An improved domestic and external environment is contributing to very positive short-term prospects for the region this year. This year's GDP growth is predicted to grow to 4.7%, its highest level since 1997. The fundamental reasons for this improvement are found in these countries' currency competitiveness and strength in commodity prices. These, together with the improved prospects for world economic growth, will add to the recovery this year as well as next. At the same time, many of these economies have benefited from the strong performance of the Chinese economy, the growth of which fundamentally helped the Brazilian and (to a lesser degree) Argentine industrial sectors,

as they took advantage of the strong, nominal, and real depreciation of the currency after the currency crises of 1999 and 2002.

We expect growth in the region to taper off to a more modest 3.7% during 2005, as the current combination of factors will not repeat next year. We do not see a worsening trend in terms of the growth potential of the region; however, in order for the region to post a higher growth rate (above 3.0%), it needs to be able to attract foreign direct investment. Today's growth rates are the consequence of a strong foreign investment profile during the 1990s, as well as strong gains in the competitiveness of the region's currencies. This will not last forever, and while yesterday's investment can support current growth rates, the region does need to invest a larger proportion of its resources to continue modernization.

## **CENTRAL EUROPE AND THE BALKANS**

The economies of Central and Southeastern Europe have continued to report very dynamic growth in the first half of 2004. According to our latest forecasts, GDP growth will jump to 5.5% this year, driven by strong performances in the two largest economies—Turkey and Poland—as well as by strengthening GDP growth in most of the smaller countries in the region. Indeed, in some of the largest economies in the region, growth has accelerated consistently during the last several quarters, buoyed by steady expansion in personal spending and booming investment. Among them, Poland reported growth of 6.5% year on year in the first half of this year, making it once again the growth leader in the Central European region, while Hungary saw growth accelerate to 4.1%. Even countries where growth has struggled to gain any traction in the last two years reported considerably stronger growth in 2004 such as the Czech Republic and Slovenia, with growth of 3.8% and 4.2%, respectively.

The Eurozone economic rebound means that exports have become a leading source of economic growth in Poland and Slovakia, and are becoming a very important growth driver in Hungary, the Czech Republic, Slovenia, Turkey, and the Balkans. The renewed demand for goods from the region in the key West European economies supported a significant expansion in exports. In most cases, annual rates of growth in exports in euro terms reached double digits. Manufacturers in emerging Europe continued to benefit from their competitive position as lower-cost producers that are increasingly being integrated into the production and distribution chains of Western multinationals. By no means, however, will the contribution from net exports become the key, medium-term determinant of growth in the region. Growth in the region will be mostly supported by a rebound in investment activity and steady expansion in private consumption.

Looking forward, we forecast that growth dynamics in the region will gradually moderate, but not before the second half of 2005. The slowdown will result mostly from weaker growth in personal consumption, forced, to some extent, by tighter fiscal policies and other measures aimed at moderating household spending growth. In our medium-term forecast for the Central European economies, we assume a stabilization of growth rates in the 3–5% range for most of the countries in the years following accession to the

EU and immediately ahead of admission into the Eurozone. Membership in the EU and the related large inflows of regional and structural funds from the union's budget should strengthen the growth potential of the new accession states and provide additional resources for investment in infrastructure projects and restructuring of less-efficient sectors of the economy. Therefore, when coupled with further economic and trade integration with the West, EU membership should have a very positive impact on the new member states.

## **MIDDLE EAST AND NORTH AFRICA**

According to our revised forecast, MENA's (Middle East and North Africa's) real GDP growth, at 5.9% in 2004, will be the strongest registered by the region since 2000. Oil market conditions continue to be the driving force behind economic growth for most of the economies in the Middle East and North Africa. The OPEC benchmark price has surged to more than \$35 per barrel in recent weeks, due to higher world demand, particularly from the United States and China, and the potential for supply disruptions from the Gulf. In the Persian Gulf countries, where oil accounts for more than 40% of GDP, higher oil revenues will not only contribute to the region's real output in the form of higher net exports, they also serve as the driver of growth for components of domestic demand, particularly public consumption and investment spending. The combined impact of continued fiscal expansion, particularly in the region's net oil exporting countries, and low interest rates for much of 2004 will be the major underlying factors for growth.

The region's non-oil Arab countries, such as Jordan and Lebanon, and small producers, such as Egypt and Syria, will also benefit from the spillover effects of the robust economic growth in the GCC countries. These benefits will include increased regional tourism, remittances from their expatriates working in GCC countries, increased exports to GCC countries, and increasing investment flows from the GCC.

Two of the region's large economies that were weak last year, Israel and Egypt, will improve in 2004 and 2005. Over the next several quarters, continued growth in the U.S. high-tech sector will fuel Israel's high-tech export growth and employment, which will spark recoveries in private consumption and gross fixed investment in Israel. In Egypt, the largest economy in North Africa, growth will be fueled by higher oil prices and improved tourism receipts. Natural gas exports are expected to increase over the next few years, boosting the export sector's share of GDP.

## **SUB-SAHARAN AFRICA**

Growth prospects for sub-Saharan Africa remain strong in 2004, as growth in the world economy remains on track and commodity prices remain relatively buoyant. Higher oil and non-oil commodity prices will push real GDP growth in 2004 to average around 4.4% and 4.5%, respectively, in 2004 and 2005. External balances of the region's net oil exporters continue to improve, as growth in oil prices during the first two quarters of 2004 exceeded that of 2003 by over 20%. Higher oil prices and low excess oil production capacity have resulted in an increase in investment in the hydrocarbon sectors of

countries such as Angola, Nigeria, and Equatorial Guinea. While real GDP growth for the region as a whole averaged 3.8% in 2003, economies of the region's net oil exporters grew around 10.0% on average. Higher export revenues have put upward pressure on growth in domestic demand, as many of the governments are undertaking expansionary fiscal policies. Most of the region's non-oil exporters fared less well, as their gains from exports were partially offset by high energy import prices. We expect such trends in the external balances of the region's economies to continue on a similar path through the rest of 2004. A combined impact of high oil prices and oil production, as well as improved agricultural production, will continue to boost growth in the Nigerian economy through 2005. In South Africa, the economy is poised to grow 2.6% in 2004, improving on last year's mediocre 1.9% growth. Non-oil exporters will fair relatively better as oil prices moderate in the medium term.

Growth in South Africa's trade surplus in 2004 will be constrained by the appreciating rand. With the exception of CFA franc zone countries, CPI inflation in many countries in Sub-Saharan Africa will remain high in 2004. The main causes of this deterioration in most countries are higher food prices and a decline in fiscal and monetary discipline. Despite some success at democratic elections, the political environment in Sub-Saharan Africa remains fragile.

## **2. PERSPECTIVE ON THE NEW WORLD TRADE FORECAST**

Entering the second half of 2004, the world economy is showing a little more strength than previously forecasted. The world economic growth forecast has been revised up by 0.23 percentage point in terms of real GDP, reaching 4.11%. In response, world merchandise trade growth is forecasted to be up by 0.42 percentage point in terms of real commodity value, reaching 9.67%. In terms of nominal value, world merchandise trade growth is forecasted to be up by 2.45 percentage points, reaching 15.88%. The major contribution to the higher nominal growth is surging energy prices.

This year, the world economy has shown the strongest recovery since the 2001 recession, with firms resuming investment and households having higher confidence to spend more. Nevertheless, high energy prices have depressed economic activities worldwide. The United States' huge budget deficit has created restrained U.S. public spending, and no further tax cuts can be expected to promote private consumption. The U.S. domestic demand expansion will slow down. Furthermore, the U.S. current account deficit is also huge, reaching \$700 billion. This has led to a continuing decline in the exchange rate of the U.S. dollar and has upset the account balance of many countries. The year 2005 is full of uncertainty. World real GDP growth could slow down to 3.4%, and world merchandise trade growth could slow down to 7.2% in real terms. In nominal terms, world trade could slow down to 6.0%. The lower nominal growth is mainly due to the regression of energy prices.

This year, the economies of industrialized countries have generally performed better than previously forecasted. The U.S. economy has shown significant improvement from last year. Japan's real GDP growth has reached the highest rate since 1990. Germany has come out of recession. Asian and Latin American economies are robust, and oil-exporting countries have received windfalls from surging oil price. Table 1 displays the real GDP and import growth by country and region for 2004-06. Real GDP and import growth are all very strong this year, but will moderate next year.

**Table 1. Real GDP and Import in Real Commodity Value by Country/Region**  
Annual Percent Change

Country and Region	GDP			Import		
	2004	2005	2006	2004	2005	2006
United States	4.27	3.32	2.90	10.61	6.27	5.23
NAFTA	4.16	3.37	2.95	10.86	7.08	5.74
EU Four	2.05	2.19	2.29	7.90	5.57	4.86
Eurozone	1.81	2.17	2.37	7.96	6.03	5.25
Japan	4.52	2.31	1.91	11.25	8.22	5.92
China	8.67	7.23	7.00	19.96	16.77	16.57
Asian Four	5.60	5.32	5.21	12.66	8.49	7.67
Southeast Asia	6.13	5.27	5.04	13.49	7.79	7.18
Oceania	3.32	3.24	2.86	9.50	5.55	5.46
CIS	7.41	6.13	5.48	7.78	8.85	6.87
Indian Subcontinent	6.22	5.96	5.63	10.00	8.35	8.35
Caribbean and Central America	3.08	3.86	4.19	2.95	5.25	4.79
South America	4.73	3.53	3.65	11.39	4.30	4.88
Middle East	5.65	5.43	4.82	7.06	6.50	6.00
North Africa	4.86	5.48	5.26	6.48	4.69	4.13
Sub-Saharan Africa	4.09	4.61	4.66	7.14	4.93	3.85
World	4.11	3.41	3.20	10.11	7.43	6.59

*Note: EU Four refers to Germany, United Kingdom, France, and Italy. Asian Four refers to Korea, Taiwan, Singapore, and Hong Kong. CIS is the Commonwealth of Independent States. Imports do not include arms and ammunition, explosives, precious metals and stones, jewelry, art and antiques, etc.*

China continues to lead the world in economic and trade growth. However, the Chinese economy has been an investment-pushed, rather than a demand-pulled, economy. Overcapacity and low efficiency generate little or no return on many of the investments. Therefore, this year, the Chinese government has tried to fix the banking system and slow the overheated investments in the manufacturing and housing sectors. When the measures go into effect, China's demand for capital goods and raw materials is expected to slow. High energy prices have also had a negative impact on the Chinese economy; this year, Chinese demand for automobiles has significantly slowed down. Overall, Chinese import growth is projected to slow in the coming years.

The forecast of slower import growth is partly based on the forecasted slower export growth, because a large portion of the China's imports are used for producing goods for export. This year (2004), the prices of many commodities that China exports have risen sharply, and there are two factors causing this, factors that are not likely to disappear. One factor is the higher energy costs. In the past, manufacturers in China depressed workers' wages to absorb increased input costs, rather than transferring these costs into

export prices. However, world energy prices this year have increased by a scale that can no longer be absorbed by depressing workers' wages. The second factor is widespread pressure to raise workers' wages. In nearly a decade, although the salary of white-collar employees has been increasing briskly, the wages of blue-collar workers have hardly advanced at all. With the cost of living rising significantly this year, workers can barely meet the normal daily cost of living. As a result, in more and more factories, workers choose to either leave their jobs or organize strikes to force owners to raise their wages.

To sum up, higher prices will dampen demand and lower China's export growth, even though China's current price levels, in general, are extremely competitive.

Turning to a commodity group perspective, for agricultural goods, there are often fluctuations in short-term forecasts reflecting the latest developments in trade due to weather and natural disasters—difficult to predict using economic variables alone. In the new World Trade Service forecast, for example, we have added updated data on China's 2004 imports of an unprecedented large volume of grain and mill products due to a low harvest in China and the shift of farmers towards growing more profitable vegetables and fruits for export, instead of growing grain for domestic consumption. According to China Customs data, China's imports of grain and mill products increased by 348% in volume terms in January to October from the same period a year earlier. At the same time, year-to-date data indicate that the volume of China's 2004 exports of vegetables and fruits will increase by at least 20%.

In energy products, the surge in crude oil prices has reflected the strong economic growth in China, India, the United States, and Japan, which has increased the demand for oil. But next year, slower economic growth will weaken the demand for energy. Crude oil will retreat to around \$40 a barrel, and a lower oil prices will help prevent the world economy from slowing further.

The demand on capital goods this year, especially machinery and equipment, is stronger than previously forecasted, because firms' confidence in the economy is increasing. The forecast of trade in consumer electronics has been revised down, because the prices of luxury electronics have not decreased to a level the majority of consumers can afford.

