THE CZECH MACROECONOMY:
TRIUMPHS AND FAILURES IN THE PATH TO TRANSITION

PREPARED FOR:

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INTRODUCTION
The Czech Republic is reputed as a great economic success story, especially when compared to other Central and Eastern European countries. Since the collapse of the communist regime at the start of the 1990s, the Czech government has undertaken major economic and political reforms in its effort to join the rest of the world’s developed nations.

The aim of this paper is to gain perspective on Czech economic policies. The Solow Economic Growth Model helps achieve this by illustrating how growth in capital stock, advances in technology, and other factors may affect a nation’s output of goods and services. As such, we proceed in this paper by first offering a brief survey of recent macroeconomic performance. We then evaluate the Czech government’s record, focusing on both problems and successes that may gauge the effectiveness of economic reforms. The paper concludes with a discussion on macroeconomic policy recommendations.

PRAIGUE’S MACROECONOMIC RECORD: A STORY OF TRANSITION
Since its transition to a capitalist market-oriented economy, the Czech Republic’s output per capita has been increasing rapidly. It climbed from CK 3,126 (Czech koruny, or crowns) in 1990 to CK 5,640 projected in 2000, reflecting more than an 80 percent increase in ten years. This trend has occurred despite a two-year period of negative real GDP growth, down to –3.3% in some quarters, from 1997 to 1999.1

The decline was a consequence of a May 1997 national banking scandal, which sparked a national currency crisis. The roots of the scandal, according to the OECD, were state-controlled banks with lax credit lending practices, largely unregulated capital markets, and “confused” corporate governance. This environment inhibited restructuring of domestic banking firms and resulted in speculative pressure against the currency.

In May 1997, Czech authorities abandoned the nation’s fixed-exchange rate, which was pegged to a basket of five currencies led by the U.S. dollar and German deutsche mark, and introduced several macroeconomic structural changes. These included inflation targets, tightened fiscal policy, growing price regulation, and rapid privatization of the banking and other sectors. A combination of tight monetary policy and fiscal policies provoked slowed GDP growth, which, together with the Asian and Russian crises, set the stage for economic recession in the Czech Republic until 1999.2

The depreciated currency and lower GDP growth rate lead to improved export competitiveness shrinking the current account deficit to 2.4 percent in 1998, down from 6.1% in 1997. The drop in GDP growth had various other macroeconomic effects, including higher unemployment (from an average of 5.2% in 1997 to 9.4% in 1999; unemployment in 2000 fell to 8.8%).3

Since liberalization, GDP achieved a maximum annual growth rate of 6.6% in 1995, while a modest growth rate of 2.6% percent was reported for 2000. Despite recent economic recession, we view the country’s return to growth and its overall rising standard of living, evaluated over ten years, as long-term indicators of the economy’s health.

The Solow growth model would attribute rising GDP per capita to a combination of factors, which include rising productivity, rising investment, and improvements in labor efficiency due to technological innovation. In addition, the model expects a strong correlation between a high savings

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2 OECD. OECD Economic Survey: Czech Republic 2000. Pg. 9-12
3 OECD. OECD Economic Survey: Czech Republic 2000. Pg. 9-12
rate and an equally high level of investment in capital, which, by extension, leads to an increase in GDP.

**Productivity**
The Solow growth model associates rising productivity with rising GDP. Productivity typically is considered a function of capital and labor, the two most important production factors. As such, changes in productivity may be assumed to be the result of changes in either one or both of these factors. For the purposes of this paper, we treat productivity change as exogenous, focusing our analysis on, first, capital in terms of investment and, second, labor in terms of labor-augmenting technology.

