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THE CYPRUS PEACE DIVIDEND REVISITED

A PRODUCTIVITY AND SECTORAL APPROACH

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CONTENTS

EXECUTIVE SUMMARY V

ACKNOWLEDGEMENTS XI

1. *INTRODUCTION AND EXISTING LITERATURE* 1

2. *CURRENT STATUS OF THE ECONOMIES ON BOTH SIDES OF THE ISLAND* 7

3. *COMBINING THE TWO DATA-SETS* 17

4. *HOW WILL THE ECONOMIES GROW WITHOUT A SOLUTION?* 19

5. *SETTLEMENT-RELATED INVESTMENT: NATURAL GAS, FAMAGUSTA AND NEW HOUSING* 21

6. *THE “HARE AND THE TORTOISE”: IMPORTANCE OF TOTAL FACTOR PRODUCTIVITY* 29

7. *MEASUREMENT OF TOTAL FACTOR PRODUCTIVITY* 35

8. *SECTOR-BASED ANALYSIS* 43

9. *MAXIMISING THE GROWTH POTENTIAL: KEY CHALLENGES* 59

10. *CONCLUSION: THE PEACE DIVIDEND QUANTIFIED* 63

APPENDIX A: CHARTS 65

APPENDIX B: METHODOLOGY FOR GAS-RELATED CALCULATIONS 71

APPENDIX C: METHODOLOGY FOR TFP-BASED FORECASTS 75

BIBLIOGRAPHY 81

EXECUTIVE SUMMARY

In the *Day after* series published between 2008 and 2010, Mullen, Antoniadou Kyriacou and Oğuz-Çilsal made the first substantive attempt to quantify the commercial opportunities of a Cyprus settlement. These included the recurring (permanent) benefits (Mullen, Oğuz, & Antoniadou Kyriacou, 2008); the combined recurring and solution-related benefits (Antoniadou Kyriacou, Oğuz, & Mullen, 2009); and the benefits that would accrue to Turkey and Greece (Oğuz-Çilsal, Antoniadou Kyriacou, & Mullen, 2010).

Much has happened to the economic environment since then: the Lehman Brothers crash of September 2008 that has had a long-term effect on economic growth in the world and the Eurozone in particular; the economic crisis culminating in the March 2013 bailout that continues to affect the economy in the Greek Cypriot community (GCC economy); and the weaker Turkish lira that is affecting the economy in the Turkish Cypriot community (TCC economy). On the other hand, natural gas finds offshore have also changed long-term prospects.

Taking these recent developments into account, *The Cyprus Peace Dividend Revisited* takes a fresh look at the likely boost to economic activity that would take place as a result of a settlement of the Cyprus problem. Our research takes as a working assumption that the settlement comes into force in 2016 (Year 1) and that a united Cyprus will be based on a bi-communal, bi-zonal federation with political equality as outlined in the February 2014 joint declaration. Documents in the public domain suggest that the two communities have expended considerable efforts during the negotiations to date to avoid the kind of deadlocks that arose in the 1960s; therefore our working assumption is that a united Cyprus will have a functioning government system, albeit with new challenges, which we also address. These same documents suggest that attempts will be made to minimise debt-financed property compensation, therefore we also assume that the property settlement will not lead to a ballooning of the already high debt of the state.

Our research found that the economies in both parts of the island are currently significantly underperforming. Moreover, this was the case even before the recent crisis. In the period 2005-12, growth in total factor productivity (TFP)—a measure of the long-term prospects for growth—was negative in the north, at -0.742% and barely positive in the south, at 0.008%. As a result of such weak TFP productivity, both sides of the island suffer from competitiveness problems, which in turn create risky imbalances such as high current-account deficits and rising debt. Moreover, a low TFP growth points to a continued future of very weak overall economic growth and high unemployment.

The long path to raising TFP growth is investment in human and physical capital through training and education, the use of technology and enhancing energy efficiency. Yet the existing division hampers the ability of the communities to capitalise on their achievements in areas

such as higher education. Both sides of the island, therefore, would benefit from what economists call the positive shock that would come from a settlement. This “peace dividend” will come from two sources: recurring benefits and settlement-related investment. *Recurring* benefits mean the permanent gains that come from opening up the Turkish market of 74m people to Greek Cypriots and the European Union market of 500m people to Turkish Cypriots.

A settlement of the Cyprus problem would attract new tourists to holy sites and ancient sites on both sides of the island, such as the Hala Sultan Tekke mosque in Larnaca and the church and monastery of St Barnabas in Famagusta, or the ancient ruins of Kourion near Limassol and Salamis near Famagusta. Shipping, including cruise tourism, would be liberated from current constraints and there will suddenly be more options for natural gas exploitation. Peace would allow the established universities on the island, which on both sides are typically connected with universities abroad and already teach in English, to create a single united Cyprus brand that would have a chance of becoming one of the most important educational centres in the region. New flight connections will allow Cyprus to become the regional hub it has always sought to be, a true business nexus centred on the professional services sector, especially if a solution is accompanied by double taxation and bilateral investment treaties with Turkey. The removal of legal impediments to property will support the real estate sector, which will also enjoy a strong boost from the above-mentioned factors and from normalisation of intercommunal relations. The boost to the real estate and construction sectors will help significantly alleviate the problems faced by banks with respect to non-performing loans and liquidity.

Last but not least, construction can be expected to enjoy a boom as a result of settlement-specific investments. A solution of the Cyprus problem could allow the construction of an energy pipeline to Turkey. This would be possible even with today’s level of gas volumes, which is currently not the case for a liquefied natural gas plant (LNG) or a pipeline to Greece. It should be noted that a pipeline to Turkey would be *in addition to* and not *instead of* an LNG plant, which would remain a desirable goal. A pipeline to Turkey would generate €1.3bn in additional gross investment. More importantly, it would yield much earlier government gas revenues than would be the case without a solution. Rejuvenating Famagusta, including Varosha and Famagusta port, could generate, in a low-investment scenario, €5bn. However, sector specialists informed us that a big-vision idea, such as a state-of-the-art eco-city that integrated the whole of Famagusta, could generate investment of up to €15bn. Whichever option is chosen, it would need to be done primarily with private-sector investment. Importantly, however, specialists told us that a state-of-the-art idea would attract considerably more private finance than the low-investment scenario. However, we have taken the lower scenario in our assumptions. A solution of the Cyprus problem, via the property and territorial settlement, would create demand for new housing, which we estimate would generate gross investment of €2bn. In total, investment in infrastructure and housing that is *specifically* related to the settlement could reach €10bn. It is important to note that €10bn of construction investment is not the same as value-added recorded for national accounts and GDP purposes. Thus, €10bn of mainly construction investment will lead to value-added ranging from roughly €4bn to €5bn. It will therefore account for between a fifth and a quarter of the peace dividend.

How much of the cost of revitalising Famagusta and implementing the property and territory settlement falls on the taxpayer will depend to a great degree on how carefully these issues are planned and managed. As we discuss in the report, if planned with international private-sector expertise in large-scale development, the cost to the taxpayer should be substantially reduced.

In the past, the costs and benefits of a solution have been seen in a static way: there was an appreciation of the immediate costs, but there was little understanding of the dynamic benefits. For example, if an economy is growing rapidly, an increase in the available land supply and property does not mean that property prices will fall. Indeed, the reverse is likely to be the case.

We have considered the economic impact of peace in two ways: from a top-down and a bottom-up approach. In the first case we put emphasis on the macroeconomic environment and the boost to the economy through capital and productivity enhancement, using a methodology known as Growth Accounting. In the second, we build GDP by aggregating each sector of the economy. The results are informative in different ways. In growth accounting the real productivity benefits that might arise through peace can be appreciated, while the sectoral breakdown allows an analysis of the benefits to each sector of the economy.

We made revisions to the first draft of our forecasts following input from peer reviewers as well as from senior business leaders who attended the PRIO Cyprus Peace Dividend Revisited Conference held in Brussels on 6-7 March 2014. Their input was invaluable in cross-checking our assumptions and in understanding their opinion of challenges and opportunities.

Using the two methodologies outlined above, we were able to calculate the “peace dividend”: for the Greek Cypriots, the Turkish Cypriots and the economy of the whole island. Assuming a solution will be implemented from 1 January 2016 and using the geometric mean of these two results, we found that, with a solution to the Cyprus problem, all-island GDP (at constant 2012 prices) would rise from just over €20bn in 2012 to just under €45bn by 2035, (that is, in Year 20 after the settlement) compared with around €25bn without a solution. In other words, the peace dividend over 20 years would be approximately €20bn. The annual average peace dividend, that is, the average peace dividend every year, would be just over €2bn on average in the first five years after a solution, just under €5bn in the first ten years and just over €10bn the first 20 years.

This will also translate into higher incomes. GDP per capita, that is, the additional income to individuals due to peace, would rise from approximately €17,000 in 2012 to just over €28,000 in 2035, compared with approximately €16,000 without a solution. Thus, annual incomes, at constant 2012 prices, would be €12,000 higher by Year 20 with a solution than without one. The annual average growth rate would be 4.5% on average over 20 years, compared with just 1.6% without a solution, with the peak growth rates coming in the first ten years. The lift to real GDP growth rates would therefore be 2.8 percentage points on average each year.

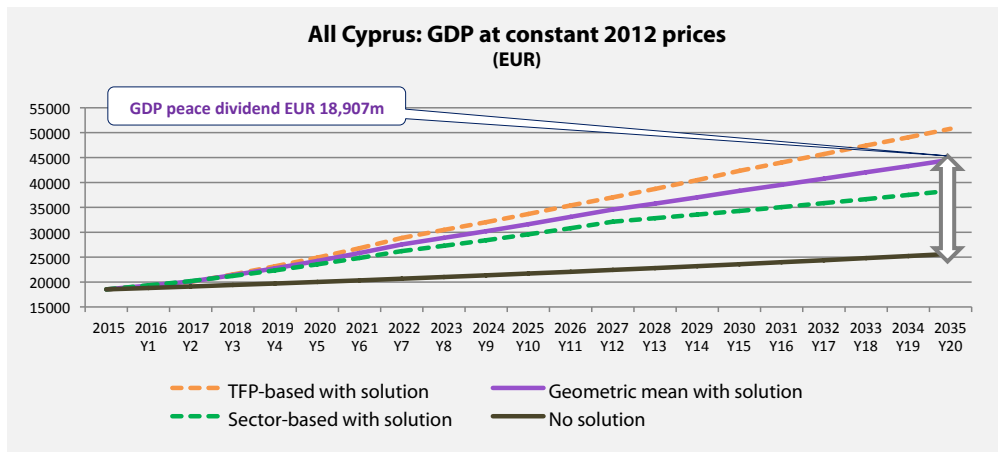
In the sector-specific forecasts, we estimate that in a united Cyprus, value-added in the tourism sector will rise from €1.3bn in 2012 to €2.9bn in 20 years, with additional income-creation of approximately €550m per year at constant prices. We estimate that the all-island construction sector in a no-solution scenario, which in the GCC economy is expected to

continue shrinking in 2014-15 after a 30% decline in 2012, would recover to only €730m at constant prices compared with just over €1bn in 2012. However, in a united Cyprus this sector would expand much faster, reaching €2.1bn in 2035 and yielding an annual average peace dividend of €725 million per year for the two communities. Growth in these two sectors will create spillover effects for wholesale and retail trade, which we expect to rise from just over €2bn in 2012 to €5bn in constant prices in 20 years, compared with only €2.8bn without a solution. Financial and insurance activities would grow from €1.7bn in 2012 to €2.7bn in 2035, with an annual average peace dividend of €380m, while professional services would increase from €1.3bn to €3.7bn and enjoy an annual average peace dividend of just over €1bn. Transport (mainly shipping) would increase from just under €900m in 2012 to €2.3bn in 2035, with an annual average peace dividend of €761m. Higher education has significant potential and we estimate that the total size of the sector will grow from €1.3bn in 2012 to €2.4bn in 20 years, yielding an annual average peace dividend of just under €270m in constant prices.

These positive developments will also help eliminate the per-capita income disparity between the two communities with converging incomes. We forecast that TCC per capita income, with the average of the two approaches employed, will be 91% of GCC incomes in 20 years (that is, not far from full convergence), compared with just 60% of GCC incomes today.

Preliminary estimates suggest that this kind of lift to economic activity will bring the unemployment rate in the GCC economy down to less than 5% within ten years compared with an unemployment rate of well over 10% without a solution. The €20bn boost to the economy will reduce high public debt and should offset a large proportion of any solution-related costs. Moreover, elimination of the disparity problem between the two communities will also have positive long-term political benefits, by supporting a well-functioning federation.

Chart 1



Source: Authors' forecasts.

Table 1

Peace dividend summarised EUR million at constant 2012 prices	2012 Actual	2035 With solution	2035 No solution	Annual Average Dividend
Construction (a)	1,083	2,104	731	725
GCC	942	1,107	493	336
TCC	141	997	238	389
Wholesale & retail trade	2,197	5,003	2,828	1,284
GCC	1,911	3,684	2,194	869
TCC	286	1,318	635	415
Transportation & storage	897	2,308	955	761
GCC	756	1,647	768	506
TCC	141	661	187	255
Accommodation & food services	1,272	2,884	1,920	553
GCC	1,119	1,627	1,454	133
TCC	152	1,258	466	420
Finance & insurance	1,728	2,668	2,065	379
GCC	1,542	2,085	1,737	230
TCC	185	582	328	149
Professional, scientific & technical	1,259	3,678	1,607	1,019
GCC	1,003	2,412	1,216	561
TCC	256	1,266	390	458
Education	1,285	2,385	2,013	267
GCC	1,107	1,920	1,726	159
TCC	179	466	286	109
GDP including others (b)	20,328	44,571	25,665	10,026
GCC	17,720	33,346	20,997	6,596
TCC	2,607	11,225	4,668	3,431
GDP per capita (b)	17,483	28,618	16,479	6,975
GCC	20,512	29,338	18,473	6,260
TCC	11,857	26,674	14,323	8,943
Real GDP growth rate 20-year average, % (b)	-	4.5%	1.6%	2.8%
GCC	-	3.8%	1.5%	2.3%
TCC	-	7.1%	2.5%	2.8%

(a) GCC construction shrank dramatically in 2013 and is expected to continue shrinking in 2014-15.

(b) Geometric mean of sector-based and TFP approach.

Source: Statistical services and authors' forecasts.

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Nicosia, April 2014

1. INTRODUCTION AND EXISTING LITERATURE

Previous analysis of the peace dividend

Economics focuses on the social interactions of humans. Modern economics sees the actions of individuals through the lens of human beings' attempts to maximise their "utility" (happiness or satisfaction), subject to several constraints that prevent them from achieving their desires. In this respect, the conflict and division of the island of Cyprus can be seen as a restraint on the ability of Cypriots to pursue happiness (Apostolides, Apostolides, & Güryay, 2012).¹

The political aspect of the problem has usually overshadowed the social and economic effects of the conflict on the island's population. The first attempt to assess the economic aspects of violence and division in Cyprus was historical in perspective (Strong, 1999). Forward-looking efforts were pioneered by Nathan Associates under the auspices of the U.S. Agency for International Development (USAID) in 2001 (Nathan Associates, 2001), while the *Day After* series broke new ground by quantifying (putting a number on) the benefits. The series began in 2008, quantifying the *recurring benefits*, i.e., the permanent benefits that accumulate over time (Mullen, Oğuz-Çilsal, & Antoniadou Kyriacou, 2008). The authors made forecasts on a balance-of-payments basis (that is, mainly trade in goods and services). They took as a reference the boom in trade between Greece and Turkey after the "earthquake diplomacy" of 1999, in which services between the two countries grew at an annual average rate of 36% in 1999-2006, compared with 10% for the rest of the world. They concluded that in the first seven years after a solution, the economy stood to gain, on a gross basis, an additional EUR €1.8bn from the *recurring* benefits of a solution to the Cyprus problem. This translated into a gain of €5,500 on average per household per year.

Having quantified the recurring benefits of a solution, in *The Day After II* (Antoniadou Kyriacou, Oğuz & Mullen 2009) they went one step further by adding settlement-related investment, as well as analysing options for financing. By adding settlement-related housing and infrastructure investment to the recurring benefits, they lifted their forecast to €12,000 per year per household. They found that a solution would create 33,000 new jobs and raise the average annual real GDP growth rate by 3 percentage points per year during at least the first five years.

¹ In the most recent Eurobarometer survey of 2013, 69% of Greek Cypriots and 49% of Turkish Cypriots were satisfied with their lives, compared with an EU average of 75% (Eurobarometer November, 2013).

The series culminated in the peace dividend that would be enjoyed by Greece and Turkey (Oğuz-Çilsal, Antoniadou Kyriacou, & Mullen, 2010). The authors found that Turkey not only stood to make significant savings from property litigation, military expenditure and subsidies to Turkish Cypriots, it would also greatly benefit from the opening up of the energy chapter in EU accession negotiations and the transformation of the Turkey-Cyprus-Greece region into one of peace and stability.

The *Day After* series marked a milestone in quantifying the dynamic benefits of the solution. Even in the negotiations between the two communities, the economics of a solution were a relatively recent addition to the discussion. The costs and benefits of a solution were seen previously in a static way: although there might be an appreciation of the immediate costs, there was little understanding of the dynamic benefits. The many immediate benefits include a sudden decrease in the risk premium of the country and a better interaction of factor markets which will have significant positive welfare effect on individuals. In addition, if an economy is growing rapidly and enjoys a lower risk premium, an increase in the available land supply and property does not mean that property prices will fall. Indeed, the reverse is likely to be the case.

The failure to resolve conflict is often linked to the impaired capacity of the parties involved to gain the most by increased trade. Clearly, as outlined in section 8, increased trade will benefit Cyprus and its neighbours. A re-alignment of areas to its competitive advantage can greatly increase the ability of Cyprus's capacity to operate as the service hub for the Eastern Mediterranean. Yet this is quite a narrow definition of how the communities will benefit from a solution. An increasingly large body of literature suggests that cost of enduring conflict, even if such a conflict has reached an impasse, is far bigger than the loss of trade.²

There has been an effort to calculate the benefits of peace brought about by the reduced pressure of conflict since the loosening up of movement and trade across the UN-monitored buffer zone (Green Line). As part of the wider Economic Interdependence Project, funded by the United Nations Development Programme-Action for Cooperation and Trust (UNDP-ACT), a group of Greek Cypriot and Turkish Cypriot economists (named the Peace Economic Consortium, PEC) estimated the size of the combined Cypriot economy in 2008 and the benefit of increased interaction. They calculated that economic transactions of over €300m had been generated in expenditure, income and tourist traffic across the Green Line and that has benefited both sides of the island (Peace Economic Consortium 2011).

In this paper, as well as renewing the qualitative analysis to take into account the global financial crisis, the banking sector crisis in the economy of the Greek Cypriot community (GCC economy) and the likely impact of Turkish lira fluctuations on the economy of the Turkish Cypriot community (TCC economy), we advance earlier efforts to estimate the Cyprus peace dividend by exploring new approaches and linking it to the existing economic literature on the topic.

² An overview of part of the literature is provided by Brauer & Dunne.

The economic impact of conflict

Peace economics “is the study of conflict and conflict resolution in different forms” (Caruso, 2011, p. 2). These benefits may arise by eliminating unproductive uses of labour, land and capital that arise directly and indirectly through the conflict. There are tangible examples of how conflict, or even the threat of conflict, can lead to the poor allocation of resources. The excessive expenditure on defence in Greece and Turkey, for example, leads to the unproductive use of resources. It has been estimated that a reduction of 50% of military expenditure would lead to an increase of GDP by 1.8 percentage points for Turkey and by 7.61 percentage points for Greece (Özdemir & Bayar, 2006).

Conflict has been identified as creating negative effects not only through misallocation of resources, but also through negatively distorting the underlying infrastructure of the economy. The establishment of well-functioning institutions is now understood to be critical to sustainable development, since once set, such institutions (that underpin the economy) can be very resistant to change (North, Wallis, & Weingast, 2009). There is a growing concern that the design of institutions, which need to be working optimally in order for an economy to prosper, is linked to important historical events, such as the threat of conflict. Violent situations modify institutions in a way that is not conducive to economic growth. They impose rules that are forged by conflict but which are unsuitable for the proper functioning of the market. There are signs that the Cypriot communities, as a result of their violent separation from each other, created institutions that are not in tune with the increasingly globalised world. It could be argued, for example, that the Cyprus problem was behind traditional resistance to foreign ownership of utilities and banks in the economy of the Greek Cypriot community (GCC economy)³; likewise, in the economy of the Turkish Cypriot community (TCC economy), property was in some cases allocated with reference to individuals’ role in the conflict rather than for productive uses. Subsidies from Turkey to the public sector also create an array of distortions that work against reform (see section 2).

The reasons for loss of growth do not just lie in the impediments to institutional effectiveness and the misplacement of productive assets. For a small island such as Cyprus there are substantial losses from the unnatural reduction of what are known in the literature as “agglomeration benefits.” Distances between cities are small, yet the arbitrary nature of the division and the small number of crossing points restrict the utilisation of people and capital in the most productive way. For example, a journey from north to south in the eastern part of old Nicosia that would take five minutes without barriers can take more than half an hour even by car, generating substantial economic cost (in terms of lost time and use of resources) to the individual. On top of these losses, the inability to reap the rewards of economies of scale is a

³ Domestic ownership of the three largest banks and the close-knit relations that this created made the banking sector more vulnerable to the high risks that led to the March 2013 crisis in the GCC economy. For a thorough analysis of the weaknesses in the banking sector, see.

daunting problem for the Cypriot communities. Cyprus as a whole is very small; continuing division reduces the potential to lower costs by working on a bigger scale. From Polis and Kokkina, to Varosha and Famagusta, the fact that utilities and infrastructure do not traverse the dividing line, and the inability of people to cross and interact in the way that benefits the economy, is a very large cost for such a small population.

