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Projecting Global Economic Growth
The Conference Board Global Economic Outlook 2015

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Abstract

This paper presents the methodology for The Conference Board Global Economic Outlook 2015, including projections for 11 major regions and individual estimates for 33 mature and 22 emerging market economies for 2015, 2015-2019, and 2020-2025. The projections are based on a supply-side growth accounting model that estimates the contributions of the use of factor inputs − labor and capital −, and productivity growth to the growth of real Gross Domestic Product (GDP). While labor input growth rates are estimated using information on demographic changes and work force participation rates, capital input and total factor productivity growth are econometrically estimated using a wide range of related variables during past periods. The trend growth rates that are obtained from this exercise are adjusted for possible deviations between actual and potential output.

1. Introduction and Summary

Since 2008, The Conference Board publishes an annual global economic outlook, projecting GDP growth for 55 countries using growth accounting techniques. The basis of the framework is built upon the works of Dale Jorgenson and colleagues, including Jorgenson, Ho and Stiroh (2005) and Jorgenson and Vu (2009 a and b). Over the years The Conference Board has extended and improved the projection methods, using more information from the historical performance and adjusting for cyclical deviations from the trend in the short term.

This paper describes the methodology and sources underlying the projections of growth of Gross Domestic Product in the 2015 edition of *The Conference Board Global Economic Outlook* (GEO). The projection methodology used in the 2015 GEO is an expanded version of the methods implemented in the 2012 edition of the outlook, especially by basing the methodology more strongly on variables that have an established economic significance for the projected variables.[1] The predictive model has been improved substantially by including more theoretically pertinent explanatory variables in the productivity and capital services equations and also by allowing for regional differences in intercept.

The projections in this paper cover the period 2015-2025, with separate projections for the medium term (2015-2019) and the long term (2020-2025). The outlook covers 55 major economies across 11 regions, including 33 mature economies (the United States, Europe, Japan and other mature economies) and 22 emerging and developing economies. Section 2 describes how trend growth is estimated on the basis of an extrapolated growth accounting model which projects the various growth components of the production function. The model first estimates the factor inputs – labor quantity, labor composition (the effect of heterogeneity among workers in terms of educational qualification), and capital services –, and total factor productivity. Broadly speaking, the measures for labor quantity (Section 2.1) are based on projections of the labor force from International Labor Organization (ILO). The measures on labor composition (Section 2.2) are based on projections of educational attainment by Lutz et al. (2014) and KC et al. (2010). Capital services and total factor productivity (Section 2.3) are estimated using regression models which are largely based on relevant past-period variables. Projections of all input factors are combined to provide projections of GDP growth, which are presented in Section 2.4.

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[1] See Chen, Cheng, Levanon, Ozyildirim and van Ark (2012).

The projected GDP growth rates, which are based on the growth accounting framework, can be interpreted as a representation of the trend growth of each economy. In the long run, countries grow according to their trend.[2] In the short run, however, countries deviate from their long-run path due to temporary fluctuations primarily due to business cycle dynamics. Moreover, shocks can occasionally occur which can have a deep impact on the structure of the economy and can permanently change the course of the trend. The 2008/09 recession represents a combination of business cycle dynamics and structural effects, which has led to such a change in the trend growth. Section 3 describes the medium-term adjustments to the trend growth estimates obtained from the extrapolated growth accounts. Section 4 compares our GDP growth projections with those from other studies. Section 5 concludes.

The outlook for 2015 and beyond predicts some effects of an economic recovery in mature economies from the 2008/09 recession (and subsequent 2012/13 recession in the Euro Area), which brings this group of economies to an average growth of 1.9 percent between 2014 and 2019. Among the larger economies, the United States is likely to see a slightly faster growth at 2.6 percent in 2015 compared to 2.2 percent in 2014. While the United States will maintain a 2.4 percent average growth rate in the medium term (2015-2019), it will decline to just below 2 percent during 2020-2025. European growth environment remains fragile and the downward risks are still around. Euro Area will see a 1.6 percent growth rate in 2015, compared to 0.9 percent in 2014. While a modest recovery in the job market will likely strengthen domestic consumption, European growth is constrained by decline in exports to emerging markets, and the ongoing geopolitical tensions. The long-run growth in Euro Area will decline from 1.9 percent during 2015-2019 to 1.2 percent during 2020-2025, as the declining work force and the increase in ageing of the population further adds to long-run downside risks. .

While growth in emerging and developing economies was quite strong immediately after the crisis in 2010 and 2011 (6 to 7 per cent) it has shown a declining trend since then. The growth rate of emerging and developing economies declined to 5.2 percent in 2012 and further to 4.9 percent in 2013. Declining export demand from mature economies and many domestic policy and structural constraints hindered these countries from attaining a higher growth rate. Given the

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[2] Our trend growth rates may be seen as a proxy to the growth rate of potential output, but as our estimates do not explicitly account for a non-inflationary constraint on our growth measure, and our estimates are not accompanied by a measure of potential output, we prefer to use the term "trend growth", as our estimates are essentially derived from past growth trends.

current weak conditions in the global economy, and the time lag by which reforms pay off in terms of faster growth, there is little scope for emerging economies to accelerate their growth performance much in the next few years. In 2014, the growth rate will be slightly lower than that of 2013. Improved growth rates in 2014 in India, Mexico, Middle East and Africa was not substantial enough to offset declines in the growth rates of China, Brazil and Russia. In particular, the *"soft fall"*[3] of China's economy provides for a difficult business environment, and reduces the outlook for emerging economies. Chinese growth rate is projected to decline from 7.7 percent in 2013 to 7.3 percent in 2014 and further to 6.5 percent in 2015. Increased business confidence, and improved fiscal and current account conditions will help India improve its growth rates from 4.7 percent in 2013 to 5.2 percent in 2014 and further to 5.5 percent in 2015. Despite Mexico showing an improvement from 1.1 percent in 2013 to 3 percent in 2014, Latin America is likely to see a decline from 2.1 percent to 1.5 percent, as Brazil is to see a decline from 2.5 percent to 0.5 percent. On average, emerging economies will see an ongoing slowdown from 5.7 percent from 2008-2014 to 4.5 percent from 2015-2019 and the growth will further slow to 3.7 percent on average during 2020-2025.

In sum, even though growth in the mature economies in 2015 is expected to recover beyond 2014, there will be major offsetting effects from continued slower growth in the emerging markets. Based on current trends, global GDP is projected to grow at 3.2 in 2014, with only a moderate increase in 2015 to 3.4 percent. In the longer run, the trend growth rate shows a further slowdown to 2.7 percent during 2020-2025 compared to the growth projection of 3.3 percent during 2015-2019. This is the case in almost all regions of the economy; while mature economies show a decline of almost half a percentage point, emerging economies show an even larger decline of about 0.8%, primarily driven by a decline in Chinese growth rates by 1.6 percent and Indian growth rates by half a percentage point[4]

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[3] See the Conference Board report on "How will the long fall in China's growth impact risks and opportunities for business?" https://www.conference-board.org/china-growth/

[4] For a broad analysis of the results, see The Conference Board Chief Economist's analysis in StraightTalk® "Asleep at the Wheel? Are the Opportunities for Faster Growth Passing Us by?"

2. Medium- and Long Term Projections for 2015-2019 and 2020-2025

2.1 The Growth Accounting Framework

The medium- and long-term projections which form the basis of The Conference Board Global Economic Outlook are based on the growth accounting framework as developed in Jorgenson, Gollop and Fraumeni (1987) and more recently in Jorgenson, Ho and Stiroh (2005) and Jorgenson and Vu (2009b). The growth accounting methodology is based on a production function, which decomposes output growth into components associated with changes in factor inputs – capital and labor – , and a residual that reflects technological progress and production efficiency, known as Total Factor Productivity (TFP). Assume a production function of the following form:

$$Y = Af(L, Q, K) \qquad\qquad (1)$$

Where Y is gross value added, L is labor quantity, Q is the composition of the labor force based on different education attainment, K is capital services, A is total factor productivity. Under the assumption of perfect competitive factor markets where the marginal product of each input equals its price, and constant returns to scale, the above general production function can be transformed into the following growth accounting framework:

$$\Delta lnY_t = \Delta lnA_t + \bar{v}_{L,t}\Delta lnL_t + \bar{v}_{L,t}\Delta lnQ_t + \bar{v}_{K,t}\Delta lnK_t \qquad (2)$$

In the above equation, growth of output in a given year t (ΔlnY_t) is decomposed into the contributions of total factor productivity growth (ΔlnA_t), labor (ΔlnL_t), labor composition (ΔlnQ_t) and capital services (ΔlnK_t).[5] The contribution of factor inputs, L, Q and K are obtained as the product of their growth rates over the current and previous periods and their compensation share ($\bar{v}$) in value added averaged over the last two years:

$$\bar{v}_{L,t} = 0.5 * (v_{L,t} + v_{L,t-1}) \text{ and } \quad \bar{v}_{K,t} = 0.5 * (v_{K,t} + v_{K,t-1})$$

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[5] In this paper, all growth rates are calculated as the difference in the log of the levels of each variable unless otherwise specified.

where $v_{K.t} = \frac{P_L.L}{P_Y.Y}$ and $v_{K.t} = \frac{P_K.K}{P_y.Y}$, with P_L being the price of labor (wage rate), P_K is the price of capital (rental price) and P_Y is the price of output. Under the assumption of constant returns to scale, the cost shares of labor and capital sums to unity, $\bar{v}_L + \bar{v}_K = 1$.

Equation (2) illustrates that output growth is driven by share weighted input growth and TFP growth, a residual that captures all sources of growth which are left unexplained by labor and capital inputs. Thus, projection of output growth requires projection of each individual input component on the right hand side of equation (2). Our projection covers the medium term period (2015-2019) and a longer term period (2020-2025) for 33 mature economies and 22 major emerging economies.

