Chapter 5

The Decline in Unemployment in Israel by International Comparison

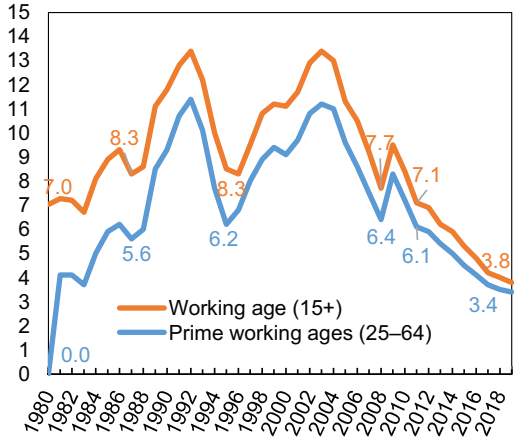
- The current unemployment rate in Israel is low both compared with its rate in recent decades and by international comparison, following a continuous decline since the economic crisis at the beginning of the previous decade.
- At less than 4 percent, the current unemployment rate is low even when compared to the lowest levels reached at the peaks of previous business cycles.
- The decline in the unemployment rate encompassed all population groups, including the weaker segments of the labor force, such low-educated workers, members of minority groups, and residents of Israel's geographic periphery.
- By international comparison, the decline of the natural unemployment rate in Israel—especially since the financial crisis—is anomalous.
- The high wage elasticity in Israel held back the rise in unemployment in the two crises that hit the economy during the previous decade, and prevented the extensive sustained unemployment that occurred in less elastic labor markets.
- From 2007 to 2017, the increased educational attainment levels of the labor force contributed to about a quarter of the decline in unemployment in Israel.
- The contraction of the government safety net, the policy of incentivizing employment in the past decade, and the increased efficiency of the labor market—such as through technological improvements and greater Internet accessibility—have also contributed to the decline in Israel's unemployment rate beyond the effect of the business cycle.
- The Israeli economy's proximity to the minimum unemployment levels in OECD countries, as well as the equalization of the employment rates, make it all the more clear that the key to the continued closing of standard of living gaps between Israel and other advanced economies lies in narrowing the productivity gaps.

1. BACKGROUND AND PRESENTATION OF THE QUESTION

As of the end of 2019, Israel's unemployment rate is the lowest it has been in the past 40 years.

As of the end of 2019, Israel's unemployment rate is the lowest it has been in the past 40 years (Figure 5.1). In contrast to the peaks of previous business cycles—during which the unemployment rate declined to approximately 6 percent only to rise again—in the past few years, it has persistently fallen beyond that level (reached as early as 2012), and in the last quarter of 2019, it fell to 3.1 percent (among the prime working ages of 25–64). This is one of Israel's most prominent economic achievements in recent years, as unemployment reflects underutilization of an economy's labor force and diminishes household welfare. Such low unemployment rates were only typical in Israel four and five decades ago, but at the time, the economy was characterized by a different employment model than the current one: More than half of the employees worked for the public sector and government-owned companies, and the labor force participation rates were much lower. In recent years, the unemployment rate in the prime working ages (25–64) has been even lower than during that time.

Figure 5.1
Unemployment rate in Israel, 1980–2019
(percent)



*The series are concantenated for years in which methodological changes were made in Labor Force Surveys: 1995, 2001, 2009, and 2012.
SOURCE: Based on Central Bureau of Statistics.

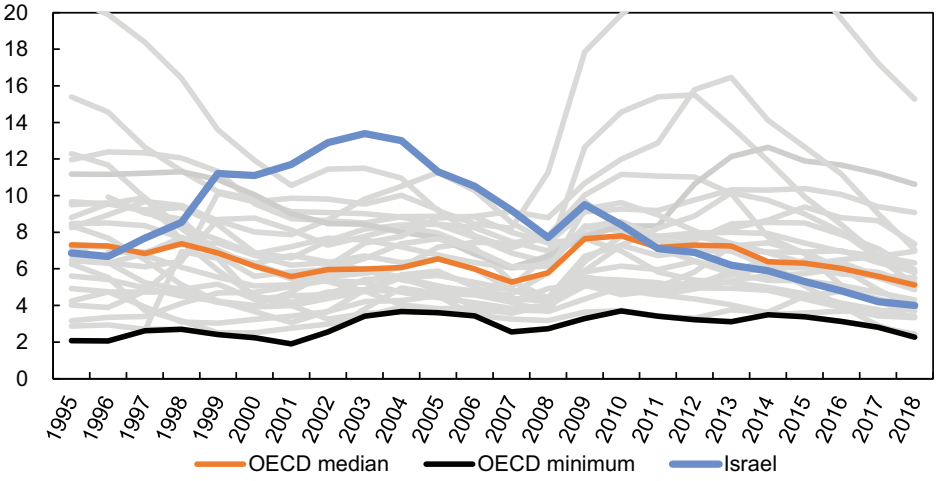
After being higher than in most OECD countries in 2007, the unemployment rate in Israel is currently one of the lowest in the OECD.

The decline of the unemployment rate in Israel since 2007, the year prior to the onset of the Global Financial Crisis, is highly impressive by global standards as well: After being higher than in most OECD countries in 2007—and being at the center of the unemployment rate ranking among OECD countries during the previous unemployment rate low, in 1995—the unemployment rate in Israel is currently one of the lowest in the OECD (Figure 5.2). This is true even by age group: Across all age groups—youth (15–24), adults (25–54), and the older population (55–64)—the unemployment rate in Israel was higher than the OECD average in 2007 and lower than the OECD average in 2018.

When analyzing the unemployment rate, it is customary to separate the effects of the business cycle from the economy's fundamentals.

When analyzing the unemployment rate, it is customary to separate the effects of the business cycle from the economy's fundamental characteristics ("natural unemployment"), which are reflected both in structural gaps between demand and supply in the labor market ("structural unemployment") and the process of "matching" workers with employers ("frictional unemployment"):

Figure 5.2
The Development of the Unemployment Rate in Israel and in Other OECD Countries, Working Ages, 1995–2018



SOURCE: Based on OECD data.

1. The cyclical component: When economic activity slows down, the demand for workers falls: Companies hire fewer workers and tend to dismiss more. As a result, the number of job seekers who do not find employment rises. The opposite is true during an economic boom.