The forecast of world trade in motor vehicles for this year has also been revised down, due to softness in sales across developed country markets and to the increases in petroleum prices. But the trade in motor vehicle parts has continued to grow, as manufacturers have increased the portion of parts sourced from low-cost countries such as China.

Table 2 displays the forecast of changes in price and trade by major commodity group. The rise in crude oil prices has pushed up the price of all commodities, with the exception of IT goods, whose prices continue to decline due to rapid technology progress and the small energy share in their production cost. However, although commodity prices are rising across the board, the world's major economies are doing well this year, so they can absorb the price hikes and import large volumes of both capital and consumer goods.

Next year (2006), prices will be soft. But since world economic growth will slow down, so will world merchandise trade growth.

**Table 2. Price and World Merchandise Trade in Real Commodity Value**  
*Annual Percent Change*

Commodity	Price			Trade		
	2004	2005	2006	2004	2005	2006
Agriculture and Forestry	10.95	0.93	0.94	4.42	2.97	2.51
Non-energy Mineral	22.89	0.81	0.73	1.48	5.26	4.15
Energy Mineral and Product	39.43	-6.10	1.74	2.68	2.80	1.99
Chemical	5.26	1.12	1.14	7.16	5.81	5.29
Non-metal and Products	3.77	0.78	0.92	9.10	6.48	5.46
Metal and Products	20.24	-0.98	0.85	4.40	4.65	3.09
Non-IT Machinery	1.96	0.56	0.56	11.63	7.93	6.69
IT Machinery	-3.55	-1.01	-1.04	20.81	12.62	11.57
Transportation	2.39	1.51	1.54	4.62	5.19	4.38
Food and Beverage	2.09	1.41	1.35	4.23	3.09	2.96
Textile, Apparel, and Footwear	2.38	0.92	0.67	6.88	7.12	5.35
Furniture, Toy, Sport, and Travel Goods	1.63	0.50	0.42	9.81	7.39	6.96
All Commodities	5.72	-1.16	-0.07	10.11	7.43	6.59

## CHINA OVERVIEW

We maintain our view that Beijing will continue its fixed exchange rate policy for another couple years. The policy is clearly causing problems for China, however, not only through trade friction, but also by exacerbating the country's accelerating liquidity growth and overheating economic growth problems. Foreign exchange reserves surged more than \$160 billion last year—\$60 billion in the first half and \$100 billion in the second. Also, money supply growth measured by M2 accelerated to around 20% in late 2003. In 2004, foreign exchange reserves have continued their fast climb: reserves in the first three quarters shot up \$111.2 billion, to \$514.5 billion at the end of September, while the trade balance and foreign direct investment (FDI) have combined for only \$53.3 billion of foreign exchange credit in the first nine months (with the trade balance registering a \$4.6 billion surplus and FDI posting a \$48.7 billion inflow).

The pressure that foreign exchange reserve gains have exerted on money supply growth has been enormous. The ratio of foreign reserve increases to money supply gains has averaged more than 30% in 2004. Consequently, Beijing is unlikely to take a do-nothing approach on the renminbi issue. Indeed, on 20 July 2005, the Chinese government announced a new exchange rate policy to give them more flexibility in adjusting the renminbi to other currencies, while minimizing disruptions. The policy options most frequently suggested to the government were:

- 1) Revalue the renminbi.
- 2) Widen the renminbi trading band.
- 3) Free float the currency and open the capital account.
- 4) Repeg the renminbi to a trade-weighted basket of currencies.
- 5) Adopt a managed float system.
- 6) Maintain the currency peg, while offering an outlet for foreign exchange earnings and finding ways to relieve appreciation pressures.

On 20 July 2005, the Chinese selected a combination of options 4 and 5.

### **Update –China's change in its exchange rate setting procedures, July 20 2005**

The People's Bank of China (PBOC) announced that China has abandoned its fixed exchange rate with the US dollar and moved to a managed float.

This means that, each trading day, the PBOC will set the value of the Chinese renminbi, with a basket of major trading-partner currencies as a guide (including the US dollar, yen, and euro at a minimum).

Beijing has not revealed - nor is it likely to anytime soon - the composition of this basket.

China has given itself a little more flexibility on its currency than before.

### **Why Did They Do It Now?**

China's currency move was in reaction to both external and internal pressures.

Part of the government's motive was to head off protectionist moves by the US Congress.

But Chinese authorities are also trying to stem the flow of hot money, which has produced a boom in capital investment and pushed its share of the economy from 40% three years ago to 51% last year.

### **Impacts: Very Small, Unless the Chinese Currency Continues to Appreciate**

So far, the renminbi has appreciated 2%. This will have almost no impact on the US and Chinese economies.

Global Insight's best guess is that Beijing will allow the currency to appreciate by no more than 10% over the next two years. This should be seen in the context of estimates suggesting that the renminbi is undervalued by 30–40%.

Assuming that all other Asian economies (including Japan) allow their currencies to appreciate by roughly the same amount, this will translate into a 4% drop in the US dollar on a trade-weighted basis. This is relatively small compared with its 17% drop since early 2002.

The Chinese government has now adopted the managed float option, encouraging more domestic firms to invest overseas, allowing exporters to retain more foreign exchange earnings, and cutting export tax rebates. It has chosen this option because the other alternatives are not immediately viable. Option 1 is problematic because a revaluation needs to be large enough to be credible, and it is widely believed that the renminbi is undervalued by some 20-40%, although this is not the position of Global Insight. A small revaluation would almost certainly induce more “hot money” inflows and fuel speculation over further revaluation, which would exert more pressure on China’s liquidity growth. A large revaluation, however, would place the Chinese economy in a precarious position, since exports are the only non-state source of economic growth. A much-recommended exchange-rate policy option (by analysts and the press) has been a widening of the renminbi’s trading band. But this alternative is also problematic in the near term. Again, too small a widening would not only offer insufficient relief to the trade and liquidity imbalances, but also encourage speculation of a further widening of the band; too large a widening, on the other hand, runs the risk of the renminbi appreciating to levels harmful to export growth.

Option 3—currency flotation and capital account liberalization—is also not viable because of China’s effectively insolvent banking sector and underdeveloped financial system. Should Beijing open up the capital accounts and allow foreign banks to conduct renminbi business, the more efficient foreign banks would be able to offer higher interest rates to Chinese depositors. This could create a bank run and risk a collapse of China’s state-owned banks. Moreover, as economists Ronald McKinnon and Gunther Schnabl have pointed out, free floating the exchange rate under an underdeveloped financial system would be extremely volatile.<sup>1</sup> The reason is that for an economy like China, which lacks a well-developed bond market, interest-bearing bonds of various term structures are not available to cover its currency forward contracts. As a result, natural market makers for foreign exchange cannot exist. Floating an exchange rate in an economy without natural foreign exchange market makers would be excessively volatile.

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<sup>1</sup> McKinnon, Ronald and Schnabl, Gunther (2003), “The East Asian Dollar Standard, Fear of Floating, and Original Sin,” Stanford University, Department of Economics, Working Paper 03-007.

The option of repegging the renminbi to a basket of currencies (option 4) is another alternative that has been frequently suggested. However, as McKinnon and Schnabl indicated, the basket peg option is also undesirable for China. Because the country still lacks a developed financial market, Chinese firms engaged in merchandise trade cannot buy renminbi forward contracts to hedge against exchange-rate risks. But since much of China's trade is quoted in dollars (even trade with non-U.S. partners), the government can provide an informal hedge by keeping the yuan-dollar rate stable. Trade quoted in other major currencies could be hedged by purchasing forward contracts of those currencies against the dollar, and then converting to the domestic currency through the pegged rate. So, if Beijing repeg the renminbi to a basket of currencies, exchange rate hedging would no longer be possible.

When the government tried to contain overheating in the past, it would devalue the currency, because the source of the overheating was always domestic. Thus, the government needed export growth to offset its austerity measures. Right now, the international political pressure on Chinese exports makes it almost impossible to devalue the renminbi.

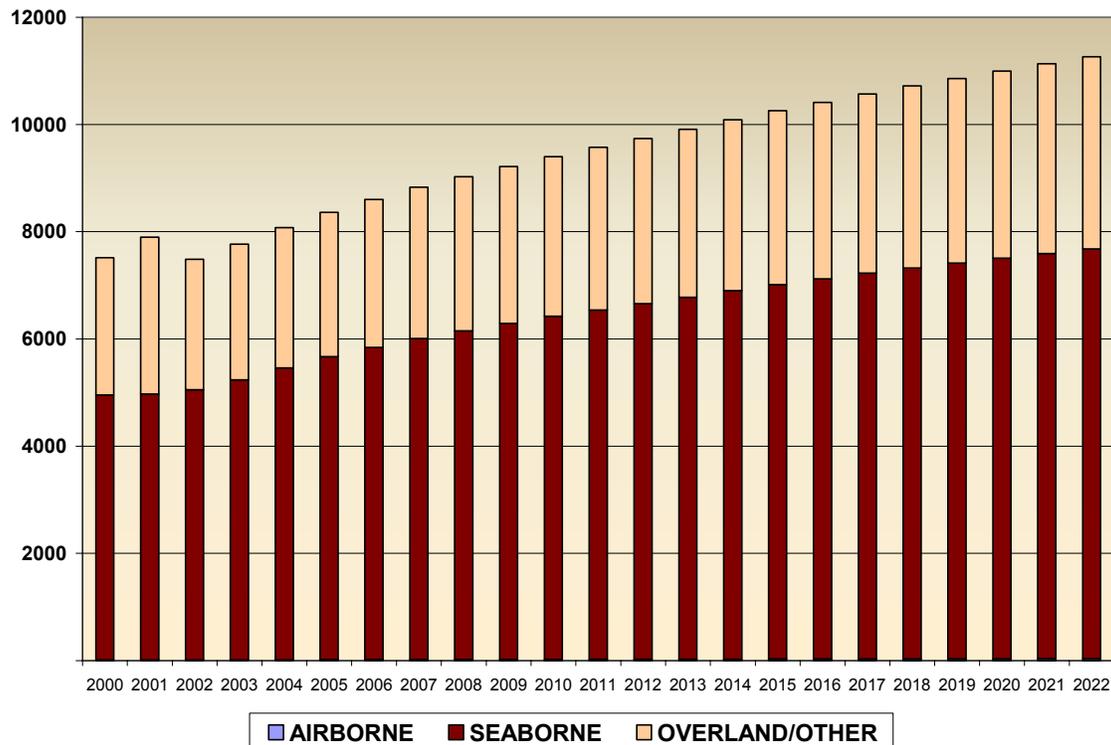
Nevertheless, the fundamental policy conflict exposed by the current overheating episode remains. China's capital account has become increasingly porous as a result of the government's incremental liberalization measures on capital movements. Consequently, the country's monetary-currency policy mix has gradually come to resemble what is sometimes called the "impossible triangle"—a country cannot simultaneously maintain a fixed exchange rate, independent monetary policy, and open capital account. The result is a fixed exchange rate that is under pressure with greater frequency. In addition, China's monetary conditions have fallen increasingly under the influence of the U.S. Federal Reserve. Indeed, the results of a simple regression of China's M2 money supply growth on the U.S. federal funds rate over the period June 1995 (when the renminbi was pegged at 8.3 per dollar) to the present show the federal funds rate coefficient becoming increasingly significant, and negative (i.e., a lower funds rate causes Chinese M2 growth to jump), when the sample starting point moves past June 1996.

It is inconceivable that Beijing is willing to defer monetary policy decisions to Washington, since China's business cycle is often not in sync with the U.S. cycle. Therefore, unless Beijing is willing to reverse its capital account liberalization moves, alternatives to the fixed exchange-rate regime must be seriously considered.

## TOTAL WORLD CARGO TRADE

Based on new historical trade data and a fresh run of the Global Insight World Trade Model, the outlook for world trade in metric tons looks brighter than in the previous forecast. In particular, seaborne trade, the largest volume mode of cargo transport worldwide, grew 4.3% in 2004, a healthy return after feeble growth in 2001 and 2002. World trade in total grew by 3.9% in 2004, with air growing by 9.4% and the other modes as shown in the Table 3.