2.2 Measuring the Growth of Labor input

2.2.1 Growth of Labor quantity

The growth in labor quantity for our projection periods are based on labor force participation rate projections from the ILO and the growth of the working-age population from United Nations (UN). Our previous model only used the growth of the working-age population,[6] and thus assumed participation rates to remain constant. Given that participation rates across mature economies as well as emerging markets have changed over the previous decade and will likely to do so in the future, this addition to the model will produce better projections of the growth in labor quantity. Still, predictions on labor force participation are subject to a high degree of uncertainty as they are affected by unpredictable factors such as policy changes like retirement plans, cultural changes, such as preferences for work vs. leisure, as well as cyclical fluctuations.

At an annual rate of 0.7 percent, the United States has one of the fastest growth rates in labor force[7] among the larger mature economies during 2015-2019. Labor force growth in many European economies, as well as in Japan and Russia, is already projected to become negative between 2015 and 2019, putting downward pressure on output growth.

Among the emerging economies, China and Russia are already part of the group of countries that witness a contraction in their labor force during 2015-2019. China, where

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[6] The range of ages used in defining working-age population often differs from country to country. However, to be consistent across countries, we use the most common definition of population of age 15 to 64.
[7] The term labor force growth here refers to the growth rate of the product of working age population and labor force participation rate.

economic growth has thus far been fueled by cheap and abundant labor, will see its labor force growth decline at a faster rate (-0.2) between 2020 and 2025. Thailand is also likely to join this group of countries with declining demographic dividend in the longer term. India, on the other hand, still enjoys a demographic dividend, registering 1.5 percent annual growth in its labor force during 2015-2019, with a marginal decline to 1.3 percent during 2020-2025. Most other emerging markets also still have demographic dividends as their labor force continues to grow though the pace of the growth will slow from 2015-2019 period to 2020-2025 period. The two sub-Saharan African countries, Nigeria and South Africa, however, do not follow this pattern. Their labor force is projected to increase further in the long-run primarily because of an increasing working-age population.

2.2.2 Growth of Labor Composition

In addition to the change in labor quantity, an adjustment for changes in the composition of the labor force in terms of different skill-levels is needed to measure labor's effective contribution to output growth. The change of labor composition is constructed on the basis of weighted measures of different skill-level groups (low, medium and high skilled workers based on educational attainment) in the labor force:

$$\Delta lnQ_t = 0.5 * \sum_i (v_{i,t} + v_{i,t-1})(lnh_{i,t} - lnh_{i,t-1}) \qquad \textbf{(3)}$$

where v_i is the compensation share of ith labor type (where i=low, medium and high skilled) in total labor compensation and h_i is the share of ith labor type in total hours worked. For a detailed methodology describing the construction of the labor composition data, please refer to Bonthuis (2011).

The projection data used in equation (3) are mainly based on the projection of population by level of educational attainment by Lutz et. al. (2014) and KC et al. (2010). In general, labor composition is relatively stable over time. The average growth rate across all 55 countries in our projection sample is around 0.3 percent for two projection periods. Consequently, the direct contribution from the growth of labor composition to total output growth is quite small. However, a well-educated labor force can improve productivity by enabling better utilization of equipment, adoption of advanced technology, and improvement of production process, thereby contributing to output growth. There is also a likely complementarity with investment in

intangible capital, such as R&D and organizational changes, which will also enhance productivity (Corrado, Haskel and Jona-Lasinio, 2014).

2.2.3 The Share of Labor income in GDP

In order to establish the contribution of labor quantity and labor composition to GDP growth, and in accordance with the growth accounting model, we need to assign weights relative to the contribution of capital, discussed in the next section. According to Gollin (2002), labor shares are approximately constant across time and countries within a range of 0.65-0.80. Historical data on labor shares are taken from The Conference Board Total Economy Database, which has been revised using data available from Penn World Tables (see Feenstra, Inklaar and Timmer, 2013). This revision incorporates the inclusion of imputed self-employed compensation for many emerging economies. While our data shows a decline in labor share in many advanced economies over a long span of time, it has been stable during the last several years at around 0.6. We therefore use the average labor share for individual countries in 2006-2014 for the projection years. On average labor shares are lower in emerging economies because capital is scarcer and expensive while labor is cheaper compared to mature economies. Our data (see Table 1) confirms this pattern. Emerging economies including Mexico, Turkey, Thailand, China, India and Indonesia all have low labor shares, which average at about 0.5 while labor shares in mature economies such as Switzerland, Denmark, and the United Kingdom, are around 0.7.

Table 1: Growth of Labor Force, Growth of Labor Composition, and Labor Share for 2015-2019, 2020-2025

MATURE ECONOMIES		Growth of labor quantity (%)		Growth of labor composition (%)	Labor share (%)
Country	*Region*	*2015-2019*	*2020-2025*	*2015-2025*	*2015-2025*
United States	United States	0.67	0.34	0.24	0.59
Austria	Europe	0.22	-0.39	0.08	0.67
Belgium	Europe	0.27	-0.10	0.33	0.69
Cyprus	Europe	1.03	0.62	0.52	0.59
Czech Republic	Europe	-0.02	-0.13	0.23	0.63
Denmark	Europe	0.32	0.20	0.08	0.68
Finland	Europe	-0.07	-0.13	0.29	0.69
France	Europe	0.31	0.15	0.25	0.63
Germany	Europe	-0.29	-0.88	0.15	0.66
Greece	Europe	0.35	-0.46	0.59	0.50
Hungary	Europe	-0.09	-0.31	0.40	0.59
Iceland	Europe	0.96	0.56	0.45	0.71
Ireland	Europe	1.45	0.89	0.27	0.56
Italy	Europe	0.11	-0.28	0.08	0.66
Luxembourg	Europe	1.18	0.80	0.29	0.52
Malta	Europe	0.29	-0.29	0.40	0.57
Netherlands	Europe	0.13	-0.34	0.11	0.68
Norway	Europe	1.11	0.56	0.22	0.49
Poland	Europe	-0.31	-0.66	0.22	0.47
Portugal	Europe	-0.01	-0.31	0.84	0.62
Spain	Europe	0.29	-0.18	0.50	0.55
Sweden	Europe	0.73	0.36	0.15	0.66
Switzerland	Europe	0.72	0.47	0.08	0.74
United Kingdom	Europe	0.56	0.18	0.20	0.68
Japan	Japan	-0.45	-0.52	0.24	0.56
Australia	Other Mature	0.91	0.88	0.29	0.60
Canada	Other Mature	0.62	0.23	0.25	0.57
Hong Kong	Other Mature	-0.09	-0.65	0.23	0.53
Israel	Other Mature	1.16	0.91	0.28	0.55
New Zealand	Other Mature	0.78	0.57	0.49	0.61
Singapore	Other Mature	1.50	0.36	0.68	0.44
South Korea	Other Mature	0.55	-0.42	0.35	0.55
Taiwan	Other Mature	-0.25	-0.89	0.46	0.57

EMERGING MARKETS		Growth of labor quantity (%)		Growth of labor composition (%)	Labor share (%)
Country	*Region*	*2015-2019*	*2020-2025*	*2015-2025*	*2015-2025*
China	China	-0.05	-0.21	0.15	0.42
India	India	1.53	1.28	0.30	0.46
Indonesia	Other Developing Asia	1.42	1.20	0.33	0.46
Malaysia	Other Developing Asia	1.87	1.34	0.33	0.53
Pakistan	Other Developing Asia	2.49	2.10	0.33	0.50
Thailand	Other Developing Asia	0.10	-0.38	0.76	0.40
Argentina	Latin America	1.11	0.94	0.26	0.43
Brazil	Latin America	1.01	0.68	0.40	0.61
Chile	Latin America	1.04	0.49	0.53	0.47
Colombia	Latin America	1.51	1.26	0.41	0.49
Mexico	Latin America	1.75	1.32	0.30	0.31
Venezuela	Latin America	1.67	1.42	0.64	0.36
Algeria	Middle East & Northern Africa	1.42	1.04	0.39	0.50
Egypt	Middle East & Northern Africa	1.91	1.68	0.38	0.35
Iran	Middle East & Northern Africa	1.24	0.75	0.37	0.26
Morocco	Middle East & Northern Africa	1.30	0.93	0.33	0.50
Saudi Arabia	Middle East & Northern Africa	2.65	1.35	0.36	0.32
United Arab Emirates	Middle East & Northern Africa	1.93	1.37	0.00	0.50
Nigeria	Sub-Saharan Africa	2.93	3.11	0.21	0.40
South Africa	Sub-Saharan Africa	0.97	1.05	0.57	0.55
Russian Federation	Russia, Central Asia and Southeast Europe	-0.87	-0.95	0.33	0.65
Turkey	Russia, Central Asia and Southeast Europe	1.51	0.94	0.29	0.35

Source: The Conference Board Global Economic Outlook, 2015
Notes: The growth rates in labor quantity are based on labor force participation rate projections from the ILO and the growth of the working-age population from the United Nations. The labor composition projections are mainly based on the projection of population by level of educational attainment by Lutz et al. (2014) and KC et al. (2010).

2.3 Measuring the Growth of Capital Services and Total Factor Productivity

Compared to the projections for labor inputs, the development of capital services and total factor productivity (TFP) are subject to a higher degree of uncertainty. The growth contributions are estimated by a system of equations in which we have applied explanatory variables suggested by the literature. This revision of the outlook uses an improved regression model, using more theoretically pertinent economic and institutional variables to determine capital services and productivity growth. We estimate three endogenous variables: TFP growth, the savings rate, and

capital services growth. The savings rate is important to add in, because it is closely related to investment in capital that determines the growth of capital services. Moreover, savings, representing the other part of consumption, also related to elements of demand in our otherwise supply side model. All other variables are either exogenous or predetermined.

