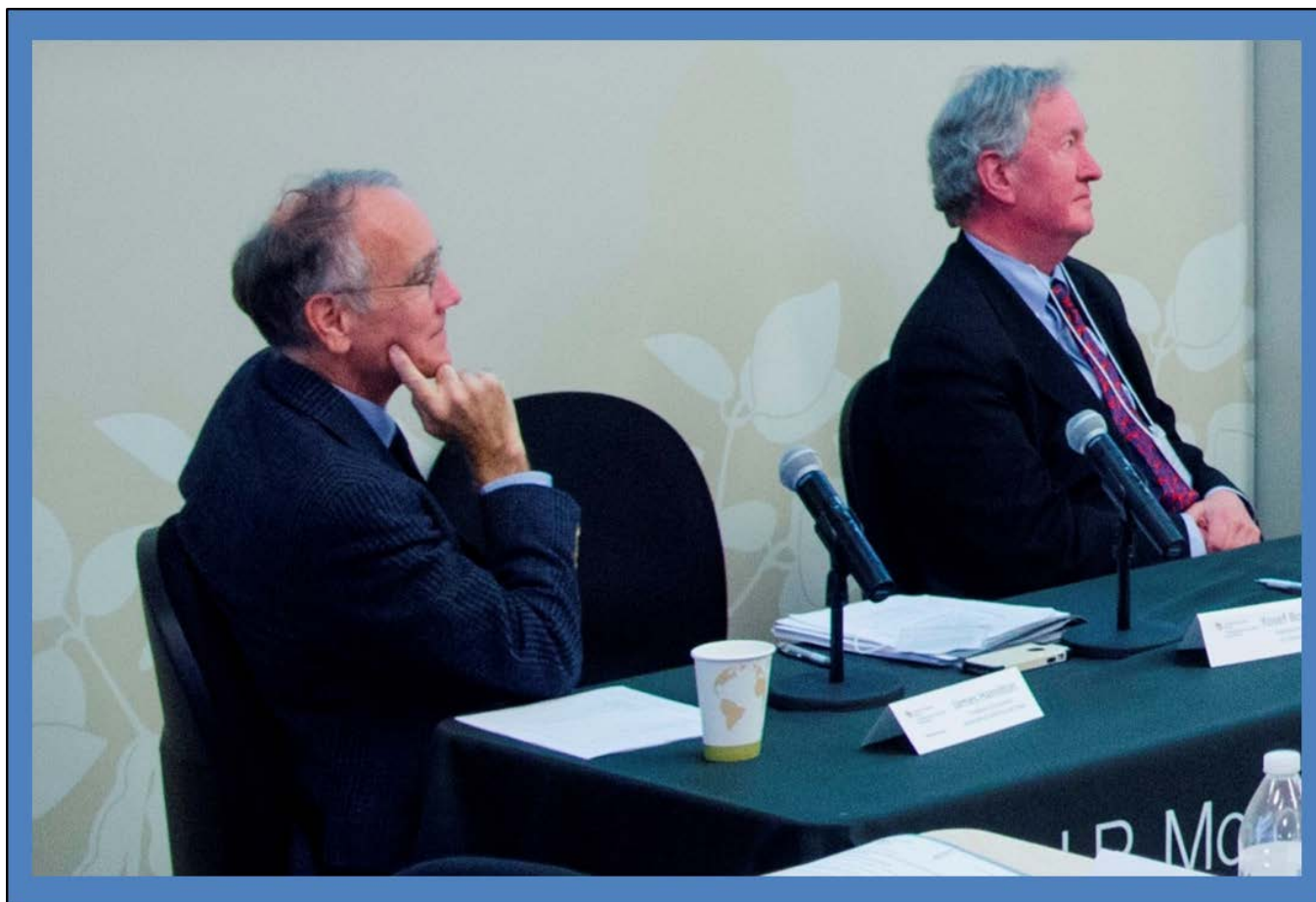




From El Niño to La Niña: Implications for Natural Gas, Agricultural Price Volatility, and the Potential for Hurricanes

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Dr. Bluford Putnam (right), Chief Economist at the CME Group, was the industry discussant for the presentation on “Fracking, China, and the Geopolitics of Oil” by Professor James Hamilton (left), University of California, San Diego at the J.P. Morgan Center for Commodities’ (JPMCC’s) Research Council meeting in the Center’s CoBank Lecture Hall on December 4, 2015.