2. Structural unemployment reflects a mismatch between the characteristics of job seekers and employers' demand. Specifically, it reflects a situation where the skills of some job seekers fail to meet the needs of employers.[1] This situation may also be the result, for example, of a structural change in the economy or a mismatch between the education system and employee training and the needs of the labor market. It may also reflect geographic gaps and a lack of adequate transportation infrastructure between regions in which potential workers reside and those in which available employers are located.

3. Frictional unemployment: As job seekers and employers do not have full information about each other, it takes job seekers time to find adequate jobs and for employers to find adequate employees, even if the characteristics of the job seekers match those of the employers. This situation is expressed in the existence of unfilled

[1] An example of the increase in structural unemployment in Israel occurred in the early 1990s, with the immigration from the former Soviet Union, which resulted in an increase in the labor supply. It took the immigrants time to adjust their skills to the needs of the labor market in Israel—including learning Hebrew—and it took time for the employers to become familiar with the needs of the immigrants and to adjust their capital stock accordingly. In the early 1990s, the immigrants' unemployment rate was approximately 30 percent. Ten years later, however, it was similar to that of veteran Israelis—see Table 5.A.8 in the Report's Statistical Appendix. See N. Kasir (Kaliner) and K. Flug (1993), "The Absorption in the Labor Market of Immigrants from the CIS—the Short Run", Discussion Papers Series 93.09, Bank of Israel Research Department.

job vacancies as well as job seekers with matching skills. A change in this situation is identified when, for example, the unemployment rate declines with no change in the demand for employees (job vacancy rate). One of the causes of change is a more efficient search process, e.g. by making information about job vacancies and requirements, as well as information about the job seekers and their qualities, more readily available.

In most cases, the unemployment components cannot be directly identified in the data and are estimated using different statistical methods.

In this chapter, we examine whether the decline in the natural unemployment component in Israel since 2007—the year preceding the global financial crisis—was different than in other OECD countries. Where we find that it was indeed different, we search for variables that could explain the difference. The remainder of the chapter is structured as follows: Section 2 shows that natural unemployment in Israel declined markedly—unusually so compared to other advanced economies. Section 3 offers possible explanations for this decline from the economic literature, and Section 4 presents the correlation between various characteristics of the labor market policies and the unemployment rates in OECD countries. Section 5 concludes the chapter.

2. COMPARISON OF THE DECLINE IN NATURAL UNEMPLOYMENT BETWEEN ISRAEL AND THE OTHER OECD COUNTRIES

Since the previous business cycle peak, the decline in the unemployment rate was greater in Israel than in all other OECD countries except Germany.

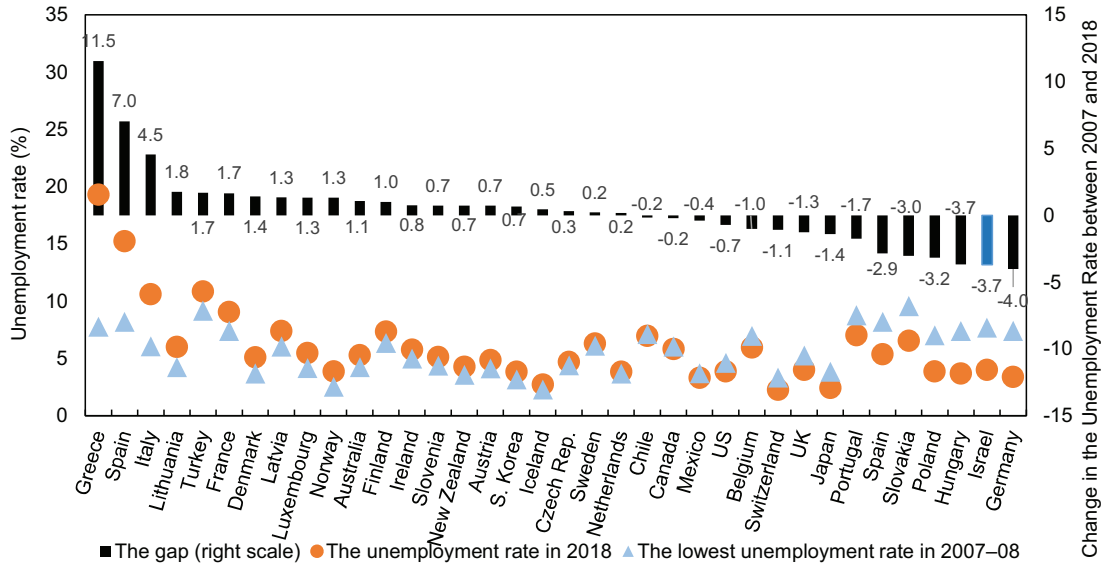
Figure 5.2 shows that the unemployment rate has dropped more sharply in Israel since the years preceding the crisis than in most other OECD countries. Figure 5.3 presents the unemployment rate in each country in years in which demand reached cyclical peaks (2007–08)[2], its unemployment rate in 2018, and the difference between them. The figure shows that the decline in the unemployment rate was greater in Israel than in all other OECD countries except Germany.[3] The figure also shows that in the five countries in which the unemployment rate dropped most significantly (Germany, Poland, Israel, Hungary, and Slovakia), the unemployment rate in 2007–08 was higher than the average of the other countries. Nevertheless, an analysis encompassing all of the countries shows there is no statistical correlation between the change in the unemployment rate and the unemployment rate at the outset, in 2007–08.

An accepted approach to calculating the natural unemployment rate, which we shall use later in the chapter, is an estimation of the Non-Accelerating Inflation Rate of Unemployment (NAIRU). Its use is based on the assumption that a decline

[2] In the business cycle preceding the financial crisis, the unemployment rate in the OECD was at a low, in some countries in 2007 and in others in 2008. For each country, we used the lower rate among these two years. Another accepted indicator of the phase of the business cycle is the output gap, which was at an all-time-high in 2007 and 2008 on average in the OECD countries (and almost in each and every one of them) and in Israel.

[3] For more information about the reform in Germany, please see Box 5.1.

Figure 5.3
The Change in the Unemployment Rate in OECD Countries between 2007 and 2018



SOURCE: Based on OECD.

in unemployment causes inflation.[4] Figure 5.4 presents the data excluding the effect of the business cycle (i.e., excluding the "cyclical component") according to the OECD's NAIRU calculations. The figure indicates that the drop in the natural unemployment rate in Israel, especially since the financial crisis, was unusual among OECD countries: Israel recorded a sharp decline, similar to the development of the actual unemployment rate (Figure 2), while other countries[5] were stable or recorded a moderate decline during that period.[6]

By international comparison, the decline in the natural unemployment rate in Israel—especially since the financial crisis—is anomalous.