The three equations are specified as follows:

$$\Delta \ln TFP_t = \alpha_0 + \alpha_1 \Delta \ln TFP_{t-1} + \alpha_2 lnLP_{t-1}^{US} + \alpha_3 lnCORRUPT_t + \alpha_4 R\&D_t +$$
$$\alpha_5 HDI_t + \sum_{i=1}^n \alpha_i R\_DUMMY_i + \varepsilon_{1t} \tag{4}$$

$$SAVING_t = \beta_0 + \beta_1 DEP_t + \beta_2 P\_GDP_t + \beta_3 \Delta lnGDP_{t-1} + \beta_7 SERVICE_t +$$
$$\sum_{i=1}^n \alpha_i R\_DUMMY_i + \varepsilon_{2t} \tag{5}$$

$$\Delta lnKSERV_t = \gamma_0 + \gamma_1 SAVING_t + \gamma_2 \Delta lnGDP_{t-1} + \gamma_3 DPN\_RATE_t + \gamma_4 \Delta lnTFP_t +$$
$$\gamma_5 lnKD_{t-1} + \gamma_6 WAGE_t + \gamma_7 ENERGY_t + \gamma_8 SD.INFL_t + \sum_{i=1}^n \alpha_i R\_DUMMY_i + \varepsilon_{3t} \tag{6}$$

where ΔlnX denotes the log growth rate of variable *X* over period t and t-1, *ln X* indicates the log level of the variable *X*. The definition of the variables and the data sources are listed in Table 2 below and a discussion of the actual versus expected signs follows below.

The above three equations constitute a simultaneous equation system which is estimated using three-stage least squares. We use this approach, firstly because the capital services growth equation contains endogenous variables (TFP growth) among the explanatory variables, thus instrumental variable estimation is needed to produce consistent estimates. Secondly, since some of the explanatory variables are the dependent variables of other equations in the system, the three error terms are expected to be correlated, thus generalized least squares should be used to account for the correlation among the error terms across equations.

To implement our regressions, we restrict our sample to 33 mature economies and 22 major emerging economies from 1972 to 2014 to ensure consistency of the high quality data. We divide the 41 years into six time periods: (1) 1972-1978; (2) 1979-1986; (3) 1987-1992; (4) 1993-1998; (5) 1999-2005, and (6) 2006-2014. We choose time periods so that the initial and

end years do not fall on recession years.[8] All annual variables from the data sources are averaged for each defined period.

Table 2: Definition of variables, expected signs, and data sources

Independent Variables	TFP	Saving	Capital Services	Description	Data sources
$\Delta \ln TFP_{t-1}$	+			Total factor productivity growth in the previous period	Total Economy Database* and Projection from TFPG equation
$\ln LP_{t-1}^{US}$	-			Log of level labor productivity relative to the United States in the previous period	Total Economy Database*
$CORRUPT_t$	-			Corruption	World Bank, Worldwide Governance Indicators; Transparency International
$R\&D_t$	+			Growth rate of real R&D spending	OECD, UNESCO, Eurostat
HDI	+			Geometric average of average years of schooling and life expectancy at birth	Schooling: Barro -Lee (2012) and Cohen and Soto (2007); Life expectancy: United Nations, except for Taiwan, which are from Taiwan National development council
DEP_t		-		Total (sum of old and young) dependency ratios	UN Population Division
$SERVICE_t$		-		Service share in GDP	UN National Account Statistics
$\ln P\_GDP_t$		+		Log of per capita GDP	Total Economy Database*
$\Delta \ln GDP_{t-1}$		+	+	GDP growth in the previous period	Total Economy Database*
$\Delta \ln TFP_t$			+/-	Total factor productivity growth	Total Economy Database* and Projection from TFPG equation
$SAVING_t$			+	Saving rate	World Bank World Development Indicators and Projection from Saving equation
DPN_RATE_t			+	Depreciation rate	Total Economy Database*
$SD.INFL_t$			+	Standard deviation of inflation rate	IMF, World Economic Outlook; IMF, International Financial Statistics; OECD
$WAGE_t$			+	Growth rate of wages	Implicit Wage rates from Total Economy Database*
$ENERGY_t$			+	Growth rate of energy use	International Energy Statistics
$\ln KD_{t-1}$			-	Log of capital deepening in the previous period	Total Economy Database*
R_DUMMY	+/-	+/-	+/-	Region dummies	1 if a country belongs to a given region, and 0 otherwise

Note: A + (-) sign indicates that the expected impact of the variable is positive (negative)
* Data is from The Conference Board Total Economy Database, September 2014 update.

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[8] Recession years vary across countries. However, we choose divisions based on U.S. recession years as determined by the National Bureau of Economics Business Cycle Dating Committee because the U.S. is the largest economy throughout the period under study.

Table 3 reports the results of the simultaneous equation system using the three-stage least squares estimation. The results are largely consistent with theoretical expectations. Specifically, the relative level of the labor productivity variable in the TFP growth equation and the lagged capital deepening variable in the capital services growth equation are specified to test the convergence hypothesis.[9] Both variables are significantly negative, lending support to the convergence hypothesis that the country with higher labor productivity (or capital deepening) levels will show slower growth of total factor productivity (capital services) in the next period.

In the TFP growth equation, the coefficient of the geometric average of life expectancy and average years of schooling is significantly positive. This indicator represents a country's human development, which reflects both innovative and absorptive capacity. We combined these two indicators into one single variable, which is similar to the United Nation's Human Development Indicator, in order to avoid serial correlation in the regression equation. Longer life expectancy is closely related to better health conditions, a foundation for faster productivity growth. A better educated labor force is equipped with the necessary knowledge and skills to enhance the productivity in the production process. Corruption and the growth rate of Research and Development (R&D) spending are two new additions to our model. While emerging economies benefit a lot from adopting technologies developed elsewhere, mature economies gain faster productivity growth by innovating. In both cases, R&D spending is crucial in fostering productivity growth; our results yield a significant positive effect of R&D growth rates on TFPG. Corrupt economies are prone to misallocation of resources, as investment decisions can be heavily influenced by wasteful rent seeking and a distorted bureaucracy.[10] Lack of transparency and accountability can not only lead to irresponsible investments resulting in misallocation of capital, but can also strangle innovation, and, therefore, corruption is expected to impact productivity negatively. Our results confirm this hypothesis, suggesting that higher corruption reduces productivity growth.

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[9] Ideally, we want to use the TFP and capital services level of the initial year to test convergence. Since we do not have the level data for TFP and capital services for all countries, labor productivity and capital deepening levels are used instead in the specification.

[10] Mauro (1995), among others, show a negative impact of corruption on investment/GDP ratio.

Table 3: Estimation results of simultaneous equations

Independent Variables	TFP Growth		Saving Rate		Capital Service Growth	
$\Delta \ln TFP_{t-1}$	0.137	***				
	(2.72)					
$\ln LP_{t-1}^{US}$	-1.25	***				
	(-5.65)					
$CORRUPT_t$	-0.313	**				
	(-2.36)					
$R\&D_t$	0.050	***				
	(2.87)					
HDI	1.235	**				
	(2.18)					
DEP_t			-0.22	***		
			(-5.72)			
$SERVICE_t$			-0.34	***		
			(-7.02)			
$\ln P\_GDP_t$			8.345	***		
			(8.02)			
$\Delta \ln GDP_{t-1}$			0.524	***	0.206	***
			(3.06)		(3.93)	
$\Delta \ln TFP_t$					-0.35	***
					(-2.94)	
$SAVING_t$					0.0327	**
					(2.04)	
DPN_RATE_t					0.598	***
					(7.86)	
$SD.INFL_t$					-0.355	**
					(-2.47)	
$WAGE_t$					0.298	***
					(4.52)	
$ENERGY_t$					0.299	***
					(6.78)	
$\ln KD_{t-1}$					-0.74	***
					(-6.65)	
Constant	-4.10	**	53.86	***	-0.14	
	(-2.07)		(10.53)		(-0.24)	

Notes: The system of equations is estimated by the 3SLS (three-stage least squares) method. Number of observations: 271.
** significant at 5%; *** significant at 1%

In the savings equation, the dependency ratio has a negative effect on the savings rate as population outside the working age group mostly does not earn an income and are major

consumers of education and health care. The negative relationship between the share of the services sector in an economy and the savings rate probably results from the larger presence of government funded social services, education and health care, causing people to have less precautionary savings. The saving rate is positively influenced by the overall growth of real GDP and level of per capita income.

In the capital services growth equation, the savings rate, depreciation rate and GDP growth in the previous period all lead to higher growth in capital services. Intuitively, the growth accounting identity imposes a negative relationship between TFP and capital services growth because TFP growth is calculated as a residual in the equation. However, if TFPG is purely exogenous, it can affect capital services positively by pushing out the productivity frontier. Therefore, faster productivity growth can promote capital service growth via increased efficiency in the production process. The observed negative coefficient, however, defies this hypothesis, and suggests that productivity growth does not stimulate capital service growth. The standard deviation of inflation is used as a proxy for the stability of the macroeconomic environment. The significant negative effect indicates that unstable macroeconomic conditions may deter investment and consequently growth in capital services. Two other major indicators that affect capital service growth rates are the wage rate and the growth rate of energy use. As labor costs rise, demand for capital is likely to increase due to possible substitutions between the two. Energy use is a proxy for capacity utilization. If a large part of the current capital stock is underutilized, firms are unlikely to increase investment, hence a positive relationship between the two.