**Figure 1. Total World Trade by Mode (Millions of metric tons)**



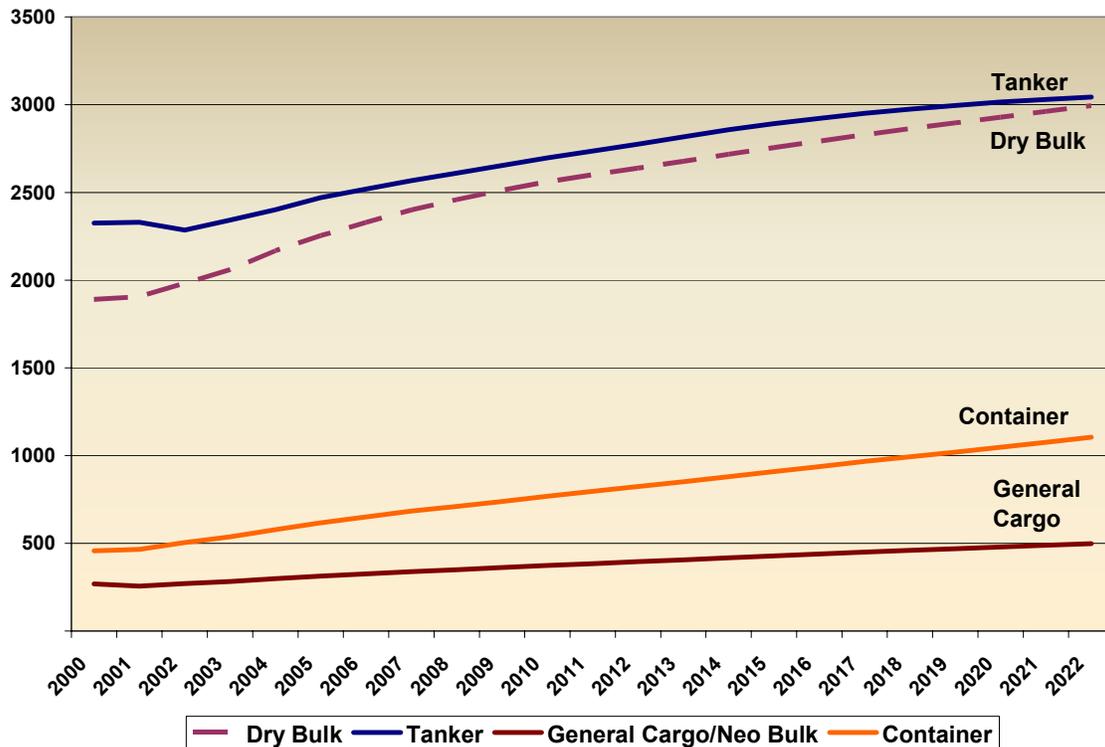
**Table 3. Annual Growth Rates of Global Trade Volumes by Mode**

	2004	2005	2006	2007	2008
<b>Air</b>	9.4%	7.6%	6.4%	5.9%	4.8%
<b>Sea</b>	4.3%	3.8%	3.1%	2.8%	2.3%
<b>Overland</b>	3.2%	3.0%	2.4%	2.3%	1.9%

In the long term to 2022, air is projected to outpace the other modes, as it has in the past, averaging 4.7% per year, while sea tonnage will grow at less than 2% per year.

Within the seaborne trade segment, the four service types are predicted to grow substantially through the end of the current forecast period (2022), with container cargo rising from this year's 579 million tons to 1.1 billion tons at the end of the period. Container trade will outpace tanker and dry bulk shipping, averaging almost 4% per year over the long term.

**Figure 2. Seaborne Trade by Service Type (Millions of metric tons)**



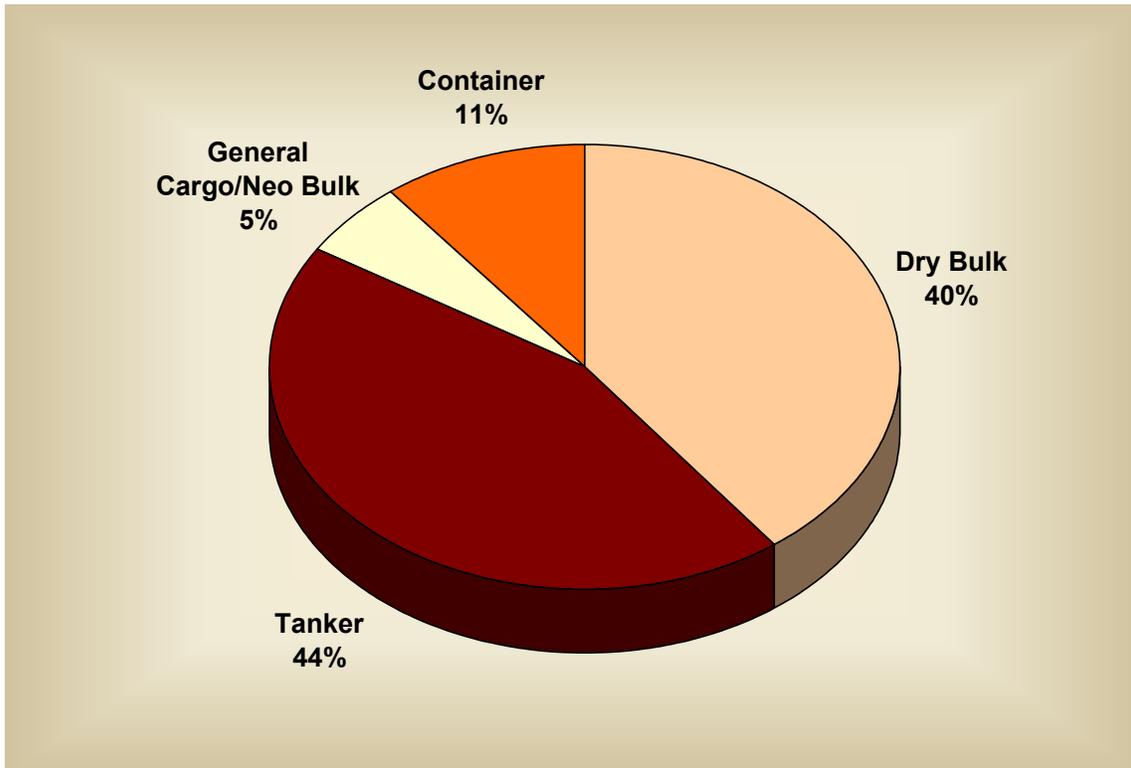
The expected growth rates of each service type are shown in Table 4, in which it is clear that container trades are projected to grow the fastest. The two bulk sectors will grow in line with overall real economic growth worldwide, which is expected to average slightly above 3% annually, while general cargo will grow faster. The forecast includes a shift of some general cargo to containers over time.

**Table 4. Growth Rates of Four Major Service Types—Ocean Freight**

	<b>2000-05</b>	<b>2005-10</b>	<b>2010-15</b>	<b>2015-22</b>
<b>Dry Bulk</b>	3.6%	2.6%	1.5%	1.2%
<b>Tanker</b>	1.2%	1.8%	1.4%	0.7%
<b>General Cargo/Neo Bulk</b>	3.1%	3.6%	2.8%	2.2%
<b>Container</b>	6.1%	4.5%	3.4%	2.8%

Tanker trade is expected to average around 1.3% annual growth, starting from 2004's 2.4 million metric tons. Because of the varying growth rates, the shares of world sea trade by service also shift, and container trades, in particular, will climb from 10.6% of total world sea trade in 2004 to 14.5% in 2022 as economies develop, incomes rise, the other service types do not keep pace with economic growth, and there is a steady shift to the use of containers for appropriate cargo types.

**Figure 3. Shares of Total Sea Trade in 2004**



## Seaborne Trade by Region

The quantity of and growth in seaborne exports is shown in Table 5. Latin America (including Mexico and the Caribbean) is currently number two on the list and will move to first place by 2022, in view of growing export petroleum volumes and the simulative effect of many new free trade agreements put in place within the last five years. Northeast Asia is clearly the fastest growing because of China and the nations of the region feeding China its manufacturing inputs.

**Table 5. Seaborne Metric Tons (Millions) — Exports  
Long-Range Forecast**

Export Region/Year						Avg. Annual Growth		
	2003	2005	2010	2015	2022	2003-05	2005-10	2010-22
North America	499	527	573	609	651	2.7%	1.7%	1.1%
North Europe	414	432	478	520	554	2.2%	2.0%	1.2%
Northeast Asia	560	635	776	898	1051	6.4%	4.1%	2.6%
Southeast Asia	471	506	553	584	617	3.6%	1.8%	0.9%
Mediterranean	160	170	186	203	222	2.9%	1.9%	1.5%
Middle East	887	949	1039	1124	1191	3.5%	1.8%	1.1%
Indian Subcontinent	100	126	172	208	267	11.8%	6.5%	3.7%
Australia/New Zealand	511	580	682	745	828	6.5%	3.3%	1.6%
Latin America (inc Mex/CRB)	839	911	1027	1109	1206	4.2%	2.4%	1.4%

The Indian subcontinent continues to grow quickly, from a small base, more than doubling its export tonnage over the 18-year forecast horizon. Its export growth rate is, in fact, faster than that of Northeast Asia.

On the import side of global sea trade, Northeast Asia is by far the largest importer, dominated by China, at 2 billion metric tons (2004). The expected growth rate of the region's imports is faster throughout the forecast than that of the second-largest importer, North America. Therefore, we do not expect the ranking to shift during the forecast period.

**Table 6. Seaborne Metric Tons (Millions)—Imports  
Long-Range Forecast**

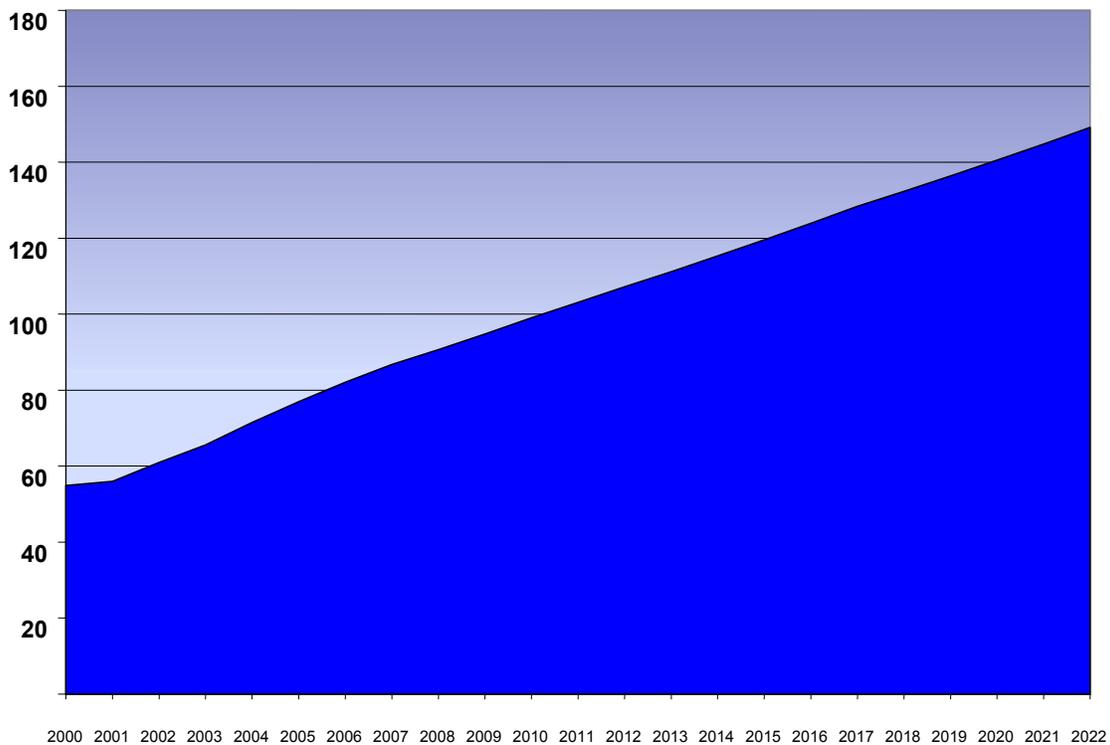
Import Region/Year						Avg. Annual Growth		
	2003	2005	2010	2015	2022	2003-05	2005-10	2010-22
North America	967	994	1072	1155	1224	1.4%	1.5%	1.1%
North Europe	685	715	767	810	879	2.2%	1.4%	1.1%
Northeast Asia	1843	2107	2532	2813	3109	6.9%	3.7%	1.7%
Southeast Asia	364	385	419	455	497	2.8%	1.7%	1.4%
Mediterranean	453	476	511	542	587	2.5%	1.4%	1.2%
Middle East	83	90	104	117	136	3.9%	3.1%	2.2%
Indian Subcontinent	175	192	233	272	318	4.9%	3.9%	2.6%
Australia/New Zealand	70	74	79	84	89	2.6%	1.3%	1.0%
Latin America (inc Mex/CRB)	276	298	327	355	389	3.9%	1.9%	1.5%

Latin America's imports by sea (sixth in ranking) are not expected to grow quickly, only slightly faster than total global trade (all modes). Therefore, Latin America will have a net deficit in terms of tons and, hopefully, a net surplus in terms of trade balance.