El Niño 2015 is long gone. Now there is high potential that La Niña 2017 is forming. The impacts of these weather events can be very far reaching. El Niño 2015 led to less rain in the monsoon seasons of India, Malaysia, and Indonesia, and the drought conditions created more wildfires. In Brazil, El Niño 2015 eased drought conditions and water shortages around São Paulo. Going against historical patterns, in North America the storm track failed to move southward, so southern California did not get as much rain as hoped, the Pacific Northwest experienced storm after storm, and the US Midwest winter was warmer than predicted.

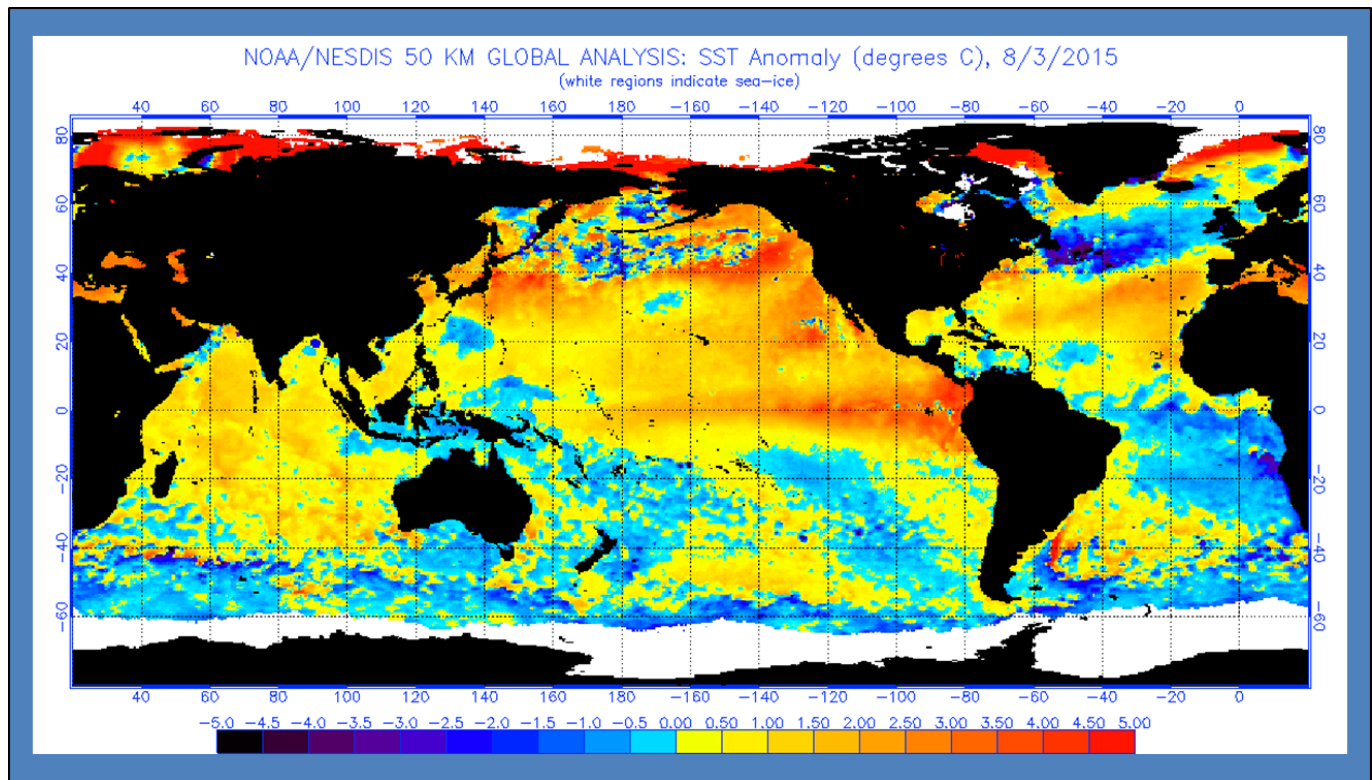


In “Science” (June 24, 2016, Volume 352, Issue 6293), Eli Kintisch analyzed what factors contributed to forecasts failing to work as planned, especially the failure of the North American storm track to move further south. The key to how winds above North America are impacted depends on the “southern oscillation.” In 2015, the Pacific Ocean off the coast of North America was much warmer than in the previous strong El Niño’s of 1982 and 1997, and the warmer northern Pacific is getting credit for keeping the storm track from moving south.

Now that El Niño has departed, weather analysts are observing the potential (current probabilities are in the 60% to 70% range) for La Niña to form, which means colder than usual waters along the equatorial Pacific Ocean. A flip from El Niño (the boy) to La Niña (the girl) is typical, especially when El Niño was quite strong, as occurred in 2015.

