The upswing of Nairu in Cyprus as a post crisis residual

October, 2018

Abstract

This economic policy paper[1] proposes a distinct method to measure the level of Nairu[2] following Punnoose Jacob et al[3], 2018. In Cyprus, the upswing of Nairu level seems to be a side effect of the financial crisis that hit Cyprus during 2012-2014. Furthermore, the different types of unemployment can be analyzed depending on unemployment by duration. This can help estimate the Nairu by focusing on the duration of unemployment adjusted for frictional, cyclical-seasonal and structural unemployment.

It is important to know that the Nairu ensures that in a given time, inflation would not be higher than the price level needed to keep steady inflationary expectations and thus retain macroeconomic stability.

The analysis contrasts two different periods; amid the financial crisis period 2012-2014 and the post crisis period 2015-2017. The Nairu and the Natural rate of unemployment (Nru) estimations are based on data from the Labour Force Survey (LFS) and the registered unemployed database.

Moreover, the increase of the Nairu can be also approached by estimating the loss in total Gross Value Added (GVA) in the reference period by focusing upon the labour intensive sectors exhibiting how productive labour varied as a result of the effects of the financial crisis.

The results of the essay show that as the Cyprus economy is gradually returning to its pre-crisis levels, the Nairu is pursuing a downward path towards a steady state long run equilibrium.

Keywords: E24, J21, J23, J64

[1] The views expressed herein are those of the author and do not necessarily reflect the views of the Ministry of Finance or the Government of the Republic of Cyprus.

[2] The non-accelerating inflation rate of unemployment (nairu) - also referred to as the long-run Phillips curve - is the specific level of unemployment that is evident in an economy that does not cause inflation to rise up.

[3] Punnoose Jacob and Martin Wong "Estimating the NAIRU and the Natural Rate of unemployment in New Zealand", Reserve Bank of New Zealand, 2018.

Contents

1. INTRODUCTION

The Cyprus economy is envisaged to achieve a steady state equilibrium by 2020-21 and thus, it is forecast to safeguard long run sustainability. At that period, the inflation rate is assumed to fluctuate at its core level of 2% and the Nairu shall be replicating the long run aggregate supply[4]. The above is complemented by high primary surpluses and a steady decline of public debt to GDP.

Nevertheless, following the financial crisis that the Cyprus economy experienced, the Nairu unavoidably exhibited a steady surge after the actual upswing in the unemployment rate. Henceforth, the equilibrium level between the goods and services market with the labor market was disturbed. This trend seems to have been reversed as a consequence of the declining trend that the actual unemployment rate has been exhibiting.

The gradual upsurge of the Nairu was associated with the financial crisis and its economic repercussions. It can also be regarded as a direct outward and downward shift of the Short run Philips Curve (SPC). The SPC is expected to converge with the Nru and the Nairu in the long run. This process distorts the rational formulation of fiscal and fiscal-structural policies and thereby, it puts the macroeconomic stability under strain.

The Nru reflects the equilibrium unemployment, which stipulates that labour supply is equal to labour demand. The Nru apart from reflecting the equilibrium unemployment it can also be viewed as the long run unemployment rate.

It should be illustrated that the estimation of the Nairu is not an easy task to undertake as it is influenced by structural factors and thus, it makes the formulation of macroeconomic policy more uncertain and challenging. However, even a rough estimation of the Nairu is considered as a useful exercise for a more robust macroeconomic policy design and a more accurate the fiscal structural position.

Section 2 is concerned, inter alia, with the estimation of the GVA change due to the fluctuation of the unemployment rate in the crisis and post crisis periods. The technical reasoning behind it is presented in Appendix 1. Furthermore, Section 2 presents some graphical correlations of the actual unemployment rate. The abovementioned correlations justify the Nairu post crisis upward shift.

Section 3 considers the observation that after the end of the financial crisis the Cyprus' economy is faced with an additional challenge, which is related to the fact that the post crisis Nairu is substantially

[4] The Nairu was first introduced in 1975 as the non-accelerated inflationary rate of unemployment (Niru) named as the long run Philips curve.

higher compared to the pre-crisis period. Some economic and institutional policy measures are anticipated as a means to restrict it.

Section 4 focuses more on the Nairu's upswing as a post crisis adverse effect for which some specific policy measures are proposed. Appendix 2 presents datasets used for Sections 2, 3, and 4.

The paper concludes with suggesting some final policy recommendations.

2. ESTIMATION OF TOTAL GVA CHANGE DUE TO POST CRISIS EFFECTS

The cumulative GVA loss (in constant prices) in major labour intensive sectors during 2012-2014 is estimated at €1.1 bn whereas during 2015-2017 it has regained about €0.7 billion. Using National Accounts[5] one could estimate how the reduction in major labour intensive sectors led the economic activity to a signifiant downswing.

Comparing 2012-2014 and 2015-2017, it is found that the average quarterly seasonally adjusted employment in persons has nearly returned to its pre-crisis level, in the wholesale and retail trade sectors, whereas in the construction and manufacturing sectors continue to be somewhat higher than their pre-crisis levels. (Appendix 1).

