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**Impact of recession on  
labour supply: Experiences  
from the 1990s in Finland<sup>1</sup>**

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*The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Bank of Finland.*



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## General

Discussion about active fiscal policy has gained momentum, apace with the deterioration of employment prospects. In the background, there are concerns about worsening unemployment and passivation of the working-age population.

A material weakening in the employment situation tends to lead to a long-term reduction in the supply of labour. This kind of development was experienced in Finland with the working-age population being permanently excluded from the labour force as a consequence of the depression in the 1990s. Experience from the previous depression is of particular value now that we are determining the scope of stimulus policies, labour policy and the significance of the present economic recession for the labour potential in general. As the volume of the working-age population decreases in the coming years, it would be particularly problematic if part of the working-age population were to vanish from the labour market again.

In this paper we investigate the significance of the depression of the 1990s with respect to labour supply. The impacts are assessed using models estimated for participation rates by age cohorts. We start by assessing the overall impact of the depression of the 1990s on the size of the labour force and estimate on that basis what a corresponding disruption in the present situation would mean in terms of labour developments over the next few years. Subsequently, we assess the impact of the depression of the 1990s on age cohorts entering the labour market. The reviews are based on a similar model used by Kostianen (2008) to assess the factors affecting labour supply in Finland.

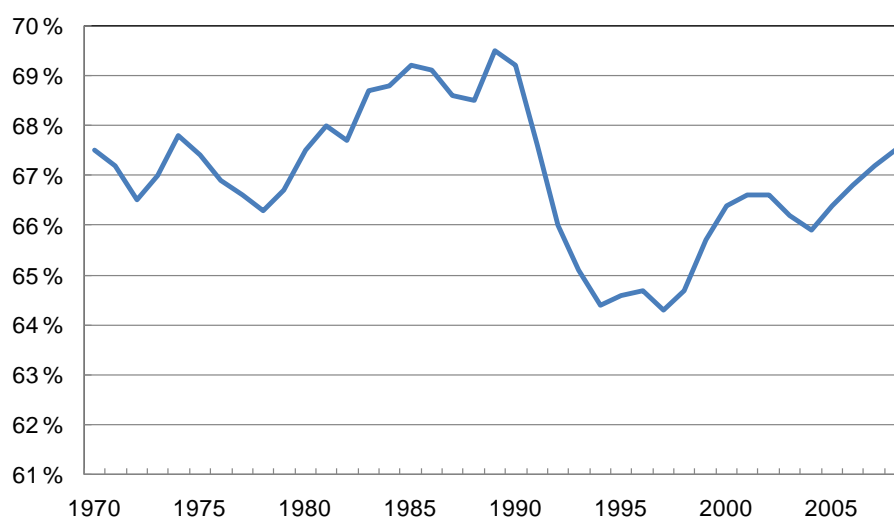
## 1 Depression of the 1990s and participation rates

In terms of their participation in the labour force, different age groups respond differently to economic recessions. The highest sensitivity to weakening in employment conditions typically coincides with life stages where there are clearer alternatives to participation in the labour markets. This is the case with adolescents, women with families and the elderly. When employment prospects weaken and wage expectations decrease, studying, early

retirement and child care leave, for example, become relatively more attractive alternatives to working. In addition, economic policy used to respond to the recession affects labour participation. Therefore, changes in tax bases and other policy measures may also change the relative attractiveness of leisure time. Due to segmentation of labour markets by gender, reactions to economic depressions vary between men and women depending also partly on the industries particularly affected by the recession.

Chart 1 illustrates that the participation rate decreased on average by five percentage points in 1989–1994 and had not by 2007 reached the levels before the depression. Hence, the 1990s depression has cast a significantly long shadow.

Chart 1. Labour force participation 1970–2007, ages 15–74



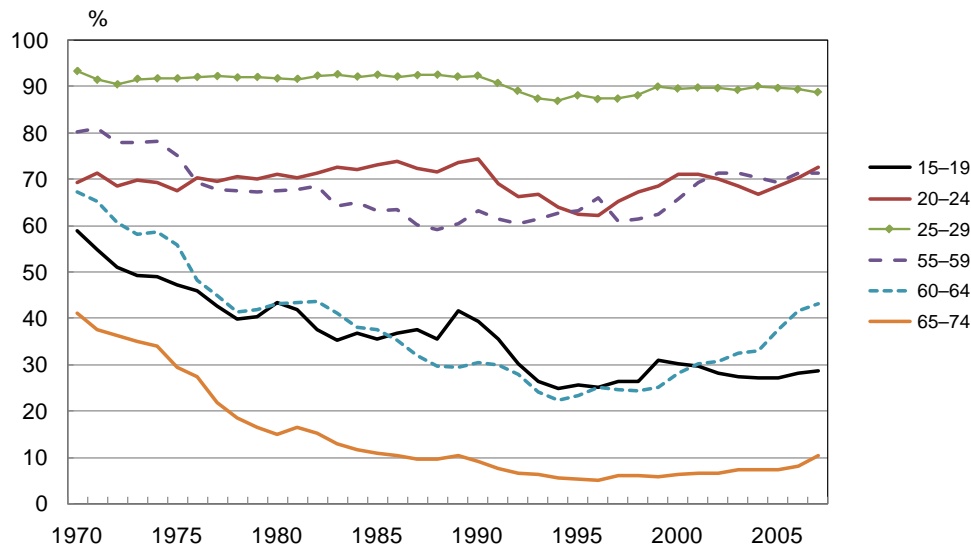
Source: Statistics Finland.

