

APPENDIX

The value of flexible work for food delivery couriers

Study for Delivery Platforms Europe
November 2021

PART A

STYLISTED ANALYSIS OF ONE EFFICIENCY HARM CHANNEL AND ECOSYSTEM IMPACT

- **Summary: The stylised model shows that abandoning the flexible work model would harm the entire ecosystem**
- **An inflexible model would lead to inefficiencies in serving consumers' demand peaks**
- **An inflexible model would lead to higher costs, lower courier earnings, lost transactions and/or higher waiting time**
- **The inefficiencies of the inflexible employment model would harm consumers, platforms, restaurants and couriers**

Summary: The stylised model shows that abandoning the flexible work model would harm the entire ecosystem

Pre-determining in which hours couriers shall work under a fixed employment model, **platforms face a cost/quality trade-off** between meeting all demand while facing high courier idle time (thus higher cost for consumers and restaurants) or meeting less demand while decreasing courier idle time (thus lower service quality for consumers and restaurants).

We developed a stylised model based on industry facts to explore how a policy shift could impact consumers and restaurants. While this model does not capture the full range of effects (and may thus underestimate the effects), it **tests two scenarios where hours are pre-determined** by the platform or other employers of delivery staff. Both scenarios lead to **sub-optimal performance and demand-side effects resulting in negative outcomes for couriers, restaurants and consumers**.

Scenario A: Platforms / employers choose to serve the same level of consumer demand as currently achieved with the flexible model but at the cost of lower worker productivity. Employers will have to book more courier hours which increases the costs of the service. Thus, the per unit price for each delivery will increase. In turn, all else equal, price increases would lead to lower consumer demand – and thus lower demand for couriers' and restaurants' services. Thereby, the number of courier and restaurant workers and their earnings would be impacted.

Our high-level estimations suggest that in this scenario, assuming platforms/ employers set three-hour shifts, the sector would incur **additional cost of EUR 100m across Europe**. This cost increase would harm

the entire ecosystem:

- Consumers would face **higher delivery fees**. The yearly cost of food delivery for European consumers would increase by EUR 45m. In sectors with intense competition, cost shocks are passed through to customers and consumers¹. Since platform-based delivery is subject to intense competition at several layers (multiple delivery platforms, alternative platform business models, restaurants' own delivery, consumers' own pick-up, consumers eating out, supermarket ready-meals or self-cooking), we expect a high pass-through of costs. The remaining costs will be borne by restaurants, couriers and the platforms.
- Restaurants would also be harmed when some customers may choose not to order food due to higher delivery fees, resulting in fewer transactions.
- In addition, the lowering of average work productivity may likely lead to lower earnings per hour for couriers.

Scenario B: Platforms or other employers choose to keep the worker productivity stable but at the cost of reducing the ability to serve all the demand as currently achieved with the flexible model.

Our high-level estimations suggest that in this scenario, assuming platforms/ employers set three-hour shifts, (i) each year up to **19m transactions (orders) could be lost** in Europe and (ii) an additional 38m deliveries would be at stake given the longer waiting time.

- Restaurants would be harmed **as food deliveries worth almost EUR 360m could be lost**.

Additional orders may be lost when restaurant sell less via delivery platforms due to longer waiting times.

- Consumers would be harmed as their demand is not met entirely and longer waiting times are likely.
- Couriers would be harmed as fewer orders require fewer couriers. **Up to 13,000 currently active couriers would have to find alternative sources of income** to compensate for **total yearly lost courier earnings of EUR 160m**. Some of them may not find such alternatives, especially if other flexible work opportunities are affected by the policy shift.

Our initial stylised model demonstrates the harms at stake. However, the inefficiencies and associated harm may even be higher than our initial estimations suggest.

- Firstly, the inefficiencies would increase with the shift-length, e.g. more than five times in a five-hour shift scenario.
- Secondly, platforms or other employers of couriers cannot predict future demand with accuracy due to unexpected events. Whenever demand deviates from the employer's expected demand, mismatches between supply of couriers and demand for deliveries are likely, resulting in even higher inefficiencies.

Further research is welcome to identify any additional, long-run impacts, especially on consumer demand. Demand effects can depend on specific consumers and market factors which may vary even city by city.

