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Can East Asia Weather a US Slowdown?

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Can East Asia Weather
a US Slowdown?

Cyn-Young Park

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CAN EAST ASIA WEATHER A US SLOWDOWN?

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FOREWORD

The ERD Working Paper Series is a forum for ongoing and recently completed research and policy studies undertaken in the Asian Development Bank or on its behalf. The Series is a quick-disseminating, informal publication meant to stimulate discussion and elicit feedback. Papers published under this Series could subsequently be revised for publication as articles in professional journals or chapters in books.

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ABSTRACT

The expected slowdown in the economy of the United States (US) has ignited increasing concerns over the short-term growth prospect of East Asia. Historically, a US slowdown has often been associated with a global slowdown. East Asia has been particularly vulnerable to slowing US growth, given its relatively high export reliance on the US market. During the last slump in 2001–2002, a drop in US imports immediately translated into falling exports, cuts in industrial production, and declining growth rates in East Asia. Using the Oxford Economics' Global Model, this paper examines the possible impacts on East Asia of a sharper and longer US slowdown than is currently anticipated by the Asian Development Bank in its *Asian Development Outlook 2007*. The results of the simulation exercises suggest that the impact of a US slowdown on its own would not significantly impact growth in East Asia. However, if a US slowdown instigates disorderly adjustments in international financial markets and spills over into the People's Republic of China, the remainder of East Asia would not be spared.

I. INTRODUCTION

A slowdown in the United States (US) in 2007 has become more of a fact than a conjecture. The US economy registered the lowest growth rate in 4 years in the first quarter at 1.3%, sparking increased concern over its 2007 growth prospects. A downturn in the US housing market, which has already dented US economic performance through declines in residential investment and construction activity, is expected to further the slowdown before it improves. Historically, a US slowdown has often been associated with a global slowdown. The US is by far the largest single economy in the world, accounting for nearly one third of global economic activity. A slowdown in the US economy could thus represent a significant downside risk to the global economy.

In the past, East Asia¹ has proven particularly vulnerable to slowing growth in the US economy given its relatively high export reliance on the US market. During the last slump in 2001–2002, US imports fell by a cumulative 4.2% and this fall was translated into falling exports, cuts in industrial production, and declining growth rates in East Asia. Although a sharp downturn in the US economy is not a part of the baseline scenario for the global economy presented in the *Asian Development Outlook (ADO) 2007* (ADB 2007), there is increasing concern about further weakness in the US economy and its potential impact on the East Asian economy.

Using the Oxford Economics' Global Model (the Oxford model) (see Appendix for the model description), this paper examines the possible impacts on East Asia of a sharper and longer US slowdown than is currently anticipated in the ADO 2007. Additional scenarios where a sharper US slowdown triggers an unwinding of global imbalances or a "hard" landing in the People's Republic of China (PRC) economy will also be considered. A deeper slowdown in the US economy could spark fear over the sustainability of large US current account deficits, thus leading to a sharp depreciation in the US dollar. Also, there are concerns about overheating in investments of the PRC. The PRC reported another strong growth in investment in the first quarter of 2007, with fixed asset investment rising about 25% from a year ago. Tightening measures intended to rein in booming asset demands in the PRC continue. Combined with this, if a sharper slowdown in the US instigates instability in global financial markets, a sudden shift in investors' sentiment may lead to a sharp reduction in the PRC investment.

The results of these exercises suggest that the impact of a US slowdown on its own would not significantly impact growth in East Asia. However, if a US slowdown instigates disorderly adjustments in international financial markets and spills over into the PRC, the remainder of East Asia would not be spared.

¹ Throughout this paper, East Asia refers to nine economies in East and Southeast Asia: People's Republic of China; Hong Kong, China; Indonesia; Korea; Malaysia; Philippines; Singapore; Taipei, China; and Thailand.

II. ASIA'S EXTERNAL DEPENDENCY

There is debate on whether East Asia is uncoupling from the US economy. Traditionally, East Asia has been viewed as a region that relies heavily on exports for growth. As an important corollary of this, the East Asian economy has been considered vulnerable to external demand shocks. However, despite a visible slowing in US growth in the second half of 2006, East Asia's exports remained robust. Some commentators have interpreted this as evidence that East Asia might be uncoupling from the US business cycle. This "uncoupling" thesis rests on the fact that countries in East Asia increasingly trade with each other and less with the US. Today, 40% of all goods leaving East Asia's ports are headed for other East Asian destinations. The US market now accounts for only 18% of East Asia's total exports, down from 24% just 5 years ago. Also, although the East Asian economy accounts only about 10% of world gross domestic product (GDP) in real US dollar terms (22% on a purchasing power parity basis), its share of incremental income in the global economy is growing rapidly. East Asia posted an average growth rate of 7.6% per year over the past 5 years, contributing nearly one fourth of global growth in the same period.