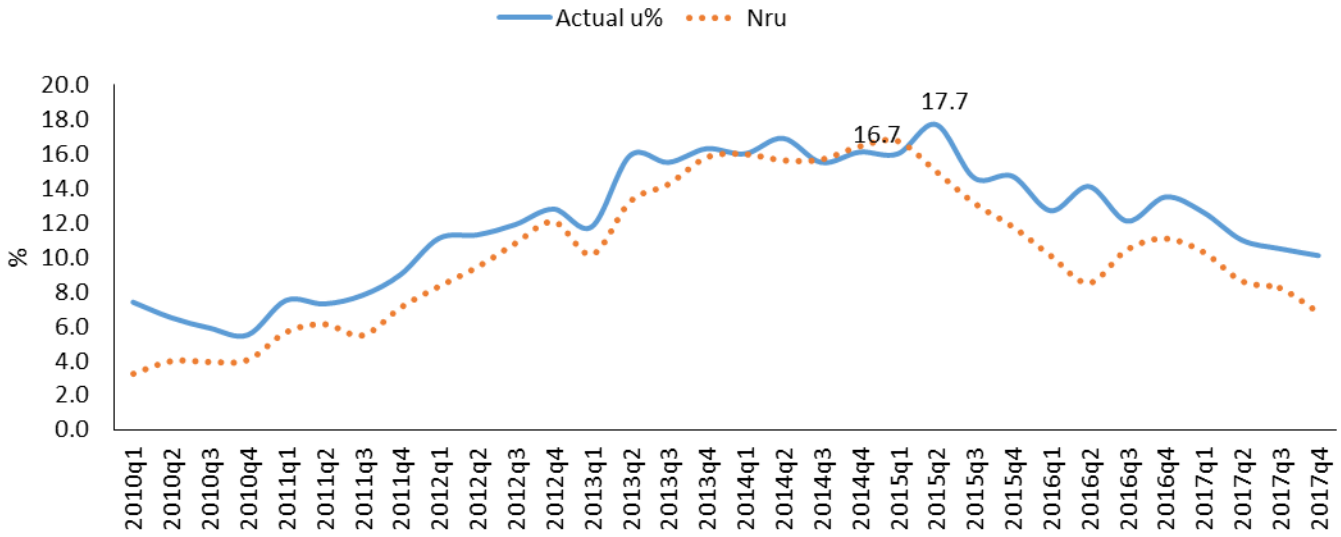
The average unemployment rate in Cyprus, during the pre-crisis era was low[6], notwithstanding the post crisis level was substantially higher. This implies that a share of the gainfully employed population entered the unemployment pool. As a result**, the Nru before the crisis is estimated on average at around 5%, whereas the post crisis rate is estimated higher at about 10.9%. These results are depicted below in figure 1.** As shown, during 2010-2011, the Nru[7] was maintained at around 5% while the average actual unemployment rate was higher at around 11%.

[5] http://www.mof.gov.cy/mof/cystat/statistics.nsf/index_en/index_en

[6] The average pre-crisis quarterly unemployment rate in Cyprus is estimated at 7.1%.

[7] The Natural rate of unemployment (Nru) is estimated quarterly by the formula: labour force minus total seasonally adjusted employment in persons divided by the labour force.