1) [Passing-on Guidelines](#)

An inflexible model would lead to inefficiencies in serving consumers' demand peaks

While the flexible work model can cater for uncertain demand fluctuations, an inflexible model, where the number of couriers available is fixed over a certain number of hours, would make it more difficult for platforms to match demand peaks and to match unexpected demand.

Even if platforms could predict demand, an inflexible employment system with pre-determined hours would result in increased courier idle time and periods with unserved demand compared to the current flexible set-up, as we will show in the following.

Designing an employment model with pre-determined hours to match demand peaks, **platforms face a cost/quality trade-off** between meeting all demand while facing high courier idle time (thus higher cost for consumers and restaurants) or meeting less demand while decreasing courier idle time (thus lower service quality for consumers and restaurants), see figure to the right with two example scenarios. In other words, meeting the highest peak in demand requires platforms to employ many riders in set blocks of hours around that anticipated peak point, resulting in high courier idle time when demand is not at that peak. If platforms instead decide to employ fewer couriers to reduce the courier idle

time, they may not be able to meet all consumer demand.

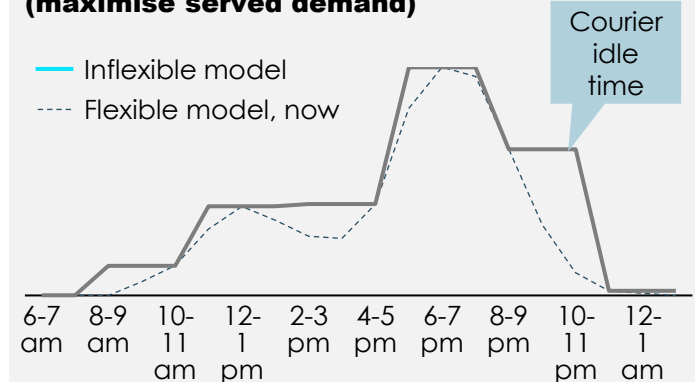
In any case, inefficiencies will arise as we analyse in our stylised model calculation assuming platforms hire couriers in predetermined three-hour shifts and can predict demand. The inefficiencies depend on whether the platforms choose to minimise courier idle time, unserved demand, or a mix between the two.

Since the four players (platforms, couriers, consumer and restaurants) of the food delivery ecosystem are intertwined, any inefficiencies created will affect the entire ecosystem. As we explain in the following, keeping up the same level of service (almost all demand served at short waiting time), the inefficiencies resulting from a policy shift will likely lead to higher costs for the platforms resulting in higher delivery fees for consumers and lower courier earnings. To avoid such cost increases, the platforms may decide to lower the level of service (amount of orders served and waiting time), which will result in lost orders to the harm of consumers, restaurants and couriers.

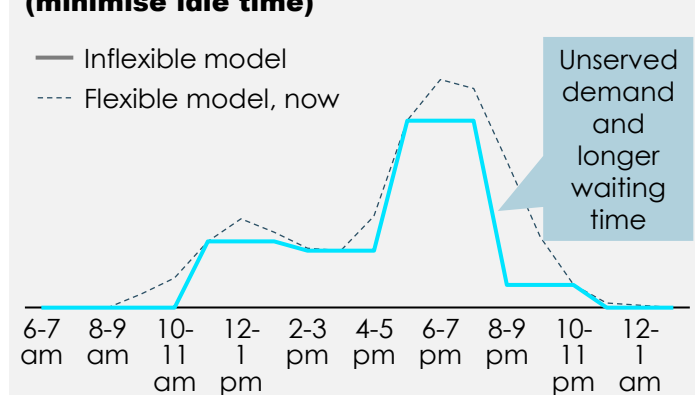
Couriers at work during an average day - Example of an inflexible model in predetermined three-hour shifts

Number of couriers working

Scenario A (maximise served demand)



Scenario B (minimise idle time)



Note: The illustrated scenarios assume couriers work in predefined shifts of three hours (e.g. before 8 am, 8 am-11 am, 11 am-2 pm, ... and 11 pm-2 am). The workday may be planned in different ways depending on regulation and companies' decision to meet demand in different times during the day.

Source: Copenhagen Economics based on company data.