The Beveridge Curve (Figure 5.5) depicts the simultaneous existence of unemployed persons and job vacancies. The vertical axis of the curve represents the job vacancy rate[7]—jobs that employers are unable to fill—and the horizontal axis describes the unemployment rate. It is common practice to identify a shift along the curve as a development in the business cycle (a left and upward shift signifies an

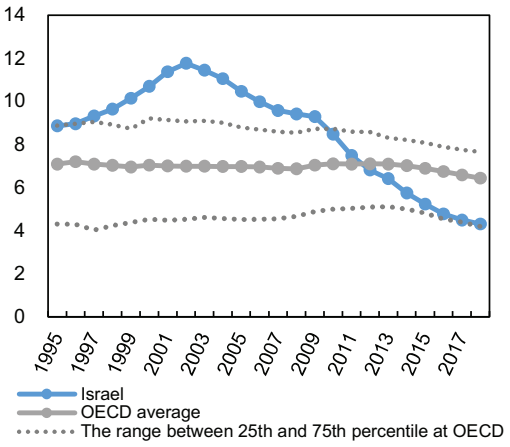
[4] The difficulty with this estimator is that a decline in inflation that is not caused by unemployment will be interpreted as a decline in the natural unemployment rate (for a discussion of the topic see, for example, O. Blanchard (2018), "Should We Reject the Natural Rate Hypothesis?", *Journal of Economic Perspectives* 32(1): 97–120. Calculations using a different tool to identify natural unemployment—the output gap, which is an estimator of the deviation of actual output from its full-employment equilibrium level—show that until 2018, neither the OECD countries in general nor Israel in particular returned the high level of positive output gaps that prevailed in 2007 and 2008, but Israel was closer to that level.

[5] The range between the 25th percentile and 75th percentile in the distribution of the OECD countries.

[6] Out of the 11 countries in which the unemployment rate declined by more than one percentage point between 2007 and 2008, the natural unemployment rate dropped substantially only in Poland, Germany, Slovakia, and moderately in the UK and the US.

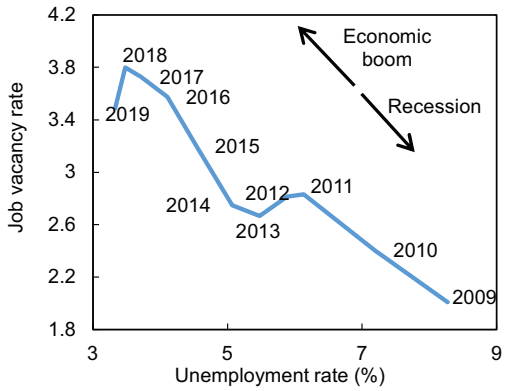
[7] Data on job vacancies under a uniform definition are available for Israel only since 2009.

Figure 5.4
Noncyclical Unemployment Rate (NAIRU), 1995–2018 (percent)



SOURCE: Based on OECD.

Figure 5.5
The Beveridge Curve: The Unemployment Rate Among Those Aged 25–64 and the Job Vacancy Rate in the Business Sector, 2009–19



SOURCE: Based on Central Bureau of Statistics.

According to the Beveridge curve as well, there is a marked decline in the natural unemployment rate in Israel.

economic boom and vice-versa), and a shift of the curve as a change in the natural unemployment rate. Figure 5.5 shows that between 2011 and 2014 the curve shifted to the left: The unemployment rate fell in tandem with a slight decline in the job vacancy rate.[8]

A prominent feature of the development of unemployment in Israel in recent years is the narrowing of gaps in unemployment rates between different population groups[9], converging to the low levels that characterize the strong groups.

The decline in the unemployment rate in Israel encompassed all population segments, and resulted in narrowing the gaps between them.

Figure 5.6 depicts the decline in unemployment rates over time by education and area of residence, and shows that unemployment gaps by educational attainment and between residents of Central Israel and the geographic periphery have all but closed in the past few decades, especially since 2009. The figure also shows that at each educational attainment level, the unemployment rate in the past decade has fallen below the lows that characterized it at the peaks of the previous business cycles. Moreover, the decline in the unemployment rate was accompanied by a decline in the depth of unemployment[10] and a decrease in the percentage of involuntary part-time workers.[11]

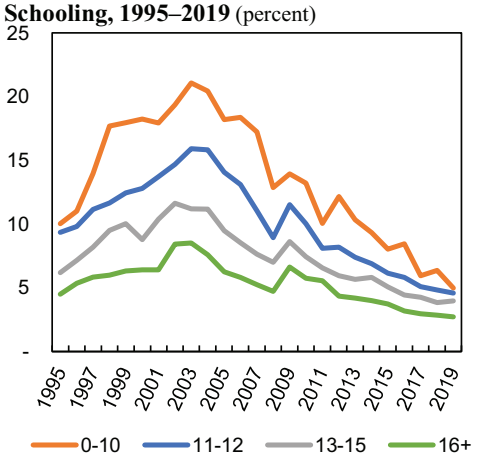
[8] It may well be that the curve also shifted in other years, but this can only be clearly identified by the figure when job vacancies and unemployment move in the same direction.

[9] Including convergence to unemployment rates and low gaps by sector, gender, and religion. We also found convergence of the gaps in unemployment rates by marital status (married vs. other): The gap in favor of married people—whose unemployment rates used to be lower—has narrowed over the years. In the latter aspect—the increase in unmarried people as a share of the prime working age group has contributed to some increase in the unemployment rate.

[10] Thus, for example, there was a continuous drop in the rate of unemployed persons seeking jobs for 53 weeks or more as a share of the labor force.

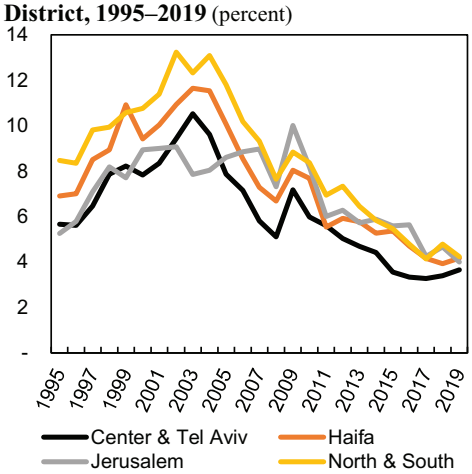
[11] For a discussion of treating part-time involuntary work as unemployment, please see A. Brender and L. Gallo (2008), "The Response of Voluntary and Involuntary Female Part-Time Workers to Changes in Labor Market Conditions", Discussion Papers Series 2008.08, Bank of Israel Research Department.