In this report we take a new approach to the benefits of a solution. Given the true cost of continuing separation, we suggest that the dynamic benefits of a solution are greater than previously realised. Benefits will not arise solely from increased trade, but also from the increase in productivity that arises from removing the decades-old barriers to agglomeration, interaction and rational economic behaviour.

This paper therefore introduces a new way of assessing the peace dividend in Cyprus: through the effects on productivity (and in particular through total factor productivity, TFP). We also undertake this with a more thorough sector-by-sector approach than attempted in the past. The strength in using two methods is that they are independent of each other. In this way we can analyse the benefits of a solution that appeals to two different audiences. The estimation of benefits through increased productivity appeals to the macroeconomist, who is mostly concerned about the overall effects on the economy. The sector-by-sector estimation appeals to business people who want to have a better grasp of what the impact of peace will be on their businesses. In order to arrive at the “peace dividend”—*the difference between economic activity with a solution and without a solution*—we take the geometric mean of these two effectively independent approaches.

Base scenario for a united Cyprus

The solution of the Cyprus problem is of course in the hands of politicians and not economists. Despite that, some basic assumptions need to be made in order to be able to estimate the impact of a solution. We wish in no way to pre-empt the recently resumed negotiations under United Nations (UN) auspices, but there is a need to place a minimal framework and set of assumptions that allow a working hypothesis for the estimates. We have based our assumptions on the joint declaration of 11 February 2014 which outlines, *inter alia*, that “The settlement will be based on a bi-communal, bi-zonal federation with political equality as set out in the relevant Security Council Resolutions and the High Level Agreements” (United Nations, 2014).

Traditionally, one of the key concerns about a united Cyprus is that it might involve complex power-sharing structures that would affect government effectiveness and, potentially, lead to deadlock and break-up. Such a scenario would inevitably have a negative impact on the economy. While it is too early to know for sure, the joint declaration suggests that the model agreed upon is what the political analyst, James Ker-Lindsay (2014), described as “an unbreakable loose federation,” namely one in which the two constituent states exercise considerable autonomy but also one in which “union in whole or in part with any other country, or any form of partition or secession or any other unilateral change to the state of affairs is prohibited.” It is hoped that these features will reduce the likelihood for deadlock in policy-making. One can

also infer from documents that have made it into the public domain⁴ that the two communities have expended considerable effort during the 2008-2012 period avoiding the kind of deadlocks that arose in the 1960s. On the basis of these and the joint declaration, our working assumption is that a united Cyprus will have a functioning governance system, albeit with new challenges that will need to be addressed (see section 9). This document suggests that there has also been some exploration into ways to avoid property compensation being fully debt-financed.

If we assume that a settlement could be put to referenda in late 2014 or 2015, then the **effective start for the Cyprus solution will be 1 January 2016**. Thus we define the first year of a solution (Y1) as 2016 (see section 3).

⁴ <http://www.c21broker.net/Newsletters/downers77page.pdf>.

2. CURRENT STATUS OF THE ECONOMIES ON BOTH SIDES OF THE ISLAND

Comparative analysis

In 2012, GDP at current prices was €17.7bn in the GCC economy, while it was TL 6.8bn, or around €2.6bn,⁵ in the TCC economy. Thus, the GCC economy is approximately seven times larger than the TCC economy, even though the population is only around three times the size. However, incomes per capita are rather closer, with TCC incomes reaching 58% of GCC incomes (at current prices) in 2012. Once adjusted for purchasing power, our calculations suggest that TCC incomes are probably closer to around 70% of GCC incomes and 65% of average EU incomes.

As a result of the global financial crisis and, in the GCC economy, the run-up to the domestic banking crisis, both economies have displayed very weak growth in the past five years. Real GDP grew by only 0.2% per year on average in the GCC economy in 2008-2012, and only by 0.3% in the TCC economy during the same time period. Weak economic performance has led to rising unemployment in the south and stubbornly high unemployment in the north, as well as high budget deficits well in excess of the EU Stability and Growth Pact threshold of 3% of GDP.⁶

⁵ For the purposes of our 2012 constant-price forecast we have taken an exchange rate of TL 2.6 per euro. For further explanation see section 3.

⁶ The high budget deficit recorded in the GCC economy in 2009 led to entry into the European Commission's 'excessive deficit procedure' in June 2010.

Table 2

Comparative macroeconomic indicators						
	2008	2009	2010	2011	2012	Ave 08-12
Real GDP growth (%)						
Cyprus south	3.6	-1.9	1.3	0.4	-2.4	0.2
Cyprus north	-2.9	-5.5	3.7	3.6	2.8	0.3
GDP at current prices (EUR million)						
Cyprus south	17,157	16,853	17,406	17,878	17,720	17,403
Cyprus north	2,498	2,361	2,448	2,536	2,607	2,490
GDP per capita (EUR)						
Cyprus south	21,812	20,858	20,986	21,011	20,512	21,036
Cyprus north	11,364	9,836	11,397	10,780	11,857	11,047
<i>North as % of south</i>	<i>52.1</i>	<i>47.2</i>	<i>54.3</i>	<i>51.3</i>	<i>57.8</i>	<i>52.5</i>
GDP per head at PPS as % of EU27						
Cyprus south	100.0	100.0	97.0	94.0	92.0	96.6
Cyprus north	56.2	55.7	60.0	62.6	64.8	59.9
<i>North as % of south</i>	<i>56.4</i>	<i>55.7</i>	<i>62.0</i>	<i>66.3</i>	<i>70.3</i>	<i>62.2</i>
Unemployment rate (%)						
Cyprus south	3.7	5.3	6.2	7.7	11.8	6.9
Cyprus north	9.8	12.4	11.9	9.7	9.6	10.7
Consumer prices (% change)						
Cyprus south	3.6	-1.9	1.3	0.4	-2.4	0.2
Cyprus north	14.5	5.7	3.3	14.7	3.6	8.4
Budget balance (% of GDP)						
Cyprus south	0.9	-6.1	-5.3	-6.3	-6.4	-4.6
Cyprus north	-9.3	-14.1	-10.1	-9.2	-8.8	-10.3
Current-account balance (% of GDP)						
Cyprus south	-15.6	-10.7	-9.8	-3.4	-6.9	-9.3
Cyprus north	-9.9	-1.9	-7.4	-5.1	-3.8	-5.6

Source: Cystat and SPO (2013); authors' estimates in italics.

Weaknesses of the GCC economy

High current-account deficit points to weak competitiveness

One of the most telling signs of the weaknesses in the GCC economy, which was clear well before the 2013 crisis, was the high current-account deficit. Based on the most recently revised data, it reached a staggering 15.6% of GDP in 2008—the peak of the construction-led boom. Had Cyprus not adopted the euro in 2008, this size of deficit would have led to a balance-of-payments crisis, although the large current-account deficit was in many ways directly linked to the journey to the euro (Mullen, 2011). A large current-account deficit is both a sign that a country is consuming more than it saves and, when it is caused by unproductive investment (building holiday homes rather than investment in higher productivity, for example), a sign of weak competitiveness. This is a particularly serious problem in a country that is a member of the Eurozone, because regaining competitiveness via devaluation (if that option was ever possible for a small island such as Cyprus) is no longer an option.

The deterioration in the GCC economy's competitiveness has been reflected in the World Economic Forum's rankings. When the Republic of Cyprus first entered the rankings in 2004 it had a score of 4.56 and the ranking of 38 out of 104 countries (World Economic Forum, 2004); by 2013 it had dropped to a score of 4.30 and a ranking of 58 out of 148 (World Economic Forum, 2014).

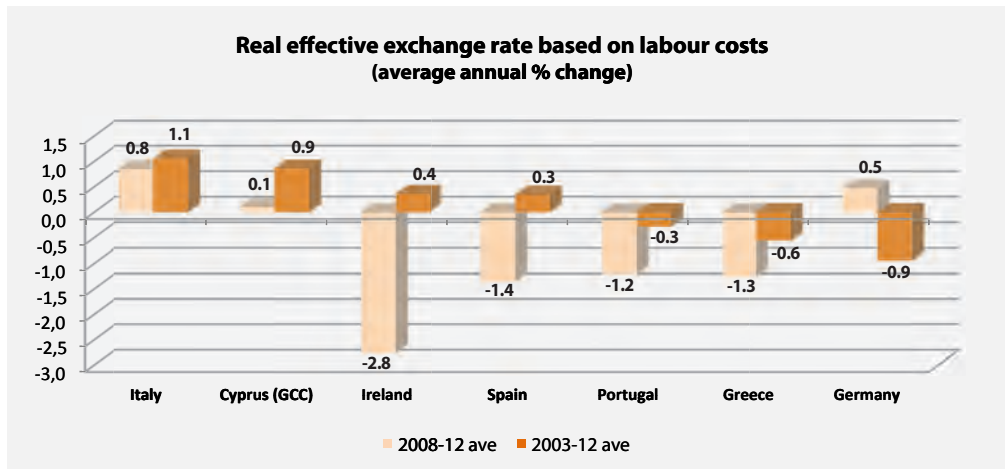
Another indication of the absence of real competition in the GCC economy is high prices for products such as foodstuffs. According to Eurostat data, prices of dairy products have been the highest in the EU for several years. Similar patterns can be seen in the banking sector. In March 2010, when the financial crisis had not yet hit Cyprus but had already hit Greece, the main business rate (the average interest rate charged to non-financial corporations on outstanding loans of up to one-year duration) was 6.33%, a full 290 basis points higher than its equivalent rate in the Eurozone and 37 basis points higher than crisis-ridden Greece (Mullen, 2011).

Table 3

GCC economy: competitiveness indicators		
	Rank (out of 148)	Score (1-7)
Global Competitiveness Index 2013-2014	58	4.3
GCI 2012-2013 (out of 144)	58	4.3
GCI 2011-2012 (out of 142)	47	4.4
Basic Requirements (40%)	51	4.8
1st pillar: Institutions	42	4.5
2nd pillar: Infrastructure	44	4.6
3rd pillar: Macroeconomic environment	126	3.7
4th pillar: Health and primary education	8	6.5
Efficiency Enhancers (50%)	49	4.3
5th pillar: Higher education and training	32	5.0
6th pillar: Goods market efficiency	29	4.7
7th pillar: Labour market efficiency	36	4.6
8th pillar: Financial market development	64	4.1
9th pillar: Technological readiness	36	4.8
10th pillar: Market size	110	2.8
Innovation and sophistication factors (10%)	50	3.9
11th pillar: Business sophistication	44	4.3
12th pillar: Innovation	56	3.4
<i>Source: World Economic Forum, 2014.</i>		

This lack of competitiveness is reflected in the real effective exchange rate (REER) as measured on a labour cost basis. Both in the ten-year period 2003-2012 and the more recent five-year period 2008-12, the REER of the GCC economy rose at a faster pace than all of the other "PIIGS" (Portugal, Ireland, Italy, Greece and Spain) apart from Italy. The GCC economy is also "far behind its competitors in areas such as business sophistication, creative outputs and therefore the generation and capitalisation of knowledge" (Mullen & Theodotou, 2012).

Chart 2



Source: Eurostat.

The banking crisis has left the GCC economy with weak banks and a high debt burden

All of these problems existed in the GCC economy before the banking crisis that led to its rapid deterioration. When the Cyprus Popular Bank (CPB, Laiki) and the Bank of Cyprus (BOC) lost around 75% of the money they had invested in Greek government bonds owing to the private-sector involvement (PSI, or haircut) that was stipulated as part of the agreement for a second Greek bailout, the losses pushed Laiki into technical insolvency immediately and also left BOC severely short of capital. Prior to this the government had already ignored the deterioration in the macroeconomy, allowing the public deficit to rise, which it funded with ever more short-term debt instruments. When the PSI hit the banks, access to international markets was lost. With default on the Euro Medium Term Notes looming in June 2013, the government entered negotiations with the Eurozone partners and the International Monetary Fund (IMF) for a bailout in late June 2012. But it did not conclude the deal, thus leaving the final negotiation to the incoming government in circumstances that were considerably worse than they had been a year earlier.

The conditions of the March 2013 bailout attempted to separate government debt risks from financial institution risks by forcing “creditors” (mainly depositors) instead of Cypriot or EU taxpayers to bail out BOC and the part of Laiki that was absorbed by BOC. Thus, while government deficits are being covered by bailout funds, the resolution of troubled banks required a bail-in (haircut) of 100% of the uninsured deposits (of more than €100,000) in Laiki (the second largest bank), as well as 47.5% bail-in of the uninsured deposits of BOC, the largest bank in the GCC economy. Hellenic Bank was left to find capital in the private market and the GCC credit co-operatives were recapitalised by the government with bailout funds.

The complicated and controversial way in which the bailout/bail-in took place is explained in more detail elsewhere (Apostolides, 2013). The GCC economy is still suffering the effects of a drastic reduction in liquidity, caused by the haircut, capital flight, the firesale of GCC bank assets in Greece, and the transfer of €9bn in Laiki’s Emergency Liquidity Assistance (ELA) liability

to BOC. These decisions left the recapitalised Bank of Cyprus in a precarious situation. Capital controls on domestic and international transactions were therefore imposed, thus damaging one of the few competitive sectors of the economy, namely the professional services sector. Although the liquidity situation is now beginning to ease (Sapienta Economics, January 2014), the high non-performing loan ratios of the banks and cooperatives are now a cause for concern.

The new government had to introduce steep austerity measures and is unlikely to return to international debt markets until 2015-16. Debt as a proportion of GDP, which is now mainly held by the official sector (European states and multilateral institutions) is expected by the IMF to peak at more than 125% of GDP in 2015 (IMF, 2014). The government will not be able to finance substantial projects unless there is a robust recovery. But this is unlikely in view of the corporate and household debt burden.

All of the above have a long-term impact on GDP growth potential. The IMF estimates that "the growth impact of deleveraging [debt-reduction by the public and private sector] in Cyprus could be around 0.2-0.4 percentage points per year over 5-10 years" (IMF, December 2013). At the same time it remains unclear if the GCC economy will be able to achieve recovery by 2015.

Weaknesses of the TCC economy

The two biggest constraints on the economic development prospects of the TCC economy stem from the lack of resolution of the Cyprus problem. The first issue is the absence of direct access to international markets. The TCC economy does not have preferential access to EU markets for all exports of goods. The Green Line regulation allows only for the export of goods that either originate or were mostly processed in the TCC economy, which excludes a substantial array of products. The second constraint that arises from division is the unsolved property issue. This increases uncertainty and shortens the time horizon of local business people, as well as deterring foreign direct investment.

Given the constraints, it is important to understand that without a solution some activities may not be viable due to the higher incurred costs faced by the community operating without economies of scale. Avenues of development are both limited and operate at a higher cost structure because of the obstacles due to the Cyprus problem. Currently, the TCC economy is characterised not only by a poor use of public money but also a diversion of precious labour and capital resources away from more productive and sustainable activities (World Bank, 2006). The above-mentioned constraints of conflict will always have an impact on the TCC economy if there is no solution. The investment climate of the TCC economy is marked by considerable economic and political uncertainty, trade restrictions on TCC goods in global markets and heavy public-sector influence on economic activity. These problems dampen investors' expectations about the future, increase risk, and weaken incentives for investment, innovation and technical progress. The above does not create an atmosphere that induces the private sector to think about long-term investment.

In addition to these serious issues the TCC economy faces major structural problems noted below that weaken investment climate. As a result the economy is very susceptible to reverses, often from exogenous factors.

Fluctuating inflation, high interest rates and volatile exchange rates

Currently the TCC economy is de facto part of the Turkish lira zone, and thus imports substantial inflation via the use of the lira. Imported inflation is aggravated by existing structural problems, leading to sudden (and damaging) acceleration of inflation. The inflation rate rose to 14.7% per cent in 2011; inflation declined to 3.7% in 2012 but has since turned upwards again, reaching 10.2% in 2013. The uncertainty this creates reinforces the short-termism of economic decisions, to the detriment of long-term economic growth.

These fluctuations in prices disrupt the conduct of trade and business. They also influence finance; the cost of financing is very high in the TCC economy. Borrowing rates range from between 12% and 18% with an Interest Rate Parity (IRP) of about 4% to 7%. This reduces the ability to invest.

Another issue that destabilises the TCC economy is the fluctuating exchange rate of the Turkish lira relative to other currencies. This dynamic has recently resurfaced after a quite stable period. In the last three years, the Turkish lira has lost its value against the euro by 13%, 0.5% and 23%, respectively in 2011, 2012 and 2013 (TCC Central Bank, 2014).

The imported inflation rate, the volatile exchange rate and the resulting high cost of finance have exacerbated the existing structural issues of the TCC economy, leaving it exposed to external shocks and weakening growth prospects.

Public finances are aid dependent

Public expenditure in the TCC economy is exceptionally high compared with the EU average; it is even high compared with the GCC economy. The high expenditure is driven by structural issues in the government budget. The share of GDP spent on public-sector wages is 17% of GDP (SPO, 2013). Social and financial transfers total up to 20% of GDP in addition to approximately 5% for investments and another 2%-3% for the military. In total the Turkish government finances nearly 30% of the budget, of which 50% comprises grants for infrastructure; the remainder is given as a loan for recurrent financing needs.

The total TCC budget expenditure is equivalent to nearly 50% of GDP, which in turns makes the economy highly dependent on government expenditure and decisions. The problem with the high public expenditure to GDP ratio is that the TCC economy does not have the tax-generating capacity to finance all the budgeted expenditures. This is why most of the deficit is financed by aid and credit from Turkey. This makes the TCC economy an aid-dependent economy.

Inefficient public sector

There is over-employment in the public sector, while the services provided by the sector are often of poor quality and ineffective. This affects competitiveness, with a worsening of the economic impact of public sector inefficiencies. Poor public service leads to a reduction in tax compliance by taxpayers, and there is no urgency to reduce the size of the sector. This reinforces the constraints mentioned above, thus weakening growth prospects.

In fact, there has even been an expansion in public sector employment. Public sector employees receive high wages and benefits yet there is an absence of accountability in the use of public funds and a lack of emphasis on quality. The higher wages and lack of accountability lead to severe distortions in the labour market, as these benefits encourage young entrants into the labour market to apply for public sector jobs. As a result the best and brightest are tempted away from productive private employment and are discouraged from being entrepreneurial.

The broader public sector (which includes government and semi-government organisations) has also created distortions that negatively affect the investment climate. Public enterprises are involved in agriculture, banking, importing, flour production, shipping and many other industries and services; this curtails business opportunities for the private sector. It is difficult to compete with such public entities since they can often offer prices/services below cost, while the government covers any losses from its budget. This creates inefficiency while burdening public expenditure, and impedes the incentive and capacity of private industries to develop further.

The overall effect of the large and also inefficient expenditure of the public sector is the decline of competitiveness. The Turkish Cypriot Chamber of Commerce (KTTO) has been calculating the competitiveness of the TCC economy using the same methodology as the World Economic Forum (2014). The results are nothing short of dispiriting as the TCC economy ranks at the bottom of the list, exhibiting similar low levels of competitiveness as Tanzania, Swaziland and Lesotho.

Despite the existence of such large fiscal imbalances and the widespread role of government in the market, there is still inadequate infrastructure. Most government funds are used for public wages and transfers, leaving little for infrastructure investments. As a result, per capita income remains low and the inadequate infrastructure hampers businesses: critical lack of investment in energy, roads and utilities increases costs and creates unreliability for business. Consumer costs for water and electricity are particularly high.

The government not only reduces the ability of the private sector to compete effectively both at home and abroad, but the legal framework as it exists and is interpreted by the authorities causes further problems. There is legal inflexibility on the one hand, while on the other hand the lack of criteria and transparency regarding who qualifies for state aid (where spending is as much as 50% of GDP) creates ample opportunities for rent-seeking and unfair competition that have negative repercussions on the TCC economy.

Low total factor productivity and under-capacity utilisation

Although we shall expand on this issue in section 6 in the discussion on growth accounting, it is important to point out here how the TCC economy has not been able to utilise its capital, both human and physical, effectively. Labour costs are high yet the required skill set is not high, leading to low labour productivity. In fact, the capacity used by the economy is unsustainably low, meaning that the means of production (humans or machines) remain idle, to the detriment of the TCC society and economy.

Table 4

TCC economy: competitiveness indicators		
	Rank (out of 148)	Score (1-7)
Global Competitiveness Index 2013-2014	118	3.6
GCI 2012-2013 (out of 144)	123	3.5
GCI 2011-2012 (out of 142)	118	3.6
Basic Requirements (40%)	103	4.1
1st pillar: Institutions	107	3.4
2nd pillar: Infrastructure	101	3.3
3rd pillar: Macroeconomic environment	124	3.8
4th pillar: Health and primary education	67	5.8
Efficiency Enhancers (50%)	116	3.4
5th pillar: Higher education and training	92	3.8
6th pillar: Goods market efficiency	130	3.7
7th pillar: Labour market efficiency	129	3.7
8th pillar: Financial market development	77	3.9
9th pillar: Technological readiness	74	3.7
10th pillar: Market size	143	1.8
Innovation and sophistication factors (10%)	126	3.0
11th pillar: Business sophistication	139	3.1
12th pillar: Innovation	109	2.9
<i>Source: KTTO, 2014.</i>		

In summary, the constraints faced by the TCC economy are severe; at the same time the lack of macroeconomic stability is both maintained and augmented due to deep-seated structural issues within the public sector and the role of the government within the economy. This has created a vicious cycle: the instability is caused by, and in effect creates weaknesses in terms of, high budget deficit, high inflation, and a low savings rate. Although some of these structural issues could be corrected, the majority of the problems arise from the very small size of the economy and the economic consequences of the conflict. Thus, these challenges can only be overcome through a solution to the Cyprus problem. Without a solution the TCC economy will have to implement a comprehensive set of reforms in order to be able to strengthen its competitiveness, but such reforms will have a greater positive impact if the barriers created by conflict are removed.