2.4 Trend Growth Projections

Equations (4) – (6) are estimated using the period averages in the actual data from periods 1 to 6. The estimated coefficients are then used to derive projections for TFP and capital services growth. To project TFP and capital services growth for both medium-term (2015-2019, period 7) and long-term (2020-2025, period 8), we also need to obtain all the exogenous variables in the system, which can be divided into three categories.

The first category includes variables whose values of medium- and long-term are available: old and youth dependency ratios, as well as growth of the labor force, sourced from the UN and ILO datasets.

The second category includes lagged variables whose long-term values need to be calculated based on medium-term projection: lagged TFP growth, lagged labor productivity and lagged capital deepening. The period 8 value of the first two lagged variables can be obtained by the projected value of period 7. The lagged labor productivity level in period 8 is calculated through labor productivity growth, which is obtained from the difference between GDP growth and employment growth. GDP growth in period 7 is obtained using projected capital services and TFP growth as explained above. Employment growth is approximated by the growth of the labor force. The lagged capital deepening in period 8 is calculated based on the projected growth of capital services in period 7 together with the growth of labor force.

The third category includes contemporary variables whose period 7 and 8 values are subject to judgment: inflation, standard deviation of inflation, services share in total value added, life expectancy, education attainment, corruption, R&D spending, wage rate and energy growth. Share of services sectors reflect the structure of the economy; inflation rate and the standard deviation of inflation characterize the macro condition. For period 7, we use inflation rate projections from IMF, and for period 8, we assume they remain the same as in period 7. Life expectancy and education attainment are considered as policy oriented variables, whose values are subject to change depending on a country's economic condition and development strategy. For education attainment, we rely on Cohen and Soto (2007) and Barro-Lee dataset on schooling. Cohen and Soto (2007) provide projections of average years of schooling until 2020, and for years after 2020, we assume it to be constant. Projections of life expectancy at birth are obtained from United Nations. Corruption, an institutional variable, is assumed to remain constant, so that it captures mainly cross section effect while projecting forward. Growth rates of R&D spending, a major innovation influencing indicator, wage rates and energy use are also assumed to remain the same as in period 6 for period 7 and 8.

Table 4 lists GDP projections for periods 7 (2015-2019) and 8 (2020-2025) for all 55 economies as well as the growth contributions of labor, capital and TFP. The average actual GDP growth between 2008 and 2014 is also reported in the table for comparison purpose.11

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[11] To evaluate the accuracy of our projection, we carried out out-of -sample tests on capital services growth, TFP growth and GDP growth to measure the deviation of the forecast value from the actual value for period 5 (1999-2005) and 6 (2006-2014). Please see the Appendix tables for details.

Among the mature economies, GDP growth in the U.S. and most European countries are projected to recover between 2015 and 2019 from the 2008–2014 crisis period, which covers the global economic and financial crisis. The recovery will be most noticeable in those troubled European economies, such as those of Greece, Ireland, Portugal, Spain and Italy. Almost all mature economies in Asia will experience a slowdown in GDP growth during the 2015-2019 period, while other mature economies, such as Australia, Canada, New Zealand and Israel, will see an increase. The Asian Tiger economies (Hong Kong, Singapore, South Korea and Taiwan) are projected to see a decline in their growth rates during 2015-2019 compared to 2008-2014, ranging from a 0.2 percent decline in South Korea to a 1.8 percent decline in growth rate in Singapore. Japan, on the other hand, will gain more than 1 percentage growth on average in the next five years. Japan's stimulus efforts on the fiscal and policy fronts may translate into slightly better growth at 1.4 percent during 2015-2019 on average, compared to the average growth rate of 0.2 percent during 2008-2014. The projected long-term trend growth of GDP will slowdown during the 2020-2025 period in almost all mature economies. The majority of the emerging economies in our sample experienced higher average GDP growth during 2008-2014 than projected GDP growth in the following period (2015-2019). China and India were among the fastest growing countries during 2008-2014. Both these economies, however, are unlikely to see their extraordinary performance repeated in the future. China's investment-driven growth in the past decade will not be sustainable in the longer run, because it will not be able to maintain its labor cost advantage, as its demographic dividend is dwindling, and more importantly as its productivity growth is weakening as it is reaching the point of diminishing returns. Even though India has more potential and demographic dividend, translating its potential to growth crucially depends upon its ability to strengthen its human capital, and continued commitment to structural reforms. The rapid economic growth in emerging countries will abate across the board after 2019 with the projected trend growth of 2020-2025 ubiquitously lower than, if not equal to, that of 2015-2019. While the growth in the emerging economies will continue to be faster than that of mature economies, their relative contributions to global growth will start declining. This is not only a reflection of Chinese 'soft fall' but other emerging market economies, with possible exception of Sub-Saharan African countries, are likely to witness a slowdown in their long-term growth. The translation of potential in Africa to growth, however, depends substantially on improved institutional performance and better governance.

Table 4: Projection of GDP trend growth and its components (%)

Country	Average growth 2008-2014	Average annual growth 2015 - 2019 (projected trend growth adjusted for output gaps*)					Average annual growth 2020 - 2025 (projected trend growth)				
		GDP	Labor Quantity	Labor Quality	Capital Services	TFP	GDP	Labor Quantity	Labor Quality	Capital Services	TFP
Mature Economies											
United States	1.1	2.4	0.5	0.2	1.6	0.2	1.9	0.2	0.1	1.4	0.1
Austria	0.7	2.0	0.2	0.1	1.1	0.6	1.2	-0.3	0.1	0.9	0.5
Belgium	0.5	2.0	0.2	0.3	1.3	0.1	1.5	-0.1	0.2	1.0	0.3
Cyprus	-1.4	1.9	1.1	0.5	0.0	0.3	1.1	0.4	0.3	0.0	0.4
Czech Republic	0.4	2.9	0.0	0.2	1.3	1.4	2.5	-0.1	0.1	1.0	1.4
Denmark	-0.4	2.4	0.3	0.1	1.3	0.8	2.2	0.1	0.1	1.1	0.9
Finland	-0.7	1.7	-0.1	0.3	1.1	0.3	1.2	-0.1	0.2	0.6	0.5
France	0.2	1.8	0.3	0.2	1.1	0.2	1.3	0.1	0.2	0.8	0.3
Germany	0.8	1.6	-0.2	0.1	1.1	0.6	1.3	-0.6	0.1	1.0	0.7
Greece	-3.7	3.2	0.5	0.9	2.6	-0.8	1.5	-0.2	0.3	1.3	0.1
Hungary	-0.3	2.6	-0.1	0.3	1.4	1.0	2.7	-0.2	0.2	1.3	1.4
Iceland	0.0	2.5	0.8	0.4	0.5	0.8	1.9	0.4	0.3	0.5	0.7
Ireland	-0.9	3.3	1.2	0.2	1.8	0.0	2.3	0.5	0.2	1.4	0.2
Italy	-1.3	1.5	0.2	0.2	1.9	-0.7	0.4	-0.2	0.1	0.7	-0.1
Luxembourg	0.4	2.1	0.6	0.2	1.1	0.2	2.3	0.4	0.2	1.1	0.6
Malta	1.8	1.9	0.2	0.2	0.5	1.0	1.7	-0.2	0.2	0.4	1.1
Netherlands	-0.1	2.6	0.1	0.1	1.2	1.2	1.6	-0.2	0.1	0.8	1.0
Norway	0.9	2.7	0.6	0.1	1.6	0.3	2.5	0.3	0.1	1.5	0.6
Poland	3.0	3.2	-0.2	0.1	1.8	1.5	2.6	-0.3	0.1	1.4	1.4
Portugal	-0.8	2.6	0.0	1.0	1.0	0.5	1.4	-0.2	0.5	0.6	0.4
Spain	-0.7	2.2	0.3	0.4	1.2	0.2	1.2	-0.1	0.3	0.8	0.2
Sweden	1.3	3.2	0.6	0.1	1.8	0.6	2.6	0.2	0.1	1.6	0.7
Switzerland	1.4	2.5	0.5	0.1	1.1	0.9	2.4	0.3	0.1	1.0	1.0
United Kingdom	0.2	2.2	0.4	0.2	1.4	0.3	1.9	0.1	0.1	1.2	0.4
Japan	0.2	1.4	-0.3	0.2	0.8	0.8	1.1	-0.3	0.1	0.6	0.7
Australia	2.5	3.5	0.6	0.2	2.4	0.3	3.5	0.5	0.2	2.3	0.5
Canada	1.5	2.7	0.4	0.2	1.7	0.4	2.4	0.1	0.1	1.6	0.5
Hong Kong	2.7	2.1	-0.1	0.1	1.8	0.3	1.3	-0.3	0.1	1.5	0.0
Israel	3.7	3.9	0.6	0.2	2.5	0.6	3.6	0.5	0.2	2.3	0.6
New Zealand	1.6	3.2	0.5	0.3	1.5	0.9	3.3	0.3	0.3	1.5	1.1
Singapore	4.6	2.8	0.6	0.3	1.4	0.5	2.5	0.2	0.3	1.4	0.6
South Korea	3.2	3.1	0.3	0.2	2.1	0.4	2.2	-0.2	0.2	2.0	0.3
Taiwan	2.8	2.6	-0.2	0.3	1.9	0.5	1.6	-0.5	0.3	1.6	0.3