Figure 5.6a
The Unemployment Rate by Years of Schooling, 1995–2019 (percent)



SOURCE: Based on Central Bureau of Statistics.

Figure 5.6b
The Unemployment Rate by Residential District, 1995–2019 (percent)



SOURCE: Based on Central Bureau of Statistics.

The above analysis shows that the decline in unemployment in Israel in recent years has led to lower rates than those measured in recent decades, including at the peak of the previous business cycles, and that unemployment is also low in the weaker segments of Israel's labor force. The decline in the unemployment rate was greater than in the vast majority of OECD countries, reaching a level that is one of the lowest among the organization's member countries, even when excluding the effect of the differences in business cycle phases among the various countries.

Although both NAIRU-derived natural unemployment estimators and output gap calculations are subject to uncertainty margins and retrospective changes, it is still possible to conclude from the data that a significant portion of the drop in the unemployment rate in Israel, particularly since 2007, constituted a decline in its "natural" component, which reflected processes that are unique to Israel.

3. DEVELOPMENT OF THE VARIABLES EXPLAINING THE NATURAL UNEMPLOYMENT RATE IN THE REVIEWED PERIOD

Many factors described by the economic literature can explain the sharp decline in the natural unemployment rate in Israel—including technological improvements, changes in the transportation system, and direct and indirect policy processes.

This section examines what developments, beyond the effect of the business cycle, can explain the drop in Israel's unemployment rate and the shortening of search times both among employers and unemployed persons.[12] The decline may be attributed to several factors, although the data do not allow identification of each individual factor's contribution separately:

1. Technological changes, which have made the job search and search for employees more efficient. These include greater Internet access for increasing segments of the population through app development and the expansion of, and greater participation in, social networks.
2. Structural changes in the labor market, such as greater involvement of placement firms in employee recruitment and an increase in employment through contractors.
3. The government's transportation policy for example, improving infrastructure in the geographic periphery and reducing taxation on vehicles, which has contributed to an increase in the motorization rate.[13]
4. Public service measures, such as promoting free education for children aged 3-4 years.[14]
5. Welfare policy measures and incentives, such as the introduction and expansion of the Earned Income Tax Credit (EITC) and tightening of eligibility criteria for unemployment benefits.[15] The economic literature[16] contains wide-ranging

[12] According to Y. Yakhin and N. Presman (2015), "A Flow-Accounting Model of the Labor Market: An Application to Israel", *Bank of Israel Survey*, 88, 53–95 (Hebrew), it appears that structural changes explain at least half of the decline in the unemployment rate between 2004:Q1, in which unemployment was at a 10.9 percent peak, and 2011:Q4, in which it reached a low of 5.4%. For more information, please see the Bank of Israel *Annual Report* for 2013, Chapter 5 (pp. 106 and 112–118).

[13] In recent years, employment hubs have become increasingly accessible to residents living in other locations. This is reflected in the per capita motorization rate, in the length of railway tracks and roads—including in the geographic periphery—and the extension of bus services (see, for example A. Barak (2019), "The Effect of Public Transit on Employment in Israel's Arab Society", Discussion Papers Series 2019.03, Bank of Israel Research Department; Bank of Israel. "Periodic Studies Collection".) These contributed to the increase in people working outside their residential locality from 35 percent of the workers in 1995 to 41 percent in 2015. (The latter data are taken from Labor Force Surveys and Bank of Israel calculations.) For more information, please see the section regarding transportation in Chapter 1.

[14] However, Israeli public spending on preschool children is still very low by international standards. See Figure 2.4 in "Research Department Special Report: Raising the Standard of Living in Israel by Increasing Labor Productivity" (2019).

[15] Brender, Peled-Levy, and Kasir, for example, have shown that the preconditions and tests for receiving an income insurance benefit contributed to an increase in the rate of recipients at the beginning of the previous decade. See A. Brender, O. Peled-Levy, and N. Kasir (Kaliner) (2002), "Government Policy and Labor Force Participation Rates in the Nineties – Israel and OECD countries", *Bank of Israel Survey*, 74, 7–61 (Hebrew).

[16] A comprehensive up-to-date review may be found in P. Heimberger and J. Kapeller (2019), "What is Structural About Unemployment in OECD Countries?", *Review of Social Economy*, published online October 17.

discussion of policy measures and institutional variables (labor market institutions) affecting unemployment—policy factors in which a change is likely to alter the amount of time needed for the unemployed to find a job. These variables include the following[17]:

a. Public spending on labor market programs[18]: Programs such as "Employment Circles" in Israel and other public vocational training schemes that train the unemployed for jobs available in the market, thus streamlining their job search and increasing their potential contribution to employers. Other such schemes, such as the EITC, directly increase the incentive to work without increasing the cost for employers.
b. Employment rigidity[19,20]: Legal restrictions on employer-employee relations—such as rigid employee layoff rules, changes in job structure and wage adjustments may cause employers to hesitate to hire new employees, since should market conditions change, they may find it difficult to reduce costs quickly by adjusting the number of employees or wages.[21]
c. The power and size of workers' unions[22,23]: The existence of strong labor unions may, under some circumstances, have the same effect as employment rigidity. However, in the event of a crisis, sizable labor unions—which serve a large portion of the population—may make it possible to take joint measures with employers to prevent the need for layoffs (such as the wage agreements signed in Israel in 2003 and 2009) and the resulting protracted damage to employment (hysteresis).[24]
d. The replacement rate of unemployment benefits to wages[25]: When unemployment benefits relative to wages are higher and the period of

[17] The references at the top of each section are to the paper relevant to the issue described in it, a paper which also includes a literature review on that factor.

[18] S. Nickell (1997). "Unemployment and Labor Market Rigidities: Europe versus North America", *Journal of Economic Perspectives,* 11(3): 55–74

[19] S. Nickell (1997). "Unemployment and Labor Market Rigidities: Europe versus North America", *Journal of Economic Perspectives*, 11(3): 55–74.

[20] S. Nickell, L. Nunziata, and W. Ochel (2005). "Unemployment in the OECD Since the 1960s: What Do We Know?", *The Economic Journal*, 115(500): 1–27.