Broken down by age group, reactions in labour force participation to the depression of the 1990s varied in terms of both intensity and duration. Particularly within the younger age groups, the extended weakness of the labour markets led to a permanent change in preferences. In other words, part of the labour potential was excluded from the labour markets. The situation still prevails.

The largest drop in participation rates at the beginning of the 1990s was observed in the youngest age groups (15–19 year olds). In this group, the average participation rate for both females and males was 25% at the lowest, while prior to the depression it had been over 40% (Charts 2 and 3). In the next 5-year age group up (20–24 year olds), the participation rate also decreased materially, and women seem to have reduced their participation in the labour markets more than men. In the 25–29-year-old age group, the impact of the depression is practically only reflected in the females' participation rate, since the depression

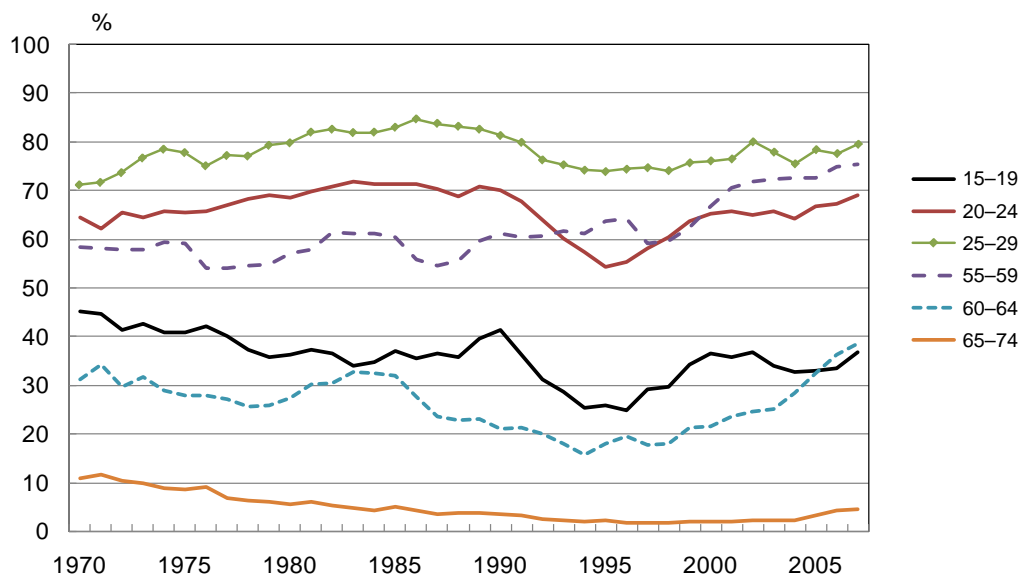
years do not seem to have discouraged 25–29-year old males to any significant degree. It is interesting that the participation rate for both 25–29-year-old females and particularly 15–19-year-old males seems to have stuck permanently below pre-depression levels. At the other end of the age spectrum, participation by 60–64 year-olds in particular decreased during the depression years, but this age group on the other hand subsequently materially increased its participation in the labour markets.

Chart 2. Labour participation rates by the youngest and oldest men



Source: Statistics Finland.

Chart 3. Labour participation rates by the youngest and oldest women



Source: Statistics Finland.

The impact of the depression at the beginning of the 1990s on labour force participation rates can be examined by accounting separately for the impact of individual factors (age and gender) and the cyclical situation. To that end, two alternative models have been constructed. One explains the total impact of the depression on participation rates (participation rate in Chart 1) and the other aims to identify the permanent impact on participation rates of different birth cohorts, separately for females and males (participation rates in charts 2 and 3).