An inflexible model would lead to higher costs, lower courier earnings, lost transactions and/or higher waiting time

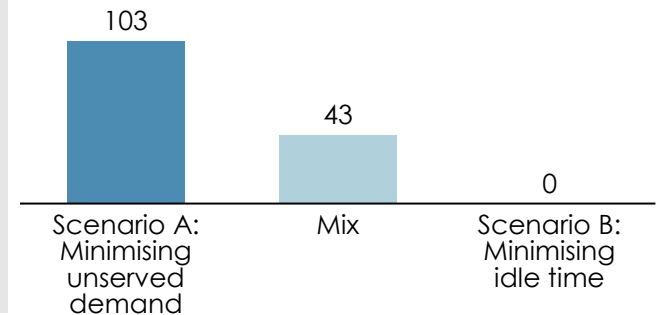
Inefficiencies resulting from a policy shift will increase platforms' costs resulting in higher delivery fees for consumers and lower courier earnings.

Assume platforms/employers choose to meet the same level of consumer demand as currently achieved with the flexible model (scenario A) but at the cost of lower worker productivity. Employers will have to book more courier hours which increases the costs of the service. Thus, the per unit price for each delivery will increase and our model estimations suggest that the **associated costs for the platforms in Europe could amount to EUR 100m**, see upper figure.

Platforms cannot fully absorb this cost increase while demand stays the same, as this would erode any company profits and eventually make the business go under. Parts of the cost increase will be passed on to consumers via **higher delivery fees**. In addition, some customers may not be able/willing to pay higher fees and choose not to order food, resulting in fewer orders for restaurants. Platforms may also **lower courier earnings** if they experience cost increases.

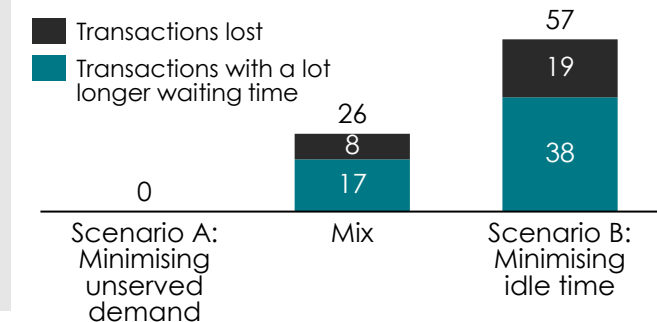
Increased cost of idle courier hours in an inflexible model with predetermined three-hour shifts

Million euro



Transactions with longer waiting time and transactions lost in an inflexible model with predetermined three-hour shifts

Transactions (million)



To avoid cost increases, platforms may lower the level of service (amount of orders served and waiting time), resulting in lost transactions to the harm of consumers, restaurants and couriers.

Instead, platforms / employers choose not to reduce worker productivity but at the cost of reducing the ability to serve all the demand as currently achieved with the flexible model (scenario B). Our high-level model calculations suggest that in this scenario each year up to **19m transactions** could be lost in Europe.

This will harm restaurants as **food deliveries worth almost EUR 360m will be lost**. In addition, also consumers will be harmed as fewer demand will be served. An additional **38m deliveries could experience longer waiting time** due to lack of couriers at demand peak times, see lower figure.

Fewer transactions also imply lower demand for courier hours. Around 13,000 couriers¹ in Europe could lose their delivery work, corresponding to **yearly lost courier earnings of EUR 160m**.

The inefficiencies of the inflexible model may even be more severe than our initial estimates suggest. Firstly, we have assumed three-hour shifts. However, the **size of the inefficiencies rapidly increases with shift-length**.¹ In a five-hour shift scenario, e.g., the presented inefficiencies and associated costs increase more than five times. Secondly, **platforms are unable to predict future demand with accuracy**. Whenever demand deviates from the platforms' expected demand, mismatches between supply of couriers and demand for deliveries are likely and the societal costs are even higher than our initial estimations suggest.

Note: Figures based on an inflexible model with minimum three-hour shifts with more efficient planning than illustrated in the figures on the previous slide – i.e. less kinks in the numbers of couriers working.

1) Estimation based on the share of transactions lost and the number of couriers today.

Source: Copenhagen Economics based on courier survey and company data.