[21] Calmfors and Driffill have shown that there is a non-linear (U-shape) correlation between labor market performance and market concentration, so that the lowest labor market performance occurs when the labor market is half concentrated. See L. Calmfors and J. Driffill (1988), "Bargaining Structure, Corporatism and Macroeconomic Performance", *Economic Policy*, 3(6): 13–61. For a literature review of the topic, see, for example: J. Driffill (2006), "The Centralization of Wage Bargaining Revisited: What Have We Learnt?", *Journal of Common Market Studies*, 44(11): 731–756.

[22] S. Scarpetta (1996). "Assessing the Role of Labour Market Policies and Institutional Settings on Unemployment: A Cross-Country Study", *OECD Economic Studies*, 26: 43–98.

[23] O. Blanchard and J. Wolfers (2000). "The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence", *The Economic Journal* 110(462): C1–33.

[24] See Calmfors and Driffill (1988) above.

[25] O. Blanchard and J. Wolfers (2000). "The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence", *The Economic Journal*, 110(462): C1–33.

When unemployment benefits relative to wages are higher and the period of eligibility is longer, employees will be less fearful of losing their jobs.

eligibility is longer[26], employees will be less fearful of losing their jobs and will not rush back to work, but will rather continue to look for a job that suits them—relative to a situation where the replacement rate is low. Unemployment benefits that are too low may compromise the employee matching, thus reducing labor productivity and raising the natural unemployment rate due to a high employee turnover rate.[27]

e. Government spending as a share of GDP, specifically—the social service expenditure[28]: In addition to unemployment benefits, social services provided regardless of an individual's employment raise the threshold wage below which individuals would prefer not to work, since these services provide a safety net, such that even if an individual does not find work, he/she would still receive the basic services (education, healthcare, transportation) and basic income (for example through child allowances and income insurance).

f. The payroll tax rates of employees and employers[29] (tax wedge) - The higher the ratio, the greater the risk of not having an equilibrium wage that meets both the employees' wishes (threshold salary) and the greater willingness of the employer to pay (value of the employee's marginal output).

g. Minimum wage level[30]: A high minimum wage can result, at least in the short term, in reluctance by employers to hire workers whose marginal output value is lower than the minimum wage. The greater the number of low-skilled job seekers (and employees), the greater the negative effect of minimum wage is on the ability of unemployed persons to find work, potentially causing low-skilled workers to lose their jobs.[31]

Many of these variables also formed the basis for the Hartz Reform, which was instituted in Germany in the previous decade and is deemed one of the most successful measures for encouraging employment and reducing unemployment in advanced economies.

In addition to analyzing their effect on the structural changes in the labor market, the economic literature also deals with the effects of an economy's openness to foreign trade on unemployment. In the short term, the process of exposing the economy

[26] The unemployment benefit eligibility period for some of the groups in Israel is very low by international standards.

[27] A. Nekoei and A. Weber (2017). "Does Extending Unemployment Benefits Improve Job Quality?", *American Economic Review*, 107(2), 527–561.

[28] H. Feldmann (2006). "Government Size and Unemployment", *Public Choice*, 127(3), 451–467.

[29] S. Scarpetta (1996). "Assessing the Role of Labour Market Policies and Institutional Settings on Unemployment: A Cross-Country Study", *OECD Economic Studies*, 26: 43–98.

[30] J. Elmeskov, J.P. Martin, and S. Scarpetta (1998). "Key Lessons for Labor Market Reforms: Evidence from OECD Countries' Experience". *Swedish Economic Policy Review*, 5(2): 205–252.

[31] Since the important paper by D. Card and A. Krueger (1994), "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania", *American Economic Review*, 84(4): 772–793, which presented evidence that an increase in minimum wage (in the fast food industry) did not increase the unemployment rate, multiple studies on the subject have been published—some supporting these findings and others disputing them.

to foreign trade may result in structural change, which will increase structural unemployment.[32],[33] However, the effect of the economy's level of openness on long-term unemployment is unclear, since an open market is more susceptible to shocks from abroad, but is also capable of more efficiently dispersing local shocks. Actual measurement of the effect of the economy's openness is not straightforward, since in the short term, the accepted measures for openness fluctuate, and often reflect nonstructural factors such as exchange rate differences, and identifying the structural openness sometimes requires specific data that are not easily formed into a clear picture.[34]

Another potential cause for the drop in the natural unemployment rate in Israel is the rise in the labor force's educational attainment. This increase has improved the matching between job seekers' skills and employers' changing needs, thus also contributing to an increase in the elasticity of educated workers, which allows them to be employed in different places. We found that approximately 25 percent of the decrease in Israel's unemployment rate from 2007 to 2017 was due to an increase in the educational attainment levels of its labor force[35], while the remainder reflected a decline in the unemployment rate within the educated group.[36]

We found that about one-quarter of the decrease in Israel's unemployment rate from 2007 to 2017 was due to an increase in the educational attainment levels of its labor force.

Box 5.1

The Hartz Reforms in Germany, 2003–05

Against the background of the high and rising unemployment rate in Germany at the beginning of the previous decade (13.4 percent in 2002), the Agenda 2010 program was instituted. The program included a scaling down of the welfare system, tax cuts, and new arrangements regarding employment and wages. The basis for the policy was the Hartz Reforms, which were enacted in four phases (Hartz I–IV) between 2003 and 2005—the period in which Israel also took significant measures to reduce unemployment and encourage employment. The German reform package had three objectives:

1. To increase matching efficiency by improving the services of employment agencies.
2. To motivate the unemployed to enter the job market through better incentives.
3. To encourage demand for employees and foster new employment opportunities by reducing the tax wedges.

[32] A. Bernard, S. Redding, P. Schott (2007). "Comparative Advantage and Heterogeneous Firms", *Review of Economic Studies*, 74(1), 31–66; G. Felbermayr, J. Pratand, and H. J. Schmerer (2011). "Trade and Unemployment: What do the Data Say?", *European Economic Review*, 55(6): 741–758.

[33] Thus, for example, the opening of the Israeli textile market to competition at the beginning of the previous decade led to a temporary rise in the unemployment rate, which declined over time due to adjustment by the market.

[34] See the Bank of Israel *Annual Report* 2019, Chapter 8.

[35] "Composition" calculation—a static calculation method in which the weights of the population groups in a base year are held fixed. The actual unemployment rate is then examined net of the changes in these weights.

[36] We attained a similar result in an analysis of the years 1999–2017. This is contrary to an increase in the labor force participation rate, most of which is attributed to composition changes.