Data show that labor productivity in the Czech Republic has been on the rise. With 1995 as the base year (1995=100), recently released figures show the industrial production volume index to have averaged about 110.5 for most of 2000. A gain in this index was posted in January 2001, amounting to 113.8 year-on-year.\(^4\) Other figures show a 15.8% increase in industrial output of capital goods. Referring to the Solow model, rising productivity is depicted in a shift of the production possibilities curve from \(f(k)\) and \(f(k)'\), a healthy move. (see Appendix)

**Capital Investment**
Besides growing productivity, the Czech Republic has experienced changes in savings and capital investment. Although the Solow model assumes only physical capital (e.g., production plants, computer technology, and infrastructure like roads and bridges), investment of many sorts has been growing substantially in the Czech Republic, both from the private and public sectors. In fact, the Czech economy enjoys strong investment at a rate that is comparable to and even exceeds some rates of developed countries.

Domestic savings and investment are important for transition economies like the Czech Republic. First, as stated earlier, the Solow model predicts that a high savings rate, hence investment, leads to higher GDP. Second, domestic savings and investment helps avoid over reliance on volatile international markets.

Data from the Czech Republic show that in 1999, Gross Domestic Savings (GDS), as a percentage of GDP, was about 26.5%, reflecting a slight decrease from previous years.\(^5\) OECD countries average savings rates between 19-21%. Meanwhile, gross investment in tangible goods has risen almost 8% since 1995, to CK 463,054 million in 1998 (expressed in constant prices). The 1998 figure is down from the 1997 CK 517,363 million figure, once again, due likely to the Czech banking scandal and its subsequent effects.\(^6\)

Another notable trend is the robust growth in foreign direct investment (FDI) that the Czech Republic has enjoyed. According to one estimate, FDI has risen from USD 654 million in 1993 to USD 2,562 million in 1995 (a 291% increase), which coincided with the height of its privatization programs.\(^7\) Despite a decrease in 1997, FDI inflow continued to surge, reaching levels of USD 5,108 million in 1999 and USD 6 billion in 2000.\(^8\)

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As indicated earlier, the creation of a risk-free environment for investing is key in allaying negative expectations from investors. In other words, there is strong incentive for Prague to show a clear separation between the practices of the current and old political regimes. To this end, the Czech government has implemented many reforms of governmental institutions as well as laid sound foundations for legal institutions. Since these practices contribute to increases in investment, their significance is accounted for in the Solow model (output growth due to investment per worker).

Nonetheless, in its movement towards European Union accession, Prague has set for itself high standards in attracting investment from abroad. Integration into the EU means that the Czech Republic is increasingly becoming part of the Western European family of nations, which serves as an indicator of its economic and institutional maturity and essentially is representative of its status as a soon-to-be developed country.

At the same time, the strength in the Czech Republic’s industrial output could be attributed partly to the legacy that it inherited as one of the world leaders in industrial production. Left unharmed throughout World War II, Prague’s production of weapons and large machinery were in demand by governments all over the world, including the Soviet Union. The fact that it has become a worldwide leader in attracting FDI inflow attests to the Czech government’s success to this end.

In addition to domestic and foreign physical capital investment is human capital investment. The latter is analogous to the former in that it raises worker productivity. An emerging economy, the Czech Republic has a highly educated yet unskilled work force. As a percentage of 1997 GDP, spending on non-tertiary education was about 3.6%, slightly below the OECD average of 3.7%. This contrasts sharply to spending on tertiary education, which includes vocational training and amounts to approximately 0.80% of GDP. This is quite low when compared to the OECD average of 1.70%.

One of the legacies of the communist regime is a neglect of tertiary education and a skill-based training system that is, overall, below international standards. Since Czech students do not pay college tuition, tertiary education is entirely government-financed, which ultimately leads to unavoidable, yet harmful, restrictions on access to and quality of education. Figures show that while 88% of Czech labor force, aged 25-64, have completed higher secondary school, only 12% of this group completed university studies, again, including vocational training.