3. COMBINING THE TWO DATA-SETS

Combining two different data-sets for the purposes of comparison is a considerable challenge. The TCC national accounts are prepared on the basis of Turkish lira and itemise slightly different categories from the GCC national accounts, which are prepared under EU ESA95 norms. Moreover, the constant-price series of the TCC national accounts is based on 1977 figures, whereas the GCC series uses constant prices of 2005. Harmonising and merging two data-sets with very different base years for the purposes of comparisons and forecasts creates statistical discrepancies which can distort the results.

In an effort to minimise the distortions we first had to resolve the issue of the convertibility to the euro of the TCC economy, which is denominated in Turkish lira. We chose the euro as the basis of measurement of the unified economy since it will be the currency of choice in a united Cyprus. Yet the fact that the Turkish lira is volatile relative to the euro also creates issues. If we were to convert the TCC GDP at a time when the lira was historically low against the euro, the proportion of the Turkish Cypriot economy to the total economy of Cyprus would be underestimated and vice versa. This was particularly an issue at the time of writing, when the lira was weaker than in the recent past. We therefore took the decision to convert the TCC national accounts in 2012 at an exchange rate of TL 2.6 per euro. This is around half way between the annual average market exchange rate in 2012 of TL 2.3 per euro and the market rate that prevailed at the time of writing, which was TL 3 per euro. By doing this, we run the risk over under-estimating the size of the TCC economy in euro terms. But we considered it better to under-estimate than over-estimate.

A second issue was to harmonise the different categorisations of data. For example, the TCC national accounts merge transport and communication, whereas the GCC data separate transport and storage from information and communication. We resolved the issue by aggregating data and using estimates for relative proportions of the TCC economy based on actual data for the GCC economy in order to minimise distortions created by possible differences in definitions.

A third issue was the different base year for the measurement of real economic growth (that is, GDP adjusted for changes in prices). Economic growth or “real GDP growth” is defined as the growth of GDP (or GNP) in constant prices and not current prices. Measuring growth in constant prices ensures that one truly captures increases in income rather than increase caused only by a rise in prices but which leave price-adjusted income (GDP) unchanged. As noted above, the TCC economy base year is 1977. This creates significant problems when trying to produce a current-price series, the most extreme example of which is the very large differential

of GDP at constant prices and GDP at current prices in the latter years of the forecast period. A second serious issue is the overestimation of growth in constant prices due to the fact that the base year is quite far back in the past (well over 37 years ago). As a result the growth in GDP in constant prices between the two communities is not directly comparable.

For this reason we chose not to use current prices in our forecasts, but to forecast only on the basis of constant (“today’s”) prices. In addition, in order to ensure that the starting base for the TCC economy was an appropriate proportion of the GCC economy we combined the two economies using current prices of 2012—the latest data that we have for both economies. Using the above-mentioned exchange rate of TL 2.6 per euro, we took 2012 as our common base year, and thus combined and created a new 2012 constant-price series for the purposes of forecasting a united Cyprus. By adding the two series, we were able to generate forecasts for the GDP of the whole of Cyprus on a common basis. This does not eliminate all distortions but was the best way of minimising them as much as possible; yet weaknesses remain. We cannot compute a confidence interval as neither side’s statistical agency publishes such an interval for its data; as a result, any confidence interval we suggest would be subject to the implicit validity of the underlying data, which is not known to us.

Having converted the two economies to 2012 constant prices, we first projected forward to 2015, since we assume that the first major impact of the peace dividend will arise from the beginning of 2016. For the GCC economy we took the published real GDP growth rate in 2013 and for 2014-15 we took the average of three different forecasts.⁷ This produced negative growth rates of 5.4% in 2013, 4.9% in 2014 and 1.8% in 2015. For the TCC economy we took as basis official estimates, but revised them downwards owing to the emerging problems created by the depreciation of the Turkish lira. We therefore used an estimate of GDP growth for the TCC of 2.2% in 2013, and forecast 2% in 2014 and 3.8% in 2015.

We assume that the Cyprus solution will be effective as of the first of January 2016.

Thus we define the first year of a solution (**Y1**) as 2016. The solution will need some preparation time before substantial implementation of its requirements. Thus we divide the economic impact of the solution into three stages. It allows us to vary the impact of the solution to immediate, medium-term and long-term influences.

We assume that the implementation of the settlement will take place in the following stages:

- Stage I (Years Y1, Y2): The signing of the Cyprus settlement and a period of preparation for rehousing and reconstruction.
- Stage II (Years Y3, Y4, Y5, Y6, Y7): Peak investment period: where the majority of the settlement-related investment (transport, buildings, utilities and the construction of necessary infrastructure) takes place.
- Stage III (Years Y8+): Normalisation period: major programmes of the transition period are completed and issues of restitution and development addressed.

⁷ IMF forecasts, Economic Research Centre of the University of Cyprus Forecasts and Sapienta Economics Forecasts.

4. HOW WILL THE ECONOMIES GROW WITHOUT A SOLUTION?

In order to be able to calculate the size of the peace dividend, we need to forecast a base scenario of what will happen to the GCC and TCC economies if there is no solution to the Cyprus problem.

As noted in section 2, both the GCC and TCC economies have considerable weaknesses that have a negative impact on their long-term growth potential. If the status quo remains, therefore, both the TCC and GCC economies will face substantial challenges moving forward. The TCC economy is particularly susceptible to changes in the exchange rate of the Turkish lira with other currencies. The TCC economy operates using a range of currencies in different sectors (for example, mortgages are often taken out in pounds sterling but imports from Turkey are also typically denominated in euro). The substantial depreciation of the Turkish lira creates negative downward pressures on the economy, as well as increasing the possibility of growth being eroded by rising inflation (through the rising cost of non-Turkish lira denominated imports). The TCC economy will keep growing without a solution, but the difficult international economic climate makes it quite unlikely that it will experience rapid economic growth. This is due to the challenges facing the Turkish economy, and to the fact that there will be collateral damage in the TCC economy as a result of the severe recession in the GCC economy, which is reducing the current economic interdependence of the two economies. It is more likely that a reduction in the annual average growth of the economy will take place.

Without a solution, the TCC economy grows by 2.5% on average

For the above reasons we assume that the long-run annual average growth rate of the TCC economy without a solution will be lower than the average of the years 2005-2014,⁸ which was 3.5%. We have therefore assumed that the long-run annual average growth rate of the TCC economy without a solution (the growth rate from 2016 onwards if no solution takes place) will be 2.5%.

The GCC economy is facing very severe challenges that inhibit both short-term and long-term growth prospects. As noted in section 2, the economy is feeling the intense negative effects of the near bankruptcy of the government and collapse of the banks in 2013 and the

⁸ These years were chosen as a response to data issues: there is a break in the series in 2004 and the quality of data for the TCC economy is much improved after 2004.

subsequent bailout (which was combined with a bail-in of the two largest banks of the economy) by the Eurozone partners and the IMF. The negative impact on growth is severe. In the short term the loss of bank deposits, the imposition of internal and external capital controls and the steep budgetary austerity are causing the largest recession in the Eurozone area, with the possible exception of Greece, which is not currently producing quarterly real GDP growth rates. There is a debate about whether the GCC economy without a solution will be able to have a “V” shaped recovery, thus mitigating the loss of income. GDP is currently more likely to follow a more “L” shape trajectory, with anaemic or negative growth rates even in the medium term.

Even if the recovery is achieved in 2015 the negative pressures on the GCC economy will continue into the long term. Countries that have received European bailouts and have resumed economic growth (such as Ireland and Spain) have achieved the start of recovery through exports of services; the internal economy has remained anaemic in part due to the necessary deleveraging of heavily indebted companies and households. The deleveraging of indebted households and firms will be a particularly difficult issue for the GCC economy in the future, as currently the non-performing loans have reached 120% of 2013 GDP (Stockwatch, 2014). As noted in section 2, the IMF has estimated that moving forward the negative effect of the reduction of lending will lead to a reduction of up to 0.4 percentage points per annum for as many as ten years after the 2013 bailout (IMF, December 2013). This both creates worries about the future outlook of the GCC economy and raises concerns about increased risks to further financial stability. In addition to the above, the government without a solution will need to maintain austerity in order to grind down the very high debt to GDP ratio of the government, and in order to comply with the additional fiscal governance treaty it signed in 2012 (European Council, 2012).

Without a solution, the GCC economy grows by 1.5% on average

Such challenges were taken into account when we projected forwards the trajectory of the GCC economy without a solution. Thus our estimate of GDP growth if there is a solution is less optimistic than the historical average. The historical annual average growth of the GCC economy since 1960 is not that relevant to the economy of the GCC today as the economy has largely achieved the rapid “catch-up” (Abramovitz, 1986) with the income levels of more developed European economies. Yet, if we take the last cycle of boom and trough in GDP (2005-2014) the annual average growth is just 0.4% per annum, which is far too pessimistic as a long-run growth rate. Thus, we believe that, after the negative growth rates in 2013-2015, which are based on an average of different forecasts, the long-run growth of the Greek Cypriot economy without a solution will trend around 1.5% per annum, after taking the negative pressures of deleveraging into account.

5. SETTLEMENT-RELATED INVESTMENT: NATURAL GAS, FAMAGUSTA AND NEW HOUSING

Before turning to our models based on productivity and sector-by-sector analysis, it is worth paying particular attention to solution-specific investment. A solution of the Cyprus problem will create demand for investments that would not take place otherwise. These include: the possibility of building a natural gas pipeline to Turkey; upgrading Famagusta port; rehabilitating the “ghost” town of Varosha; and building housing for a proportion of those affected by territorial adjustment and reinstatement.

While we are aware that these are often considered “costs” of the solution, how much of this would be financed by the taxpayer depends to a great extent on how these issues are managed (see section 9).

Investment in natural gas

A solution of the Cyprus problem would make it possible to construct a natural gas pipeline to Turkey, and have Turkey as a customer for Cypriot gas or act as a transit for gas supplies to the EU. Assuming that future exploratory drilling discovers the 60 trillion cubic feet (tcf) indicated as possible by the former Executive President of the Cyprus National Hydrocarbons Company, Charles Ellinas (Ellinas, 2013), it should be noted that a pipeline to Turkey would be *in addition to* and not *instead of* a liquefied natural gas (LNG) plant. The main attraction of a pipeline to Turkey is that, unlike an LNG plant or a pipeline to Greece, a pipeline to Turkey could be financed today, and would start generating revenues within a few years. By contrast, as explained more fully in the appendices, financing for an LNG plant remains some years away and it could well be 2028 before the first LNG exports are shipped. Thus, solving the Cyprus problem and building a pipeline would generate around \$1.7bn (€1.3bn) of construction investment that would not otherwise take place. The majority of financing is likely to be provided by foreign direct investment. Such an arrangement would also lead to earlier government revenues from natural gas resources.

The suggestion of a post-solution pipeline to Turkey is not an unreasonable expectation. Speaking at an Oil and Gas Association event on 5 December 2013, the Republic of Cyprus (ROC) Foreign Minister, Ioannis Kasoulides, is reported to have said that the government’s long-term plans for hydrocarbons include Turkey. In the same month, the Minister of Commerce, Industry and Tourism, George Lakkotrypis, was more specific, saying that he ruled out a pipeline

in advance of a solution, but it could be an option after a settlement of the Cyprus problem (Tamaras, 2013). More recently the Republic of Cyprus President, Nicos Anastasiades, qualified that Turkish companies would be considered as a client for Cypriot gas, but not a strategic partner (Adilinis 2014).

If such a pipeline were constructed, there would certainly be considerable demand for gas from within Turkey itself. Turkey depends for 73% of its energy needs on imports (Ministry of Energy and Natural Resources, Turkey, 2011). Natural gas demand was 46.3 bcm in 2012 (BP, 2013) and is expected to reach 65.2 bcm in 2023 (Ministry of Energy and Natural Resources, Turkey, 2011, p. 13). Not surprisingly, therefore, diversifying gas sources is a key energy policy priority for Turkey. For geostrategic reasons, however, and to reduce dependence on Russian gas, there may well be a preference for a pipeline that goes beyond Turkey to Europe. It has been suggested, for example, that gas from the Eastern Mediterranean could be linked to the planned Trans-Anatolian natural gas pipeline (TANAP), although it would need some alterations to current plans for this to be possible (Gürel & Mullen, March 2014; Bryza, 2012).

In order to calculate the viability of different export options at the current 5 tcf level of resources,⁹ we have taken today's market prices for LNG in Europe and Asia (which may vary in future), deducted gas used for domestic consumption, and then deducted all the costs related to exploration, production and construction. Our findings for LNG sold to Asia were compatible with those cited by Mr Lakkotrypis in October 2013, namely a gross value after costs of \$30bn and a net value (to the government) of \$12bn to \$18bn (*Financial Mirror*, 2013).

Table 5

Estimated value of natural gas as LNG		
	Europe LNG	Asia LNG
Natural gas in tcf	5	5
Value of natural gas in the ground \$ million	\$59,126	\$81,553
Value of natural gas after exploration, production, domestic consumption, \$ million	\$44,436	\$62,903
Total LNG costs in \$ million	\$24,940	\$29,137
of which construction of LNG plant	\$6,000	\$6,000
Value minus costs in \$ million	\$23,746	\$38,016
<i>In euros</i>	€18,266	€29,243
Companies' take (assume 50%)	\$11,873	\$19,008
Value to government in \$ million	\$11,873	\$19,008
<i>in euros</i>	€9,133	€14,622
<i>Source: Authors' estimates based on industry sources.</i>		

⁹ Gas resources do not become official "reserves" until they are declared commercially viable.

Testing the viability of an LNG plant

In order to test whether the construction of an LNG plant is a viable commercial proposition, in other words, whether it can attract finance, we made extensive calculations using industry sources to estimate the net present value (NPV) of an LNG plant. The NPV figures suggest that, at current volumes, there is not enough gas to attract finance for an LNG plant today. According to our calculations, the threshold volume for reaching a positive NPV with LNG, at today's prices, is 7 tcf (see Appendix B).

Given the current uncertainties about the impact on prices of shale gas, one can imagine that investors might well build in a 10% to 20% price-drop before making an investment decision. This pushes the bar even higher. If prices drop by 10%, the "positive NPV" threshold rises to 8 tcf, and if they drop by 20%, the volume rises to 10 tcf. By contrast, even today's estimated volume of 5 tcf in the Aphrodite field is enough to invest in a pipeline to Turkey.

Table 6

Commercial viability thresholds for natural gas export options		EUR million
	NPV value	NPV pass/fail
Viability at 5 tcf and today's prices		
CNG	€ 6,284	PASS
Pipeline to Turkey	€ 1,312	PASS
LNG to Asia	-€ 817	FAIL
LNG to Europe	-€ 1,548	FAIL
Pipeline to Greece	-€ 1,536	FAIL
<i>Source: Sapienta Economics.</i>		

A pipeline can earn revenue until an LNG plant comes on stream

Indeed, officials have also begun to admit that the construction of an LNG plant is currently beyond reach until more gas volumes are found.¹⁰ The main reason for the new caution is that in October 2013, the US company leading exploration in Block 12, Noble Energy, revised down its estimate for the natural gas resources in the offshore Cyprus Aphrodite field in Block 12 from a range of 5 to 8 trillion cubic feet (tcf), with a gross mean of 7 tcf, to 3.6 to 6 tcf with a gross mean of "approximately" 5 tcf (Noble Energy, 2013).

¹⁰ Interview with Mr. Lakkotrypis, (Tamaras, 2013) «–Αν τα δεδομένα με τις ποσότητες παραμείνουν ως έχουν, μπορεί να προχωρήσει η επένδυση του τερματικού; – Χρειαζόμαστε περισσότερο φυσικό αέριο.» ["Q: If the data on the quantities remain unchanged, is it possible to proceed with investment in the terminal? A: We need more gas."]. See also Ellinas (2013, slide 8): "However, with gas quantities at Aphrodite being at the lower end of expectations, achieving 2016 is a challenge."

Clearly, therefore, at today's volumes it is not possible to start construction of an LNG plant unless Israel adds gas from its own reserves or new Cypriot gas resources are found. However, the notion of Israel sharing LNG facilities with Cyprus is becoming increasingly uncertain. The partners in Israel's Leviathan giant block received more than ten bids in March 2014 to export gas via pipeline to Turkey (Globes, 2014). There is also talk of building an offshore floating LNG (FLNG) plant at Leviathan (Globes, 2013). Moreover, for reasons explained in the Appendices, construction of an LNG plant is unlikely to begin before 2018 or 2019 and it could be 2028 before the first LNG exports are shipped.

That is not to say that an LNG plant will never be built. Since LNG would be sold to Asia, where demand is rising much faster than in Europe and therefore prices are higher, an LNG plant will always remain a desirable goal with or without a solution. Moreover, Greek Cypriots may not want to depend only on Turkey for gas exports.

But if Cypriots have to wait until 2028 to ship the first LNG tanker to be able to export natural gas, and if volumes are likely to be as high as 60 tcf, it makes sense to find other ways to earn revenue from the gas in the meantime. This is why the construction of a pipeline to Turkey if there is a solution of the Cyprus problem could be an additional export solution. Excluding a pipeline that would in any case be sent from Block 12 to Vassilikos for domestic consumption, this could create an additional €1.3bn of investment over a period of three to five years that would not otherwise take place. If the new technology option of compressed natural gas (CNG) option is chosen (see Appendices), then the peace dividend from CNG would be on the revenue side.

Rebuilding Famagusta and upgrading the port

The Famagusta resort of Varosha has been uninhabited since 1974. Although the area remains inaccessible to the public, there are reports that in the past 40 years trees have sprung up in the middle of roads and even inside buildings. Until more thorough research is undertaken *in situ*, estimating the amount of investment required for Varosha is thus a difficult exercise. This is especially true when there are strong feelings about whether buildings should remain standing or be torn down and rebuilt from scratch and whether any initiative will be coordinated or left mainly to the owners.¹¹ Nevertheless, based on feedback from the Brussels conference and peer reviews, we have substantially revised up our estimates for investment in the area. In the lowest investment scenario, focusing only on Varosha would imply simply adapting buildings and utilities such as water and electricity to current safety and environmental standards and restoring buildings. In a "big vision," high-investment scenario, such the vision

¹¹ Discussions among stakeholders during the Famagusta Ecocity design studio held in January 2013 demonstrate that there is as yet no clear consensus on this issue.

for an integrated eco-city,¹² the whole region of Famagusta would be integrated on the basis of a unified development plan between the Turkish Cypriot and Greek Cypriot constituent states.

We were advised by those with substantial experience in these matters that a smaller-scale, non-environmental project could involve investment of €5 to €7bn. A larger project could involve €10bn, while a “state of the art” integrated eco-city would involve primarily private sector investment of €15bn. For the purposes of our forecast we are taking the lower investment scenario. Nevertheless, we were told that the lower end option, while involving less financial outlay, would also attract significantly less private and foreign direct investment (see box). Given the current state of the local banking sector and the public finances, one can imagine that under the “small idea” scenario, it will be difficult to find financing, and plans for rehabilitating Varosha might lie idle for many years.

Feedback: the bigger the idea, the more easily one can raise private finance

We learned at the Brussels conference from those who have substantial experience in large-scale development projects abroad that the bigger the idea, the more easily one attracts private finance. How much the rebuilding of Varosha alone adds to investment will therefore depend on the extent of one’s imagination and the quality of planning. One could go even further and argue that merging a grand design for an integrated Famagusta eco-city with private sector solutions for the property and territory settlement (see section 9) would not only attract significant private sector investment but would be considerably less burdensome on the taxpayer.

Table 7

Estimates for rebuilding and upgrading Famagusta	EUR million
Small-scale scenario: restoration of buildings and infrastructure in Varosha	€5,000
of which private finance	€500
Grand-scale: state-of-the-art integrated Famagusta region inc. port	€15,000
of which private finance	€12,750
of which upgrading Famagusta port	€1,000
Total investment in Famagusta: low estimate	€5,000
Total investment in Famagusta: high estimate	€15,000
<i>Note: We take the low investment scenario in our assumptions.</i>	

¹² The Famagusta Ecocity Project: <http://ecocityproject.com/famagusta/>.

New housing costs for those affected by territorial adjustment and reinstatement

It has been a hallmark of negotiations on the Cyprus problem that a settlement will result in territorial adjustment, namely the transfer of areas that are currently *de facto* under Turkish Cypriot control to Greek Cypriot control in what would be the Greek Cypriot constituent state. In Article 10 of the Comprehensive Settlement of the Cyprus Problem, commonly known as the Annan Plan, property in the territorial adjustment areas would be reinstated in full (United Nations, 2004). Assuming that this principle applies in the current negotiations, territorial adjustment and reinstatement will therefore create a housing need for a proportion of people who are displaced as a result.

Based on figures for the construction of new housing, we estimate that building these new dwellings, including land acquisition, would cost around €1.9bn. With related infrastructure for new housing, the total investment comes to just over €2bn.