Yet despite its increasing share in world output, East Asia's economic size remains small relative to the US's 30.6% of world GDP, Japan's 14.0%, and European Union's (henceforth, G3 economies) 24.9%. East Asia's weight in global demand is also less than its weight in income, as it has continued to run large current account surpluses. While the G3 economies consume nearly as much as they produce, East Asia consumes only about 70% of what it produces. The great bulk of East Asia's products are being exported outside the region.

ADB (2007) presents evidence that East Asia is vulnerable to the global business cycle both structurally and cyclically. Sharing of production processes across East Asia has given strong momentum to regional economic and trade integration since the 1990s. But this regional integration is tied to the globalization of business networks. Growing intraregional trade is to a large extent being driven by back and forth shipments of intermediate goods that are eventually consumed outside the region. The world's major industrial countries continue to contribute the bulk of final demand from which much of East Asia's trade in intermediate goods is derived. More than 60% of East Asian exports are ultimately headed for the G3 economies, after tracking the ultimate destination of trade of intermediate goods.

Analysis of East Asian business cycles also yields some surprises. Growth in East Asian countries has become much more closely synchronized, and, increasingly, the ups and downs of growth in the PRC have moved in tandem with the rest of East Asia. But evidence of greater business cycle synchronization is not confined to the region. Cyclical comovements of output in East Asia and the G3 have also visibly strengthened since the 1997 Asian crisis. Finally, there is evidence of stronger, not weaker, sensitivity of cyclical movements of East Asian output to cyclical movements of the G3 in the postcrisis period. The International Monetary Fund (IMF 2007) broadly corroborates the evidence presented in the *ADO 2007*.

Taken together, this evidence questions the "uncoupling thesis." Indeed, despite appearances to the contrary, it would seem that in the postcrisis period, East Asia has become more, not less sensitive, to the vicissitudes of movements in international demand, particularly in the G3. However, a question mark does exist over the economic (rather than statistical) significance of the underlying linkages. To examine these, the next section uses the Oxford model, to quantify and trace the impacts of a variety of "shocks" on East Asia.

III. IMPACT OF A US SLOWDOWN

A. Baseline Scenario

The baseline assumption is that US growth slows to an annual rate of 2.5% in 2007, down from 3.3% in 2006. The ongoing housing slump has already hurt growth by crimping residential investment and slowing business activity. Residential investment has fallen for the fifth consecutive quarter in the last quarter of 2006. Although the pace of decline in home prices has moderated, falling housing starts and building permits continue to set a downward trend in the housing sector. However, buoyant consumption demand underpinned by steady improvement in the job market provides a backdrop for a quick rebound. The baseline scenario projects the US economy to quickly recover, growing at 3.0% in 2008.

While it is clear that East Asia remains vulnerable to a severe slowing in the US economy, the baseline scenario has modest implications only. There are three reasons for this. First, the depth of the slowdown in the US economy is expected to be contained. So far, the housing market-led US slowdown has had limited spillovers elsewhere. Private consumption and business investment unrelated to construction demand in the US remain buoyant. With the US import demand being generally healthy, it also helps that East Asia has little industry exposure to the US housing sector. Second, both the Japanese and European economies are on a modest cyclical upturn. Together, they account for nearly 30% of total world GDP and represent more than one fourth of East Asia's total export market—much larger than the share of the US market. Although historically these economies were also seen generally sensitive to the US business cycle, their export reliance is far smaller than the East Asian economy. As long as these economies retain growth momentum, their domestic demand could provide a meaningful buffer for East Asian exports. Third, the baseline scenario embodies moderate accommodations in monetary and fiscal policies. For example, the baseline scenario already incorporates a nearly 100 basis point reduction in the US Federal Funds rate by the end of 2008. Timely and responsive policy actions may help mitigate adverse impacts of the slowing economy.

Against this backdrop, the outlook for East Asia remains brisk. As the pace of global expansion eases, growth is projected to ease to 7.5% in 2007, down from 8.1% in 2006 (ADB 2007). But growth of 7.5% would still be faster than the average annual growth of 6.5% over the last decade. While net exports' contribution to growth is expected to soften, strengthening domestic demand is expected to fill part of the gap. Little change is expected in 2008. This baseline outlook is consistent with the consensus assessment that a housing market-led slowdown in the US would be a relatively isolated domestic phenomenon with little complications for the rest of the world (see IMF 2007).