## 2 Impact of economic depression on labour force

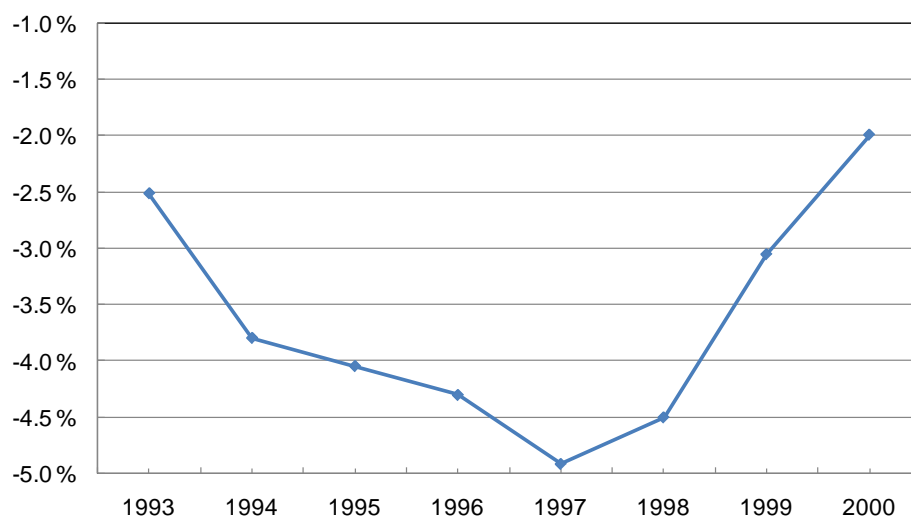
Overall impact of the depression on labour participation is examined using a model in which participation rates are explained with both individual factors and the cyclical factor (GDP trend). Year dummies included in the estimations therefore measure all other factors. The data used is the labour participation rates as reported by Statistics Finland for 15–74 year olds in 1970–2007. The participation rates have been broken down into 5-year cohorts

separately for both genders. The objective is to find out the extent of the depression in the 1990s, that is, the size of the employment loss caused by the depression. The model and estimation results are described in Annex 1.

The results show that the depression years had a long-term impact on labour participation rates. Even if the cyclical situation is controlled with GDP growth, and dependencies resulting from age and gender are accounted for, negative impact remains for the period 1993 through to 2000. In these cases, the estimated coefficients for year dummies (d93–d00) deviate significantly from zero. Hence we can conclude that, during these years, the participation rates have been reduced by special factors related to these years, in other words, factors somehow related to the depression. These may include changes in people's preferences – increased appreciation of leisure time – and social exclusion as a consequence of long-term unemployment.

The impact of the depression on participation rates has not only been deep but also extended. The estimation results show that, at its largest in 1997, the impact was about 5 percentage points, but even in 2000 it still stood at 2 percentage points (Chart 4).

Chart 4. Impact of economic depression on participation rates in 1993–2000, estimates of year dummies

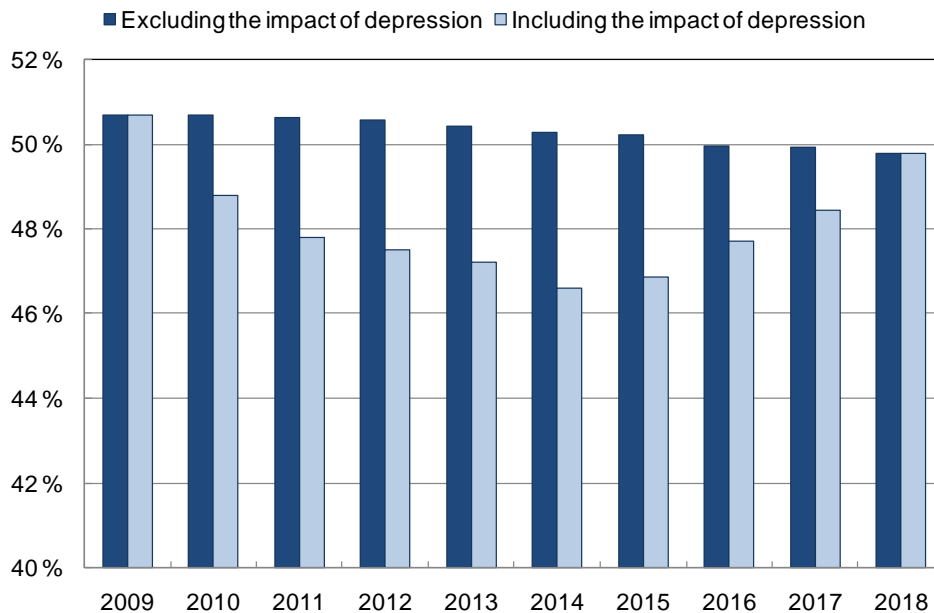


Source: Bank of Finland calculations (Annex 1).

Applied to the present situation and with the predicted population structure, a reaction of comparable extent would mean a dramatic additional weakening of the dependency ratio. This is illustrated by the so-called activity rate, that is, labour force relative to the entire population. The ratio will decrease solely as a consequence of the population structure

during the next 10 years even if the labour participation rate were to stand at 2007 levels (67.2%). If we assume that, in addition to changes in the population structure, from 2010 onwards there would be a disruption of the same extent as the previous depression, the activity rate would deteriorate materially over the five next years (Chart 5).

Chart 5. Labour force as proportion of entire population



Sources: Statistics Finland and Bank of Finland calculations (Annex 1).

It is evident that a reduction in labour force of this extent, in the present situation, would have significant consequences for the whole economy. It would materially weaken the growth potential of the economy. However, it should be emphasised that a comparison with the present situation also involves an assumption that for example policy choices and structural changes in the economy would be comparable to the depression of the 1990s and the subsequent recovery. These factors cannot be explicitly assessed in the model. However, even with these limitations, the calculation shows that if the present downturn evolves into a depression comparable to that of the 1990s, this could undermine the foundations of economic growth for a long time. It would also create a very unsustainable situation in public finances.