Table 8

Estimates for investment in new housing & related infrastructure	EUR million
Total investment in new housing	€1,873
Associated infrastructure (10%)	€187
Total investment for re-housing and related infrastructure	€2,060
<i>Source: Authors' estimates.</i>	

Total solution-related investment could reach €10bn to €20bn

Based on our estimates, the construction of a pipeline to Turkey would generate €1.3bn that would not otherwise take place. Investment in Famagusta port and the revitalisation of Varosha would generate between €5bn and €15bn depending on the path chosen, although the higher investment would attract more private investment than the lower investment. Finally, investment in new housing and related infrastructure would generate €2.1bn in investment. The total *settlement-related* investment, that is, investment that is separate from the ongoing, recurring benefits of uniting the island, would amount to between around €10bn and €20bn. The gross *value-added* of this investment would be smaller. Based on historical data, it could add around €5bn and €10bn to gross value-added and therefore GDP.¹³

In GDP terms, construction will be recorded as construction investment. How much of the costs of revitalising Varosha and housebuilding and the property settlement falls on the taxpayer will depend to a degree on how carefully these issues are planned and managed. As noted in section 9, if planned with international private sector expertise in large-scale development, the cost to the taxpayer should be substantially reduced.

¹³ For a simple guide to gross value added and GDP, see Coppola (2014).

Table 9

Total settlement-related investment in natural gas, Famagusta and re-housing	EUR million
Investment in pipeline to Turkey	€1,292
Investment in Famagusta (low estimate)	€5,000
Investment in re-housing and related infrastructure	€2,060
Total solution-related investment (low estimate)	€10,275
Addition to GDP	€5,138
Memorandum item	
Total solution-related investment (state-of-the-art Famagusta)	€20,275
Addition to GDP	€10,138
<i>Source: Authors' estimates.</i>	

6. THE “HARE AND THE TORTOISE”: IMPORTANCE OF TOTAL FACTOR PRODUCTIVITY

The productivity costs of conflict

What will be the effects of peace on the economy of a united Cyprus? It is clear that a solution will affect the economy in multifaceted ways. As mentioned in section 1, the cost of the conflict is severe and the easing of the conflict will aid Cypriots in terms of added investment.

What are the costs of the conflict in terms of productivity? The known costs of continuing conflict are often easily seen but are less important than broader, structural issues that conflict can create.

Often, known benefits are estimated only within the narrow boundary of their effects on government budgets: the reduced cost in military expenditure, the ability of the government to borrow at lower interest rates than previously due to the reduction of tension and conflict. The reduction of conflict in Cyprus will certainly bring benefits in this respect to Cyprus both in terms of saved government expenditure as well as in terms of saved labour time. Yet others rightly point out that the reduction in cost through the cessation of conflict is often much more far-reaching in the economy (Skaperdas, Soares, Willman, & Miller, 2009). These benefits that take place due to the creation of a stable peace agreement can be categorised in terms of macroeconomic and microeconomic benefits, as well as a positive shock to institutional infrastructure that is no longer hampered by the conflict. It is from these that most of the permanent gains in productivity arise.

The macroeconomic benefits of a solution to the Cyprus problem relate to the removal of both uncertainty and the current blocks to increasing productivity. The opportunity to create the conditions for sustainable growth exists, but can only be fully realised by the Cypriot communities through a solution of the Cyprus problem that would lead to full normalisation of economic relationships between the communities and their neighbouring countries. On top of such benefits, the normalisation of the political situation, especially in stages 2 and 3 of the solution, will reduce government financing costs, since international financial markets will no longer factor in conflict-related uncertainty.

Clearly the reduced lack of opportunity, mainly for the TCC but also for the GCC in relation to Turkey, is a severe constraint on the growth potential of Cyprus. Feedback from business leaders constantly stressed the restrictions that the Cyprus problem places on how they

operate their enterprises. In this respect, the report authors were overwhelmed by the feedback of the business community: ideas that would enhance the production of the communities are constantly thwarted because of the Cyprus problem, even in sectors of which we were not aware. The lack of opportunity has often led to the emigration of the educated workforce, leading to lower national ability, which could be reversed due to the possibilities offered through the solution of the Cyprus problem.

At the same time the fact that investments can now occur under a solution that were not possible previously enables the unlocking of capital, land and economic opportunities that have been frozen by conflict. It is true that some consider the investment necessary as daunting, and often wrongly consider such investment as “cost” to the government. Although financing is very important, particularly in Stage 1 of the solution process where the peace dividend is relatively modest, these investments can lead to greater growth and productivity through the integration of networks as well as infrastructure, and provision of better quality of life to those who will move to new areas. Such investments will increase the income (GDP) of the economy and thus increase government revenue through taxation. As a result, the public sector will over time have a greater capacity to fund investments than under a “no solution” scenario. Such investments will be gradual in character as the majority of investment will be put in place subsequent to this preparatory stage. Thus it is not correct to assign investment needs as “costs”: funding requirements have to be considered and as much as possible they should not financially burden the government, but such investments will be beneficial to the economy. To achieve that, government expenditure could be limited at Stage 1 to the creation of the unified island superstructure; non-essential and primarily developmental projects should be scheduled after the intensive transitional period. For the private sector, the ability to exploit the release of resources (in terms of land, capital and population mobility) will provide an additional boost to the unified economy that in Stage 1 could have a stronger impact than government investment in new capital.

A second very important cost is the lack of trade due to the ongoing situation. Trade and the opportunities that a solution would bring were highlighted in the *Day After* reports of Antoniadou-Kyriacou, Oğuz-Çilsal and Mullen (2008, 2009, 2010). For a small island such as Cyprus, the restriction on trade creates a severe restriction on productivity; small economies are much more dependent on trade than larger nations, and thus lack of access to trade leads to lower economies of scale, lower productivity, and thus lower production and income.

The microeconomic benefits of a solution can be even more beneficial, as the environment for making economic decisions will improve. Consumers are currently not able to allocate their resources efficiently due to transaction costs (in terms of money and lost time) involved in operating across the Green Line.

The first stage of the solution will immediately allow some resources to be put to better use. Consumers will be able to shop across the two economies with the withdrawal of the existing barriers. The reduction of barriers will greatly reduce the transaction costs of interactions across the Green line. At the same time export-related service sectors will gain from the visibility of a

solution: evidence from Sri Lanka points to increased bookings for the tourism industry (BBC, 2011),¹⁴ for example, after the full settlement. This boost will not only be centred on tourism, but will support other services too: unblocking productivity restrictions in export-driven sectors can provide immediate boost to the economy of the now unified Cyprus as the feedback from the business community has confirmed.

The institutional costs and impact on infrastructure

Last but not least, the conflict has created a huge barrier to development that often is not taken into account. This has to do with the institutional infrastructure that the two economies currently rely on. Thus the reduction in conflict will promote immediate productivity benefits for all Cypriots. The effect of the immediate productivity boost through greater institutional improvement has already been felt in Cyprus with the significant relaxation of flows of people and goods across the Green Line since 2003. Shops on either side learned of the needs of customers and through copying existing practices were able to drive up output: this “learning-by-doing” (Arrow, 1962) or what, in this case, is more apt to be defined as “learning-by-seeing-each-other,” has increased the productivity of the markets of both communities. Even at Stage 1 of a solution, the increased productivity will be significant as many existing barriers (including psychological ones) will be lifted through the signing of a peace agreement and re-unification.

The institutional infrastructure of the island is dictated by conflict; as a result, the ability of people to interact in a way that increases their productivity and thus their rewards is lacking. The division also prevents the island from enjoying the benefits of an economics of agglomeration. Agglomeration economics suggests that there are greater opportunities for economic growth when people are allowed to live close to each other and interact freely: this can explain why there can be a whole street of shops in New York City selling chess-related items, while this will not occur in smaller, more isolated towns. The most poignant example of this is Varosha and the walled city of Famagusta: the abandonment of the large (for Cypriot standards) agglomeration centre of Varosha did not just hurt Cypriots through the grave loss of capital (in terms of hotels, housing, etc.): it hurt the walled city of Famagusta as well, as the opportunities to sell, interact and maximise economic opportunity were destroyed through the removal of such an important and close centre of economic interaction. In addition, there are neighbourhoods and areas not put to their most productive uses. Current utilities infrastructure projects have been built around the conflict, leading to losses of efficiency in terms of energy transmission and the transfer of utilities.

¹⁴ Some suggested that the case of Sri Lanka was an end to hot conflict rather than the current Cypriot stalemate, and this is what led to the rise in tourism in the country. However such a rapid rise in tourism did not arise when then conflict in the Sri Lanka was stable nor when a ceasefire with peace mediation took place in 2002, but only after a full settlement. This indicates that there should be a “Peace Boost” to tourism also for Cyprus.

Worst of all, the conflict has defined the very way the two communities have set up their current economic and social infrastructure. As a result many institutions have been built with the conflict in mind, and are not up to the task in a global environment. The solution allows economic and social institutions to be redrawn in a way that focuses on enhancing the productivity of individuals and their quality of life rather than reacting to problems that were created through conflict.

In terms of estimating the growth in GDP per worker, we have analysed the previous increases in capital of the GCC and TCC economies in order to be able to suggest a figure that would be feasible in periods of modest to high growth. At the same time, the fact that Cypriots will no longer need to allocate resources for (conflict-related) unproductive uses, as well as the increase in agglomeration benefits and the improved institutional infrastructure will increase productivity for the benefit of all. The range of this increase of productivity is based on research on the cases of Sri Lanka (Fonseka, Pinto, Prasad, & Rowe, 2012) and Korea (Noland, Robinson, & Liu, 1998).

What is meant by an increase in productivity?

To understand what is meant by an increase in productivity, we must first define productivity. Productivity is the ability to maximise output while using the same or fewer resources. This increase in the capacity to generate more output with the same amount of resources is intrinsically linked to the existing level of technology and level of efficiency in a society: in order for productivity to be improved, technological knowledge and the practical application of that knowledge must increase.

Productivity gains are much more important to middle to higher income nations that are striving to reach parity with the most advanced nations. Less developed nations can rely in part on increased capital and labour input to provide the main driver for growth, while middle to higher income economies find that the return to investment of capital does not provide as much sustainable growth as it does for poorer nations. Thus, in a united Cyprus an increase in capital investment will have a positive effect on the economy, but the real sustainable increases in income will arise from the country's ability to realise productivity gains. In this respect the solution of the Cyprus problem offers a unique opportunity to allow the communities to increase their productivity and so ensure a higher, long-term sustainable growth rate of their economies.

For economies like Cyprus, Total Factor Productivity is key

The next question is how to measure this productivity. A crude but common measure of productivity is output per worker unit (labour-hour or person). However, this is not a very good indicator for understanding why output per worker rose or fell over a certain period: such increases could have resulted from unsustainable injections of capital (such as in construction) that are often more speculative than growth-enhancing. Part of measuring a better productivity per worker necessitated measuring long-term productivity gains called Total Factor

Productivity (TFP). TFP is intrinsically linked to how an economy can create, adopt and adapt technology to allow it to produce more output using the same (or fewer) resources than before.

The ability to better utilise existing resources is intrinsically linked to the use of technology and knowledge. The TFP of an economy is a way of seeing how important to growth are those things that are hard to measure, such as the introduction of better managerial or technical systems. In this respect TFP is a powerful driver of the economy: it is by far the most sustainable part of economic growth as better use of resources and the accumulation of technological knowledge are hard to reverse.

It has been demonstrated elsewhere that an increase in TFP productivity leads to *permanent* increases in income (GDP), which are, moreover, less susceptible to reverses as a result of the economic cycle.

TFP is particularly important for middle to high income countries. For example, an increase in TFP has been a key source of growth for countries that strive to move up the income ladder: Japan realised 47% of its growth in the period 1960-1995 through the increase of TFP, transforming it to the advanced technological nation that it is today (Barro & Sala-i-Martin, 2004, p. 439).¹⁵ Unlike lower income countries, by the time an economy has reached the developed stage, the ability to “catch-up” to advanced states through importing capital is largely exhausted (Abramovitz, 1986). Thus for middle and higher income economies like Cyprus, the increase in TFP is the key to ensuring sustainable long-term economic growth. The greatest benefit to peace in Cyprus will be the ability of Cyprus to eliminate (or at least substantially reduce) the unproductive use of resources and thus be able to increase its productivity.

Hence our emphasis is not just on the possible release of resources that a solution can bring, which we also factor in the following analysis; our focus is on how a solution can allow for greater efficiency and opportunity, thus increasing the TFP of a united Cyprus economy, and allowing for faster and more sustainable growth of the economy than would result without a resolution of the Cyprus problem.

This is important to be understood by all: although many will focus on the increased income that will arise due to the investment (both institutional and private) that a peaceful Cyprus will attract, the **real, long-term, sustainable benefit** for Cyprus will be the ability to cross boundaries and to use resources more productively. In many ways TFP and capital investment remind us of the story of the hare and the tortoise. If the immediate benefits of capital inflows outlined in section 5 are the hare, then the tortoise, who in the fable won the race, is the increase in TFP; over the longer term such increases in TFP growth can outweigh the benefits of capital inflows.

¹⁵ Feedback has suggested that at least in the case of South Korea, the TFP growth should not be interpreted as a pure technology shock. That fits with our use of TFP, since we feel that TFP growth due to the resolution of the Cyprus problem will arise from any number of factors, including demand and trade shocks, as analysed in section 7.

7. MEASUREMENT OF TOTAL FACTOR PRODUCTIVITY

Solow Residual and Growth Accounting

Growth accounting is used in economics to discover the causes of economic growth. We begin by estimating the Solow residual for the two economies. According to neoclassical theory of economic growth, the growth in income (GDP) arises from the following factors:

- A growth in the labour force used in the economy
- A rise in the quality of labour (human capital)
- A rise in the capital used in the economy
- A more productive use of existing resources (Total Factor Productivity or TFP)
- In effect, growth accounting helps policy-makers understand why their economies grow, by helping them understand how critical to growth are factors such as the rise of labour, education investments and productivity (Barro, 1998).

There are several ways to estimate the breakdown in the growth of GDP into its constituent parts. However, here we are constrained by the way in which the data are collected by both communities. We can only measure output per worker (and not hours worked) in a consistent way in both communities after 2004. Some factors that can explain GDP growth (e.g., energy usage) are not directly comparable. In addition, in order to be able to see the impact of employment, we chose a formulaic expression that uses GDP growth per worker. Thus the impact of the contribution of additional labour (for example, via migration) is unclear in the model we use.

What is the current situation in terms of productivity in the two communities?

In order to assess the causes of GDP growth in the two communities we assume a Cobb-Douglas Production function, where the economy operates under constant returns to scale. We then assume that the shares of factors in production are constant. This simple model allows us to be transparent in our assumptions. The full explanation of our estimates can be found in Appendix C.

The results are grim reading for Cypriots. The TCC economy's growth is strongly dependent on increasing the capital per worker; yet as income rises, this growth will slow down, as an ever increasing amount of additional investment will be consumed by the depreciation of existing capital. This is already evident in the GCC economy, where total investment did not neces-

sarily lead to additional capital *per worker*, and thus dragged down the growth of GDP per worker. In both communities labour quality has risen, and it constitutes a strong driver for long-term growth.¹⁶

However, for both communities the growth of TFP has been disappointing. Growth in TFP has been negative in the TCC economy and only barely positive in the GCC economy. This demonstrates what was discussed in the previous section about how the conflict does not promote the potential of the island: currently Cyprus in conflict is very poor at using existing resources in a productive way and the island's ability to promote TFP is limited. The low positive TFP of the GCC economy means that productivity and the better use of technology only marginally provided for an increase in GDP per worker. In the past seven years the GCC economy has been effectively using existing resources that are no longer forthcoming, such as capital (through the growth of its financial sector) and labour expansion. In the TCC economy the issue is more severe: the TFP growth rate is negative. The economy is becoming worse at using existing resources efficiently, with extremely negative consequences for long-term growth, employment and, ultimately, social stability.

Table 10

Estimating TFP in the period 2005-12		
	TCC	GCC
Average output growth per worker	2.19%	0.98%
Average physical capital growth per worker	5.84%	0.92%
Share of physical capital	40.0%	40.0%
Quality of labour	1.0%	1.0%
Total factor productivity	-0.742%	0.008%
<i>Source: Statistical services and authors' estimates.</i>		

These results hold a warning for the communities in Cyprus: growth in output per worker is not based on sustainable increases in productivity. The ability of the Cypriot communities to catch up with the European average in a way that will be sustainable is under threat unless attention is given to the poor use of existing resources. This is particularly true for the TCC economy; the rapid increase in the quality of labour through education is undermined by the destructive way in which the economy uses its resources. The data for 2005-2012 seem to suggest that currently both economies have not been able to stimulate the type of economic growth that leads to permanent increases in the capacity to produce more with the same amount of resources, as the very low (and in the TCC case negative) TFP growth suggests.

¹⁶ Çiftçioğlu and Besim (2006) estimated TFP for the TCC and GCC economies to be -1.34% and -1.00%, respectively, for the years 1994-2003.

These results are particularly worrying if they are compared with OECD developed countries. Although TFP productivity varies in the OECD, it is consistently positive and can be as high as 1% (Barro & Sala-i-Martin, 2004). Although the amount seems small, it is the *recurring annual* nature of such additional growth that lifts developed economies to ever greater growth in incomes, as well as ensuring continuing feats of productivity. It must also be noted that countries with high income but low rates of TFP growth are usually resource-rich; in their case a large injection of capital per worker can compensate for the lack of further TFP growth as natural resources boost income.

What does this low TFP mean in practical terms? Although a technical term with a residual (i.e., unclear) derivation, the evidence of the misuse of resources in the two communities can be seen in the anecdotal evidence all around us. An engineering graduate delivering coffee as he can find no other employment is just such a case where the increase in education quality is offset by the under-use of the person's productive resources—a negative TFP effect. This negative TFP growth is seen not only in cases where workers are overqualified for what they do; it can also be seen where workers (in particular migrant workers with very low salaries) are used when more efficient solutions could be found. Construction is a case in point: despite an increase in technological ability, the cost of building construction has remained at a stable (and slightly upward) level.

As argued in the previous section, it is in the very poor TFP growth numbers in Cyprus where the true economic cost of continued conflict and division lies. The lack of productive ability is a direct consequence of the institutional, allocative and administrative set-up that has been created by this conflict. The change brought about by a solution will at last enable both communities to unleash the productive potential that has been restrained by the division of the island.

Use of growth accounting to estimate a peace dividend

How is the above useful in allowing us to estimate the benefits of peace? To answer that question that we need to go back to the equation that enabled us to break down the GDP per worker in both communities (see Appendix C).

In short, **we estimate** the growth of capital per worker and TFP increase; then **we can calculate the estimated growth of GDP per worker at each stage of the solution.**

We assumed that even at the peak investment time (Stage 2) of a solution, the growth of capital per worker would not be higher than previous historical peaks. It should be noted that since a solution will provide unparalleled opportunities for investment, this assumption is very conservative. This assumption is conservative on purpose: by biasing the result against what we expect to find (a very large increase in GDP per worker) we can ensure that our assumptions remain plausible.¹⁷

¹⁷ Any forward planning requires a leap of faith and using the basis of assumptions; by attempting to bias the result against high growth we act as an internal check to ensure that the leap of faith remains plausible.

The increases in TFP were also very conservative. We based our assumptions on the scenarios of Korea (Noland, Robinson, & Liu, 1998) and were very careful to be comparatively similar to (and below) those of developed nations.

Other arguments put forward for the need to be conservative about the increase in TFP are the unknown effects of federal government structures and the possible withdrawal of capital investment in the TCC economy by Turkey, although there are reasons to be optimistic that a withdrawal will be more than compensated by the increase in private direct investment by Turkey.

Economic growth under peace: Stage 1 (Y1 and Y2)

Table 11 indicates the assumptions made in terms of capital per worker and TFP, and the resulting effect on the growth of GDP per capita of the two communities. The growth rate per worker we calculated based on these assumptions is in italics.

Table 11

TFP growth in solution Stage 1 (Y1 and Y2)		
	TCC	GCC
<i>Average output growth per worker</i>	4.42%	1.91%
Average physical capital growth per worker	8.90%	2.00%
Share of physical capital	40.0%	40.0%
Quality of labour	1.0%	1.0%
Total factor productivity	0.26%	0.51%
<i>Source: Authors' forecasts.</i>		

We have estimated that the increase in the average physical capital growth rate per worker will be gradual.¹⁸ For the TCC economy we took the halfway point between the existing creation of new capital per worker (Table 10) and the peak creation of capital per worker in the past. For the GCC economy, which is currently plagued by deleveraging, we considered that a halfway point between the existing (Table 10) and the historical peak was implausible.

Using the existing estimated TFP of the two communities as a base, we added a 1 percentage-point increase in TFP for the TCC and a 0.5 percentage-point increase for the GCC. The addition, the TFP for the TCC is higher than the GCC due to the fact the TCC community is less developed (and thus has a greater window to promote TFP through the adoption and spread of existing technology), but also because the TCC will experience the immediate

¹⁸ Here it is worth recalling why TCC growth rates seem much higher than GCC growth rates. As the TCC economy is less developed, a similar amount of net capital creation (say €1m) results in a far bigger percentage increase in the capital per worker employed than the more capital-intensive GCC economy.

benefits of being fully part of a state that is recognised by the international community, as well as the benefits from the requirements of harmonisation with the EU *acquis communautaire* (body of laws and regulations) that will provide a greater productivity boost.

Economic Growth under Peace: Stage 2 (Y3 to Y7)

Table 12 shows the assumptions and the corresponding GDP growth per worker for the second phase of a solution.