B. Three Alternative Scenarios of a US Downturn

The analysis in this section focuses on three alternative scenarios, each of which anticipates a sharper fall in US GDP growth compared with the baseline scenario. The first scenario (Scenario 1) considers a further decline in US consumption, which will amount to a 1 percentage point drop in GDP growth from the baseline scenario in 2007 and 2008. Scenario 1A and Scenario 1B provide a more explicit description of relevant downside risks associated with the sharper US slowdown. In Scenario 1A, the slower US growth triggers a dollar depreciation of 10% against all the currencies,

except Hong Kong, China where the currency is fixed. Finally, Scenario 1B considers the possibility that slower US growth acts as a drag on global investment, leading to a reduction in gross fixed investment by 10% over the baseline level in the PRC.

Figures 1a–c demonstrate the changes implied by these scenarios compared to the baseline. The first panel of Figure 1 shows that US growth rates fall by 1 percentage point from the baseline growth rates for two consecutive years. This implies that US growth slows to 1.5% in 2007 and 2.0% in 2008, compared with 2.5% and 3.0% respectively presented in the baseline scenario. The second panel shows that the US dollar depreciates by 10 percent. This one-step depreciation against all currencies leaves the effective exchange rate for the US dollar permanently lower than the baseline level by 10 percent. Likewise, the third panel illustrates a permanent reduction in the PRC investment by 10% compared to the baseline level. Scenario 1B is again a one-step adjustment in the level. In terms of growth rates, it is only a temporary shock and investment growth rates return to the baseline scenario values immediately after one year. For example, investment growth drops from the baseline growth rate in 2007 by nearly 12 percentage points, but from 2008 onward, growth resumes at the baseline pace. Figure 1a corresponds to Scenario 1. A combination of Figure 1a and 1b represents Scenario 1A, whereas Figure 1a and 1c together express Scenario 1B.

Scenario 1 envisions a sharper US slowdown than currently anticipated in the baseline scenario. While a sharper than anticipated slowdown may warrant more aggressive monetary and fiscal easing, there may not be enough room for these policies to deal with the slowdown globally this time around, as opposed to the last global downturn in 2001. First, persistently high oil prices continue to feed into underlying inflationary pressures, which may prevent affected countries from exercising expansionary monetary policy corresponding to a further slowdown. Second, fiscal expansion as well may not be easily accommodated, as many countries remain stretched in their fiscal balances and are now committed to long-term consolidation plans. The simulation exercise is therefore based on the assumption that there is no further change in domestic and international policies, global interest rates, and exchange rates beyond which are already embedded in the baseline scenario.

Scenario 1A considers an additional risk that a sharper US slowdown triggers dollar depreciation by motivating international investors to restructure their portfolios away from dollar assets. The US current account deficit reached \$856.7 billion in 2006, accounting for about 7% of GDP. As a result of steady rises in deficits, the US has now accumulated net foreign debt of about \$3 trillion at the end of 2006. This implies that the US economy must attract large capital inflows from the rest of the world to finance its deficit. A disorderly resolution of large US current account imbalances could lead to a sharp depreciation in the US dollar.

Scenario 1B imagines another case where a sharper US slowdown undermines investor confidence and adversely affects emerging Asian financial markets and investment. As seen in late February, trouble in the US stockmarket often triggers a broad sell-off in emerging Asian markets. Furthermore, previous studies find that there exists an important relationship between intraregional trade and foreign direct investment (FDI) flows (see ADB 2006 for a survey of these studies), suggesting that FDI flows to the region could be responsive to the prospect of the region's export growth. As a primary recipient of private equity investment including FDI flows, the PRC might experience a sharp fall in investment, potentially precipitating a "hard" landing in the PRC.