The inefficiencies of the inflexible employment model would harm consumers, platforms, restaurants and couriers

The inefficiencies created by a shift from a flexible to an inflexible model would harm consumers, restaurants, couriers and delivery platforms, i.e., all parts of the food delivery ecosystem, as summarised below. Further research is welcome to identify any additional impacts, especially on demand. The specific effect on demand can depend on specific consumer and market factors which may vary even city by city. Some initial evidence from policy shifts via “natural experiments” is emerging (e.g. from Geneva and Spain¹), supporting our findings.

Consumers will pay more for a lower quality service

- The waiting time for food deliveries will increase for consumers. In addition, more than 19m transactions may not be served across Europe (assuming 3-hour predetermined shifts), creating inconvenience for the consumers of having to find alternatives.
- Platforms may pass-on idle time cost increases to consumers via higher delivery fees. The additional cost of food delivery for European consumers could increase up to EUR 45m (assuming 3-hour predetermined shifts)² per year. This will lower consumer surplus (measured as consumers' willingness-to-pay minus the price).
- As the quality of delivery decreases and/or the price increases, consumer surplus decreases.

Couriers have fewer opportunities and lower earnings

- Fewer transactions mean that fewer couriers are needed in which case current couriers would have to find alternative sources of income. In scenario B (minimising idle time), assuming 3-hour predetermined shifts, this will affect around 13,000 couriers in Europe and put EUR 160m of courier earnings at stake. However, in scenario A (maximising served demand), there would be a need for more courier hours supplied to cover the required hours.
- In addition, less productive work may also lower the couriers' earnings even for the same number of hours per person.
- In addition, couriers would be harmed by losing the opportunity to work flexibly, as described on slides 22-24 in the main study.

Restaurants will sell less via delivery platforms

- Since more than 19m transactions may not be served across Europe, restaurants will also be harmed and food deliveries worth almost EUR 360m may be lost. However, some lost transaction may be compensated, e.g., by consumers picking up orders themselves.
- An additional number of orders may be lost since the restaurant may sell less via delivery platforms when the quality of service decreases and the delivery price increases.

Food delivery platforms lose business and have additional cost

- Delivery platforms will lose transactions and experience additional wage costs due to idle couriers, resulting in a less profitable business.
- Fewer transactions would result in lower revenue for the delivery platforms, and the additional wage costs of idle couriers would have to some extent be financed by lower company profits.³

1) See for example [Uber \(2020\)](#) and [Wired \(2021\)](#). 2) Considering a model with 5-hour predetermined shifts, additional spending on delivery fees may even amount to EUR 250m. Based on scenario A and given an idle courier cost pass-on rate as found in (confidential) Geneva Case Study (see [Uber \(2020\)](#)). 3) Delivery platforms cannot keep lowering their profits. At some point, the cost cannot be absorbed by lower profits.

PART B

METHODOLOGY DESCRIPTION

Data sources

Survey

We have conducted a survey (via SurveyMonkey) in August 2021 which was distributed to couriers working with Bolt, Deliveroo, Delivery Hero, Uber, and Wolt in Norway and all EU countries except for Bulgaria, Denmark, Germany, and Luxembourg. The survey was not run in those countries as the companies are either not active there or could not send out the survey for administrative reasons.

The survey has been translated to several languages: Czech, Dutch, French, German, Greek, Hungarian, Italian, Polish, Portuguese and Spanish. We have cleaned the survey results for outliers, e.g., average weekly earning above EUR 1,000. Of all respondents, 16,461 are working in the countries of scope and have completed all questions of the survey – they form the basis for our survey analysis. In each country, we had between 169 and 4582 respondents, except for Spain with 83 and Cyprus with 98 respondents.

We weighed the results of the survey in each country with the respective size of the market in each country based on market size data from Statista – Digital Markets.¹

Company data

We have received comprehensive data from Bolt, Deliveroo, Delivery Hero, Uber and Wolt for 2020

- on number of active couriers, hours worked, remuneration, number of deliveries, delivery value etc.
- covering all EU countries except for Bulgaria and Luxembourg (for these countries, we have used extrapolated data based on the other countries) and Norway

The provided data only covers the own operations of the five delivery platforms and not the whole market in each country, as in many countries other delivery operators are active.