Table 12

TFP growth in solution Stage 2 (Y3 to Y7)		
	TCC	GCC
<i>Average output growth per worker</i>	6.41%	4.01%
Average physical capital growth per worker	12.00%	6.00%
Share of physical capital	40.0%	40.0%
Quality of labour	1.0%	1.0%
Total factor productivity	1.008%	1.008%
<i>Source: Authors' forecasts.</i>		

This is the phase in which the peak capital investment will be undertaken. In our assumptions, we bias the TCC economy growth downwards by limiting it to the historical peak in terms of the increase in the average physical capital per worker. We limit the GCC economy to below its peak investment to take into account the impact of deleveraging (reducing debt) by the state and by households. This will mean that investment will remain below its historical peak. However, this rapid growth will enable deleveraging to take place in a much more positive way: growth will mean that on average debt-reduction will not reduce the disposable income for the household. These are again conservative assumptions: some estimates of reconstruction investment assume unprecedented increases in capital.

The TFP has been normalised for both communities at 1.008%. This dramatic improvement in the TFP rate is due to the full normalisation of relationships across the communities and the creation of a unified economy. The exploitation of economies of scale, the provision of new productive opportunities through the added investment and the elimination of non-productive activities will provide a productivity boost for the economy. These productivity benefits will be open to all Cypriots irrespective of community, hence the normalisation across the estimate in Table 12.

The rate of TFP growth, although high by Cypriot standards, will still be below several OECD states: using data for 1960-1995 it is clear that Germany, Italy, France and Japan (Barro & Sala-i-Martin, 2004) will still have a far higher TFP growth rate than the united Cyprus. As noted above, our conservative estimates build in assumptions about some of the challenges of a solution (see section 9).

Economic growth under peace: Stage 3 (Y8+)

Finally, Table 13 indicates the assumptions and growth under the third and final stage of a solution.

Table 13

TFP growth in solution Stage 3 (Y8+)		
	TCC	GCC
<i>Average output growth per worker</i>	4.91%	2.91%
Average physical capital growth per worker	7.00%	2.00%
Share of physical capital	40.0%	40.0%
Quality of labour	1.0%	1.0%
Total factor productivity	1.51%	1.51%
<i>Source: Authors' forecasts.</i>		

In Stage 3 the full potential of a united Cyprus will have been unleashed. Eight years after a solution, the solution-related investment will start to taper off from its peak. Yet the ability of a united Cyprus to transform itself into a hub of energy, shipping, education and business services will be fully realised in this final stage. The full advantages of the possibilities of a unified Cyprus are provided in the sector-by-sector analysis that follows.

The permanent additions of TFP might look high by Cypriot standards, but they are still modest in comparison with existing productivity growth in advanced economies. TFP additions of this size are still lower than those recorded by countries that have achieved the full transition from a developing to an advanced nation, namely Japan, Singapore and Korea, which have a TFP of over 2% per annum.

Translation of GDP per worker to GDP

The above results indicate the increase in output per worker in Cyprus. However output per worker is a denomination of income growth that is often used when one wants to measure productivity. We thus needed to convert this into GDP growth rates—the more common indicators to compare economic performance. Further details can be found in Appendix C. This rapid growth in advantages will start winding down; we thus taper the growth rate from that implied by Table 11 in the last stage. However it is important to note that the unified economies, and the communities within it, are in a permanently higher trajectory of growth than they would be if they had not reached a settlement of the long-running Cyprus problem. Without a solution, the long-run real GDP growth rate in the GCC economy is unlikely to exceed 1.5% in the GCC economy and 2.5% in the TCC economy.

Table 14

With-solution real GDP growth rates under the TFP approach				% change
	Stage 1 Y1-Y2	Stage 2 Y3-Y7	Stage 3 Y8-Y20	Year 20 Y20
All Cyprus	3.9%	7.6%	4.4%	3.5%
GCC	3.3%	6.9%	4.0%	3.5%
TCC	7.6%	11.0%	6.2%	3.5%
<i>Source:</i> Authors' forecasts.				

8. SECTOR-BASED ANALYSIS

The benefit of the growth accounting methodology is the ability to look at the economy from a bird's-eye view. Yet it does not allow a more detailed description of the effects of peace. We therefore decided to complement our analysis with a bottom-up construction of GDP through the estimations of the effects of peace on every sector of the economy. The sector-by-sector approach appeals to business people who want to have a better grasp of what the impact of peace will be on their businesses. Comments from senior business people in the sectors analysed have been integrated in the text and in the "feedback boxes."

A solution to the Cyprus problem will no doubt have significant positive economic impacts on the island. These positive impacts, in addition to the cost of the settlement, referred to as the peace dividend, will flow through many channels (Fonseka, Pinto, Prasad, & Rowe, 2012) including:

- **Expansion of output through integration:** a united Cyprus will provide opportunities to expand the output through the internal integration of the economy, but also through the removal of barriers to interaction with the regional economies (Turkey for the GCC economy and EU/all economies for the TCC economy).
- **Expansion of output through economies of scale:** the ability to work in a larger economy and interact with the EU single market provides the ability for productive industries to prosper and for consumers to benefit through an increased consumer surplus.
- **Fiscal benefits:** more efficient sources of financing for governments together with increased output will result in higher revenues.
- **Removal of unproductive expenditure:** such as a reduction in military expenditure.
- **Long-run advantages:** such as lower borrowing due to capital inflows and lower country risk premium.
- **Sectoral growth:** With political stability and better fiscal balances, this will help strengthen the microeconomic foundation for doing business. A united island will attract more foreign direct investment (FDI) and the transfer of technology and capital, and will encourage domestic businesses to explore diversification into more innovative and value-added activities. This will mean more investment and faster growth.

The degree of utilisation of settlement benefits will be positively related to how fast the two economies integrate with each other and with the rest of the world. This process, if managed well, will help communities to integrate as well as help consolidate the settlement on the island.

As explained in detail in the growth accounting chapter, both economies have failed to achieve sustainable growth and development and are facing serious economic problems. One fundamental reason for the economic problems has been low total factor productivity (TFP). This is a problem not only for the period 2005-2012, which we have estimated in this report: it has also been negative over time. The TFP for the TCC and GCC economies was -1.34% and -1.00%, respectively, for the years 1994-2003 (Çiftçioğlu & Besim, 2006). The absence of better utilisation of existing resources despite adaptation of technology is exactly due to the cost of division. The “Cyprus Issue” overall has had significant negative impacts on both communities economically and leads to the exacerbation of socio-economic problems such as high unemployment, brain-drain and migration.

In this chapter, we assess the sources of growth in different sectors. The benefits followed the three defined stages of the solution that were used in the TFP analysis. By adding up the net positives we can sum up the value added and create a GDP series for the economy. In order to be able to calculate the peace dividend, we examined the sectors both in case of a solution and in the case of no solution. The difference was the peace dividend per sector. In this way we tried to understand the sectoral growth behaviour as well as the opportunities in each sector.

It is important to note that this approach is quite independent of the approach of calculating the peace dividend through growth accounting. This adds strength to the effort to calculate the dividends since two very different methodologies are used to evaluate the positives of a solution.

In order to assess the economic potential of a post-solution scenario, we make some empirically based projections for all the sectors.

1. Given that the two economies’ sectoral categorisations are not the same, certain adjustments have been made to form a standard format for all sectors, in order for them to be comparable.
2. 2012 has been taken as the base year and, as outlined in Chapter 3, we used already existing estimates to project sectoral growth rates for 2013, 2014 and 2015 in constant prices.
3. Sectoral growth rates were then projected for the three stages envisaged for the solution of the Cyprus problem. The projections were made with reference to the sector growth rates of 2002-2006 and then adjusted downwards. In these years both economies experienced very high investments and rapid growth in most sectors. The boom was also partly related to political developments: then the TCC economy was enjoying a peak in investment due to the expected solution of the Cyprus problem, and the GCC economy was experiencing the benefits of EU harmonisation and subsequent membership. In addition to these positive political developments both economies were being fuelled by the high growth rates both in the region as well as globally.

In this respect, sectoral growth rates are projected for three stages:

- Stage 1 (2016-2017): This stage has been defined as the signing of the Cyprus settlement and a period of preparation for intensive reconstruction. Given that such a positive development will occur, a high growth rate is expected, similar to the years 2002-2004. We take the average growth rate for each sector of 2002-2004 and taper it by 10%, taking into account the fact that coming years in the regional and global context are not as supportive to growth as in the early part of last decade. In other words, we grow each sector by 10% less than the 2002-2004 average growth rate for Stage 1.
- Stage 2 (2018-2022). This stage consists of the peak investment period. This is where most of the settlement-related investments including transport, buildings, utilities and other infrastructure will take place. We assign higher sectoral rates for this period that are similar to the years 2004-2006. Again, in view of global developments we taper these growth rates: for the GCC economy we taper by 12% and for the TCC we taper by 20%. The underlying argument for higher tapering in the TCC economy lies in the fact that the TCC had very high growth rates which were outliers and seen with hindsight were unsustainable over a longer time frame.
- Stage 3 (2023-2035): This long stage has been divided into two sub-stages:
 - i Stage 3a (2023-2027): This sub-stage represents the period in which major programmes for transition are completed. During this stage 75% of the growth rates of Stage 2 has been assigned for the GCC economy and 66% for the TCC economy.
 - ii Stage 3b (2028-2035): This is the stage in which two economies are expected to normalise and, in the “with solution” scenario, to converge, in terms of GDP growth rates.

Where this approach produced anomalies (such as growth being higher in the no-solution scenario), we made adjustments to smooth them out. Having forecast the sectoral benefits of a solution, we then make a forecast under a “no solution” scenario for each sector in order to calculate the peace dividend. This enables us to compare the “with solution” and “no solution” scenarios both for each sector and for total GDP. We then convert the estimates into the per capita income for each economy separately by using population growth forecasts. This enables us to see how long it will take to reach convergence on a per-capita income basis for the two economies.

The dividend allows us to visualise the benefits. In the following paragraphs, we outline the sector-by-sector growth that can arise from a solution.

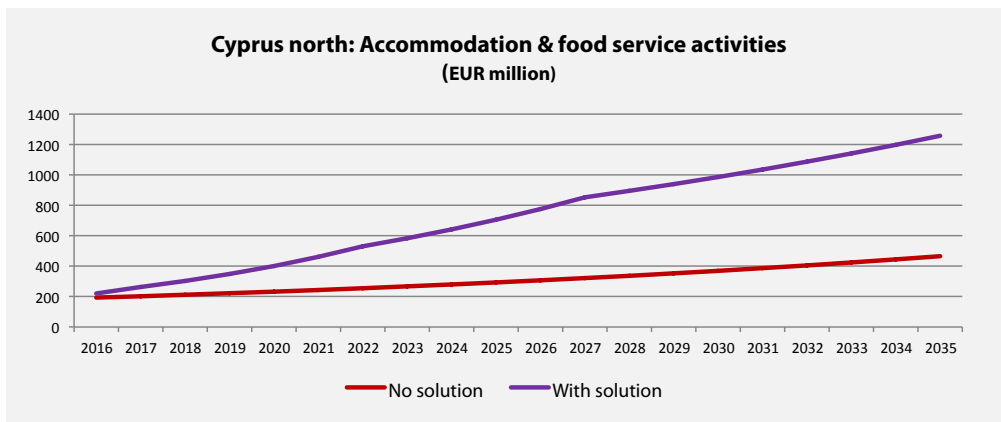
Tourism: a rapid expansion of opportunities

Cyprus is an island that has an economy dominated by the service sector. Tourism, having a significant share in total value-added, will respond very positively to a solution given the opportunities that exist but have not been fully utilised due to the Cyprus problem. A united island would be more attractive to visitors because there will be a greater number and variety of places to visit. These include historical sites, beaches, as well as the different religious and ancient sites on the two sides of the island, such as the Hala Sultan Tekke mosque in Larnaca

and the church and monastery of St Barnabas in Famagusta, the ancient ruins of Kourion near Limassol and Salamis near Famagusta. Given the fact that the northern part of the island has not been exploited as much, the TCC economy will benefit more in *relative* terms from a settlement but both sides stand to gain. Direct flights to EU countries and other regional destinations will boost the hotel occupancy rates in the north that have been well below 50% (SPO, 2013). It is reasonable to assume that both communities will benefit from a settlement, but the TCC will benefit more as it catches up to the GCC tourist accommodation occupancy rates, which are currently substantially higher.

We estimate that the direct value-added impact on the tourism sector will be higher in the north relative to the south, generating an additional €791m at constant 2012 prices for the TCC economy by Year 20. This is obviously the direct impact; there will also be quite a high number of multiplier effects on transportation, manufacturing, agriculture, etc. Cyprus could also develop as a regional centre for health services through health tourism. As regards employment, existing universities have the capacity to supply more skilled labour to this sector if a shortage is indicated.

Chart 3



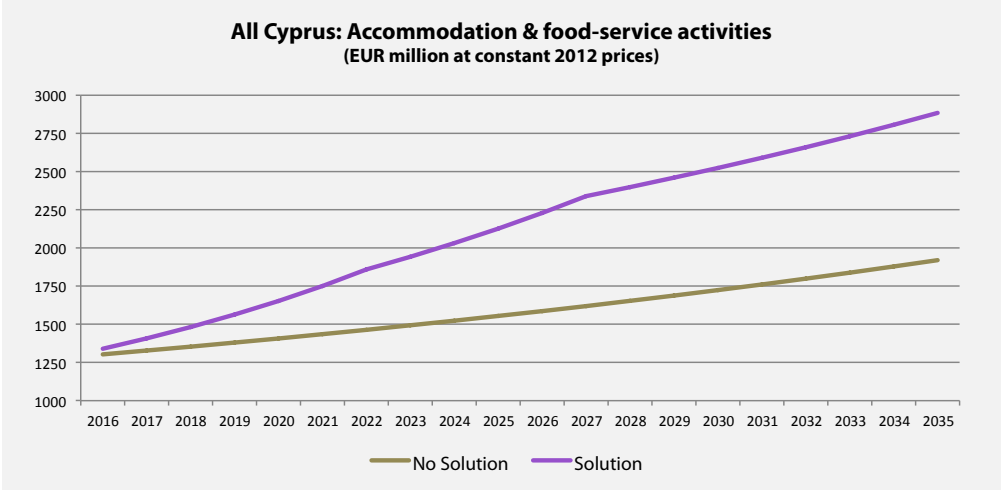
Source: Eurostat.

For the GCC tourism sector the effect is also significant, with an increase from €1.1bn in Year 1 to €1.6bn in Year 20. For a united Cyprus as a whole, the tourism sector will be generating over €2.8bn in value-added in 20 years. This implies an additional income-creation of approximately €553m per year at constant 2012 prices.

As for the GCC economy, a new market with a population of 74m will be added to the tourism portfolio through the normalisation of relationships with Turkey. Lower flight costs for both economies and an increase in transport routes will make the country more competitive in the region.

A united Cyprus will be able to provide a wide range of tourism services, including health tourism, agrotourism, ecotourism and religious tourism, while at the same time upgrading the current entertainment (including gambling) services. Thus although it might seem that the two communities will be competitors, the competition will take place in a rapidly growing market, while allowing the island to develop a competitive advantage in servicing regional tourism needs.

Chart 4



Source: Authors' forecasts.

Sector feedback: A common vision for Cyprus as a tourist destination

The business community represented in Brussels stressed that the constraints on Cyprus tourism affect both communities. A solution could provide Cyprus with a dynamic tourism product that will enable the island to attract visitors in terms of traditional strengths, but also in terms of its diversity of culture and proven ability to co-exist. The solution can also lower the current costs of tourism-related industries by offering a more integrated product, for example, combined itineraries.

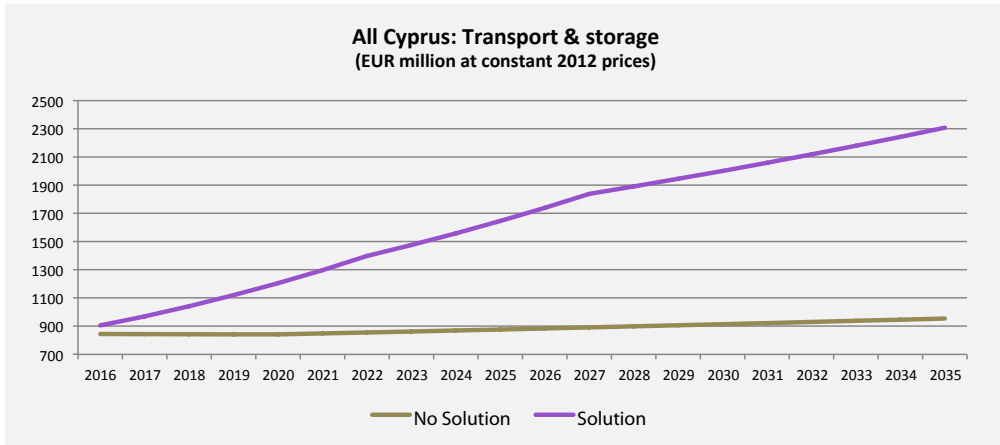
Participants noted the potential for Greece-Turkey-Cyprus cruise tourism, which, unlike other Mediterranean cruises, can offer three different cultures in one trip. Medical and conference tourism are other avenues that can be further developed. And there is also the advantage of offering Turkish citizens more opportunities to travel in a language-friendly environment.

Many countries have different regions promoted under the same banner, providing a possible blueprint for a united Cyprus for how it could promote its product abroad. The slogan of "One country, two cultures, a unique identity" was proposed. Given the existence of the Maronite, Armenian and Latin communities one might present this as "One country, many cultures, a unique identity."

A boost to transport

A rise in tourists, earlier exploitation of natural gas (see section 5) and the opening of shipping to Turkey will also have positive spillover effects on the transport sector, which we expect to rise from €897m in 2012 to €2.3bn at constant 2012 prices by 2035, yielding an annual average peace dividend of €761m.

Chart 5

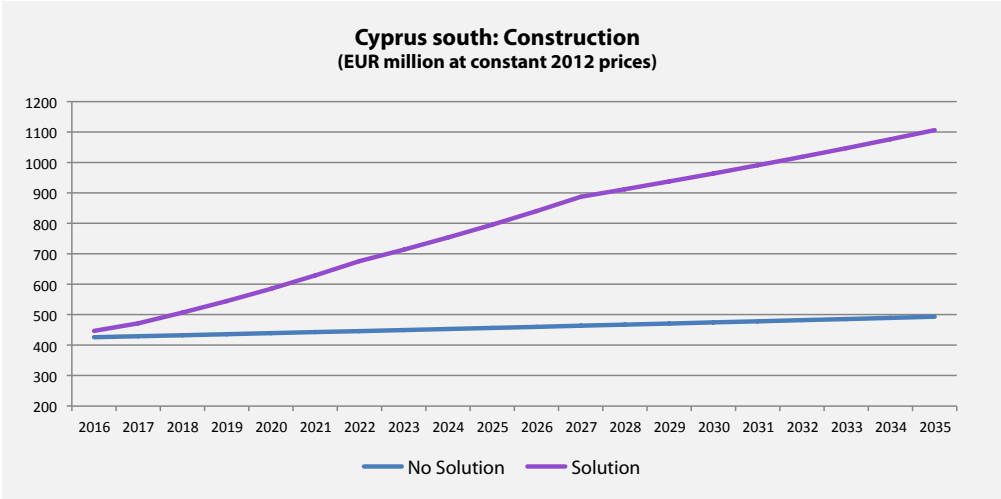


Source: Authors' forecasts.

Construction: building a united country

The construction sector is currently severely depressed, particularly in the GCC economy. As outlined in Chapter 5, a settlement will involve a huge number of building projects: housing for those who will relocate; the rehabilitation of Varosha, potentially as part of an integrated Famagusta region; the upgrading of ports and re-connecting utilities and infrastructure island-wide. This activity will turn Cyprus into one of the largest (and most ambitious) construction sites in the world. A large portion of this will not be public investment. Given that the property issue will no longer be a constraint, the TCC is expected to make additional investments for housing, and in the south reconstruction and settlement will create private investment opportunities. We forecast that value-added generated by the construction sector will more than double in the GCC economy. This translates into an annual average peace dividend of nearly €336m for the next 20 years. The sector currently has ample capacity, and in fact, the generation of greater revenues for the sector can also benefit the island's financial services: most developers have found the need to deleverage difficult under conditions of declining output, but under a solution it will become easier. The deleveraging of debt that the sector currently needs to undertake will no longer be a severe impediment under such rapid growth conditions. Thus both employment and output will rise in a depressed economic sector, but at the same time the reduction of construction companies' non-performing loans can relieve the financial sector from its current liquidity and capital constraints.

Chart 6



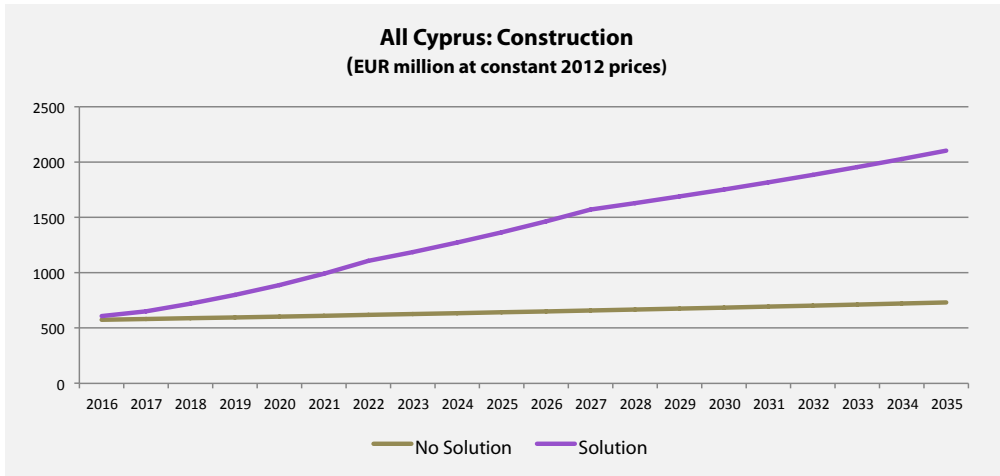
Source: Authors' forecasts.