The main objective of Hartz I and II was to reduce labor costs by subsidizing wages and creating new employment opportunities. For example, these laws did away with social security contributions on wages of up to €400 per month (mini-jobs) and decreased them for wages ranging from €400 to €800 per month (midi-jobs), as well as for companies employing older people. In addition, labor market regulation was overhauled. Restrictions were loosened on temporary work agencies as well as on limited-time employment agreements, layoff regulations were made more flexible, and more.[1] Phase III of the Hartz Reform was enacted to make placement services for the unemployed more efficient by restructuring the Federal Employment Agency and outsourcing matching services to private placement firms.[2] Hartz IV included significant changes in unemployment benefits. Prior to it, the system was characterized by a very long unemployment benefit eligibility period—with the length proportional to the claimant's age and work history—in addition to extensive employment and social support and services. Hartz IV replaced these proportional benefits with pay based on a means test[3], and reduced the eligibility period and benefit amounts for most households, particularly for the "long-term unemployed"—those who remained unemployed for over a year.

Hartz IV was found to have a long-term effect, and to fulfill its main objective—a marked reduction in natural unemployment—particularly by increasing the incentive to seek new jobs.[4] The literature's estimates regarding the program's effect on the decline in unemployment rates in Germany range from 0.1 to 2.8 percentage points. The main reason for these gaps is different assumptions regarding the decline in the replacement rate of the chronically unemployed as a result of the Reform, which ranges from a mere 7 percent (Launov and Walde, 2013) to almost 70 percent (the upper limit in Krause and Uhlig, 2012). In their paper, Hochmuth et al. proposed a new approach to assessing Hartz IV in terms of the German unemployment benefit system, which is primarily based on a job vacancies survey, in order to create an empirical measure for the ratio between the number of job vacancies (demand for workers) and employment candidates (the unemployed) over time. They found that Hartz IV caused the German unemployment rate to decline by 2.2 percentage points between 2005 and 2015, thus becoming the main driver for reducing the natural unemployment rate in Germany. The Hartz Reforms are some of the most radical labor market reforms instituted by an advanced economy. It appears that due to them, Germany was the only country in the eurozone in which the financial crisis had a minor, short-term effect on the labor market, and the unemployment rate continued to go down. As of 2018, the NAIRU in Germany was down 6 percentage points, turning it from one of the highest in the OECD in 2005 to one of the lowest.

1 M. Burda and J. Hunt (2011)(. What Explains the German Labor Market Miracle in the Great Recession? NBER Working Paper.

2 L. Jacobi and J. Kluve (2006). "Before and After the Hartz Reforms: The Performance of Active Labor Market Policy in Germany", IZA Discussion Paper.

3 B. Hochmuth, B. Kohlbrecher, C. Merkl and H. Gartner (2019). Hartz IV and the Decline of German Unemployment: A . Macroeconomic Evaluation, IZA Discussion Paper

4 T. Krebs and M. Scheffel (2013). Macroeconomic evaluation of labor market reform in Germany. IMF Working Paper.

According to the literature, another factor affecting natural unemployment is the elasticity of the labor market.[37] When an economic crisis strikes the market, the demand for employees declines sharply, sometimes unexpectedly. If wages or the number of work hours are elastic enough, layoffs can be reduced by cutting workers' wages and/or reducing their work hours. At the height of the financial crisis in 2009, real wages in Israel were down 2.2 percent, while in OECD countries, they were up by an average of 0.9 percent—a finding that reflects the high elasticity of wages in Israel[38], including in the public sector.[39] This elasticity is significant, since wages and the demand for employees are indeed cyclical, but a hike in unemployment, which was the case in some countries during the financial crisis, can have a substantial, lasting effect on natural unemployment as well. This is due to erosion of the human capital of the unemployed and loss of some of the stock of physical capital due to the closing down of manufacturing plants. Thus, for example, the aforementioned OECD study estimated that the financial crisis increased natural unemployment in OECD countries by an average 0.75 percentage points, mainly due to the sharp increase in long-term job seekers. The study finds high variance among countries in terms of the effect of the financial crisis on natural unemployment, arising from a difference in the increase of unemployment in previous years. In most countries, the effect on natural unemployment was less than one percentage point.[40]

At the height of the financial crisis in 2009, real wages in Israel declined by more than 2 percent, while in OECD countries, they were up by an average of approximately 1 percent—which reflects the high elasticity of wages in Israel.

4. STATISTICAL ANALYSIS: VARIABLES CORRELATED WITH THE CHANGE IN THE UNEMPLOYMENT RATE, AND THEIR CHANGE DURING THE REVIEWED PERIOD

Table 5.1 outlines the correlations among and between the various indicators of the natural unemployment rate in OECD countries in 2007 and 2018.

While these are only binary statistical correlations, they can teach us several things:

1. The upper and lower panels are quite similar. That is, the correlations between the indicators and the natural unemployment rates are stable in both years.
2. In countries where the educational attainment level is higher, the natural unemployment rate is lower, and in countries where the tax wedge is higher or the rate of social spending is higher (two variables that are obviously correlated), the natural unemployment rate is higher.
3. The rate of unionized workers is negatively correlated with natural unemployment and positively correlated with welfare state characteristics, such as welfare spending as a share of GDP, unemployment benefit amounts,

In countries where the educational attainment level is higher, the natural unemployment rate is lower, and in countries where the tax wedge is higher or the rate of social spending is higher, the natural unemployment rate is higher.

[37] S. Guichard and E. Rusticelli (2010). "Assessing the Impact of the Financial Crisis on Structural Unemployment in OECD Countries", OECD Economics Department Working Papers.

[38] See box, and specifically Figures 2.1 and 2.2, in *Recent Economic Developments* no. 132, Bank of Israel (2012).

[39] See Y. Mazar (2015), "The Development of Wages in the Public Sector and Their Connection with Wages in the Private Sector", *Bank of Israel Economic Review*, 88: 133–197 (in Hebrew), or the Bank of Israel *Annual Report* for 2016, Box 5.1.

[40] Israel was not included in the sample of this study.