Figure 1: Actual unemployment & natural rate of unemployment

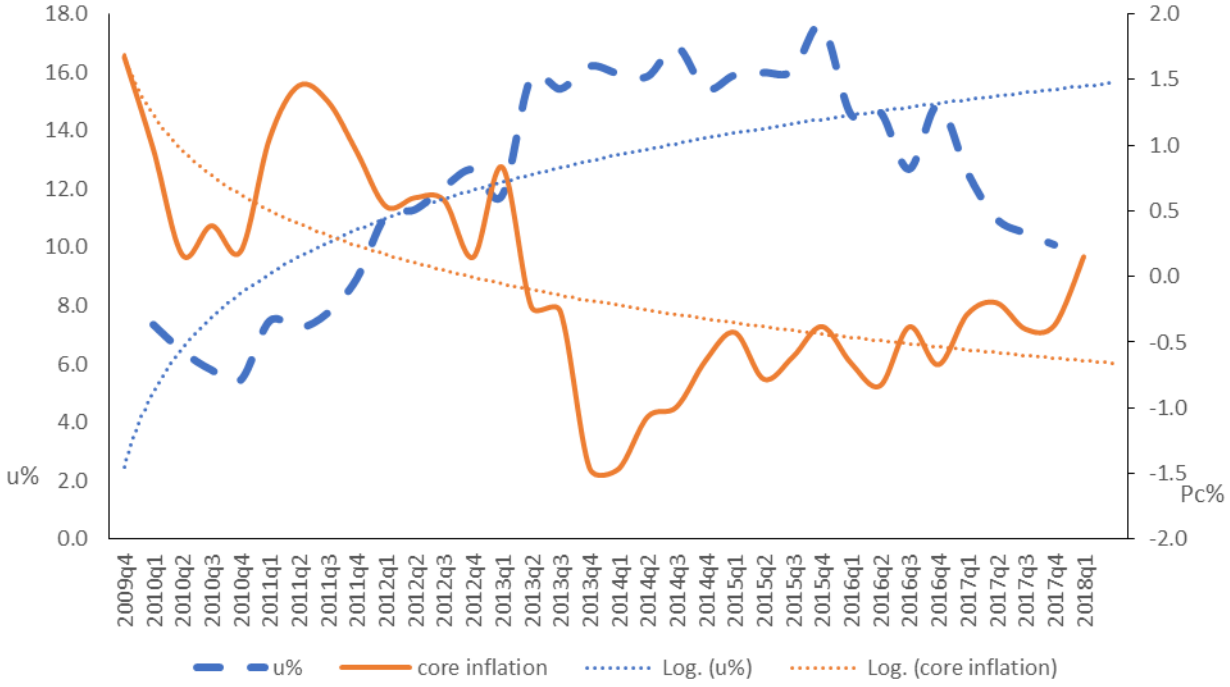


During the financial crisis periods the quarterly actual unemployment rate denoted an abrupt upswing reaching 17.7% in the 2nd quarter of 2015. On the other hand, the Nru reached its peak one quarter earlier.

As shown in Figure 1 below, the actual post crisis jobless rate began falling steadily after the 2nd quarter of 2015 and only after the Nru reached its peak at the last quarter of 2014, it is reasonable enough to note that the actual unemployment rate began falling even more. The correlation coefficient between the actual unemployment rates with the Nru is estimated to 0.92 exhibiting significant correlation between the two variables[8].

[8] All curves depicted have been smoothed.

Figure 2: Short run philips curve



The increase of the Nru was also associated with deflation that realized between 2012-2014. The deflation rate during the crisis years validates the short run philips curve (spc) since the reduction in wages-inflation is accompanied with a large increase of the unemployment rate and reveals the inverse relationship between the two.

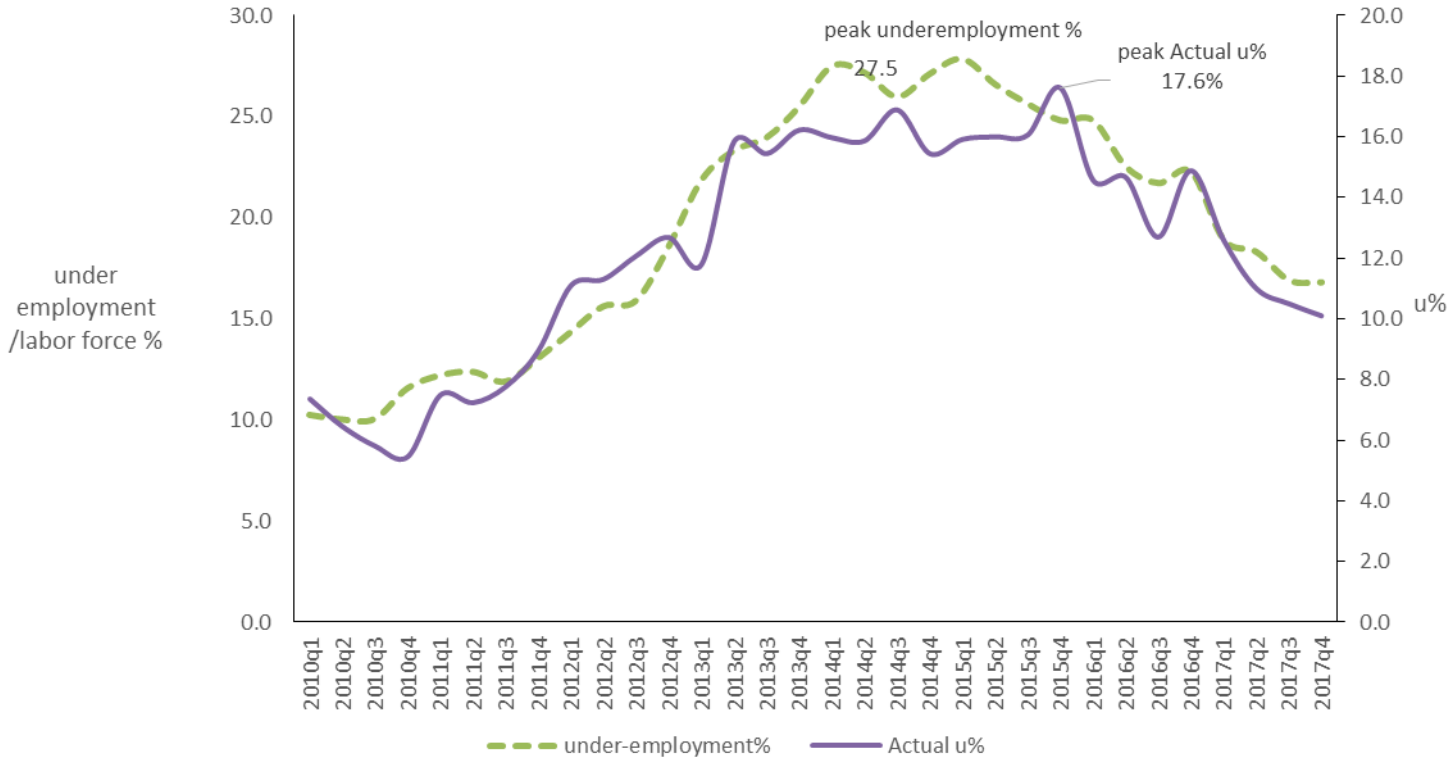
Another fact that enhances the validity of the spc is that the average nominal earnings in seasonally adjusted terms, quarter on quarter, between 2012Q2-2017Q3 was reduced cumulatively by 6.1%. Figure 2 depicts the inverse relationship between the core[9] inflation price index with the actual unemployment rate for the period 2009Q4-2018Q1.