Emerging Economies											
China**	8.7	5.5	0.0	0.1	4.2	1.2	3.9	-0.1	0.0	3.3	0.7
India	6.6	5.5	0.7	0.1	3.6	1.0	5.0	0.6	0.1	3.4	0.8
Indonesia	5.8	4.9	0.7	0.2	3.3	0.7	4.5	0.6	0.2	3.2	0.5
Malaysia	4.4	3.7	1.0	0.2	2.4	0.1	3.3	0.7	0.2	2.4	0.0
Pakistan	3.2	3.5	1.3	0.2	2.1	0.0	3.5	1.1	0.2	2.1	0.1
Thailand	3.0	4.2	0.0	0.4	3.5	0.3	3.2	-0.1	0.3	2.9	0.1
Argentina	1.8	1.4	0.3	0.1	1.2	-0.2	2.0	0.4	0.1	1.5	0.0
Brazil	2.7	3.1	0.6	0.2	1.4	0.9	3.1	0.4	0.2	1.2	1.2
Chile	3.6	2.9	0.5	0.3	1.8	0.3	2.4	0.2	0.2	1.5	0.5
Colombia	4.2	4.1	0.7	0.2	2.6	0.5	4.0	0.6	0.2	2.6	0.6
Mexico	1.9	2.8	0.6	0.1	2.0	0.1	2.8	0.4	0.1	1.9	0.4
Venezuela	1.5	1.4	0.6	0.2	1.1	-0.6	1.3	0.5	0.2	0.7	-0.2
Iran	2.8	2.8	0.7	0.2	1.8	0.0	2.9	0.5	0.2	1.9	0.3
Saudi Arabia	3.6	4.3	0.7	0.1	3.4	0.1	4.2	0.6	0.1	3.2	0.2
United Arab Emirates	1.7	2.1	0.3	0.1	1.7	0.0	2.0	0.2	0.1	1.5	0.2
Algeria	4.2	4.0	0.7	0.2	3.0	0.1	3.7	0.5	0.2	2.9	0.1
Egypt	5.6	4.3	0.9	0.1	3.1	0.1	3.6	0.4	0.1	2.9	0.1
Morocco	2.5	3.7	1.0	0.0	1.6	1.0	3.8	0.7	0.0	1.6	1.4
Nigeria	6.6	6.7	1.2	0.1	5.6	-0.3	6.7	1.2	0.1	5.5	-0.2
South Africa	2.2	3.5	0.5	0.3	2.7	0.0	3.8	0.6	0.3	2.5	0.3
Russian Federation	1.5	1.7	-0.7	0.3	1.1	1.0	1.0	-0.6	0.2	0.7	0.8
Turkey	3.2	3.1	0.5	0.1	2.1	0.3	3.0	0.3	0.1	1.9	0.7

Source: The Conference Board Global Economic Outlook, 2015
* The projected medium-term growth rates for some countries in this table are adjusted for 2015-2019 taking into account the output gap in 2014. The model projected trend growth rates are given in Appendix Table 3.
** Chinese capital service growth rates are adjusted downward by 1.1 percent in period 7 and further by 1.9 percent in period 8, as the model does not automatically account for the structural break we envisage in the trend in Chinese investment growth going forward, which is assumed not to be sustainable in the long-run (See the Conference Board report on "How will the long fall in China's growth impact risks and opportunities for business?" https://www.conference-board.org/china-growth/)

The projected GDP growth rates based on the growth accounting framework are to be interpreted as the trend growth rates of an economy. Trends are important for projecting future growth because they depict how an economy develops on the basis of its growth potential which is determined by the available labor force, capacity in capital and technology base. In the long run, countries grow according to their trend. In the short run, however, countries may deviate from their long-run path due to temporary factors primarily, in particular their business cycle dynamics. Occasionally, shocks can also occur which have a deep impact on the structure of the economy beyond the business cycle permanently changing the course of its long-run trend.

Table 5: Output gap assumptions for medium term projections.

	Output gap (percent)	Year in which Output gap closes	Model projected trend growth 2015-2019 (percent)	Projected growth rate 2015-2019 (percent)
United States	2.0	2017	2.0	2.4
Europe	2.3	2019*	1.6	2.1
Of which: Euro Area	*2.8*	*2019*	*1.3*	*1.9*
Japan	1.5	2019	1.1	1.4
South Korea	0.5	2017	3.0	3.1
Argentina	-4.1	2019	2.2	1.4
Brazil	-0.3	2019	3.2	3.1
Chile	1.0	2019	2.7	2.9
Czech Republic	2.7	2019	2.4	2.9
Hong Kong	1.4	2017	1.8	2.1
Indonesia	0.5	2019	4.8	4.9
Mexico	1.0	2019	2.6	2.8
Russian Federation	1.5	2019	1.4	1.7
Singapore	-2.5	2019	3.3	2.8
Taiwan	1.3	2019	2.3	2.6
Thailand	3.2	2019	3.5	4.2

Source: The Conference Board Global Economic Outlook, 2015
*For all countries in Europe we assume output gap to close in 2019, except in the U.K, where we assume it to be closing in 2017

As a prime example, the 2008-09 recession created a large gap in most mature economies between the actual output level and what could have been produced if the economy had stayed on the trend. In contrast, some major emerging economies have grown beyond their growth trend in the past few years. In order to come up with annual estimates between 2015 and 2019, we therefore made use of estimates of existing output gaps in individual economies. We make a distinction between average projected growth (trend growth) between 2015 and 2019 and the potential growth rate of the economy averaged over those years. In the long run these two concepts converge. Assuming that the potential output in a country grows at the model projected trend growth rates, we estimate the required growth rate for a country to close its current (2014) output gap by a given year in the future. For instance, in the case of United States, we assume a 2 percent output gap in 2014, and we also assume that the U.S will close this output gap by 2017. Taking the model projection for potential output growth from 2015-2019, which is 2 percent per year on average, we obtain 2.4 percent average annual growth rate for the period 2015-2019,

which is required to close the output gap in 2017. Table 5 below provides an overview of the output gap assumptions that feed into our model. Annual growth for 2015 and 2016 are linearly interpolated using 2014 growth and trend growth of period 2015-2019. As our trend GDP growth is derived via a growth accounting approach, we also adjust the contribution of labor, capital and TFP when the actual projected GDP is modified by the aforementioned method. Specifically, we calculate a ratio of the adjusted actual GDP growth over trend GDP growth, which we then apply to all three input contributions. In the long-run (2020-2025), we assume actual GDP growth coincides with the trend GDP growth.

Table 6: Projected GDP growth by region (%)

	2014	2015	2015-2019	2020-2025
United States	2.2	2.6	2.4	1.9
Europe*	1.4	2.0	2.1	1.5
Of which: Euro Area	*0.9*	*1.6*	*1.9*	*1.2*
Japan	0.9	1.1	1.4	1.1
Other Mature**	3.1	3.0	2.9	2.5
MATURE ECONOMIES	**1.9**	**2.3**	**2.3**	**1.8**
China	7.3	6.5	5.5	3.9
India	5.2	5.5	5.5	5.0
Other Developing Asia	4.4	4.3	4.3	3.9
Latin America	1.5	1.8	2.8	2.9
Of which: Brazil	*0.5*	*1.5*	*3.1*	*3.1*
Of which: Mexico	*3.0*	*2.8*	*2.8*	*2.8*
Middle East & North Africa	3.0	3.4	3.4	3.2
Sub-Saharan Africa	4.2	5.0	5.0	5.3
Russia, Central Asia and Southeast Europe***	0.8	1.4	2.1	1.7
EMERGING MARKETS	**4.8**	**4.7**	**4.5**	**3.7**
WORLD	**3.2**	**3.4**	**3.3**	**2.7**

Source: The Conference Board Global Economic Outlook 2015
Notes: Projections are based on trend growth estimates, which – for the period 2015-2019 – are adjusted for remaining output gaps.
* Europe includes 27 members of the European Union (excluding Croatia) as well as Switzerland and Norway.
** Other mature economies are Australia, Canada, Iceland, Israel, Hong Kong, South Korea, New Zealand, Singapore, and Taiwan Province of China.
*** Southeast Europe includes Albania, Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Montenegro, and Turkey.

As is evident from Table 6, in 2014, the GEO model predicts a global economic growth rate of 3.2 percent, which is 0.1 percent higher than our last year GEO projection for 2014. The

global economy is projected to see a moderate increase from 3.2 percent to 3.4 percent in 2015. This improvement is mainly driven by mature markets, which grow at 2.3 percent, nearly half a percent higher than the 1.9 percent growth they had in 2014. Emerging markets, on the other hand, show no improvement in their growth rate. In the medium-term (2015-2019), our projections show mature economies to grow at their 2015 growth rate, while the growth rates of emerging markets tend to decline marginally, though they still grow above 4 percent on average.

Table 7: Regional contribution to Global Economic Growth

	2008-2014	2015	2015-2019	2020-2025
United States	0.2	0.5	0.5	0.4
Europe*	0.0	0.4	0.4	0.3
Japan	0.0	0.1	0.1	0.1
Other Mature**	0.2	0.2	0.2	0.2
MATURE ECONOMIES	**0.4**	**1.2**	**1.2**	**0.9**
China	1.4	1.2	1.1	0.9
India	0.4	0.3	0.4	0.4
Other Developing Asia	0.2	0.2	0.2	0.2
Latin America	0.2	0.1	0.2	0.2
Middle East & North Africa	0.1	0.1	0.1	0.1
Sub-Saharan Africa	0.0	0.1	0.1	0.1
Russia, Central Asia and Southeast Europe**	0.1	0.1	0.1	0.1
EMERGING MARKETS	**2.3**	**2.1**	**2.1**	**1.8**
WORLD GDP GROWTH	**2.8**	**3.4**	**3.3**	**2.7**

Source: The Conference Board Global Economic Outlook 2015
Note: Sum of regional contributions may not add up precisely to World GDP growth because contributions are expressed in log changes and World growth in annual percent changes.

While the emerging markets contributed almost about 85 percent of global growth during 2008-2013, their contribution will decline substantially to just above 60 % in next 5 years, even while global growth improves marginally by almost half a percentage point (see Table 7). This decline in the pace at which the emerging markets grow has a big impact on the speed at which they influence the composition of world income. While the emerging markets increased their share in world GDP from 34.5 percent in 2001 to 48.2 percent in 2013 – an increase of 14 percent in 12 years, during the next 12 years, their share is projected to increase to 54.4 percent – an increase of 6 percent.