FIGURE 1
SCENARIOS

FIGURE 1A
US GDP
(IN US\$ BILLIONS)

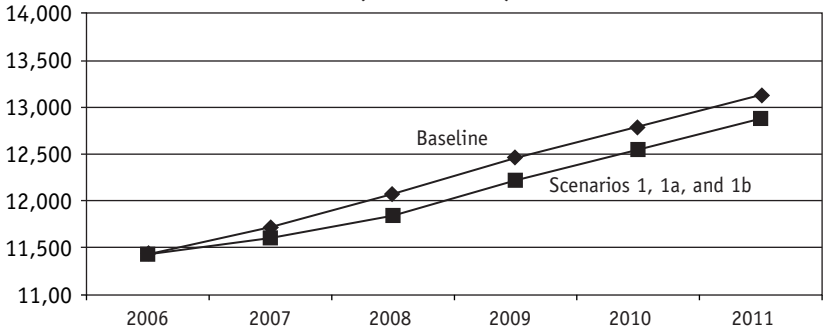


FIGURE 1B
US DOLLAR
(IN EFFECTIVE EXCHANGE RATES)

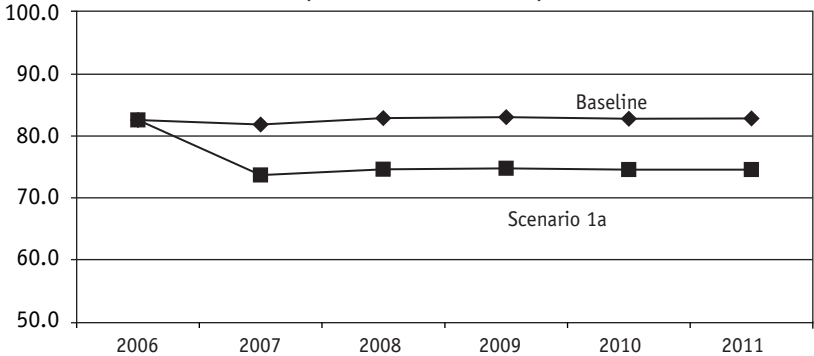
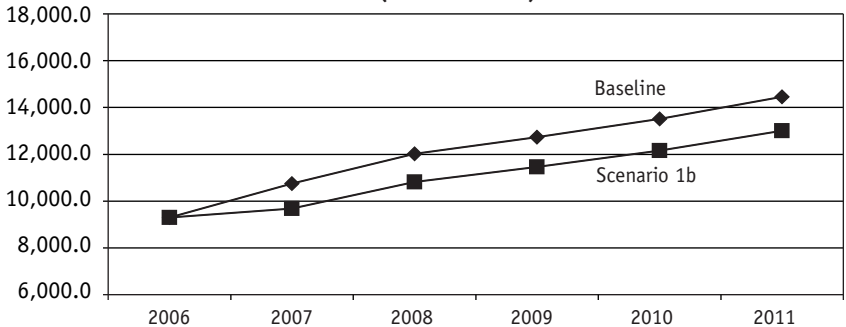


FIGURE 1c
PRC GROSS FIXED INVESTMENT
(IN US\$ MILLIONS)



C. Simulation Results

Table 1 summarizes the estimated effects of a 1 percentage point drop in US GDP growth on overall GDP along with its demand components, consumer prices, industrial production, employment, and current account balance for East Asia and East Asia excluding the PRC. The effects are shown as percentage point deviations from the baseline. For example, East Asian growth drops by a 0.5 percentage point, which can be translated into an annual growth rate of 7.0% in 2007 instead of 7.5% in the baseline projection. This amounts to an income loss of \$80.3 billion—about 0.4% of total GDP in East Asia—compared to the estimated GDP level for the first year in the baseline scenario.

The main transmission mechanism here is trade linkages (see Appendix for the detailed model mechanism). Slower US growth implies slower growth in exports and income for US trading partners. Reduced export earnings and income relative to the baseline level will then depress domestic consumption. This adverse income effect for the US trading partners can be further aggravated by the price effect. As domestic demand ends lower than the baseline level, excess supply will add downward pressure on domestic price levels from the baseline level. As a result, the inflation rate will fall under the baseline inflation rate, thus lifting real interest rates instantly higher relative to the baseline scenario. Higher real interest rates then curb domestic consumption and investment growth even more. In the absence of monetary and fiscal policy responses in East Asia, domestic demand growth will be further trimmed.

ADB (2005) finds that significant improvements in investment and capital accumulation are also often associated with strong export growth in East Asia. It further suggests that exports act as an important growth stimulator for the East Asian economy. Slower export growth often discourages domestic production, corporate spending, and hiring, thus leading to slower domestic demand and income growth. Slower investment growth also has long-term consequences, as a reduction in the capital stock relative to the baseline will lower potential output (again relative to the baseline). Where investment growth slows significantly vis-à-vis the baseline scenario and recovers only gradually due to country-specific rigidities, capital stocks could end much lower than the baseline level, thus having a lasting effect on productivity and potential growth.