Figure 1

August 2015 – Strong El Niño

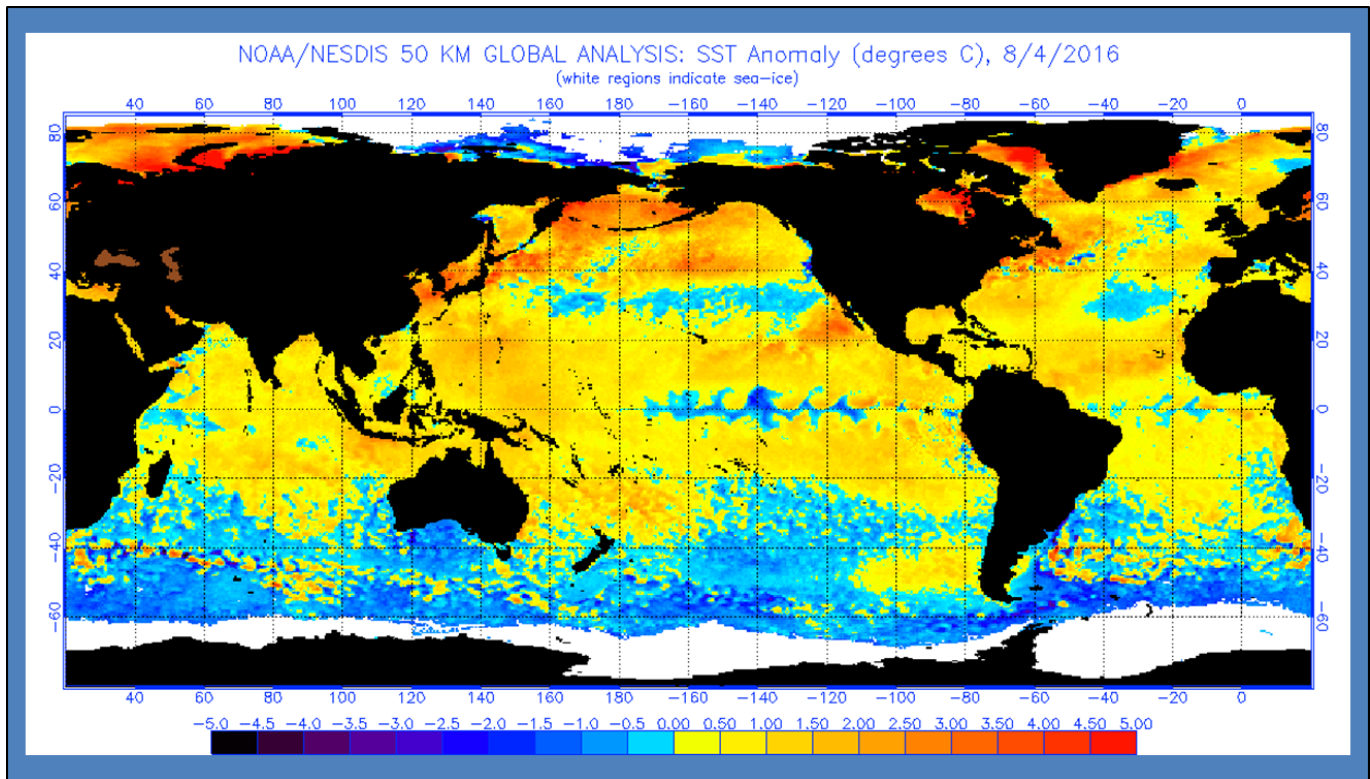


Orange indicates warmer than usual sea surface temperatures. El Niño is warmer waters along the east equatorial Pacific Ocean.

Source: <http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/>



Figure 2
August 2016 – La Niña Forming?



Blue indicates colder than usual sea surface temperatures. La Niña is colder waters along the east equatorial Pacific Ocean.

Source: <http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/>

Focus on Natural Gas in North America

With La Niña 1998-99 came a very cold winter that helped to deplete natural gas supplies in the US, and eventually, with a lag, led to sharply higher natural gas prices. This time around could be different, depending on whether the sea temperatures in the Pacific Ocean off the coast of North America cool down and reinforce La Niña as they did in 1999 and also in 2007, or they could stay warmer than usual and partly counteract a strong La Niña.

We know, however, that there have been other changes in the natural gas market since 1999. First, there is much more natural gas production in the US. In 2015, US natural gas production was 42% higher than in 2000. The boom really got in high gear after 2006 and has not looked back. Second, much more US electrical production has shifted to natural gas from coal. Indeed, natural gas as a source of electrical power generation will most probably surpass coal for the first time in 2016.



The implication of more power generation from natural gas is that if there is an exceptionally cold winter, the additional demands on the electrical grid may help to work off natural gas inventories faster than the last La Niña. The implication due to vastly expanded natural gas production is that the upside potential for price movement is not as great as in 2000-2002. Still, natural gas prices are likely to see considerable volatility and a rapid reaction to a shift from El Niño to La Niña, if it happens.