### 3 Depression and age groups entering the labour market

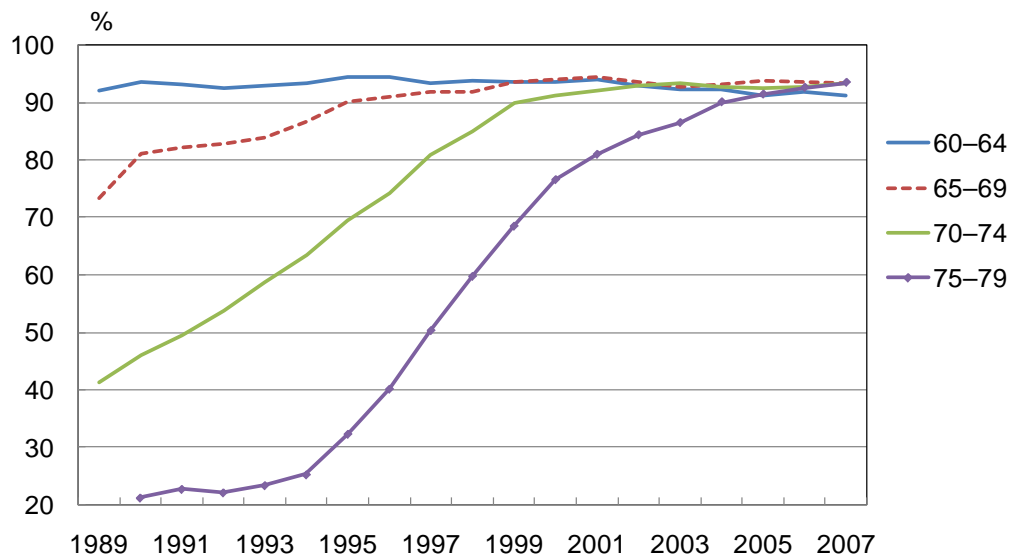
According to the results, almost throughout the entire 1990s, more working-age population was outside the labour force than the cyclical situation or age-cohort-specific factors would suggest. Age-cohort-specific variation in participation rates reflects factors that have increased the relative advantage of leisure and changed the structure of production and the labour markets.

Institutional factors have also had an impact. For example early-retirement opportunities were still reasonably favourable in the 1990s. Family policies were also revised, which encouraged parents (mothers) at the beginning of the 1990s to stay home and care for the children. In 1985, the Act on support for home care entered into force, and in the 1990s, the increasingly popular home care support was increased. At the same time, day care charges were raised. The student benefit system was also reformed in 1992 with the result that student allowances more than doubled (Lounasmaa 2003).

With respect to other policy choices, particularly the tightening of income taxation weakened the supply of labour. The income tax rate of an average-wage worker increased from 32% in 1991 to 38% in 1995. A special structural impact was also caused by economic difficulties in the municipal economy, which weakened the employment prospects of educated women in particular. In addition, it has been noted that wage formation was different during the depression years from normal times. According to Maliranta (2008), the wages of those changing jobs in the depression years rose more slowly than the wages of those remaining with the same employer. This showed itself as slower income developments for those that entered the labour markets during the period.

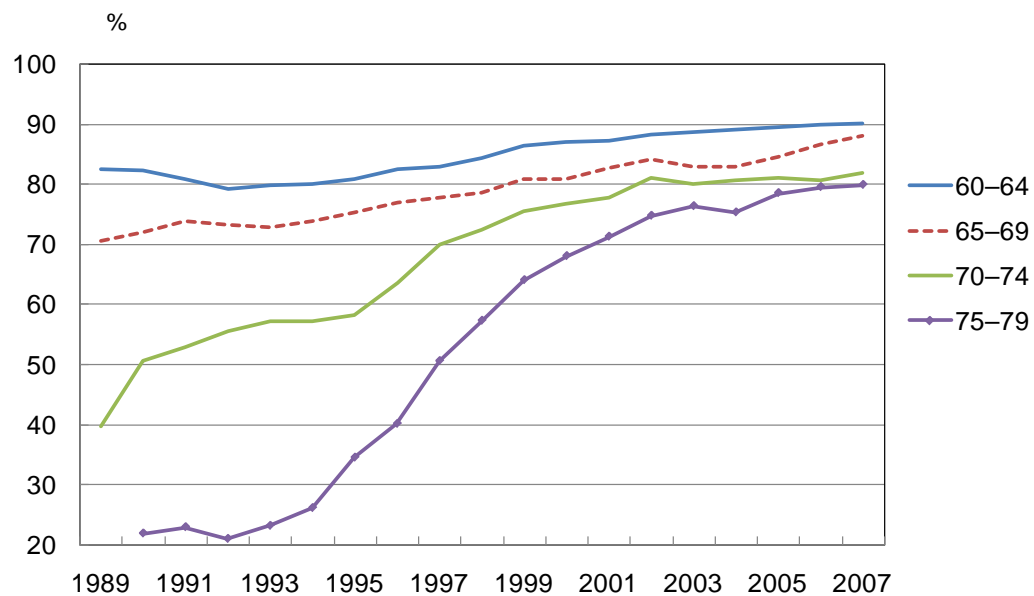
All these factors combined have contributed to the permanent impact of the depression, particularly on age groups starting their careers during that period. Charts 6 and 7 show that particularly those born in the 1970s, who were 20–25 years at the outset of the depression, remained outside the labour markets for extended periods more often than older age groups. The participation of females belonging to these age groups seems to have permanently lagged behind other age groups. Unlike other age groups, the participation rate of women born at the beginning of the 1970s has not increased at all after 2001.