Table 5.1
Statistical correlations among the various benchmarks, 2007 and 2018

2007

	Unionization rate	Welfare expenditure as a share of GDP	Tax wedge	Replacement rate	Ratio of minimum wage to median wage	Share of adults with post-secondary education
Unionization rate						
Welfare expenditure as a share of GDP	0.40					
Tax wedge	0.14	0.58				
Replacement rate	0.29	0.53	0.25			
Ratio of minimum wage to median wage	0.21	0.25	0.03	0.33		
Share of adults with post-secondary education	0.24	-0.03	-0.33	-0.05	-0.18	
Natural unemployment rate (NAIRU)	-0.25	0.13	0.43	-0.05	-0.09	-0.28

2018

	Unionization rate	Welfare expenditure as a share of GDP	Tax wedge	Replacement rate	Ratio of minimum wage to median wage	Share of adults with post-secondary education
Unionization rate						
Welfare expenditure as a share of GDP	0.39					
Tax wedge	0.15	0.62				
Replacement rate	0.31	0.43	0.25			
Ratio of minimum wage to median wage	0.02	-0.15	-0.25	-0.14		
Share of adults with post-secondary education	0.26	0.05	-0.28	0.13	-0.18	
Natural unemployment rate (NAIRU)	-0.15	0.25	0.43	-0.10	-0.05	-0.24

The darker the color of a cell is, the larger the absolute value of the correlation between the variables is.
Blue cells signify a positive correlation and pink cells signify a negative correlation.
SOURCE: Based on OECD.

Table 5.2
The development of benchmarks for factors that impact on natural unemployment and the assessment of the impact on its development in Israel, on institutional factors, and on policy factors, 1999–2019

		1999	2007	The difference between 1999 and 2007	2018	The difference between 2007 and 2018	Total difference 1999 to 2018	The relative (expected) effect on noncyclical inflation in Israel
Welfare expenditure as a share of GDP	**Israel**	**16.48**	**14.61**	**-1.87**	**16.03**	**1.42**	**-0.45**	**Negative**
	OECD average	**18.20**	**18.07**	**-0.13**	**20.24**	**2.16**	**2.04**	
Tax wedge[a]	**Israel**	**21.69**	**18.33**	**-3.36**	**16.69**	**-1.64**	**-5.00**	**Negative**
	OECD average	**30.63**	**28.99**	**-1.64**	**28.39**	**-0.60**	**-2.25**	
Percentage of unionized workers[b]	Israel	37.70	30.30	-7.40	25.00	-5.30	-12.70	-
	OECD average	32.31	27.56	-4.75	24.26	-3.31	-8.05	
Ratio of unemployment allowance to wage (replacement rate)[c]	Israel	12.59	7.08	-5.51	13.59	6.51	1.00	-
	OECD average	27.12	24.03	-3.09	21.00	-3.03	-6.12	
Ratio of minimum wage to median wage[d]	Israel	0.54	0.57	0.03	0.59	0.02	0.06	-
	OECD average	0.45	0.46	0.01	0.51	0.05	0.06	
Government's active expenditure in the labor market[e]	Israel	0.20	0.19	-0.01	0.17	-0.02	-0.03	-
	OECD average	0.60	0.46	-0.15	0.52	0.06	-0.08	
Share of adults with post-secondary education[f]	Israel	39.68	43.59	3.91	51.60	8.01	11.92	-
	OECD average	22.67	27.33	4.66	36.98	9.65	14.31	

The difference in the "public expenditure per capita" is expressed in percent.

[a] The tax wedge is defined as the ratio (in percent of the labor cost) between the amount of taxes paid on wages by a working couple, with one at a full time (100 percent) post and the other at 33 percent of a post, with 2 children, and the employer's overall cost of labor.

[b] The share of unionized employees is defined as the ratio of the number of workers who are members of a union to the overall number of workers. This share is calculated using survey data and administrative data, expressed in percent. The government's expenditures on welfare as a percent of GDP include transfer payments to households, direct supply of goods and services in the area of welfare, and tax breaks. These benefits can be directed at low-income households, the elderly, the disabled, infirm, unemployed or youth, and are measured as a percent of GDP.

[c] The unemployment allowance paid to an unemployed person relative to wage is defined as the ratio of total nominal expenditure on unemployment allowances to the number of unemployed based on the Central Bureau of Statistics Labor Force Surveys (that is, not only workers eligible for unemployment benefits) to the nominal wage.

[d] The minimum wage to median wage ratio: The ratio of the minimum wage for a full time position to the median wage of full-time employees.

[e] The government's active expenditure in the labor market includes public services for supporting employment (such as placement services, professional training, employment incentives, and creating workplaces directly in the public sector for employing unemployed people, alongside various unemployment allowances and benefits. The data are based mainly on information regarding the labor market programs that appear in the government's budgets, as well as annual reports of the entities implementing the programs. This index is presented as a percent of GDP.

[f] The share of adults with upper-secondary education is defined as the ration (in percent) of the population aged 25–64 that completed post-secondary education to the total population of that age.

SOURCE: Based on OECD.

and level of education. These correlations show that countries differ in their preferences regarding the welfare state and employment. Therefore, we see that analyzing unemployment based on the effect of each separate variable does not yield a representative picture.

Table 5.2 presents the development of the various institutional indicators that were found in the literature to explain the development of natural unemployment over the years. Since the effect of the variables is not expected to be immediate, and is sometimes long-term, the table presents the indicator for 1999 (the first year for which most data are available), for 2007 (a peak year in the business cycle), and for the last year for which data is available (in most cases 2018). The table thus presents the change in the indicators between each of these years and the cumulative change over the entire period, separately for Israel and for the average of the other OECD countries.

The last column in the table presents the expected trajectory of the indicator's effect on the natural unemployment rate in Israel relative to the other OECD countries, in light of the effect of the indicator found by the literature. Thus, for example, if it is found that an increase in the tax wedge is expected to increase the natural unemployment rate, and in Israel the tax wedge declined more than the OECD average, this variable is expected to reduce the natural unemployment rate relative to the other countries. When there is a negligible difference in the development of the variable between Israel and the average of the other countries, or the sign of the parameter is unclear, we left the direction of the expected effect empty. We divided the indicators in the table into two panels: the upper panel for indicators whose effect on the different development of the unemployment rate in Israel could be estimated, and the lower panel for those with an unclear effect.

The reduction of welfare spending in Israel and the decline in the payroll tax wedge resulted in a drop in the natural unemployment rate in Israel.

Table 5.2 indicates that the reduction of welfare spending in Israel and the decline in the payroll tax wedge resulted in a drop in the natural unemployment rate in Israel, as did the decline in the number of unionized workers, to the extent that it has an effect on the existing levels of unionized workers in Israel. This finding is also supported by the table of statistical correlations (Table 5.1) and by additional statistical models we have estimated, which also reflect a positive and stable correlation between these two indicators and the natural unemployment rate.