[9] Core inflation index excludes energy and seasonal product prices.

Nevertheless, this inverse relationship is not valid in the long run when the unemployment rate becomes fully inflexible with respect to inflation. In theory, the long-run Phillips curve is a vertical line, which illustrates that there is no permanent trade-off between the two in the long run[10].

Another interesting finding is depicted in Figure 3, exhibiting the relationship between the actual unemployment rate with the underemployment rate. In the pre-crisis years, the underemployment[11] rate was sustained below 10%. Though, after the actual unemployment rate was increasing, the underemployment rate was moving higher too. It is clear enough that amid the financial crisis many unemployed were anticipating wage rate low due to lower actual money wages. **Thus, they were ready to work more hours in jobs not matching their skills. This is one of the reasons why structural unemployment increased at a great extent during the crisis years pushing in turn the Nairu upwards.**

Figure 3: Underemployment & unemployment rates



The above validation is depicted in Figure 3, when actual unemployment began falling streadily at the end of 2015, because some persons moved from the temporary underemployment pool into the

[10] Principles of Economics by N. Gregory Mankiw – South-Western Cengage Learning – December 2010, The History of the Phillips Curve: Consensus and Bifurcation by Robert J. Gordon – Northwestern University, NBER, and CEPR – March 7, 2009.

[11] Source: LFS, 2017.

permanent employment pool after finding more permanent jobs. It is interesting that in Figure 3 both, the actual unemployment and underemployment[12] curves are highly correlated. The steady decrease of underemployment occured after it reached its peak in 2015q1, whereas the actual unemployment rate reached its peak later. During the reference period (2010Q1-2017Q4) the relevant correlation coefficient of the two was estimated to 0.95 showing the significant correlation between the two variables.

3. UPSWING OF THE NAIRU

It is essential to investigate the economic impact of the Nairu upsurge to the Cyprus economy. The rise of the Nairu represents underutilized labour caused by the increase of structural and frictional unemployment reflecting primarily the failure of the mismatch mechanism between vacancies with unemployed who are capable and available for work. The increase of the Nairu is related with the rise of specific types of unemployment replicating the long term and youth unemployment.

These types of unemployment need costly, tailor made and long term targeted remedies to decline. Moreover, brain drain and loss of skills of labour are side effects that need time to repair and put the labour market back to near full employment conditions.

According to the forecasts of the Ministry of Finance included in the Stability Program[13] 2018-2020 the post crisis Nairu is projected at 6.5%, which is explicitly higher than the pre-crisis rate. The rise of the Nairu is analogous with the increase of structural and frictional unemployment rates. The measurement of the Nairu can be achieved by concentrating on different scopes of the actual unemployment and distinguish a relevant amount of persons falling in structural unemployment based exclusively on duration.