In general, individual countries may take a different route in the return to long-term equilibrium, depending on the existing policy frameworks and structural rigidities. In some cases, a lack of central bank credibility may put an economy through high inflation during the adjustment process. In others, structural rigidities in the labor market may prolong the adjustment process until real wages drop to balance the market. Reflecting the country-specific assumptions regarding price, wage, and structural rigidities in the Oxford model, the impact on GDP growth will differ from one country to another.

In Scenario 1, a deceleration in US growth has non-negligible effects on a number of East Asian economies. East Asia's growth slows by 0.5 percentage point in 2007 and by a further 0.8 percentage point in 2008 in response to a 1 percentage point fall in US growth. The implied loss of income is significant, amounting to \$282.2 billion or 1.5% of East Asia's total GDP over 2 years. But underlying growth would remain comparatively robust and above 6% given the strong baseline projection.

The impact on East Asia's economic performance of slower US growth is significant, both directly through slowing US import growth and indirectly through the influence of the US slowdown

TABLE 1
SIMULATION RESULTS
(IN PERCENTAGE POINT DEVIATIONS FROM BASELINE GROWTH RATES)

SCENARIO 1: US GROWTH DECLINES BY 1 PPT FOR TWO CONSECUTIVE YEARS						
	ASIA		ASIA EXCLUDING PRC		G3	
	YEAR 1	YEAR 2	YEAR 1	YEAR 2	YEAR 1	YEAR 2
GDP (% , yoy)	-0.45	-0.76	-0.42	-0.59	-0.56	-0.65
Consumption (% , yoy)	-0.14	-0.34	-0.23	-0.57	-0.63	-0.66
Investment (% , yoy)	-0.31	-1.11	-0.34	-0.58	-0.74	-1.18
Exports (% , yoy)	-1.42	-0.98	-0.97	-0.98	-0.62	-0.63
Imports (% , yoy)	-1.08	-1.11	-0.81	-0.93	-1.06	-0.95
Consumer prices (% , yoy)	-0.03	-0.15	-0.01	-0.06	-0.03	-0.32
Industrial production (% , yoy)	-0.51	-0.78	-0.57	-0.66	-0.54	-0.90
Unemployment rate (%)	0.05	0.10	0.02	0.05	0.18	0.31
Current account (% of GDP)	-0.18	-0.16	-0.11	-0.13	0.07	0.12
Trade balance (\$ million)	-10771.02	-12193.44	-2852.62	-4120.74	25401.97	49309.44
SCENARIO 1A: 10% US\$ DEPRECIATION IN ADDITION TO SCENARIO 1						
	ASIA		ASIA EXCLUDING PRC		G3	
	YEAR 1	YEAR 2	YEAR 1	YEAR 2	YEAR 1	YEAR 2
GDP (% , yoy)	-1.85	-1.73	-2.19	-1.11	-0.86	-1.05
Consumption (% , yoy)	-0.36	-1.16	-0.67	-2.28	-1.28	-1.10
Investment (% , yoy)	-1.17	-2.70	-1.35	-1.70	-0.88	-1.70
Exports (% , yoy)	-4.08	-2.99	-3.52	-2.21	-0.40	-1.73
Imports (% , yoy)	-2.09	-3.75	-1.61	-3.65	-2.51	-1.90
Consumer prices (% , yoy)	-0.66	-0.56	-0.85	-0.04	-0.25	-0.47
Industrial production (% , yoy)	-2.11	-1.52	-3.36	-0.11	0.04	-1.35
Unemployment rate (%)	0.13	0.28	0.07	0.14	0.24	0.46
Current account (% of GDP)	-0.61	-0.35	-0.20	0.19	0.47	0.42
Trade balance (\$ million)	-3597.68	1759.43	3005.32	12720.23	154426.41	140742.72
SCENARIO 1B: 10% REDUCTION IN THE PRC GROSS FIXED INVESTMENT IN ADDITION TO SCENARIO 1						
	ASIA		ASIA EXCLUDING PRC		G3	
	YEAR 1	YEAR 2	YEAR 1	YEAR 2	YEAR 1	YEAR 2
GDP (% , yoy)	-3.42	-0.29	-0.81	-0.93	-0.61	-0.73
Consumption (% , yoy)	-0.69	-0.83	-0.43	-1.04	-0.63	-0.72
Investment (% , yoy)	-6.50	-0.51	-0.60	-1.00	-0.78	-1.29
Exports (% , yoy)	-1.99	-0.90	-1.92	-1.45	-0.97	-0.93
Imports (% , yoy)	-3.57	-2.00	-1.59	-1.56	-1.19	-1.12
Consumer prices (% , yoy)	-0.27	-0.78	-0.02	-0.08	-0.03	-0.36
Industrial production (% , yoy)	-2.60	-1.59	-1.11	-1.00	-0.64	-1.05
Unemployment rate (%)	0.31	0.16	0.04	0.09	0.19	0.35
Current account (% of GDP)	0.50	0.80	-0.22	-0.17	0.04	0.08
Trade balance (\$ million)	14677.82	36285.79	-6387.18	-6277.31	19480.49	39479.63