As for the TCC economy, which has quite a high growth potential, we forecast that the construction sector will grow to €1bn in 20 years—five times its size today. Because this sector requires input from over 30 sub-sectors, it has a high multiplier effect on the others sectors, especially in manufacturing and trade.

We estimate that in the “no solution” scenario, the construction sector in both economies in total would grow to €731m in constant prices. With a united Cyprus, this sector could grows as much as three times and reach €2.1bn, yielding an annual average peace dividend of €725m for the two communities. In sum, construction will only be able to re-live the vibrant days of the early part of this century if there is a solution.

The boom in construction, and in the economy generally, will have a positive effect on real estate prices, as it will offset the impact of an increase in the available land supply.

Chart 7



Source: Authors' forecasts.

Sector feedback: A struggling industry where peace benefits are immediately apparent

The participants of the business community agreed that the weak construction activity of recent years meant that there was plenty of spare capacity in both communities. While expecting a significant boom, participants were mindful of the environmental impact, with one participant remarking “you should be careful what you ask us to build.” It was suggested that a joint environmental agency should promote a balance between construction and the environment. To avoid mistakes of the past (speculative construction), a joint vision is required. This is particularly the case for Famagusta: leveraging the tourism potential of the heritage in the walled city, potentially transforming the current location of Famagusta port into a marina, and rejuvenating Varosha.

Thought needs to be put into financing. During the first phase of the solution, before benefits will have accrued to the government, funds must be in place to ensure the necessary investment takes place. In this respect the private sector needed to be incentivised to generate private investment (both domestic and foreign).

Wholesale and retail trade: better access and efficient trading

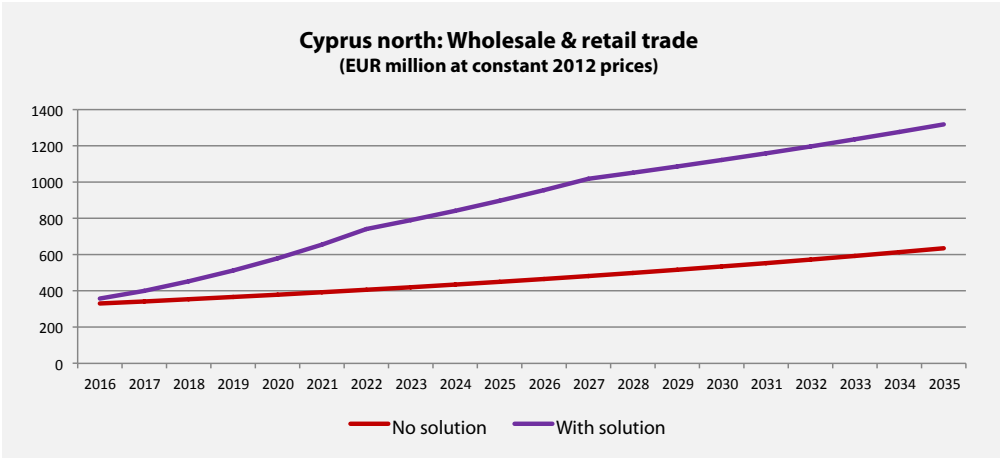
After a solution, trading activities both at wholesale and retail level are expected to increase, as trade will be supplying all the inputs required by the other sectors (such as construction and tourism). The sector will also provide consumer goods to households, which will be enjoying higher incomes. This implies an increase in both domestic and international trading (imports and exports). In addition, the political resolution will generate positive synergies in the region, creating new trading opportunities for a united Cyprus.

The interdependence of the two communities will create consumer and producer surpluses through the elimination of the welfare loss created by the division. Since, unlike Germany, Cyprus is a service-based economy, prices will harmonise rapidly and markets will expand, which will lead to efficiency gains. The effect on the economy should not be underestimated: the Single European Market created efficiency gains that for small states led to increases as high as 1% of GDP (European Commission, 2012). The integration of the two economies on the island will make market conditions more efficient, creating a positive increase of consumer welfare on the citizens that could be higher than the achievement of the Single European Market has achieved for the average European consumer.

The opening of the ports for direct trade, especially for the TCC economy, will reduce transport costs and will have positive effects at the retail level. A settlement will also create new trading destinations for the TCC economy. As for the GCC economy, the very large Turkish market will be a new and highly lucrative trading partner.

Based on these expectations, we forecast that wholesale and retail trading activities for the TCC economy will grow from €352m in 2016 to €1.3bn in constant prices by 2035. This expansion may look high. However, considering that in the TCC economy this sector has doubled in the last ten years without a solution, it is not too optimistic to argue that this sector with a solution can grow four times as much in two decades under peace conditions. In the same period, we forecast that trade in the GCC economy will double, reaching €3.7bn by 2035 with an average yearly peace dividend in constant 2012 prices of € 869m.

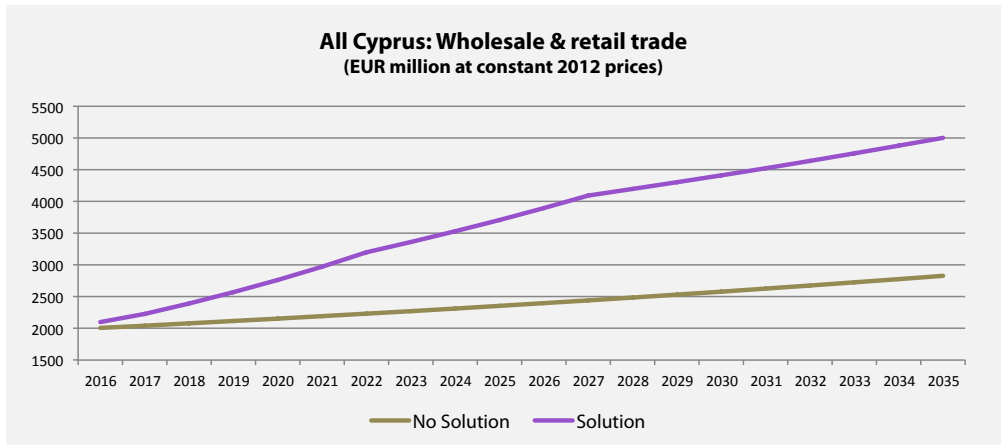
Chart 8



Source: Authors' forecasts.

In a united Cyprus, we estimate this sector to grow to €5bn, compared with €2.8bn without a solution. Normalisation of the political and economic relations of a united Cyprus within the region will mean better economies of scale where firms will be able to create value chains across communal and geographical boundaries.

Chart 9



Source: Authors' forecasts.

Sector feedback: A lively debate

Interestingly, while our results suggest that the wholesale and retail sectors on both sides of the island will stand to gain the most from a settlement, there was clearly concern among Turkish Cypriots about the impact of opening up the sector to greater competition. A vibrant debate ensued, in which the relative benefits of protective measures or the incentives to raise competitiveness created by an open market were discussed. The Greek Cypriot representatives stressed the lessons they felt they have received over the last ten years of full EU entry. In their opinion any sheltering of competition only creates companies and institutions that are unready for when the protection is lifted. Some Turkish Cypriot representatives argued that while the economies of scale of that re-unification would bring were evident, the benefits were likely to be lopsided with possibly Greek-Cypriot and Turkish companies benefiting more than Turkish Cypriot entities, while others argued for the absence of protective measures. Incentives for joint ventures were suggested as a one way of addressing concerns, as well as measures to reduce psychological barriers.

Higher education: strong prospects for a regional hub¹⁹

Another service sector that not only generates economic benefits but also helps to enhance human capital and enrich communities culturally is the higher education sector comprising universities and colleges. In the northern part of the island, there are seven locally established universities and two branches of well-established Turkish universities. These universities attract nearly 60,000 students from the region (YODAK, 2014). In the southern part of Cyprus, there are 43 public and private institutions with a total enrolment of 32,118 students, with seven public and private universities.

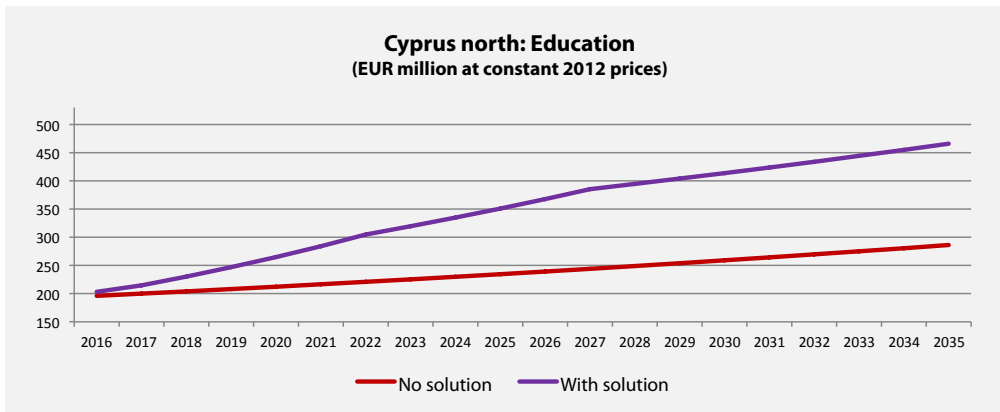
What is striking is that the two communities are gaining competitive advantage in very different markets and sectors in this industry. The TCC education sector has advantages in the Turkish and Near East market, while the GCC is a strong player in the Greek market. In terms of subjects there has been a recent expansion in areas relating to health in the south, which would greatly complement existing subject areas in the north.

One great disadvantage of the Cyprus education sector today is the lack of any distinct identity in the global education market. “Brand Cyprus” is missing for the education sector and it has little chance of being created and understood by students and their parents without a solution. A unified education sector could create a strong brand to attract students from the Near East area and the Commonwealth of Independent States. Although both sides will have to address challenges (the GCC education sector will face the lower tuition fees charged in the north, while the TCC sector will face closer harmonisation to EU directives), the fact that they have advantages in different markets can provide the complementarities needed for Cyprus to become a regional education hub.

A settlement will enable TCC universities to be part of EU’s Erasmus and Bologna processes, which in turn will make them even more attractive for the potential students in the region. Cyprus, being at a geographically convenient location, with good weather and a low crime rate, has a very strong potential for becoming a centre for higher education. GCC universities already have the advantage of extensive links with European institutions, and could tap into the ability to teach both the topic and the English language to students from Turkey, as the TCC education sector currently does.

¹⁹ The GCC education sector represents all levels of education including primary, secondary and higher education, whereas the TCC education sector represents only higher education. i.e. universities.

Chart 10



Source: Authors' forecasts.

Given the assumptions made, we forecast that with a solution the education sector in the TCC economy will grow from €179m in 2012 to €466m at constant prices in 20 years. This implies an annual average peace dividend of just over €109m for the TCC economy. It is important to note that what has been forecast here is the direct value-added created by higher education. Foreign students, who are required to stay at least a full eight months on the island, also make a significant contribution to food, housing and retail sectors, thus creating substantial job opportunities.

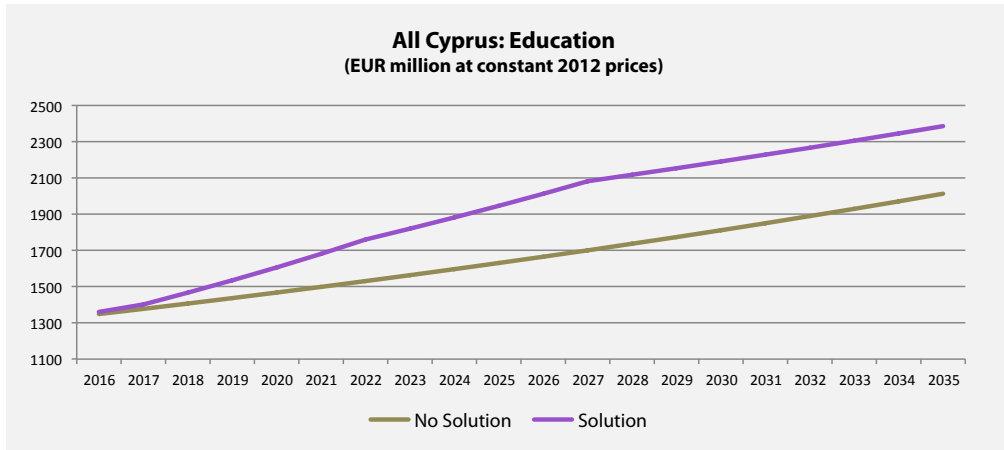
The education sector in the GCC economy is expected to rise from €1.1bn in 2012 to €1.9bn by Year 20, with an annual average peace dividend of €159m.

As for the united Cyprus, the total size of the sector is forecast to reach €2bn in 20 years. This yields an annual average peace dividend of €267m at constant prices.

Sector feedback: increased economies of scale and removal of constraints

It was acknowledged that a solution would offer the education sector increased economies of scale and the removal of constraints caused by the lack of cross-recognition that prevent the sector reaching its full potential. Education could be combined with tourism to ensure that universities enroll students all year round. Centres of excellence in which Cyprus would have a competitive advantage, such as peace studies or archaeology, were suggested. Business people also stressed the need to adapt higher education to the changing needs of businesses.

Chart 11



Source: Authors' forecasts.

Financial and professional services: benefits of diversification

One reason for the banking crisis in the GCC economy was the excessive concentration of risk. For example, Cyprus Popular Bank (Laiki) had lent more than 100% of its capital to the Greek government (Mullen, 2014). One can also argue that, for the professional services sector, which is dominated by legal and accounting firms, over-dependence on Russian business constituted not only a concentration of business risk but also a form of reputational risk that influenced the decision to “bail in” depositors perceived to be “Russian mafia” (Stocker, 2013).

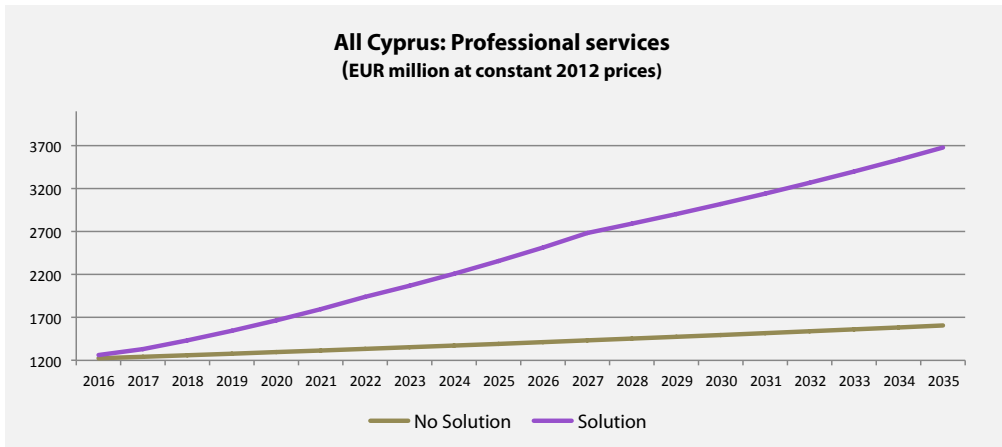
A solution of the Cyprus problem will allow the financial services sectors on both sides of the island to diversify. Turkish Cypriot banks will gain an “EU passport,” allowing them to do business all over the Eurozone, while Turkish banks already operating in the north as well as internationally will have a new member state from which to do business, with promising investment opportunities stemming from the solution. This will be especially advantageous if a united Cyprus quickly signs a double taxation agreement with Turkey and, as suggested by the business leaders, a bilateral investment treaty. Assuming that the corporate tax structure remains similar to that which currently prevails in the south, this will also benefit the professional services sector, by allowing companies from Turkey to use Cyprus as a base from which to invest in other EU countries, as other non-EU companies do. This, in turn, will open up new employment opportunities for Turkish Cypriots to train as accountants.

We estimate that a solution to the Cyprus problem will increase professional services in the GCC economy from €1bn in 2012 to €2.4bn by 2035 (Year 20). This translates into an average peace dividend of just over €560m per year for the GCC economy. For the TCC economy, the sector would grow from an estimated €256m in 2012 to €1.3bn in 2035, yielding an average peace dividend of €458m per year. Thus, although the TCC professional services sector remains smaller than that of the GCC, its peace dividend will be similar. This makes sense, given that professional services in the north currently serve primarily the local population and will have

the capacity to serve as a bridge between Turkish business interests and the existing professional services in the GCC economy.

As for the united Cyprus, the total size of the professional services sector is forecast to reach €3.7bn in 20 years. This yields an annual average peace dividend of €1m at constant 2012 prices.

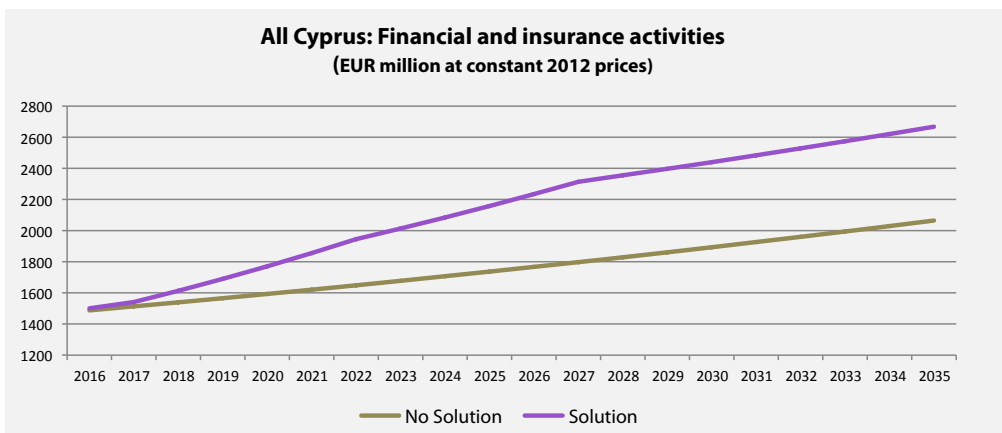
Chart 12



Source: Authors' forecasts.

As regards financial services, we forecast that this will grow in the GCC economy from €1.2bn in Year 1 (2016) to €2.1bn in Year 20, with an average peace dividend of just over €230m per year. In the TCC economy, financial services rise from €213m in Year 1 to €582m in Year 20, with an average annual peace dividend of €149m. We forecast that this sector will reach €2.7bn in a united Cyprus by 2035.

Chart 13



Source: Authors' forecasts.

Sector feedback: bilateral agreements with Turkey would significantly boost potential

The interconnectedness of global business means that several cross-party and bilateral agreements need to be in place for a destination to be attractive as a location for global headquarters and a provider of other business services. A united Cyprus should negotiate a double taxation treaty and a bilateral investment treaty with Turkey in order for the united Cyprus to use its potential in professional services fully. An open skies agreement would serve to increase traffic to Cypriot airports and boost conference tourism.

Table 15

Sector dividend summarised		EUR million at constant 2012 prices		
	2012 Actual	2035 With solution	2035 No solution	Annual average dividend
Construction (a)	1,083	2,104	731	725
GCC	942	1,107	493	336
TCC	141	997	238	389
Wholesale & retail trade	2,197	5,003	2,828	1,284
GCC	1,911	3,684	2,194	869
TCC	286	1,318	635	415
Transportation & storage	897	2,308	955	761
GCC	756	1,647	768	506
TCC	141	661	187	255
Accommodation & food services	1,272	2,884	1,920	553
GCC	1,119	1,627	1,454	133
TCC	152	1,258	466	420
Finance & insurance	1,728	2,668	2,065	379
GCC	1,542	2,085	1,737	230
TCC	185	582	328	149
Professional, scientific & technical	1,259	3,678	1,607	1,019
GCC	1,003	2,412	1,216	561
TCC	256	1,266	390	458
Education	1,285	2,385	2,013	267
GCC	1,107	1,920	1,726	159
TCC	179	466	286	109

(a) GCC construction shrank dramatically in 2013 and is expected to continue shrinking in 2014-15.

Source: Statistical services and authors' forecasts.

9. MAXIMISING THE GROWTH POTENTIAL: KEY CHALLENGES

We have argued in the preceding chapters that the potential for post-settlement growth is significant. However, it would be naïve to suggest that such growth rates are guaranteed. As noted in section 2, the GCC economy is considerably weaker than it was ten years ago, while the TCC economy also has considerable weaknesses. Moreover, the GCC economy's participation in the ESM/IMF bailout programme could complicate some previous understandings reached in the economy negotiations to date.

EU oversight of eurozone countries has changed radically in the past two to three years. Membership in the eurozone will imply that a united Cyprus will be party to recent additional treaties, fiscal compacts and other measures that will restrict its room for manoeuvre. For example, EU institutions will have considerable powers over eurozone member state budgets, while larger banks will come under the direct supervision of the European Central Bank.

The property and territory settlement will also bring significant challenges. We recommend that all of these challenges be addressed in detail with technical assistance well before a settlement is reached, in order to increase trust in the viability of a settlement. Addressing and managing these issues well will reduce the risk of political infighting that could lead to economic destabilisation. We identify the key challenges as follows.

Technical assistance on the matching of resources to service provision

Federations typically involve complex distribution mechanisms from one level of government to the other. Naturally, since the issue involves taxpayers' money, these mechanisms are also the subject of intense debate in all federations. They are likely to be more so in Cyprus. Whether the distribution is from federal to state (constituent state) government or the other way round will depend a great deal on how tax-raising powers are distributed. This is complicated further by the structural reforms currently taking place in the GCC economy as part of the bailout programme.