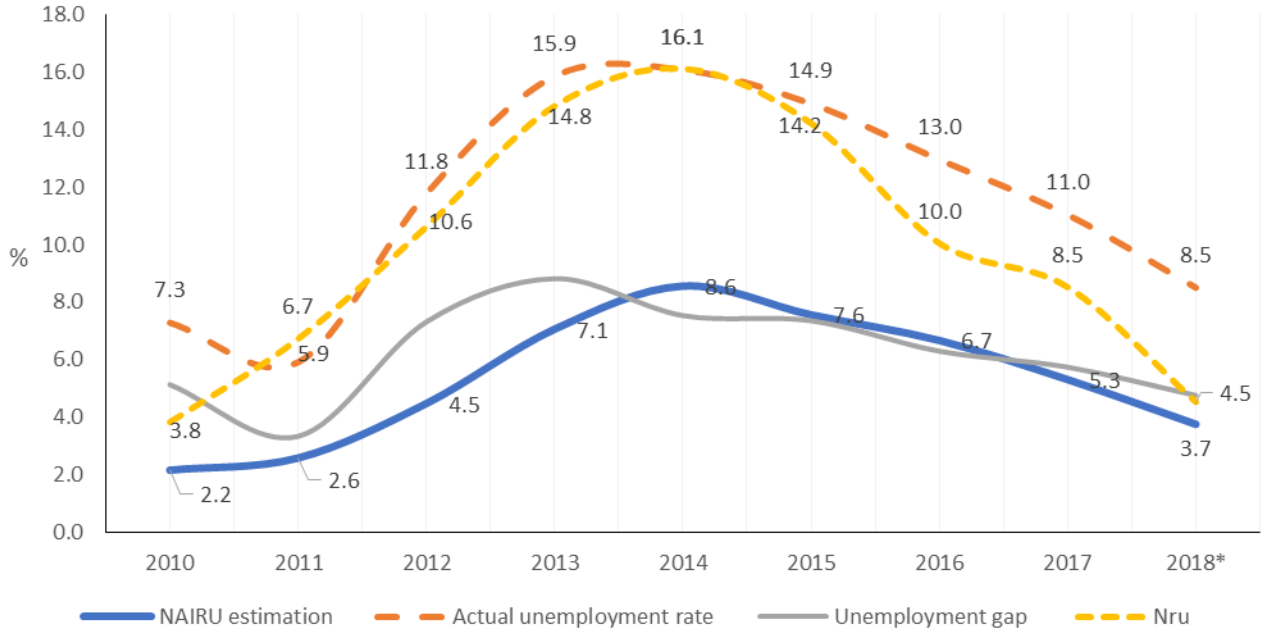
[12] The underemployment rate is estimated by the number of underemployed divided by the labour force. Underemployed are all those persons who would prefer to work more hours.

[13] Cyprus Ministry of Finance, Stability Program, 2018-2020.

In Chart 4, the Nairu is depicted[14] for 2010-2017 in actual terms and 2018 in forecasting terms. It is obvious that after 2014 Nairu's peak, it is pursuing a declining trend and in 2018 it is forecast to fluctuate around 3.7% of the labour force. In the same graph, the Nairu is contrasted with the actual unemployment rate to derive the unemployment gap while the natural rate of unemployment is depicted for the same time limit.

For 2018, it is projected that gradually the actual unemployment rate is forecast to converge with the Nairu and the Nru when the unemployment gap[15] would become zero. This development signals a better utilization of labour, necessary to raise the potential output in the long run.

Figure 4: Actual u%, Nru, Nairu & u gap



*2018 projected

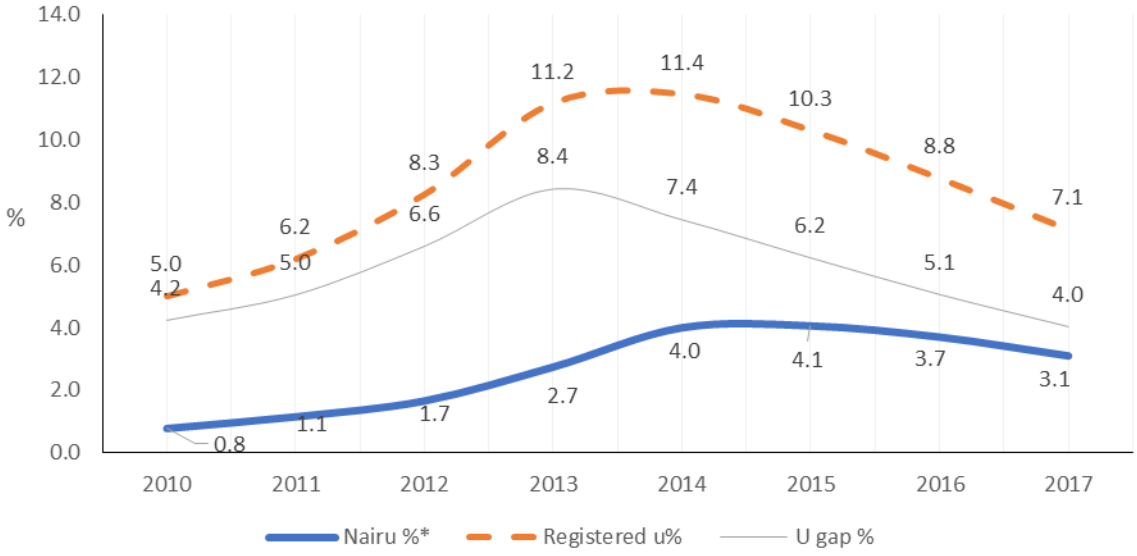
In Figure 5 underneath, the estimation of Nairu is shown on the basis of the registered unemployed database. The results exhibit a significantly lower Nairu due to a different context of data[16]. Another way to reduce the Nairu needs specific, time consuming and tailored made policy measures if the government actively intervenes to modify institutional factors that influence the labour market.

[14] The estimation of the Nairu is based upon LFS data. The assumptions for estimating Nairu concerns that frictional unemployment is related to those being unemployed up to 4 weeks and structural unemployment is related to those being unemployed for more than 52 weeks. The rest of the unemployment pool equals cyclical and seasonal unemployment.