Figure 3

US Electrical Generation Energy Sources – Coal versus Natural Gas

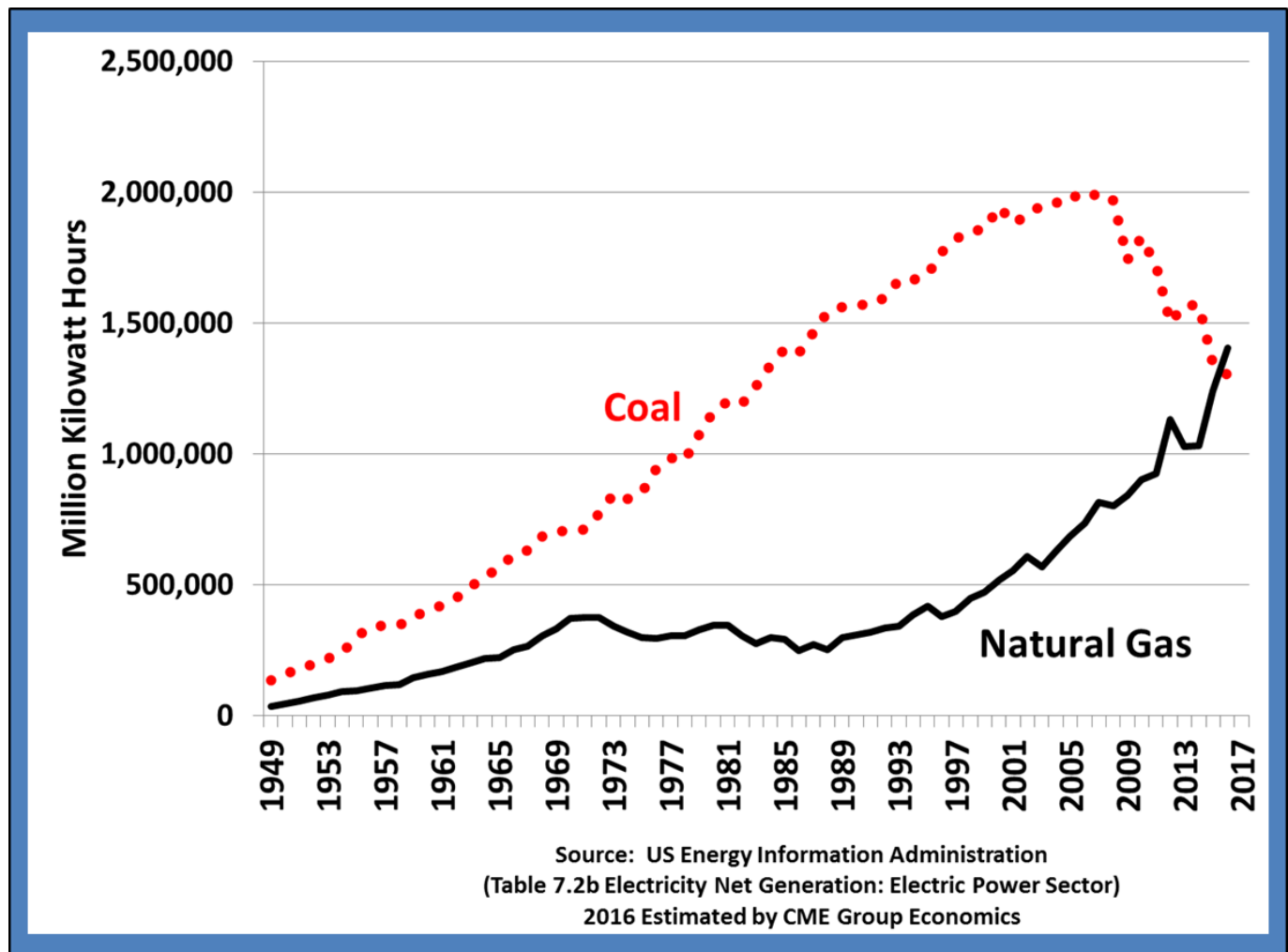
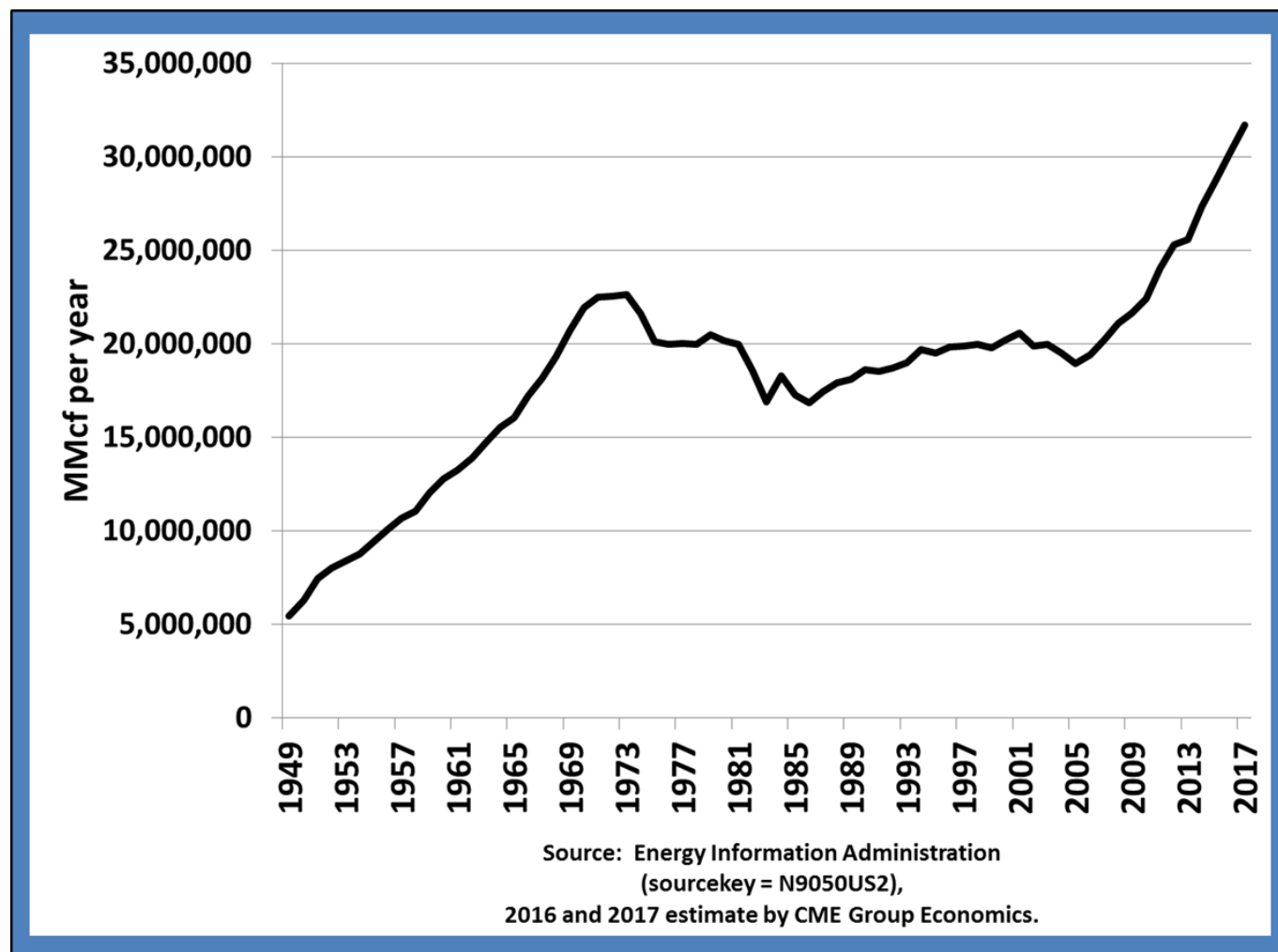