## Containerized Traffic

The dismal growth of container traffic in 2001 is a distant memory, especially since 2004 was an excellent year, when global TEU traffic should be finally reported to climb by 9%. Reaching 71.4 million TEUs in 2004, this will be the largest volume of full containers shipped in history, and in 2005, it will grow by another 7.8%, according to the revised outlook. Over the long term (2004-22), the forecast calls for 4.4% average annual growth in total seaborne (full) TEUs, reaching almost 150 million in the final year.

**Figure 4. Total Container Trade (Millions of TEUs)**



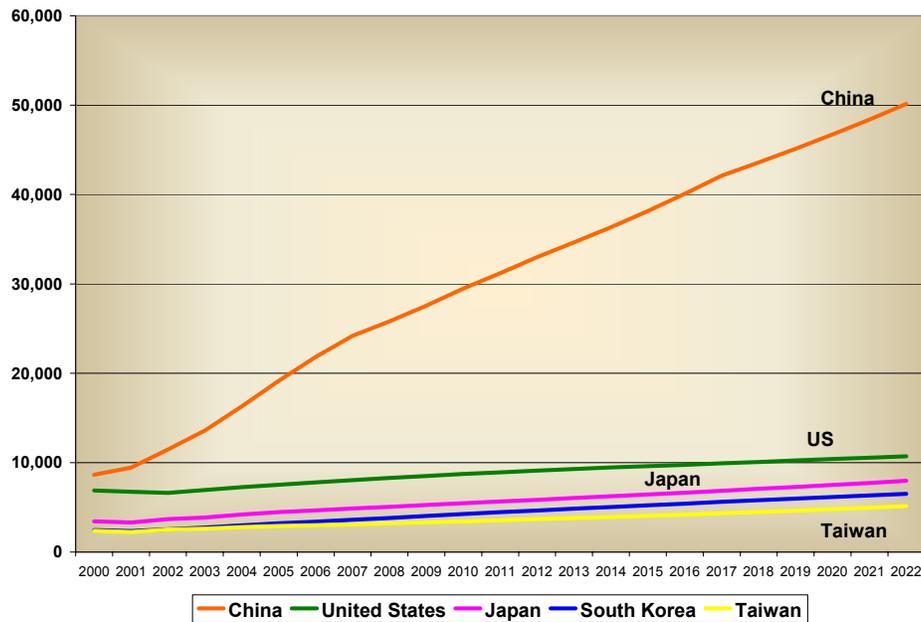
The breakdown of this strong growth is shown in the tables and charts that follow.

**Table 7. Five Largest Container Exporting Nations  
(Thousands of TEUs)**

Export Country	2004	2005	2006	2007	CAGR 2003-2021
China	16,306	19,146	21,828	24,184	6.4%
United States	7,257	7,516	7,788	8,036	2.2%
Japan	4,203	4,456	4,659	4,865	3.6%
South Korea	2,986	3,202	3,402	3,598	4.4%
Taiwan	2,774	2,901	3,000	3,101	3.5%

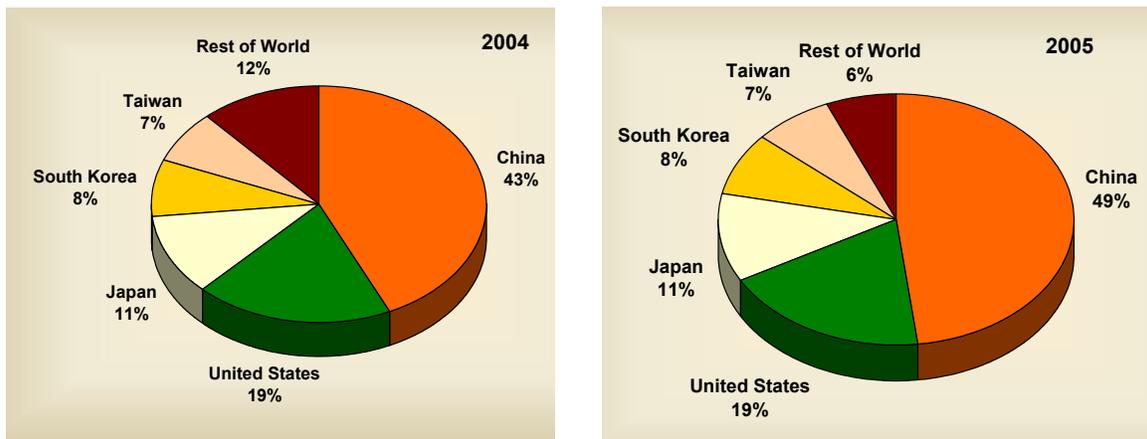
The amazing dominance of China as an exporter of containerized cargo can be seen in the preceding table and in Figure 5; China's exports in 2005 will be more than double its exports in 2000. Its average annual growth of 6.4% through the end of the forecast period will keep it in the top position. The economic growth assumptions behind this aggressive forecast are outlined in the global economic overview in this issue. It should be noted that China's high growth of the last few years is expected to slow, starting in 2005.

**Figure 5. Top Five Container Exporters Over Time**



The expected growth in China's container exports can be seen in the fact that, in 2000, China exported just 20% more TEUs than the United States. By the end of the forecast period, however, for every 1.0 TEU exported by the United States, China will export 4.7 TEUs. China's overall share of the global container shipping market can be seen in Figure 6, with an expansion in share again in 2005 to 49% of total world container trade.

**Figure 6. Top Five Container Exporters' Shares**



Containerized trade in TEUs by route is shown in Table 8, and graphical in Figure 6 following the table.

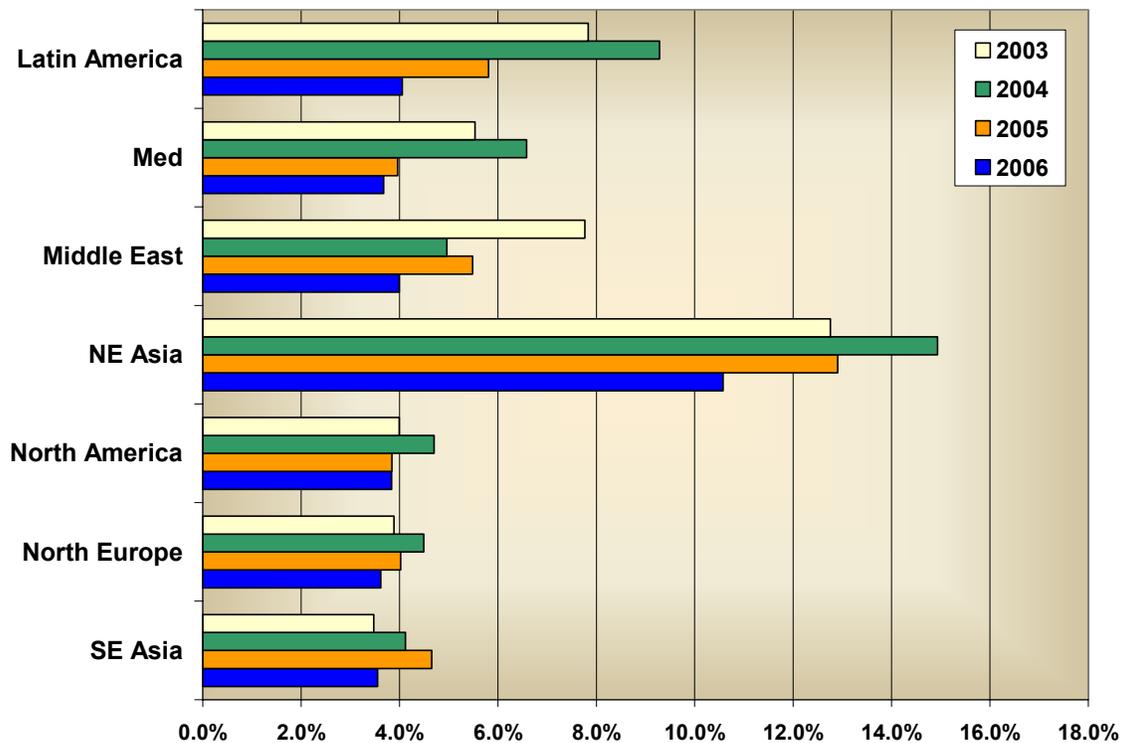
**Table 8. Containerized Trade by Route (Thousands of TEUs)**

Export Country	Import Country	2003	2004	2005	2006	2007	2008	Annual Growth Rate				
								2004	2005	2006	2007	2008
North America	ANZ	166	170	173	176	179	182	2.6%	1.5%	1.8%	1.5%	1.6%
North America	Eastern Europe	150	143	162	175	186	194	-4.5%	13.1%	8.1%	6.0%	4.4%
North America	Latin America	1,395	1,425	1,451	1,494	1,521	1,566	2.1%	1.8%	3.0%	1.8%	3.0%
North America	Med	435	446	451	457	464	469	2.4%	1.0%	1.5%	1.4%	1.1%
North America	Middle East	150	153	156	160	165	169	2.0%	2.2%	2.9%	2.8%	2.7%
North America	NE Asia	3,495	3,728	3,941	4,143	4,331	4,511	6.7%	5.7%	5.1%	4.5%	4.2%
North America	North America	335	361	368	375	382	387	7.5%	2.1%	1.8%	2.0%	1.4%
North America	North Europe	991	1,051	1,080	1,115	1,160	1,189	6.0%	2.8%	3.2%	4.0%	2.5%
North America	SE Asia	530	544	551	559	563	568	2.5%	1.3%	1.4%	0.7%	0.9%
North Europe	ANZ	179	186	191	195	199	205	4.3%	2.3%	2.2%	1.8%	3.0%
North Europe	Eastern Europe	177	191	207	220	233	247	8.0%	8.1%	6.5%	5.8%	5.7%
North Europe	Latin America	495	535	559	579	591	614	8.0%	4.5%	3.7%	2.0%	3.8%
North Europe	Med	922	975	1,024	1,068	1,109	1,149	5.7%	5.0%	4.3%	3.8%	3.6%
North Europe	Middle East	441	445	453	461	468	476	0.9%	1.8%	1.8%	1.5%	1.6%
North Europe	NE Asia	1,289	1,394	1,490	1,585	1,676	1,783	8.1%	6.9%	6.4%	5.8%	6.4%
North Europe	North America	1,711	1,731	1,747	1,765	1,789	1,811	1.2%	0.9%	1.0%	1.4%	1.2%
North Europe	North Europe	743	775	808	838	868	892	4.3%	4.4%	3.7%	3.5%	2.8%
North Europe	SE Asia	493	519	545	570	588	612	5.1%	5.1%	4.5%	3.3%	4.1%
NE Asia	ANZ	378	430	465	492	517	533	13.7%	8.3%	5.8%	5.0%	3.2%
NE Asia	Eastern Europe	493	559	630	687	743	782	13.4%	12.6%	9.1%	8.1%	5.2%
NE Asia	Latin America	1,768	2,043	2,286	2,544	2,825	3,042	15.5%	11.9%	11.3%	11.1%	7.7%
NE Asia	Med	1,159	1,364	1,544	1,726	1,904	2,029	17.7%	13.2%	11.8%	10.3%	6.6%
NE Asia	Middle East	515	597	691	764	822	879	16.1%	15.7%	10.6%	7.6%	6.8%
NE Asia	NE Asia	5,261	5,975	6,679	7,307	7,875	8,433	13.6%	11.8%	9.4%	7.8%	7.1%
NE Asia	North America	7,913	9,157	10,439	11,690	12,725	13,377	15.7%	14.0%	12.0%	8.9%	5.1%
NE Asia	North Europe	3,023	3,539	4,076	4,526	4,968	5,275	17.1%	15.2%	11.1%	9.7%	6.2%
NE Asia	SE Asia	1,968	2,208	2,437	2,632	2,800	2,930	12.2%	10.4%	8.0%	6.4%	4.6%
SE Asia	ANZ	195	209	221	229	235	241	7.5%	5.4%	3.9%	2.6%	2.5%
SE Asia	Eastern Europe	108	115	122	129	137	144	5.8%	6.5%	5.5%	6.1%	5.2%
SE Asia	Latin America	452	478	505	514	522	533	5.9%	5.7%	1.8%	1.5%	2.0%
SE Asia	Med	382	415	436	455	478	497	8.7%	5.0%	4.5%	5.1%	3.9%
SE Asia	Middle East	363	386	411	434	455	465	6.4%	6.4%	5.5%	4.8%	2.4%
SE Asia	NE Asia	1,994	2,073	2,166	2,237	2,321	2,414	4.0%	4.5%	3.3%	3.8%	4.0%
SE Asia	North America	1,331	1,355	1,398	1,442	1,496	1,497	1.8%	3.2%	3.1%	3.8%	0.1%
SE Asia	North Europe	982	1,058	1,130	1,183	1,245	1,291	7.8%	6.7%	4.8%	5.2%	3.7%
SE Asia	SE Asia	1,099	1,089	1,115	1,134	1,162	1,184	-0.9%	2.3%	1.7%	2.5%	1.9%
ANZ	ANZ	193	210	221	230	239	248	8.9%	4.9%	4.0%	4.2%	3.7%
ANZ	Eastern Europe	10	10	11	12	12	13	7.0%	5.9%	5.7%	5.3%	4.8%
ANZ	Latin America	37	40	42	43	45	47	6.6%	5.1%	4.1%	4.0%	4.6%
ANZ	Med	79	84	88	93	98	102	6.1%	5.9%	5.0%	5.2%	4.1%