[15] The unemployment gap exhibits the difference between the actual unemployment rates with the Nairu.

[16] Data used on employment and unemployment is from Social Security Services.

Figure 5: Registered u%-Nairu %



Some of these instiiutonal adjustments could be among others, the following:

- the government to reinforce **part time and temporary work** and provide employment-friendly incentives for temporary contracts to employers in case they employ more workers under these provisions.
    - Additionally, for younger ages and for those with larger duration, especially for tertiary education graduates, for whom the opportunity cost of unemployment is certainly higher. This measure can be temporary and should have certain provisions for employers in case they employ a definite number of employees.
- one of the most common methods to restrain Nairu thereby reducing the unemployment rate is to ensure **greater flexibility** in the labour market so as to provide employers with adequate space to decide rationally for their next business plans and without having any obstacles to

decide for the size of their staff and thereby, labour cost. There are still some areas where labour market fragmentation still exists. For instance partial wages indexation[17] and some other related to the minimum wage on specific low wage occupations that can be considered as market barriers to a more flexible labour force.

- moreover, it is worthwhile noting that Cyprus has no national **minimum wage**. However, it maintains minimum wage to certain low pay jobs. The minimum monthly wage upon recruitment was revised in April 2012 to €870, while the minimum[18] monthly wage for employees, who have completed a six month period of employment at the same employer, was revised to €924. **Moreover, it is clear that any policy to raise the level of minimum wage in the aforementioned occupations would enhance the labour market distortions and exercise higher pressure of the mismatch process, since employers would be less reluctant to employ minimum wage recipients for jobs where the wage rate is lower leading to a higher jobless rate.**

- **COLA remains a rigid prices and wages mechanism** that eventually pushes nominal wages upwards leading to a higher labour cost.

- despite the underemployment rate is currently declining as shown in Figure 3, it stipulates that some employees have much lower job satisfaction, especially if the high structural unemployment rate is taken into consideration, as a result of the significant jobs mismatch between the unemployed with available jobs. This process signals a **failure of the job searching and matching[19] process and needs measures to repair it**.

- **skills mismatch**[20] has been linked to incomplete and asymmetric information, transaction costs and unresponsive education and training systems. Efficient job placement services and training opportunities beyond initial schooling should therefore be priorities for policymakers, and more so if job openings are scarce. The same is true for social dialogue to strengthen linkages between education and training systems.

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[17] The implementation of the Macroeconomic Adjustment Program, which was agreed with the European Commission, the ECB and the IMF during 2013q2-2016q2, modified the Cost of Living Allowance (COLA) mechanism so as to be payable once a year capped at 50% of the CPI, if the 2nd and 3rd quarters of the previous year the growth rates were positive.

[18] Minimum wage covers the following occupations: clerks, sales persons, cleaners, guards, assistant nurses and school assistants.

[19] Mortensen, Dale; Pissarides, Christopher (1994). "Job creation and job destruction in the theory of unemployment" Review of Economic Studies. **61** (3): 397–415. doi:10.2307/2297896.

[20] www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents Literature Review on Organization Culture Skills mismatch in Europe - International Labour Organization

4. POLICY MEASURES TO REDUCE LONG RUN EQUILIBRIUM NAIRU

The impact of a higher empoyment rate with the aim to reduce the Nairu through the reduction of unemployment, although it is a necessary, still it is not a sufficient condition, since it can only be realized if certain policy measures are put forward to create quality new jobs. The moderation of the Nairu is a long lasting procedure that needs tailor made policy measures, which should be targeted upfront and refined continuously.

Between the first quarter of 2008 and the last quarter of 2016 the share of people working part-time, while willing to work longer hours, increased very sharply in Cyprus adding to labour market fragmentation. At the same time, part time work is highly plausible to intensify illegal employment due to the fact that many unemployed who are Guaranteed Minimum Income (GMI) recipients work part time exhibiting that they are available and capable to work. A further comment for long term unemployment is associated with the risk of labour market marginalization of long term unemployed. This is the case also for Cyprus, since in the face of long unemployment spells, recorded sharp increases in its long-term unemployment rate between 2003 and 2015 (European Commission, 2017).

Policy measures to mitigate the long term and youth unemployment rates could be designed in such a way for those who find it difficult to search for a job. These groups are mostly those who are long run unemployed and have lost contact with the labour market. In these categories there are other groups related to women, disabled and GMI recipients, unskilled persons and long term unemployed. There are ongoing ALMPs covering the above groups implemented by the Department of Labour in cooperation with the Human Development Authority. From the economics literature the most apparent distortions of the unemployment to be urgently considered are:

- **Benefits provision** needs ex ante a very well organized and monitoring system so that no disincentives exist that could be worsening, instead of improving, the labour market dynamics. For Cyprus, the introduction of the GMI has contributed significantly in tackling the indefinite period of provision of social benefits and has made the whole system more targeted and efficient.