Note: PPT means percentage point; yoy means year-on-year, GDP means gross domestic product.

Source: Staff estimates using the Oxford model.

on other important markets for East Asia's exports. The estimated results also manifest empirical regularities that slowing exports lead to slower growth of industrial production and business investment. The level of investment and capital stocks will fall lower than the estimated levels in the baseline scenario over time, with the fall in investment tending to be most significant in PRC; Korea; Malaysia; Singapore; Taipei, China; and Thailand given their export dependence.²

Reflecting its relatively high exposure to external markets, a decline in East Asian export growth is more significant than that of other regions. East Asia's export growth declines by a cumulative 2.4 percentage points over 2 years, compared to a drop of 1.1 percentage points in the euro-zone economy. A reduction in US imports relative to the baseline was also transmitted directly as a decline in East Asia's trade surplus. The loss of the trade surpluses of these nine East Asian economies amounted to about \$10.8 billion in 2007 and another \$12.2 billion in 2008—about one third of the gains in US trade balance owing to a reduction in its imports. But in light of relatively healthy growth in Japan and the European countries, the reduction of East Asia's current account balance is still moderate and limited to only about 0.2% of GDP each year.

Strong growth momentum in East Asia's domestic demand, however, limits the severity of the overall impact. Consumption growth fell by 0.5 percentage point from the baseline over 2 years mainly due to a reduction in real income. Investment is hit more significantly, as its growth declined by 1.4 percentage points over 2 years from the baseline assumption. But, excluding the PRC where investment growth fell by 1.8 percentage point, the rest of the region suffers only a 0.9 percentage point drop in investment growth.

The relatively modest impact of a US slowdown is generally consistent with the earlier empirical results (see IMF 2007 for a survey). This is largely because most global economic models including the Oxford model focus on trade linkages as the main mechanism through which shocks are transmitted from one economy to another, and net exports are generally only a small component of GDP no matter how open an economy is.

But, conventional global economic models may miss or underestimate the working through other mechanisms. Recent studies (see ADB 2007, Kose et al. 2003, IMF 2007) have shown that global trade and financial linkages are strengthening over time, thus providing channels of increasingly rapid transmission for a global shock. In particular, increased global financial linkages appear to underpin the cross-country correlations of asset prices and related market sentiments. Past global recessions often witnessed significantly larger spillovers through reactions in global financial markets besides usual trade channels. Moreover, the impact of shocks can be amplified if they are concentrated in particular sectors. For example, a global slowdown in global durable investment, such as in 2001–2002, would likely hit the information technology industry, an activity in which countries in East Asia specialize. External disturbances may also impinge on domestic demand more directly by affecting consumer and investor confidence. In an increasingly integrated world, producers and investors share global product and financial markets, making them potentially susceptible to sentiments in other markets. Although the Oxford model incorporates global trade linkages with empirically calibrated short-term impulses through trade-related channels, it does not capture the behavioral effect through business and investor confidence.

² The estimated results for individual countries are not reported in this study due to space limitations, but are available upon request.

Scenario 1A and 1B explores the potential risks of a US slowdown affecting other economies more explicitly.³ First, in Scenario 1A a weaker dollar implies a loss of competitiveness for US trading partners, which produces a more synchronized global downturn. Overall, the reduction in overall GDP growth amounts to 1.8 percentage points in 2007, compared to 0.5 in Scenario 1. Growth slows in 2008 by another 1.7 percentage points. In combination with the weaker global demand, stronger currencies in East Asia appear to exacerbate the price effect by restraining inflation further and thus pushing real interest rates even higher compared to Scenario 1. As a result, domestic consumption and investment growth falls by 1.5 and 3.9 percentage points, respectively, in the next 2 years relative to the baseline scenario. Although the trade surplus widens marginally in 2008 compared to the baseline, this mainly reflects a contraction in import growth due to weaker growth of domestic demand. Both industrial production and investment growth slow sharply, which bear potentially longer-term consequences on productivity and growth.