Within the Solow model, assuming the aforementioned relationship between physical and human capital, the phenomenon of an educated but insufficiently skilled workforce means output is higher than it otherwise would be given an under- or uneducated workforce, but not as high as it potentially could be were skill levels enhanced. Therefore, we can conclude that domestic and foreign investments are key factors in supporting physical capital levels in the Czech Republic. However, there remains room for improvement when it comes to human capital investment. The Solow model reflects increases in total investment through an upward shift of the sf(k) curve (see Appendix).

**Privatization and Technology: Labor Efficiency Improvements**

In the Czech Republic, privatization efforts have taken place at break-neck speed. In 1990, 5% of GDP was attributed to the private sector, compared to over 80% in 2000. Technological innovation often can be a positive externality of privatization. Representative of this transformation is Skoda Holding, the producer of Skoda cars and other transportation vehicles, which first was privatized in 1992. By 1999, financial difficulties caused the company to be placed

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11 World Bank and EBRD Transition Report 2000
on the international market as it was bought by the German automaker Volkswagen. This process of internal then external divestiture, which has occurred across industries, has become known in some circles as the “Czech method” of privatization. Relinquishing domestic holdings, however, in many cases has allowed Czech industries to enjoy substantial tech transfer from Europe and North America.

For example, Skoda plants and operations throughout the Czech Republic now are on par with world auto industry standards for technology, which includes management techniques like just-in-time inventories, and production line and other innovations. Examining another case, privatization efforts within the telecommunications industry have brought valuable knowledge and know-how relating to cable, digital, and other technology.

The Solow model shows that sustained growth in income or GDP comes only from technological progress. High savings/investment rates lead to high growth rates only until the steady state is reached, at which point output per worker (productivity) depends only on the rate of technological progress.12

For the Czech Republic, effects that otherwise counteract the positive growth effects of technology are limited. Specifically, the population size has remained stable13, and there is no indication that capital depreciation exceeds the average rate of 4%, interpreted as replacement every 25 years. Changes in technology are reflected in the depreciation curve, \((\delta + g + n)k'\), specifically the variable \(g\). Improvements in production efficiency due to technology pivot the curve outward, as indicated in the move to \((\delta + g + n)k'\) (See Appendix).

**Solow Says…**

In sum, improvements in productivity, investment, and efficiencies due to labor-augmenting technological progress are reflected in higher output, shown in the Solow model by upwards shifts in the variable ‘y’. A further result is an improvement in the capital to labor ratio (at least in the cases of investment and technological efficiency improvements), indicated by upward movement in the variable ‘k’ (See Appendix).

Overall, the Solow model has proven a useful lens through which to view the Czech economy’s progress, explaining vast improvements over the last ten years in GDP per capita. The model does little to explain the reasons for the 1997 banking scandal and resulting currency crisis. Its focus is the long-term, and the model would concern itself with this matter only insofar as events could prove detrimental to long-term productivity, investment, and/or technological innovation. Given this, does the model predict permanent or semi-permanent set backs in output or capital stock?

Concerning labor productivity, data show no declines despite the 1997 crisis. In fact, industrial labor productivity appears to have continued to rise.14 As for investment, discussed above, domestic savings, investment in tangible goods, and FDI all appeared to have taken a hit in 1997, but these indicators, as recently as 1999, are once again exhibiting positive growth. Finally, research and development indicators, which, for example, include state budget allocations for R&D and a total count of R&D organizations, show almost uninterrupted growth during the 1990s. The only exception is the total number of R&D employees, which fell in conjunction with overall employment in 1997. However, this indicator has not only recovered since the crisis, but since 1999 has reached a record high. Given this, we feel safe in assuming that the Solow model will predict ongoing improvement in the Czech Republic’s standard of living.

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12 Mankiw, p. 108.
13 Between 1990 and 1999, the Czech Republic’s population fell insignificantly from 10.36 million to 10.28 million. Source: http://www.czso.cz/eng/angl.htm
POLICY RECOMMENDATIONS

The Case for Education Reform
If any theme emerges from this report, it is that the Czech economy has, by and large, enjoyed sweeping success throughout most of the past decade. It is no wonder that it is often hailed as a model for transition economies. This record, however, should not hide some important sectors that have been neglected. Namely, education and investment in human capital are areas that need more attention and will be central to the following discussion.