Therefore, we have scaled the numbers in each country to cover the whole market using the following methodology **for each country**:

1. Summing up the information provided by the five companies
2. Using the market share of the five companies in each country¹ to scale the numbers to the whole market (unless the combined market share is below 10 per cent – see point 3)
3. For countries where the combined market share is below 10 per cent: scaling by market size¹ (to avoid the risk of overestimating the results, as market shares are uncertain)
4. Summing the numbers to European level covering the EU and Norway (no country specific results are used).

1) Statista – Digital Markets, Platform-to-Consumer Delivery

Number of active couriers per week

Approach

For the number of couriers working with food delivery companies in a given week, we use company data. We scale the reported company numbers to overall market numbers using the market shares of the respective companies. To avoid double-counting of couriers working for several platforms, we take into account the share of couriers working for multiple platforms from the courier survey.

$$\text{Number of active couriers} = \text{company reported number of couriers} * \text{market share of respective company} * \text{share of couriers that only work with one delivery platform}$$

Data source

Total number of couriers

Company data: Average number of couriers logged in on the app per week

Market shares

[Statista – Digital Markets, Platform-to-Consumer Delivery](#) see Appendix slide 8.

Share of couriers that only work with one delivery platform

Courier survey question

Resulting number of couriers that only work with one platform

We find that 375,000 active couriers per week partner with food delivery platforms.

Hours on task

Approach

We asked couriers in the survey how many hours they are on average logged into the app(s) per week. We also asked couriers how much of this time they are not actually conducting a delivery task, i.e. how much “idle time” they have. To arrive at the average weekly hours couriers work on tasks, we subtract the reported idle time from the reported weekly hours logged into the app(s).

$$\text{Average weekly hours on task} = \text{average weekly hours logged into the app(s)} * (1 - \text{average percentage idle time})$$

	Courier survey data	"Company data (quality check)"
	Courier survey: Weekly hours logged into the app(s)	Company data: Number of hours worked per week (in total across all couriers)
	Courier survey: Share of idle time in courier work	Company data: Average number of couriers logged in on the app per week
Resulting average weekly hours on task	The resulting average weekly hours on tasks amounts to 23 hours.	From the company data, we find, after weighing the data (see Appendix slide 8) that couriers work on average 17 hours per week on task. This does not include additional hours from multi-apping.

Income earned

Approach

We have gathered information on income and hours worked in our courier survey and based on company data. Since remuneration setups are different across companies and countries, we use the self-reported average weekly incomes from our courier survey to ensure consistency across couriers working for different companies and in different countries. We scale average weekly incomes to average monthly earnings.

We use the company data as a quality check of incomes and hours worked in each country. Any difference in the information based on the two sources can be explained by various factors, e.g. respondents likely overestimate hours logged in to the apps and idle time but underestimate income, also some couriers work for multiple delivery platforms. By using the survey data, we are taking the conservative approach as the self-reported weekly incomes are lower than incomes calculated based on the company data and we thus underestimate lost earnings from a policy shift.

	Courier survey data	Company data (quality check)
Income earned	Courier survey: Income earned including tips in the last three months (in 2021)	Information provided by the firms: income earned (including and excluding tips) in 2020
Hours worked	Courier survey: Number of hours logged into the apps and ready to receive a task.	Information provided by the firms: Number of hours worked per week (in total across all couriers)
Resulting average monthly earnings	From the survey, we find that couriers in Europe on average have an income of 236 EUR per week, amounting to EUR 1,025 per month.	From the company data, we find that couriers in Europe earn on average EUR 277 per week, amounting to EUR 1,208 per month in 2020.