- **Wage determination** could be leading to involuntary unemployment and might create a mismatch between labour supply and demand and thus, cause an increase to the structural unemployment.[21]

- The initiation and monitoring of **Active Labour Market Policies (ALMPs)** could play a significant role in lowering the Nairu in the long run. The ALMPs are a significant tool used to contain the number of unemployed and thus, the unemployment rate. The purpose of these schemes is the reactivation of the unemployed through retraining and making benefits to be labour market employment-friendly.
- **ALMPs promotion needs a more precise and systematic technical evaluation** to increase efficiency and their structure in line with past European Commission's recommendation during the Macroeconomic Adjustment Program. To this end, the role of Public Employment Services is crucial in directing unemployed persons to facilitate them towards the right employment channels. The Department of Labour is envisaged to put forward an electronic platform to facilitate a better matching process by providing employers a useful tool to select on a sectoral level from the unemployment pool.
- **Tailor made ALMPs for unemployed aged 15-24** to provide them with more job opportunities to work part time and thereby enhance contact with the labour market needs. This policy may have multiple merits when it becomes skills-oriented by offering specific training and retraining programs. It can also be designed and targeted with respect to available jobs so that to restrain structural unemployment.
- In the same framework programmes to enhance **Life Long Learning** for all ages is considered vital as well as participation in **Vocational Education Training (VET**).
- **GMI provision** should not discourage recipients to enter the labour market. In case the GMI is found higher than wages from employment, either temporary or part time, GMI recipients would reasonably opt to remain GMI beneficiaries. This can mitigate the reduction of unemployment and possibly an intervention into the welfare system could entrench necessary to better regulate the benefit system for not discouraging beneficiaries from employment.

- Increase **labour market inspections** for those who are GMI recipients and at the same time work. This measure should be designed cautiously for not adding unnecessary expenses on the state budget without having the desirable outcome.

- **The declining business interest rates,** could open up easier new jobs in sectors of economic activity that workers are unemployed; labour intensive sectors and other capital intensive sectors like IT services, pharmaceuticals and corporate business.

[21] R. Layard, S. Nickell and R. Jackman «Unemployment», 1990.

5. CONCLUDING REMARKS

The conclusions reached by the aformentioned analysis could be summarized as follows:

- ✓ The gradual contraction of the Nru and eventually Nairu needs targeted, timely policy and brave institutional measures to occur apart from the steady increase of the growth rate.
- ✓ Their implementation is significant for Cyprus to determine a reliable and robust macroeconomic policy framework taking into consideration all other relevant macroeconomic variables.
- ✓ Mostly, for the Ministry of Finance it is imperative the reliability of the Nairu estimation to drive fiscal policy into more safe budgetary projections and retain the estimation on public finances sound.
- ✓ The estimates of the Nairu[22] should be cautiously faced since it could lead to miscalculations of the size of the structural fiscal deficit and false fiscal policies.
- ✓ Demand management policy measures can only reverse the high unemployment rate only in the short run due to the fact that a sustainable reduction of the Nru should be based upon long term supply side policy measures rather than short run policies. Furthermore, demand management policies could only reduce unemployment by raising at the same time the inflation rate, unless unemployment is above the long run Nairu and there is hysterisis. In that case a temporary incomes policy is a way of helping unemployment to return to the Nairu more quickly (R. Layard, et others, 1991).
- ✓ Labour market institutions that support a smooth transition of workers towards new opportunities also support the recovery and reduce the risk of labour market duality. To this aim, flexible employment protection legislation needs to go hand in hand with an adequate social safety net and active labour market policies to support the taking up of new opportunities in more productive activities.

[22] Philipp Heimberger, Jakob Kapeller, Bernhard Schütz "What's Structural about unemployment in Europe? On the Determinants of the European Commission's NAIRU Estimates", 2016.

- ✓ Cyprus, is a clear example, to pinpoint that unemployment and underemployment rates were maintained relatively low before the crisis and increased rapidly and remained high after the crisis. This process renders the economic policy necessary to act proactively to regulate labour market institutions and redirect employment to higher value added jobs.

- ✓ Most indicators of labor market institutions – employment protection legislation, union density, tax wedge and minimum wage – do not explain much; either is their sign inconsistent with the expectation from standard theory, they are statistically insignificant, or their significance is sensitive to the model specification. **Only active labor market policies and unemployment benefit replacement rates are consistently signed as expected and significant.**

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APPENDIX 1

Table 1 underneath, reveals how the crisis affected the GVA of the 3 major labour intensive sectors i.e. manufacturing, construction and wholesale and retail trade for 2012-2017. During the relevant period 2012-2017, it is exhibited that the net cumulative impact[23] of the above sectors' GVA in constant prices was negative by €0.43 billion. In the crisis years (2012-2014) the total GVA loss in the three sectors was as high as €1.1 billion, whereas in 2015-2017 it was reversed to nearly €0.7 billion positive GVA.