Export Country	Import Country	2003	2004	2005	2006	2007	2008	Annual Growth Rate				
								2004	2005	2006	2007	2008
ANZ	Middle East	62	65	68	71	74	76	4.3%	4.8%	4.1%	4.3%	3.3%
ANZ	NE Asia	475	506	541	575	611	649	6.6%	6.9%	6.3%	6.2%	6.2%
ANZ	North America	187	199	200	202	205	209	6.3%	0.4%	0.8%	1.9%	2.0%
ANZ	North Europe	126	130	134	139	144	150	3.3%	3.2%	3.5%	4.3%	3.8%
ANZ	SE Asia	259	271	289	305	320	337	4.5%	6.4%	5.9%	4.8%	5.3%
Eastern Europe	ANZ	4	5	5	5	5	6	6.8%	6.0%	6.8%	5.2%	6.8%
Eastern Europe	Eastern Europe	0	0	0	0	0	0					
Eastern Europe	Latin America	24	26	28	30	31	33	8.7%	6.7%	6.4%	5.2%	6.6%
Eastern Europe	Med	58	62	66	70	75	80	6.4%	6.9%	6.5%	6.7%	6.6%
Eastern Europe	Middle East	24	25	27	29	30	32	4.1%	6.3%	6.8%	6.2%	6.3%
Eastern Europe	NE Asia	37	40	44	48	52	56	6.8%	9.4%	8.9%	8.7%	8.9%
Eastern Europe	North America	110	120	127	133	142	150	9.9%	5.3%	5.2%	6.1%	6.0%
Eastern Europe	North Europe	160	173	185	198	213	226	7.9%	7.3%	7.2%	7.3%	6.4%
Eastern Europe	SE Asia	13	14	15	16	17	18	8.4%	7.3%	7.7%	6.7%	7.6%
Latin America	ANZ	18	19	20	21	21	22	4.4%	4.3%	4.4%	3.5%	3.8%
Latin America	Eastern Europe	141	152	157	164	169	175	7.7%	3.7%	4.0%	3.3%	3.6%
Latin America	Latin America	760	812	858	902	939	985	6.9%	5.8%	5.1%	4.1%	4.9%
Latin America	Med	459	484	503	521	541	555	5.4%	4.0%	3.4%	4.0%	2.6%
Latin America	Middle East	95	98	102	106	109	113	3.9%	3.7%	3.6%	3.4%	3.2%
Latin America	NE Asia	543	592	636	675	710	747	9.0%	7.4%	6.0%	5.2%	5.1%
Latin America	North America	1,934	2,196	2,332	2,410	2,455	2,483	13.6%	6.2%	3.4%	1.8%	1.2%
Latin America	North Europe	1,092	1,171	1,239	1,289	1,333	1,355	7.2%	5.8%	4.0%	3.4%	1.7%
Latin America	SE Asia	88	91	95	99	102	106	3.9%	4.3%	4.0%	2.9%	3.9%
Med	ANZ	87	93	96	99	101	104	6.6%	3.1%	3.2%	1.8%	2.8%
Med	Eastern Europe	109	117	125	133	140	148	7.7%	7.3%	6.0%	5.7%	5.1%
Med	Latin America	338	364	382	398	408	425	8.0%	4.7%	4.3%	2.4%	4.4%
Med	Med	685	723	751	777	803	831	5.5%	3.9%	3.5%	3.3%	3.5%
Med	Middle East	427	458	475	494	508	525	7.3%	3.8%	3.8%	3.0%	3.2%
Med	NE Asia	298	318	338	356	373	393	7.0%	6.0%	5.4%	4.8%	5.5%
Med	North America	782	811	829	844	861	878	3.8%	2.1%	1.9%	2.0%	1.9%
Med	North Europe	906	993	1,036	1,079	1,123	1,160	9.6%	4.4%	4.1%	4.1%	3.3%
Med	SE Asia	117	122	128	133	137	142	4.7%	4.5%	4.2%	2.9%	3.9%
Middle East	ANZ	11	11	12	12	12	12	3.3%	2.5%	1.2%	1.0%	0.8%
Middle East	Eastern Europe	46	48	51	54	58	61	4.7%	7.4%	6.1%	6.1%	5.4%
Middle East	Latin America	3	3	3	4	4	4	8.0%	4.0%	3.0%	3.1%	3.4%
Middle East	Med	142	151	160	166	174	179	6.0%	5.9%	3.8%	4.6%	2.9%
Middle East	Middle East	38	39	40	42	43	44	1.5%	3.7%	3.1%	2.9%	2.6%
Middle East	NE Asia	690	735	783	822	867	913	6.5%	6.6%	5.0%	5.4%	5.3%
Middle East	North America	71	72	74	74	76	78	2.5%	2.1%	0.9%	2.7%	1.6%
Middle East	North Europe	144	153	161	165	171	174	6.2%	5.1%	2.6%	3.9%	1.7%
Middle East	SE Asia	84	86	90	93	96	99	2.9%	4.8%	3.3%	3.3%	3.1%

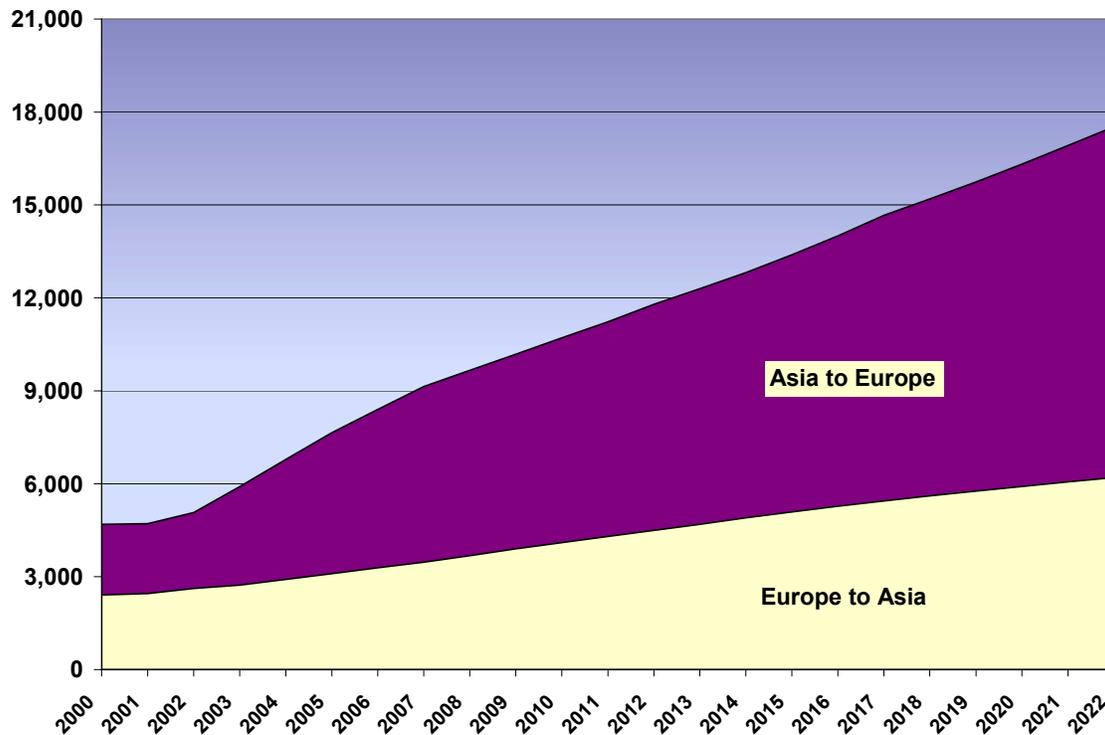
The growth of container exports by region in Figure 7 shows that Northeast Asia will be the largest and the fastest-growing exporter in 2004 and for the next two years. Latin America will be second fastest, although the volumes are considerably smaller. Latin America's container exports grew by 7.8% in 2003 and will climb by another 9.3% in 2004, thanks in part to the revival of Argentina's economy and the global response to its re-priced exports (including fruits and other refrigerated products) resulting from the devalued peso. Brazil's exports also contribute to this very positive near-term outlook. By 2006, however, in the face of a cooling world economy, Latin America's exports fall into the general 4-6% range of the other regions.

**Figure 7. Growth Rates of Containerized Exports by Region**



The forecast for the fast-growing Europe-Asia trade calls for Europe's container imports in 2004 to be more than double its exports to Asia, at 6.8 million TEUs westbound and 2.9 million eastbound. Also, this discrepancy is projected to remain in force, with the growth rates shown in the table following Figure 8.

**Figure 8. Asia Container Trade with Europe  
(Thousands of TEUs)**



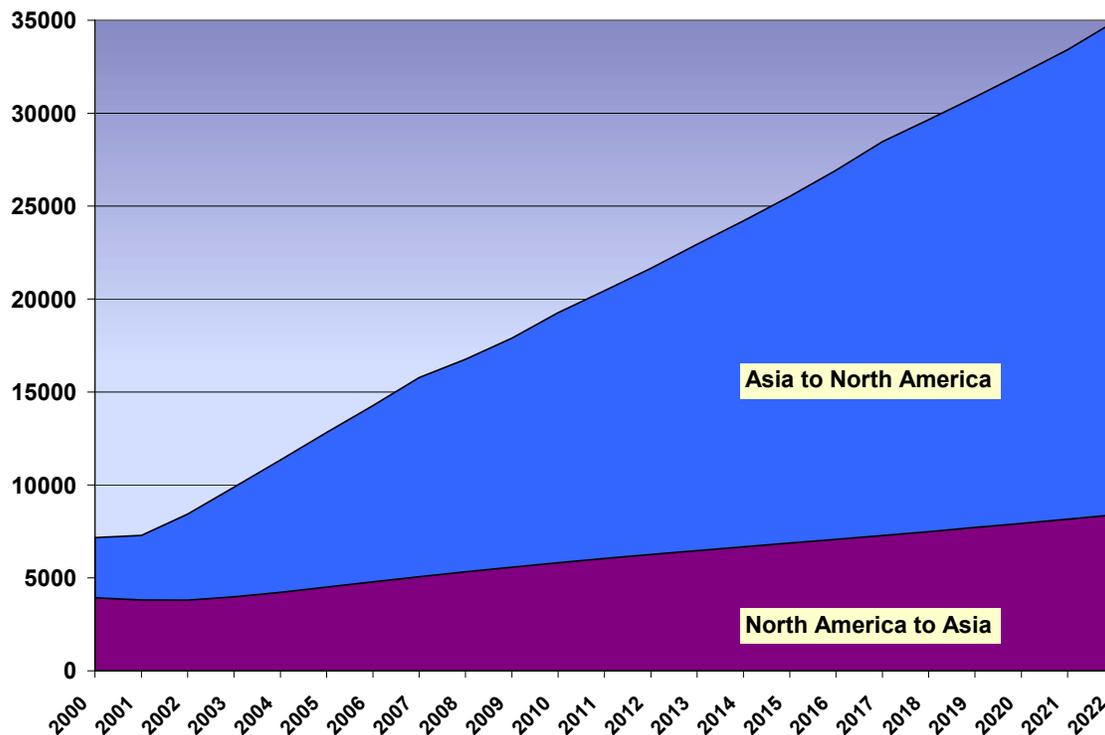
**Asia-Europe Trade (Annual Growth Rates)**

	2004	2005	2006	2007	2008
<b>Asia to Europe</b>	14.9%	12.7%	9.8%	8.9%	5.7%
<b>Europe to Asia</b>	6.5%	6.7%	6.1%	5.4%	5.9%

The high growth in westbound container traffic does not stem directly from simple economic growth in Europe, since we are expecting rather slow growth in real terms in the major countries of the region. Rather, it is the "China effect," in which a growing percentage of consumer durable goods are purchased from China and other Far Eastern sources, and, at the same time, the strong euro suppresses growth in industrial inputs from Europe. Indeed, we are expecting the dollar to fall in value against the euro over the period to 2008, thereby giving the United States a pricing lead for comparable substitute products.