Second, investment is assumed to fall by 10% in the PRC over the baseline in Scenario 1B. However, with investment projected to grow more than 10% a year over the next 2 years in the baseline scenario, a 10% reduction in the 2007 level means that it is still higher than the 2006 level. Nevertheless, slower growth of PRC investment has significant ripple effects on the rest of East Asia. The PRC bears the direct impact of the slowdown with growth shaved by 5.6 percentage points in 2007. But, the rest of East Asia also sees its growth clipped by about 0.8 percentage point in 2007, followed by another 0.9 percentage point off in 2008. As rapid investment growth in the PRC has been an engine of growth for the region's trade, the external sector of the rest of East Asia suffers most significantly. Regional economies that export a bulk of capital goods to the PRC such as Hong Kong,China; Korea; and Taipei,China, appear to incur proportionally large losses in trade surpluses, thus contributing most to the total loss of \$12.7 billion (about \$6 billion each year) over 2 years borne by the rest of East Asia relative to the baseline. It is also noteworthy that Japan, which is a major supplier of capital goods for East Asia (but not included in East Asia in this paper) suffers a substantially large loss of \$7.4 billion in 2007, and an even bigger loss of \$10.2 billion in 2008.

In both Scenarios 1A and 1B, a loss of real income vis-à-vis the current baseline is substantially larger than Scenario 1 of a 1 percentage point drop in US growth alone. In all cases, however, overall economic impacts exhibit diverse patterns across affected trading partners depending on the specifics of an individual economy, including its exposure to the US or the PRC markets; differences in price and income elasticities of export and import; and relative sizes of income effects at home and abroad. For instance in Scenario 1A, a broader global slowdown accompanied by a weaker dollar appear to have more significant effect on PRC; Hong Kong,China; Korea; Singapore; Taipei,China; and Thailand, given their high export dependency. In Scenario 1B, economies that are exposed to the PRC market appear to suffer a significant reduction in trade surpluses as mentioned above. Overall, the speed of economic adjustment will also depend on various country-specific factors, including differences in initial conditions and economic structures.

³ The relative sizes of the impacts are not directly comparable between the two scenarios, given the different nature of these shocks. But in both cases, the magnitude of these shocks falls between one standard deviation and two standard deviations of their respective variables, indicating the probability of each of these risks materializing may be similar. For example in Scenario 1A, one standard deviation of the dollar index against weighted global currencies over the last decade was about 7%. Thus, a 10% change in the dollar exchange rate is a shock of the magnitude greater than one standard deviation but smaller than two standard deviations.

IV. CONCLUDING REMARKS

East Asian growth is set to slow to a more moderate pace against the backdrop of a US slowdown. But the East Asian economy is expected to continue a still healthy expansion by historic standards, if the US slowdown remains orderly with limited spillovers into the rest of the world. The Oxford model estimates suggest that growth in East Asia would be clipped by about 0.5 and 0.8 percentage point off from the currently projected growth rates in 2007 and 2008, respectively, in response to a 1 percentage point cut in US growth.

However, the simulation results also warn against complacency. The influence of the US economy on the rest of the world remains significant and there are risks of potential spillovers from a sharper US slowdown to the rest of the world. Downside risks are real and particularly relevant against the backdrop of persistently large current account imbalances in the PRC and the US. Often in the past, slower growth proved to be a harbinger of something worse, prompting a recession and related financial instability. Given its undisputed signaling role in the global financial system, any shockwave emanating from the US market could be particularly threatening to the region's financial stability and growth. At the same time, there are indications that the East Asian economy has become more sensitive to cyclical fluctuations of the global economy (see ADB 2007). Greater trade and financial linkages both within the region and with the rest of the world suggest that potential spillovers from a sharper US slowdown and its resonance through the rest of the world could be more significant now than in the past. The simulation results generally confirm that in case of any spillovers, the impact on the East Asian economy of the same magnitude of a US slowdown could be much more serious.

Ability to sustain domestic demand growth by promoting economic efficiency and flexibility remains a key to keeping growth momentum against falling external demand. The simulation results suggest that economies that are more agile and flexible in both product and factor markets quickly recover and minimize the longer-term consequences. Flexibility in the exchange rate regime is another important factor to consider in insulating the economies from external shocks. Efforts to improve economic agility and structural flexibility can only be made against sound macroeconomic management at all times. Initial conditions and economic structures exert significant influence on the initial impact of a shock and the following adjustment process. For example, the current cyclical position of an economy relative to its potential growth rate may either offset or amplify the initial impulses of a shock. In this sense, a stable macroeconomic environment of low inflation and prudent fiscal management also allows room for more accommodative policies to minimize the pain of necessary economic adjustments to an external shock.