In its annual review of transition economies, including the Czech Republic, the EBRD stressed that a distinct problem exists in that the quality of the workforce in transition economies lags behind that of advanced industrialized countries.\footnote{European Bank for Reconstruction and Development (EBRD). \textit{Transition Report 2000}. Pg. 113}

The spurt in technological growth experienced in the Czech Republic, and elsewhere, has led to some fundamental structural changes in the economy. For Prague to capitalize on these changes, a competent workforce is required to apply these technologies and to keep the country at a level approximate to international standards. In other words, there is a clear demand for skilled workers, which, if not fulfilled, has the potential to stifle growth.

From the perspective of the Solow model, we can see that in a state of constant technological progress, i.e., at the point where technological improvement has tapered off, there would be pressure to churn more “effective workers.” For this to occur, Czech political parties must embrace the fact that the system they inherited is flawed and be willing to introduce swift reforms. Hence we recommend a system where more emphasis is placed on vocational training.

To do so the Czech government can adopt a system where students must pay college tuition. This will free up monies earmarked for education, which can be redirected into vocational and technical training programs. The alternative is to increase education spending in order to increase access to higher academia nation-wide, as well as create tertiary education options beyond academia. The benefits are clearly realized in the Solow model, where an in increase in human capital investment leads to an increase the sf(k) curve, allowing worker output to increase, improving the Czech Republic’s standard of living.

Other Avenues
Given the link between privatization and technological innovation, we encourage the Czech Republic to continue its divestiture of public enterprises, regardless of the holders’ national origins. Further, as it continues to build a regulatory framework, we call on the Czech Republic to, first, examine its patent system to ensure it promotes new invention and protect current holders; second, explore revisions in the tax code to offer tax breaks for firms engaging in research and development; and, third, consider forming government agencies and programs that will subsidize or further subsidize university research.

Likely, moving towards EU accession already has required policymakers to pursue these reforms, and, no doubt, EU accession will make possible additional investment and technological transfer. The move towards EU accession will necessitate improvements in corporate governance structures and, to reduce corruption (a leading cause of the 1997 banking scandal), enhancements of measures to promote transparency across all industries. Crucial to these recommendations will be, first, ongoing formation of government agencies charged with achieving these reforms and, second, an effectively-enforced legal framework. These changes will provide for a stable institutional environment that will promote investment. As such, we support continuation of the Czech Republic’s efforts to join the European Union.
Appendix

Graph 1

The Solow Growth model shows that an increase in productivity results in a shift of the production possibilities curve from $f(k)$ and $f(k)'$. The result is an increase in income from $y_1$ to $y_2$.

Graph 2

The Solow Growth model predicts that a high savings rate, and investment, leads to an increase in GDP. An increase in total investment is reflected in an upward shift of the investment curve $sf(k)$ to $sf(k)'$. The result is an increase in GDP ($y_1$ to $y_2$) and an increase in the capital to labor ratio ($k_1$ to $k_2$). The increase in $y_1$ to $y_2$ should be more dramatic than reflected in the graph.
The Solow Growth model shows the increase in output per worker due to technological improvements. The increase is reflected in the outward pivot of the depreciation curve. The increase is in the variable ‘g’. Note that the labor component of the output/savings and capital per labor ratios implies a labor efficiency component (L X E, where E = efficiency of labor).

The improvement in the capital-to-labor ratio is indicated by the move on the graph from $k_1$ to $k_2$.

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Source: *Overview of the Labor Market in the Czech Republic* 
In Class Presentation 
SP 674 
Professor Katherine Terrell 
Assoc. Prof. of Corporate Strategy & Int'l Business and Business Economics & Public Policy 
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