The trans-Pacific outlook calls for very strong growth, especially eastbound, where the volume in 2004 will be 2.4 times higher than the westbound volumes of TEUs—10.5 million eastbound and 4.3 million westbound. The gap will widen over time, reaching a ratio of 3.9 to 1.0 in the final year (2022) of the forecast. U.S. demand for Far Eastern (Chinese) goods continues to outpace the real economic growth expected in the United States, a situation similar to that in Europe, where China gains market share in most containerizable commodities.

**Figure 9. North America Container Trade with Asia  
(Thousands of TEUs)**



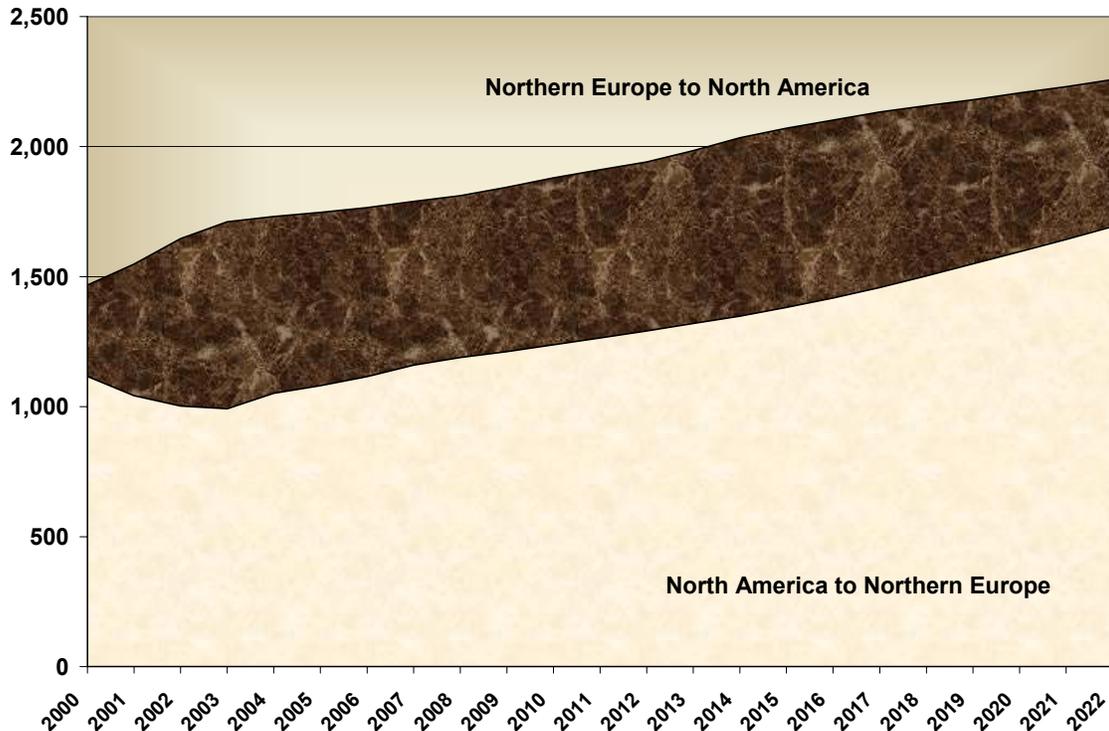
The difference in growth rates over the short term, eastbound versus westbound, are shown in the following table.

**Asia-North America TEU Trade (Annual Growth Rates)**

	2004	2005	2006	2007	2008
<b>Asia to North America</b>	13.7%	12.6%	10.9%	8.3%	4.6%
<b>North America to Asia</b>	6.1%	5.1%	4.7%	4.1%	3.8%

Transatlantic container trade is expected to show the effects of a declining dollar against the euro, and a shrinking imbalance as the North American import/export ratio goes from 1.6 in 2004 to 1.5 in 2008 and, finally, to 1.3 in 2022.

**Figure 10. North America Container Trade with Northern Europe  
(Thousands of TEUs)**



**Growth Rates of TEUs – Transatlantic**

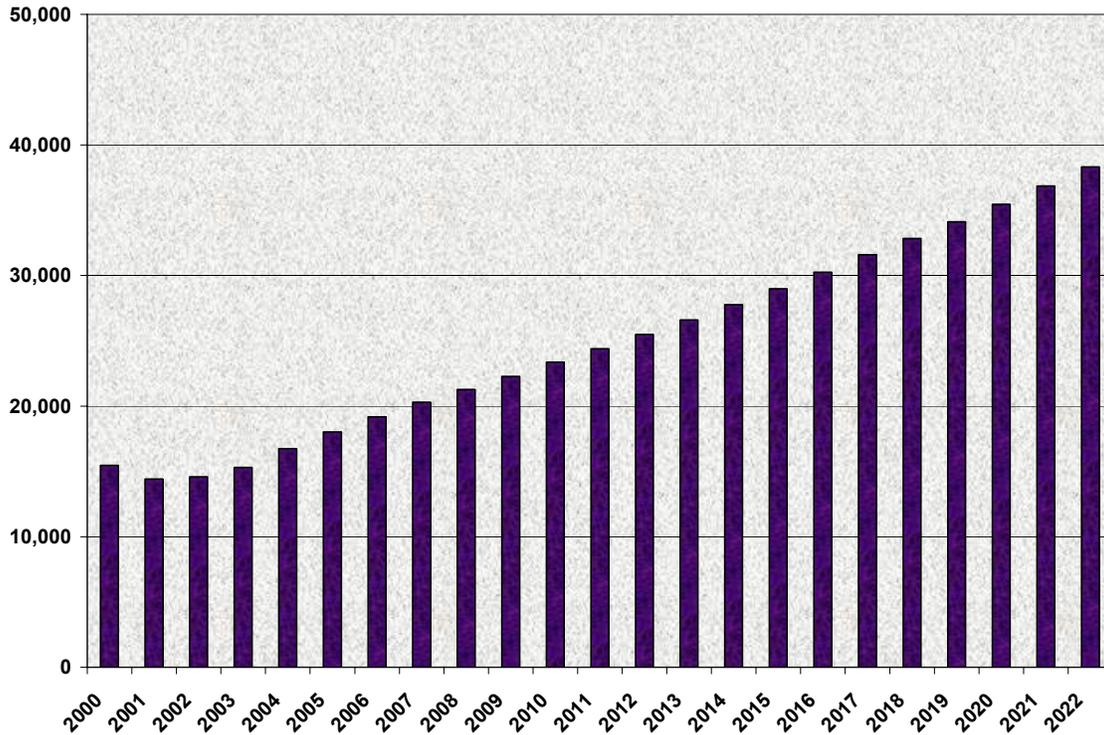
	2004	2005	2006	2007	2008
<b>N. Europe to N. America</b>	1.2%	0.9%	1.0%	1.4%	1.2%
<b>N. America to N. Europe</b>	6.0%	2.8%	3.2%	4.0%	2.5%

Some of the weak westbound growth is due to a substitution effect, with the United States purchasing more and more goods, of steadily higher value, from the Far East. This effect is likely to continue so long as product quality from the Far East improves and the dollar remains weak against the euro.

## Air Cargo

The negative year (2001) is finally being forgotten, especially in 2004, when we expect 9.4% growth in world air cargo volumes. At 16.8 million metric tons, this year's air cargo will be the highest on record. In 2005, 7.6% growth will also be strong for the industry as a whole.

**Figure 11. Total Air Cargo Shipments  
(Thousands of metric tons)**

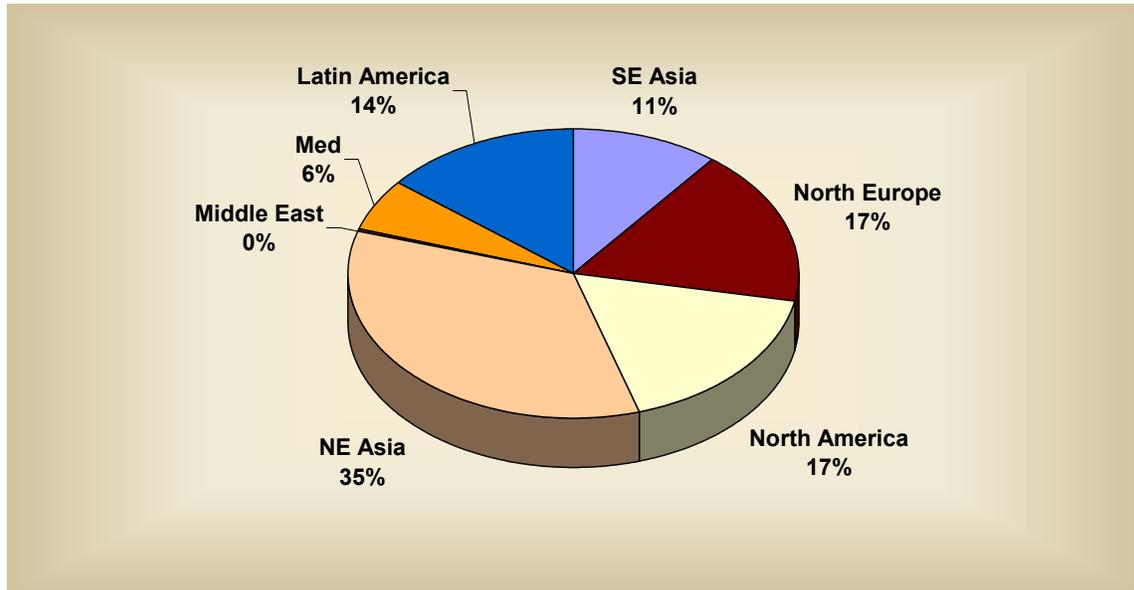


	2001	2002	2003	2004	2005	2006	2007	2008
<b>World Total</b>	-6.7%	1.1%	5.0%	9.4%	7.6%	6.4%	5.9%	4.8%

The long-range future of world air cargo is quite strong, averaging 5.0% from 2004 to 2022, considerably faster than real world economic growth, which will be around 3.2%.

From Figure 12, it is obvious that Northeast Asia represents the largest exporting region for air cargo in the world. It is double the size of North America in 2004.

**Figure 12. World Air Cargo Exports by Region, 2004**



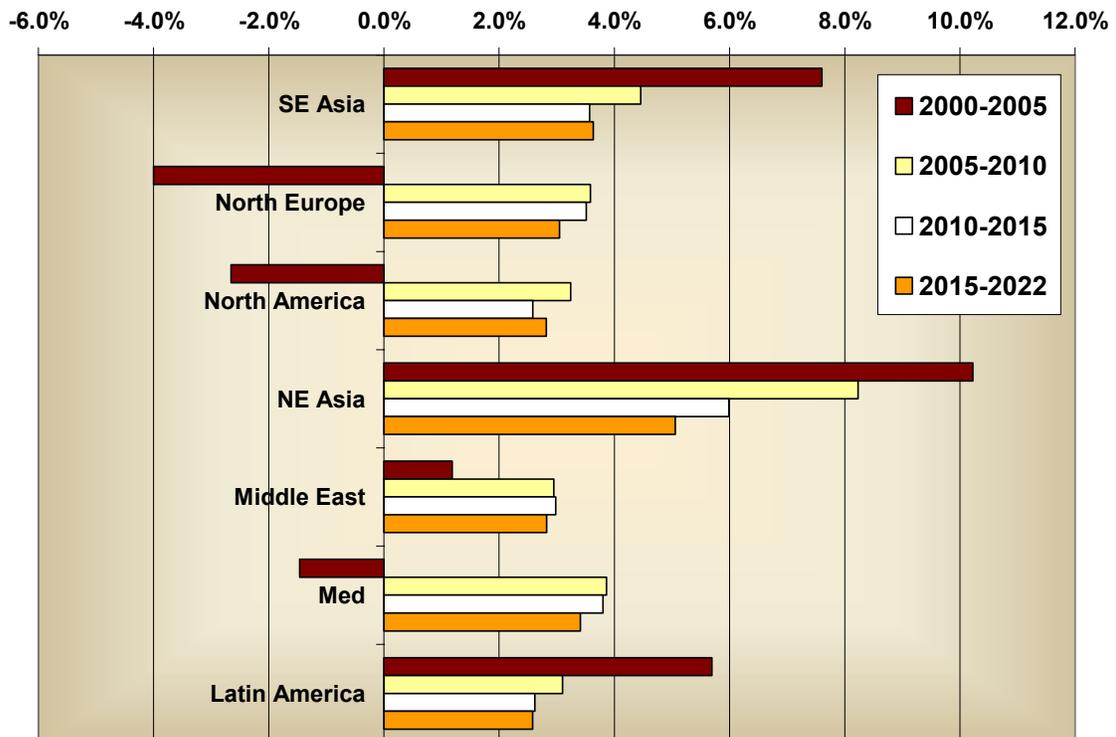
	2001	2002	2003	2004	2005	2006	2007	2008
<b>World Total</b>	-6.7%	1.1%	5.0%	9.4%	7.6%	6.4%	5.9%	4.8%

The outlook through 2008, shown in the previous figure, calls for total world air trade volumes to reach 21 million metric tons in that year. The ranking of the world's export regions for 2004 and 2008 is shown in the following table in metric tons. As in the case of sea trade, Northeast Asia tops the list in air volume, and its growth rate is the fastest, as the region exports higher and higher value-added products.