APPENDIX

The Oxford Economics' Global Model (the Oxford model) is a multi-country multi-region macroeconomic model of the world economy that is designed to capture channels of international transmission of a shock through trade and investment flows as well as relationships with other key economic variables, such as GDP, employment, inflation, interest rates, and exchange rates. The Oxford model is, therefore, well suited for the analysis of economic consequences of scenarios including changes in monetary and fiscal policies in the international context.

The Oxford model is structured in a way that, while it exhibits "Keynesian" dynamics that stems from price rigidities in the short to medium term, its long-run properties are "neo-classical", which means that the long-run equilibrium is ultimately bound by supply factors.

A simulation of a fall in GDP of 1 percentage point sustained over 2 years in the scenarios presented here is based on the assumption that a fall in private consumption (a main component of final demand) is the direct cause of the GDP decrease. It should be emphasized that the results of a growth simulation depend critically on the assumption regarding how the change in GDP has been made. A reduction in GDP arising from the demand side would yield very different results compared with those when the reduction is the product of a supply side shock, which is in principal more permanent in nature.

Also like most other macroeconomic models, embedded in the Oxford model are such channels of international transmission of a shock as trade and investment flows. When there is a shock, key nominal variables including inflation, interest rates, wages, and exchange rates will change to restore balance between demand and supply both at the national and global levels. Just as external shocks affect domestic economic activity and prices, the related adjustments in an individual economy will transmit to other countries through trade and investment linkages until balance is restored both domestically and internationally. In this adjustment process, however, differences in the degree of nominal rigidities and the credibility of monetary authorities, as presented in the parameters of these price reaction functions, determine how long it will take to stabilize inflation and return to a long-run equilibrium growth rate.

The Oxford model comprises 44 country models including 20 emerging market countries together with six trading blocs. The country models are fully integrated through trade, prices, interest rates, and exchange rates. Individual country models are identical in basic theoretical structure, but cross-country differences are reflected in different estimated parameter values, which are meant to characterize idiosyncrasies of an individual country.

The structure of individual country models is based on the income expenditure accounting framework. Consumption is a function of real income, real financial wealth, real interest rates, and inflation. Investment behavior is based on Tobin's q theory, according to which the investment rate is determined by its opportunity cost, after taking significant adjustment costs into account. However, on the supply side, each of these economies behaves like a one-sector economy under Cobb-Douglas technology (with a constant rate of total factor productivity growth) using two factor inputs (labor and capital). Firms are assumed to set prices given output and the capital stock, but the labor market is imperfectly competitive. Output cycles move around a deterministic trend, where the level of potential output corresponds to a natural rate of unemployment. Inflation is a monetary phenomenon in the long run. The Oxford model embodies a vertical Phillips curve in the long run, while inflation is controlled by endogenized monetary policy. Central banks are assumed to generate credible and effective inflation targets that determine the nominal trends and also the embedded equations. The model converges to a long-run equilibrium that is determined by a natural growth rate based on productivity and population growth.

The Oxford model solves each block of simultaneous equations using an iterative procedure to ensure consistency across blocks until the full system has converged. For trade links, the model operates a trade matrix based on weighted trade partner imports to drive demand for a country's exports instead of bilateral

trade relationships. There are also interest rates, exchange rates, risk premia, and asset price linkages identified in the model. Commodity prices, including crude oil prices, are determined by aggregate global supply and demand.

Finally, due caution is necessary when interpreting the simulation results. Most macroeconomic models, including the Oxford model here, often fall short of explaining the full account of potential economic impacts, given the complexity of transmission mechanisms. At play could be many other factors, which are not fully incorporated in a macroeconomic model.

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The ongoing slowdown in the economy of the United States (US) has sparked increasing concerns over the short-term growth prospect of East Asia. Using the Oxford Economics' Global Model, Cyn-Young Park examines the possible impacts on East Asia of a sharper and longer US slowdown than is currently anticipated in the *Asian Development Outlook 2007*. The simulation results suggest that a US slowdown on its own would not meaningfully derail East Asia's strong growth. However, in case of significant spillovers from the US slowdown through financial instability and a hard landing in investments in the People's Republic of China, different growth stories of East Asia may unfold.

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