Minimum wage benchmark

Purpose	Result
<p>We find based on our survey that couriers' gross earnings from work with food delivery platforms are on average EUR 1,025 per month. However, cost of living and average earnings differ across European countries. In the EU in 2018, the highest national median gross hourly earnings were 11 times as high as the lowest.¹ Similarly, we also find that couriers' gross earnings vary across countries.</p> <p>To put the couriers' gross earnings into perspective, we create a benchmark based on minimum wages across EU countries (which vary considerably).</p>	<p>The resulting minimum wage benchmark for Europe is EUR 8,76 per hour. For a 23-hour work week, the European minimum wage benchmark amounts to EUR 875 earnings per month.</p> <p>For a 23-hour work week, the European minimum wage benchmark amounts to EUR 875 earnings per month.</p> <ul style="list-style-type: none">• This is calculated as follows: EUR 8.76 * number of weeks per month (365/7/12) * 23 weekly hours
Approach	Caveat
<p>For countries that have minimum wage legislation, we use minimum wages as reported by Eurostat.² For Austria, Finland, Italy, Norway and Sweden, we use minimum wages based on collective agreements of deliverers as reported by Eurofound as an approximation.³</p> <p>To calculate an average minimum wage benchmark, we weigh the country specific information with the respective size of the delivery market in each country based on market size data from Statista – Digital Markets.⁴ We thereby apply the same weight than used in calculating the average monthly gross earnings by the couriers based on country-specific survey results. This allows for better comparison between couriers' gross earnings and the minimum wage benchmark.</p>	<p>While we acknowledge that couriers' average monthly gross earnings across Europe are above the calculated European minimum wage benchmark, the two measure are not directly comparable.</p> <p>Couriers' earnings are gross earnings and for example do not consider any costs borne by couriers - even if entry costs (e.g. bicycle, smart phone) in many cases may be low. In addition, minimum wages may include social benefits in some countries. Also, income taxation may differ when comparing earnings from employment at minimum wages and earnings from self-employment.</p>

1) Eurostat, [Minimum Wage Statistics](#) 2) Eurostat, [Minimum Wage Statistics](#) / 3) Eurofound, [Minimum wages in low-paid sectoral collective agreements](#)/ 4) Statista – [Digital Markets, Platform-to-Consumer Delivery](#)

Number of couriers discouraged from working as a delivery person

Approach

We found that 375,000 active couriers partner with delivery platforms weekly (Appendix slide 9). Based on survey results, we calculate

- how many of those couriers would not be able to work as couriers if couriers had to work at predetermined hours & how many of those couriers would not seek alternative employment and be discouraged from work, see upper table
- how this affects aggregate couriers' earnings, see next slide

Calculation of number of couriers who would stop working as a courier and be discouraged from the work force

If couriers had to work at predetermined hours ...	Share of couriers who fall in each category	Number of couriers in each category (375,000 * share)	Total	Number of couriers who would not seek alternative employment (0.14* number of couriers)	Total
couriers that would be able to commit no hours (lower bound scenario)	0.26	97,500	97,500	13,650	13,650
couriers that would be able to commit less hours compared to the status quo (additional step)	0.15	56,250	153,750	7,875	21,525
couriers that would be able to commit the same hours compared to the status quo (medium scenario when added to two steps above) ¹	0.3	112,500	266,250	15,750	37,275
Source	Survey result	own calculation	own calculation	own calculation based on survey result (i.e., 14 per cent of couriers would do nothing else or be unemployed without courier work)	own calculation

Additionally, we also consider that policy initiatives may curtail flexible work in other sectors (which couriers may seek if they could not work with delivery platforms). Based on our survey results, we calculate how many couriers would not be able to commit any hours if couriers had to work at predetermined hours & how many of those couriers would seek other flexible work, see lower table.

Calculation of number of couriers who could be affected if a policy shift would also apply to other sectors with flexible work

If couriers had to work at predetermined hours ...	Share of couriers who fall in each category	Number of couriers in each category (375,000 * share)	Total	Number of couriers who would seek alternative flexible employment (0.44* number of couriers)	Total
couriers that would be able to commit no hours (upper bound scenario when added to medium scenario)	0.26	97,500	97,500	42,900	80,175 (rounded down to 75,000)
Source	Survey result	own calculation	own calculation	own calculation based on survey result (i.e., 44 per cent of couriers would seek other flexible work if courier work was not a possibility)	own calculation

¹) Some of the couriers that report that they could work the same number of hours than currently logged into the apps may also lose some courier work if the fixed employment model would require them to work more hours than they are currently logged into the app or if the working times set by their future employers are not convenient/feasible for the couriers.