In contrast, the contribution of the last three factors in the table is unclear. Unemployment benefits as a percentage of the wages paid in Israel are indeed low compared to the OECD average, but they have not changed during the reviewed period, while in other OECD countries they declined significantly (on average).[41]

[41] In OECD countries, the unemployment replacement rate indicator—i.e., the ratio between the unemployment benefit and wages immediately prior to the switch to unemployment—is used, according to the number of months or years after the switch. Such data are only available for Israel since 2010. According to this indicator as well, under the definitions and in the various periods presented regarding that indicator in the OECD data, the development in Israel relative to the average of the other countries is the opposite of the development in unemployment, and does not contribute to explaining the change it has undergone.

The ratio of the minimum wage to the median wage in Israel increased during the period, similar to the increase in the average of the other OECD countries. Thus, it also appears to not have contributed to the drop in the unemployment rate in Israel. While the rate of educated workers did indeed increase notably in Israel and is higher than the average in the other OECD countries,; its increase in the countries was more rapid than in Israel over the years.

The ratio of the minimum wage to the median wage in Israel increased during the period, similar to the increase in the average of the other OECD countries.

Government spending on active labor market policies as a percentage of GDP in Israel declined somewhat during the period, at a similar rate to the other OECD countries. However, the composition of these expenditures has changed in Israel. At the beginning of the period, most of the spending was on vocational training programs which were inefficiently managed[42], resulting in the down-scaling or discontinuation of many of the programs. During that period, they were replaced, inter alia, by the EITC program and the "Employment Circles" program, which support employment effectively. As a result, it may well be that the qualitative change was a vital component in the drop in natural unemployment in the past decade.

Government spending on active labor market policies as a percentage of GDP in Israel declined somewhat during the period.

The difficulty in identifying the institutional variables' dominant effects on unemployment is in line with the findings in the economics literature. In the 1990s and the beginning of the 2000s, the accepted practice was to attribute the increase in the unemployment rate in advanced economies to institutional changes, specifically excess regulation in the labor market. Policy recommendations therefore emphasized that they should be alleviated and the market should be "released".[43] In contrast, studies in recent years do not find that institutional factors have a marked effect, and attribute a greater part of the change in natural unemployment to basic economic variables—although it is possible that some reflect cyclical effects, which are not excluded from the common analyses. Thus, for example, Heimburger[44] uses various indicators to explain the variance and development of natural unemployment in OECD countries.[45] He shows that most labor market institutions do not provide a sufficient econometric explanation for natural unemployment variables, but the macroeconomic controls—the real long-term interest rate, the terms of trade, and total

[42] See press release issued by the Bank of Israel in August 2007, entitled "Vocational Training in Israel".

[43] S. Nickell (1997). "Unemployment and Labor Market Rigidities: Europe versus North America", *Journal of Economic Perspectives*, 11(3): 55–74.; O. Blanchard and J. Wolfers (2000). "The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence", Economic Journal 110(462): C1–33.

[44] P. Heimberger and J. Kapeller (2019). "What is Structural About Unemployment in OECD Countries?", *Review of Social Economy*, published online October 17.

[45] The dependent variable used in the study excludes three unemployment variables: Hamilton, NAIRU, and HP. For more information, see ibid.

factor productivity (TFP)—are more strongly correlated[46,47] with the unemployment variables.

5. CONCLUSION

The empirical economics literature does not offer comprehensive structural models that adequately explain the natural unemployment rate.

The high wage elasticity in Israel mitigated the rise in unemployment in the two crises that occurred in the previous decade, and prevented the extensive sustained unemployment that occurred in less elastic labor markets.

The increase in workers' educational attainment contributed to better matching between workers and employers than in the past.

The decline in unemployment rates in Israel from the middle of the previous decade was not accompanied by a narrowing of the labor productivity gaps between Israel and the other advanced economies.

In the past decade, the unemployment rate in Israel declined to far below 6 percent, the rate it reached during the previous business cycles. The unemployment rate was even closer to that of the advanced economies with the lowest unemployment rates.

The empirical economics literature does not offer comprehensive structural models that adequately explain the natural unemployment rate, but points at several institutional and structural factors that contribute to its decline. An examination of labor market trends in in Israel in the past two decades shows that changes in several such variables may explain at least some of the marked decline in unemployment, which is beyond the effect of the business cycle. Wage elasticity in Israel has reduced the increase in unemployment in the two crises that occurred in Israel during the previous decade (2001–03 and 2009) and prevented the extensive sustained unemployment that occurred in less elastic labor markets. The increase in workers' educational attainment contributed to better matching between workers and employers than in the past—although not in relation to other advanced economies—and the changes in the structure of incentives and welfare policies reduced the unemployed's threshold wages and increased the gain on hiring new workers.

The decline in the natural unemployment rates in Israel since the middle of the previous decade was accompanied by a significant increase in labor force participation rates, which was manifest both in a marked increase in the employment rate and in increases in per capita GDP and in the standard of living. However, the increase was not accompanied by a narrowing of the labor productivity gaps between Israel and the other advanced economies. The Israeli economy's proximity to the minimum natural unemployment levels of OECD countries, as well as the equalization of the employment rates, make it all the more clear that the key to the continued closing of standard of living gaps between Israel and the advanced economies lies in narrowing the productivity gaps.[48]

[46] See also: P. Heimberger and J. Kapeller (2017). "The Performativity of Potential Output: Procyclicality and Path Dependency in Coordinating European Fiscal Policies". *Review of International Political Economy*, 24(5): 904–928; G. Bertola, F. D. Blau, and L.M. Kahn (2007). "Labor Market Institutions and Demographic Employment Patterns", *Journal of Population Economics*, 20(4): 833–867; S. Avdagic (2015). "Does Deregulation Work? Reassessing the Unemployment Effects of Employment Protection", *British Journal of Industrial Relations*, 53(1): 6–26.

[47] Other papers supporting the finding that the effect of the general indicators is greater than that of the institutional indicators were mentioned by Constancio in his speech: "…The structural indicators explain only a small fraction of the changes in NAIRU, whereas the macroeconomic indicators appear to explain the …bulk of its variation". V. Constancio (2018). "Past and Future of the ECB Monetary Policy", Speech by Vitor Constancio, Vice-President of the ECB, 4 May. https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180504.en.html

[48] For a comparison of labor productivity in Israel and the OECD countries and the Research Department's recommendations on how to improve labor productivity, see Bank of Israel (2019). Research Department Special Report: "Raising the Standard of Living in Israel by Increasing Labor Productivity".