3. Comparison of GDP Projections with Other Studies

A number of researchers have attempted projecting global economic growth (e.g. Jorgenson and Vu, 2013; Lee and Hong, 2010; Fogel, 2007; Wilson et.al., 2011, among others). However, not all these projections are updated on annual basis, and, therefore, often do not reflect the most up to date information and dynamics of the global economy. A few organizations such as IMF, OECD, Goldman Sachs and Price Water Coopers provide up to date projections. We compare the results from The Conference Board's growth projections with some of these studies, which provide up-to-date data on global economic growth.

Obviously, the existence of several projections also implies a variety methodological approaches used in these projections. While some of these studies are closely related to our approach some are quite different. As mentioned before, our projection model is based on Jorgenson's growth accounting framework. However, Jorgenson and Vu (2013)'s projections for all input components are based on the performance of the near past, while in our methodology this only holds for the inputs capital services and TFP growth. Our methodology is closely akin to Lee and Hong (2010), in terms of both the growth accounting framework as well as the regression approach to estimate and project input factors. However, their work only covers Asian countries while ours includes 33 mature economies and 22 emerging ones. IMF projections for the World Economic Outlook use a 'bottom-up' approach, where the individual country projections produced by respective country teams are aggregated through a series of iterations. Therefore, the methodology can vary from country to country and between different series. The OECD uses the NiGEM model of the UK-based National Institute of Economic and Social Research (NIESR), which is a general equilibrium model based on estimation using historical data. While OECD economies are modeled separately, the rest of the world is modeled through regional blocks (Latin America, Africa, East Asia, Developing Europe, OPEC and a "miscellaneous group" mainly in West Asia). Unlike our model, which is purely supply side, OECD also incorporates demand variables (domestic and foreign) in each of the country model. The methodologies used in some other studies are less explicit, and not available to public. For instance, the methodology used in the Price Water Coopers' projection is not publically available, but it appears their projections are based on expenditure based models.

Table 8: Comparison of Projections of GDP growth among difference sources

	TCB – GEO Nov. 2014			IMF Oct.2014		OECD May 2014			PWC Oct. 2014	Goldman -Sachs Nov. 2014
	2015-2019	2020-2025		2015-2019		2015-2019	2020-2025		2016-2020	2015-2017
United States	2.4	1.9		2.9		3.0	2.5		2.4	3.0
Japan	1.4	1.1		0.9		0.8	1.1		1.2	1.4
Germany	1.6	1.3		1.5		1.2	1.0		1.3	1.6
France	1.8	1.3		1.6		2.5	2.5		1.7	1.3
Italy	1.5	0.4		1.1		1.7	2.1		1.0	1.0
United Kingdom	2.2	1.9		2.5		2.8	2.8		2.4	2.9
China	5.5	3.9		6.7		6.3	4.5		7.0	6.9
India	5.5	5.0		6.6		5.9	5.9		6.5	6.6
Brazil	3.1	3.1		2.5		2.7	2.5		4.0	2.5
Russia	1.7	1.0		1.6		3.3	2.9		2.5	3.5
MATURE ECONOMIES	2.3	1.8		2.4		2.6	2.3			2.4
EMERGING MARKETS	4.5	3.7		5.2						5.5
WORLD	3.3	2.7		4.0		3.7	3.3		3.6	3.8

Sources: The Conference Board Global Economic Outlook 201; International Monetary Fund (IMF) - World Economic Outlook Database, October 2014; Organization for Economic Cooperation and Development (OECD) – Economic Outlook, November 2014; Price Water Coopers (PWC), Global Economy Watch- Economic Projections, October 2014; Goldman Sachs (2014). "Global Economics Weekly", November, 2014.

Table 8 presents a comparison of the projection results from the different studies. Though the projection time periods are different between the studies, some comparisons are still useful. For the medium term, IMF projection for the global economy is higher by 0.7 percentage point than our projection for the period 2015-2019. This difference is mainly emanating from emerging economies while our projections for mature economies are somewhat higher than IMF's projection with the exception of the U.K., the U.S., China and India. In particular, IMF forecasts for China and India are at least 1 percentage point higher than our forecasts, making their emerging market forecasts higher.

The OECD global projection of 3.7 percent for 2015-2019 is in between our projection of 3.3 percent and IMF projection of 4 percent. However, OECD projection for mature economies are higher than both our projections and IMF projections, indicating that the OECD's implicit projection for emerging economies is somewhere around 4.5 to 5 percent from 2015-2019.

Often there are notable differences between the projections at country level. Our forecast for the United States is at least half a percentage point lower than that of IMF and OECD forecasts. Both our forecasts and IMF forecasts are higher than OECD for Germany, whereas OECD forecasts faster growth for France, Italy, the U.K., and more notably so for Russia. Both IMF and OECD are more optimistic about China compared to the GEO, while the IMF is also more optimistic about India and so is OECD about Russia. It may be noted here again that our model also predicted a faster growth for China, picking up from China's historical performance. However, we believe that the Chinese economy will see many downward risks in the coming years, which the model is not able to pick up. Therefore, we make some manual downward adjustment to Chinese investment growth rate, which revises our projections down.

Between our projections for the whole period (2015-2025) and PWC's for 2011-2030, our projections are lower for most countries except for Germany and Japan, where our projections are slightly optimistic. In particular, our long-term projection for China is quite lower than PWC's.

Goldman Sachs' projections for 2015-2017 are higher than our projections for 2015-2019 for the U.S., the U.K., China, India and Russia, whereas they are the same for Japan and Germany and lower for France, Italy and Brazil. While the difference between our projections and Goldman Sachs' projections for mature economies is quite low, they differ by almost 1 full percentage point for the emerging markets, consequently leading to an almost half a percentage point difference for the global economy.

In general, our medium-term projections for mature economies tend to be quite in line with IMF and Goldman Sachs (and only slightly lower than OECD), while we differ substantially for the emerging economies, thus resulting a lower Global GDP growth in our projection.

4. Closing Remarks

Projecting future growth is an ambitious undertaking. The only way we can forecast the future is to begin with looking at past performances, supplemented by assumptions on output gaps and some of the future trends in underlying variables. The results will therefore crucially depend upon the assumptions we make regarding the relationships between GDP growth and various factors that are expected to influence growth.

The growth accounting framework provides a good starting point for projecting output growth in the medium and long term. It uses information from projected factor inputs – capital and labor – and productivity to project output growth. Therefore, the final projection results are strongly dependent on the approach to estimate factor inputs, particularly capital and total factor productivity growth rates. We believe that our methodology combining simple growth accounting and regression analysis using economic variables makes it possible to be more explicit about understanding the sources of growth and the drivers of change over time.

Our projections of GDP growth may be seen as relatively low compared with other studies. However, over a time span as long as the one we have used, there will likely be deviations in both directions. Despite the transparency and comparability of our approach, the disadvantage is that there is no simple framework that can take into account all the country specific factors and potential shocks in the future. That said, our goal is not to provide an explicit forecast in the sense of the precise point forecasts on growth, but rather to provide a reasonable way of benchmarking trend growth across a large group of economies.

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Appendix

In order to evaluate the accuracy of our projections, we carry out out-of -sample tests on capital services growth, TFP growth and GDP growth to measure the deviation of the forecast value from the actual value. Specifically, we use the first four or five periods' data in simultaneous equation system to predict capital services and TFP growth in periods 5 (1999-2005) or 6 (2006-2014). Together with the labor contribution, we then calculated the projected GDP growth. In the appendix table below, we list the actual and projected values for capital service growth, TFP growth and GDP growth, and the corresponding difference between the projected and actual values. Three points worth noting when reading the numbers in the appendix tables 1 and 2 below:

1. Because we specify lagged variables as explanatory variables in the simultaneous equation system, the projected capital services growth and TFP growth is affected by the performance of the previous period. That is why in period 6 (2006 – 2014), which contains the 2008-2009 crisis and the European debt crisis, the projected growth is higher than the actual growth for most mature economies. This also explains why in our medium-term projection (2015-2019), the base scenario growth continues the downward trend. The model specification determines the path dependence nature of the projection and is not able to forecast any unforeseeable shocks, either negative (such as a global financial crisis, or the breakup of the euro zone) or positive (such as a strong acceleration in technological progress and innovation that will lift the world growth out of the sluggish trajectory).

2. The deviation between the projected GDP growth and actual GDP growth for period 5 and 6 comes not only from the differences in the projected and actual capital services growth and TFP growth. It is also partially due to the fact that in our projected GDP growth, we approximate the actual employment growth by the growth in working age population. The discrepancy will be especially evident in countries with volatile labor participation rate and employment rate.

3. Our medium and long-term projections for China and India may seem low compared with the actual GDP growth in the past decades in these two countries. However, when comparing with the projections in period 5 and 6, these projections indicate a gradual slowdown in China and India instead of a sudden drop from 2015 onwards. It is a result of combined slowdown in all of the input factors. Specifically, China will run out of the demographic dividend during 2015-2019 as its working age population growth will decline; capital services growth gradually slow down as the return to capital declines after many years of intensive investment and the economy is shifting towards a more consumption driven growth model; last but not the least, productivity growth weakens as the country matures and the easy productivity gains from learning the leaders exhaust and future productivity growth has to originate from technological progress and innovation.