Lost earnings associated with being discouraged from working as a delivery person

Approach

We have described on the previous slide how many couriers could be discouraged from the workforce due to a policy shift. Now, we calculate how this affects aggregate couriers' earnings, see table below.

Calculation of lost earnings (if a policy shift would apply to the delivery sector)

If couriers had to work at predetermined hours ...	Number of couriers in each scenario	Aggregated lost earnings monthly	Aggregated lost earnings yearly
Lower bound scenario: Only those couriers who report being unable to commit any hours are considered at risk of reducing labour supply and earnings	13,650	EUR 14m = 13,650 * EUR 1,025	EUR 168m
Additional step: Couriers in the lower bound scenario + couriers who report being able to commit less hours (for the latter, we assume only half couriers' earnings in this group are at stake to be conservative)	7,875	EUR 18m = 14m + 7875 * EUR 1,025/2	EUR 216m
Medium scenario: Couriers in above two steps + couriers who report being able to commit the same hours (for the latter, we assume only half couriers' earnings in this group are at stake to be conservative) ¹	15,750	EUR 26m = 18m + 15750 * 1,025/2	EUR 312m
Source	Own calculation	Own calculation based on survey result (i.e. average monthly earnings of EUR 1,025)	Own calculation

Additionally, we have also calculated on the previous slide how many couriers, who would not be able to work as couriers if couriers had to work at predetermined hours, would seek alternative flexible employment. If policy initiatives would apply also to other sectors with flexible work, these couriers may not be able to access any flexible work. Now, we calculate how this affects aggregate couriers' earnings, see table below.

Calculation of lost earning if policy initiatives would also curtail flexible work in other sectors

If couriers had to work at predetermined hours ...	Number of couriers in this scenario	Aggregated lost earnings monthly	Aggregated lost earnings yearly	Total
Upper bound scenario (when added to medium scenario): Couriers who would not be able to work as a delivery person at pre-determined hours and would seek other flexible work instead	42,900	EUR 44m = 42,900 * EUR 1,025	EUR 530m	EUR 842m
Source	Own calculation	Own calculation based on survey result (i.e. average monthly earnings of EUR 1,025)	Own calculation	Own calculation

¹) We also consider those couriers that could commit the same number of hours because when answering the survey, couriers did not yet know the actual shifts pattern and the working times set by their future employers may not be convenient/feasible for the couriers. Furthermore, the fixed employment model may require them to work more hours than currently. However, when calculating earnings at stake, we only consider half of this group to be conservative.

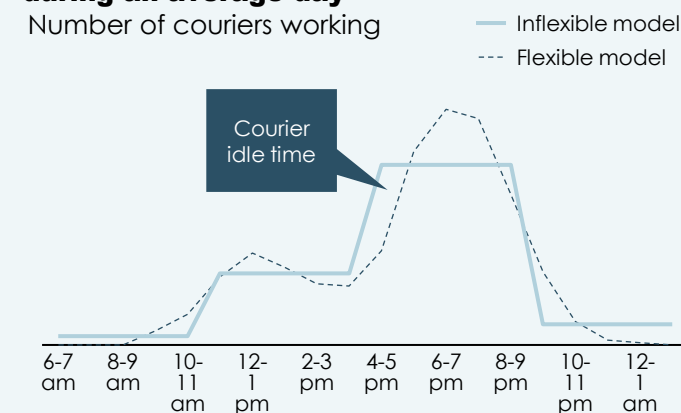
Increased costs from an increase in the courier idle time

Approach

We use the daily average supply of couriers (indexed) based on company data to calculate how an inflexible model with predetermined hours increases the number of idle courier hours working in times they are not currently working, as illustrated in figure to the right. We do this for the three scenarios (A, B, and Mix), as specified in Appendix part A, and for different shift lengths (2, 3, 4, and 5-hour shifts), assuming a fixed hourly wage in each country.

For the inflexible scenarios, we optimise the planning of the shifts to lower the idle time, while still being coherent with the shift length. This is to consider the likely actions that the employer would take in an inflexible scenario. This means that the modelled inflexible scenarios are less “angled” than illustrated to the right.