Chart 6. Participation rates by cohorts 1989–2007, males



Source: Statistics Finland.

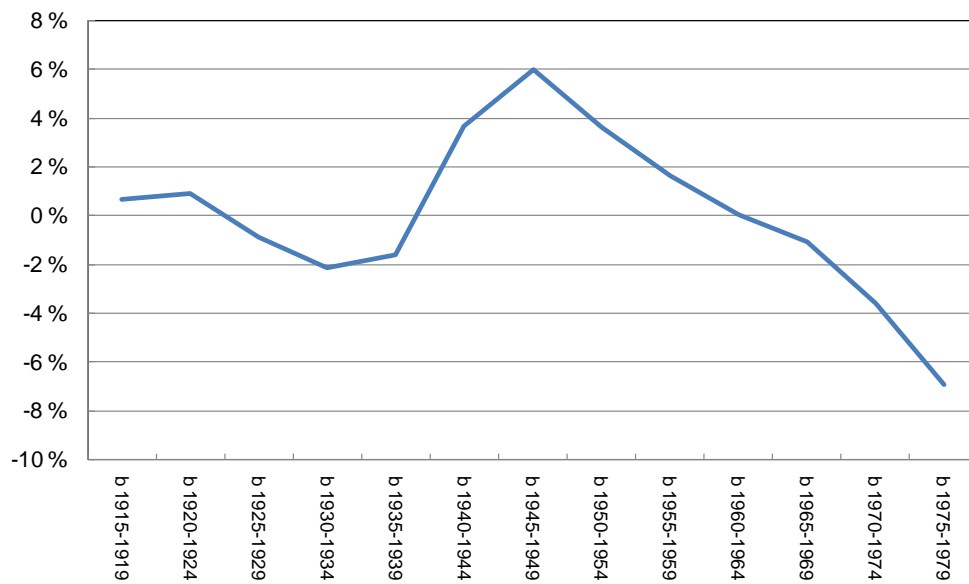
Chart 7. Participation rates by cohorts 1989–2007, females



Source: Statistics Finland.

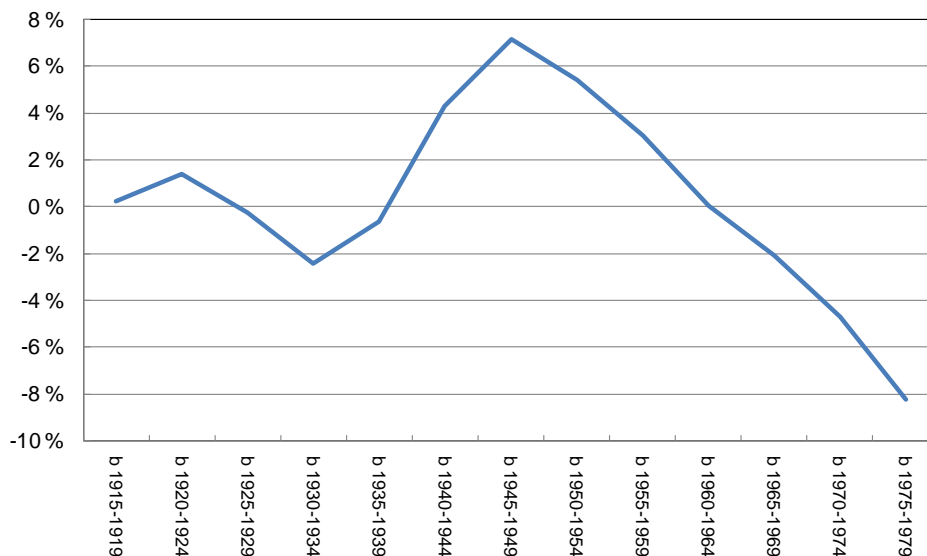
In the cohort-specific participation rate model, where age and birth year were used as controls in addition to the cyclical situation, birth year impact was negative for females born in 1965–1984 and males born in 1970–1984. This model and the estimation results are presented in Annex 2. The results mean that females born in 1965–1984 and males born in 1970–1984 engaged significantly less in working life than those born in 1940–1964 (Chart 8 and Chart 9).

Chart 8. Estimated cohort coefficients, males



Source: Bank of Finland calculations (Annex 2).

Chart 9. Estimated cohort coefficients, females



Source: Bank of Finland calculations (Annex 2).