Appendix Table 1: Actual and projected growth of capital services, TFP and GDP and the differences, Period 5 (1999-2005)

Period 5 (1999-2005)									
MATURE ECONOMIES	Capital services growth (%)			TFP growth (%)			GDP growth (%)		
	Actual	Projected	Difference (Projected - Actual)	Actual	Projected	Difference (Projected - Actual)	Actual	Projected	Difference (Projected - Actual)
United States	3.8	4.7	0.9	0.9	0.4	-0.5	3.0	2.8	-0.2
Austria	2.9	3.6	0.7	0.6	1.0	0.3	2.2	2.8	0.6
Belgium	3.7	4.1	0.4	0.1	0.1	0.0	2.1	2.3	0.2
Cyprus	2.0	2.2	0.2	1.2	1.2	0.0	3.6	3.7	0.1
Czech Republic	5.4	4.6	-0.8	1.5	1.1	-0.4	3.7	3.0	-0.7
Denmark	3.6	3.2	-0.4	0.2	1.0	0.8	1.7	2.4	0.6
Finland	3.2	2.7	-0.5	1.3	1.4	0.1	3.1	3.1	-0.1
France	3.2	3.5	0.3	0.4	0.1	-0.2	2.1	2.0	-0.1
Germany	1.8	2.4	0.6	0.8	1.1	0.3	1.1	1.6	0.5
Greece	5.6	4.3	-1.3	-0.2	0.5	0.8	3.9	4.1	0.2
Hungary	6.8	3.4	-3.4	0.5	1.6	1.0	4.0	3.7	-0.3
Iceland	4.1	3.6	-0.4	1.9	1.4	-0.5	4.2	3.7	-0.5
Ireland	7.7	6.5	-1.2	0.7	0.9	0.1	6.3	5.9	-0.4
Italy	2.9	3.8	1.0	-0.4	-0.1	0.3	1.4	2.1	0.7
Luxembourg	6.0	5.4	-0.6	0.3	0.2	0.0	4.8	4.5	-0.3
Malta	1.3	3.2	1.8	1.0	1.5	0.5	2.0	3.3	1.2
Netherlands	2.8	3.7	0.9	0.5	0.8	0.2	2.1	2.7	0.5
Norway	3.8	2.4	-1.3	0.3	0.8	0.5	2.3	2.2	-0.1
Poland	4.1	2.6	-1.4	1.6	2.0	0.5	3.4	3.3	-0.1
Portugal	5.2	4.0	-1.2	-1.2	0.5	1.8	1.7	3.1	1.4
Spain	5.2	4.0	-1.2	-0.9	0.2	1.1	3.7	4.3	0.6
Sweden	3.3	4.1	0.8	1.5	1.1	-0.4	3.2	3.0	-0.1
Switzerland	3.2	3.3	0.0	0.2	1.0	0.9	1.6	2.5	0.9
United Kingdom	5.0	5.8	0.8	0.6	1.0	0.4	3.1	3.8	0.7
Japan	1.5	2.4	0.9	0.6	0.5	0.0	1.1	1.6	0.4
Australia	5.1	5.4	0.4	0.0	1.0	1.0	3.4	4.5	1.1
Canada	4.3	3.5	-0.8	0.2	0.9	0.7	3.2	3.6	0.4
Hong Kong	3.6	5.5	2.0	1.8	0.5	-1.3	4.4	4.0	-0.4
Israel	4.4	5.7	1.2	0.3	0.5	0.1	3.2	4.0	0.8
New Zealand	4.1	4.7	0.6	0.2	1.2	0.9	3.8	5.0	1.2
Singapore	3.2	5.2	1.9	2.4	1.1	-1.4	5.5	5.2	-0.3
South Korea	5.8	6.7	1.0	2.3	0.7	-1.7	6.1	4.9	-1.2
Taiwan	5.8	5.4	-0.4	1.7	0.9	-0.7	4.2	3.5	-0.7

EMERGING MARKETS	Capital services growth (%)				TFP growth (%)				GDP growth (%)		
Period 5 (1999-2005)											
	Actual	Projected	Difference (Projected - Actual)		Actual	Projected	Difference (Projected - Actual)		Actual	Projected	Difference (Projected - Actual)
China	10.6	8.6	-1.9		4.2	2.9	-1.3		10.2	8.0	-2.2
India	6.5	6.2	-0.3		1.2	1.1	-0.1		6.2	5.9	-0.3
Indonesia	4.3	5.2	0.9		1.3	-0.3	-1.5		4.1	3.0	-1.1
Malaysia	3.7	6.2	2.5		2.2	0.0	-2.1		5.4	4.4	-1.0
Pakistan	4.0	4.8	0.8		1.6	0.5	-1.0		4.8	4.1	-0.6
Thailand	2.1	5.7	3.6		2.6	-0.3	-2.9		5.0	4.4	-0.7
Argentina	1.2	2.0	0.7		-1.4	0.8	2.2		0.5	3.4	2.9
Brazil	2.9	2.4	-0.6		-0.6	1.6	2.2		2.6	4.5	1.9
Chile	6.2	3.6	-2.6		-0.3	1.0	1.2		3.8	3.7	-0.2
Colombia	2.8	2.1	-0.7		-0.6	0.5	1.0		2.3	3.0	0.7
Mexico	4.0	2.3	-1.7		-0.5	0.6	1.1		2.8	2.8	0.0
Venezuela	0.9	0.0	-0.8		-0.4	-0.4	0.0		1.4	1.0	-0.5
Iran	1.3	2.0	0.7		1.5	-0.8	-2.2		4.6	2.7	-1.9
Saudi Arabia	3.1	5.6	2.5		1.1	0.9	-0.2		4.2	5.5	1.3
United Arab Emirates	2.5	1.9	-0.6		1.5	0.4	-1.1		5.0	3.5	-1.5
Algeria	4.3	4.9	0.6		0.6	0.6	0.0		3.8	4.1	0.3
Egypt	3.2	2.8	-0.4		0.4	-0.6	-1.0		4.0	2.7	-1.3
Morocco	3.9	3.2	-0.7		1.0	0.7	-0.2		6.0	5.4	-0.6
Nigeria	3.2	5.1	1.9		5.2	0.9	-4.3		8.3	5.1	-3.2
South Africa	4.4	5.2	0.8		0.6	0.5	-0.1		3.6	3.8	0.2
Russian Federation	-1.6	0.4	2.0		5.7	0.6	-5.1		6.5	2.3	-4.2
Turkey	5.8	3.8	-2.0		-0.3	0.1	0.4		3.6	2.8	-0.8

Appendix Table 2: Actual and projected growth of capital services, TFP and GDP and the differences, Period 6 (2006-2014)

MATURE ECONOMIES	Period 6 (2006-2014)								
	Capital services growth (%)			TFP growth (%)			GDP growth (%)		
	Actual	Projected	Difference (Projected - Actual)	Actual	Projected	Difference (Projected - Actual)	Actual	Projected	Difference (Projected - Actual)
United States	2.1	4.3	2.2	0.1	0.5	0.4	1.3	2.6	1.3
Austria	1.8	2.7	0.9	0.5	0.8	0.2	1.3	1.9	0.5
Belgium	2.9	4.3	1.4	-0.7	0.4	1.0	1.0	2.5	1.5
Cyprus	2.4	0.5	-1.9	-0.8	0.9	1.7	-0.1	0.8	0.9
Czech Republic	4.2	3.9	-0.3	-0.2	2.1	2.3	1.7	3.8	2.2
Denmark	2.9	4.4	1.5	-0.5	0.9	1.4	0.3	2.2	1.9
Finland	3.7	3.1	-0.6	-0.9	0.9	1.8	0.5	2.2	1.6
France	2.1	2.7	0.6	-0.4	0.4	0.8	0.7	1.7	1.0
Germany	1.8	3.3	1.5	0.3	1.3	0.9	1.4	2.8	1.4
Greece	3.0	3.4	0.4	-2.4	0.7	3.1	-2.0	1.4	3.3
Hungary	4.8	3.3	-1.6	-1.6	2.0	3.6	0.2	3.2	3.0
Iceland	0.7	3.1	2.4	1.0	1.1	0.1	1.2	2.4	1.2
Ireland	4.4	4.7	0.3	-1.2	0.7	1.8	0.4	2.5	2.1
Italy	0.9	2.4	1.5	-0.6	0.2	0.8	-0.6	0.7	1.3
Luxembourg	4.6	2.3	-2.3	-2.0	0.4	2.4	1.6	2.9	1.3
Malta	0.7	4.7	4.0	0.5	1.1	0.6	2.1	4.4	2.3
Netherlands	1.6	3.1	1.5	-0.1	1.0	1.0	0.7	2.2	1.5
Norway	4.4	2.5	-1.9	-2.0	0.7	2.6	1.2	2.9	1.7
Poland	5.0	3.8	-1.2	0.6	2.1	1.5	3.7	4.6	0.9
Portugal	2.6	2.5	-0.1	-0.9	0.8	1.7	-0.2	1.4	1.7
Spain	3.0	2.6	-0.4	-0.5	0.5	0.9	0.3	1.1	0.8
Sweden	3.6	5.0	1.4	-0.2	1.0	1.2	1.8	3.5	1.7
Switzerland	2.6	4.5	1.8	0.3	1.1	0.8	1.9	3.2	1.3
United Kingdom	2.8	4.1	1.3	-0.6	0.9	1.5	0.8	2.8	1.9
Japan	0.9	1.8	0.9	0.2	1.0	0.7	0.6	1.7	1.1
Australia	6.9	7.0	0.1	-1.1	0.8	1.9	2.7	4.7	1.9
Canada	3.9	3.8	-0.1	-0.7	0.7	1.4	1.7	3.1	1.4
Hong Kong	3.1	3.6	0.5	1.4	0.8	-0.5	3.5	3.2	-0.3
Israel	4.4	6.2	1.8	0.7	1.0	0.3	4.2	5.5	1.3
New Zealand	4.1	4.7	0.6	-0.5	1.3	1.9	1.8	3.9	2.1
Singapore	5.1	4.5	-0.6	0.3	1.0	0.8	5.4	5.9	0.5
South Korea	5.0	5.4	0.4	1.0	1.4	0.4	3.6	4.2	0.6
Taiwan	2.9	4.1	1.2	1.7	1.0	-0.7	3.4	3.5	0.1