Figure 4
US Natural Gas Production



Agricultural Price Volatility

The potential for agricultural price volatility rises with shift from El Niño to La Niña. More rain comes to India and Indonesia, as well as Australia and Africa, **while drought potential rises in Peru, Chile, and the US southwest**. For now, the US corn-belt is in very good shape regarding moisture.

Hurricanes and Cyclones, Too

Finally, we note that there could be economic disruptions in the US and China due to storms. If it comes about, **La Niña 2017 would likely be associated with the potential for many more hurricanes or cyclones to form and make landfall**, which could impact both the US east coast and the Chinese east coast.



Endnotes

All examples in this report are hypothetical interpretations of situations and are used for explanation purposes only. The views in this report reflect solely those of the author and not necessarily those of CME Group or its affiliated institutions. This report and the information herein should not be considered investment advice or the results of actual market experience.

Author Biography

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Bluford (Blu) Putnam is Managing Director and Chief Economist of CME Group. He manages the Strategic Intelligence & Analytics team, which includes both data science and management analytics. As Chief Economist, Blu is responsible for leading economic analysis on global financial markets by identifying emerging trends, evaluating economic factors and forecasting their impact on CME Group and the company's business strategy. He also serves as CME Group's spokesperson on global economic conditions and manages external research initiatives.

Prior to joining CME Group, Dr. Putnam gained experience in the financial services industry with concentrations in central banking, investment research and portfolio management. He most recently served as Managing Partner for Bayesian Edge Technology & Solutions, Ltd., a financial risk management and portfolio advisory service he founded in 2000. He also has served as President of CDC Investment Management Corporation and was Managing Director and Chief Investment Officer for Equities and Asset Allocation at the Bankers Trust Company in New York. His background also includes economist positions with Kleinwort Benson, Ltd., Morgan Stanley & Company, Chase Manhattan Bank and the Federal Reserve Bank of New York. Dr. Putnam holds a bachelor's degree in liberal arts from Florida Presbyterian College (later renamed Eckerd College) and a Ph.D. in economics from Tulane University.

Blu has authored five books on international finance, as well as many articles that have been published in academic journals, including the *American Economic Review*, *Journal of Finance*, and *Review of Financial Economics* among others.

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