All in all, the estimation results imply that the depression has had a permanent impact on the labour market position of those born in the 1970s. People born in that period are significantly more passive in their participation in working life in comparison with the previous generations.

Mechanically, it can be estimated what the impact would be if those now entering the labour markets would be excluded to a similar extent as the age groups beginning their careers during the depression years of the 1990s. To that end, the birth year impact was converted to numbers of persons, based on the assumption that today males aged 20–24 and females aged 20–29 would become passive in a similar way to young employees at the beginning of the 1990s (those born in 1965 were 28 years old in 1993 and those born in 1970 were 23 years old). Applied to the present situation, this would generate a permanent (exit of 17,000 people from the labour force. Furthermore, if one includes the age cohorts that were 15–19 years at the outset of the recession, the outcome is a permanent loss of 42,000 workers. Hence, at its most extensive, a deep economic recession could lead to a permanent reduction of labour force, the extent of which would correspond to about 2/3 of the age group now entering the labour markets. Even by the most conservative estimate,<sup>2</sup> a deep recession coinciding with entry into the labour markets may lead to the loss of a good quarter of the age group.

<sup>2</sup> It is possible that the impact estimated for cohorts born in the 1980s is biased since observations about the labour market behaviour of this age cohort only cover a relatively brief period.

## 4 Finally

Experience from the previous depression showed that participation rates decrease rapidly as economic growth recedes and the impact of a deep depression on the participation rate may be surprisingly longstanding. What makes the situation particularly difficult is that a rapid reduction in the participation rate would be more harmful to economic growth in the present situation than at the beginning of the 1990s. The labour force would diminish strongly in those years as the age structure also deteriorates the fastest.

It must be taken into account that the labour market reactions are a result not only of the economic depression but also the policy choices made as a consequence of the depression. For example the unemployment pension route, home care support and measures related to the consolidation of public finances were among the policy choices made at the beginning of the 1990s that contributed to the reduced supply of labour by certain groups.

Labour market problems were also protracted in the 1990s by the fact that when the economy recovered, growth was centred on industry, particularly information and technology sectors, where labour demand typically focuses on age groups whose participation rate is more rigid than average with respect to cyclical fluctuations. The demand for labour in the service sectors did not increase until the beginning of the 21<sup>st</sup> century as municipalities' financial position began to improve. Until then, municipalities had reduced their labour force and use of out-sourced services. This undermined the labour market position of educated females in particular for long periods of time.

The results do not identify which special factors related to the depression years are highlighted in the background of the responses. Nonetheless, lessons can be learned from the varied responses of different age groups when considering the scope and direction of stimulus policies. In addition to actual support targeted at production, particularly in support of industry and construction, there is an emphasis on the need to support the groups where the risk of exclusion is high, for various reasons.

Another important special group consists of those entering the labour market. If the economic situation becomes particularly weak, there is a risk that part of the age groups reaching working age in the coming years is lost from the labour markets. This also means a reduction of the return on education investment and an analogous long-term deterioration of growth potential. This is a topical concern, as the graduation reform encouraged university

students to graduate in the summer of 2008, which has boosted the number of recent graduates entering the labour markets to exceptionally high levels over the past year-half.

There are grounds to believe that responses in participation rates would probably not be as large today as at the beginning of the 1990s even if the recession turned out to be deep. The present pension policy in particular now supports participation in the labour markets completely differently from the 1990s. Furthermore, there are no structural changes in sight comparable to those in the 1990s. At that time, due to the collapse of trade with Finland's eastern neighbour, labour-intensive industrial activity disappeared and the adjustment need of public finances was exceptionally large. Furthermore, employment in construction had risen to unsustainably high levels in the wake of the house price bubble, and so the drop was very large. Although the present situation in construction has some similar characteristics to the 1990s, employment responses are respectively smaller because a large proportion of the increase of those employed in construction has come from abroad.

On the other hand, some decisions made in recent years may serve to reduce the supply of labour space with the deterioration of the cyclical situation. For example, student allowances were increased by 15% in 2008 and the support for private care increased by almost as much at the beginning of 2009. Home care support and child allowances were also increased by a few per cent at the beginning of 2009. Although these measures are justifiable in the context of weak employment, they also contribute to the risk of permanent exclusion from the labour market.

All in all, the review highlights the long-term impact of economic depressions on the labour market. The depression of the 1990s had an extensive and protracted impact on the size of the labour force. The impact varied by age group and gender. There is the risk that the participation rate will also decrease for extended periods due to the present recession, which in turn will reduce the growth potential of the economy. To prevent this from happening, economic policies aimed at increasing the supply of labour are warranted, despite the recession.

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(*In Finnish*).

Lounasmaa, J. (2003). Opintolainan nousu ja tuho (*In Finnish*).

[http://www.stat.fi/tup/tietoaika/tilaajat/ta\\_09\\_03\\_opintolaina.html](http://www.stat.fi/tup/tietoaika/tilaajat/ta_09_03_opintolaina.html): Statistics Finland.  
(*Available in Finnish*)

Maliranta, M. (2009). Työpaikka- ja työntekijävirrat ja tehtävärakenteiden dynamiikka Suomen yrityssektorilla, The Research Institute of the Finnish Economy, Discussion Papers No. 1177.