	Period 6 (2006-2014)									
EMERGING MARKETS	**Capital services growth (%)**				**TFP growth (%)**				**GDP growth (%)**		
	Actual	Projected	Difference (Projected - Actual)		Actual	Projected	Difference (Projected - Actual)		Actual	Projected	Difference (Projected - Actual)
China	11.5	9.3	-2.3		2.3	3.3	0.9		9.3	9.0	-0.3
India	8.9	7.7	-1.2		1.4	1.6	0.2		7.0	6.5	-0.5
Indonesia	7.4	5.8	-1.6		0.5	1.4	0.9		5.7	5.7	0.0
Malaysia	4.8	5.4	0.6		0.7	0.9	0.2		4.7	5.1	0.5
Pakistan	6.3	4.2	-2.1		-1.2	0.6	1.8		3.7	4.4	0.8
Thailand	3.9	4.6	0.7		0.3	1.0	0.7		3.4	4.5	1.1
Argentina	4.7	3.6	-1.1		-1.4	0.5	1.9		3.1	4.3	1.3
Brazil	5.9	5.0	-0.9		-0.6	1.0	1.6		3.2	4.3	1.2
Chile	7.9	2.8	-5.1		-1.3	0.7	2.0		3.9	3.1	-0.8
Colombia	7.2	4.2	-2.9		-0.3	1.0	1.4		4.6	4.4	-0.2
Mexico	4.4	2.2	-2.2		-1.3	0.7	2.0		2.4	2.9	0.5
Venezuela	6.1	2.3	-3.8		-2.0	0.0	1.9		3.1	2.7	-0.3
Iran	4.7	3.2	-1.5		-1.3	0.9	2.1		2.7	4.1	1.4
Saudi Arabia	6.5	5.6	-0.8		-1.0	1.6	2.6		4.2	6.3	2.1
United Arab Emirates	4.2	3.1	-1.1		-0.6	0.7	1.3		2.9	3.4	0.5
Algeria	7.9	6.8	-1.2		-0.4	1.0	1.4		4.3	5.1	0.8
Egypt	6.4	4.4	-2.1		0.1	0.8	0.7		5.5	4.8	-0.7
Morocco	6.5	4.3	-2.2		-1.4	1.4	2.8		3.3	5.0	1.7
Nigeria	12.4	7.3	-5.1		-1.6	2.2	3.7		6.4	8.0	1.6
South Africa	7.9	6.6	-1.3		-2.1	1.1	3.2		2.9	5.5	2.6
Russian Federation	3.6	3.0	-0.6		1.1	2.5	1.4		2.9	4.0	1.1
Turkey	7.4	3.2	-4.2		-2.0	0.8	2.8		3.7	3.8	0.1

Appendix Table 3: Model predicted growth rates and contributions for 2015-2019 and 2020-2025

MATURE ECONOMIES	Average annual growth 2015-2019 (trend growth projection)					Average annual growth 2020-2025 (trend growth projection)				
	GDP	Labor Quantity	Labor Composition	Capital Services	TFP	GDP	Labor Quantity	Labor Composition	Capital Services	TFP
United States	2.0	0.4	0.1	1.3	0.1	1.9	0.2	0.1	1.4	0.1
Austria	1.6	0.1	0.1	0.9	0.5	1.2	-0.3	0.1	0.9	0.5
Belgium	1.6	0.2	0.2	1.1	0.1	1.5	-0.1	0.2	1.0	0.3
Cyprus	1.1	0.6	0.3	0.0	0.2	1.1	0.4	0.3	0.0	0.4
Czech Republic	2.4	0.0	0.1	1.1	1.2	2.5	-0.1	0.1	1.0	1.4
Denmark	2.0	0.2	0.1	1.1	0.7	2.2	0.1	0.1	1.1	0.9
Finland	1.1	0.0	0.2	0.7	0.2	1.2	-0.1	0.2	0.6	0.5
France	1.3	0.2	0.2	0.8	0.2	1.3	0.1	0.2	0.8	0.3
Germany	1.6	-0.2	0.1	1.1	0.6	1.3	-0.6	0.1	1.0	0.7
Greece	1.1	0.2	0.3	0.9	-0.3	1.5	-0.2	0.3	1.3	0.1
Hungary	2.4	-0.1	0.2	1.2	0.9	2.7	-0.2	0.2	1.3	1.4
Iceland	2.1	0.7	0.3	0.4	0.7	1.9	0.4	0.3	0.5	0.7
Ireland	2.2	0.8	0.2	1.2	0.0	2.3	0.5	0.2	1.4	0.2
Italy	0.5	0.1	0.1	0.6	-0.2	0.4	-0.2	0.1	0.7	-0.1
Luxembourg	2.1	0.6	0.2	1.1	0.2	2.3	0.4	0.2	1.1	0.6
Malta	1.9	0.2	0.2	0.5	1.0	1.7	-0.2	0.2	0.4	1.1
Netherlands	1.8	0.1	0.1	0.8	0.8	1.6	-0.2	0.1	0.8	1.0
Norway	2.4	0.5	0.1	1.5	0.3	2.5	0.3	0.1	1.5	0.6
Poland	3.0	-0.1	0.1	1.7	1.4	2.6	-0.3	0.1	1.4	1.4
Portugal	1.3	0.0	0.5	0.5	0.3	1.4	-0.2	0.5	0.6	0.4
Spain	1.3	0.2	0.3	0.8	0.1	1.2	-0.1	0.3	0.8	0.2
Sweden	2.7	0.5	0.1	1.6	0.6	2.6	0.2	0.1	1.6	0.7
Switzerland	2.5	0.5	0.1	1.1	0.9	2.4	0.3	0.1	1.0	1.0
United Kingdom	1.9	0.4	0.1	1.2	0.2	1.9	0.1	0.1	1.2	0.4
Japan	1.1	-0.3	0.1	0.6	0.6	1.1	-0.3	0.1	0.6	0.7
Australia	3.5	0.6	0.2	2.4	0.3	3.5	0.5	0.2	2.3	0.5
Canada	2.5	0.4	0.1	1.6	0.4	2.4	0.1	0.1	1.6	0.5
Hong Kong	1.8	0.0	0.1	1.5	0.2	1.3	-0.3	0.1	1.5	0.0
Israel	3.9	0.6	0.2	2.5	0.6	3.6	0.5	0.2	2.3	0.6
New Zealand	3.2	0.5	0.3	1.5	0.9	3.3	0.3	0.3	1.5	1.1
Singapore	3.3	0.7	0.3	1.7	0.6	2.5	0.2	0.3	1.4	0.6
South Korea	3.0	0.3	0.2	2.1	0.4	2.2	-0.2	0.2	2.0	0.3
Taiwan	2.3	-0.1	0.3	1.7	0.5	1.6	-0.5	0.3	1.6	0.3

EMERGING MARKETS	Average annual growth 2015-2019 (trend growth projection)						Average annual growth 2020-2025 (trend growth projection)				
	GDP	Labor Quantity	Labor Composition	Capital Services	TFP		GDP	Labor Quantity	Labor Composition	Capital Services	TFP
China	5.5	0.0	0.1	4.2	1.2		3.9	-0.1	0.0	3.3	0.7
India	5.5	0.7	0.1	3.6	1.0		5.0	0.6	0.1	3.4	0.8
Indonesia	4.8	0.7	0.2	3.2	0.7		4.5	0.6	0.2	3.2	0.5
Malaysia	3.7	1.0	0.2	2.4	0.1		3.3	0.7	0.2	2.4	0.0
Pakistan	3.5	1.3	0.2	2.1	0.0		3.5	1.1	0.2	2.1	0.1
Thailand	3.5	0.0	0.3	2.9	0.2		3.2	-0.1	0.3	2.9	0.1
Argentina	2.2	0.5	0.1	1.9	-0.3		2.0	0.4	0.1	1.5	0.0
Brazil	3.2	0.6	0.2	1.4	0.9		3.1	0.4	0.2	1.2	1.2
Chile	2.7	0.5	0.2	1.6	0.3		2.4	0.2	0.2	1.5	0.5
Colombia	4.1	0.7	0.2	2.6	0.5		4.0	0.6	0.2	2.6	0.6
Mexico	2.6	0.5	0.1	1.8	0.1		2.8	0.4	0.1	1.9	0.4
Venezuela	1.4	0.6	0.2	1.1	-0.6		1.3	0.5	0.2	0.7	-0.2
Algeria	2.8	0.7	0.2	1.8	0.0		2.9	0.5	0.2	1.9	0.3
Egypt	4.3	0.7	0.1	3.4	0.1		4.2	0.6	0.1	3.2	0.2
Iran	2.1	0.3	0.1	1.7	0.0		2.0	0.2	0.1	1.5	0.2
Morocco	4.0	0.7	0.2	3.0	0.1		3.7	0.5	0.2	2.9	0.1
Saudi Arabia	4.3	0.9	0.1	3.1	0.1		3.6	0.4	0.1	2.9	0.1
United Arab Emirates	3.7	1.0	0.0	1.6	1.0		3.8	0.7	0.0	1.6	1.4
Nigeria	6.7	1.2	0.1	5.6	-0.3		6.7	1.2	0.1	5.5	-0.2
South Africa	3.5	0.5	0.3	2.7	0.0		3.8	0.6	0.3	2.5	0.3
Russian Federation	1.4	-0.6	0.2	0.9	0.8		1.0	-0.6	0.2	0.7	0.8
Turkey	3.1	0.5	0.1	2.1	0.3		3.0	0.3	0.1	1.9	0.7