Table 1: **Gross Value Added** to selected labour intensive sectors[24] in constant prices (€ mln)

	C.	F.	G.	annual change, €
2012	736.2	850.2	3737.3	-422.0
2013	631.1	654.4	3493.2	-545.0
2014	654.6	578.8	3396.6	-148.7
2012-2014, %	**-11.1**	**-31.9**	**-9.1**	**-52.1**
2015	693.3	567.7	3426.1	57.1
2016	736.7	618.8	3574.0	242.4
2017	792.0	773.5	3747.1	383.1
2015-2017, %	**12.5**	**26.6**	**8.6**	**47.6**

In Table 2 below, the average quarterly percentage change of SA employment in persons is depicted for the reference period in the same selected labour intensive sectors. It is obvious that during 2012-2014 the three sectors experienced large cumulative employment losses due to the financial crisis impact. However, from the data it is depicted that the only sector that has fully covered losses is wholesale and retail trade. On the other hand, it is clear that manufacturing and construction sectors have not recovered their crisis' employment losses. The same is true if one compares the overall employment losses in the crisis period with the post crisis employment gains. The net loss for the three sectors in SA employment terms is higher by 4.33 percentage points. This tendency is assumed to decline further as long as the actual unempoyment rate continues to fall.

[23] Author's estimations.

[24] C stands for Manufacturing, F for Construction and G for Wholesale & Retail Trade sectors.

Table 2: **Average quarterly % change in persons in SA employment terms** in selected labour intensive sectors

	C.	F.	G.	annual % change
2012	-2.40	-4.97	-0.97	-8.34
2013	-2.14	-4.27	-0.50	-6.91
2014	0.06	-0.58	0.10	-0.43
2012-2014	**-4.47**	**-9.83**	**-1.37**	**-15.68**
2015	0.96	1.14	0.73	2.84
2016	0.68	2.01	0.84	3.52
2017	1.14	2.36	1.50	4.99
2015-2017	**2.78**	**5.51**	**3.07**	**11.35**

APPENDIX 2

	Actual u%	core inflation
2009q4		1.67
2010q1	7.4	0.97
2010q2	6.4	0.16
2010q3	5.8	0.39
2010q4	5.5	0.19
2011q1	7.5	1.05
2011q2	7.2	1.45
2011q3	7.8	1.33
2011q4	8.9	0.95
2012q1	11.1	0.53
2012q2	11.3	0.60
2012q3	12.1	0.58
2012q4	12.7	0.15
2013q1	11.8	0.83
2013q2	15.8	-0.23
2013q3	15.4	-0.27
2013q4	16.2	-1.46
2014q1	16.0	-1.46
2014q2	15.9	-1.07
2014q3	16.9	-0.99
2014q4	15.4	-0.64
2015q1	15.9	-0.43
2015q2	16.0	-0.78
2015q3	16.1	-0.61
2015q4	17.6	-0.38
2016q1	14.6	-0.66
2016q2	14.7	-0.83
2016q3	12.7	-0.38
2016q4	14.9	-0.67
2017q1	14.1	-0.29
2017q2	12.1	-0.20

2017q3	10.5	-0.40
2017q4	10.1	-0.37

	Actual u%	**under-employment%**
2010q1	7.4	10.3
2010q2	6.4	10
2010q3	5.8	10.1
2010q4	5.5	11.6
2011q1	7.5	12.2
2011q2	7.2	12.4
2011q3	7.8	11.9
2011q4	8.9	13.1
2012q1	11.1	14.3
2012q2	11.3	15.6
2012q3	12.1	15.9
2012q4	12.7	18.6
2013q1	11.8	21.8
2013q2	15.8	23.3
2013q3	15.4	23.9
2013q4	16.2	25.5
2014q1	16	27.5
2014q2	15.9	27.1
2014q3	16.9	26
2014q4	15.4	27.1
2015q1	15.9	27.8
2015q2	16	26.6
2015q3	16.1	25.6
2015q4	17.6	24.8
2016q1	14.6	24.8
2016q2	14.7	22.5
2016q3	12.7	21.7
2016q4	14.9	22.3
2017q1	14.1	18.9
2017q2	12.1	18.3
2017q3	10.5	16.9
2017q4	10.1	16.8

LFS	Nairu%	unemployment rate	unemployment gap	Nru
2010	2.2	7.3	5.1	3.8
2011	2.6	5.9	3.3	6.7
2012	4.5	11.8	7.3	10.6
2013	7.1	15.9	8.8	14.8
2014	8.6	16.1	7.5	16.1
2015	7.6	14.9	7.3	14.2
2016	6.7	13.0	6.3	10.0
2017	5.3	11.0	5.7	8.5
2018*	3.7	8.5	4.8	4.5

*For 2018 the forecast was based upon the average of Q1 and Q2.

	Nairu %	Registered u%	U gap %
2010	0.8	5.0	4.2
2011	1.1	6.2	5.1
2012	1.7	8.3	6.6
2013	2.7	11.2	8.4
2014	4.0	11.4	7.4
2015	4.1	10.3	6.2
2016	3.7	8.8	5.1
2017	3.1	7.1	4.0