## Annex 1

The estimated model is:

$$tvo_{ijt} = \alpha_0 + \alpha_{ij} + \beta * bkt + d93 + d94 + d95 + d96 + d97 + d98 + d99 + d00 + \varepsilon_{ijt}$$

In the model,  $tvo_{ijt}$  is the participation rate for five-year age group  $i$ , gender  $j$ , at time  $t$ .  $\alpha_0$  is the constant term and  $\alpha_{ij}$  is the five-year-age-group- and gender-specific fixed impact. The variable 'bkt' describes the trend growth of GDP and d93–d00 are dummy variables for years 1993–2000.

Table 1. Estimation results

tvo	Coef.	Std. Err.	t	P> t	[95% Conf.Interval]	
bkt	40.7403	13.1436	3.10	0.002	14.94053	66.54006
d93	-2.505937	1.239076	-2.02	0.043	-4.938137	-.0737361
d94	-3.788899	1.185483	-3.20	0.001	-6.115901	-1.461897
d95	-4.038927	1.163984	-3.47	0.001	-6.323729	-1.754125
d96	-4.295366	1.167751	-3.68	0.000	-6.587562	-2.003169
d97	-4.907415	1.178631	-4.16	0.000	-7.220967	-2.593864
d98	-4.494093	1.181607	-3.80	0.000	-6.813488	-2.174697
d99	-3.046734	1.175788	-2.59	0.010	-5.354706	-.7387612
d00	-1.986192	1.168102	-1.70	0.089	-4.279077	.3066926
$\alpha_0$	66.11586	.4500442	146.91	0.000	65.23246	66.99926
Observations 836						
Groups 22						
Observations per group 38						
R-sq		0.0877				
F(9,805)		8.60				
Prob > F		0.0000				



## Annex 2

The estimated model is:

$$\begin{aligned} \text{tvo}_{it} = & \alpha_0 + \beta * \text{bkt} + \text{d93} + \text{d94} + \text{d95} + \text{d96} + \text{d97} + \text{d98} + \text{d99} + \text{d00} + \text{koh1519} + \text{koh2024} + \\ & \text{koh3539} + \text{koh3034} + \text{koh3539} + \text{koh4044} + \text{koh4549} + \text{koh5054} + \text{koh5559} + \text{koh6064} + \\ & \text{koh7074} + \text{koh7579} + \text{koh8084} + \text{ika1519} + \text{ika2024} + \text{ika2529} + \text{ika3034} + \text{ika3539} + \\ & \text{ika4549} + \text{ika5054} + \text{ika5559} + \text{ika6064} + \text{ika6575} + \varepsilon_{ijt} \end{aligned}$$

In the model,  $\text{tvo}_{it}$  is the participation rate for age group  $i$ , at time  $t$ .  $\alpha_0$  is the constant term and 'bkt' describes the trend growth of GDP and d93–d00 are dummy variables for years 1993–2000. 'Koh1519–koh8084' are dummy variables for five-year-birth cohorts. 'Ika1519–ika6576 are dummy variables for age groups. The model is estimated separately for women and men.

Table 1. Estimation results: women

Source	SS	df	MS	Number of obs = 1074		
Model	116.110559	33	3.5185018	F( 33, 1040) = 1120.54		
Residual	3.26559717	1040	.003139997	Prob > F = 0.0000		
				R-squared = 0.9726		
				Adj R-squared = 0.9718		
				Root MSE = .05604		
Total	119.376157	1073	.111254573			
tvo	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
bkt	.7709697	.1488471	5.18	0.000	.4788947	1.063045
koh1519	.0019017	.0191112	0.10	0.921	-.0355992	.0394026
koh2024	.0136945	.0137899	0.99	0.321	-.0133648	.0407538
koh2529	-.0027782	.0110218	-0.25	0.801	-.0244057	.0188494
koh3034	-.0243505	.0091675	-2.66	0.008	-.0423394	-.0063616
koh3539	-.006768	.0101424	-0.67	0.505	-.0266698	.0131338
koh4044	.0424657	.0078067	5.44	0.000	.0271469	.0577845
koh4549	.0712641	.0078083	9.13	0.000	.0559422	.086586
koh5054	.0540215	.0077593	6.96	0.000	.0387958	.0692472
koh5559	.0300886	.0076986	3.91	0.000	.0149821	.0451951
koh6569	-.0209757	.0088335	-2.37	0.018	-.0383092	-.0036423
koh7074	-.0471901	.0103603	-4.55	0.000	-.0675195	-.0268606
koh7579	-.0826771	.0122181	-6.77	0.000	-.106652	-.0587023
koh8084	-.0806817	.016404	-4.92	0.000	-.1128704	-.0484929
ika1519	-.434021	.0151503	-28.65	0.000	-.4637497	-.4042924
ika2024	-.1625726	.0129084	-12.59	0.000	-.187902	-.1372432
ika2529	-.0485165	.0109582	-4.43	0.000	-.0700192	-.0270138
ika3034	-.0349942	.0094574	-3.70	0.000	-.0535519	-.0164365
ika3539	-.008229	.0116409	-0.71	0.480	-.0310714	.0146134
ika4549	-.013341	.0083173	-1.60	0.109	-.0296616	.0029797
ika5054	-.0543965	.0085456	-6.37	0.000	-.071165	-.037628
ika5559	-.2351595	.0089956	-26.14	0.000	-.2528112	-.2175078
ika6064	-.6388276	.009824	-65.03	0.000	-.6581047	-.6195506
ika6569	-.8237505	.0109536	-75.20	0.000	-.8452442	-.8022567
ika7074	-.8442195	.0128947	-65.47	0.000	-.8695221	-.818917
d93	-.0228785	.0080113	-2.86	0.004	-.0385986	-.0071585
d94	-.0415075	.0077041	-5.39	0.000	-.0566248	-.0263902
d95	-.0467089	.0079267	-5.89	0.000	-.062263	-.0311548
d96	-.0524137	.0083879	-6.25	0.000	-.0688729	-.0359545
d97	-.0561743	.008779	-6.40	0.000	-.0734008	-.0389477
d98	-.0514196	.0088139	-5.83	0.000	-.0687147	-.0341246
d99	-.032821	.0085804	-3.83	0.000	-.0496579	-.0159841
d00	-.0216071	.0082891	-2.61	0.009	-.0378723	-.0053419
$\alpha_0$	.8601116	.0077078	111.59	0.000	.8449869	.8752363