The main purpose of these distribution mechanisms is to ensure that if a service is the responsibility of a particular level of government, then there are sufficient resources to provide that service. In the case of Cyprus, if it is decided, for example, that big budget services such as education, healthcare and social security are competences of the constituent states, then the constituent states will need enough resources to be able to provide those services at least to the same level of quality that they have provided to date. This will either mean sufficient tax-

raising powers at constituent state level or a distribution mechanism from the federal government revenues to the constituent states.

At the same time, controlling expenditure of big budget items such as healthcare is one of the greatest challenges facing developed economies today. Wherever the competence of healthcare is placed, and whatever the mechanism for funding it, significant controls need to be in place to ensure that spending does not spiral out of control. Rather than leave these questions to those who have no experience of federations, and thus risk the economic viability of a settlement, we recommend that expert technical assistance be sought on these issues well in advance of a settlement.²⁰

Minimising debt finance for the property and territory settlement

On the assumption that the property settlement will involve a certain amount of compensation, as well as reinstatement that will lead to the displacement of those currently using the property, work needs to be done on identifying non-debt forms of financing, ensuring that displaced communities are moved in ways that allow them to sustain a livelihood, and that the property market is not hampered for decades by unresolved claims. In addition, during the first phase of the solution the funds need to be in place to ensure that other necessary investment takes place.

As regards financing, given the high indebtedness of most developed countries these days, and growing unwillingness among EU voters to finance other countries' debt, as witnessed in the "bail-in" of March 2013 in the GCC economy, it would be too easy to assume that resettlement and property compensation costs will be financed by foreign donors, especially given the sums involved. Even under a conservative scenario for the proportions of reinstatement, exchange/alternative property and compensation, according to preliminary research of a forthcoming PRIO report, the compensation bill could amount to €10bn. As noted in section 5, another €2bn could be needed for re-housing and resettlement. (The two numbers are related: the more property is reinstated, the higher the number of those who will need to be re-housed). Even if international donors were willing to raise such sums or even if financial markets were willing to lend such an amount, it would be wiser to seek solutions that provide incentives for private (domestic and foreign) investment to take an active role in taking on such projects. In such a way one can avoid burdening the state with further debt in the beginning of the post-solution period.

Resettlement presents its own challenges. A worst-case scenario would see the displaced moved to poor-quality housing estates with no local amenities. They could become unemployment ghettos with a variety of social problems which, because the island is small, would

²⁰ The International Monetary Fund (IMF) and the World Bank have considerable experience in these areas.

spill over to the rest of society and potentially damage inter-communal relations. That is more possible if resettlement takes place with a lack of strategic vision, and without listening to the needs of those who are to be resettled.

One way of addressing the costs of the property and territory settlement is via debt write-downs for both communities. If Turkey, the eurozone partners or Russia were willing to forgive some of the debt of a united Cyprus then this should make it easier to access international debt markets.

Private-sector solutions need to be fleshed out

However, government debt-financing for these two challenges is not the only option. Private sector solutions for tackling these issues have already been suggested. These include assessing options for maximising the currently depressed values of Greek Cypriot property in the north and the Turkish Cypriot property in the south. For example, Greek Cypriot properties currently attract a lower price than original Turkish Cypriot property with the same features. This is because the market recognises that there is an encumbrance on the title, or in layperson's terms, there is a risk of lawsuits from the Greek Cypriot dispossessed owner. In the south, the value of Turkish Cypriot property is depressed because of lack of liquidity (it is barely traded at all), and some Turkish Cypriot land lacks basic infrastructure such as water and electricity. Carefully planned development of this property could have considerable upside potential for an increase in price. How best to leverage the value of properties in ways that might raise funds for compensation needs to be fleshed out in more detail with experts in asset-backed financing and real estate development who have experience of these kinds of large-scale projects.

One suggestion for compensation is that, in cases where the "current user" gets to keep the property, he/she will be taxed over time on the increase in value that he/she enjoys as a result of obtaining an unencumbered title. This debt would be legally binding, would come with a state guarantee and could act as a lien on the property. As for the property in the south, assuming that there is not a mass desire by Turkish Cypriots to move back to the south, a not-for-profit real estate investment trust, with strict guidelines about phased, environmentally responsible development could develop these properties over time, which in turn could support the overall property settlement and help finance compensation.

In order to prevent an inflationary gush of liquidity into the economy that might come about if compensation were paid in lump-sums, there are also ways in which one might create incentives for those owners who are compensated to opt for money over time, or compensation in kind (such as education vouchers), rather than immediate cash. Finally, there are precedents from class action suits from abroad to give guidance on how to resolve the claims as quickly as possible. If a considerable portion of the property market is locked in legal disputes, this can only damage property values in the short term and the economy as a whole in the long term.

Given that both the property settlement and the management of territorial adjustment will involve property development, it makes sense to handle the financing and management of these issues together. These are issues for which it would be valuable to gain the input of

large private-sector real estate development companies, financial institutions such as banks and insurance companies, as well as institutions like the World Bank, that have managed large-scale relocation, development and stakeholder participation in other areas of the world. In today's world of highly indebted governments, finding private-sector solutions to this issue will be critical.

Preparing the TCC economy for competition and the EU acquis

Table 4 of this report indicates that the TCC economy has a substantial way to go to reach acceptable European levels of institutional infrastructure and macroeconomic balance. The public sector will need to adapt to EU standards; while it is challenging to think how the TCC economy will avoid a fiscal crisis if the financial support of Turkey is rapidly removed after a solution.

While we recognise the sensitivities surrounding how this issue is implemented, it is clear that technical assistance will be needed to integrate the TCC banking system smoothly into the eurozone European System of Central Banks, to support producers of foodstuffs such as dairy products and to prepare TCC businesses more generally for the onset of new competition and the adoption of EU norms. Both communities will need reassurances that these issues are being handled professionally and will not constitute a risk to the post-settlement economy.

10. CONCLUSION: THE PEACE DIVIDEND QUANTIFIED

In this paper we have made an attempt to forecast the economic benefits of a solution on the island of Cyprus. For this, two approaches have been employed. In the first phase, we took a macro approach, using growth accounting with an emphasis on the growth in total factor productivity (TFP). In the second phase, we developed a sectoral approach where GDP was forecast on a sector-by-sector basis. The results are informative in different ways. In growth accounting an appreciation of the long-term, recurring productivity benefits that might arise through peace can be appreciated, while the sectoral breakdown allows an analysis of the benefits to each sector of the economy. The first methodology is of greater interest to economists, while the second is of greater interest to business people.

The TFP-based approach produced an annual average growth rate over 20 years of 5.2% (7.5% TCC, 4.6% GCC) for a united Cyprus, compared with just 1.6% (2.5% TCC, 1.5% GCC) without a solution. The sector-based approach produced an annual average of 3.7% (6.6% TCC, 3.0% GCC). To produce a single series, we took the geometric mean of these two results.

With these estimates we were able to calculate the “peace dividend”: for the Greek Cypriots, the Turkish Cypriots, the economy of the whole island, as well as for each sector. We found that a solution to the Cyprus problem would increase GDP (at constant 2012 prices) by just over €2bn on average in the first five years after a solution, just under €5bn in the first ten years and €10bn in the first 20 years. GDP per capita, that is, the additional income to individuals due to peace, would rise annually on average by around €1,700 in the first five years, €3,700 in the first ten years and €7,000 in the first 20 years. This constitutes a significant permanent boost to the economic welfare of Cypriots. The lift to real GDP growth rates would be 4.0 percentage points on average in the first five years, 3.9 percentage points in the first ten years and 2.8 percentage points in the first 20 years.

As for the sectoral analysis, we estimate that in a united Cyprus, the tourism sector will reach over €2.9bn value-added in 20 years at constant prices. This implies additional income-creation of approximately €553m per year. We estimate that the construction sector in a no-solution scenario in both economies would grow to only €731m at constant prices. In a united Cyprus this sector will expand three times as much and reach €2.1bn, yielding an annual average peace dividend of €725m for the two communities.

After a solution, trading activity both at wholesale and retail level is expected to boom. Normalisation of the political and economic relations of a united Cyprus within the region will mean better economies of scale, where firms will be able to create value chains across communal

and geographical boundaries. We forecast that trading activities will more than double, reaching €5bn in constant prices in 20 years.

Another key sector that is expected to benefit from a solution is higher education. We estimate the total size of the sector to be €2bn in 10 years, and €2.3bn in 20 years, yielding an annual average peace dividend of €267m in constant prices.

By the year 2035, that is, 20 years after a solution, GDP at today's prices would be more than €18.9bn higher than it would be without a solution; that is, the united island economy would be more than twice the size of the two economies today. GDP per capita would be €10,865 higher for Greek Cypriots and €13,180 higher for Turkish Cypriots. These positive developments will also help eliminate the per capita income disparity between two communities with converging incomes. We forecast that TCC per capita income, taking the average of the two approaches employed, will be 90.9% of GCC incomes in 20 years, that is, not far from full convergence.

Our preliminary work suggests that the elasticity of employment growth to real GDP growth in the GCC economy is 0.6. That is, for every 1 percentage point increase in real GDP growth there is a 0.6 percentage point increase in employment. Further work needs to be done on this area. But we estimate that within ten years, the unemployment rate should drop to less than 5% from well over 10% without a solution. The €20bn boost to the overall economy will reduce high public debt and should offset a large proportion of any solution-related costs. Moreover, elimination of the disparity problem between the two communities will also have positive long-term political benefits, by supporting a well-functioning federation.

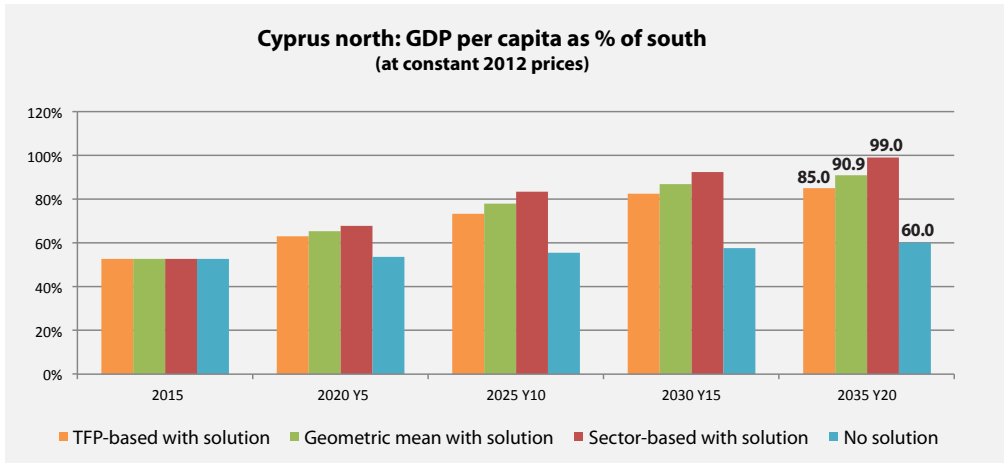
Table 16

Annual average peace dividend (boost)	EUR million at constant 2012 prices		
	5 Yr ave	10 Yr ave	20 Yr ave
Boost to GDP at constant prices			
All Cyprus	2,145	4,973	10,026
GCC	1,445	3,338	6,596
TCC	700	1,635	3,431
Boost to GDP per capita			
All Cyprus	1,690	3,753	6,975
GCC	1,540	3,417	6,260
TCC	2,115	4,694	8,943
Boost to real GDP growth			
All Cyprus	4.0%	3.9%	2.8%
GCC	3.2%	3.2%	2.3%
TCC	7.5%	6.9%	4.6%

Source: Authors' forecasts.

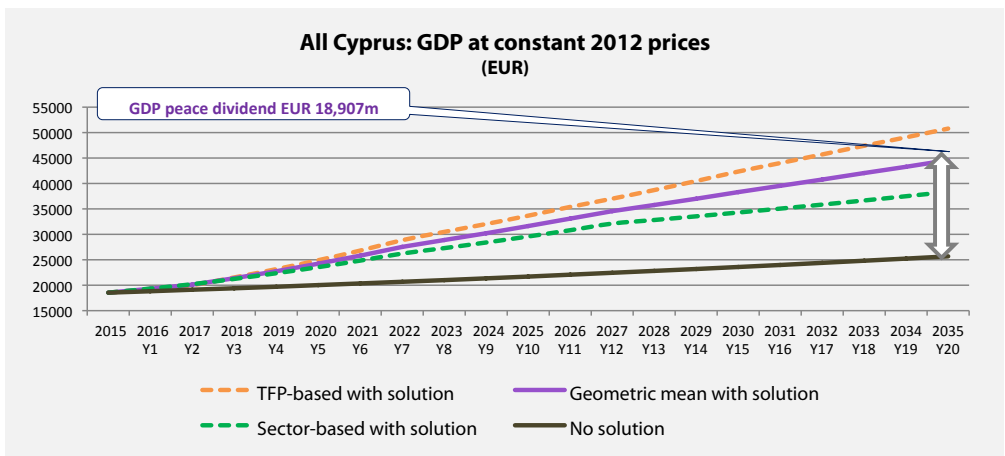
APPENDIX A: CHARTS

Chart 14



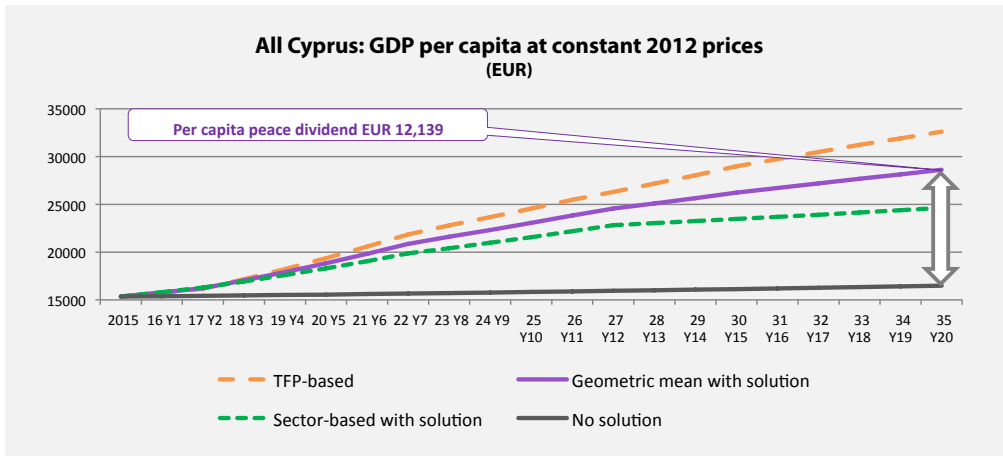
Source: Authors' forecasts.

Chart 15



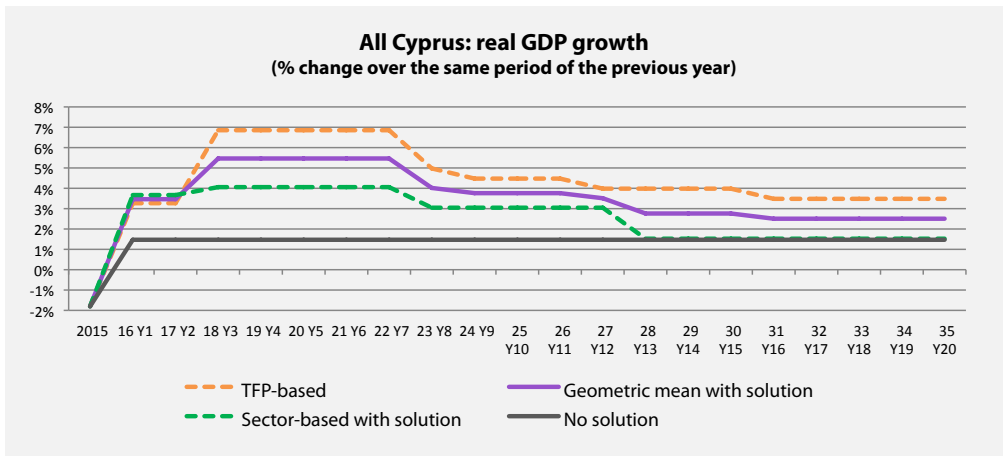
Source: Authors' forecasts.

Chart 16



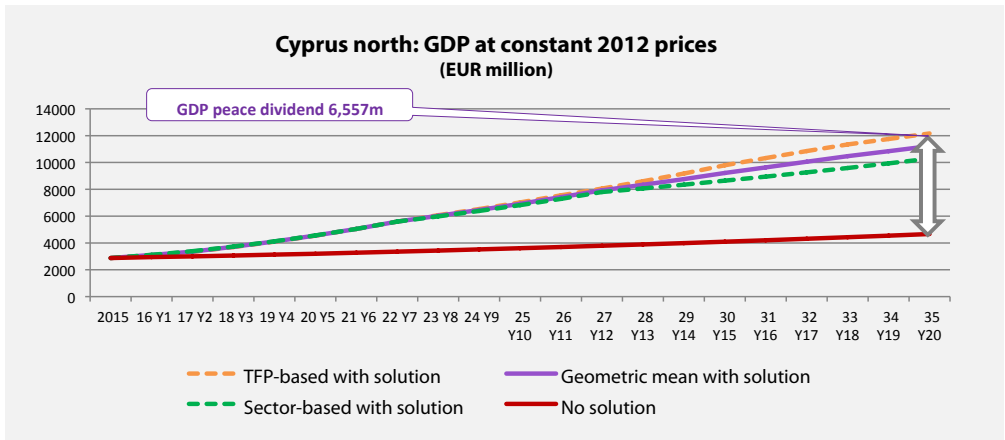
Source: Authors' forecasts.

Chart 17



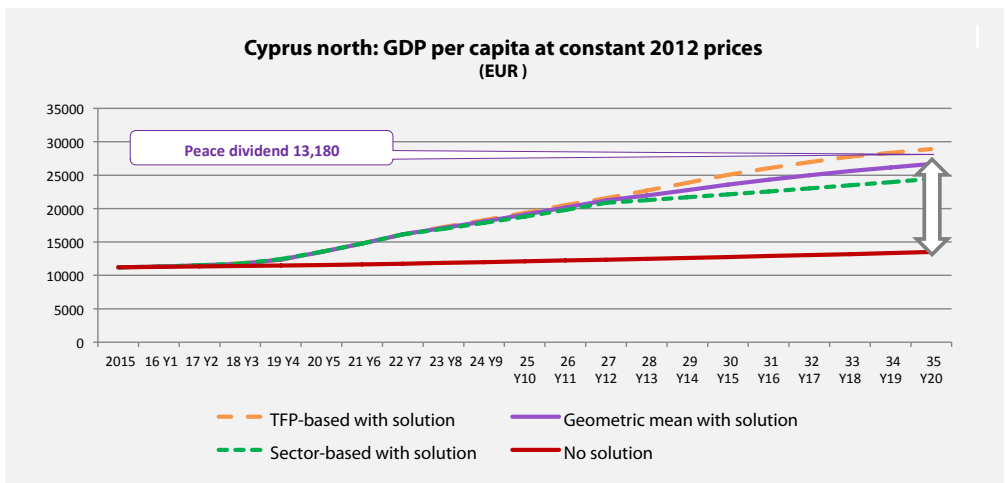
Source: Authors' forecasts.

Chart 18



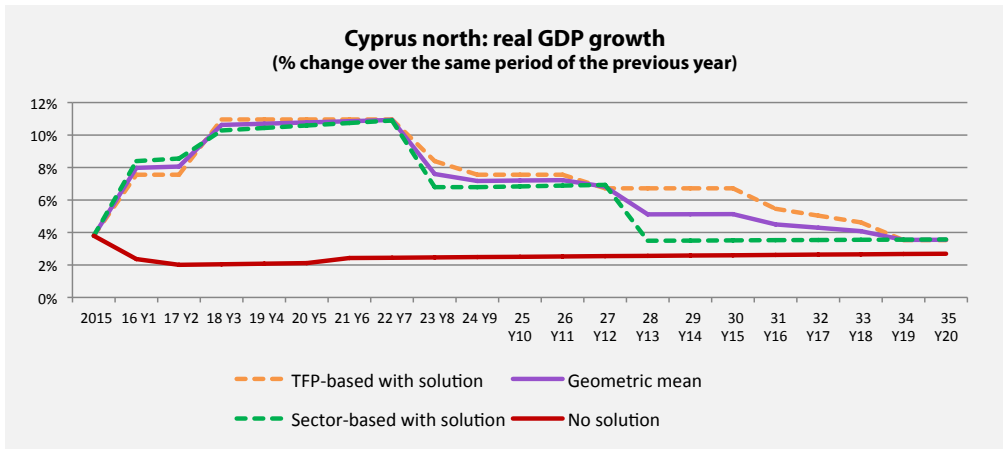
Source: Authors' forecasts.

Chart 19



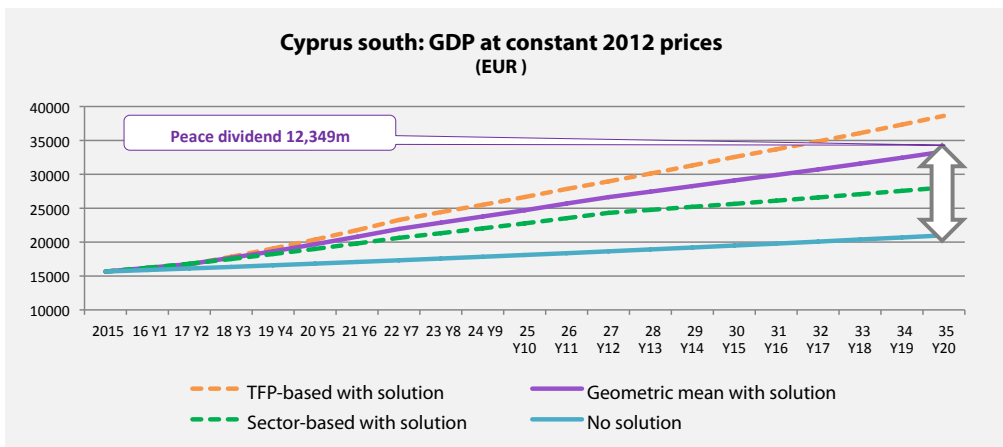
Source: Authors' forecasts.