	2004	2008
<b>NE Asia</b>	5,281,680	7,823,596
<b>North America</b>	2,683,822	3,076,950
<b>North Europe</b>	2,660,371	3,059,792
<b>Latin America</b>	2,179,813	2,529,736
<b>SE Asia</b>	1,634,907	2,004,806
<b>Med</b>	883,160	1,031,786
<b>Middle East</b>	52,633	59,393

The growth rates over the forecast period are shown in Figure 13. It is clear that through 2010, the focus is on Northeast Asia. In the final years of the forecast, Southeast Asia is still growing strong, shipping higher-value goods. For Latin America, following the strong 2000-05 performance, air exports remain relatively strong with around 4% annual growth.

**Figure13. Airborne Metric Tons Exported by Regional Forecast Growth Rate**



### **3. NOTES ON THE FORECAST UPDATE**

For this new forecast, Global Insight has updated the historical trade data using the latest trade statistics released by U.S. Census Bureau, which now include data through the year 2003 for all U.S. trade routes.

The country/regions that were pending update were Belgium, Luxembourg, South Africa, and Other Southern Africa. Each of these countries/regions has changed the way it reports its data to the United Nations due to customs union and data reporting changes. The processing of updating Belgium, Luxembourg, and the main commodities for the South African countries for the year 2002 has now been finalized and is incorporated into the forecasts presented in this report.

**APPENDIX A -**

**A BRIEF INTRODUCTION TO THE WORLD TRADE**  
**FORECASTING METHODOLOGY**

# **Global Insight World Trade Service**

## **A Brief Introduction to the World Trade Forecasting Methodology**

### **1. Introduction**

The primary purpose of Global Insight's world trade forecasting system is to provide information to assist decision makers involved with international transportation. International transportation businesses, such as ocean shipping companies, terminal operators and port authorities, need detailed global trade volume forecasts for their operations and development planning. Policy makers and managers in companies that are not in the transportation business also can use these comprehensive forecasts to analyze world trade issues.

To meet the needs of the users, our global trade forecasts include all commodities that have physical volume, but not trade in services or commodities without physical volume, such as electricity. These commodities are grouped into our own categories derived from the International Standard Industrial Classification (ISIC). We cover 77 ISIC categories, as listed in Table 1 of the Appendix.

For all trade partners in the world, we track 54 major countries individually and group the rest of the countries in the world into 16 regions according to their geographic location. Therefore, we forecast 77 commodities traded among 70 country/regions. This is a framework of  $77 \times 70 \times (70 - 1)$ , or 371,910 potential trade flows. Because not every country trades every commodity with every other country, we presently have about 270,000 trade flows in our forecasts.

We forecast world trade in nominal and real commodity value and then convert to physical volume by transportation mode. Primary modes of transportation include air, overland and maritime transport, all measured in metric tons as well as in value. Maritime transport is further detailed for liquid bulk, dry bulk, general cargo/neobulk, and container trades. Container trade is measured in twenty foot equivalent units (TEUs) as well as metric tons. Table 3 in the Appendix shows the 18 concepts of the world trade in the forecast.

### **2. Trade Data Sources**

Our primary international trade history data come from the United Nations' as processed and published by Statistics Canada. These commodity trade statistics are collected from member countries' customs agencies. Customs departments have records of both the export side and import side of trade flows. Statistics Canada produces export data in f.o.b. (free on board) terms, which are better to use in estimating the real value of the commodity trade. This data covers all UN member countries and non-member economies, such as Taiwan. We also purchase OECD International Trade by Commodity Statistics for more current data from the developed countries.

Because international trade statistics collected by different countries usually have discrepancies when compared to each other, and because no one source has entirely complete data, we also use U.S. Customs data and IMF Direction of Trade data to calibrate and supplement the historical commodity trade data. Data from different sources are recorded in different classification systems and units of measurement. We convert the data into thousands of current U.S. dollars and then into 1997 real commodity value.

Our world trade forecasting models also rely on Global Insight's comprehensive macroeconomic history and forecast databases. Among the data used are population, GDP, GDP deflators, industrial output, foreign exchange rates, and export prices by country. We use these data as exogenous variables in the trade forecast models. For international commodity prices, we also obtain data from the U.S. Bureau of Labor Statistics' on international import and export prices. We also use other data, such as foreign direct investment and import tariffs, as available, as determinants of a country's export capacity and import costs.

### **3. Modeling International Trade**

The basic structure of the model for the trade flow of a commodity is that a country's import from another country are driven by the importing country's demand forces, enabled by the exporting country's capacity of exporting (supplying) the commodity, and affected by the exporting country's export price and importing country's import cost for the commodity. A country will import more of a commodity if its demand for this commodity increases. At the same time, the country will import more of this commodity from a particular exporting country if that exporter's capacity to export this commodity is larger and its export price for this commodity is lower than in other exporting countries. Importers will ultimately purchase based on the delivered cost, importing more when the import cost decreases. The distance between two countries is also an important factor in determining the scale of trade between two countries. Our models are constructed to capture the dynamics of international trade so that geographic distance as a constant is embedded in determining the scale of the base.

Demand forces are commodity specific. Presently, we group 77 commodities into two types. For the first type of commodities, major demand forces are the importing country's population and income growth. For the second type of commodities, the major demand forces are the importing country's production and technology development.

A country's export capacity for a commodity is estimated based on the country's capacity to produce this commodity and its ability to export it. The infrastructure, the establishments and resources that are needed for production determine production capacity. For export capabilities, we pay attention to the capacity that exceeds that needed to meet a country's domestic demand. Export capability is also determined by the quality and cost of the products that face competition in world markets.

Import costs are determined by export prices, import tariffs, and each importing country's foreign exchange rates. We categorize our 77 commodities into three groups to control the estimation of the impact of import costs on countries' imports of each commodity. These three groups generally can be described as price inelastic, low price elastic, and price elastic.

The models are constructed in real value terms. That is, value type variables are in terms of value minus the effect of price inflation. For example, the trade flow of a commodity is measured in the 1997 value of this commodity, and GDP of a country is measured in its 1990 value of GDP. We use the data in real value terms, because only in real terms do the levels of imports and exports show clear respective responses to changes in demand, supply, and prices.

As our main purpose is not simply forecasting a country's aggregate imports and exports, the models must be able to forecast each country's imports and exports with each of its trade partners. Trade between each pair of trading partners is generally quite volatile with importing behavior exhibiting switching of suppliers on an ongoing basis. A very simple example of switching behavior is when the pattern of an exporter's supply dynamic is smaller than the importer's demand dynamic, the exporter's supply dynamic will dominate the trade. In the opposite case, when an importer's demand dynamic is smaller than the exporter's supply dynamic, the importer's demand dynamic will dominate the trade. To capture such a pattern switch, we use multi-stage switch models.

#### 4. Model Estimation

To minimize the impact of measurement errors and achieve stationarity for valid estimation of times series models, our models are constructed to represent the relationship between year-over-year growth indexes of commodity trade and the year-over-year growth indexes of other exogenous variables. Because the calculated year-over-year index is asymmetric around unity, it can exaggerate growth dynamics if the present year is an upturn and the previous year is a downturn. This problem can be serious for the detailed international trade data that have very volatile dynamics. To reduce such asymmetric distortion in model estimation, we rectify the asymmetry in the data before estimating the trade models.

Our trade models are nonlinear multi-stage switch models. Switch models are not continuous functions, so conventional derivative methods cannot be applied to estimating these models. So to estimate the trade models, we use a direct search method. Though thus use of the direct search method is infrequent in economic forecasting, it is popular in other scientific fields. This is because economists often abstract from reality to fit simplified theoretical models, while scientists must construct their models to capture reality as evidenced in empirical data. Our experience has shown that international trade of goods among world markets are so complicated with regard to each commodity, each pair of partners, and over time that they cannot be sufficiently abstracted to fit into simple continuous functions for accurate forecasting. Instead we have developed our system using complex switch functions, for which we employ a direct search method for estimation.

For estimating simple continuous functions, derivative methods have the advantage of quick convergence. However, with faster computers and decreasing computation costs convergence time is no longer a problem. This means our ability to estimate practical models can depend upon the criterion used for choosing our estimation method. The direct search method we use has three major advantages over conventional derivative methods. The first advantage, which is the most important one, is that it can be used to estimate switch functions. The second advantage is that it allows us to freely define our error minimization function. For forecasting it is minimizing the relative absolute error not the sum of squared error that is important for producing the most accurate models. However, an absolute error function is not continuous so we use a direct search method for its estimation. For nonlinear models, the continuous error function defined for derivative methods sometimes cannot avoid multi local minimums, so use of a derivative method frequently cannot attain global minima. Through the use of the direct search method, we can freely define the error function to only contain one minimum. The third advantage is that the direct search method allows us to conveniently set the boundary of

model parameters. That means it allows us to apply prior information to our model estimation.

## 5. Forecast Approach

There are two key factors that influenced our choice of forecasting approach. One is the scale of our trade forecasts, and the other is the real character of international trade. The real character of international trade includes economic resource constraints, heterogeneous import behavior, and overall supply and demand equilibrium.

Previous international trade forecasting approaches can be categorized as bottom-up, top-down, and a (manual) hybrid approach. Our forecasting experience leads us to believe that none of these approaches are suitable to best meet our requirements. The bottom-up approach requires that the individual items to be forecast are not subject to total resource constraints or an overall equilibrium. This denies the existence of real resource constraints in international trade. For just one example, a country's imports are limited by its income constraint. We also find that there is an overall equilibrium in international trade, where no country can export more than what other countries are willing to import from it. In contrast, the top-down approach requires that individual items to be forecast have identical dynamic patterns. Examining commodity trade statistics quickly reveals that it is difficult to find one country's imports of a commodity from two different countries that have the same dynamic patterns. So this approach is not appropriate either. To overcome the shortcomings of using the bottom-up or top-down approaches alone, some economists have forecast individual commodities and their aggregates simultaneously and then manually reconciled the difference between the sum of individual forecasts and the aggregate forecasts. This is called a hybrid approach, which is generally a manual method. Unfortunately, the manual reconciliation is very time consuming, so it cannot be efficiently applied to comprehensive forecasts such as ours, which include more than a quarter million forecast series.

To overcome the weaknesses in these approaches, we have built a system that can be described as a top-down controlled approach. To implement this approach, we aggregate detailed trade flows to three top levels. We call the most detailed trade flows Level 4 (the lowest level) and aggregate them up level-by-level in the following structure:

### Level 1

L1: World trade of total commodities,  
1X1X1 = 1 series.

### Level 2

L2C: World trade by commodity,

77X1X1 = 77 series.

L2M: Total commodities that each country/region imports from the world,

1X1X70 = 70 series.

L2X: Total commodities that each country/region exports to the world,

1X70X1 = 70 series.

### Level 3

L3M: Commodities that each country/region imports from the world,

77X1X70 = 5,390 series maximum.

L3X: Commodities that each country/region exports to the world,

77X70X1 = 5,390 series maximum.

### Level 4

L4: Commodities traded between each pair of countries/regions,

77X70X(70-1) = 371,910 series maximum.