Illustrative example of couriers at work during an average day



$$\text{Increased wage cost of idle workers} = \frac{\sum_{\text{Hours } 0-1}^{\text{Hours } 23-24} \text{Max}(0; \text{Inflex hours} - \text{Flex hours})}{\text{Total number of hours in a day}} * \text{Total wages earned}$$

	Courier work distribution now	Inflexible courier work distribution	Total wages earned
Data source	Company data	Own assumption of inflexible work	Courier survey ¹

1) Courier survey data used to ensure consistency across countries and companies and to be conservative.

Loss in transactions from fewer couriers at peak times

Approach

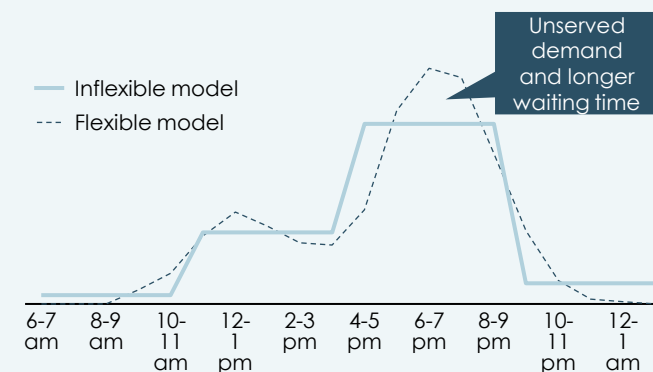
We consider the three scenarios (A, B, and Mix), as specified in Appendix part A, and different shift lengths (2, 3, 4, and 5-hour shifts) and follow four calculation steps:

1. We estimate how many fewer couriers are available during peak hours of an average day as a share of those available during peak time today (see illustration to the right)
2. We estimate how much demand is affected in these periods, where fewer couriers are available.
3. From 1, we can find an average waiting time increase using a parameter estimate from the literature.¹
4. From 2 and 3, we can find the transactions lost using a parameter estimate from the literature.

Subtracting 4 from 2, gives the number of remaining transactions that could experience longer waiting time.

Illustrative example of couriers at work during an average day

Number of couriers working



1. Share of couriers not available during peak times = $\frac{\sum_{\text{Hours } 0-1}^{\text{Hours } 23-24} \text{Max}(0; \text{Flex hours} - \text{Inflex hours})}{\sum_{\text{Hours } 0-1}^{\text{Hours } 23-24} \text{Flex hours in peak demand times}}$
2. Transactions affected = $\sum_{\text{Hours } 0-1}^{\text{Hours } 23-24} \text{Transactions in peak demand hours}$
3. Average change in waiting time for affected transactions = $\lambda * \text{Share of couriers not available during peak times}$
4. Transactions lost = $\Gamma * \text{Average change in waiting time for affected transactions} * \text{transactions affected}$

λ = Relationship between number of couriers and waiting time (elasticity)
 Γ = Relation between waiting time and transactions (elasticity)

Number of deliveries
 Number of couriers in high demand times

Data source

Uber (2020): Geneva Case Study

Company data and own model of supply of workers

¹) Has been calculated based on numbers presented in the confidential Geneva case study, see Uber (2020) [Independent couriers' reaction to employee reclassification: learnings from Geneva](#)

References



Adigital (2019, 2020)	La contribución económica de las plataformas de delivery en españa & Importancia económica de las plataformas digitales de delivery y perfil de los repartidores en España
Capital Economics (2020)	The value of delivery services in the United Kingdom
Cramer & Krueger (2016)	Disruptive change in the taxi business: the case of Uber, American Economic Review, Vol. 106.
Deloitte (2019)	Delivering growth: The impact of third party platform ordering on restaurants
Eurostat (2021)	Wages and Labour cost & Minimum Wage Statistics
Eurofound (2020)	Minimum wages in low-paid sectoral collective agreements
European Commission	Passing-on Guidelines
Katsnelson & Oberholzer-Gee (2021)	Being the Boss: Gig Workers' Value of Flexible Work, Harvard Business School, Working paper
OECD (2019)	Gig Economy Platforms: Boon or Bane?
Statista (2021)	Digital Markets, Platform-to-Consumer Delivery
Start Magazine (2021)	Tutti i riders sono a favore dell'assunzione?
Uber (2020)	Independent couriers' reaction to employee reclassification: learnings from Geneva
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