Table 2. Estimation results: men

Source	SS	df	MS	Number of obs = 1074		
Model	121.080089	33	3.6690936	F( 33, 1040) = 1209.73		
Residual	3.15429459	1040	.003032976	Prob > F = 0.0000		
				R-squared = 0.9746		
				Adj R-squared = 0.9738		
Total	124.234384	1073	.115782277	Root MSE = .05507		

tvo	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
bkt	.6009118	.1462885	4.11	0.000	.3138575	.8879662
koh1519	.0062031	.0187827	0.33	0.741	-.0306532	.0430594
koh2024	.008656	.0135529	0.64	0.523	-.0179381	.0352501
koh2529	-.0088962	.0108324	-0.82	0.412	-.030152	.0123596
koh3034	-.0213422	.0090099	-2.37	0.018	-.0390218	-.0036626
koh3539	-.0160901	.009968	-1.61	0.107	-.0356498	.0034696
koh4044	.0361238	.0076726	4.71	0.000	.0210684	.0511793
koh4549	.0595057	.0076741	7.75	0.000	.0444472	.0745642
koh5054	.0357897	.0076259	4.69	0.000	.0208258	.0507537
koh5559	.0158679	.0075662	2.10	0.036	.001021	.0307147
koh6569	-.0109761	.0086816	-1.26	0.206	-.0280116	.0060594
koh7074	-.0360602	.0101822	-3.54	0.000	-.0560402	-.0160802
koh7579	-.0693078	.012008	-5.77	0.000	-.0928706	-.0457451
koh8084	-.0831614	.016122	-5.16	0.000	-.1147968	-.0515259
ika1519	-.5074201	.0148899	-34.08	0.000	-.5366377	-.4782024
ika2024	-.162167	.0126865	-12.78	0.000	-.1870609	-.137273
ika2529	.0233909	.0107698	2.17	0.030	.0022578	.044524
ika3034	.0471142	.0092948	5.07	0.000	.0288754	.0653529
ika3539	.040687	.0114408	3.56	0.000	.0182373	.0631367
ika4549	-.0381358	.0081743	-4.67	0.000	-.0541759	-.0220957
ika5054	-.0940173	.0083987	-11.19	0.000	-.1104975	-.077537
ika5559	-.2741812	.008841	-31.01	0.000	-.2915295	-.256833
ika6064	-.618783	.0096551	-64.09	0.000	-.6377287	-.5998374
ika6569	-.8118	.0107653	-75.41	0.000	-.8329243	-.7906757
ika7074	-.8521093	.012673	-67.24	0.000	-.876977	-.8272417
d93	-.0246603	.0078735	-3.13	0.002	-.0401102	-.0092105
d94	-.0375909	.0075716	-4.96	0.000	-.0524483	-.0227334
d95	-.0431483	.0077904	-5.54	0.000	-.0584351	-.0278616
d96	-.0483797	.0082438	-5.87	0.000	-.064556	-.0322034
d97	-.0492707	.0086281	-5.71	0.000	-.0662011	-.0323403
d98	-.0413178	.0086624	-4.77	0.000	-.0583155	-.02432
d99	-.0303686	.0084329	-3.60	0.000	-.0469161	-.0138211
d00	-.0174361	.0081466	-2.14	0.033	-.0334217	-.0014505
$\alpha_0$	.9042263	.0075753	119.36	0.000	.8893615	.919091