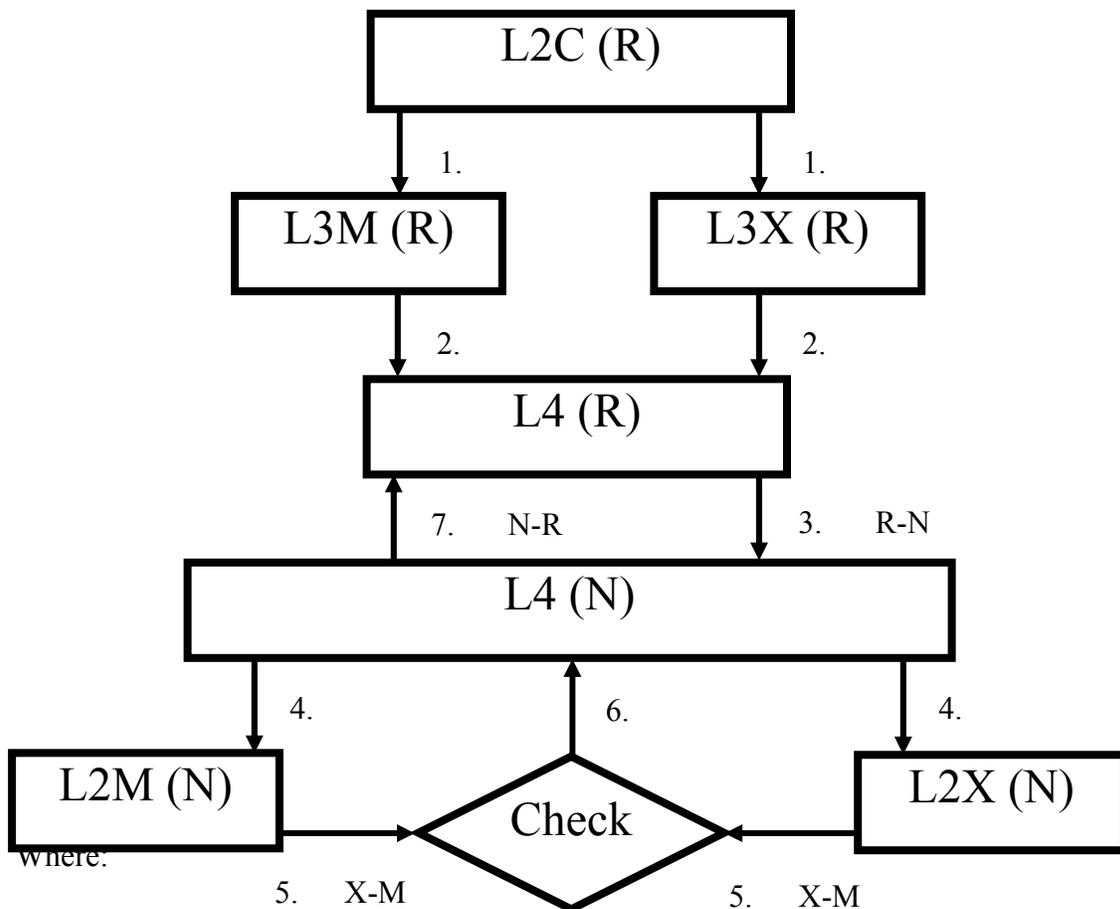
In this hierarchical structure, each series in levels L2C, L3M, L3X, and L4 has its own behavioral equation in the model structure (as described above in section 3). In this top-down controlled forecasting approach, each series is forecast by its own behavioral equation, but individual items at the lower level are forecast under the control of the forecast of their aggregate at the higher level. The forecasting program detects the discrepancy between the sum of individual forecasts and the aggregate forecast, identifies individual items that can be adjusted, and adjusts them step by step to diminish the discrepancies. The identification and adjustment are based on the estimated allowable variation of the behavior models. With such a design, the top-down controlled forecast adheres to the reality that international trade is subject to economic resource constraints, has heterogeneous behavior, and will attain overall supply and demand equilibrium.

## **6. Forecasting Process**

Our forecast approach determines our forecasting process, as shown by the flowchart that follows. The numbers in the flowchart indicate the sequence of the forecasting. The forecast starts from L2C. These are the top-level forecasts. We then use them to do top-down controlled forecasting of L3M and L3X, and in turn use L3M and L3X to do top-down controlled forecasting of L4. They are all forecast in real commodity value. After we obtain the detailed forecasts of the international trade in real commodity value, we check whether the overall forecast implies a reasonable trade balance that we should expect for every country/region according to their macro economic development. Trade balance is a financial concept that we need to examine in nominal, not real, value terms.

Therefore, we convert real value L4 into nominal value L4 and then aggregate them to import and export by country/region, i.e., L2M and L2X in nominal value. Although our forecast does not include service sectors, we take into account the development of services trade for each country/region when examining the trade balance between L2M and L2X. If the forecasted trade balance for a country/region is not reasonable, we adjust L2M or L2X, or both, and then use the adjusted L2M and L2X to do a top-down controlled adjustment of the nominal L4 detailed trade. Because the trade of these countries/regions link to each other, adjusting the trade balance of one country/region affects the trade balance of other country/regions, depending on the magnitudes of their trade links. Therefore, usually we need several rounds of adjustments to attain reasonable trade balances for all country/regions. After completing the trade balance check and adjustment step, we convert nominal value L4 to real value L4 and aggregate these final detailed forecasts to their upper three levels.

### Global Insight World Trade Forecasting Process



where:

R – real commodity value

N – nominal value

TDCF – top-down-controlled forecast  
R-N CV – real-nominal value conversion  
AG – aggregation  
X-M CP – export-import balance comparison  
TDCAD – top-down-controlled adjustment  
N-R CV – nominal-real value conversion

Because the release of trade data always lags behind current trade activity, and because behavioral forecasting models cannot include unexpected events, such as disease outbreaks in livestock, oil price shocks, earthquakes, strikes, wars, etc., we create dummy variable multipliers for each series, and modify some of them at certain levels in accordance with development of events in the world.

## **7. Converting Real Value Trade to Transportation Volume**

There are predictable relationships between the physical volume and the real value of each trade flow. After we obtain the forecasts of world trade in real commodity value, we use these relationships to convert the real commodity value to the physical volume of 77 commodities transported among 70 countries/regions, by transportation mode. We first convert the commodity flows to the value and physical volumes shipped by different transportation modes. Transportation mode represents the primary mode of transport used in the international shipment, usually for the greatest distance (or line haul) part of the complete origin-to-destination shipment. These major modes are air, overland/other (comprised mainly of truck, rail and pipeline) and maritime. For maritime trade, we further distinguish between liquid bulk, dry bulk, general cargo/neobulk and container trade. The volume of commodities carried by each mode reflects the historic shares carried by each mode, at a commodity-specific, and trade route-specific basis with adjustments made to maritime shares based on observed shifts in share between the types of maritime shipping. For container trades, the forecast tonnage volume is further translated into twenty-foot equivalent units (TEUs) through application of commodity-specific and trade route-specific stowage factors for twenty-foot and forty-foot containers and the mix of twenty-foot and forty-foot containers used on each trade route. (The full list of forecast trade concepts produced is shown in Table 3 of the Appendix.).

## **8. Forecast Range and Frequency**

The history of our trade statistics starts from 1980 and extends to about a one-year lag from the current time. We forecast 20 or more years into the future, depending on clients' needs. Our forecasts are annual series, because the main historical trade data are reported as annual series. However, our supplementary trade data and exogenous macro economic

data can be annual series, quarterly series, or monthly series. They are updated quarterly or monthly, so we update our trade forecasts every quarter.

## APPENDIX B – TRADE MODEL DETAIL

**TABLE 1. GLOBAL INSIGHT WORLD TRADE SERVICE FORECAST  
COMMODITY CATEGORIES**

<b>Count</b>	<b>ISIC</b>	<b>Description</b>
1	1A	<b>Grain</b>
2	1B	Oil Seeds
3	1C	Vegetables, Fruits and Eggs – Requiring Refrigeration
4	1D	Vegetables and Fruits - non-Refrigerated
5	1E	Cork and Wood
6	1F	Natural Rubber
7	1G	Cotton
8	1H	Other Raw Textile Materials
9	1I	Other Agriculture
10	2A	Stone, Clay and Other Crude Minerals
11	2B	Crude Fertilizers
12	2C	Ores and Scrap
13	2D	Coal
14	2E	Crude Petroleum
15	2F	Natural Gas
16	2G	Scrap
17	311A	Meat/Dairy/Fish Requiring Refrigeration
18	311B	Other Meat/Dairy/Fish
19	311C	Sugar
20	311D	Animal Feed
21	311E	Animal and Vegetable Oils
22	311F	Other Food
23	313	Beverages
24	314	Tobacco
25	321	Textiles
26	322	Wearing Apparel
27	323	Leather and Products
28	324	Footwear
29	331	Wood Products
30	332	Furniture and Fixtures
31	341A	Waste Paper
32	341B	Pulp

33	341C	Paper and Paperboard and Products
34	342	Printing and Publishing
35	3511A	Organic Chemicals
36	3511B	Inorganic Chemicals
37	3512	Fertilizers and Pesticides
38	3513	Synthetic Resins
39	3521	Paints, Varnishes and Lacquers
40	3522	Drugs and Medicines
41	3523	Soap and Cleaning Preparations
42	3529	Chemical Products, nec.
43	353	Petroleum Refineries
44	354A	Briquettes and Coke
45	354B	Residual Petroleum Products
46	355	Rubber Products
47	356	Plastic Products, nec.
48	361	Pottery, China etc.
49	362	Glass and Products
50	369	Non-Metallic Products, nec.
51	371	Iron and Steel
52	372	Non-Ferrous Metals
53	381	Metal Products
54	3821	Engines and Turbines
55	3822	Agricultural Machinery
56	3823	Metal and Wood Working Machinery
57	3824	Special Industrial Machinery
58	3825	Office and Computing Machinery
59	3829	Machinery and Equipment, nec.
60	3831	Electrical Industrial Machinery
61	3832A	Radio and TV
62	3832B	Semi-conductors, Electronic Tubes, etc.
63	3832C	Other Communications Equipment
64	3833	Electrical Appliances and House wares
65	3839	Electrical Apparatus, nec.
66	3841	Shipbuilding and Repairing
67	3842	Railroad Equipment
68	3843A	Motor Vehicles
69	3843B	Parts of Motor Vehicles
70	3844	Motorecycles and Bicycles
71	3845	Aircraft

72	3849	Transport Equipment, nec.
73	3851	Professional Equipment
74	3852	Photographic and Optical Goods
75	3853	Watches and Clocks
76	390	Other Manufacturing, nes.
77	399	Goods not classified by kind

Note: nec – not elsewhere classified; nes – not elsewhere specified

**TABLE 2. GLOBAL INSIGHT WORLD TRADE SERVICE FORECASTING COUNTRIES/REGIONS**

<b>54 Major Countries</b>		<b>Count</b>	<b>Country Name</b>
<b>Count</b>	<b>Country Name</b>	41	Pakistan
1	United States	42	Venezuela
2	Canada	43	Brazil
3	Japan	44	Argentina
4	Germany	45	Colombia
5	France	46	Peru
6	United Kingdom	47	Chile
7	Italy	48	Mexico
8	Austria	49	Israel
9	Belgium	50	Saudi Arabia
10	Denmark	51	United Arab Emirates
11	Finland	52	Egypt
12	Greece	53	Kenya
13	Ireland	54	South Africa
14	Netherlands		
15	Norway		<b>16 Aggregate Regions</b>
16	Portugal	<b>Count</b>	<b>Region Name</b>
17	Spain	55	Other Europe
18	Sweden	56	Baltic States
19	Switzerland	57	CIS West
20	Turkey	58	CIS Southeast
21	Russia	59	Other Indian Subcontinent
22	Poland	60	Other East Coast of South America
23	Czech Republic	61	Other West Coast of South America
24	Slovak Republic	62	Caribbean Basin
25	Hungary	63	Other Central America
26	Romania	64	Other Persian Gulf
27	Bulgaria	65	Other Mediterranean Region
28	Australia	66	Other North Africa
29	New Zealand	67	Other East Africa
30	China	68	Western Africa
31	Taiwan	69	Other South Africa
32	Hong Kong	70	Other Region
33	South Korea		

34	Indonesia		
35	Philippines		
36	Singapore		
37	Malaysia		
38	Thailand		
39	Vietnam		
40	India		

**TABLE 3. GLOBAL INSIGHT WORLD TRADE SERVICE FORECAST CONCEPTS**

<b>Count</b>	<b>Concept</b>
1	<b>Nominal Value</b>
2	Real Value
3	Airborne Nominal Value
4	Seaborne Nominal Value
5	Airborne Real Value
6	Seaborne Real Value
7	Airborne Metric Tons
8	Seaborne Metric Tons
9	Tanker Metric Tons
10	Dry Bulk Metric Tons
11	General Cargo/Neobulk Metric Tons
12	Container Metric Tons
13	Number of 20 foot Containers
14	Number of 40 foot Containers
15	Container Twenty-foot Equivalent Units (TEUs)
16	Over Land / Other Transportation Nominal Value
17	Over Land / Other Transportation Metric Tons
18	All Transportation Mode Metric Tons