Chart 20



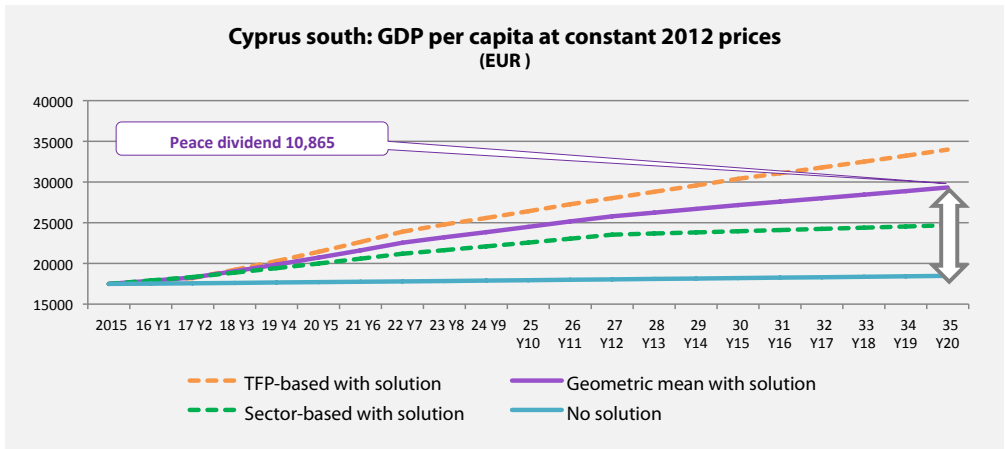
Source: Authors' forecasts.

Chart 21



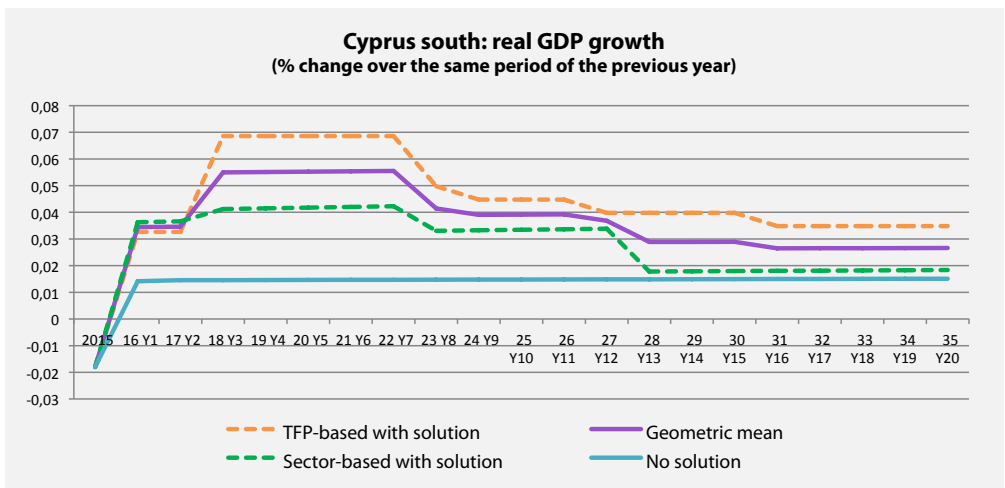
Source: Authors' forecasts.

Chart 22



Source: Authors' forecasts.

Chart 23



Source: Authors' forecasts.

APPENDIX B: METHODOLOGY FOR GAS-RELATED CALCULATIONS

Current volumes are too low for an LNG plant

The reason why an LNG plant cannot be financed today relates to how commercial decisions are made. One of the critical references for commercial decisions is what is termed the Net Present Value (NPV) of an investment. In layman's terms, NPV measures whether the likely revenue from an investment really adds value to a company after all the investment-related costs are taken into account. If the NPV of an investment is negative, then it does not add value in current conditions and the decision will be against investing at that time.

The key notion in NPV is the time value of money. To give a simplified example, if my cost of capital is 10%, the NPV of €110 received in a year's time is worth only €100 today. NPV is particularly important when, as in the case of offshore oil and gas exploitation, very large investments have to be made upfront before any revenues flow in. The longer the wait for revenue, the lower the NPV.

In order to estimate the NPV, we have made extensive calculations using industry sources to calculate the cost of exploration, production and construction as well as net cash flows. Using current prices for LNG in Europe and Asia (which may vary in the future), our findings for LNG sold to Asia were compatible with those cited by Mr Lakkotrypis in October 2013, namely a gross value after costs of \$30bn and a net value (to the government) of \$12bn to \$18bn (*Financial Mirror*, 2013).

Table 17

Value of natural gas as LNG		
	Europe LNG	Asia LNG
Natural gas in tcf	5	5
Natural gas in bcm	141.6	141.6
Natural gas in MMBTU	5,097	5,097
Europe spot prices in MMBTU \$ in Oct 2013	11.6	16.0
Value of natural gas in the ground \$ million	\$59,126	\$81,553
<i>in euros</i>	€45,481	€62,733
Domestic consumption at 1 bcm per year (source CERA), bcm	25	25
Gas available for export, bcm	116.6	116.6
Gas available for export in MMBTU	4,197	4,197
Value of natural gas after domestic consumption \$ million	\$48,686	\$67,153
<i>in euros</i>	€37,451	€51,656
Upstream exploration cost	\$600	\$600
Upstream production costs	\$2,850	\$2,850
Pipeline to Vassilikos (source: DEFA)	\$800	\$800
Value of natural gas after exploration, production, domestic consumption, \$ million	\$44,436	\$62,903
<i>in euros</i>	€34,181	€48,387
LNG plant construction cost (source: government)	\$6,000	\$6,000
LNG liquefaction cost per MMBTU	\$1.5	\$1.5
Subtotal LNG liquefaction cost	\$6,296	\$6,296
LNG transport cost per MMBTU	\$1.5	\$2.5
Subtotal total transport costs	\$6,296	\$10,493
Regasification cost per MMBTU	\$0.5	\$0.5
Subtotal regasification cost	\$2,099	\$2,099
Total LNG costs in in \$ million	\$26,140	\$30,337
<i>in euros</i>	€20,107	€23,336
Value minus costs in \$ million	\$24,940	\$29,137
<i>In euros</i>	€19,184	€22,413
Companies' take (assume 50%)	\$11,873	\$19,008
Value to government in \$ million	\$11,873	\$19,008
<i>in euros</i>	€9,133	€14,622

Source: Various industry sources.

However, once the costs and revenues are entered into an NPV calculation, it becomes clear that, at current volumes, there is not enough gas to make an investment in an LNG plant a viable concern today. According to our calculations, the threshold volume for reaching a positive NPV with LNG, at today's prices, is 7 tcf. If prices drop by 10%, which they may well do as additional gas volumes come on stream, the "positive NPV" threshold rises to 8 tcf. If they drop by 20%, the volume rises to 10 tcf. By contrast, even at today's estimated volume of 5 tcf, the Aphrodite field is above the threshold for investing in a pipeline to Turkey.

Table 18

Commercial viability thresholds for natural gas export options		
	NPV value	NPV pass/fail
Viability at 5 tcf		
CNG	€ 6,284	PASS
Pipeline to Turkey	€ 1,312	PASS
LNG to Asia	-€ 817	FAIL
LNG to Europe	-€ 1,548	FAIL
Pipeline to Greece	-€ 2,561	FAIL
Viability at 7 tcf		
CNG	€ 9,835	PASS
Pipeline to Turkey	€ 3,858	PASS
LNG to Asia	€ 479	PASS
LNG to Europe	-€ 627	FAIL
Pipeline to Greece	-€ 909	FAIL
Viability at 10 tcf		
CNG	€ 15,162	PASS
Pipeline to Turkey	€ 7,677	PASS
LNG to Asia	€ 2,423	PASS
LNG to Europe	€ 755	PASS
Pipeline to Greece	€ 1,568	PASS

Source: Sapienta Economics.

First LNG exports might not be until 2028

Construction of an LNG plant can only begin once a number of conditions have been met: there is enough volume to make it commercially viable to exploit the gas; there is a long-term buyer for the gas; financing has been secured; and a final investment decision (FID) has been signed.

As noted, the current volumes are not enough. Moreover, additional volumes in other parts of the Exclusive Economic Zone (EEZ) will not be verified for two or more years, because further drillings by Noble and the Eni-Kogas consortium are not due until late 2014 at the earliest, while initial drilling by Total is not due until 2015. Exploratory wells have to be verified by appraisal wells and there is a general shortage of deepwater gas rigs. Therefore it will be at least the end of 2015 or 2016 before any additional gas finds can be verified.

If one adds another year or two to find the financing and sign the FID, it becomes clear why construction might not begin before 2018 or 2019. An LNG plant typically takes ten years to build (there has been only one case in which an LNG plant has been built in six years),²¹ not least because some of the extremely large parts have a very long build time. For this reason, 2028 is a more realistic timetable for an LNG plant. This may well be one of the reasons why the troika of international lenders did not, in the end, build gas revenues into Republic of Cyprus revenue projections, although a strongly worded warning by Turkey about using gas as collateral for borrowing probably also played a part (Turkey Ministry of Foreign Affairs, 2013).

A pipeline would create investment, while CNG would bring in faster government revenue

It should be noted that there is another way of selling gas to Turkey, namely via compressed natural gas (CNG) shipments. Since pipeline gas is compressed, CNG can be fed into a pipeline network, either continuously via more than one ship, or intermittently. Marine CNG is a new technology but the Coselle ship technology developed by Sea NG has been tested and approved for construction by the American Bureau of Shipping (ABS) and the ship design has also been approved for construction.²²

High transport costs mean that this technology is only appropriate for short distances. Nevertheless, our calculations show that it is viable at much lower volumes than LNG (or even a pipeline). CNG would not create demand for investment within Cyprus, but according to our calculations would create revenue for the government much faster than either LNG or a pipeline. The peace dividend from CNG would therefore be on the revenue side.

²¹ Information from Pete Wallace, Engineering Business Unit Manager at Chiyoda Al Mana, Qatar.

²² Personal correspondence with Adam Hedayat, Vice-President for the Mediterranean, Middle East and Africa for Sea NG Corporation.

APPENDIX C: METHODOLOGY FOR TFP-BASED FORECASTS

In order to measure the total factor productivity of the GCC and TCC economies we break down the GDP growth of the two communities using the following formula:

$$\dot{y}_N = \dot{A}_N + \alpha_N \dot{k}_N + (1 - \alpha_N) \dot{h}_N$$

Where:

\dot{y}_N = Growth in GDP *per worker per time period*_N

\dot{A}_N = Growth in Total Factor Productivity (TFP) for time period_N
this is also known as the *Solow Residual*

α_N = The elasticity of capital with respect to an increase of GDP per worker for time period_N, which we assume to be constant²³

\dot{k}_N = The growth of physical capital per worker for time period_N

\dot{h}_N = The growth of human capital per worker or growth in labour quality for time period_N.
This is linked with the rising education of workers

With these data inputs we can see the macroeconomic reasons for economic growth in the GCC and TCC economies. Since consistent reporting of the input data begins only in 2004, we chose the period 2005-2012 to evaluate what explains the growth rate of GDP of the two communities. In this estimate we use empirical data for the economies in terms of output, labour, investment and education to estimate the growth of TFP as a residual (that is, that which accounts for all other GDP per worker growth).

The results are as follows.

²³ The elasticity for advanced nations for the period ranges from 0.38 to 0.35, while the elasticity in developing nations, where the scarcity of capital is much greater, ranges from 0.45 to 0.66. In our case we have chosen 0.4 as the historically accurate elasticity for Cyprus .

Table 19

Growth Accounting for the period 2005-2012: Estimating TFP				
		2005-2012		2005-2012
		TCC economy		GCC economy
Average output growth per worker	\dot{y}_N	2.192%	\dot{y}_N	0.98%
Average physical capital growth per worker	\dot{k}_N	5.835%	\dot{k}_N	0.92%
Share of physical capital	α_N	40%	α_N	40%
Quality of labour	\dot{h}_N	1%	\dot{h}_N	1%
Total factor productivity	\dot{A}_N	-0.742%	\dot{A}_N	0.008%

Use of growth accounting to estimate a peace dividend

In order to estimate the benefits for peace we used the equation that enabled us to break down the GDP per worker in both communities.

$$\dot{y}_N = \dot{A}_N + \alpha_N \dot{k}_N + (1 - \alpha_N) \dot{h}_N$$

In the above equation, for the period 2005-2012 we knew all the variables except TFP [\dot{A}_N], the variable that we sought to discover. We found the TFP by subtracting all other variables from GDP growth per worker [\dot{y}_N]. Thus TFP is a residual; it was found as the unknown by removing all other explanatory variables of GDP growth per worker.

Yet in a solution of the Cyprus problem we know that capital per worker [\dot{k}_N] will increase, and we know that TFP will increase [\dot{A}_N]. What we do not know is the GDP growth per worker [\dot{y}_N]. Thus, if we can estimate the growth of capital per worker [\dot{y}_N] and TFP increase [\dot{A}_N] then we can calculate the estimated growth of GDP per worker at each stage of the solution. The above methodology presented substantial challenges. We had to estimate plausible and defensible growth rates of capital per worker [\dot{k}_N] and TFP increase [\dot{A}_N]. We assumed that even at the peak investment time (Stage 2) of a solution, the growth of capital per worker [\dot{k}_N] would not be higher than previous historical peaks. Since a solution will provide unparalleled opportunities for investment, this assumption is very conservative. This assumption is conservative on purpose: by biasing the result against what we expect to find (a very large increase in GDP per worker) we can ensure that our assumptions remain plausible.²⁴

²⁴ Any forward planning requires using as a basis assumptions and historic data to explain a very different state of affairs; by attempting to bias the result against high growth we impose an internal check to ensure that the leap of faith remains generally acceptable.

The increases in TFP were also very conservative. We based our assumptions on the scenarios of Korea (Noland, Robinson, & Liu, 1998) and were very careful to be comparatively similar to (and below) those of developed nations.

Other reasons to be conservative about the increase in TFP are: the unknown effects of federal government structures, Turkey's possible withdrawal of capital investment in the TCC economy, and a comparatively low labour-force participation in the TCC economy.

Each stage of the solution (Stages 1, 2 and 3) was provided with assumptions to fit the way we have considered that a solution of Cyprus would work in practice.

Economic growth under peace: Stage 1 (Y1 and Y2)

Table 20 indicates the assumptions made in terms of capital per worker and TFP, and the resulting effect on the growth of GDP per capita of the two communities. The growth rate per worker that we calculated based on these assumptions is in italics.

Table 20

Solution Stage 1 (Y1 and Y2) effects	Stage 1			
		TCC economy		GCC economy
Average output growth per worker	\dot{y}_N	4.42%	\dot{y}_N	1.91%
<i>Average physical capital growth per worker</i>	\dot{k}_N	8.9%	\dot{k}_N	2%
Share of physical capital	α_N	40%	α_N	40%
Quality of labour	\dot{h}_N	1%	\dot{h}_N	1%
<i>Total factor productivity</i>	\dot{A}_N	0.26%	\dot{A}_N	0.51%

We have estimated that the increase in the average physical capital growth per worker will be gradual.²⁵ For the TCC economy we took the halfway point between the existing creation of new capital per worker found in 2005-12 and the peak capital per worker creation in the past. For the GCC economy, which is currently plagued by deleveraging, we considered that a halfway point between the existing and the historical peak was implausible.

Substantial changes were imposed on the Total Factor Productivity. Using the existing estimated TFP of the two communities as a base, we added a 1 percentage point increase in TFP for the TCC and a 0.5 percentage point increase for the GCC. The addition in TFP for the TCC is higher than the GCC due to the fact the TCC community is less developed (and thus has a

²⁵ Here it is worth recalling why TCC growth rates seem much higher than GCC growth. As the TCC economy is less developed, a similar amount of net capital creation (say €1m) creates a far bigger percentage increase in the capital per worker employed than the more capital-intense GCC economy.

greater window to promote TFP through the adoption of new technology and the spread of existing technology), but also because of the immediate benefits of being part of a state that is fully recognised by the international community as well as those benefits deriving from the requirements of harmonisation with the EU *acquis communautaire* (body of laws and regulations), which will provide a greater productivity boost.

Economic Growth under Peace: Stage 2 (Y3 to Y7)

Table 21 shows the assumptions and the corresponding GDP growth per worker for the second phase of a solution.

Table 21

Solution Stage 2 (Y3, Y4, Y5, Y6, Y7) effects	Stage 2			
		TCC economy		GCC economy
Average output growth per worker	\dot{y}_N	6.41%	\dot{y}_N	4.01%
Average physical capital growth per worker	\dot{k}_N	12%	\dot{k}_N	6%
Share of physical capital	α_N	40%	α_N	40%
Quality of labour	\dot{h}_N	1%	\dot{h}_N	1%
Total factor productivity	\dot{A}_N	1.008%	\dot{A}_N	1.008%

Economic growth under peace: Stage 3 (Y8+)

Table 22 indicates the assumptions and growth under the third and final stage of a solution.

Table 22

Solution Stage 3 (Y8+) effects	Stage 3			
		TCC economy		GCC economy
Average output growth per worker	\dot{y}_N	4.91%	\dot{y}_N	2.91%
Average physical capital growth per worker	\dot{k}_N	7%	\dot{k}_N	2%
Share of physical capital	α_N	40%	α_N	40%
Quality of labour	\dot{h}_N	1%	\dot{h}_N	1%
Total factor productivity	\dot{A}_N	1.51%	\dot{A}_N	1.51%

In Stage 3 the full potential of a united Cyprus will be unleashed. Eight years after a solution, the solution-related investment will start to taper-off from its peak. Yet the ability of a united Cyprus to transform itself into a hub of energy, shipping, education and business services will be fully realised in this final stage.

The permanent additions of TFP might look high by Cypriot standards, but they are still modest in comparison with existing productivity growth in advanced economies. TFP additions of this size are still lower than those recorded by countries that have achieved the full transition from a developing to an advanced nation, namely Japan, Singapore and Korea, which have a TFP of over 2% per annum.

Translation of GDP per worker to GDP

The above results indicate the increase in output per worker in Cyprus. However output per worker is a denomination of income growth that is often used when one wants to measure productivity. We thus needed to convert this into GDP growth rates—the more common indicators to compare economic performance.

Here we faced another challenge. In order to achieve this, we needed both the growth of population and the activity rate (how many of the adult population are seeking work) of the said population over time. Yet the high growth would itself create incentives for people who were previously inactive to enter the job market. We therefore chose to use the ratio of real GDP growth to GDP per worker growth to produce an estimate for the real GDP growth rates. In both communities the ratio of real GDP growth to GDP per worker growth was 1.71, which we applied to the forecasts for both communities.

This rapid growth in advantages will start winding down; we thus taper the growth rate in the last stage from that indicated by the Stage 3 results. However it is important to note that the unified economies, and the communities within it, are in a permanently higher trajectory of growth than they would be if they had not reached a settlement of the long-running Cyprus problem.

Table 23

With-solution real GDP growth rates under the TFP approach				% change
	Stage 1 Y1-Y2	Stage 2 Y3-Y7	Stage 3 Y8-Y20	Year 20 Y20
All Cyprus	3.9%	7.6%	4.4%	3.5%
GCC	3.3%	6.9%	4.0%	3.5%
TCC	7.6%	11.0%	6.2%	3.5%
<i>Source: Authors' forecasts.</i>				

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The Cyprus Peace Dividend Revisited is a new effort to quantify the value of a solution of the Cyprus problem: to the economy as a whole, to different sectors and to individuals. In so doing, it also updates the qualitative analysis and advances earlier efforts, by exploring new approaches and linking these to the existing economic literature on the topic.

In the *Day After* series, published between 2008 and 2010, Mullen, Antoniadou-Kyriacou and Oğuz-Çilsal made the first substantive attempt to quantify the commercial opportunities of a Cyprus settlement. The award-winning three-part series included the recurring (permanent) benefits, the combined recurring and solution-related benefits, and the benefits that would accrue to Turkey and Greece.

Much has happened to the economic environment since then, while subsequent natural gas finds offshore have also changed long-term prospects. Both parts of the island were significantly underperforming even before the recent economic crisis. In the period 2005-12, growth in total factor productivity (TFP)—a measure of the long-term prospects for growth—was negative in the north and barely positive in the south. This has created risky imbalances such as high current-account deficits and rising debt. Moreover, low TFP growth points to a continued future of very weak overall economic growth and high unemployment.

The dynamic impact of peace is considered in two ways: through a “top-down” approach known as Growth Accounting and through a bottom-up, sector-by-sector approach. In order to arrive at the “peace dividend”—the difference between economic activity with a solution and without a solution to the Cyprus issue—the authors take the geometric mean of these two effectively independent approaches.

The Report concludes that the accumulated peace dividend over 20 years would be approximately €20bn, with all-island GDP (at constant 2012 prices) rising from just over €20bn in 2012, to just under €45bn by 2035 (Year 20), compared with only €25bn without a solution. Annual average incomes at constant prices would be €12,000 higher by Year 20 with a solution than without one. The annual average growth rate would be 4.5% on average over 20 years, compared with just 1.6% without a solution, with the peak growth rates coming in the first ten years. The lift to real GDP growth rates would therefore be 2.8 percentage points on average each year.

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